



**ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT FOR 2018
Coal Combustion Residual Rule Groundwater Monitoring System Compliance
Four Corners Power Plant
Fruitland, New Mexico**

Submitted to:

Arizona Public Service

Submitted by:

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LIST OF ACRONYMS AND ABBREVIATIONS

§	Section
ACI	American Concrete Institute
AECOM	AECOM Technical Services, Inc.
Annual Report	Annual Groundwater Monitoring and Corrective Action Report
Amec Foster Wheeler	Amec Foster Wheeler, Environment & Infrastructure, Inc.
AMSL	above mean sea level
APS	Arizona Public Service
BTV(s)	Background Threshold Value(s)
CCR	coal combustion residuals
CCR units	CCR landfills and surface impoundments
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
CWTP	Combined Waste Treatment Pond
DFADA	Dry Fly Ash Disposal Area
F CPP	Four Corners Power Plant
ft	foot, feet
GWPS(s)	Groundwater Protection Standard(s)
LAI	Lined Ash Impoundment
LDWP	Lined Decant Water Pond
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
Multiunit 1	CCR multiunit comprised of the LAI and LDWP
SAP	Sampling and Analysis Plan
SSI(s)	statistically significant increase(s)
SSL(s)	statistically significant level(s)
TestAmerica	TestAmerica Laboratories, Inc.
URS	Upper Retention Sump
USEPA	United States Environmental Protection Agency
Wood	Wood Environment & Infrastructure Solutions, Inc.

1.0 INTRODUCTION

This *Annual Groundwater Monitoring and Corrective Action Report* for 2018 (Annual Report) was prepared on behalf of Arizona Public Service (APS) by Wood Environment & Infrastructure Solutions, Inc. (Wood) for the Four Corners Power Plant (FCPP) located in Fruitland, New Mexico. The Annual Report summarizes groundwater monitoring and corrective action data collected to support compliance with coal combustion residuals (CCR) groundwater monitoring requirements detailed in 40 Code of Federal Regulations (CFR) Sections (§) 257.90 through 257.98 (herein referred to as the CCR Rule) (Federal Register, 2018).

The CCR Rule became effective on October 19, 2015 and established standards for the disposal of CCR in landfills and surface impoundments (CCR units). In particular, the CCR Rule set forth groundwater monitoring and corrective action requirements for CCR units. The CCR Rule includes the requirement that an “annual groundwater monitoring and corrective action report” be prepared by January 31 for the preceding calendar year (the reporting period). This Annual Report prepared for the 2018 calendar year is intended to document the status of the groundwater monitoring and corrective action programs for each CCR unit, summarize key actions completed, and forecast key activities for 2019.

The remainder of this section (Section 1.0) provides a summary description of the power generating facility, the CCR units present at the facility, and the facility’s environmental setting which forms the basis for assessment of underlying groundwater conditions. Sections 2.0 and 3.0 present groundwater monitoring and corrective action activities performed during the reporting period, respectively. Key activities identified for the upcoming year are presented in Section 4.0. Section 5.0 presents report references.

1.1 Site Background

1.1.1 Facility and CCR Unit Description

Facility Description. FCPP is an operating power plant owned by APS and four other utilities. The plant burns low sulfur coal in two electrical generating units (Units 4 and 5) and has a net generating capacity of 1,540 megawatts. FCPP formerly had five generating units and a capacity of 2,040 megawatts; Units 1, 2, and 3 were retired in December 2013 and decommissioned between 2014 and 2016. Coal burned at the plant is generally sourced from the nearby Navajo Mine (Navajo Transitional Energy Company, 2016).

Facility Location. The plant and associated infrastructure are located approximately 20 miles southwest of the city of Farmington, in the Colorado Plateau physiographic province of northwestern New Mexico (Figure 1-1). The land on which the plant resides is leased from the Navajo Nation and is primarily located in Section 36, Township 29 North, and Range 16 West.

CCR Unit Description. Plant infrastructure includes three single CCR units and one CCR multiunit (referred to as Multiunit 1) which are located in the main plant area and to the west of the plant within the FCPP lease boundary (also known as the disposal area), respectively (Figure 1-2). Table 1-1 summarizes the location, function, operation, size/construction, and history of each unit. The boundaries of CCR units depicted in Figure 1-2 are based on available historical plans for the units.

1.1.2 Environmental Setting

Unless otherwise noted, the following information is abstracted from AECOM Technical Services, Inc. (AECOM), 2017.

Climate. The plant is located in a semi-arid climate on the western flank of the San Juan Basin. The area receives an average of 8.6 inches of precipitation and 12.6 inches of snow per year.

Topography. The main plant area of the FCPP is located at an elevation of approximately 5,340 to 5,360 feet (ft) above mean sea level (AMSL). The topography of the FCPP area is characterized by rolling terrain, steep escarpments, and incised drainages/arroyos. In the vicinity of the plant, the ground surface is relatively flat, sloping to the west at approximately 20 ft per mile; however, surface drainage immediately near Morgan Lake flows towards the lake. About one mile west of the plant, the level ground surface drops rapidly to 5,200 ft AMSL. Chaco Wash (a.k.a. Chaco River) is located west of this abrupt change in elevation and ephemerally flows north to the San Juan River.

Surface Water Hydrology. FCPP is situated on the southern bank of Morgan Lake, an approximately 1,300-acre man-made lake that has a maximum storage capacity of 39,000 acre-ft of water and supplies cooling water to the plant. Morgan Lake was formed by damming a westerly flowing stream (now known as 'No Name Wash') and is replenished by an underground pipeline (i.e., aqueduct) that routes flow from the San Juan River located approximately 3 miles north of the FCPP. The typical water surface elevation of the lake is 5,330 ft AMSL. Morgan Dam discharges to 'No Name Wash' which flows west of the lake to Chaco Wash.

Site Geology. The San Juan Basin is a structural depression that lies at the eastern edge of the Colorado Plateau (Dames & Moore, 1988). The dominant geographic feature in the vicinity of FCPP is the Hogback Monocline located to the west of the plant; this monocline is a steep (38 degree) eastward-dipping flank composed of Cretaceous sedimentary rock (Dames & Moore, 1988).

There are two 'uppermost geologic units' that underlie the FCPP site and immediate vicinity. These units are expected to influence groundwater flow and result in variations in naturally occurring constituent concentrations across the site. The units are as follows:

- **Pictured Cliffs Sandstone:** The Pictured Cliffs Sandstone is the uppermost geologic unit beneath the plant and the CCR units located in this vicinity (i.e., the Upper Retention Sump [URS] and the Combined Waste Treatment Pond [CWTP] as depicted in Figure 1-2). This unit is a fine- to medium-grained marine sandstone. The lower portions of the Pictured Cliffs Sandstone represent a transitional sequence between this formation and the underlying Lewis Shale as indicated by alternating thin beds of very fine-grained sandstone and silty shale. The Pictured Cliffs Sandstone forms a capstone on an exposed cliff face located between the plant site and the CCR units located to the west (i.e., the Lined Ash Impoundment [LAI], Lined Decant Water Pond [LDWP] and the Dry Fly Ash Disposal Area [DFADA]).
- **Lewis Shale:** The Lewis Shale is a marine shale that contains evaporite deposits resulting in naturally occurring saline groundwater conditions. The Lewis Shale is the uppermost geologic unit that underlies the LAI, LDWP, and DFADA and spans west of the Pictured Cliffs Sandstone cliff face approximately 1.5 miles westward to the base of the Hogback Monocline. The regional thickness of the Lewis Shale is approximately 500 ft and is underlain by Cliff House Sandstone. The Lewis Shale consists of a weathered shale subunit overlying a hard, unweathered shale subunit. The thickness of the weathered shale varies between 11 and 47 ft with an average thickness of 30 ft within the vicinity of the site (Dames & Moore, 1988). The weathered shale is not as thick when overlain by Pictured Cliffs Sandstone in the vicinity of the plant site. This subunit contains thin sandstone lenses that vary in thickness from 1 to 7 ft; the sandstone is fine to very fine-grained and cemented by calcium carbonate (Dames & Moore, 1988). The unweathered shale is significantly less permeable than the weathered shale. The unweathered shale is very fine-grained to silty, and contains periodic

siltstone and sandstone lenses (Dames & Moore, 1988). The surface of the unweathered shale slopes towards the Chaco Wash at approximately the same slope as land surface (Dames & Moore, 1988) but displays some irregularity resulting in varying levels of saturated thickness in the weathered shale. The Lewis Shale is variably saturated and hydraulically interconnected with alluvial deposits of Chaco Wash. The low-permeability unweathered shale underlying the Pictured Cliffs Sandstone results in a perched saturated zone beneath the plant.

Applicable Hydrostratigraphy. Three general hydrostratigraphic units are conceptualized beneath the FCPP and associated CCR units. These units form the basis for the Conceptual Site Model (CSM) developed by AECOM (2017) for the purpose of designing the site CCR groundwater monitoring system and establish the working basis for statistically evaluating groundwater conditions underlying the site.

The first hydrostratigraphic unit (Pictured Cliffs Sandstone) is dominant only under the plant area, which is located in an elevated area south of Morgan Lake (Figure 1-2). Two CCR units (i.e., the URS and CWTP) reside within this area. The Pictured Cliffs Sandstone is the uppermost water bearing unit for the plant area and extends from ground surface (between approximately 5,340 to 5,360 ft AMSL) to approximately 5,300 ft AMSL in the plant area. Groundwater in this area is strongly influenced by Morgan Lake (at a surface elevation of approximately 5,330 ft AMSL) and generally flows northward towards the lake. However, construction and operations of the plant have resulted in disturbed ground conditions and associated impacts are not well understood.

The second hydrostratigraphic unit (Weathered Lewis Shale/Alluvium) underlies the Pictured Cliffs Sandstone in the plant area and the Multiunit 1/DFADA CCR units in the disposal area, approximately 1 mile west of the plant (Figure 1-2). The Weathered Lewis Shale and the hydraulically connected alluvial deposits along Chaco Wash are designated as the uppermost water bearing unit in the disposal area. Although the Lewis Shale is geologically continuous in this area, it is unsaturated in the vicinity of the DFADA. The water table in the Weathered Lewis Shale can exhibit local seasonal fluctuations that are attributed to interactions between rates of groundwater recharge and discharge (Dames & Moore, 1988) from/to Morgan Lake, historical unlined ponds, and Chaco Wash. Groundwater flow generally follows the surface topography and descends to the west-southwest in the disposal area, mainly in the weathered shale and in local alluvial channels that drain toward the Chaco Wash (APS, 2013).

The third hydrostratigraphic unit (Unweathered Lewis Shale) consists of the Unweathered Lewis Shale and is a regionally extensive confining unit that forms the base of the uppermost aquifers in the plant and disposal areas.

1.2 CCR Groundwater Monitoring System

Multiple monitoring wells are in place at FCPP to monitor groundwater conditions beneath the four site CCR units and support ongoing assessment of impacts from potential leakage. Table 1-2 identifies each well with associated CCR unit information, the date of well installation, and summary well construction details. Figure 1-2 presents a map with well locations.

Installation of the FCPP CCR groundwater monitoring system is summarized in the *CCR Monitoring Well Network Report and Certification* and is identified as compliant with 40 CFR §257.91(a) through (e) (AECOM, 2017). Per the CCR Rule, site monitoring systems are required to evaluate groundwater quality that is representative of background (i.e., groundwater that has not been affected by leakage from a CCR unit) and groundwater passing the downgradient boundary of each CCR unit, in the uppermost water bearing hydrostratigraphic unit underlying the CCR unit.

1.2.1 Monitoring System Description

Background Groundwater Monitoring Wells. Background water quality at the site can be established by a single monitoring well or a group of monitoring wells. If a group of monitoring wells is used, these wells should be screened within the same lithologic unit, exhibit similar groundwater chemistry, illustrate similar statistical merits, and be supported by the CSM. The grouping and adequacy of background wells identified for FCPP to assess background water quality are assumed adequate until proven otherwise.

Per the *CCR Monitoring Well Network Report and Certification*, the following monitoring wells are designated as "background monitoring wells" for the respective geologic and hydrostratigraphic conditions underlying the FCPP (AECOM, 2017):

- Background Wells for the Pictured Cliffs Sandstone: Three wells (MW-71, MW-72, and MW-73) were installed to assess background groundwater quality for both the URS and the CWTP overlying the Pictured Cliffs Sandstone.
- Background Wells for the Weathered Lewis Shale/Alluvium: Seven wells upgradient to sidegradient of Multiunit 1 and the DFADA, including MW-12R1 (a replacement well for MW-12R; see Section 1.2.2), MW-49A, MW-51, MW-50A, MW 43, MW-55R and MW-74, are designated to assess background groundwater quality for the Weathered Lewis Shale/Alluvium. Many of these wells are routinely either dry or have a limited saturated thickness which precludes sampling; the wells are included in the program in case conditions change in the future.

Due to the natural heterogeneity of the geologic and hydrostratigraphic conditions underlying the FCPP, background constituent concentrations are expected to be spatially heterogeneous across the site. The site is also expected to exhibit temporal heterogeneity due to local climatic regimes, potential leakage from Morgan Lake, and potential operational activity at the site. The adequacy of designated background monitoring wells will be assessed on an ongoing basis using groundwater elevation data, boron data, a working understanding of the spatial heterogeneity of geochemistry underlying the FCPP, and the statistical merits of the constituents of concern. Historic groundwater chemistry data may be consulted during this evaluation but data preceding December 2011 will not be considered due to noted "matrix interference issues associated with saline waters" in samples analyzed prior to this date (APS, 2013).

Downgradient Monitoring Well Networks. A total of 23 downgradient wells are in place at the site to monitor the downgradient groundwater conditions of each CCR unit (Table 1-2; Figure 1-2). Thirteen of these monitoring wells are installed in the Pictured Cliffs Sandstone. The remaining ten other wells are completed in the Weathered Lewis Shale/Alluvium. The grouping of monitoring wells, spatial density, and coverage of the monitoring well network are assumed representative and adequate until proven otherwise. These wells are identified by respective CCR unit, as described below:

- URS Downgradient Wells (Pictured Cliffs Sandstone): The groundwater flow direction underlying the URS has historically been radially outward from the CCR unit. On this basis, five wells, MW-66, MW-67, MW-68, MW-69, and MW-70 were installed around the perimeter of the URS. In 2018, four additional wells were installed to evaluate groundwater conditions downgradient of the URS (see Section 1.2.2). These wells include MW-83, MW-84, MW-85, and MW-86. URS downgradient wells are screened within the Pictured Cliffs Sandstone.
- CWTP Downgradient Wells (Pictured Cliffs Sandstone): Similar to the URS, the groundwater flow direction underlying the CWTP is radially outward from the CCR unit. Four monitoring wells,

including MW-62, MW-63, MW-64, and MW-65, were installed around the perimeter of the CWTP. Each of these wells are screened within the Pictured Cliffs Sandstone.

- **Multiunit 1 Downgradient Wells (Weathered Lewis Shale/Alluvium):** Six downgradient monitoring wells are in place below the toe of the western to southwestern edge of Multiunit 1: MW-7, MW 8, MW-40R, MW-61, MW-75 and MW-76. Two wells, MW-40R and MW-76, are routinely either dry or have a limited saturated thickness which precludes sampling; the wells are included in the program in case conditions change in the future. A new Multiunit 1 downgradient well (MW-87) was installed in 2018 to evaluate groundwater conditions downgradient of this CCR unit (see Section 1.2.2). The screened interval for each Multiunit 1 downgradient well resides within the Weathered Lewis Shale/Alluvium.
- **DFADA Downgradient Wells (Weathered Lewis Shale/Alluvium):** Four existing wells are identified downgradient of the DFADA: MW-13, MW-44, MW-10 and MW-48. Each well, except MW 48, is screened within the Weathered Lewis Shale/Alluvium. The screened interval for MW-48 resides within the Unweathered Lewis Shale. The downgradient DFADA wells are known to be dry; this groundwater monitoring system was designed to detect releases since the next underlying aquifer (in the Cliff House Sandstone) is separated from the CCR unit by several hundred ft of Lewis Shale, a regional aquitard.

Supplementary Site Monitoring Wells. There are many groundwater monitoring wells at the site that are not part of the CCR groundwater monitoring system but may provide useful information to the program. Figure 1-2 identifies these wells. MW-54 is completed within Multiunit 1 and MW-60 is not considered downgradient of Multiunit 1; however, elevations in these wells may be monitored periodically to evaluate the direction of groundwater flow in the disposal area. LS-1 and LS-2 are completed in the Unweathered Lewis Shale.

1.2.2 Implemented Changes to Monitoring System

Most of the wells that comprise the site CCR groundwater monitoring system were installed prior to or during 2017 (Table 1-2). During the reporting period, implemented changes to the the monitoring system included:

- **Abandonment of MW-12R and replacement of the well with MW-12R1 (a DFADA background well):** Appendix A documents the abandonment of MW-12R and replacement of this well with new well MW-12R1 located approximately 600 ft northeast of MW-12R. MW-12R required replacement because of DFADA fill encroachment on the wellhead rendering the well inaccessible. MW-12R was abandoned on April 9, 2018 and MW-12R1 was completed on April 11, 2018. Well completion details are summarized in Table 1-2.
- **Modification to the wellhead completion of MW-67 (a URS downgradient well):** Appendix B documents modification of the abovegrade completion of this monitoring well to a subsurface completion during activities associated with the demolition of the URS and construction of an associated aboveground replacement tank (Section 3.3). The modification was required because after construction of the tank, MW-67 was in the travel way for trucks entering and exiting the access ramp. Wellhead modifications began on October 29, 2018 and were completed on November 9, 2018.
- **Modification of the wellhead completion of MW-49A (a Multiunit 1 background well):** The surface monument and well casing of MW-49A were extended because nearby berm reinforcement activities raised ground level in the vicinity of the well. Modifications were conducted on December

3, 2018. Documentation of wellhead modifications was not complete as of the end of the reporting period; however, Table 1-2 includes updated top of casing and ground surface elevations after completion of the modifications.

- Installation of URS downgradient wells MW-83, MW-84, MW-85, and MW-86 and Multiunit 1 downgradient well MW-87: In response to statistical evaluations of data collected from the CCR monitoring well network (Section 2.3.2), five new wells were installed to promote characterization of the nature and extent of fluoride concentrations downgradient of the URS and cobalt and molybdenum concentrations downgradient of Multiunit 1. Well installation activities occurred from November 16 through December 6, 2018. Documentation of well installation activities was not complete as of the end of the reporting period; however, Figure 1-2 identifies the locations of the new wells and Table 1-2 includes associated well construction details.

2.0 GROUNDWATER MONITORING PROGRAM

The groundwater monitoring and corrective action process defined in the CCR Rule includes a phased approach to groundwater monitoring, leading (if applicable) to the establishment of Groundwater Protection Standards (GWPSs) for each CCR unit. Exceedances of the GWPSs that are determined to be statistically significant can trigger requirements for additional groundwater characterization and corrective action assessment followed by implementation.

The first phase of groundwater monitoring is the detection monitoring phase. This phase focuses on a set of constituents (listed in Appendix III of the CCR Rule) that are the more mobile components of CCR and therefore represent indicators of possible impacts from CCR in groundwater. If statistically significant increases (SSIs) of any of the Appendix III constituents relative to background conditions are detected in the downgradient waste boundary wells, and cannot be demonstrated to be associated with a source other than the CCR unit, then groundwater monitoring moves into the second phase, assessment monitoring.

The second phase of groundwater monitoring focuses on the constituents listed in Appendix IV of the CCR Rule. The Appendix IV constituents are generally less mobile and occur at lower concentrations in groundwater than the Appendix III constituents. Concentrations of Appendix IV constituents in downgradient wells are compared to GWPSs. The GWPSs, established for Appendix IV constituents only, are the higher of either the federal Safe Drinking Water Act Maximum Contaminant Level (MCL), alternative risk-based GWPSs established in the CCR Rule, or the background concentration for each constituent.

If exceedances of the GWPSs are determined to be occurring in the downgradient boundary wells at statistically significant levels (SSLs) and no alternative sources for the exceedances can be demonstrated, then both additional groundwater characterization and assessment of corrective actions are initiated. Following assessment of corrective measures, a remedy (or set of remedial activities) is selected and implemented as the groundwater corrective action program for the CCR unit. According to the CCR Rule, groundwater corrective action will continue until compliance with the GWPSs has been attained in all impacted wells and sustained for a period of three consecutive years.

2.1 Program Status

2.1.1 Summary of Key Actions Completed

A summary of key actions conducted at the site through the end of 2018 to address CCR Rule requirements is as follows:

- Completion of Statistical Analyses for Appendix III Constituents – 40 CFR §257.90(b)(iv) requires that owners/operators of existing CCR units begin evaluating groundwater monitoring data for SSIs over background levels for Appendix III constituents by October 17, 2017 and complete the analysis no later than 90 days after completing associated sampling and analysis. Section 2.3.1 summarizes the results of APS's initial statistical analysis for site CCR units which concluded that there is enough evidence to declare an SSI over background for one or more Appendix III constituents at both the URS and Multiunit 1. The statistical analysis also recommended that resampling was required to confirm whether there was enough evidence to declare an SSI over background for select Appendix III constituents at the CWTP.
- Documentation of Groundwater Monitoring Activities Conducted in 2017 - 40 CFR §257.90(e) requires that an Annual Groundwater Monitoring and Corrective Action Report for applicable sites be prepared for existing CCR units no later than January 31, 2018 and annually thereafter. During the reporting period, APS prepared the *Annual Groundwater Monitoring and Corrective Action Report for 2017* (Amec Foster Wheeler, 2018), placed the report in the facility's operating record, and posted the report to APS's CCR information webpage in accordance with 40 CFR §257.105(h)(1) and 40 CFR §257.106(h)(1).
- Transition to Assessment Monitoring at the URS and Multiunit 1 – 40 CFR §257.94 requires the transition from detection monitoring to assessment monitoring whenever an SSI over background levels has been detected for one or more of the constituents listed in Appendix III. Section 2.1.3 presents additional detail regarding groundwater monitoring program transitions and Section 2.2 summarizes assessment monitoring data collected on a semiannual basis from the URS and Multiunit 1 during 2018.
- Continuation of the Detection Monitoring Program at the CWTP and DFADA – 40 CFR §257.94(b) requires the continuation of detection monitoring at a semiannual frequency for Appendix III constituents at CCR units where statistical analysis of Appendix III constituent data do not indicate an SSI over background. Section 2.2 presents the results of detection monitoring data collected on a semiannual basis from the CWTP and DFADA during 2018.
- Statistical Analyses of Collected Appendix IV Constituent Data at the URS and Multiunit 1 – 40 CFR §257.95(d)(2) requires the establishment of GWPSs for detected Appendix IV constituents after completion of two assessment monitoring rounds with evaluation of whether constituent concentrations at downgradient wells exceed GWPSs at SSLs. During the reporting period, APS updated the *Statistical Data Analysis Work Plan* (Wood, 2018) to incorporate evaluation of assessment monitoring data. Section 2.3.2 summarizes the results of APS's statistical analysis for the URS and Multiunit 1 which establish GWPSs for detected Appendix IV constituents and concluded that there is enough evidence to declare that one or more Appendix IV constituents are present at SSLs above GWPSs at both the URS and Multiunit 1.
- Characterization of the Nature and Extent of Potential Releases Indicated at the URS and Multiunit 1 – 40 CFR §257.95(g)(1) requires characterization of the nature and extent of releases from CCR units where one or more Appendix IV constituents exceed GWPSs at SSLs. Section 3.2 summarizes activities conducted in 2018 to address this requirement including the installation and sampling of wells downgradient of the URS and Multiunit 1.

2.1.2 Problems Encountered and Resolutions to Problems

There were no problems encountered during the reporting period.

2.1.3 Groundwater Monitoring Program Transitions

The URS and Multiunit 1 transitioned to assessment monitoring on February 12, 2018. Appendix C presents a notification prepared per 40 CFR §257.94(e)(3) documenting the establishment of an assessment monitoring program for the URS and Multiunit 1. This notification was placed in the facility's operating record and posted to APS's CCR information webpage in accordance with 40 CFR §257.105(h)(5) and 40 CFR §257.106(h)(4).

2.1.4 Alternative Source Demonstrations

There were no alternative source demonstrations performed for site CCR units during the reporting period.

2.2 Monitoring Data Collected

APS conducted CCR groundwater monitoring at FCPP in accordance with the site Sampling and Analysis Plan (SAP) presented in the *Annual Groundwater Monitoring and Corrective Action Report for 2017* (Amec Foster Wheeler, 2018). The SAP documents the methods and procedures used to conduct groundwater sampling, analyze collected samples for CCR constituents, and assess associated analytical data for quality assurance purposes.

The following sections summarize groundwater monitoring activities conducted in 2018. Table 2-1 identifies when monitoring occurred and which units were monitored. During the reporting period, detection monitoring included evaluation of collected samples for Appendix III constituents on a semiannual basis (40 CFR §257.94[b]) and assessment monitoring included evaluation of collected samples for all Appendix IV constituents on an annual basis (40 CFR §257.95[b]) and detected Appendix IV constituents as well as all Appendix III constituents on a semiannual basis (40 CFR §257.95[d][1]).

2.2.1 Water Level Monitoring

Appendix D presents groundwater elevation data collected during groundwater sampling with hydrographs depicting collected groundwater elevations over time. Groundwater elevations in the Pictured Cliffs Sandstone (i.e., plant area) and Weathered Lewis Shale/Alluvium (i.e., disposal area) are graphed independently based on assessment of the data during initial CSM development; review of the data suggests that the two groundwater systems are likely not in direct communication. As shown in monitoring well hydrographs, groundwater elevations were relatively stable over the period monitored with the following exceptions:

- MW-7 (downgradient well for Multiunit 1): An increasing trend in water level elevations was reversed at this well during the reporting period with a decline of approximately 1.5 ft over the duration of 2018.
- MW-71, MW-72, and MW-73 (background wells for the URS and CWTP): Declining trends in groundwater elevations on the order of 1 ft or less occurred in these wells during 2018.
- MW-66, MW-67, MW-68, MW-69 and MW-70 (the downgradient URS wells): Monitoring of these wells in November 2018 indicated decreases in water level elevations ranging from 0.8 to 2.8 ft (at MW-67 and MW-69, respectively) from elevations monitored in March and May 2018. Decreases in groundwater monitoring elevations are likely associated with the URS closure activities initiated in June 2018 (Section 3.3).

- MW-74 (background well for Multiunit 1 and the DFADA): Groundwater levels at this well located downstream of Morgan Lake varied by more than 3 ft over the duration of 2018. Trends were comparable to those observed in 2017 with elevations higher in early spring and lower in late summer to late fall.

The significance of these exceptions will be evaluated as additional data are collected.

Figures 2-1 through 2-3 present quarterly potentiometric surface maps that are representative of conditions at the time of groundwater sampling based on hydrograph data. The estimated direction and gradient of groundwater flow derived from collected groundwater elevation data are noted in these figures. As indicated, groundwater appears to flow towards Morgan Lake in the plant area and towards Chaco Wash in the disposal area. During the first and second quarters of 2018, groundwater appeared to mound under the URS. The extent of mounding was limited during the fourth quarter of 2018.

2.2.2 Groundwater Flow Rate Estimation

The CCR Rule requires that groundwater flow rates beneath CCR units be estimated during each monitoring event. To meet this requirement, water levels measured at the time of sampling were used to calculate the direction and magnitude of the hydraulic gradient in the vicinity of each unit using a spreadsheet tool available on the United States Environmental Protection Agency (USEPA) website (USEPA, 2014). Darcy's Equation for flow through porous media was then used with Site data (where available) and/or literature-based hydraulic conductivity and effective porosity values for hydrogeologic units to estimate groundwater flow rates. Table 2-2 summarizes the results of these calculations.

For the Pictured Cliffs Sandstone underlying the URS and CWTP, the hydraulic gradient and flow direction were relatively consistent throughout the reporting period. The magnitude of the hydraulic gradient ranged from 0.001 to 0.002 ft per ft and the direction of groundwater flow was northwest towards Morgan Lake (325 to 339 degrees from north). Corresponding groundwater flow rates ranged from 0.02 to 0.04 ft per day.

For the Lewis Shale underlying Multiunit 1, the hydraulic gradient and flow direction were also relatively stable. The magnitude of the hydraulic gradient was 0.03 ft per ft during each calendar quarter and the direction of groundwater flow was southwest towards Chaco Wash (250 to 269 degrees from north). The corresponding groundwater flow rate was 0.0002 ft per day.

2.2.3 Sample Collection

APS collected, labeled, preserved, and shipped groundwater samples in accordance with the SAP. In some instances, the wells were assessed as dry upon monitoring or did not have enough water and could not be sampled (Table 2-1). In accordance with 40 CFR §257.93(i), collected groundwater samples were not field filtered prior to analysis. Pursuant to the SAP, quality control samples (i.e., field duplicates, field blanks and extra sample volume for matrix spike samples) were collected during each groundwater monitoring event. These samples are noted on associated chain-of-custody documentation.

2.2.4 Sample Analysis and Data Validation

APS submitted groundwater samples to TestAmerica Laboratories, Inc. (TestAmerica) located in Phoenix, Arizona for analysis. TestAmerica is an Arizona Department of Health Services-licensed laboratory (AZ0728). Appendix E presents the associated Laboratory Reports of Analysis organized by CCR unit.

Table 2-1 identifies the analytes evaluated during each monitoring event. Analytes varied based on the monitoring program (i.e. detection vs. assessment monitoring), groundwater monitoring program transition requirements of the CCR Rule, and the need for supplementary information useful in evaluating the nature and extent of potential releases from select units (Section 3.2). The SAP identifies Appendix III and Appendix IV constituents with associated analytical methods.

Following receipt of final laboratory reports of analysis, the reports and associated sample data collected during detection and assessment monitoring were evaluated for quality assurance purposes. The scope of the review was a USEPA Stage 2A validation. Appendix F presents the *2018 Data Validation Report* which documents these reviews.

2.2.5 Sample Results

Appendix E presents sample results in the Laboratory Reports of Analysis. The sampling coverage and frequency of the groundwater monitoring system is assumed representative and adequate of spatial and temporal heterogeneity until proven otherwise.

2.3 Statistical Analysis of Monitoring Data

During the reporting period, two different types of statistical analyses were conducted to evaluate whether collected monitoring data indicate site CCR units have adversely impacted underlying groundwater. These analyses were conducted in accordance with the updated site-specific *Statistical Data Analysis Work Plan* (Wood, 2018) and are summarized in the following sections.

2.3.1 Evaluation of Initial Appendix III Constituent Data

Following collection of at least eight independent samples from each CCR unit during initial groundwater monitoring activities, the CCR Rule requires that a statistical assessment of Appendix III constituent data be conducted to assess whether there are SSIs over background in constituent concentrations downgradient of CCR units. Appendix G presents a technical memorandum documenting this initial analysis for the CWTP, Multiunit, and URS. Groundwater was not present in monitoring system wells evaluating the DFADA and thus this unit was not included in the statistical analysis.

As summarized in Table 2-3, APS's initial statistical analysis for site CCR units included the development of background threshold values (BTVs) derived from prediction limits for each Appendix III constituent calculated using data collected from site background wells. Based on a comparison of downgradient well data to the BTVs, the analysis concluded that there is enough evidence to declare an SSI over background for boron at Multiunit 1 as well as boron, chloride, and fluoride at the URS. Although additional Appendix III constituents at Multiunit 1 and the URS indicated initial exceedances with advocated resampling for these constituents to assess these potential SSIs, resampling was not necessary based on the SSI declarations for other constituents noted above.

For the CWTP, the Appendix III constituent statistical analysis documented in Appendix G advocated resampling to confirm initial exceedances for boron, calcium, and pH (Table 2-3). The evaluation also identified an issue with elevated reporting limits for fluoride in samples collected from the Pictured Cliffs Sandstone background wells relative to downgradient wells associated with the CWTP. To address this issue, it was recommended that reporting limits for fluoride be maintained at 0.8 milligrams per liter (mg/L) or less for analysis of CWTP samples going forward.

Appendix H presents two follow up technical memoranda that evaluate the results of CWTP resampling conducted in April 2018 and June 2018. Evaluation of detection monitoring data collected in June 2018 for SSIs at the CWTP is also presented. The resampling analyses did not confirm the initial exceedances for boron, calcium and pH identified in the initial statistical evaluation of Appendix III constituent data; however, exceedance assessment of detection monitoring data identified initial exceedances for fluoride at all CWTP wells and pH for MW-64 and MW-65. These initial exceedances require confirmation prior to declaring an SSI over background at this CCR unit. Assessment of November 2018 detection monitoring data collected from the CWTP was ongoing as of the end of the reporting period.

2.3.2 Evaluation of Initial Appendix IV Constituent Data

Following collection of two rounds of assessment monitoring data from units where an SSI over background has been declared, the CCR Rule requires establishment of GWPSs and comparison of downgradient well data to the GWPSs to determine if SSLs of Appendix IV constituents are present in groundwater downgradient of the unit. Appendix I and Appendix J present technical memoranda documenting these statistical analyses for Multiunit 1 and the URS, respectively.

Table 2-4 summarizes the results of statistical analyses of Appendix IV constituent data collected from Multiunit 1 and the URS. BTVs derived from upper tolerance limits and GWPSs are identified for each constituent as is the basis for GWPS selection. Where SSLs of constituent concentrations exceeded GWPSs, the location and magnitude of the exceedances are also summarized. As indicated in Table 2-4, the analyses concluded that there is enough evidence to declare that cobalt and molybdenum are present at SSLs above GWPSs in groundwater downgradient of Multiunit 1 and fluoride is present at SSLs above the GWPS in groundwater downgradient of the URS.

3.0 CORRECTIVE ACTION PROGRAM

Based on the declaration that one or more Appendix IV constituents are present at SSLs above GWPSs downgradient of Multiunit 1 and the URS, APS prepared notices of Appendix IV exceedances, progressed characterization of potential releases from these units and initiated closure activities at the URS during the reporting period. Additional information regarding these corrective action program activities is presented in the following sections.

3.1 Notification of Appendix IV Exceedances

On November 14, 2018, APS provided notice that cobalt and molybdenum exceeded GWPSs at Multiunit 1 and fluoride exceeded the GWPS at the URS. Appendix C presents applicable notifications prepared per 40 CFR §257.95(g). These notifications were placed in the facility's operating record and posted to APS's CCR information webpage in accordance with 40 CFR §257.105(h)(8) and 40 CFR §257.106(h)(6).

3.2 Characterization of Potential Releases from CCR Units

To characterize releases from CCR units, 40 CFR §257.95(g)(1) requires: (i) the installation of wells to define the extent of contaminant plumes, (ii) collection of data on the nature and estimated quantity of material released, (iii) installation of at least one well at the facility boundary in the direction of contaminant migration, and (iv) sampling of these wells to characterize the nature and extent of the release.

During the reporting period, activities conducted to address CCR Rule release characterization requirements downgradient of Multiunit 1 and URS included:

- A review of the existing well groundwater monitoring network at FCPP to assess whether any of these supplementary wells could provide useful information regarding the nature and extent of cobalt and molybdenum downgradient of Multiunit 1 and fluoride downgradient of the URS.
- Installation of a new CCR well (MW-87) near the property lease boundary in the direction of contaminant migration downgradient of Multiunit 1 (Figure 1-2).
- Installation of a new CCR well (MW-83) near the property lease boundary in the direction of contaminant migration downgradient of the URS (Figure 1-2).
- Installation of three new CCR wells (MW-84, MW-85, and MW-86) downgradient of the URS to define the extent of fluoride impacts downgradient of the URS (Figure 1-2).
- Sampling of new and existing wells occurred from December 15 to 17, 2018 with subsequent analysis of collected samples for Appendix III and IV constituents as well as general water quality parameters. Table 2-1 identifies the wells sampled during release characterization efforts; Figure 1-2 presents associated well locations.

Evaluation of collected data and documentation of these activities was ongoing as of the end of the reporting period.

3.3 CCR Unit Closure Activities

On July 24, 2018, APS published an amended closure plan for the URS that details a plan to close the unit by removal of CCR and replace the unit with a new concrete tank. Activities conducted during the reporting period to prepare for URS closure were as follows:

- A temporary cofferdam was constructed in the southwest corner of the old URS footprint to constrain flows prior to pumping the stored water to the LAI. The cofferdam remained in use until December 10, 2018, at which point, all inflow to the old URS was halted and diverted to the new tank.
- Prior to demolishing the URS, stored liquid in the URS was removed. The wet material or sludge that remained was removed by Riley Industrial Services, Inc. using vacuum trucks. After the wet material was removed, the soil-cement lining of the URS was demolished and removed. In addition, a minimum of two ft of soil beneath the soil-cement lining was over-excavated in accordance with foundation requirements for the replacement concrete tank. After the over-excavated soil was removed, a visual observation was conducted to verify all CCR-impacted material had been removed. The demolished and removed materials were disposed of by placing them in the DFADA. Removal of the existing soil cement layer and the old pump station, along with any remaining CCR sediments began on June 25, 2018 and was completed on December 14, 2018.
- A new concrete tank was erected in the footprint of the closed URS to replace the function of the URS. Construction of the new tank started in August 2018 and was completed on October 19, 2018. The free-standing tank was filled and hydrostatically tested for leaks in accordance with American Concrete Institute (ACI) 350.1, *Specifications for Tightness Testing of Environmental Engineering Concrete Containment Structures*. Following successful testing, soil was backfilled around the tank for final completion. The tank was completed on November 5, 2018.

A notice of intent to initiate closure of the URS was published December 10, 2018. The new tank was placed into service and CCR disposal to the former URS impoundment ceased on December 10, 2018. The CCR monitoring well network at the URS exhibits fluoride concentrations present at SSLs over the GWPS for this

constituent; therefore, closure by removal will not be complete until constituent concentrations no longer exceed the GWPS.

4.0 KEY ACTIVITIES FOR UPCOMING YEAR

During 2019, the following key activities will likely be conducted to support CCR groundwater monitoring and corrective action compliance at the site:

- Preparation of an Annual Groundwater Monitoring and Corrective Action Report for 2019 – Per 40 CFR §257.90(e), an annual report must be prepared no later than January 31 of the year following the calendar year documented in the report.
- Continued Detection Monitoring at the CWTP and DFADA with Evaluation for SSIs – Per 40 CFR §257.94(b), detection monitoring (including analysis of collected samples for Appendix III constituents) must continue on a semiannual basis. On an ongoing basis, APS must determine whether there has been an SSI over background at the CCR units undergoing detection monitoring within 90 days of sampling and analysis (40 CFR §257.93[h][2]).
- Initiation of Assessment Monitoring for CCR Units with an SSI over Background (as applicable) – Per 40 CFR §257.94(e)(1), within 90 days of detecting an SSI over background levels for any Appendix III constituent, an assessment monitoring program must be established.
- Continued Assessment Monitoring at Multiunit 1 and the URS – While corrective action evaluation progresses, assessment monitoring (including analysis of collected samples for Appendix III and Appendix IV constituents) must be conducted on a semiannual basis per 40 CFR §257.95(b) and (d)(1).
- Characterization of the Nature and Extent of Potential Releases from Multiunit 1 and the URS – Per 40 CFR §257.95(g)(1), characterization of the nature and extent of the release indicated by SSLs over GWPSs must be completed to evaluate whether corrective measures should be initiated or an alternative source demonstration should be conducted for these CCR units. The characterization must be sufficient to support a complete and accurate assessment of corrective measures.
- Evaluation of Corrective Measures for Multiunit 1 and the URS - Per 40 CFR §257.95(g)(4), if an Alternative Source Demonstration has not been successfully completed within 90 days of detecting an SSL exceeding a GWPS, an assessment of corrective measures for Multiunit 1 and the URS must be initiated. The Assessment of Corrective Measures must be completed within 90 days of initiating the assessment unless extended up to no more than 60 days with a demonstration that site-specific conditions or circumstances require the extension.

Since the CCR Rule is implemented in phases based on analysis of data collected during the groundwater monitoring program, the foregoing list only includes reasonably probable activities that will occur in 2019; this list is not comprehensive.

5.0 REFERENCES

- AECOM, 2017. *CCR Monitoring Well Network Report and Certification*, Four Corners Power Plant, Fruitland, New Mexico. AECOM Job No. 60531071. September 18, 2017.
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wood.

TABLES



**Table 1-1
Description of Coal Combustion Residual Units**

CCR Unit	Location	Function	Operation	Size/Construction	History
Upper Retention Sump (URS)	<i>Plant Area</i> NW1/4 of Section 36, T29N, R16W	<i>Single CCR unit.</i> Impoundment. Surge pond for FGD system.	Historically, FGD system discharge was discharged into the URS via 10 plus controlled/monitored lines. Pond contents were recirculated back into the FGD process via a pump chamber located on the south end of the pond. Solids were periodically removed from the sump.	- 1.07 acres in areal extent - Soil-cement liner on bottom and inside slopes	Placed in service around 1983. Pond demolished in 2018 and replaced with an above-ground concrete tank in the footprint of the former URS.
Combined Waste Treatment Pond (CWTP)	<i>East of Plant, Adjacent to Morgan Lake</i> SE1/4 of Section 25, T29N, R16W	<i>Single CCR Unit.</i> Impoundment. Detention pond used as a settling and stabilization basin for ash-impacted and other Plant wastewater flows prior to discharge to Morgan Lake in accordance with an NPDES permit.	The primary source of water to the CWTP is from hydrobins which separate transport water from bottom ash generated in plant Units 4 and 5. Seven earthen basins in the western edge of the CWTP promote sediment settling prior to the water decanting into the main portion of the CWTP and then overflowing into the cooling water discharge canal at the northeast corner of the pond.	- 13.7 acres in areal extent	Constructed in 1978.
Lined Ash Impoundment (LAI)	<i>Disposal Area</i> E1/2 of Section 34, T29N, R16W	<i>Part of a CCR multiunit with the LDWP</i> that receives fly ash, flue gas desulfurization (FGD) waste and associated residuals as a slurry from the plant. Impoundment.	Waste is discharged into the pond in the northeast portion of the pond. Decanted flow discharges via a vertical drop structure through a toe drain into the LDWP.	- 75 acres in areal extent - 60 mil HDPE liner - 5,364 acre-ft design capacity - 5,275.2 ft AMSL maximum working level	Constructed on top of closed Ash Ponds 4 and 5 and placed in service in 2004.
Lined Decant Water Pond (LDWP)	<i>Disposal Area</i> E1/2 of Section 34, T29N, R16W	<i>Part of a CCR multiunit with the LAI</i> that receives decanted water from the LAI. Impoundment.	Decanted water is discharged into the LAI via gravity; the water is pumped from the LDWP back to the plant for reuse in operations.	- 45 acres in areal extent - Two 60 mil HDPE liners separated by a leak detection layer - 435 acre-ft design capacity - 5,213.2 ft AMSL maximum working level	Constructed on top of closed Ash Pond 3 and placed in service in 2003.
Dry Fly Ash Disposal Area (DFADA)	<i>Disposal Area</i> SE1/4 of Section 34, T29N, R16W	<i>Single CCR unit.</i> Landfill. Disposal of dry fly ash, bottom ash, and construction debris. In the future, FGD solids will be mixed with fly ash at the plant and landfilled in the DFADA.	The DFADA is filled in general accordance with a stacking plan. Leachate generated from the DFADA cells is pumped into trucks and used for dust control or can be transferred to the LDWP.	- 3 conjoined cells (DFADA 1, 2, and 3) with areal extents of 37 acres, 32 acres, and 15 acres, respectively - 3,125 acre-ft design capacity - DFADA 1: compacted clay overlain by 60 mil HDPE liner and drainage layer - DFADA 2 and 3: geosynthetic clay liner overlain by 60 mil HDPE liner and drainage layer - Leachate collection system drains each DFADA cell - DFADA 4 is planned but not yet constructed	Constructed in 2007 (DFADA 1), 2012 (DFADA 2), and 2014 (DFADA 3).

Notes:

AMSL - above mean sea level

CCR - Coal combustion residuals

CWTP - Combined Waste Treatment Pond

DFADA - Dry Fly Ash Disposal Area

FGD - flue gas desulfurization

ft - feet

HDPE - high density polyethylene

LAI - Lined Ash Impoundment

LDWP - Lined Decant Water Pond

NPDES - National Pollutant Discharge Elimination System

URS - Upper Retention Sump

**Table 1-2
CCR Groundwater Monitoring System Summary**

Well	CCR Unit	Well Designation	Hydrogeologic Unit	Date Installed	Borehole Depth [ft bgs]	Top of Casing Elevation [ft AMSL]	Ground Surface Elevation [ft AMSL]	Top of Screen [ft bgs]	Bottom of Screen [ft bgs]	Screen Length [ft]	Top Screen Elevation [ft AMSL]	Bottom Screen Elevation [ft AMSL]	Bottom Borehole Elevation [ft AMSL]
MW-66	URS	Downgradient	Pictured Cliffs Sandstone	9/27/2015	33	5,344.69	5,344.70	15	25	10	5,329.70	5,319.70	5,311.70
MW-67	URS	Downgradient	Pictured Cliffs Sandstone	9/11/2015	31	5,352.76 ^(d)	5,353.8 ^(d)	19.6	29.6	10	5,334.42	5,324.42	5,323.02
MW-68	URS	Downgradient	Pictured Cliffs Sandstone	9/10/2015	30	5,353.58	5,353.95	19	29	10	5,334.95	5,324.95	5,323.95
MW-69	URS	Downgradient	Pictured Cliffs Sandstone	9/9/2015	35	5,357.66	5,355.26	24.3	34.3	10	5,330.96	5,320.96	5,320.26
MW-70	URS	Downgradient	Pictured Cliffs Sandstone	9/30/2015	53	5,371.12	5,368.62	40	50	10	5,328.62	5,318.62	5,315.62
MW-83	URS	Downgradient	Pictured Cliffs Sandstone	11/29/2018	35	5,343.15	5,341.51	14	29	15	5,327.51	5,312.51	5,306.51
MW-84	URS	Downgradient	Pictured Cliffs Sandstone	11/18/2018	35	5,338.23	5,339.34	10	30	20	5,329.34	5,309.34	5,304.34
MW-85	URS	Downgradient	Pictured Cliffs Sandstone	11/18/2018	35	5,352.78	5,353.69	15	30	15	5,338.69	5,323.69	5,318.69
MW-86	URS	Downgradient	Pictured Cliffs Sandstone	11/17/2018	35	5,338.76	5,338.74	10	30	20	5,328.74	5,308.74	5,303.74
MW-71	URS/CWTP	Background	Pictured Cliffs Sandstone	3/12/2016	50	5,362.91	5,363.62	22.5	42.5	20	5,341.12	5,321.12	5,313.62
MW-72	URS/CWTP	Background	Pictured Cliffs Sandstone	3/2/2016	61	5,381.62	5,379.09	50.7	60.7	10	5,328.39	5,318.39	5,318.09
MW-73	URS/CWTP	Background	Pictured Cliffs Sandstone	1/18/2017	45	5,353.95	5,351.90	28.9	43.9	15	5,323.00	5,308.00	5,306.90
MW-62	CWTP	Downgradient	Pictured Cliffs Sandstone	9/28/2015	20	5,341.87	5,339.37	10	20	10	5,329.37	5,319.37	5,319.37
MW-63	CWTP	Downgradient	Pictured Cliffs Sandstone	9/25/2015	20	5,337.02	5,337.02	9	19	10	5,328.02	5,318.02	5,317.02
MW-64	CWTP	Downgradient	Pictured Cliffs Sandstone	9/26/2015	25	5,337.66	5,337.66	10	20	10	5,327.66	5,317.66	5,312.66
MW-65	CWTP	Downgradient	Pictured Cliffs Sandstone	9/27/2015	20	5,339.74	5,337.24	8	18	10	5,329.24	5,319.24	5,317.24
MW-7	Multiunit 1	Downgradient	Lewis Shale	3/11/1987 ^(a)	60	5,149.32	5,148.29	14.7	34.7	20	5,133.59	5,113.59	5,088.29
MW-8	Multiunit 1	Downgradient	Lewis Shale	3/11/1987 ^(a)	74	5,122.56	5,120.85	28	48	20	5,093.15	5,073.15	5,046.85
MW-40R	Multiunit 1	Downgradient	Lewis Shale	9/17/2015	25	5,137.43	5,134.83	14.3	24.3	10	5,120.53	5,110.53	5,109.83
MW-43	Multiunit 1	Background	Lewis Shale	3/24/2012	60	5,271.58	5,269.42	16	26	10	5,253.42	5,243.42	5,209.42
MW-49A	Multiunit 1	Background	Lewis Shale	5/18/2013	68	5,288.62 ^(d)	5,285.29 ^(d)	50	65	15	5,231.38	5,216.38	5,213.38
MW-50A	Multiunit 1	Background	Lewis Shale	5/7/2013	63	5,335.97	5,333.20	28	43	15	5,305.20	5,290.20	5,270.20
MW-51	Multiunit 1	Background	Lewis Shale	4/28/2013	80	5,288.14	5,285.14	20	30	10	5,265.14	5,255.14	5,205.14
MW-61	Multiunit 1	Downgradient	Lewis Shale	9/16/2015	35	5,129.19	5,126.59	24.2	34.2	10	5,102.39	5,092.39	5,091.59
MW-74	Multiunit 1	Background	Lewis Shale	1/18/2017	40	5,219.09	5,216.70	8.1	18.1	10	5,208.60	5,198.60	5,176.70
MW-75	Multiunit 1	Downgradient	Lewis Shale	3/15/2017	41	5,126.80	5,124.80	29.0	39.0	10	5,095.80	5,085.80	5,083.80
MW-76	Multiunit 1	Downgradient	Lewis Shale	3/16/2017	33	5,116.23	5,114.30	11.8	26.8	15	5,102.50	5,087.50	5,081.30
MW-87	Multiunit 1	Downgradient	Lewis Shale	11/28/2018	50	5,076.53	5,074.29	15	45	30	5,059.29	5,029.29	5,024.29
MW-10	DFADA	Downgradient	Lewis Shale	3/12/1987	35	5,150.71	5,149.65	13	33	20	5,136.65	5,116.65	5,114.65
MW-12R ^(b)	DFADA	Background	Lewis Shale	3/27/2012	70	5,264.44	5,261.71	13.5	33.5	20	5,248.21	5,228.21	5,191.71
MW12R1 ^(c)	DFADA	Background	Lewis Shale	4/10/2018	40	5,270.12	5,268.23	22	32	10	5,246.20	5,236.20	5,228.20
MW-13	DFADA	Downgradient	Lewis Shale	8/31/1987	60	5,150.75	5,149.52	34.9	54.9	20	5,114.62	5,094.62	5,089.52
MW-44	DFADA	Downgradient	Lewis Shale	3/28/2012	40	5,146.89	5,145.15	13.5	23.5	10	5,131.65	5,121.65	5,105.15
MW-48	DFADA	Downgradient	Lewis Shale	5/14/2013	80	5,165.96	5,163.43	35	60	25	5,128.43	5,103.43	5,083.43
MW-55R	DFADA	Background	Lewis Shale	9/13/2015	95	5,243.96	5,241.36	72.9	92.9	20	5,168.46	5,148.46	5,146.36

Notes:

Source of presented information presented is AECOM, 2017; AECOM, 2018; and Sakura Engineering & Surveying, 2018 and 2019

Vertical datum is NAVD 88

^(a) - Estimated^(b) - Abandoned^(c) - Replacement well for MW-12R

AMSL - Above mean sea level

bgs - below ground surface

btoc - below top of casing

CCR - coal combustion residual(s)

CWTP - Combined Waste Treatment Pond

DFADA - Dry Fly Ash Disposal Area

ft - feet

URS - Upper Retention Sump

**Table 2-1
CCR Groundwater Monitoring Event Summary for 2018**

CCR UNIT	Well ID*	Monitoring System Well Type	Sampling Date (Monitoring Program)								Number of Field Original Samples Collected in 2018**
			Mar 16-17, 2018 (Detection)	Mar 16-17, 2018 (Assessment)	Apr 6, 2018 (Resampling)	May 31-Jun 3, 2018 (Detection)	May 31-Jun 3, 2018 (Assessment)	Nov 2-4, 2018 (Detection)	Nov 2-4, 2018 (Assessment)	Dec 15-17, 2018 (Characterization)	
CWTP	MW-62	CCR	---	---	X	X	---	X	---	---	3
	MW-63	CCR	---	---	X	X	---	X	---	---	3
	MW-64	CCR	---	---	---	X	---	X	---	---	2
	MW-65	CCR	---	---	---	X	---	X	---	---	2
DFADA	MW-10	CCR	Dry	---	---	Dry	---	Dry	---	---	0
	MW-12R	CCR	Not Accessible	---	---	Not Accessible	---	Not Present	---	---	0
	MW-12R1	CCR	Not Present	---	---	Not Present	---	Dry	---	---	0
	MW-13	CCR	Dry	---	---	Dry	---	Dry	---	---	0
	MW-44	CCR	Dry	---	---	Dry	---	Dry	---	---	0
	MW-48	CCR	Dry	---	---	Dry	---	Dry	---	---	0
Multiunit 1	MW-55R	CCR	Dry	---	---	Dry	---	Dry	---	---	0
	MW-7	CCR	---	X	---	---	X	---	X	X	4
	MW-8	CCR	---	NS	---	---	X	---	X	X	3
	MW-16	Supplementary	---	---	---	---	---	---	---	X	1
	MW-17R	Supplementary	---	---	---	---	---	---	---	X	1
	MW-38R	Supplementary	---	---	---	---	---	---	---	X	1
	MW-40R	CCR	---	NS	---	---	NS	---	NS	---	0
	MW-43	CCR	---	NS	---	---	Dry	---	NS	---	0
	MW-49A	CCR	---	X	---	---	X	---	X	---	3
	MW-50A	CCR	---	NS	---	---	Dry	---	Dry	---	0
	MW-51	CCR	---	Dry	---	---	Dry	---	Dry	---	0
	MW-56	Supplementary	---	---	---	---	---	---	---	X	1
	MW-57	Supplementary	---	---	---	---	---	---	---	X	1
	MW-61	CCR	---	X	---	---	X	---	X	X	4
	MW-74	CCR	---	X	---	---	X	---	NS	---	2
	MW-75	CCR	---	X	---	---	X	---	X	X	4
	MW-76	CCR	---	NS	---	---	Dry	---	Dry	---	0
DMX-4	Supplementary	---	---	---	---	---	---	---	X	1	
DMX-6	Supplementary	---	---	---	---	---	---	---	X	1	
URS	MW-66	CCR	---	X	---	---	X	---	X	---	3
	MW-67	CCR	---	X	---	---	X	---	X	---	3
	MW-68	CCR	---	X	---	---	X	---	X	---	3
	MW-69	CCR	---	X	---	---	X	---	X	---	3
	MW-70	CCR	---	X	---	---	X	---	X	---	3
	MW-71*	CCR	---	X	---	---	X	---	X	---	3
	MW-72*	CCR	---	X	---	---	X	---	X	---	3
	MW-73*	CCR	---	X	---	---	X	---	X	---	3
	MW-83	CCR	---	Not Present	---	---	Not Present	---	Not Present	X	1
	MW-84	CCR	---	Not Present	---	---	Not Present	---	Not Present	X	1
	MW-85	CCR	---	Not Present	---	---	Not Present	---	Not Present	X	1
MW-86	CCR	---	Not Present	---	---	Not Present	---	Not Present	X	1	
<i>Analyzed Constituents</i>			<i>No Samples Collected</i>	<i>App IV</i>	<i>Select App III</i>	<i>App III</i>	<i>App III and Detected App IV</i>	<i>App III</i>	<i>App III and App IV</i>	<i>App III, App IV, and Supplementary Parameters</i>	65

Notes:

X - Well Monitored
 NS - Not Enough Water to Sample
 --- - Well Not Monitored

App - Appendix
 CCR - coal combustion residuals
 CWTP - Combined Waste Treatment Pond

DFADA - Dry Fly Ash Disposal Area
 ID - Identification
 URS - Upper Retention Sump

* MW-71, MW-72, and MW-73 serve as background wells for both the CWTP and URS but are only listed with the URS.
 ** Totals exclude field duplicate samples.

**Table 2-2
Aquifer Properties and Groundwater Flow Calculations**

Hydrogeologic Unit (CCR Unit)	Estimated Hydraulic Conductivity [ft/d]	Estimated Effective Porosity [Vol/Vol]	Calendar Quarter	Calculated Hydraulic Gradient [ft/ft]	Calculated Groundwater Flow Direction [degrees from North]	Estimated Groundwater Flow Rate [ft/d]
Pictured Cliffs Sandstone (URS and CWTP)	6.0 ^(a)	0.25 ^(b)	1st Quarter 2018	0.002	339	0.04
			2nd Quarter 2018	0.002	332	0.04
			4th Quarter 2018	0.001	325	0.02
Lewis Shale (Multiunit 1)	0.00028 ^(b)	0.05 ^(b)	1st Quarter 2018	0.03	268	0.0002
			2nd Quarter 2018	0.03	252	0.0002
			4th Quarter 2018	0.03	251	0.0002

Notes:

CCR - Coal Combustion Residuals
 CWTP - Combined Waste Treatment Pond
 d - day
 ft - feet
 URS - Upper Retention Sump
 Vol/Vol - volume per volume

References:

^(a) AECOM, 2017
^(b) Freeze, R.A. and Cherry, J.A., 1979.

**Table 2-3
Summary of Statistical Analysis of Initial Appendix III Constituent Data**

Constituent	CWTP				Multiunit 1				URS			
	BTV	Location of SSI Over Background	Range of Exceeding Sample Values	Conclusion	BTV	Location of SSI Over Background	Range of Exceeding Sample Values	Conclusion	BTV	Location of SSI Over Background	Range of Exceeding Sample Values	Conclusion
Boron	1.9 mg/L	MW-62 and MW-63	2 to 2.5 mg/L	Resampling Advocated	3.95 mg/L	MW-7, MW-8, MW-61, and MW-75	7.2 to 41 mg/L	SSI Over Background Declared	1.9 mg/L	MW-66, MW-67, MW-68, MW-69, and MW-70	75 to 160 mg/L	SSI Over Background Declared
Calcium	540 mg/L	MW-62 and MW-63	550 to 590 mg/L	Resampling Advocated	454.1 mg/L	MW-7, MW-8, and MW-75	460 to 500 mg/L	Resampling Advocated	540 mg/L	MW-70	550 mg/L	Resampling Advocated
Chloride	710 mg/L	---	---	---	604.7 mg/L	MW-7 and MW-8	740 to 1100 mg/L	Resampling Advocated	710 mg/L	MW-69 and MW-70	1000 to 1600 mg/L	SSI Over Background Declared
Fluoride	Detectable Concentrations Exceeding RL per the DQR	Issue with Variable Reporting Limits	---	Further Evaluation Required	2.1 mg/L	MW-8	5 mg/L	Resampling Advocated	Detectable Concentrations Exceeding RL per the DQR	MW-66, MW-67, MW-68, MW-69, and MW-70	0.94 to 26 mg/L	SSI Over Background Declared
pH	Time Regression LPL and UPL	MW-64 and MW-65	7.61 and 8.27 SU	Resampling Advocated	<6.52 SU and >7.88 SU	---	---	---	Time Regression LPL and UPL	MW-66, MW-70, and MW-68	5.85, 7.88, and 8.27 SU	Resampling Advocated
Sulfate	13,000 mg/L	---	---	---	22,000 mg/L	---	---	---	13,000 mg/L	---	---	---
TDS	20,000 mg/L	---	---	---	34,396.6 mg/L	---	---	---	20,000 mg/L	---	---	---

Notes:

BTV - Background Threshold Value
 DQR - Double Quantification Rule
 LPL - lower prediction limit
 mg/L - milligrams per liter

SU - standard pH units
 SSI - statistically significant increase
 TDS - Total Dissolved Solids
 UPL - upper prediction limit

**Table 2-4
Summary of Initial Appendix IV Constituent Statistical Analyses**

Constituent	Multiunit 1					URS				
	BTV [mg/L]	GWPS [mg/L]	Basis for GWPS	Location of SSLs Over GWPS	Range of Exceeding LCLs [mg/L]	BTV [mg/L]	GWPS [mg/L]	Basis for GWPS	Location of SSLs Over GWPS	Range of Exceeding LCLs [mg/L]
Antimony	0.01	0.01	BTV	None	---	0.01	0.01	BTV	None	---
Arsenic	0.0086	0.01	US EPA MCL	None	---	0.013	0.013	BTV	None	---
Barium	0.042	2	US EPA MCL	None	---	0.051	2	US EPA MCL	None	---
Beryllium	0.001	0.004	US EPA MCL	None	---	0.001	0.004	US EPA MCL	None	---
Cadmium	0.002	0.005	US EPA MCL	None	---	0.001	0.005	US EPA MCL	None	---
Chromium	0.02	0.1	US EPA MCL	None	---	0.01	0.1	US EPA MCL	None	---
Cobalt	0.01	0.01	BTV	MW-61 and NW-75	0.016 to 0.043	0.016	0.016	BTV	None	---
Fluoride	5	5	BTV	None	---	4	4	BTV/ US EPA MCL	MW-66, MW-67, MW-68, and MW-69	11 to 26
Lead	0.01	0.015	Alternative Risk-Based GWPS	None	---	0.005	0.015	Alternative Risk-Based GWPS	None	---
Lithium	1.8	1.8	BTV	None	---	0.8	0.8	BTV	None	---
Mercury	0.0002	0.002	US EPA MCL	None	---	0.0002	0.002	US EPA MCL	None	---
Molybdenum	0.12*	0.1	Alternative Risk-Based GWPS	MW-75	0.15	0.011	0.1	Alternative Risk-Based GWPS	None	---
Selenium	0.092	0.092	BTV	None	---	0.45	0.45	BTV	None	---
Thallium	0.017	0.017	BTV	None	---	0.0014	0.002	US EPA MCL	None	---
Combined Radium	4.43	5	US EPA MCL	None	---	5.4	5.4	BTV	None	---

Notes:

BTV - Background Threshold Value

GWPS - Groundwater Protection Standard

LCL - Lower Confidence Limit

mg/L - milligrams per liter

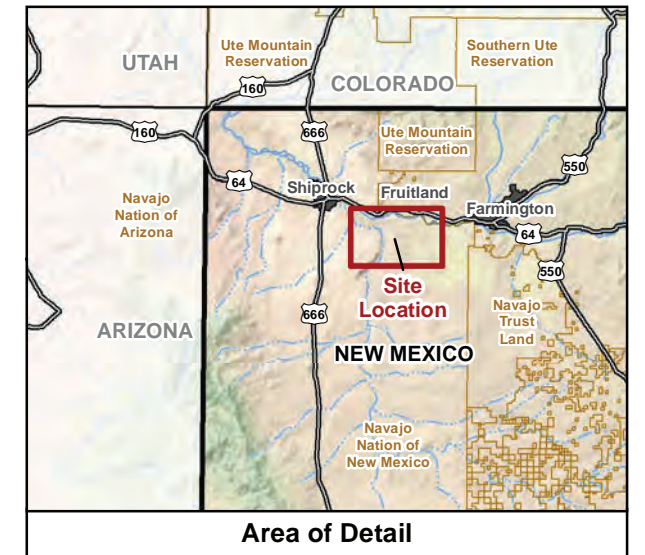
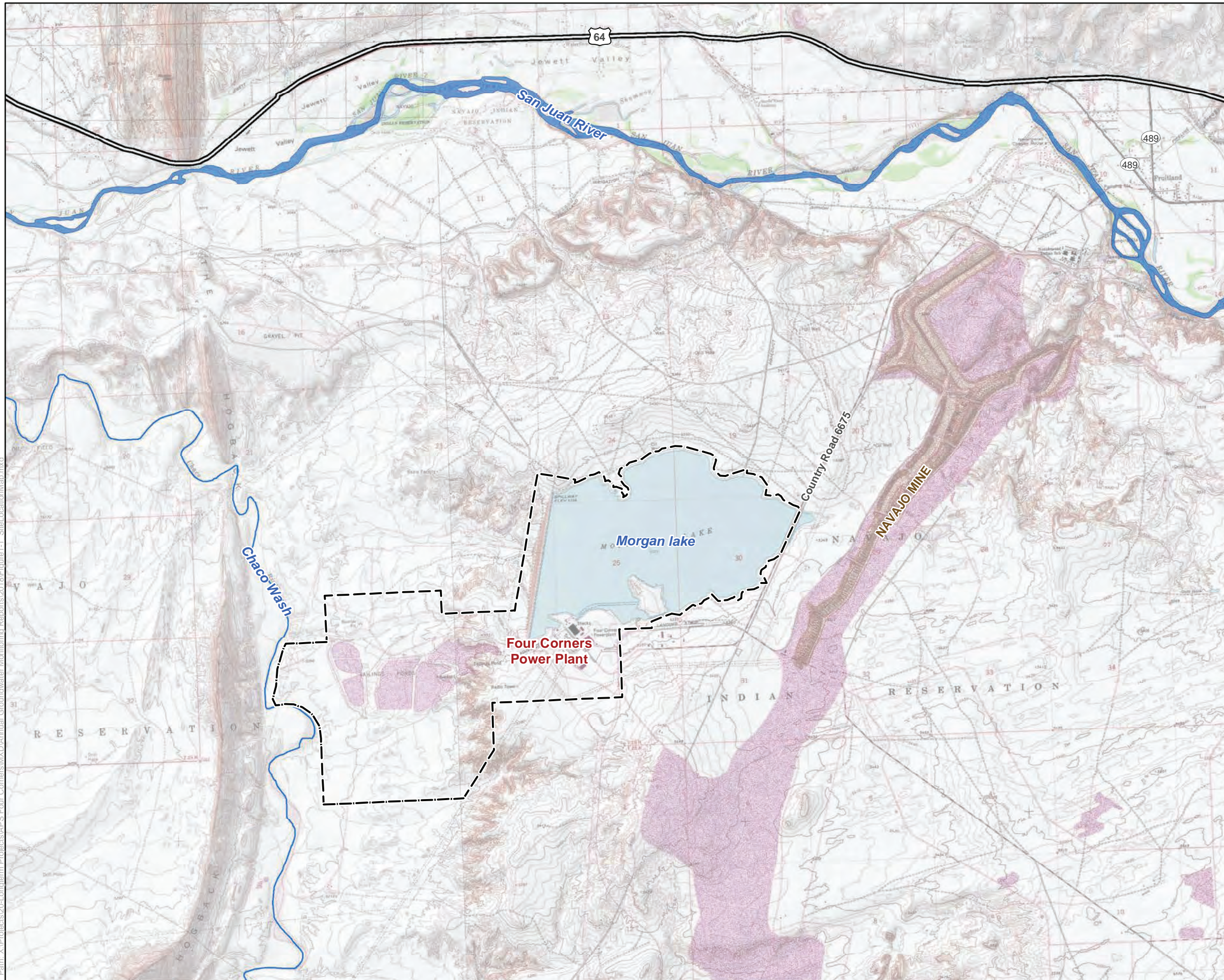
SSLs - statistically significant levels

US EPA MCL - United States Environmental Protection Agency Maximum Contaminant Level

* Inadequate temporal detrending in the background data defaults to using the US EPA MCL or Alternative Risk-Based GWPS, as applicable

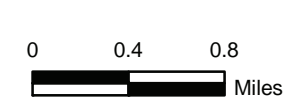
FIGURES





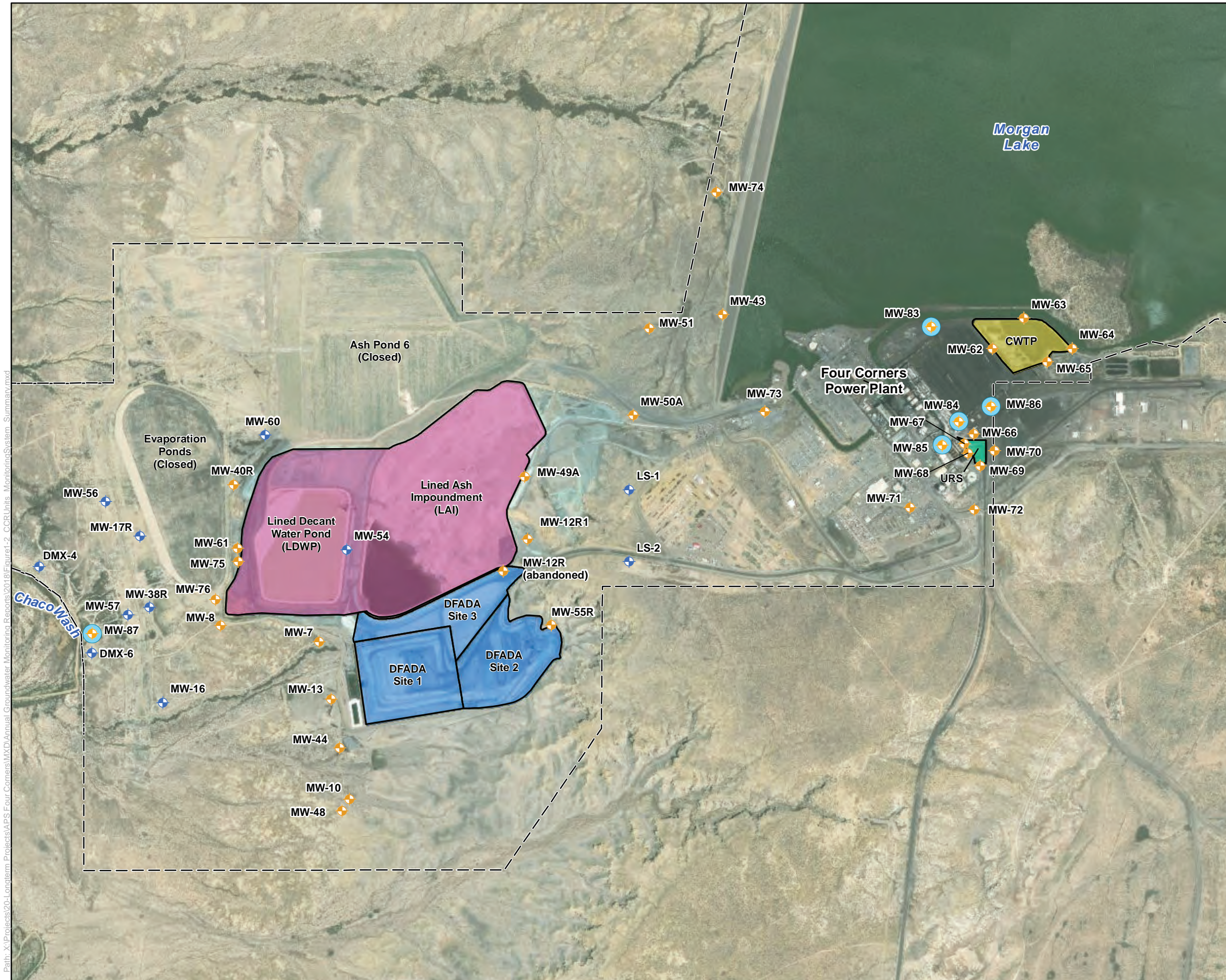
Legend

--- Four Corners Power Plant Lease Boundary



Arizona Public Service Four Corners Power Plant Fruitland, New Mexico	
FIGURE 1-1	Site Location Map
Job No. 14-2016-2024 PM: NC Date: 1/17/2019 Scale: 1" = 0.8 miles	
<small>The map shown here has been created with all due and reasonable care and is strictly for use with Wood Environment & Infrastructure Solutions, Inc. Project Number 14-2016-2024. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. Wood Environment & Infrastructure Solutions, Inc. assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.</small>	

Path: X:\Projects\20-Longterm Projects\APS Four Corners\MXD\Annual Groundwater Monitoring Reports\2018\Figure1-1_SiteLocationMap.mxd



Legend

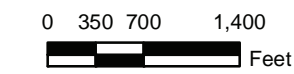
- ◆ CCR Monitoring Well Location
- ◆ Supplementary Site Monitoring Well Location
- ◆ CCR Monitoring Well Location Installed in 2018
- FCPP Lease Boundary

CCR Units

- Multiunit 1 (LAI and LDWP)
- Dry Fly Ash Disposal Area (DFADA)
- Combined Waste Treatment Pond (CWTP)
- Upper Retention Sump (URS)

Notes:

- CCR Coal Combustion Residuals
- CWTP Combined Waste Treatment Pond
- DFADA Dry Fly Ash Disposal Area
- FCPP Four Corners Power Plant
- LAI Lined Ash Impoundment
- LDWP Lined Decant Water Pond
- URS Upper Retention Sump



Arizona Public Service
Four Corners Power Plant
Fruitland, New Mexico

FIGURE 1-2 CCR Units and Monitoring System Summary

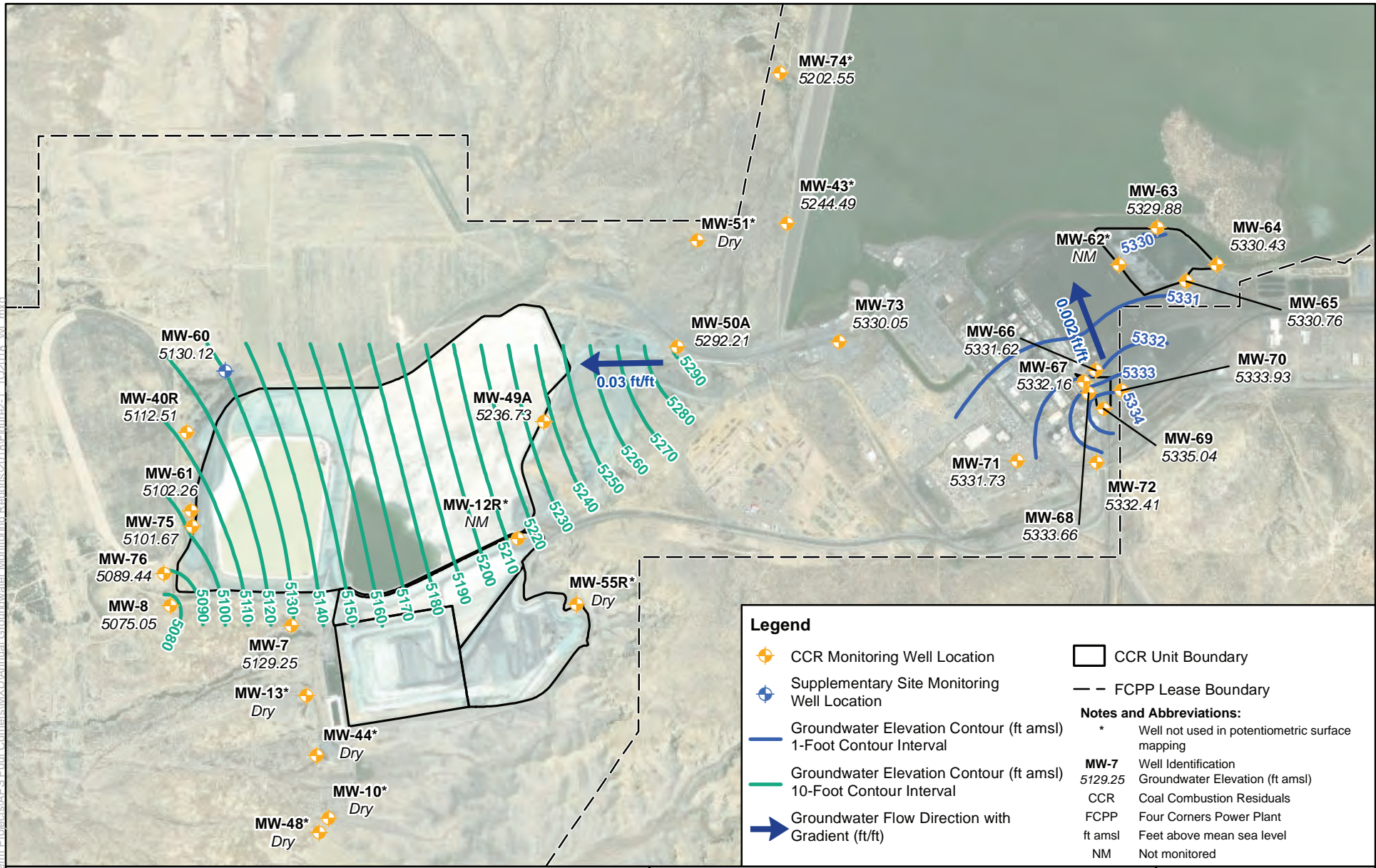
Job No. 14-2016-2024
PM: NC
Date: 1/22/2019
Scale: 1" = 1400'



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Path: X:\Projects\20-Longterm Projects\APS\Four Corners\MXD\Annual Groundwater Monitoring Reports\2018\Figure1-2_CCRUnits_MonitoringSystem_Summary.mxd

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Job No. 14-2016-2024
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 Scale: 1" = 1600'

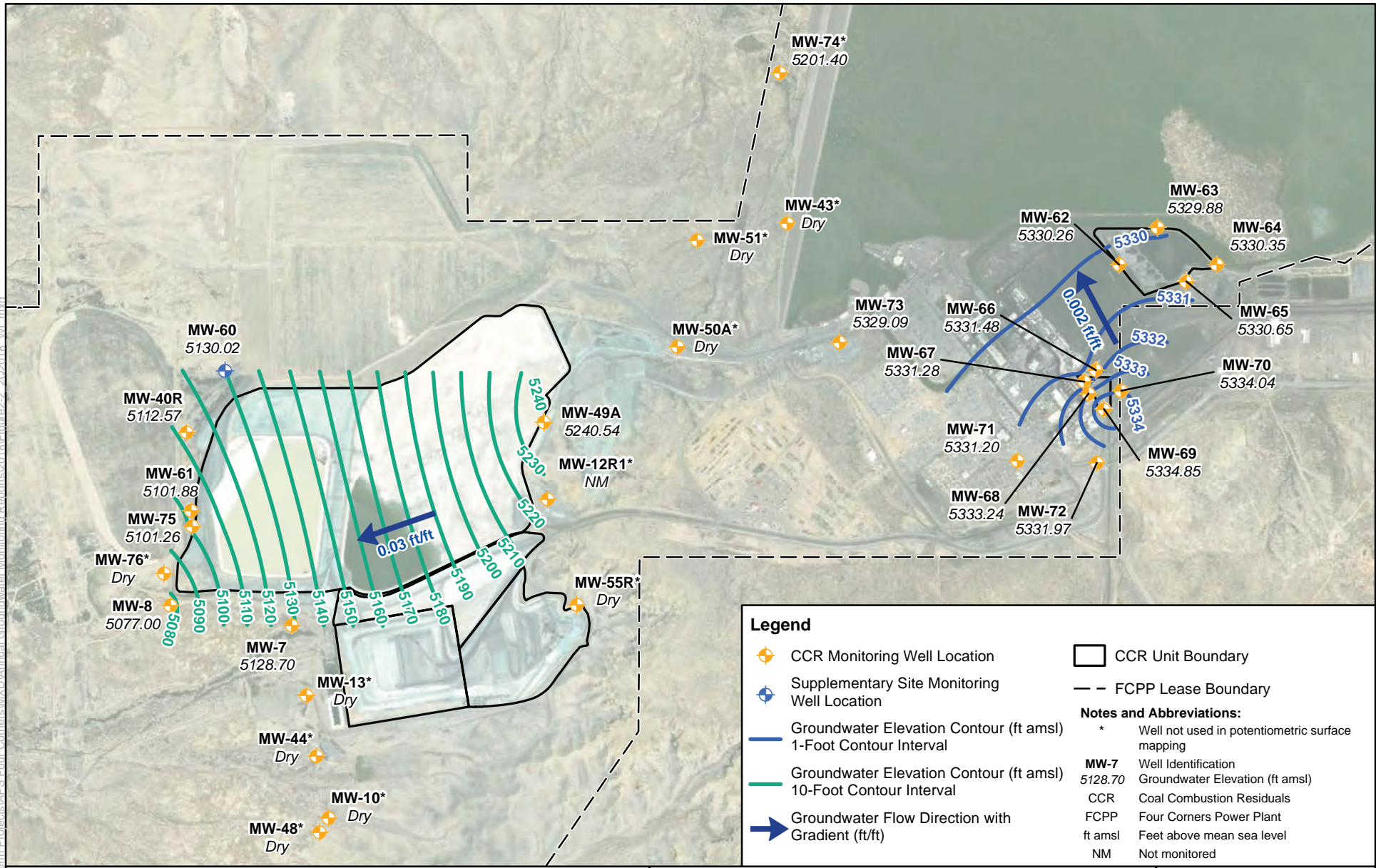
Arizona Public Service
 Four Corners Power Plant
 Fruitland, New Mexico

**Potentiometric Surface Map
 1st Quarter 2018 (3/15/2018)**

**FIGURE
 2-1**



Path: X:\Projects\20-Longterm Projects\APS-Four Corners\MXD\Annual Groundwater Monitoring Reports\2018\Figure2-2_202018_WI.mxd



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Job No. 14-2016-2024
 PM: NC
 Date: 1/25/2019
 Scale: 1" = 1600'

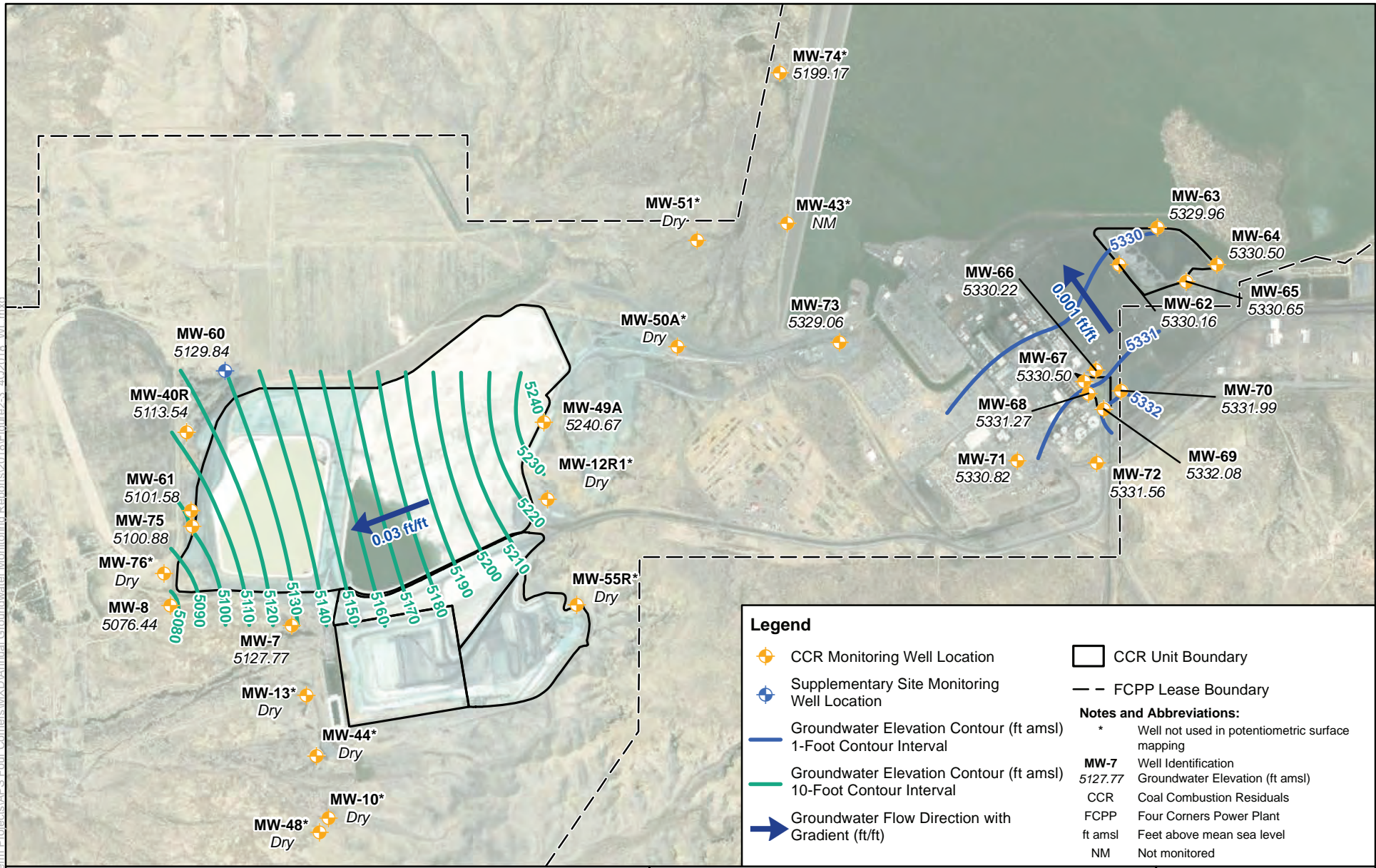
Arizona Public Service
 Four Corners Power Plant
 Fruitland, New Mexico

**Potentiometric Surface Map
 2nd Quarter 2018 (5/31/2018)**

**FIGURE
 2-2**



Path: X:\Projects\20-Longterm Projects\APS-Four Corners MXD\Annual Groundwater Monitoring Reports\2018\Figure2-3_4Q2018_WI.mxd



Legend

- CCR Monitoring Well Location
- Supplementary Site Monitoring Well Location
- Groundwater Elevation Contour (ft amsl)
1-Foot Contour Interval
- Groundwater Elevation Contour (ft amsl)
10-Foot Contour Interval
- Groundwater Flow Direction with Gradient (ft/ft)
- CCR Unit Boundary
- FCPP Lease Boundary

Notes and Abbreviations:

- * Well not used in potentiometric surface mapping
- MW-7** Well Identification
5127.77 Groundwater Elevation (ft amsl)
- CCR Coal Combustion Residuals
- FCPP Four Corners Power Plant
- ft amsl Feet above mean sea level
- NM Not monitored



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Job No. 14-2016-2024
 PM: NC
 Date: 1/25/2019
 Scale: 1" = 1600'

Arizona Public Service
 Four Corners Power Plant
 Fruitland, New Mexico

Potentiometric Surface Map
 4th Quarter 2018 (11/2/2018)

FIGURE
 2-3



APPENDIX A

AECOM LETTER REPORT DOCUMENTING MW-12R ABANDONMENT AND MW-12R1 INSTALLATION



December 5, 2018

Michele Robertson, RG
Principal Environmental Scientist
Arizona Public Service
P.O. Box 53999
Phoenix, AZ 85072

Subject: Abandonment of Monitoring Well MW-12R and Installation of Monitoring Well MW-12R1

Dear Michele:

This letter provides you with information regarding the abandonment of existing Groundwater Monitoring Well MW-12R and installation of new Groundwater Monitoring Well MW-12R1 at the Four Corners Power Plant

Well MW-12R was installed in March 2012. The well was extended vertically in April 2012 to allow future raising of the ground surface around the well associated with placement of dry ash within the DFADA landfill. In 2018, APS decided to decommission ("abandon") Well MW-12R, rather than extend the casing further, and to install new Well MW-12R1 at a location approximately 600 feet northeast of Well MW-12R.

Abandonment of Well MW-12R

Well MW-12R was abandoned on April 9, 2018 in accordance with the procedures described in the Arizona Department of Water Resources (ADWR) Well Abandonment Handbook (September 2008). After a utility clearance was completed, Cascade Drilling Services over-drilled the well to a depth of 44 feet below ground surface (bgs). The well was then filled with a cement-bentonite grout mixture, in accordance with Table 1 of the ADWR Well Abandonment Handbook, to a depth of 2 feet bgs and the remaining depth was filled by native soil. The surface and PVC casings were disposed in a roll-off dumpster identified by APS.

Installation of Well MW-12R1

Installation of groundwater monitoring well MW-12R1 started on April 10, 2018 and was completed on April 11, 2018. The borehole was drilled to refusal at 40 feet bgs (5228.2 feet above sea level (ASL)) in unweathered shale using a rotosonic drilling rig. The well was set at 32 feet bgs (5236.2 feet ASL) with a 0.010 inch slotted screen from 22 to 32 feet bgs. The well was screened in the weathered shale in coordination with the APS geologist who was on-site for the drilling.

The annular material used to backfill the well was native soil from 35 to 40 feet bgs, bentonite chips from 33 to 35 feet bgs, 20-40 Colorado Silica Sand filter pack from 20 to 33 feet bgs, bentonite chips from 18 to 20 feet bgs, and cement-bentonite grout mixture from 0 to 18 feet bgs. Initial water level measurements on April 11, 2018 showed the well was dry. A well log for MW-12R1 is attached.

A concrete pad was installed around MW-12R1. The ground surface and well casing elevations have been documented in a Monitoring Well Survey Report by Sakura Engineering and Surveying dated May 18, 2018: the top of concrete pad elevation is at 5268.23 feet ASL; the top of the PVC casing is at elevation 5270.12 feet ASL, and the top of the steel well casing is set at elevation 5271.12 feet ASL. The survey report is attached.

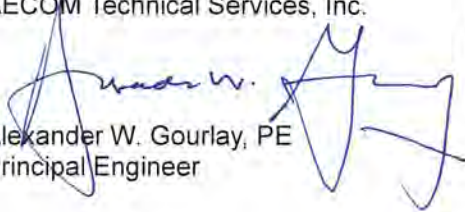
Certification

I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of New Mexico, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification is prepared in accordance with the accepted practice of engineering. I certify that the abandonment of Well MW-12R and the installation of Well MW-12R1 meet the requirements of 40 CFR § 257.91(e).

If you have any questions or require additional information, please do not hesitate to contact me at (602) 861-7439.

Sincerely,

AECOM Technical Services, Inc.


Alexander W. Gourlay, PE
Principal Engineer



Enclosures: MW-12R Well Log (Abandoned)
MW-12R1 Well Log
Certified Monitoring Well Survey Report dated 05-18-2018

cc: Byron Conrad, PE (APS)
Nicole Park, RG (AECOM)



7720 N. 16th St., Suite 100
 Phoenix, AZ 85020
 Telephone: (602) 371-1100
 Fax: (602) 371-1615

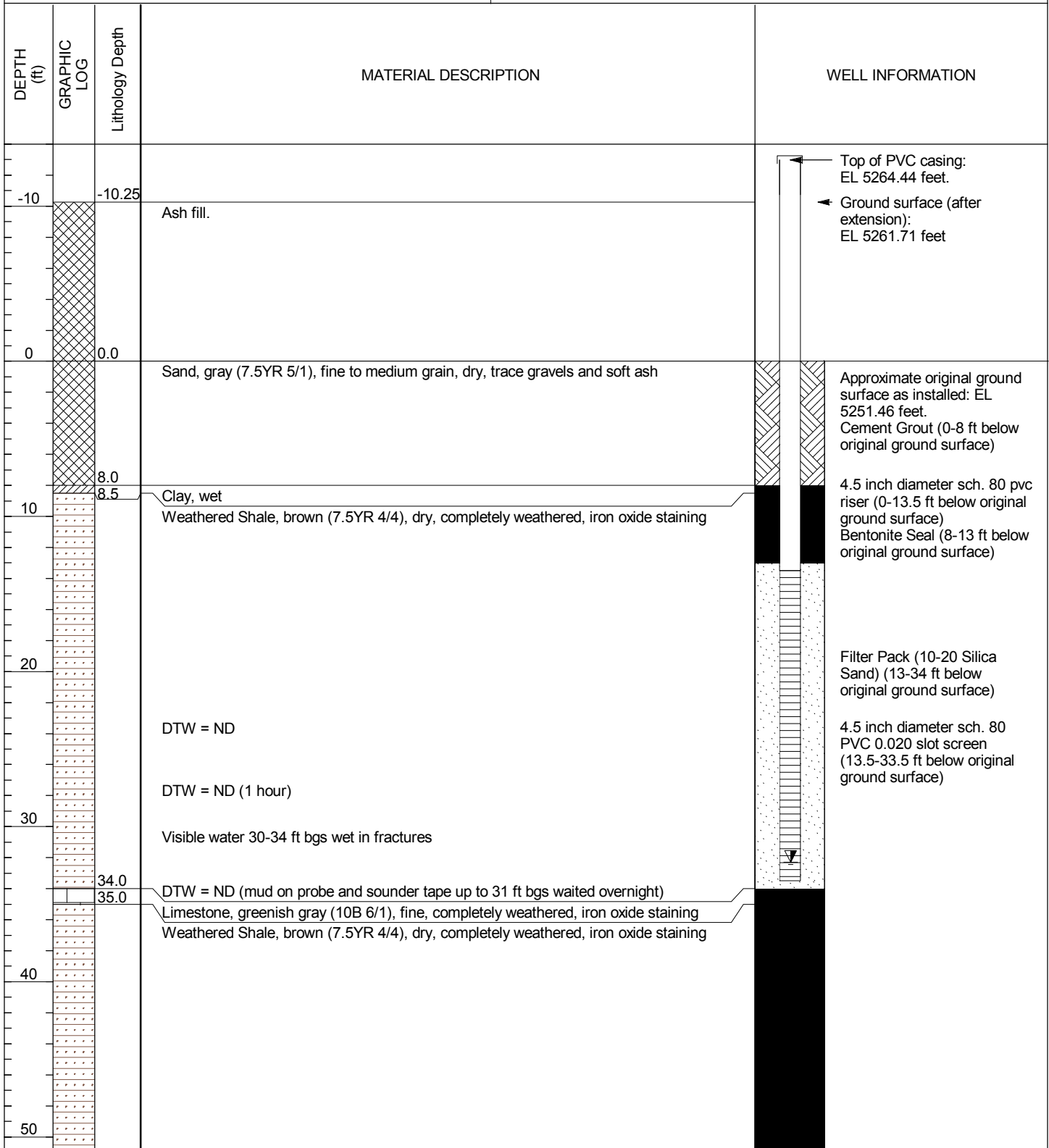
Borehole: MW-12R (Abandoned)

PROJECT: Four Corners Power Plant
CLIENT: APS
LOCATION: Fruitland, NM
URS PROJECT #: 23446275

DRILLING METHOD: Rotasonic
LOGGED BY: Derrick Maurer
START DATE/TIME: 3/26/2012 2:53:00 PM
FINISH DATE/TIME: 3/27/2012 1:20:00 PM
ABANDONED: 4/9/2018

COMMENTS: PVC was extended 10.25 feet on 4/23/12, before survey. Well log was amended 9/18/18 to show extension and ash fill. All depths from top of PVC increased by 10.25 feet after the well extension.

COORDINATES (NAD83):
 North: 2068356.17
 East: 2527509.566
TOP OF GROUND ELEVATION (NAVD88): 5261.71 feet A.S.L. (May/June 2012)



REPORT APS-FOPP-REV2 (MW-12R) | PROJECT B:\GINT\BIRRES GINT\PROJECTS\APS-FOPP\APS-FOPP.GPJ | LIBRARY APS-FOPP-2012.GLB | PRINTED 12/3/18



7720 N. 16th St., Suite 100
 Phoenix, AZ 85020
 Telephone: (602) 371-1100
 Fax: (602) 371-1615

Borehole: MW-12R (Abandoned)

PROJECT: Four Corners Power Plant
CLIENT: APS
LOCATION: Fruitland, NM
URS PROJECT #: 23446275

DRILLING METHOD: Rotasonic
LOGGED BY: Derrick Maurer
START DATE/TIME: 3/26/2012 2:53:00 PM
FINISH DATE/TIME: 3/27/2012 1:20:00 PM
ABANDONED: 4/9/2018

DEPTH (ft)	GRAPHIC LOG	Lithology Depth	MATERIAL DESCRIPTION	WELL INFORMATION
60			Weathered Shale, brown (7.5YR 4/4), dry, completely weathered, iron oxide staining <i>(continued)</i>	Bentonite Chips (34-70 ft below original ground surface)
		63.0	Transition from weathered shale to unweathered shale	
70		70.0	Unweathered Shale, blueish gray (10B 6/1), dry, hard, fine, unweathered	

Total Depth of borehole = 70.0 feet bgs

This well was abandoned on April 9, 2018 in accordance with the procedures described in the Arizona Department of Water Resources (ADWR) Well Abandonment Handbook (September 2008).

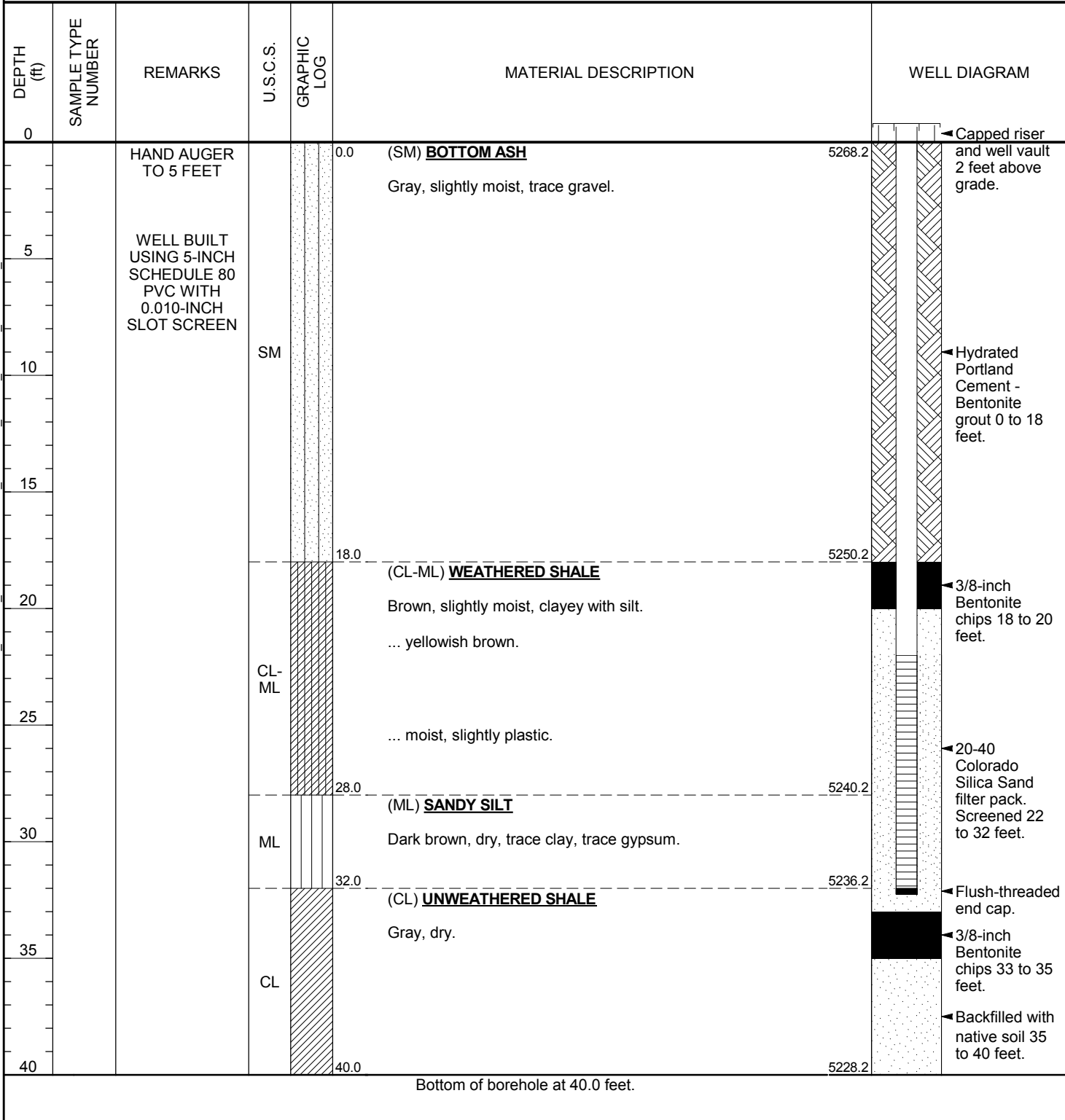


AECOM
 7720 N. 16th St.
 Phoenix, AZ 85020
 Telephone: 602-371-1100

WELL NUMBER MW-12R1

CLIENT APS	PROJECT NAME APS Four Corners
PROJECT NUMBER 60525856	PROJECT LOCATION Four Corners Power Plant
DATE STARTED 4/10/18	COMPLETED 4/10/18
DRILLING CONTRACTOR Cascade Drilling	GROUND ELEVATION 5268.23 ft
DRILLING METHOD Rotasonic/Continuous Core (LS-600)	HOLE SIZE 9 inches
LOGGED BY N. Park	GROUND WATER LEVELS: Groundwater not encountered
CHECKED BY F. Ackerman	▽ AT TIME OF DRILLING --- Dry
NOTES NAD83, NAVD88: N 2068819.84, E 2527852.04; Top of PVC Casing: 5270.12 ft	▽ AT END OF DRILLING --- Dry
	▽ AFTER DRILLING ---

GENERAL BH / TP / WELL - GINT STD US.GDT - 6/5/18 16:05 - P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60525856_FCC07573_DFADA_SECTA_CLOSURE_SG2400-TECHNICAL\431-WELL 12R ABANDONING\MW-12R1.GPJ





NEW MEXICO WEST STATE PLANE COORDINATE SYSTEM NAD83
NAVD 88
CONTROL POINT- HV53 N2070581.505, E 2529275.542, ELEV 5331.214

MW 12R1) N 2068819.84 E 2527852.04 ELEV 5268.23 NORTH SIDE OF
CONCRETE

5270.12 NORTH SIDE OF PVC
5271.12 NORTH SIDE OF STEEL CASING



125 West Main
Suite "A"
Farmington New Mexico 87401

APPENDIX B

AECOM LETTER REPORT DOCUMENTING MW-67 MODIFICATION



December 14, 2018

Michele Robertson, RG
APS Principal Environmental
Scientist
P.O. Box 53999
Phoenix, AZ 85072

Subject: CCR Monitoring Well MW-67 Modification

Dear Michele

This letter provides you with updated information regarding the recent modification to groundwater monitoring well MW-67 at the Four Corners Power Plant. A modified borehole log for MW-67 is enclosed that documents the details of the well modification.

During construction of the Upper Retention Sump Tank, MW-67 was modified from an above-ground to a below-grade completion. MW-67 is located in the travel way for trucks entering and exiting the Upper Retention Sump Tank access ramp. As such, leaving MW-67 as an above-ground completion would have put it at high risk of being damaged or destroyed by work trucks.

Installation of the well modification for MW-67 started on October 29, 2018 and was completed on November 9, 2018. The casing and concrete collar were in their final, modified configuration at the time APS measured and sampled the well on November 2 and 3, 2018.

The well modification included complete removal of all bollards, removal of most of the concrete collar surrounding the well riser, cutting of the outer 8-inch steel protective casing, and cutting of the 5-1/2-inch PVC well casing to allow for a below-grade installation. The steel and PVC casings were both cut to the same level.

The below-grade installation included installation of an H-20 traffic rated limited access monitoring well manhole (PEMCO model 100LA12X12 or equal) to protect the well casing (see Figure 1). The monitoring well manhole consists of a cast-iron lid and a 13 inch-deep steel skirt. The manhole is encased in 5,000 psi concrete that is reinforced with #5 rebar. The new concrete collar around the well manhole is 31 inches in diameter with a depth of 21 inches.

The top of the manhole is set flush with the adjacent regraded ground surface at an elevation of 5353.80 feet above sea level (ASL) based on the North American Vertical Datum 1988 (NAVD88). The top of the well casing is set at an elevation of 5352.76 feet ASL with respect to NAVD88. The ground surface and well casing elevations have been documented in a Monitoring Well Survey Report by Sakura Engineering and Surveying dated November 21, 2018.

I, David E. Mickanen, being a Registered Professional Engineer in good standing in the State of New Mexico, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification is prepared in accordance with the accepted practice of engineering. I certify that the modified surface completion of Monitoring Well MW-67 meets the requirements of 40 CFR § 257.91(e).

If you require additional information, please do not hesitate to contact me at (602) 648-2310.

Sincerely,

AECOM Technical Services, Inc.



David E. Mickanen, PE, REM
Principal Civil Engineer
AECOM

Enclosures: MW-67 Well Log
Figure 1 - CCR Monitoring Well MW-67 Modification
Certified Monitoring Well Survey Report dated 11-21-2018

cc: Byron Conrad
Brendan Lemieux
Sandy Gourlay

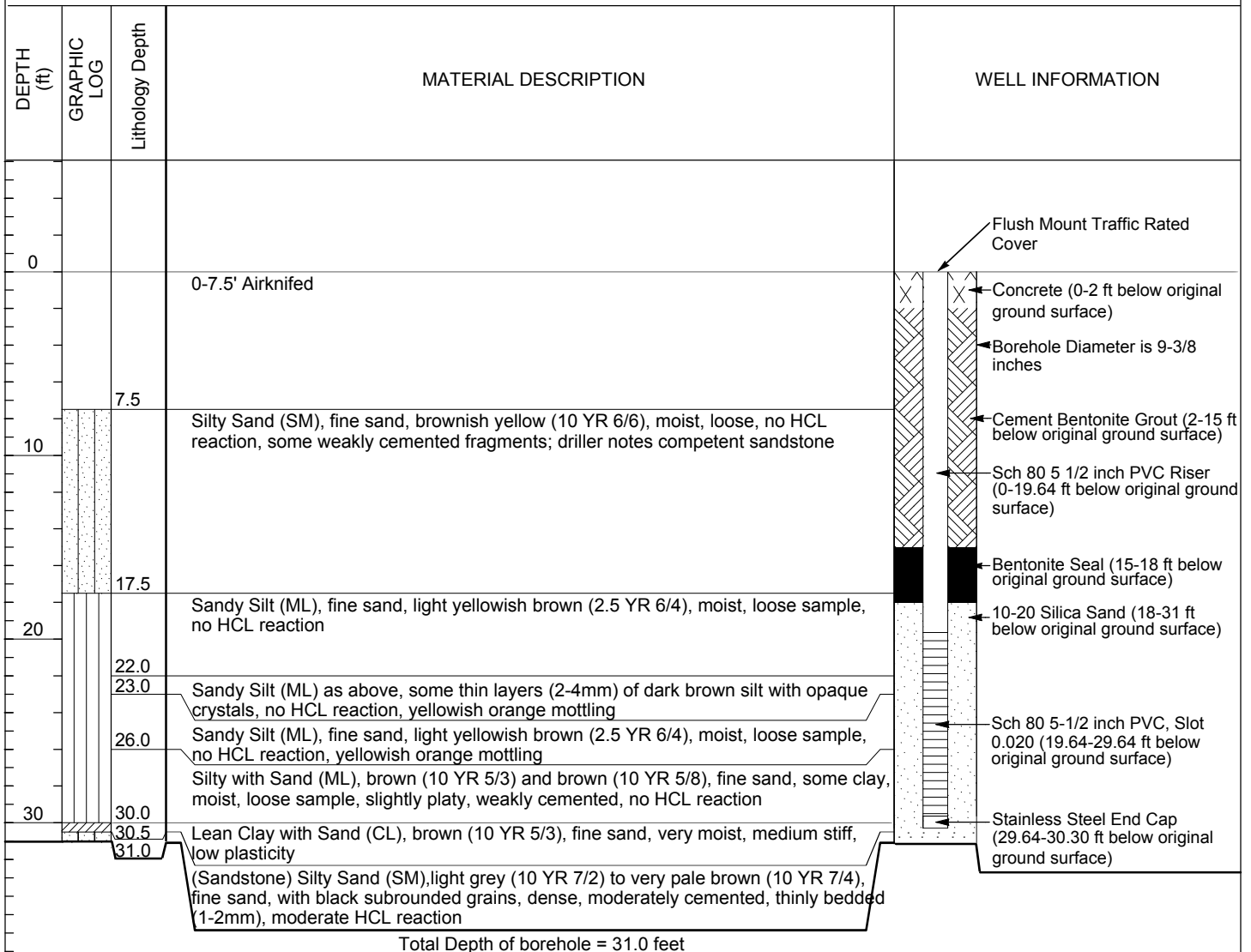
Borehole: MW-67

PROJECT: FCCP Monitoring Well Install
CLIENT: APS
LOCATION: FCCP New Mexico
URS PROJECT #: 60437300

DRILLING METHOD: RotoSonic
LOGGED BY: Rick Smith
START DATE/TIME: 9/11/2015 7:40:00 AM
FINISH DATE/TIME: 9/11/2015 10:20:00 AM

Water Level at Drilling Completion (ft bgs): 19.8
Screened Interval (ft bgs): 19.64-29.64
COMMENTS: Well was modified to a flush mount with traffic rated cover on 11/9/18. Original ground surface was 5354.02 feet A.S.L.

COORDINATES (NAD83):
North: 2070194.39
East: 2534124.22
TOP OF GROUND ELEVATION (NAVD88): 5353.80 feet A.S.L.



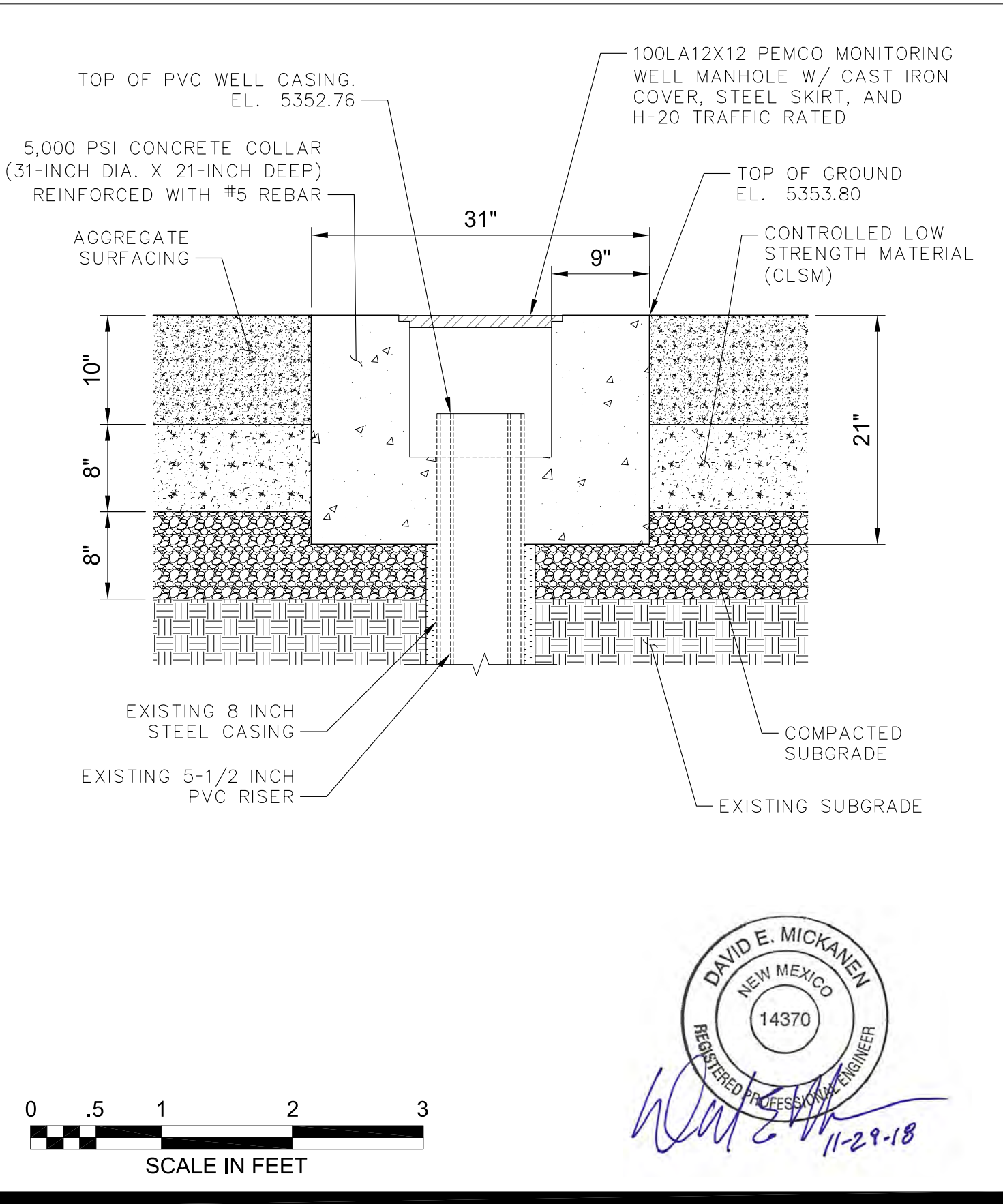


Figure 1
CCR Monitoring Well MW-67 Modification
 Arizona Public Service
 Four Corners Power Plant



FOUR CORNERS POWER PLANT GRID SYSTEM
NAVD 88
CONTROL POINT M6 N-716.400, E 1207.185, ELEV 5340.045

MW 67) N -1071.706 E 1212.664 ELEV 5353.800 NORTH SIDE OF CONCRETE
5352.764 "X" NORTH SIDE OF PVC

I, Scott A Martin, a New Mexico Professional Surveyor No. 21663, do hereby certify this Monitor Well Survey Report was prepared by me or under my supervision based on an actual survey on the ground that I am responsible for this survey; and that the survey and report meets the minimum standards for surveying in New Mexico.



A handwritten signature in black ink that reads "Scott A. Martin".

**125 West Main
Suite "A"
Farmington New Mexico 87401**

APPENDIX C

SITE CCR GROUNDWATER MONITORING SYSTEM NOTIFICATIONS





Arizona Public Service Company
CCR Program
Environmental Policy & Programs

PO Box 53999
Mail Station 9303
Phoenix, AZ 85072-3999

Telephone: 602-250-1000

February 12, 2018

**CCR Program Documentation
Groundwater Monitoring Program – Notification of Change to Monitoring Schedule
FC_GW_AMonTrigNotif_021_20180212**

Subject: GW – Notification of Triggering Assessment Monitoring Program

Pursuant to 40 C.F.R. Secs 257.94(e)(3) and 257.106(h)(4), APS is providing notice that an assessment monitoring program has been established for the LAI and North Toe Buttress/ Lined Decant Water Pond (Multi-Unit) and the Upper Retention Pond at Four Corners Power Plant. As such, APS is commencing a groundwater monitoring program in accordance with 40 C.F.R. Sec 257.95, which includes sampling and analysis of those constituents identified at 40 C.F.R. Part 257, Appendix IV. If you have any questions about this or would like additional information, please consult the CCR information webpage located within APS.com or contact neal.brown@aps.com.

Per the September 8, 2015 letter to the Navajo Nation, this assessment monitoring notification should not be construed as a waiver of the covenant not to regulate contained in the site lease for the Four Corners Power Plant.



Arizona Public Service Company
CCR Program
Environmental Policy & Programs

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Mail Station 9303
Phoenix, AZ 85072-3999

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November 14, 2018

CCR Program Documentation
Groundwater Monitoring Program – Notification of Appendix IV Exceedances
FC_GW_AppIVExc_008_20181114
FC_GW_AppIVExc_011_20181114

Subject: GW – Notification of Appendix IV Exceedances; Four Corners Power Plant

Pursuant to 40 C.F.R. Secs 257.95(g), APS is providing notice that one or more constituents in Appendix IV are detected at statistically significant levels above the groundwater protection standard for the following units:

- LAI and North Toe Buttress/ Lined Decant Water Pond (Multi-Unit)
 - Cobalt; Molybdenum
- Upper Retention Pond
 - Fluoride

As such, APS will characterize the nature and extent of the release and any relevant site conditions that may affect the remedy ultimately selected.

If you have any questions about this or would like additional information, please consult the CCR information webpage located within APS.com or contact neal.brown@aps.com.

Per the September 8, 2015 letter to the Navajo Nation, this assessment monitoring notification should not be construed as a waiver of the covenant not to regulate contained in the site lease for the Four Corners Power Plant.



Arizona Public Service Company
CCR Program
Environmental Policy & Programs

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Phoenix, AZ 85072-3999

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December 10, 2018

**CCR Program Documentation
Closure – Notification of Intent to Close
FC_ClosNOI_011_20181210**

Subject: Closure – Notification of Intent to Close; Upper Retention Pond - Four Corners Power Plant

Pursuant to 40 C.F.R. §§ 257.101(a)(1), 257.101(a)(2), 257.101(b)(1), and 257.101(b)(3), APS is providing notice of its intent to close the Upper Retention Pond.

In accordance with 40 CFR 257.102(g), the unit will be closed in accordance with its Closure Plan and the provisions of 40 CFR 257.102(c).

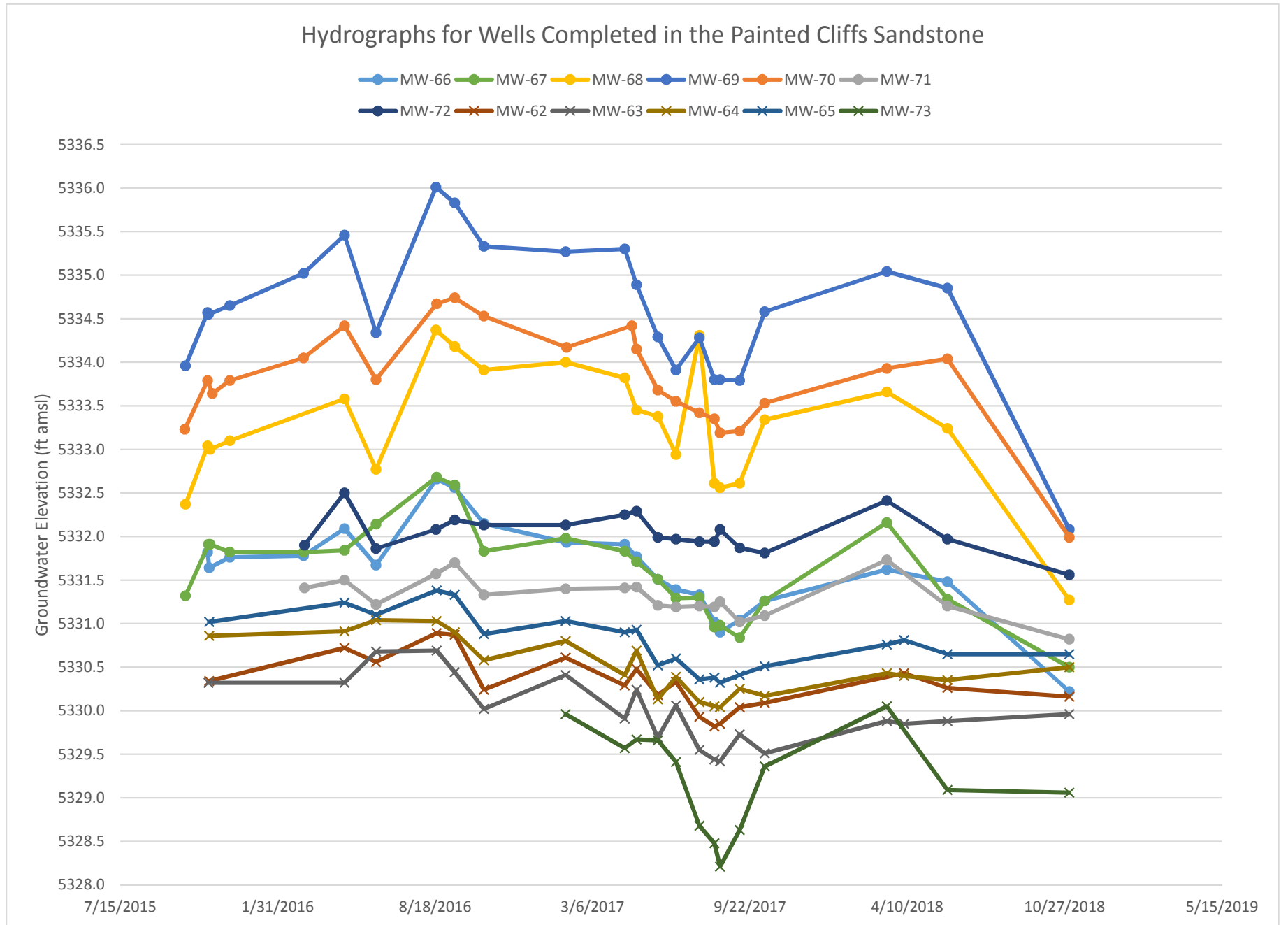
If you have any questions about this or would like additional information, please consult the CCR information webpage located within APS.com or contact neal.brown@aps.com.

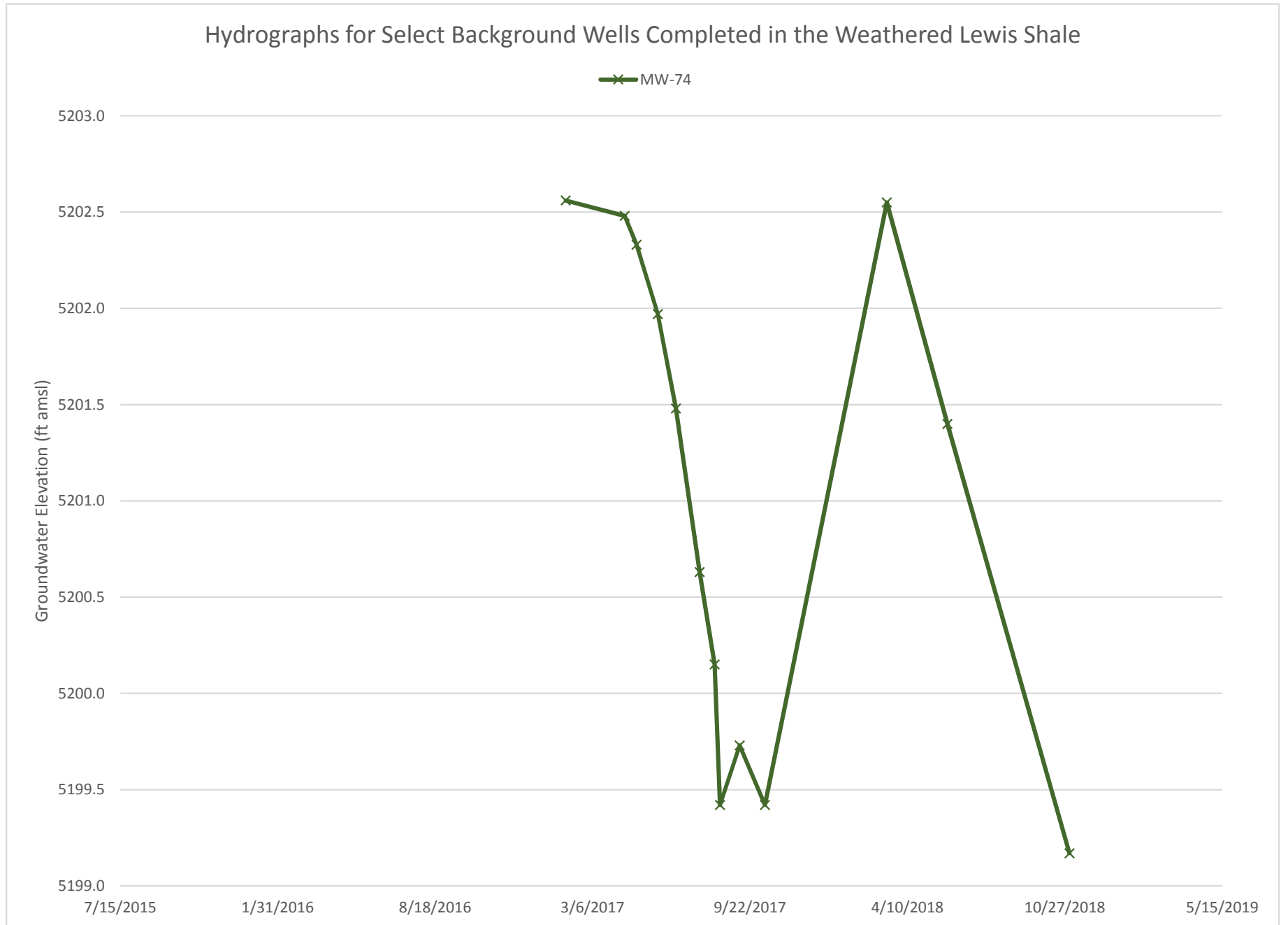
Per the September 8, 2015 letter to the Navajo Nation, this notification of intent to close should not be construed as a waiver of the covenant not to regulate contained in the site lease for the Four Corners Power Plant.

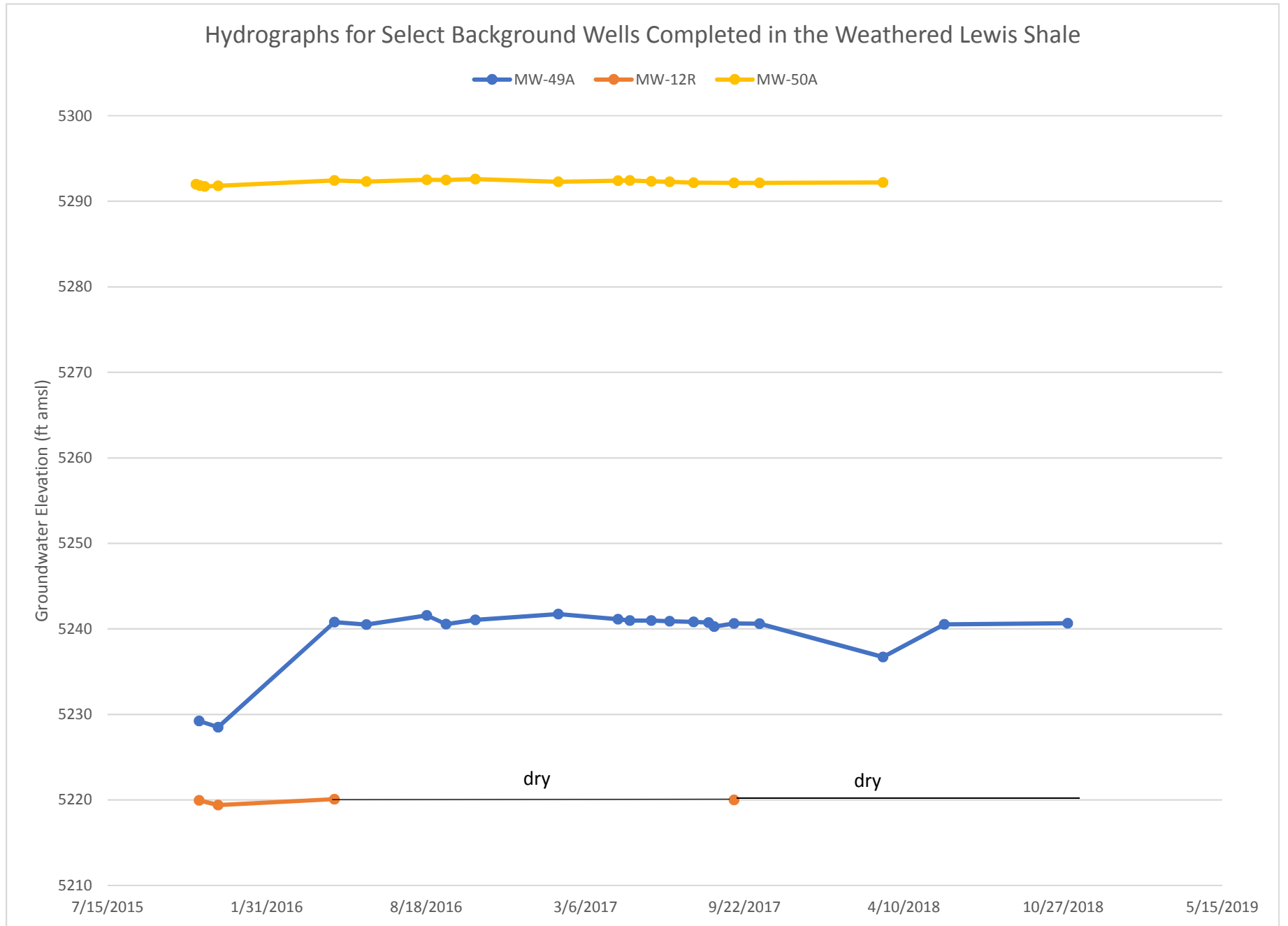
APPENDIX D

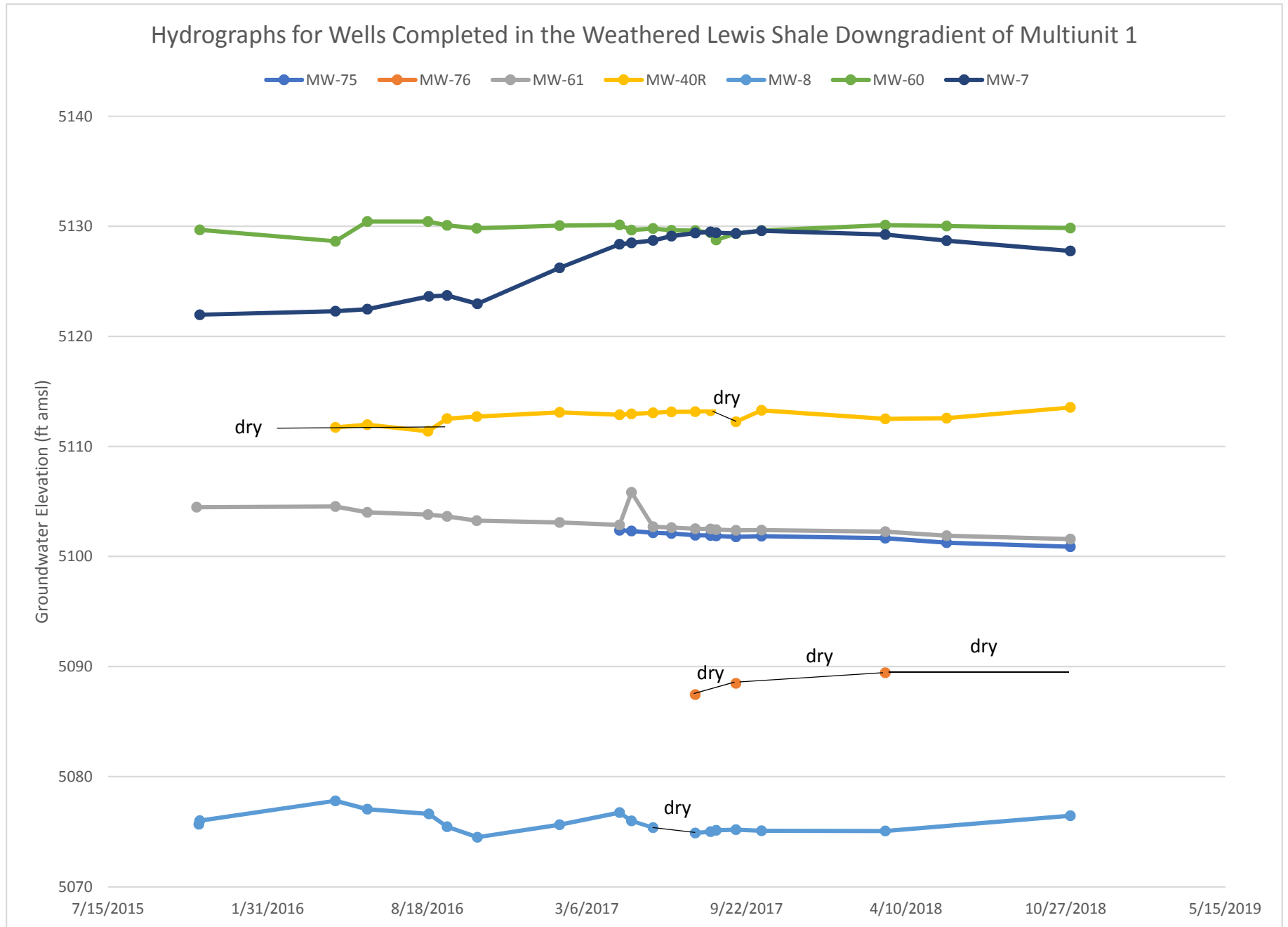
GROUNDWATER ELEVATION DATA AND HYDROGRAPHS











MW-7				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/7/2015	5149.32	27.35	5121.97	
4/25/2016	5149.32	27.04	5122.28	
6/4/2016	5149.32	26.85	5122.47	
8/20/2016	5149.32	25.68	5123.64	
9/12/2016	5149.32	25.61	5123.71	
10/20/2016	5149.32	26.36	5122.96	
1/31/2017	5149.32	23.08	5126.24	36.04
4/16/2017	5149.32	20.95	5128.37	
5/1/2017	5149.32	20.83	5128.49	
5/28/2017	5149.32	20.59	5128.73	
6/20/2017	5149.32	20.21	5129.11	
7/20/2017	5149.32	19.93	5129.39	
8/8/2017	5149.32	19.83	5129.49	
8/15/2017	5149.32	19.91	5129.41	
9/9/2017	5149.32	19.97	5129.35	
10/11/2017	5149.32	19.72	5129.6	
3/15/2018	5149.32	20.07	5129.25	
5/31/2018	5149.32	20.62	5128.7	
11/2/2018	5149.32	21.55	5127.77	

MW-8				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/6/2015	5122.56	46.9	5075.66	
11/7/2015	5122.56	46.56	5076	
4/25/2016	5122.56	44.76	5077.8	
6/4/2016	5122.56	45.52	5077.04	
8/20/2016	5122.56	45.95	5076.61	
9/12/2016	5122.56	47.11	5075.45	
10/20/2016	5122.56	48.07	5074.49	
1/31/2017	5122.56	46.94	5075.62	
4/16/2017	5122.56	45.82	5076.74	
5/1/2017	5122.56	46.59	5075.97	
5/28/2017	5122.56	47.19	5075.37	
6/20/2017	5122.56	Dry		
7/20/2017	5122.56	47.68	5074.88	
8/8/2017	5122.56	47.57	5074.99	
8/15/2017	5122.56	47.44	5075.12	
9/9/2017	5122.56	47.39	5075.17	
10/11/2017	5122.56	47.49	5075.07	
3/15/2018	5122.56	47.51	5075.05	
5/31/2018	5122.56	45.56	5077	
11/2/2018	5122.56	46.12	5076.44	

MW-12R				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/7/2015	5264.70	44.75	5219.95	
12/1/2015	5264.70	45.29	5219.41	
4/25/2016	5264.70	44.6	5220.10	
6/4/2016	5264.70	DRY		
8/20/2016	5264.70	DRY		
9/12/2016	5264.70	DRY		
10/19/2016	5264.70	DRY		
1/31/2017	5264.70	DRY		
4/16/2017	5264.70	DRY		
5/1/2017	5264.70	DRY		
5/28/2017	5264.70	DRY		
6/20/2017	5264.70	DRY		
7/20/2017	5264.70	DRY		
8/8/2017	5264.70	DRY		
8/15/2017	5264.70	DRY		
9/9/2017	5264.70	44.68		
10/11/2017	5264.70	DRY		
3/15/2018	5264.70	DRY		
5/31/2018	5264.70	DRY		
11/2/2018	5264.70	DRY		

MW-40R				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/7/2015	5137.43	DRY		
4/25/2016	5137.43	25.7	5111.73	
6/4/2016	5137.43	25.46	5111.97	
8/19/2016	5137.43	26.05	5111.38	
9/12/2016	5137.43	24.9	5112.53	
10/19/2016	5137.43	24.72	5112.71	
1/31/2017	5137.43	24.34	5113.09	
4/16/2017	5137.43	24.56	5112.87	
5/1/2017	5137.43	24.47	5112.96	
5/28/2017	5137.43	24.38	5113.05	
6/20/2017	5137.43	24.29	5113.14	
7/20/2017	5137.43	24.26	5113.17	
8/8/2017	5137.43	24.19	5113.24	
8/15/2017	5137.43	Dry		
9/9/2017	5137.43	25.18	5112.25	
10/11/2017	5137.43	24.14	5113.29	
3/15/2018	5137.43	24.92	5112.51	
5/31/2018	5137.43	24.86	5112.57	
11/2/2018	5137.43	23.89	5113.54	

MW-49A				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/7/2015	5285.96	56.71	5229.25	
12/1/2015	5285.96	57.45	5228.51	
4/25/2016	5285.96	45.17	5240.79	
6/4/2016	5285.96	45.44	5240.52	
8/19/2016	5285.96	44.38	5241.58	
9/12/2016	5285.96	45.4	5240.56	
10/19/2016	5285.96	44.90	5241.06	
1/31/2017	5285.96	44.23	5241.73	
4/16/2017	5285.96	44.82	5241.14	
5/1/2017	5285.96	44.98	5240.98	
5/28/2017	5285.96	44.98	5240.98	
6/20/2017	5285.96	45.06	5240.9	
7/20/2017	5285.96	45.13	5240.83	
8/8/2017	5285.96	45.22	5240.74	
8/15/2017	5285.96	45.68	5240.28	
9/9/2017	5285.96	45.32	5240.64	
10/11/2017	5285.96	45.34	5240.62	
3/15/2018	5285.96	49.23	5236.73	
5/31/2018	5285.96	45.42	5240.54	
11/2/2018	5285.96	45.29	5240.67	

MW-50A				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/3/2015	5335.67	43.69	5291.98	
11/8/2015	5335.67	43.84	5291.83	
11/14/2015	5335.67	43.95	5291.72	
12/1/2015	5335.67	43.85	5291.82	
4/25/2016	5335.67	43.23	5292.44	
6/4/2016	5335.67	43.36	5292.31	
8/19/2016	5335.67	43.16	5292.51	
9/12/2016	5335.67	43.18	5292.49	
10/19/2016	5335.67	43.07	5292.6	
1/31/2017	5335.67	43.38	5292.29	
4/16/2017	5335.67	43.25	5292.42	
5/1/2017	5335.67	43.24	5292.43	
5/28/2017	5335.67	43.33	5292.34	
6/20/2017	5335.67	43.39	5292.28	
7/20/2017	5335.67	43.49	5292.18	
8/8/2017	5335.67	Dry		
8/15/2017	5335.67	Dry		
9/9/2017	5335.67	43.51	5292.16	
10/11/2017	5335.67	43.52	5292.15	
3/15/2018	5335.67	43.46	5292.21	
5/31/2018	5335.67	Dry		
11/2/2018	5335.67	Dry		

MW-60				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/7/2015	5144.10	14.41	5129.69	
4/25/2016	5144.10	15.45	5128.65	
6/4/2016	5144.10	13.66	5130.44	
8/19/2016	5144.10	13.66	5130.44	
9/12/2016	5144.10	14.02	5130.08	
10/19/2016	5144.10	14.28	5129.82	
1/31/2017	5144.10	14.03	5130.07	
4/16/2017	5144.10	13.96	5130.14	
5/1/2017	5144.10	14.43	5129.67	
5/28/2017	5144.10	14.30	5129.80	
6/20/2017	5144.10	14.45	5129.65	
7/20/2017	5144.10	14.47	5129.63	
8/8/2017	5144.10	14.69	5129.41	
8/15/2017	5144.10	15.33	5128.77	
9/9/2017	5144.10	14.76	5129.34	
10/11/2017	5144.10	14.47	5129.63	
3/15/2018	5144.10	13.98	5130.12	
5/31/2018	5144.10	14.08	5130.02	
11/2/2018	5144.10	14.26	5129.84	

MW-61				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/3/2015	5129.19	24.70	5104.49	
4/25/2016	5129.19	24.64	5104.55	
6/4/2016	5129.19	25.18	5104.01	
8/19/2016	5129.19	25.38	5103.81	
9/12/2016	5129.19	25.55	5103.64	
10/19/2016	5129.19	25.94	5103.25	
1/31/2017	5129.19	26.1	5103.09	
4/16/2017	5129.19	26.32	5102.87	
5/1/2017	5129.19	23.36	5105.83	
5/28/2017	5129.19	26.48	5102.71	
6/20/2017	5129.19	26.56	5102.63	
7/20/2017	5129.19	26.67	5102.52	
8/8/2017	5129.19	26.69	5102.50	
8/15/2017	5129.19	26.75	5102.44	
9/9/2017	5129.19	26.81	5102.38	
10/11/2017	5129.19	26.79	5102.40	
3/15/2018	5129.19	26.93	5102.26	
5/31/2018	5129.19	27.31	5101.88	
11/2/2018	5129.19	27.61	5101.58	

MW-62				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/5/2015	5341.87	11.53	5330.34	
4/25/2016	5341.87	11.15	5330.72	
6/4/2016	5341.87	11.31	5330.56	
8/20/2016	5341.87	10.98	5330.89	
9/12/2016	5341.87	11.00	5330.87	
10/19/2016	5341.87	11.63	5330.24	
1/31/2017	5341.87	11.26	5330.61	
4/16/2017	5341.87	11.58	5330.29	
5/1/2017	5341.87	11.39	5330.48	
5/28/2017	5341.87	11.69	5330.18	
6/20/2017	5341.87	11.54	5330.33	
7/20/2017	5341.87	11.94	5329.93	
8/8/2017	5341.87	12.05	5329.82	
8/15/2017	5341.87	12.02	5329.85	
9/9/2017	5341.87	11.83	5330.04	
10/11/2017	5341.87	11.78	5330.09	
4/6/2018	5341.87	11.44	5330.43	
5/31/2018	5341.87	11.61	5330.26	
11/2/2018	5341.87	11.71	5330.16	

MW-63				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/4/2015	5337.02	6.70	5330.32	
4/25/2016	5337.02	6.7	5330.32	
6/4/2016	5337.02	6.34	5330.68	
8/20/2016	5337.02	6.33	5330.69	
9/12/2016	5337.02	6.58	5330.44	
10/19/2016	5337.02	7.0	5330.02	
1/31/2017	5337.02	6.61	5330.41	
4/16/2017	5337.02	7.11	5329.91	
5/1/2017	5337.02	6.78	5330.24	
5/28/2017	5337.02	7.33	5329.69	
6/20/2017	5337.02	6.96	5330.06	
7/20/2017	5337.02	7.47	5329.55	
8/8/2017	5337.02	7.58	5329.44	
8/15/2017	5337.02	7.6	5329.42	
9/9/2017	5337.02	7.29	5329.73	
10/11/2017	5337.02	7.51	5329.51	
3/15/2018	5337.02	7.14	5329.88	
4/6/2018	5337.02	7.17	5329.85	
5/31/2018	5337.02	7.14	5329.88	
11/2/2018	5337.02	7.06	5329.96	

MW-64				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/5/2015	5337.66	6.80	5330.86	
4/25/2016	5337.66	6.75	5330.91	
6/4/2016	5337.66	6.62	5331.04	
8/20/2016	5337.66	6.63	5331.03	
9/12/2016	5337.66	6.76	5330.90	
10/19/2016	5337.66	7.08	5330.58	
1/31/2017	5337.66	6.86	5330.80	
4/16/2017	5337.66	7.25	5330.41	
5/1/2017	5337.66	6.97	5330.69	
5/28/2017	5337.66	7.53	5330.13	
6/20/2017	5337.66	7.27	5330.39	
7/20/2017	5337.66	7.56	5330.10	
8/8/2017	5337.66	7.61	5330.05	
8/15/2017	5337.66	7.62	5330.04	
9/9/2017	5337.66	7.41	5330.25	
10/11/2017	5337.66	7.49	5330.17	
3/15/2018	5337.66	7.23	5330.43	
4/6/2018	5337.66	7.26	5330.40	
5/31/2018	5337.66	7.31	5330.35	
11/2/2018	5337.66	7.16	5330.50	

MW-65				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/5/2015	5339.74	8.72	5331.02	
4/25/2016	5339.74	8.5	5331.24	
6/4/2016	5339.74	8.64	5331.10	
8/20/2016	5339.74	8.36	5331.38	
9/12/2016	5339.74	8.41	5331.33	
10/19/2016	5339.74	8.86	5330.88	
1/31/2017	5339.74	8.71	5331.03	
4/16/2017	5339.74	8.84	5330.90	
5/1/2017	5339.74	8.81	5330.93	
5/28/2017	5339.74	9.22	5330.52	
6/20/2017	5339.74	9.14	5330.60	
7/20/2017	5339.74	9.38	5330.36	
8/8/2017	5339.74	9.36	5330.38	
8/15/2017	5339.74	9.42	5330.32	
9/9/2017	5339.74	9.33	5330.41	
10/11/2017	5339.74	9.23	5330.51	
3/15/2018	5339.74	8.98	5330.76	
4/6/2018	5339.74	8.93	5330.81	
5/31/2018	5339.74	9.09	5330.65	
11/2/2018	5339.74	9.09	5330.65	

MW-66				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
11/3/2015	5344.69	12.87	5331.82	
11/5/2015	5344.69	13.05	5331.64	
12/1/2015	5344.69	12.93	5331.76	
3/4/2016	5344.69	12.91	5331.78	
4/25/2016	5344.69	12.6	5332.09	
6/4/2016	5344.69	13.02	5331.67	
8/20/2016	5344.69	12.03	5332.66	
9/12/2016	5344.69	12.13	5332.56	
10/19/2016	5344.69	12.54	5332.15	
2/1/2017	5344.69	12.76	5331.93	
4/16/2017	5344.69	12.78	5331.91	
5/1/2017	5344.69	12.92	5331.77	
5/28/2017	5344.69	13.18	5331.51	
6/20/2017	5344.69	13.3	5331.39	
7/20/2017	5344.69	13.36	5331.33	
8/8/2017	5344.69	13.67	5331.02	
8/15/2017	5344.69	13.79	5330.90	
9/9/2017	5344.69	13.65	5331.04	
10/11/2017	5344.69	13.43	5331.26	
3/15/2018	5344.69	13.07	5331.62	
5/31/2018	5344.69	13.21	5331.48	
11/2/2018	5344.69	14.47	5330.22	

MW-67				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
10/6/2015	5356.42	25.1	5331.32	
11/4/2015	5356.42	24.51	5331.91	
11/6/2015	5356.42	24.51	5331.91	
12/1/2015	5356.42	24.6	5331.82	
3/4/2016	5356.42	24.6	5331.82	
4/25/2016	5356.42	24.58	5331.84	
6/4/2016	5356.42	24.28	5332.14	
8/20/2016	5356.42	23.74	5332.68	
9/12/2016	5356.42	23.83	5332.59	
10/19/2016	5356.42	24.59	5331.83	
1/31/2017	5356.42	24.44	5331.98	
4/16/2017	5356.42	24.59	5331.83	
5/1/2017	5356.42	24.71	5331.71	
5/28/2017	5356.42	24.91	5331.51	
6/20/2017	5356.42	25.13	5331.29	
7/20/2017	5356.42	25.12	5331.3	
8/8/2017	5356.42	25.46	5330.96	
8/15/2017	5356.42	25.44	5330.98	
9/9/2017	5356.42	25.58	5330.84	
10/11/2017	5356.42	25.16	5331.26	
3/15/2018	5356.42	24.26	5332.16	
5/31/2018	5356.42	25.14	5331.28	
11/2/2018	5352.76	22.26	5330.5	

MW-68				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
10/6/2015	5353.58	21.21	5332.37	
11/3/2015	5353.58	20.54	5333.04	
11/6/2015	5353.58	20.58	5333	
12/1/2015	5353.58	20.48	5333.1	
4/25/2016	5353.58	20.0	5333.58	
6/4/2016	5353.58	20.81	5332.77	
8/19/2016	5353.58	19.21	5334.37	
9/12/2016	5353.58	19.4	5334.18	
10/19/2016	5353.58	19.67	5333.91	
1/31/2017	5353.58	19.58	5334	
4/16/2017	5353.58	19.76	5333.82	
5/1/2017	5353.58	20.13	5333.45	
5/28/2017	5353.58	20.20	5333.38	
6/20/2017	5353.58	20.64	5332.94	
7/20/2017	5353.58	19.27	5334.31	
8/8/2017	5353.58	20.97	5332.61	
8/15/2017	5353.58	21.02	5332.56	
9/9/2017	5353.58	20.97	5332.61	
10/11/2017	5353.58	20.24	5333.34	
3/15/2018	5353.58	19.92	5333.66	
5/31/2018	5353.58	20.34	5333.24	
11/2/2018	5353.58	22.31	5331.27	

MW-69				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
10/6/2015	5357.66	23.7	5333.96	
11/3/2015	5357.66	23.09	5334.57	
11/4/2015	5357.66	23.11	5334.55	
12/1/2015	5357.66	23.01	5334.65	
3/4/2016	5357.66	22.64	5335.02	
4/25/2016	5357.66	22.2	5335.46	
6/4/2016	5357.66	23.32	5334.34	
8/19/2016	5357.66	21.65	5336.01	
9/12/2016	5357.66	21.83	5335.83	
10/19/2016	5357.66	22.33	5335.33	
1/31/2017	5357.66	22.39	5335.27	
4/16/2017	5357.66	22.36	5335.3	
5/1/2017	5357.66	22.77	5334.89	
5/28/2017	5357.66	23.37	5334.29	
6/20/2017	5357.66	23.75	5333.91	
7/20/2017	5357.66	23.38	5334.28	
8/8/2017	5357.66	23.86	5333.8	
8/15/2017	5357.66	23.86	5333.8	
9/9/2017	5357.66	23.87	5333.79	
10/11/2017	5357.66	23.08	5334.58	
3/15/2018	5357.66	22.62	5335.04	
5/31/2018	5357.66	22.81	5334.85	
11/2/2018	5357.66	25.58	5332.08	

MW-70				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
10/5/2015	5371.12	37.89	5333.23	
11/3/2015	5371.12	37.33	5333.79	
11/9/2015	5371.12	37.48	5333.64	
12/1/2015	5371.12	37.33	5333.79	
3/4/2016	5371.12	37.07	5334.05	
4/25/2016	5371.12	36.7	5334.42	
6/4/2016	5371.12	37.32	5333.8	
8/20/2016	5371.12	36.45	5334.67	
9/12/2016	5371.12	36.38	5334.74	
10/19/2016	5371.12	36.59	5334.53	
2/1/2017	5371.12	36.95	5334.17	
4/25/2017	5371.12	36.7	5334.42	
5/1/2017	5371.12	36.97	5334.15	
5/28/2017	5371.12	37.44	5333.68	
6/20/2017	5371.12	37.57	5333.55	
7/20/2017	5371.12	37.7	5333.42	
8/8/2017	5371.12	37.77	5333.35	
8/15/2017	5371.12	37.93	5333.19	
9/9/2017	5371.12	37.91	5333.21	
10/11/2017	5371.12	37.59	5333.53	
3/15/2018	5371.12	37.19	5333.93	
5/31/2018	5371.12	37.08	5334.04	
11/2/2018	5371.12	39.13	5331.99	

MW-71				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
3/5/2016	5362.91	31.5	5331.41	
4/25/2016	5362.91	31.41	5331.5	
6/4/2016	5362.91	31.69	5331.22	
8/19/2016	5362.91	31.34	5331.57	
9/12/2016	5362.91	31.21	5331.7	
10/19/2016	5362.91	31.58	5331.33	
1/31/2017	5362.91	31.51	5331.4	
4/16/2017	5362.91	31.50	5331.41	
5/1/2017	5362.91	31.49	5331.42	
5/28/2017	5362.91	31.70	5331.21	
6/20/2017	5362.91	31.72	5331.19	
7/20/2017	5362.91	31.71	5331.2	
8/8/2017	5362.91	31.72	5331.19	
8/15/2017	5362.91	31.66	5331.25	
9/9/2017	5362.91	31.89	5331.02	
10/11/2017	5362.91	31.82	5331.09	
3/15/2018	5362.91	31.18	5331.73	
5/31/2018	5362.91	31.71	5331.2	
11/2/2018	5362.91	32.09	5330.82	

MW-72				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
3/5/2016	5381.62	49.72	5331.9	
4/25/2016	5381.62	49.12	5332.5	
6/4/2016	5381.62	49.76	5331.86	
8/19/2016	5381.62	49.54	5332.08	
9/12/2016	5381.62	49.43	5332.19	
10/19/2016	5381.62	49.49	5332.13	
1/31/2014	5381.62	49.49	5332.13	
4/16/2017	5381.62	49.37	5332.25	
5/1/2017	5381.62	49.33	5332.29	
5/28/2017	5381.62	49.63	5331.99	
6/20/2017	5381.62	49.65	5331.97	
7/20/2017	5381.62	49.68	5331.94	
8/8/2017	5381.62	49.68	5331.94	
8/15/2017	5381.62	49.54	5332.08	
9/9/2017	5381.62	49.75	5331.87	
10/11/2017	5381.62	49.81	5331.81	
3/15/2018	5381.62	49.21	5332.41	
5/31/2018	5381.62	49.65	5331.97	
11/2/2018	5381.62	50.06	5331.56	

MW-73				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
1/31/2017	5353.95	23.99	5329.96	
4/16/2017	5353.95	24.38	5329.57	
5/1/2017	5353.95	24.28	5329.67	
5/28/2017	5353.95	24.29	5329.66	
6/20/2017	5353.95	24.54	5329.41	
7/20/2017	5353.95	25.27	5328.68	
8/8/2017	5353.95	25.47	5328.48	
8/15/2017	5353.95	25.74	5328.21	
9/9/2017	5353.95	25.32	5328.63	
10/11/2017	5353.95	24.59	5329.36	
3/15/2018	5353.95	23.9	5330.05	
5/31/2018	5353.95	24.86	5329.09	
11/2/2018	5353.95	24.89	5329.06	

MW-74				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
1/31/2017	5219.09	16.53	5202.56	
4/16/2017	5219.09	16.61	5202.48	20.86
5/1/2017	5219.09	16.76	5202.33	
5/28/2017	5219.09	17.12	5201.97	
6/20/2017	5219.09	17.61	5201.48	
7/20/2017	5219.09	18.46	5200.63	
8/8/2017	5219.09	18.94	5200.15	
8/15/2017	5219.09	19.67	5199.42	
9/9/2017	5219.09	19.36	5199.73	
10/11/2017	5219.09	19.67	5199.42	
3/15/2018	5219.09	16.54	5202.55	
5/31/2018	5219.09	17.69	5201.4	
11/2/2018	5219.09	19.92	5199.17	

MW-75				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
4/16/2017	5126.80	24.42	5102.38	41.85
5/1/2017	5126.80	24.48	5102.32	
5/28/2017	5126.80	24.64	5102.16	
6/20/2017	5126.80	24.71	5102.09	
7/20/2017	5126.80	24.88	5101.92	
8/8/2017	5126.80	24.89	5101.91	
8/15/2017	5126.80	24.93	5101.87	
9/9/2017	5126.80	25.02	5101.78	
10/11/2017	5126.80	24.95	5101.85	
3/15/2018	5126.80	25.13	5101.67	
5/31/2018	5126.80	25.54	5101.26	
11/2/2018	5126.80	25.92	5100.88	

MW-76				
Date of Measurement	Measuring Pt Elevation	Water Level	GW Elevation	Well TD
4/16/2017	5116.23	Dry		29.34
5/1/2017	5116.23	Dry		
5/28/2017	5116.23	Dry		
6/20/2017	5116.23	Dry		
7/20/2017	5116.23	28.78	5087.45	
8/8/2017	5116.23	Dry		
8/15/2017	5116.23	Dry		
9/9/2017	5116.23	27.76	5088.47	
10/11/2017	5116.23	Dry		
3/15/2018	5116.23	26.79	5089.44	
5/31/2018	5116.23	Dry		
11/2/2018	5116.23	Dry		

APPENDIX E
ANALYTICAL LABORATORY REPORTS



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-100875-1

TestAmerica Sample Delivery Group: Four Corners

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

4/13/2018 12:03:05 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Qualifiers

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Job ID: 550-100875-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-100875-1

Comments

No additional comments.

Receipt

The samples were received on 4/10/2018 9:07 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1° C.

Receipt Exceptions

Rush TAT requested.

FC-CCR-MW62-4618 (550-100875-1), FC-CCR-MW62-4618 (550-100875-1[MS]), FC-CCR-MW62-4618 (550-100875-1[MSD]) and FC-CCR-MW63-4618 (550-100875-2)

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-100875-1	FC-CCR-MW62-4618	Water	04/06/18 10:22	04/10/18 09:07
550-100875-2	FC-CCR-MW63-4618	Water	04/06/18 10:52	04/10/18 09:07

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Client Sample ID: FC-CCR-MW62-4618

Lab Sample ID: 550-100875-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Boron	2.1		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	520	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA

Client Sample ID: FC-CCR-MW63-4618

Lab Sample ID: 550-100875-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Boron	1.3		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	530		2.0	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Client Sample ID: FC-CCR-MW62-4618

Date Collected: 04/06/18 10:22

Date Received: 04/10/18 09:07

Lab Sample ID: 550-100875-1

Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.1		0.050	mg/L		04/10/18 11:37	04/11/18 14:09	1
Calcium	520	M3	2.0	mg/L		04/10/18 11:37	04/11/18 14:09	1

Client Sample ID: FC-CCR-MW63-4618

Date Collected: 04/06/18 10:52

Date Received: 04/10/18 09:07

Lab Sample ID: 550-100875-2

Matrix: Water

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.3		0.050	mg/L		04/10/18 11:37	04/11/18 14:14	1
Calcium	530		2.0	mg/L		04/10/18 11:37	04/11/18 14:14	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-144088/1-A
Matrix: Water
Analysis Batch: 144264

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144088

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		04/10/18 11:37	04/11/18 13:49	1
Calcium	ND		2.0	mg/L		04/10/18 11:37	04/11/18 13:49	1

Lab Sample ID: LCS 550-144088/2-A
Matrix: Water
Analysis Batch: 144264

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144088

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.966		mg/L		97	85 - 115
Calcium	21.0	20.8		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-144088/3-A
Matrix: Water
Analysis Batch: 144264

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 144088

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.977		mg/L		98	85 - 115	1	20
Calcium	21.0	20.8		mg/L		99	85 - 115	0	20

Lab Sample ID: 550-100875-1 MS
Matrix: Water
Analysis Batch: 144264

Client Sample ID: FC-CCR-MW62-4618
Prep Type: Total/NA
Prep Batch: 144088

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	2.1		1.00	2.96		mg/L		91	70 - 130
Calcium	520	M3	21.0	508	M3	mg/L		-44	70 - 130

Lab Sample ID: 550-100875-1 MSD
Matrix: Water
Analysis Batch: 144264

Client Sample ID: FC-CCR-MW62-4618
Prep Type: Total/NA
Prep Batch: 144088

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	2.1		1.00	2.93		mg/L		88	70 - 130	1	20
Calcium	520	M3	21.0	508	M3	mg/L		-44	70 - 130	0	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Metals

Prep Batch: 144088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-100875-1	FC-CCR-MW62-4618	Total/NA	Water	200.7	
550-100875-2	FC-CCR-MW63-4618	Total/NA	Water	200.7	
MB 550-144088/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-144088/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-144088/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-100875-1 MS	FC-CCR-MW62-4618	Total/NA	Water	200.7	
550-100875-1 MSD	FC-CCR-MW62-4618	Total/NA	Water	200.7	

Analysis Batch: 144264

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-100875-1	FC-CCR-MW62-4618	Total/NA	Water	200.7 Rev 4.4	144088
550-100875-2	FC-CCR-MW63-4618	Total/NA	Water	200.7 Rev 4.4	144088
MB 550-144088/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	144088
LCS 550-144088/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	144088
LCSD 550-144088/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	144088
550-100875-1 MS	FC-CCR-MW62-4618	Total/NA	Water	200.7 Rev 4.4	144088
550-100875-1 MSD	FC-CCR-MW62-4618	Total/NA	Water	200.7 Rev 4.4	144088

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Client Sample ID: FC-CCR-MW62-4618

Date Collected: 04/06/18 10:22

Date Received: 04/10/18 09:07

Lab Sample ID: 550-100875-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			144088	04/10/18 11:37	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	144264	04/11/18 14:09	ARE	TAL PHX

Client Sample ID: FC-CCR-MW63-4618

Date Collected: 04/06/18 10:52

Date Received: 04/10/18 09:07

Lab Sample ID: 550-100875-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			144088	04/10/18 11:37	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	144264	04/11/18 14:14	ARE	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-100875-1
SDG: Four Corners

Method	Method Description	Protocol	Laboratory
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-100875-1

SDG Number: Four Corners

Login Number: 100875

List Number: 1

Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-103738-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/12/2018 1:51:15 PM

Ken Baker, Project Manager II

(602)659-7624

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LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
D1	Sample required dilution due to matrix.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.

General Chemistry

Qualifier	Qualifier Description
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
D2	Sample required dilution due to high concentration of analyte.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Job ID: 550-103738-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103738-1**

Comments

No additional comments.

Receipt

The samples were received on 6/4/2018 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.8° C, 1.8° C, 2.0° C and 2.0° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103738-1	FC-CCR-MW-62-6318	Water	06/03/18 09:08	06/04/18 13:25
550-103738-2	FC-CCR-MW-63-6318	Water	06/03/18 09:32	06/04/18 13:25
550-103738-3	FC-CCR-MW-64-6318	Water	06/03/18 09:50	06/04/18 13:25
550-103738-4	FC-CCR-MW-65-6318	Water	06/03/18 08:50	06/04/18 13:25

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-62-6318

Lab Sample ID: 550-103738-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	120		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.6		0.40	mg/L	1		300.0	Total/NA
Sulfate	3500	D2	100	mg/L	50		300.0	Total/NA
Boron	1.8		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	490	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	320	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	8.5		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	640	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	750		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	750		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	5900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.3	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-63-6318

Lab Sample ID: 550-103738-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	90		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.7		0.40	mg/L	1		300.0	Total/NA
Sulfate	2600	D2	100	mg/L	50		300.0	Total/NA
Boron	1.4		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	510		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	260		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	5.4		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	320		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	500		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	500		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	4500	D2	40	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-64-6318

Lab Sample ID: 550-103738-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	50		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.4		0.40	mg/L	1		300.0	Total/NA
Sulfate	390	D2	40	mg/L	20		300.0	Total/NA
Boron	0.48		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	85		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	34		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	5.4		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	110		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	190		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	190		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	800		20	mg/L	1		SM 2540C	Total/NA
pH	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-65-6318

Lab Sample ID: 550-103738-4

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-65-6318 (Continued)

Lab Sample ID: 550-103738-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	52		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.9		0.40	mg/L	1		300.0	Total/NA
Sulfate	480	D2	40	mg/L	20		300.0	Total/NA
Boron	0.62		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	98		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	56		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.3		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	130		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	290		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	290		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1000		20	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-62-6318

Lab Sample ID: 550-103738-1

Date Collected: 06/03/18 09:08

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	120		2.0	mg/L			06/04/18 18:12	1
Fluoride	1.6		0.40	mg/L			06/04/18 18:12	1
Sulfate	3500	D2	100	mg/L			06/04/18 18:40	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.8		0.050	mg/L		06/05/18 12:27	06/06/18 22:15	1
Calcium	490	M3	2.0	mg/L		06/05/18 12:27	06/06/18 22:15	1
Magnesium	320	M3	2.0	mg/L		06/05/18 12:27	06/06/18 22:15	1
Potassium	8.5		0.50	mg/L		06/05/18 12:27	06/07/18 18:44	1
Sodium	640	M3	0.50	mg/L		06/05/18 12:27	06/07/18 18:44	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	750		6.0	mg/L			06/10/18 12:30	1
Bicarbonate Alkalinity as CaCO3	750		6.0	mg/L			06/10/18 12:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/10/18 12:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Total Dissolved Solids	5900	D2	100	mg/L			06/06/18 11:39	1
pH	6.8	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.3	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-63-6318

Lab Sample ID: 550-103738-2

Date Collected: 06/03/18 09:32

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	90		2.0	mg/L			06/04/18 20:30	1
Fluoride	1.7		0.40	mg/L			06/04/18 20:30	1
Sulfate	2600	D2	100	mg/L			06/04/18 20:49	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.4		0.050	mg/L		06/05/18 12:27	06/06/18 22:21	1
Calcium	510		2.0	mg/L		06/05/18 12:27	06/06/18 22:21	1
Magnesium	260		2.0	mg/L		06/05/18 12:27	06/06/18 22:21	1
Potassium	5.4		0.50	mg/L		06/05/18 12:27	06/07/18 18:50	1
Sodium	320		0.50	mg/L		06/05/18 12:27	06/07/18 18:50	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	500		6.0	mg/L			06/06/18 14:30	1
Bicarbonate Alkalinity as CaCO3	500		6.0	mg/L			06/06/18 14:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 14:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:30	1
Total Dissolved Solids	4500	D2	40	mg/L			06/05/18 08:44	1
pH	7.1	H5	1.7	SU			06/05/18 11:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-63-6318

Lab Sample ID: 550-103738-2

Date Collected: 06/03/18 09:32

Matrix: Water

Date Received: 06/04/18 13:25

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	20.0	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-64-6318

Lab Sample ID: 550-103738-3

Date Collected: 06/03/18 09:50

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	50		2.0	mg/L			06/04/18 21:07	1
Fluoride	1.4		0.40	mg/L			06/04/18 21:07	1
Sulfate	390	D2	40	mg/L			06/04/18 21:26	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.48		0.050	mg/L		06/05/18 12:27	06/06/18 22:26	1
Calcium	85		2.0	mg/L		06/05/18 12:27	06/06/18 22:26	1
Magnesium	34		2.0	mg/L		06/05/18 12:27	06/06/18 22:26	1
Potassium	5.4		0.50	mg/L		06/05/18 12:27	06/07/18 18:56	1
Sodium	110		0.50	mg/L		06/05/18 12:27	06/07/18 18:56	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	190		6.0	mg/L			06/06/18 14:39	1
Bicarbonate Alkalinity as CaCO3	190		6.0	mg/L			06/06/18 14:39	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:39	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 14:39	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:39	1
Total Dissolved Solids	800		20	mg/L			06/05/18 08:44	1
pH	7.7	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.1	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-65-6318

Lab Sample ID: 550-103738-4

Date Collected: 06/03/18 08:50

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	52		2.0	mg/L			06/04/18 21:44	1
Fluoride	1.9		0.40	mg/L			06/04/18 21:44	1
Sulfate	480	D2	40	mg/L			06/04/18 22:02	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.62		0.050	mg/L		06/05/18 12:27	06/06/18 22:29	1
Calcium	98		2.0	mg/L		06/05/18 12:27	06/06/18 22:29	1
Magnesium	56		2.0	mg/L		06/05/18 12:27	06/06/18 22:29	1
Potassium	3.3		0.50	mg/L		06/05/18 12:27	06/07/18 18:58	1
Sodium	130		0.50	mg/L		06/05/18 12:27	06/07/18 18:58	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-65-6318

Lab Sample ID: 550-103738-4

Date Collected: 06/03/18 08:50

Matrix: Water

Date Received: 06/04/18 13:25

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	290		6.0	mg/L			06/06/18 14:49	1
Bicarbonate Alkalinity as CaCO3	290		6.0	mg/L			06/06/18 14:49	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:49	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 14:49	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:49	1
Total Dissolved Solids	1000		20	mg/L			06/05/18 08:44	1
pH	7.5	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.0	H5	0.1	Degrees C			06/05/18 11:50	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148809/2
Matrix: Water
Analysis Batch: 148809

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			06/04/18 14:04	1
Fluoride	ND		0.40	mg/L			06/04/18 14:04	1
Sulfate	ND		2.0	mg/L			06/04/18 14:04	1

Lab Sample ID: LCS 550-148809/5
Matrix: Water
Analysis Batch: 148809

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.2		mg/L		106	90 - 110
Fluoride	4.00	4.14		mg/L		104	90 - 110
Sulfate	20.0	20.6		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-148809/6
Matrix: Water
Analysis Batch: 148809

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.1		mg/L		106	90 - 110	0	20
Fluoride	4.00	4.15		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.6		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-103647-A-8 MS
Matrix: Water
Analysis Batch: 148809

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	12		20.0	33.7		mg/L		110	80 - 120
Fluoride	3.3		4.00	7.53		mg/L		105	80 - 120
Sulfate	4.2		20.0	25.6		mg/L		107	80 - 120

Lab Sample ID: 550-103647-A-8 MSD
Matrix: Water
Analysis Batch: 148809

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	12		20.0	33.4		mg/L		108	80 - 120	1	20
Fluoride	3.3		4.00	7.47		mg/L		103	80 - 120	1	20
Sulfate	4.2		20.0	25.1		mg/L		105	80 - 120	2	20

Lab Sample ID: MB 550-148810/2
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			06/04/18 14:33	1
Fluoride	ND		0.40	mg/L			06/04/18 14:33	1
Sulfate	ND		2.0	mg/L			06/04/18 14:33	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-148810/5
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.4		mg/L		102	90 - 110
Fluoride	4.00	4.18		mg/L		104	90 - 110
Sulfate	20.0	20.8		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148810/6
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	20.4		mg/L		102	90 - 110	0	20
Fluoride	4.00	4.18		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.8		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103738-1 MS
Matrix: Water
Analysis Batch: 148810

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	110	D2	1000	1190	D2	mg/L		108	80 - 120
Fluoride	ND	D1	200	219	D1	mg/L		109	80 - 120
Sulfate	3500	D2	1000	4550	D2	mg/L		107	80 - 120

Lab Sample ID: 550-103738-1 MSD
Matrix: Water
Analysis Batch: 148810

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	110	D2	1000	1180	D2	mg/L		107	80 - 120	1	20
Fluoride	ND	D1	200	217	D1	mg/L		109	80 - 120	1	20
Sulfate	3500	D2	1000	4540	D2	mg/L		106	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-148865/1-A
Matrix: Water
Analysis Batch: 149072

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148865

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/05/18 12:27	06/06/18 21:55	1
Calcium	ND		2.0	mg/L		06/05/18 12:27	06/06/18 21:55	1
Magnesium	ND		2.0	mg/L		06/05/18 12:27	06/06/18 21:55	1

Lab Sample ID: MB 550-148865/1-A
Matrix: Water
Analysis Batch: 149140

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148865

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND		0.50	mg/L		06/05/18 12:27	06/07/18 18:24	1
Sodium	ND		0.50	mg/L		06/05/18 12:27	06/07/18 18:24	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Lab Sample ID: LCS 550-148865/2-A
Matrix: Water
Analysis Batch: 149072

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.947		mg/L		95	85 - 115
Calcium	21.0	20.6		mg/L		98	85 - 115
Magnesium	21.0	20.3		mg/L		97	85 - 115

Lab Sample ID: LCS 550-148865/2-A
Matrix: Water
Analysis Batch: 149140

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Potassium	20.0	19.1		mg/L		95	85 - 115
Sodium	20.0	18.6		mg/L		93	85 - 115

Lab Sample ID: LCSD 550-148865/3-A
Matrix: Water
Analysis Batch: 149072

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.950		mg/L		95	85 - 115	0	20
Calcium	21.0	20.5		mg/L		98	85 - 115	0	20
Magnesium	21.0	20.2		mg/L		96	85 - 115	0	20

Lab Sample ID: LCSD 550-148865/3-A
Matrix: Water
Analysis Batch: 149140

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Potassium	20.0	19.0		mg/L		95	85 - 115	0	20
Sodium	20.0	18.8		mg/L		94	85 - 115	1	20

Lab Sample ID: 550-103738-1 MS
Matrix: Water
Analysis Batch: 149072

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	1.8		1.00	2.77		mg/L		95	70 - 130
Calcium	490	M3	21.0	500	M3	mg/L		49	70 - 130
Magnesium	320	M3	21.0	334	M3	mg/L		61	70 - 130

Lab Sample ID: 550-103738-1 MS
Matrix: Water
Analysis Batch: 149140

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Potassium	8.5		20.0	28.6		mg/L		100	70 - 130
Sodium	640	M3	20.0	653	M3	mg/L		59	70 - 130

Lab Sample ID: 550-103738-1 MSD
Matrix: Water
Analysis Batch: 149072

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA
Prep Batch: 148865
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.8		1.00	2.76		mg/L		94	70 - 130	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-103738-1 MSD
Matrix: Water
Analysis Batch: 149072

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA
Prep Batch: 148865

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	490	M3	21.0	496	M3	mg/L		27	70 - 130	1	20
Magnesium	320	M3	21.0	331	M3	mg/L		44	70 - 130	1	20

Lab Sample ID: 550-103738-1 MSD
Matrix: Water
Analysis Batch: 149140

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA
Prep Batch: 148865

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Potassium	8.5		20.0	28.2		mg/L		99	70 - 130	1	20
Sodium	640	M3	20.0	653	M3	mg/L		60	70 - 130	0	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-149023/5
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 13:52	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1

Lab Sample ID: LCS 550-149023/4
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	250	256		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-149023/17
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	258		mg/L		103	90 - 110	1	20

Lab Sample ID: 550-103741-D-1 DU
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	300		305		mg/L		0.1	20
Bicarbonate Alkalinity as CaCO3	300		305		mg/L		0.1	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: MB 550-149226/1
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/10/18 12:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1

Lab Sample ID: LCS 550-149226/2
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	250	244		mg/L		98	90 - 110

Lab Sample ID: LCSD 550-149226/5
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	250		mg/L		100	90 - 110	2	20

Lab Sample ID: 550-103738-1 DU
Matrix: Water
Analysis Batch: 149227

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	750		700		mg/L		7	20
Bicarbonate Alkalinity as CaCO3	750		700		mg/L		7	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-148821/1
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			06/05/18 08:44	1

Lab Sample ID: LCS 550-148821/2
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	990		mg/L		99	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCSD 550-148821/3
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	986		mg/L		99	90 - 110	0	10

Lab Sample ID: 550-103742-A-1 DU
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	10000	D2	9960	D2	mg/L		5	10

Lab Sample ID: MB 550-148964/1
Matrix: Water
Analysis Batch: 148964

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			06/06/18 11:39	1

Lab Sample ID: LCS 550-148964/2
Matrix: Water
Analysis Batch: 148964

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD
Total Dissolved Solids	1000	962		mg/L		96	90 - 110	

Lab Sample ID: LCSD 550-148964/3
Matrix: Water
Analysis Batch: 148964

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	952		mg/L		95	90 - 110	1	10

Lab Sample ID: 550-103738-1 DU
Matrix: Water
Analysis Batch: 148964

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	5900	D2	5540	D2	mg/L		6	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-148864/1
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.3	98.5 - 101.5

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: LCSSRM 550-148864/13
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.1		SU		100.7	98.5 - 101.5

Lab Sample ID: 550-103738-1 DU
Matrix: Water
Analysis Batch: 148864

Client Sample ID: FC-CCR-MW-62-6318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	6.8	H5	6.8	H5	SU		0.1	5
Temperature	20.3	H5	20.2	H5	Degrees C		0.5	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

HPLC/IC

Analysis Batch: 148809

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	300.0	
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	300.0	
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	300.0	
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	300.0	
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	300.0	
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	300.0	
MB 550-148809/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148809/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148809/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103647-A-8 MS	Matrix Spike	Total/NA	Water	300.0	
550-103647-A-8 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 148810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	300.0	
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	300.0	
MB 550-148810/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148810/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148810/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103738-1 MS	FC-CCR-MW-62-6318	Total/NA	Water	300.0	
550-103738-1 MSD	FC-CCR-MW-62-6318	Total/NA	Water	300.0	

Metals

Prep Batch: 148865

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	200.7	
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	200.7	
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	200.7	
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	200.7	
MB 550-148865/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-148865/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-148865/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103738-1 MS	FC-CCR-MW-62-6318	Total/NA	Water	200.7	
550-103738-1 MSD	FC-CCR-MW-62-6318	Total/NA	Water	200.7	

Analysis Batch: 149072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	200.7 Rev 4.4	148865
MB 550-148865/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148865
LCS 550-148865/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148865
LCSD 550-148865/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-1 MS	FC-CCR-MW-62-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-1 MSD	FC-CCR-MW-62-6318	Total/NA	Water	200.7 Rev 4.4	148865

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Metals (Continued)

Analysis Batch: 149140

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	200.7 Rev 4.4	148865
MB 550-148865/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148865
LCS 550-148865/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148865
LCSD 550-148865/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-1 MS	FC-CCR-MW-62-6318	Total/NA	Water	200.7 Rev 4.4	148865
550-103738-1 MSD	FC-CCR-MW-62-6318	Total/NA	Water	200.7 Rev 4.4	148865

General Chemistry

Analysis Batch: 148821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	SM 2540C	
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	SM 2540C	
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	SM 2540C	
MB 550-148821/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-148821/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-148821/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103742-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 148864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	SM 4500 H+ B	
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	SM 4500 H+ B	
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	SM 4500 H+ B	
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-148864/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-148864/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-103738-1 DU	FC-CCR-MW-62-6318	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 148964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	SM 2540C	
MB 550-148964/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-148964/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-148964/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103738-1 DU	FC-CCR-MW-62-6318	Total/NA	Water	SM 2540C	

Analysis Batch: 149023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-2	FC-CCR-MW-63-6318	Total/NA	Water	SM 2320B	
550-103738-3	FC-CCR-MW-64-6318	Total/NA	Water	SM 2320B	
550-103738-4	FC-CCR-MW-65-6318	Total/NA	Water	SM 2320B	
MB 550-149023/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149023/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149023/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103741-D-1 DU	Duplicate	Total/NA	Water	SM 2320B	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

General Chemistry (Continued)

Analysis Batch: 149226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-149226/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149226/2	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149226/5	Lab Control Sample Dup	Total/NA	Water	SM 2320B	

Analysis Batch: 149227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103738-1	FC-CCR-MW-62-6318	Total/NA	Water	SM 2320B	
550-103738-1 DU	FC-CCR-MW-62-6318	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-62-6318

Lab Sample ID: 550-103738-1

Date Collected: 06/03/18 09:08

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148810	06/04/18 18:12	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148810	06/04/18 18:40	NBL	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149072	06/06/18 22:15	ARE	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149140	06/07/18 18:44	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149227	06/10/18 12:30	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148964	06/06/18 11:39 (Start) 06/07/18 11:00 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-63-6318

Lab Sample ID: 550-103738-2

Date Collected: 06/03/18 09:32

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148809	06/04/18 20:30	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148809	06/04/18 20:49	NBL	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149072	06/06/18 22:21	ARE	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149140	06/07/18 18:50	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 14:30	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	06/05/18 08:44 (Start) 06/06/18 10:20 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-64-6318

Lab Sample ID: 550-103738-3

Date Collected: 06/03/18 09:50

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148809	06/04/18 21:07	NBL	TAL PHX
Total/NA	Analysis	300.0		20	148809	06/04/18 21:26	NBL	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149072	06/06/18 22:26	ARE	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149140	06/07/18 18:56	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 14:39	DGS	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Client Sample ID: FC-CCR-MW-64-6318

Lab Sample ID: 550-103738-3

Date Collected: 06/03/18 09:50

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	148821	06/05/18 08:44 (Start) 06/06/18 10:20 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-65-6318

Lab Sample ID: 550-103738-4

Date Collected: 06/03/18 08:50

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148809	06/04/18 21:44	NBL	TAL PHX
Total/NA	Analysis	300.0		20	148809	06/04/18 22:02	NBL	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149072	06/06/18 22:29	ARE	TAL PHX
Total/NA	Prep	200.7			148865	06/05/18 12:27	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149140	06/07/18 18:58	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 14:49	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	06/05/18 08:44 (Start) 06/06/18 10:20 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103738-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2320B	Alkalinity	SM	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix

1625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 Phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

103738

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact		Doug Lavarnway				Doug Lavarnway				6/3/2018				COC No:		
APS Four Corners		928-587-0319				Lab Contact:				Carrier:				1 of 1 COCs		
End of County Road 6675		Analysis Turnaround Time												Sampler:		
Fruitland, New Mexico 87416		TAT if different from Below _____												For Lab Use Only:		
928) 587-0319 Phone														Walk-in Client:		
xxx) xxx-xxxx FAX														Lab Sampling:		
Project Name: CCR														Job / SDG No.:		
Site: Cholla																
PO #																
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	EPA 200.7 Rev 4.4 (B, Ca, Na, K, Mg)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HE (pH)	SM 2320B (HCO3)	Sample Specific Notes:			
FC-CCR-MW-62-6318 -01	6/3/2018	908	G	W	2	N	X	X	X	X	X	X				
FC-CCR-MW-63-6318 -02	6/3/2018	932	G	W	2	N	X	X	X	X	X	X				
FC-CCR-MW-64-6318 -03	6/3/2018	950	G	W	2	N	X	X	X	X	X	X				
FC-CCR-MW-65-6318 -04	6/3/2018	850	G	W	2	N	X	X	X	X	X	X				



Preservation Used: 1-Ice; 2-HCl; 3-H2SO4; 4-HNO3; 5-NaOH; 6-Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the Lab is to dispose of the sample.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Special Instructions/QC Requirements & Comments:

TAPHX

Custody Seals Intact:	Custody Seal No.: DL	Cooler Temp. (°C):	Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Doug Lavarnway	Company: APS	Date/Time: 6/3/18 9:20	Received by: Progers	Company: Red J	Date/Time: 6/4/18 9:20 a
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: TA PHS LAB	Company:	Date/Time: 13:25 06-04-18

Temp 20c, 18c, 20c, 18c

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103738-1

SDG Number:

Login Number: 103738

List Number: 1

Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113007-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/26/2018 4:06:46 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Job ID: 550-113007-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-113007-1**

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.9° C, 3.0° C and 3.8° C.

Receipt Exceptions

Received 3 pages of COCs from the courier.

Samples #6 - #9 only request Appendix I.

All of the other samples request Appendix I and II.

Client did provide sample containers if Appendix II is needed.

FC-CCR-MW62-11218 (550-113007-6), FC-CCR-MW63-11218 (550-113007-7), FC-CCR-MW64-11218 (550-113007-8) and FC-CCR-MW65-11218 (550-113007-9)

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW71-11318 (550-113007-10), FC-CCR-MW72-11318 (550-113007-11), FC-CCR-MW73-11318 (550-113007-12) and FC-CCR-FD01-11318 (550-113007-13). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

Method(s) 300.0: The following sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-FD02-11318 (550-113007-14). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113007-1	FC-CCR-MW66-11218	Water	11/02/18 13:28	11/07/18 13:00
550-113007-2	FC-CCR-MW67-11318	Water	11/03/18 09:57	11/07/18 13:00
550-113007-3	FC-CCR-MW68-11318	Water	11/03/18 11:01	11/07/18 13:00
550-113007-4	FC-CCR-MW69-11318	Water	11/03/18 08:49	11/07/18 13:00
550-113007-5	FC-CCR-MW70-11218	Water	11/02/18 15:32	11/07/18 13:00
550-113007-6	FC-CCR-MW62-11218	Water	11/02/18 14:10	11/07/18 13:00
550-113007-7	FC-CCR-MW63-112818	Water	11/02/18 14:49	11/07/18 13:00
550-113007-8	FC-CCR-MW64-11218	Water	11/02/18 12:52	11/07/18 13:00
550-113007-9	FC-CCR-MW65-11218	Water	11/02/18 12:08	11/07/18 13:00
550-113007-10	FC-CCR-MW71-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-11	FC-CCR-MW72-11318	Water	11/03/18 12:31	11/07/18 13:00
550-113007-12	FC-CCR-MW73-11318	Water	11/03/18 13:24	11/07/18 13:00
550-113007-13	FC-CCR-FD01-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-14	FC-CCR-FD02-11318	Water	11/03/18 12:31	11/07/18 13:00

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1800	D2	400	mg/L	200		300.0	Total/NA
Fluoride	25	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	140	D2 M3	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	470	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	20000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000	D2	400	mg/L	200		300.0	Total/NA
Fluoride	16	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	13000	D2	400	mg/L	200		300.0	Total/NA
Boron	170	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	19000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.7	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1500	D2	400	mg/L	200		300.0	Total/NA
Fluoride	12	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	150	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	460		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	18000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1200	D2	400	mg/L	200		300.0	Total/NA
Fluoride	11	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	8700	D2	400	mg/L	200		300.0	Total/NA
Boron	92	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	14000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1100	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.7	D1	0.80	mg/L	2		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW70-11218 (Continued)

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	6400	D2	400	mg/L	200		300.0	Total/NA
Boron	88	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	510		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	11000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW62-11218

Lab Sample ID: 550-113007-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	110	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.5		0.40	mg/L	1		300.0	Total/NA
Sulfate	3300	D2	100	mg/L	50		300.0	Total/NA
Boron	2.4		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	550		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	5600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW63-112818

Lab Sample ID: 550-113007-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	88		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.9		0.40	mg/L	1		300.0	Total/NA
Sulfate	2800	D2	100	mg/L	50		300.0	Total/NA
Boron	1.9		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	550		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	4300	D2	40	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	15.3	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	50		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.4		0.40	mg/L	1		300.0	Total/NA
Sulfate	350	D2	100	mg/L	50		300.0	Total/NA
Boron	0.64		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	88		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	760		20	mg/L	1		SM 2540C	Total/NA
pH	7.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW65-11218

Lab Sample ID: 550-113007-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	51		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.9		0.40	mg/L	1		300.0	Total/NA
Sulfate	420	D2	40	mg/L	20		300.0	Total/NA
Boron	0.77		0.050	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW65-11218 (Continued)

Lab Sample ID: 550-113007-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	100		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	940		20	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	520	D2	400	mg/L	200		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.56		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	450		10	mg/L	5		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.22		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	660	D2	200	mg/L	100		300.0	Total/NA
Sulfate	7500	D2	200	mg/L	100		300.0	Total/NA
Boron	1.7		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	480		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	12000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	8.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	520	D2	400	mg/L	200		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.54		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	450		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	7.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-FD02-11318 (Continued)

Lab Sample ID: 550-113007-14

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	450	D1	10	mg/L	5		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	460		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Date Collected: 11/02/18 13:28

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1800	D2	400	mg/L			11/13/18 19:51	200
Fluoride	25	D1	2.0	mg/L			11/13/18 19:33	5
Sulfate	12000	D2	400	mg/L			11/13/18 19:51	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	140	D2 M3	0.20	mg/L		11/09/18 07:19	11/16/18 04:05	4
Calcium	470	M3	2.0	mg/L		11/09/18 07:19	11/14/18 21:27	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	20000	D2	100	mg/L			11/08/18 12:33	1
pH	7.3	H5	1.7	SU			11/09/18 16:54	1
Temperature	9.6	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Date Collected: 11/03/18 09:57

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000	D2	400	mg/L			11/13/18 21:42	200
Fluoride	16	D1	2.0	mg/L			11/13/18 21:23	5
Sulfate	13000	D2	400	mg/L			11/13/18 21:42	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	170	D2	0.20	mg/L		11/09/18 07:19	11/16/18 04:11	4
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 21:33	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	19000	D2	200	mg/L			11/08/18 12:33	1
pH	7.4	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.7	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1500	D2	400	mg/L			11/13/18 22:18	200
Fluoride	12	D1	2.0	mg/L			11/13/18 22:00	5
Sulfate	11000	D2	400	mg/L			11/13/18 22:18	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	150	D2	0.20	mg/L		11/09/18 07:19	11/16/18 04:17	4
Calcium	460		2.0	mg/L		11/09/18 07:19	11/14/18 21:39	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	18000	D2	100	mg/L			11/08/18 12:33	1
pH	7.2	H5	1.7	SU			11/09/18 16:54	1
Temperature	13.5	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Date Collected: 11/03/18 08:49

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1200	D2	400	mg/L			11/13/18 23:32	200
Fluoride	11	D1	2.0	mg/L			11/13/18 23:14	5
Sulfate	8700	D2	400	mg/L			11/13/18 23:32	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	92	D2	0.10	mg/L		11/09/18 07:19	11/16/18 04:22	2
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 21:45	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	14000	D2	100	mg/L			11/08/18 12:33	1
pH	7.3	H5	1.7	SU			11/09/18 16:54	1
Temperature	13.0	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1100	D2	400	mg/L			11/14/18 00:09	200
Fluoride	2.7	D1	0.80	mg/L			11/13/18 23:50	2
Sulfate	6400	D2	400	mg/L			11/14/18 00:09	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	88	D2	0.10	mg/L		11/09/18 07:19	11/16/18 04:28	2
Calcium	510		2.0	mg/L		11/09/18 07:19	11/14/18 21:51	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	11000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.2	H5	0.1	Degrees C			11/09/18 16:54	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW62-11218

Lab Sample ID: 550-113007-6

Date Collected: 11/02/18 14:10

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	110	D2	100	mg/L			11/14/18 00:46	50
Fluoride	1.5		0.40	mg/L			11/14/18 00:27	1
Sulfate	3300	D2	100	mg/L			11/14/18 00:46	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.4		0.050	mg/L		11/09/18 07:19	11/14/18 21:57	1
Calcium	550		2.0	mg/L		11/09/18 07:19	11/14/18 21:57	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5600	D2	100	mg/L			11/08/18 12:33	1
pH	6.8	H5	1.7	SU			11/09/18 16:54	1
Temperature	13.9	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW63-112818

Lab Sample ID: 550-113007-7

Date Collected: 11/02/18 14:49

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	88		2.0	mg/L			11/14/18 01:04	1
Fluoride	1.9		0.40	mg/L			11/14/18 01:04	1
Sulfate	2800	D2	100	mg/L			11/14/18 01:22	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.9		0.050	mg/L		11/09/18 07:19	11/14/18 22:02	1
Calcium	550		2.0	mg/L		11/09/18 07:19	11/14/18 22:02	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4300	D2	40	mg/L			11/08/18 12:33	1
pH	7.1	H5	1.7	SU			11/09/18 16:54	1
Temperature	15.3	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Date Collected: 11/02/18 12:52

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	50		2.0	mg/L			11/14/18 01:41	1
Fluoride	1.4		0.40	mg/L			11/14/18 01:41	1
Sulfate	350	D2	100	mg/L			11/14/18 01:59	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.64		0.050	mg/L		11/09/18 07:19	11/14/18 22:08	1
Calcium	88		2.0	mg/L		11/09/18 07:19	11/14/18 22:08	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Date Collected: 11/02/18 12:52

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	760		20	mg/L			11/08/18 12:33	1
pH	7.8	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.8	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW65-11218

Lab Sample ID: 550-113007-9

Date Collected: 11/02/18 12:08

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	51		2.0	mg/L			11/14/18 02:54	1
Fluoride	1.9		0.40	mg/L			11/14/18 02:54	1
Sulfate	420	D2	40	mg/L			11/14/18 03:13	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.77		0.050	mg/L		11/09/18 07:19	11/14/18 22:11	1
Calcium	100		2.0	mg/L		11/09/18 07:19	11/14/18 22:11	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	940		20	mg/L			11/08/18 12:33	1
pH	7.5	H5	1.7	SU			11/09/18 16:54	1
Temperature	12.9	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	520	D2	400	mg/L			11/14/18 03:50	200
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 03:31	5
Sulfate	11000	D2	400	mg/L			11/14/18 03:50	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.56		0.050	mg/L		11/09/18 07:19	11/14/18 22:14	1
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 22:14	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.8	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	450		10	mg/L			11/14/18 04:08	5
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 04:08	5
Sulfate	11000	D2	400	mg/L			11/14/18 04:26	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.22		0.050	mg/L		11/09/18 07:19	11/14/18 22:25	1
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 22:25	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.8	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	660	D2	200	mg/L			11/14/18 05:03	100
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 04:45	2
Sulfate	7500	D2	200	mg/L			11/14/18 05:03	100

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.7		0.050	mg/L		11/09/18 07:19	11/14/18 22:31	1
Calcium	480		2.0	mg/L		11/09/18 07:19	11/14/18 22:31	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	12000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/12/18 13:18	1
Temperature	8.6	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	520	D2	400	mg/L			11/14/18 05:40	200
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 05:22	2
Sulfate	11000	D2	400	mg/L			11/14/18 05:40	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.54		0.050	mg/L		11/09/18 07:19	11/14/18 22:37	1
Calcium	450		2.0	mg/L		11/09/18 07:19	11/14/18 22:37	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.2	H5	1.7	SU			11/12/18 13:18	1
Temperature	7.4	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	450	D1	10	mg/L			11/14/18 06:35	5
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 06:35	5
Sulfate	11000	D2	400	mg/L			11/14/18 06:54	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.21		0.050	mg/L		11/09/18 07:19	11/14/18 22:43	1
Calcium	460		2.0	mg/L		11/09/18 07:19	11/14/18 22:43	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.1	H5	1.7	SU			11/12/18 13:18	1
Temperature	9.5	H5	0.1	Degrees C			11/12/18 13:18	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-161850/2

Matrix: Water

Analysis Batch: 161850

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/13/18 18:01	1
Fluoride	ND		0.40	mg/L			11/13/18 18:01	1
Sulfate	ND		2.0	mg/L			11/13/18 18:01	1

Lab Sample ID: LCS 550-161850/5

Matrix: Water

Analysis Batch: 161850

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.6		mg/L		108	90 - 110
Fluoride	4.00	4.12		mg/L		103	90 - 110
Sulfate	20.0	20.7		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-161850/6

Matrix: Water

Analysis Batch: 161850

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.5		mg/L		108	90 - 110	0	20
Fluoride	4.00	4.13		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.6		mg/L		103	90 - 110	1	20

Lab Sample ID: 550-113007-1 MS

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	25	D1	20.0	45.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113007-1 MS

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1800	D2	4000	6300	D2	mg/L		112	80 - 120
Sulfate	12000	D2	4000	15900	D2	mg/L		88	80 - 120

Lab Sample ID: 550-113007-1 MSD

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	25	D1	20.0	46.5	D1	mg/L		105	80 - 120	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113007-1 MSD

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1800	D2	4000	6340	D2	mg/L		113	80 - 120	1	20
Sulfate	12000	D2	4000	16000	D2	mg/L		91	80 - 120	1	20

Lab Sample ID: MB 550-161852/1042

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/14/18 06:17	1
Fluoride	ND		0.40	mg/L			11/14/18 06:17	1
Sulfate	ND		2.0	mg/L			11/14/18 06:17	1

Lab Sample ID: LCS 550-161852/73

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.5		mg/L		107	90 - 110
Fluoride	4.00	4.16		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-161852/74

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.4		mg/L		107	90 - 110	0	20
Fluoride	4.00	4.16		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-113012-A-1 MS ^2

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.3	D1	8.00	9.67	D1	mg/L		104	80 - 120

Lab Sample ID: 550-113012-A-1 MS ^200

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	800	D2	4000	5340	D2	mg/L		114	80 - 120
Sulfate	1200	D2	4000	5490	D2	mg/L		107	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113012-A-1 MSD ^2

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.3	D1	8.00	9.79	D1	mg/L		106	80 - 120	1	20

Lab Sample ID: 550-113012-A-1 MSD ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	800	D2	4000	5310	D2	mg/L		113	80 - 120	1	20
Sulfate	1200	D2	4000	5460	D2	mg/L		107	80 - 120	1	20

Lab Sample ID: 550-113026-B-1 MS ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	680	D2	4000	5160	D2	mg/L		112	80 - 120
Sulfate	6100	D2	4000	10400	D2	mg/L		108	80 - 120

Lab Sample ID: 550-113026-B-1 MS ^5

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	20.0	20.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113026-B-1 MSD ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	680	D2	4000	5200	D2	mg/L		113	80 - 120	1	20
Sulfate	6100	D2	4000	10400	D2	mg/L		110	80 - 120	1	20

Lab Sample ID: 550-113026-B-1 MSD ^5

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 D5	20.0	21.0	D1	mg/L		103	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-161450/1-A

Matrix: Water
Analysis Batch: 161972

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161450

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		11/09/18 07:19	11/14/18 21:06	1
Calcium	ND		2.0	mg/L		11/09/18 07:19	11/14/18 21:06	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-161450/2-A
Matrix: Water
Analysis Batch: 161972

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.971		mg/L		97	85 - 115
Calcium	21.0	21.0		mg/L		100	85 - 115

Lab Sample ID: LCSD 550-161450/3-A
Matrix: Water
Analysis Batch: 161972

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.949		mg/L		95	85 - 115	2	20
Calcium	21.0	21.1		mg/L		100	85 - 115	0	20

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Calcium	470	M3	21.0	462	M3	mg/L		-45	70 - 130

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 162061

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	140	M3 D2	1.00	134	M3	mg/L		-514	70 - 130

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Calcium	470	M3	21.0	475	M3	mg/L		15	70 - 130	3	20

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 162061

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	140	M3 D2	1.00	142	M3	mg/L		282	70 - 130	6	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-161396/1
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			11/08/18 12:33	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 550-161396/2
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	974		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-161396/3
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	974		mg/L		97	90 - 110	0	10

Lab Sample ID: 550-113007-1 DU
Matrix: Water
Analysis Batch: 161396

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	20000	D2	19000	D2	mg/L		4	10

Lab Sample ID: 550-113026-A-4 DU
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	6200	D2	6210	D2	mg/L		0.5	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-161550/1
Matrix: Water
Analysis Batch: 161550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99.6	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161550/12
Matrix: Water
Analysis Batch: 161550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.1	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161550/24
Matrix: Water
Analysis Batch: 161550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.1	98.5 - 101.5

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: 550-113007-1 DU
Matrix: Water
Analysis Batch: 161550

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.3	H5	7.3	H5	SU		0.1	5
Temperature	9.6	H5	10.7	H5	Degrees C		11	

Lab Sample ID: 550-113007-11 DU
Matrix: Water
Analysis Batch: 161550

Client Sample ID: FC-CCR-MW72-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.0	H5	7.1	H5	SU		0.7	5
Temperature	14.8	H5	15.7	H5	Degrees C		6	

Lab Sample ID: LCSSRM 550-161638/1
Matrix: Water
Analysis Batch: 161638

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits

Lab Sample ID: LCSSRM 550-161638/12
Matrix: Water
Analysis Batch: 161638

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits

Lab Sample ID: 550-113012-A-1 DU
Matrix: Water
Analysis Batch: 161638

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	9.7	H5	9.6	H5	SU		0.4	5
Temperature	10.2	H5	9.9	H5	Degrees C		3	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

HPLC/IC

Analysis Batch: 161850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	300.0	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	300.0	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	300.0	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	300.0	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	300.0	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	300.0	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	300.0	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	300.0	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	300.0	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	300.0	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	300.0	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	300.0	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	300.0	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	300.0	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	300.0	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	300.0	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	300.0	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	300.0	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	300.0	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	300.0	
MB 550-161850/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161850/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161850/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	300.0	

Analysis Batch: 161852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	300.0	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	300.0	
MB 550-161852/1042	Method Blank	Total/NA	Water	300.0	
LCS 550-161852/73	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161852/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113012-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113012-A-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-B-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113026-B-1 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-113026-B-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-B-1 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Metals

Prep Batch: 161450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	200.7	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	200.7	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	200.7	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	200.7	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7	
MB 550-161450/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-161450/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-161450/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7	

Analysis Batch: 161972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7 Rev 4.4	161450
MB 550-161450/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	161450
LCS 550-161450/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	161450
LCSD 550-161450/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450

Analysis Batch: 162061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

General Chemistry

Analysis Batch: 161396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	SM 2540C	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	SM 2540C	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	SM 2540C	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	SM 2540C	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	SM 2540C	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	SM 2540C	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	SM 2540C	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	SM 2540C	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	SM 2540C	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	SM 2540C	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	SM 2540C	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	SM 2540C	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	SM 2540C	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	SM 2540C	
MB 550-161396/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-161396/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-161396/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-113007-1 DU	FC-CCR-MW66-11218	Total/NA	Water	SM 2540C	
550-113026-A-4 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 161550

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	SM 4500 H+ B	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161550/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161550/12	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161550/24	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-113007-1 DU	FC-CCR-MW66-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-11 DU	FC-CCR-MW72-11318	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 161638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161638/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161638/12	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-113012-A-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Date Collected: 11/02/18 13:28

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 19:33	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 19:51	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:27	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	162061	11/16/18 04:05	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Date Collected: 11/03/18 09:57

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 21:23	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 21:42	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:33	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	162061	11/16/18 04:11	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 22:00	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 22:18	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:39	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	162061	11/16/18 04:17	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Date Collected: 11/03/18 08:49

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 23:14	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 23:32	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:45	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	162061	11/16/18 04:22	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
						(Start) 11/08/18 12:33		
						(End) 11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/13/18 23:50	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 00:09	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:51	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	162061	11/16/18 04:28	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
						(Start) 11/08/18 12:33		
						(End) 11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW62-11218

Lab Sample ID: 550-113007-6

Date Collected: 11/02/18 14:10

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 00:27	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161850	11/14/18 00:46	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:57	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
						(Start) 11/08/18 12:33		
						(End) 11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW63-112818

Lab Sample ID: 550-113007-7

Date Collected: 11/02/18 14:49

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 01:04	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161850	11/14/18 01:22	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:02	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Date Collected: 11/02/18 12:52

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 01:41	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161850	11/14/18 01:59	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:08	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW65-11218

Lab Sample ID: 550-113007-9

Date Collected: 11/02/18 12:08

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 02:54	NEL	TAL PHX
Total/NA	Analysis	300.0		20	161850	11/14/18 03:13	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:11	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 03:31	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 03:50	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:14	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 04:08	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 04:26	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:25	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 04:45	NEL	TAL PHX
Total/NA	Analysis	300.0		100	161850	11/14/18 05:03	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:31	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 05:22	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 05:40	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:37	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 06:35	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161852	11/14/18 06:54	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:43	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
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(480) 897-9459
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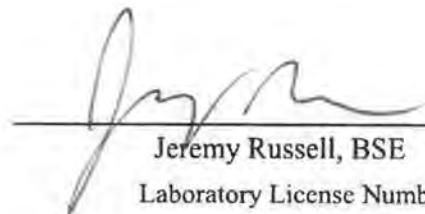
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW66-11218 (550-113007-1)	2.0 ± 0.3	0.9 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



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(480) 897-9459

FAX (480) 892-5446

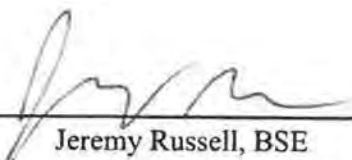
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW67-11318 (550-113007-2)	0.8 ± 0.2	0.8 ± 0.3	1.6 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW68-11318 (550-113007-3)	0.6 ± 0.2	1.3 ± 0.3	1.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

11/21/2018

Date

Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

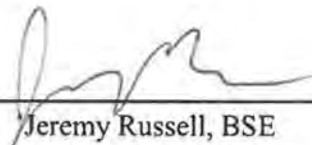
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW69-11318 (550-113007-4)	1.7 ± 0.2	1.3 ± 0.3	3.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018



 Jeremy Russell, BSE
 Laboratory License Number AZ0462

11/21/2018
 Date





Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

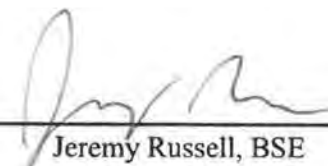
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW70-11218 (550-113007-5)	0.7 ± 0.2	< 0.7	0.7 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



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Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
 Website: www.radsafe.com

(480) 897-9459
 FAX (480) 892-5446

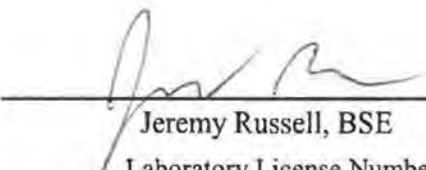
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 03, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW71-11318 (550-113007-10)	1.2 ± 0.2	< 0.7	1.2 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

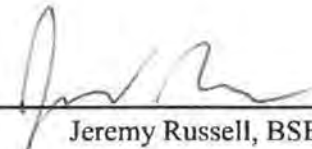
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW72-11318 (550-113007-11)	0.7 ± 0.2	1.0 ± 0.3	1.7 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462





Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

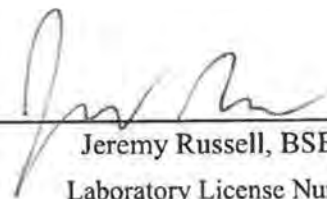
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW73-11318 (550-113007-12)	1.5 ± 0.2	1.4 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-11318 (550-113007-13)	1.8 ± 0.2	< 0.7	1.8 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

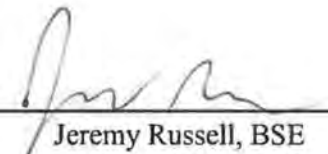
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD02-11318 (550-113007-14)	0.5 ± 0.2	1.5 ± 0.3	2.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



TestAmerica Phoenix
 4625 East Cotton Cir Blvd Suite 189
 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record

TestAmerica
PHYSICAL & ENVIRONMENTAL TESTING

SHIP (EAST) 9, ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)
 Client Contact: Lab PM: Baker, Ken
 Shipping/Receiving: E-Mail: ken.baker@testamericainc.com
 Company: State Program - Arizona
 Address: 3245 North Washington Street, Chandler, AZ 85225
 City: Chandler
 State: AZ
 Zip: 85225
 Phone: [Redacted]
 Email: [Redacted]
 Project Name: CCR
 Site: Arizona Public Service

Due Date Requested: 11/16/2018
TAT Requested (days): [Blank]
PO #: [Blank]
WO #: [Blank]
Project #: 55009706
SSOW#: [Blank]

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (Water, Swab, Dried, etc.)	Field Filtered Sample (Yes or No)	Field Filtered Sample (Yes or No)	Sub (Radium 226/228)	Analysis Requested	Total Number of Containers	Special Instructions/Note
FC-CCR-MW66-11218 (550-113007-1) # 61261	11/2/18	13:28 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW67-11318 (550-113007-2) # 61262	11/3/18	08:57 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW68-11318 (550-113007-3) # 61263	11/3/18	11:01 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW69-11318 (550-113007-4) # 61264	11/3/18	08:49 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW70-11218 (550-113007-5) # 61265	11/2/18	15:32 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW71-11318 (550-113007-10) # 61266	11/3/18	11:45 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW72-11318 (550-113007-11) # 61267	11/3/18	12:31 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-MW73-11318 (550-113007-12) # 61268	11/3/18	13:24 Arizona	Water	Water	X	X	X		2	Job 3
FC-CCR-FD01-11318 (550-113007-13) # 61269	11/3/18	11:45 Arizona	Water	Water	X	X	X		2	Job 3

Analysis Requested: A-HCL, B-NaOH, C-Zn Acetate, D-Nitric Acid, E-NaHSO4, F-MeOH, G-Antichlor, H-Ascorbic Acid, I-Ion, J-DI Water, K-EDTA, L-EDA, Other: [Blank]

Preservation Codes: M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecylsulfate, U - Acetone, V - MCAA, W - pH 4-5, X - other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archiving For _____ Months
 Special Instructions/OC Requirements: [Blank]

Empty Kit Relinquished by: [Signature] Date: 11/8/18 Time: 9:51
 Relinquished by: [Signature] Date/Time: 11/8/18 9:51 Company: [Redacted]
 Relinquished by: [Signature] Date/Time: [Blank] Company: [Redacted]
 Relinquished by: [Signature] Date/Time: [Blank] Company: [Redacted]

Custody Seals Intact: Yes No Δ Custody Seal No.: [Blank]
 Cooler Temperature(s) °C and Other Remarks: [Blank]

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontracted laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification

Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)

TestAmerica Phoenix

4825 East Cotton Cir Blvd Suite 189
Phoenix, AZ 85040
Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record



THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)		Lab PM Baker, Ken	Carrier Tracking No(s):	COC No: 550-22780.2
Client Contact: Shipping/Receiving		Phone: Ken.baker@testamericainc.com	State of Origin: Arizona	Page Page 2 of 2
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): Slate Program - Arizona		Job #: 550-113007-1
Address: 3245 North Washington Street, Chandler AZ, 85225		Due Date Requested: 11/16/2018	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NH4SO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
City: Chandler		TAT Requested (days):	M - Hexane N - None O - AsHdO2 P - Na2OAS Q - Ni2SO4 R - Ni2SO3 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
State, Zip: AZ, 85225		PO #:	Analysis Requested	
Phone:		WO #:	Total Number of containers	
Email:		Project #: 55009706	Special Instructions/Note:	
Project Name: CCR		SSOW#:	Job 3	
Site: Arizona Public Service		Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/>		
Sample Identification - Client ID (Lab ID)		Perform ILS/MSD (Yes or No) <input checked="" type="checkbox"/>		
FC-CCR-FD02-11318 (550-113007-14) # 61270	Sample Date 11/23/18	Sample Time 12:31 Arizona	Matrix (Number, Element, Description) Water	Sub (Radium 226/228)/ Radium 226/228 <input checked="" type="checkbox"/>
Sample Type (C=Comp, G=grab)		Preservation Code:	Special Instructions/Note:	
Date Requested		Date	Special Instructions/QC Requirements:	
Date/Time		Date/Time	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Date/Time		Date/Time	Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Date/Time		Date/Time	Special Instructions/QC Requirements:	
Date/Time		Date/Time	Method of Shipment:	
Date/Time		Date/Time	Received by: _____ Date/Time: 11/21/18 9:51	
Date/Time		Date/Time	Received by: _____ Date/Time: _____	
Date/Time		Date/Time	Received by: _____ Date/Time: _____	
Date/Time		Date/Time	Cooler Temperature(s) °C and Other Remarks:	
Custody Seal No.:		Custody Seal Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody.)

Possible Hazard Identification

Unconfirmed

Deliverable Requested: I, II, III, IV, Other (specify)

Empty Kit Relinquished by:

Relinquished by: M. Maginnis

Date/Time: 11/16/18 9:51A

Company: DCS

Relinquished by: _____

Date/Time: _____

Company: _____

Relinquished by: _____

Date/Time: _____

Company: _____

Relinquished by: _____

Date/Time: _____

Company: _____



113007

Chain of Custody Record

Phone 602.437.3340 Fax 623.445.6192

Client Contact
 APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416

Project Manager: Doug Lavarrway
 Tel/Fax: 928-288-1394

Analysis Turnaround Time
 Calendar (C) or Work Days (W) _____

Phone: _____
 TAT if different from Below: 7 Days

Fax: 2 weeks
 1 week
 2 days
 1 day

Project Name: CCR
E-Mail Address: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample				
						Perform MS / MSD (Y / N)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
FC-CCR-MW66-11218	11/2/2018	1328	G	W	2	N	X	X	X	X
FC-CCR-MW67-11318	11/3/2018	957	G	W	2	N	X	X	X	X
FC-CCR-MW68-11318	11/3/2018	1101	G	W	2	N	X	X	X	X
FC-CCR-MW69-11318	11/3/18	849	G	W	2	N	X	X	X	X
FC-CCR-MW70-11218	11/2/18	1532	G	W	2	N	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unk/othr

Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L

3.0°C, 3.8°C, 2.9°C

Relinquished by: Pass Lavarrway
 Company: APS
 Date/Time: 11/7/2018

Received by: P. Rogers
 Company: TADJ
 Date/Time: 11/7/18 8:05am

Relinquished by: _____
 Company: _____
 Date/Time: 11-2-18 (305)

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TestAmerica Phoenix

4645 E Cotton Cir Blvd Bldg 3
Phoenix, AZ 85040

Phone: 602.437.3340 Fax: 623.445.6192

113007

Chain of Custody Record

TestAmerica Laboratories, Inc.



Client Contact: APS Four Corners
 Project Manager: Doug Lavarnway
 Tel/Fax: 928-288-1394
 Analysis Turnaround Time
 PO Box 355, MS 4915
 Fruiland, NM 87416
 Calendar (C) or Work Days (W)
 Phone: _____
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Fax: _____
 Project Name: CCR
 E-Mail Address: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Lab Contact	Date	Carrier	COC No.	Job No.	SDG No.
FC-CCR-MW62-11218	11/2/2018	1410	G	W	2	Perform MS / MSD (Y / N)	Ken Baker	11/7/2018		1 of 1 COCS		
FC-CCR-MW63-11218	11/2/2018	1449	G	W	2	EPA 200.7 (B, Ca)						
FC-CCR-MW64-11218	11/2/2018	1252	G	W	2	EPA 300.0 (Cl, F, SO4)						
FC-CCR-MW65-11218	11/2/2018	1208	G	W	2	SM 2540C (TDS)						
FC-CCR-MW71-11318	11/3/18	1145	G	W	2	SM 4500-HB (pH)						
FC-CCR-MW72-11318	11/3/18	1231	G	W	2							
FC-CCR-MW73-11318	11/3/18	1324	G	W	2							
FC-CCR-FD01-11318	11/3/18	1145	G	W	2							
FC-CCR-FD02-11318	11/3/18	1231	G	W	2							

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Unknown
 Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L

3,0°C, 3.8°C, 2.9°C) PC

Relinquished by: Doug Lavarnway
 Company: APS
 Date/Time: 11/7/2018 8:05am
 Received by: [Signature]
 Company: [Signature]
 Date/Time: 11-7-18 1300
 Relinquished by: [Signature]
 Company: [Signature]
 Date/Time: 11-7-18 1300

113007

Chain of Custody Record

Client Contact		Project Manager: Doug Lavarnway		Site Contact: Doug Lavarnway		Date: 11/7/2018		COC No. _____ of _____ COCs	
APs Four Corners PO Box 355, MS 4915 Fruitland, NM 87416		Tel/Fax: 928-587-0319		Lab Contact: Ken Baker		Carrier:		Job No. _____	
Phone:		Calendar (C) or Work Days (W)		EPA 200.7 (Li)		EPA 200.8 (As, Ba, Co, Mo, Se, Tl)		SDG No. _____	
Fax:		TAT if different from Below _____ 7 Days		Radium 226 + 228 combined		EPA 300.0 (F)		Sample Specific Notes:	
Project Name: CCR		<input type="checkbox"/> 2 weeks		Perform MS / MSD (Y / N)					
E-Mail Address:		<input type="checkbox"/> 1 week		EPA 200.7 (Li)					
		<input type="checkbox"/> 2 days		200.8 (As, Ba, Co, Mo, Se, Tl)					
		<input type="checkbox"/> 1 day		Radium 226 + 228 combined					
				EPA 300.0 (F)					
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample		
FC-CCR-MW66-11218	-01	11/2/2018	1328	G	W	4	Perform MS / MSD (Y / N)		
FC-CCR-MW67-11318	-02	11/3/2018	957	G	W	4	EPA 200.7 (Li)		
FC-CCR-MW68-11318	-03	11/3/2018	1101	G	W	4	200.8 (As, Ba, Co, Mo, Se, Tl)		
FC-CCR-MW69-11318	-04	11/3/18	849	G	W	4	Radium 226 + 228 combined		
FC-CCR-MW70-11218	-05	11/2/18	1532	G	W	4	EPA 300.0 (F)		
FC-CCR-MW71-11318	-10	11/3/18	1145	G	W	4			
FC-CCR-MW72-11318	-11	11/3/18	1231	G	W	4			
FC-CCR-MW73-11318	-12	11/3/18	1324	G	W	4			
FC-CCR-FD01-11318	-13	11/3/18	1145	G	W	4			
FC-CCR-FD02-11318	-14	11/3/18	1231	G	W	4			
Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other									
Possible Hazard Identification									
<input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Polymers <input type="checkbox"/> Linkages									
Special Instructions/QC Requirements & Comments:									
Method 200.8 with collision cell									
Radium analyzed by Radiation Safety									
Relinquished by: <i>Doug Lavarnway</i>		Company: <i>APs</i>		Date/Time: <i>11/7/2018</i>		Received by: <i>Prognos</i>		Company: <i>PAIT</i>	
Relinquished by: _____		Company: _____		Date/Time: _____		Received by: _____		Company: <i>APHX</i>	
Relinquished by: _____		Company: _____		Date/Time: _____		Received by: _____		Date/Time: <i>11-7-18 1305</i>	

3.0°C, 7.8°C, 2.9°C) PC

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113007-1

Login Number: 113007

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113007-2

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/27/2018 7:47:31 AM

Ken Baker, Project Manager II

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Job ID: 550-113007-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-113007-2

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.9° C, 3.0° C and 3.8° C.

Receipt Exceptions

Received 3 pages of COCs from the courier.

Samples #6 - #9 only request Appendix I.

All of the other samples request Appendix I and II.

Client did provide sample containers if Appendix II is needed.

FC-CCR-MW62-11218 (550-113007-6), FC-CCR-MW63-112818 (550-113007-7), FC-CCR-MW64-11218 (550-113007-8) and FC-CCR-MW65-11218 (550-113007-9)

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW71-11318 (550-113007-10), FC-CCR-MW72-11318 (550-113007-11), FC-CCR-MW73-11318 (550-113007-12) and FC-CCR-FD01-11318 (550-113007-13). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

Method(s) 300.0: The following sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-FD02-11318 (550-113007-14). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113007-1	FC-CCR-MW66-11218	Water	11/02/18 13:28	11/07/18 13:00
550-113007-2	FC-CCR-MW67-11318	Water	11/03/18 09:57	11/07/18 13:00
550-113007-3	FC-CCR-MW68-11318	Water	11/03/18 11:01	11/07/18 13:00
550-113007-4	FC-CCR-MW69-11318	Water	11/03/18 08:49	11/07/18 13:00
550-113007-5	FC-CCR-MW70-11218	Water	11/02/18 15:32	11/07/18 13:00
550-113007-10	FC-CCR-MW71-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-11	FC-CCR-MW72-11318	Water	11/03/18 12:31	11/07/18 13:00
550-113007-12	FC-CCR-MW73-11318	Water	11/03/18 13:24	11/07/18 13:00
550-113007-13	FC-CCR-FD01-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-14	FC-CCR-FD02-11318	Water	11/03/18 12:31	11/07/18 13:00



Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	25	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.38		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0015		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.023		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.019		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0020	M1	0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.0011		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	16	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.39		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0016		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.017		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0061		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.037		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0043		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00078		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	12	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.42		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0030		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0081		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0038		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0078		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.11		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.0016		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	11	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.35		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0042		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0041		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.025		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00024		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.7	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.32		0.20	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW70-11218 (Continued)

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0043		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.010		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0041		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0064		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.19		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00029		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.35		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0046		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0098		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00079		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.27		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00031		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0031		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0075		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00078		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.13		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00088		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.31		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.022		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0078		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0026		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0062		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00020		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.34		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0068		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0095		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00065		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.31		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00030		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-FD02-11318 (Continued)

Lab Sample ID: 550-113007-14

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0026		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0075		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00078		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.15		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00087		0.00010	mg/L	1		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Date Collected: 11/02/18 13:28

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	25	D1	2.0	mg/L			11/13/18 19:33	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.38		0.20	mg/L		11/09/18 07:19	11/14/18 21:27	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0015		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Barium	0.023		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Cobalt	0.012		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Molybdenum	0.019		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Selenium	0.0020	M1	0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Thallium	0.0011		0.00010	mg/L		11/11/18 11:26	11/12/18 20:39	1

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Date Collected: 11/03/18 09:57

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	16	D1	2.0	mg/L			11/13/18 21:23	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.39		0.20	mg/L		11/09/18 07:19	11/14/18 21:33	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0016		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Barium	0.017		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Cobalt	0.0061		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Molybdenum	0.037		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Selenium	0.0043		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Thallium	0.00078		0.00010	mg/L		11/11/18 11:26	11/12/18 20:48	1

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	12	D1	2.0	mg/L			11/13/18 22:00	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.42		0.20	mg/L		11/09/18 07:19	11/14/18 21:39	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0030		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0081		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Cobalt	0.0038		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Molybdenum	0.0078		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Selenium	0.11		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Thallium	0.0016		0.00010	mg/L		11/11/18 11:26	11/12/18 20:50	1

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Date Collected: 11/03/18 08:49

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	11	D1	2.0	mg/L			11/13/18 23:14	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.35		0.20	mg/L		11/09/18 07:19	11/14/18 21:45	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0042		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Barium	0.012		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Cobalt	0.0041		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Molybdenum	0.012		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Selenium	0.025		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Thallium	0.00024		0.00010	mg/L		11/11/18 11:26	11/12/18 20:53	1

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.7	D1	0.80	mg/L			11/13/18 23:50	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.32		0.20	mg/L		11/09/18 07:19	11/14/18 21:51	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0043		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Barium	0.010		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Cobalt	0.0041		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Molybdenum	0.0064		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Selenium	0.19		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Thallium	0.00029		0.00010	mg/L		11/11/18 11:26	11/12/18 20:46	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 03:31	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.35		0.20	mg/L		11/09/18 07:19	11/14/18 22:14	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0046		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Barium	0.0098		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Molybdenum	0.00079		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Selenium	0.27		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Thallium	0.00031		0.00010	mg/L		11/11/18 11:26	11/12/18 20:55	1

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 04:08	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.37		0.20	mg/L		11/09/18 07:19	11/14/18 22:25	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0031		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Barium	0.0075		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Cobalt	0.0020		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Molybdenum	0.00078		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Selenium	0.13		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Thallium	0.00088		0.00010	mg/L		11/11/18 11:26	11/12/18 20:57	1

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 04:45	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.31		0.20	mg/L		11/09/18 07:19	11/14/18 22:31	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	V1	0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.022		0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1
Cobalt	0.0078		0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1
Molybdenum	0.0026		0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1
Selenium	0.0062		0.00050	mg/L		11/11/18 11:26	11/14/18 21:16	1
Thallium	0.00020		0.00010	mg/L		11/11/18 11:26	11/12/18 21:07	1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 05:22	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.34		0.20	mg/L		11/09/18 07:19	11/14/18 22:37	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0068		0.00050	mg/L		11/11/18 11:26	11/14/18 21:18	1
Barium	0.0095		0.00050	mg/L		11/11/18 11:26	11/12/18 21:09	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 21:09	1
Molybdenum	0.00065		0.00050	mg/L		11/11/18 11:26	11/12/18 21:09	1
Selenium	0.31		0.00050	mg/L		11/11/18 11:26	11/14/18 21:18	1
Thallium	0.00030		0.00010	mg/L		11/11/18 11:26	11/12/18 21:09	1

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 06:35	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.37		0.20	mg/L		11/09/18 07:19	11/14/18 22:43	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0026		0.00050	mg/L		11/11/18 11:26	11/14/18 21:20	1
Barium	0.0075		0.00050	mg/L		11/11/18 11:26	11/12/18 21:11	1
Cobalt	0.0020		0.00050	mg/L		11/11/18 11:26	11/12/18 21:11	1
Molybdenum	0.00078		0.00050	mg/L		11/11/18 11:26	11/12/18 21:11	1
Selenium	0.15		0.00050	mg/L		11/11/18 11:26	11/14/18 21:20	1
Thallium	0.00087		0.00010	mg/L		11/11/18 11:26	11/12/18 21:11	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	25		20.0	45.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	25		20.0	46.5	D1	mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.378		1.00	1.45		mg/L		107	70 - 130

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.378		1.00	1.42		mg/L		105	70 - 130	1	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-161588/1-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161588

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		11/11/18 11:26	11/12/18 20:32	1
Arsenic	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Barium	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Cadmium	ND		0.00010	mg/L		11/11/18 11:26	11/12/18 20:32	1
Chromium	ND		0.0010	mg/L		11/11/18 11:26	11/12/18 20:32	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Lead	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Molybdenum	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Selenium	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Thallium	ND		0.00010	mg/L		11/11/18 11:26	11/12/18 20:32	1

Lab Sample ID: LCS 550-161588/2-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.100	0.0999		mg/L		100	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 550-161588/2-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.0962		mg/L		96	85 - 115
Barium	0.100	0.0976		mg/L		98	85 - 115
Cadmium	0.100	0.0974		mg/L		97	85 - 115
Chromium	0.100	0.0960		mg/L		96	85 - 115
Cobalt	0.100	0.0962		mg/L		96	85 - 115
Lead	0.100	0.0971		mg/L		97	85 - 115
Molybdenum	0.100	0.0970		mg/L		97	85 - 115
Selenium	0.100	0.0975		mg/L		98	85 - 115
Thallium	0.100	0.0974		mg/L		97	85 - 115

Lab Sample ID: LCSD 550-161588/3-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.100	0.0991		mg/L		99	85 - 115	1	20
Arsenic	0.100	0.0965		mg/L		96	85 - 115	0	20
Barium	0.100	0.0956		mg/L		96	85 - 115	2	20
Cadmium	0.100	0.0967		mg/L		97	85 - 115	1	20
Chromium	0.100	0.0963		mg/L		96	85 - 115	0	20
Cobalt	0.100	0.0964		mg/L		96	85 - 115	0	20
Lead	0.100	0.0971		mg/L		97	85 - 115	0	20
Molybdenum	0.100	0.0964		mg/L		96	85 - 115	1	20
Selenium	0.100	0.0981		mg/L		98	85 - 115	1	20
Thallium	0.100	0.0973		mg/L		97	85 - 115	0	20

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161708

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND		0.100	0.0997		mg/L		99	70 - 130
Arsenic	0.0015		0.100	0.112		mg/L		110	70 - 130
Barium	0.023		0.100	0.122		mg/L		100	70 - 130
Cadmium	ND		0.100	0.0891		mg/L		89	70 - 130
Chromium	0.0017		0.100	0.103		mg/L		102	70 - 130
Cobalt	0.012		0.100	0.103		mg/L		91	70 - 130
Lead	ND		0.100	0.0860		mg/L		86	70 - 130
Molybdenum	0.019		0.100	0.120		mg/L		102	70 - 130
Selenium	0.0020	M1	0.100	0.139	M1	mg/L		137	70 - 130
Thallium	0.0011		0.100	0.0886		mg/L		87	70 - 130

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161708

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	ND		0.100	0.0982		mg/L		98	70 - 130	1	20
Arsenic	0.0015		0.100	0.108		mg/L		106	70 - 130	4	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-113007-1 MSD

Matrix: Water

Analysis Batch: 161708

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Prep Batch: 161588

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Barium	0.023		0.100	0.120		mg/L		97	70 - 130	2	20
Cadmium	ND		0.100	0.0866		mg/L		87	70 - 130	3	20
Chromium	0.0017		0.100	0.100		mg/L		98	70 - 130	3	20
Cobalt	0.012		0.100	0.101		mg/L		88	70 - 130	2	20
Lead	ND		0.100	0.0843		mg/L		84	70 - 130	2	20
Molybdenum	0.019		0.100	0.118		mg/L		99	70 - 130	2	20
Selenium	0.0020	M1	0.100	0.139	M1	mg/L		137	70 - 130	0	20
Thallium	0.0011		0.100	0.0867		mg/L		86	70 - 130	2	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

HPLC/IC

Analysis Batch: 161850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	300.0	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	300.0	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	300.0	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	300.0	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	300.0	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	300.0	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	300.0	

Analysis Batch: 161852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	300.0	

Metals

Prep Batch: 161450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7	

Prep Batch: 161588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.8	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.8	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.8	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.8	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.8	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.8	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.8	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.8	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.8	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.8	
MB 550-161588/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-161588/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-161588/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.8	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Metals (Continued)

Analysis Batch: 161708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.8 LL	161588
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.8 LL	161588
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.8 LL	161588
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.8 LL	161588
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.8 LL	161588
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.8 LL	161588
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.8 LL	161588
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.8 LL	161588
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.8 LL	161588
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.8 LL	161588
MB 550-161588/1-A	Method Blank	Total/NA	Water	200.8 LL	161588
LCS 550-161588/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	161588
LCSD 550-161588/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	161588
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.8 LL	161588
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.8 LL	161588

Analysis Batch: 161944

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.8 LL	161588
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.8 LL	161588
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.8 LL	161588

Analysis Batch: 161972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW66-11218

Date Collected: 11/02/18 13:28

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 19:33	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:27	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:39	SLS	TAL PHX

Client Sample ID: FC-CCR-MW67-11318

Date Collected: 11/03/18 09:57

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 21:23	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:33	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:48	SLS	TAL PHX

Client Sample ID: FC-CCR-MW68-11318

Date Collected: 11/03/18 11:01

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 22:00	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:39	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:50	SLS	TAL PHX

Client Sample ID: FC-CCR-MW69-11318

Date Collected: 11/03/18 08:49

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 23:14	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:45	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:53	SLS	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/13/18 23:50	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:51	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:46	SLS	TAL PHX

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 03:31	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:14	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:55	SLS	TAL PHX

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 04:08	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:25	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:57	SLS	TAL PHX

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 04:45	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:31	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 21:07	SLS	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161944	11/14/18 21:16	TEK	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 05:22	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:37	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 21:09	SLS	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161944	11/14/18 21:18	TEK	TAL PHX

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 06:35	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:43	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 21:11	SLS	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161944	11/14/18 21:20	TEK	TAL PHX

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
Subcontract	Radium 226/228	None	Radiation
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Radiation Safety Engineering, Inc.

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Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

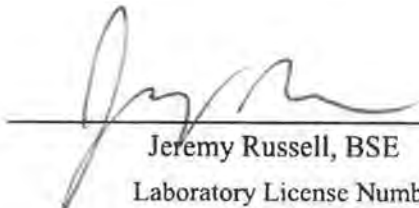
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW66-11218 (550-113007-1)	2.0 ± 0.3	0.9 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462
11/21/2018
Date



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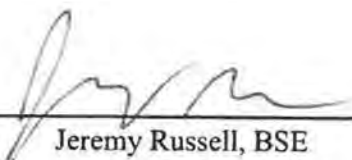
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW67-11318 (550-113007-2)	0.8 ± 0.2	0.8 ± 0.3	1.6 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW68-11318 (550-113007-3)	0.6 ± 0.2	1.3 ± 0.3	1.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date



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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW69-11318 (550-113007-4)	1.7 ± 0.2	1.3 ± 0.3	3.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



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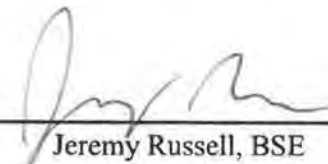
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW70-11218 (550-113007-5)	0.7 ± 0.2	< 0.7	0.7 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



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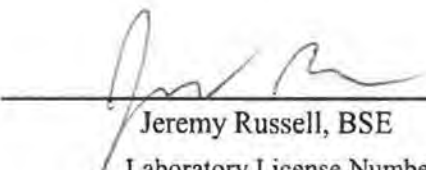
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 03, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW71-11318 (550-113007-10)	1.2 ± 0.2	< 0.7	1.2 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



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FAX (480) 892-5446

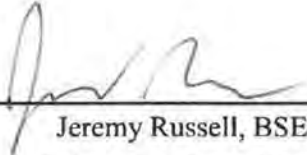
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW72-11318 (550-113007-11)	0.7 ± 0.2	1.0 ± 0.3	1.7 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462





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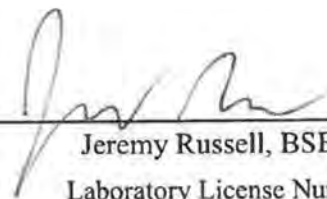
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW73-11318 (550-113007-12)	1.5 ± 0.2	1.4 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-11318 (550-113007-13)	1.8 ± 0.2	< 0.7	1.8 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date





Radiation Safety Engineering, Inc.

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Website: www.radsafe.com

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FAX (480) 892-5446

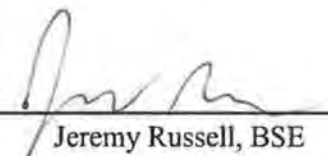
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD02-11318 (550-113007-14)	0.5 ± 0.2	1.5 ± 0.3	2.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



TestAmerica Phoenix

4625 East Cotton Cir Blvd Suite 189
Phoenix, AZ 85040
Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record



PHYSICAL & ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)		Sampler	Lab PM	Carrier Tracking Note(s)	ECC No.					
Client Contact: Shipping/Receiving		Baker, Ken	Baker, Ken		550-22780.1					
Company: Radiation Safety Eng., Inc.		E-Mail: ken.baker@testamericainc.com		State of Origin: Arizona	Page: Page 1 of 2					
Address: 3245 North Washington Street, Chandler		Accreditations Required (See note): State Program - Arizona		Job #: 550-113007-1	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anichlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:					
Due Date Requested: 11/18/2018					M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylsulfate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)					
TAT Requested (days):										
PO #:										
WO #:										
Project #: 55009706										
Site: Arizona Public Service										
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=Water, S=Soil, D=Dredge, O=Other)	Field Filtered Sample (Yes or No)	Field Filtered Sample (Yes or No)	Platform MS/MSD (Yes or No)	SUB (Radium 226/228/ Radium 226/228)	Total Number of Containers	Special Instructions/Note:
FC-CCR-MW66-11218 (550-113007-1) # 61261	11/2/18	13:28	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW67-11318 (550-113007-2) # 61262	11/3/18	08:57	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW68-11318 (550-113007-3) # 61263	11/3/18	11:01	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW69-11318 (550-113007-4) # 61264	11/3/18	08:49	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW70-11218 (550-113007-5) # 61265	11/2/18	15:32	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW71-11318 (550-113007-10) # 61266	11/3/18	11:45	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW72-11318 (550-113007-11) # 61267	11/3/18	12:31	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW73-11318 (550-113007-12) # 61268	11/3/18	13:24	Water	Water	X	X	X	X	2	Job 3
FC-CCR-FD01-11318 (550-113007-13) # 61269	11/3/18	11:45	Water	Water	X	X	X	X	2	Job 3

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontracted laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification

Unconfirmed
Deliverable Requested: I, II, III, IV, Other (specify) _____
Primary Deliverable Rank: 2
Empty Kit Relinquished by: _____ Date: _____
Relinquished by: M. McGinnis Date/Time: 11/8/18 9:51
Relinquished by: _____ Date/Time: _____
Relinquished by: _____ Date/Time: _____
Custody Seals Intact: _____ Custody Seal No.: _____
Δ Yes Δ No

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Return To Client Disposal By Lab Archiving For _____ Months
Special Instructions/OC Requirements: _____

Method of Shipment: _____
Received by: _____ Date/Time: 11/8/18 9:51 Company: KSE
Received by: _____ Date/Time: _____ Company: _____
Received by: _____ Date/Time: _____ Company: _____
Cooler Temperature(s) °C and Other Remarks: _____

Chain of Custody Record

113007

Phone 602.437.3340 Fax 623.445.6192

TestAmerica Laboratories, Inc.

Client Contact: **APPS Four Corners** Project Manager: **Doug Lavarrway** Site Contact: **Doug Lavarrway** Date: **11/7/2018** COC No: **1** of **1** COCs

PO Box 355, MS 4915 Tel/Fax: **928-288-1394** Lab Contact: **Ken Baker** Carrier:

Fruitland, NM 87416 Calendar (C) or Work Days (W) _____ Job No. _____

Phone: _____ TAT if different from Below: 7 Days _____ SDG No. _____

Fax: 2 weeks 1 week 2 days 1 day

Project Name: **CCR** E-Mail Address: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample				
						Perform MS / MSD (Y / N)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
FC-CCR-MW66-11218	11/2/2018	1328	G	W	2	N	X	X	X	X
FC-CCR-MW67-11318	11/3/2018	957	G	W	2	N	X	X	X	X
FC-CCR-MW68-11318	11/3/2018	1101	G	W	2	N	X	X	X	X
FC-CCR-MW69-11318	11/3/18	849	G	W	2	N	X	X	X	X
FC-CCR-MW70-11218	11/2/18	1532	G	W	2	N	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____

Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Unk/othr

Special Instructions/QC Requirements & Comments: _____

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): Return To Client Disposal By Lab Archive For _____ Months

Need Fluoride reporting limit ≤ 0.8 mg/L

3.0°C, 3.8°C, 2.9°C

PC

Relinquished by: **Pass Lavarrway** Company: **APPS** Date/Time: **11/7/2018** Received by: **Progers** Company: **PC&J** Date/Time: **11/7/18 8:05am**

Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: **TAPPA** Date/Time: **11-2-18 (305)**

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TestAmerica Phoenix

4645 E Cotton Cir Blvd Bldg 3
Phoenix, AZ 85040

Phone: 602.437.3340 Fax: 623.445.6192

113007

Chain of Custody Record

TestAmerica Laboratories, Inc.



Client Contact: APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416
 Project Manager: Doug Lavarnway
 Tel/Fax: 928-288-1394
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Project Name: CCR
 E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Lab Contact	Date	Carrier	SDG No.
FC-CCR-MW62-11218	11/2/2018	1410	G	W	2	Perform MS / MSD (Y / N) EPA 200.7 (B, Ca) EPA 300.0 (Cl, F, SO4) SM 2540C (TDS) SM 4500-HB (pH)	Ken Baker	11/7/2018		
FC-CCR-MW63-11218	11/2/2018	1449	G	W	2					
FC-CCR-MW64-11218	11/2/2018	1252	G	W	2					
FC-CCR-MW65-11218	11/2/2018	1208	G	W	2					
FC-CCR-MW71-11318	11/3/18	1145	G	W	2					
FC-CCR-MW72-11318	11/3/18	1231	G	W	2					
FC-CCR-MW73-11318	11/3/18	1324	G	W	2					
FC-CCR-FD01-11318	11/3/18	1145	G	W	2					
FC-CCR-FD02-11318	11/3/18	1231	G	W	2					

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other
 Possible Hazard Identification: Non-hazard Flammable Skin Irritant Poison Unknown
 Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

(3,0°C, 3.8°C, 2.9°C) PC

Relinquished by: Doug Lavarnway
 Company: APS
 Date/Time: 11/7/2018 8:05am
 Received by: [Signature]
 Company: [Signature]
 Date/Time: 11-7-18 1300
 Relinquished by: [Signature]
 Company: [Signature]
 Date/Time: 11-7-18 1300

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113007-2

Login Number: 113007

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113007-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/30/2018 4:22:04 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Job ID: 550-113007-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-113007-3

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.9° C, 3.0° C and 3.8° C.

Receipt Exceptions

Received 3 pages of COCs from the courier.

Samples #6 - #9 only request Appendix I.

All of the other samples request Appendix I and II.

Client did provide sample containers if Appendix II is needed.

FC-CCR-MW62-11218 (550-113007-6), FC-CCR-MW63-112818 (550-113007-7), FC-CCR-MW64-11218 (550-113007-8) and FC-CCR-MW65-11218 (550-113007-9)

HPLC/IC

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113007-10	FC-CCR-MW71-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-11	FC-CCR-MW72-11318	Water	11/03/18 12:31	11/07/18 13:00

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

No Detections.

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

No Detections.

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This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/28/18 01:23	2

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/28/18 01:41	2

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-163090/2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			11/27/18 20:10	1

Lab Sample ID: LCS 550-163090/5
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.11		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-163090/6
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.10		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-113026-A-1 MS ^2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 M2 D5	8.00	6.47	D1 M2	mg/L		77	80 - 120

Lab Sample ID: 550-113026-A-1 MSD ^2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 M2 D5	8.00	6.80	D1	mg/L		81	80 - 120	5	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

HPLC/IC

Analysis Batch: 163090

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
MB 550-163090/2	Method Blank	Total/NA	Water	300.0	
LCS 550-163090/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-163090/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-113026-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	163090	11/28/18 01:23	NEL	TAL PHX

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	163090	11/28/18 01:41	NEL	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Chain of Custody Record

113007

Phone 602.437.3340 Fax 623.445.6192

Client Contact: **APPS Four Corners** PO Box 355, MS 4915
 Fruitland, NM 87416
 Project Manager: **Doug Lavarrway** Tel/Fax: 928-288-1394
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 Phone: TAT if different from Below: 7 Days
 Fax: 2 weeks 1 week 2 days 1 day
 Project Name: **CCR**
 E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Perform MS / MSD (Y / N)	Lab Contact	Carrier	Date	COG No.	Job No.	SDG No.
FC-CCR-MW66-11218	11/2/2018	1328	G	W	2	N	X X X X X	EPA 200.7 (B, Ca)		11/7/2018	1 of 1 COCs		
FC-CCR-MW67-11318	11/3/2018	957	G	W	2	N	X X X X X	EPA 300.0 (Cl, F, SO4)					
FC-CCR-MW68-11318	11/3/2018	1101	G	W	2	N	X X X X X	SM 2540C (TDS)					
FC-CCR-MW69-11318	11/3/18	849	G	W	2	N	X X X X X	SM 4500-HB (pH)					
FC-CCR-MW70-11218	11/2/18	1532	G	W	2	N	X X X X X						



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Unk/othr
 Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal By Lab Archive For _____ Months

3.0°C, 3.8°C, 2.9°C

Relinquished by: **Pass Lavarrway** Company: **APPS** Date/Time: **11/7/2018** Received by: **Progers** Company: **Lab J** Date/Time: **11/7/18 8:05am**
 Relinquished by: Company: Date/Time: Received by: Company: Date/Time:
 Relinquished by: Company: Date/Time: Received by: Company: Date/Time: **11-2-18 1305**

TestAmerica Phoenix
4645 E Cotton Cir Blvd Bldg 3
Phoenix, AZ 85040

phone 602.437.3340 fax 623.445.6192

113007

Chain of Custody Record

TestAmerica Laboratories, Inc.



Client Contact
 APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416
 Phone: _____
 Fax: _____
 Project Name: CCR
 E-Mail Address: _____

Project Manager: Doug Lavarnway
 Tel/Fax: 928-288-1394
 Analysis Turnaround Time
 Calendar (C) or Work Days (W) _____
 TAT if different from Below: _____ 7 Days
 2 weeks
 1 week
 2 days
 1 day

Site Contact: Doug Lavarnway
 Lab Contact: Ken Baker
 Date: 11/7/2018
 Carrier: _____

COC No: _____
 Job No: _____
 SDG No: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Perform MS / MSD (Y / N)
FC-CCR-MW62-11218	11/2/2018	1410	G	W	2	N	X X X X X
FC-CCR-MW63-11218	11/2/2018	1449	G	W	2	N	X X X X X
FC-CCR-MW64-11218	11/2/2018	1252	G	W	2	N	X X X X X
FC-CCR-MW65-11218	11/2/2018	1208	G	W	2	N	X X X X X
FC-CCR-MW71-11318	11/3/18	1145	G	W	2	N	X X X X X
FC-CCR-MW72-11318	11/3/18	1231	G	W	2	N	X X X X X
FC-CCR-MW73-11318	11/3/18	1324	G	W	2	N	X X X X X
FC-CCR-FD01-11318	11/3/18	1145	G	W	2	N	X X X X X
FC-CCR-FD02-11318	11/3/18	1231	G	W	2	N	X X X X X

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other _____

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unknown

Special Instructions/QC Requirements & Comments:
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

Need Fluoride reporting limit ≤ 0.8 mg/L

3,0°C, 3.8°C, 2.9°C) PC

Relinquished by: *Dee Lavarnway* Company: *APS* Date/Time: *11/7/2018* Received by: *Probes* Company: *APS* Date/Time: *11/7/18 8:05am*

Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: *APAC* Date/Time: *11-7-18 1300*

TestAmerica Phoenix
 4645 E. Cotton Cir Blvd Bldg 3
 Phoenix, AZ 85040

Phone 602-437-3340 Fax 623-445-6192

113007

Chain of Custody Record

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Doug Lavarnway		Site Contact: Doug Lavarnway		Date: 11/7/2018		COC No. _____ of _____ COCs	
APs Four Corners PO Box 355, MS 4915 Fruitland, NM 87416		Tel/Fax: 928-587-0319		Lab Contact: Ken Baker		Carrier:		Job No. _____	
Phone:		Calendar (C) or Work Days (W)		EPA 200.7 (Li)		EPA 200.8 (As, Ba, Co, Mo, Se, Tl)		SDG No. _____	
Fax:		TAT if different from Below _____ 7 Days		Radium 226 + 228 combined		EPA 300.0 (F)		Sample Specific Notes:	
Project Name: CCR		<input type="checkbox"/> 2 weeks		Perform MS / MSD (Y / N)					
E-Mail Address:		<input type="checkbox"/> 1 week		EPA 200.7 (Li)					
		<input type="checkbox"/> 2 days		200.8 (As, Ba, Co, Mo, Se, Tl)					
		<input type="checkbox"/> 1 day		Radium 226 + 228 combined					
				EPA 300.0 (F)					
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample		
FC-CCR-MW66-11218	-01	11/2/2018	1328	G	W	4	Perform MS / MSD (Y / N)		
FC-CCR-MW67-11318	-02	11/3/2018	957	G	W	4	EPA 200.7 (Li)		
FC-CCR-MW68-11318	-03	11/3/2018	1101	G	W	4	200.8 (As, Ba, Co, Mo, Se, Tl)		
FC-CCR-MW69-11318	-04	11/3/18	849	G	W	4	Radium 226 + 228 combined		
FC-CCR-MW70-11218	-05	11/2/18	1532	G	W	4	EPA 300.0 (F)		
FC-CCR-MW71-11318	-10	11/3/18	1145	G	W	4			
FC-CCR-MW72-11318	-11	11/3/18	1231	G	W	4			
FC-CCR-MW73-11318	-12	11/3/18	1324	G	W	4			
FC-CCR-FD01-11318	-13	11/3/18	1145	G	W	4			
FC-CCR-FD02-11318	-14	11/3/18	1231	G	W	4			
Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other							Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		
Possible Hazard Identification							<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
<input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant									
Special Instructions/OC Requirements & Comments:									
Method 200.8 with collision cell									
Radium analyzed by Radiation Safety									
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	
Dos Lavarnway	APs	11/7/2018	Prognos	APT	11/7/18	8:05a			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	

3.0°C, 7.8°C, 2.9°C) PC

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113007-3

Login Number: 113007

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-99693-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

3/28/2018 11:12:49 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
D1	Sample required dilution due to matrix.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Job ID: 550-99693-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-99693-1**

Comments

No additional comments.

Receipt

The samples were received on 3/19/2018 6:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 2.8° C and 3.8° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99693-1	FC-CCR-MW49A-31718	Water	03/17/18 14:01	03/19/18 06:55
550-99693-2	FC-CCR-MW61-31718	Water	03/17/18 11:46	03/19/18 06:55
550-99693-3	FC-CCR-MW74-31718	Water	03/17/18 10:52	03/19/18 06:55
550-99693-4	FC-CCR-MW75-31718	Water	03/17/18 12:27	03/19/18 06:55
550-99693-5	FC-CCR-MW7-31718	Water	03/17/18 13:10	03/19/18 06:55
550-99693-6	FC-CCR-FD02-31718	Water	03/17/18 11:46	03/19/18 06:55

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-MW49A-31718

Lab Sample ID: 550-99693-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.1		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.021		0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0023		0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.021		0.0020	mg/L	4		200.8 LL	Total/NA
Thallium	0.0015		0.00040	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.6	D1	1.6	mg/L	4		300.0	Total/NA
Lithium	0.38		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cadmium	0.0011	D1	0.00040	mg/L	4		200.8 LL	Total/NA
Cobalt	0.016	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.079	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW74-31718

Lab Sample ID: 550-99693-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	3.2	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.47		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0034	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.020	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.016	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.085	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.7	D1	1.6	mg/L	4		300.0	Total/NA
Lithium	0.43		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.018	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cadmium	0.0020	D1	0.00040	mg/L	4		200.8 LL	Total/NA
Cobalt	0.044	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Lead	0.0030	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.16	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.0023	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW7-31718

Lab Sample ID: 550-99693-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.92		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.0043	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.0047	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.39		0.20	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-FD02-31718 (Continued)

Lab Sample ID: 550-99693-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.014	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cadmium	0.0010	D1	0.00040	mg/L	4		200.8 LL	Total/NA
Cobalt	0.016	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.079	D1	0.0020	mg/L	4		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-MW49A-31718

Lab Sample ID: 550-99693-1

Date Collected: 03/17/18 14:01

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	4.0	mg/L			03/20/18 00:08	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 00:22	1
Lithium	1.1		0.20	mg/L		03/21/18 05:58	03/22/18 23:12	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0040	mg/L		03/21/18 08:54	03/26/18 18:23	4
Arsenic	ND		0.0020	mg/L		03/21/18 08:54	03/26/18 18:23	4
Barium	0.021		0.0020	mg/L		03/21/18 08:54	03/26/18 18:23	4
Cadmium	ND		0.00040	mg/L		03/21/18 08:54	03/26/18 18:23	4
Chromium	ND		0.0040	mg/L		03/21/18 08:54	03/26/18 18:23	4
Cobalt	0.0023		0.0020	mg/L		03/21/18 08:54	03/26/18 18:23	4
Lead	ND		0.0020	mg/L		03/21/18 08:54	03/26/18 18:23	4
Molybdenum	0.021		0.0020	mg/L		03/21/18 08:54	03/26/18 18:23	4
Selenium	ND	M1	0.0020	mg/L		03/21/18 08:54	03/26/18 18:23	4
Thallium	0.0015		0.00040	mg/L		03/21/18 08:54	03/26/18 18:23	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:29	1

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.6	D1	1.6	mg/L			03/20/18 21:27	4

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 00:28	1
Lithium	0.38		0.20	mg/L		03/21/18 05:58	03/22/18 23:18	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:31	4
Arsenic	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:31	4
Barium	0.014	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:31	4
Cadmium	0.0011	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:31	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:31	4
Cobalt	0.016	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:31	4
Lead	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:31	4
Molybdenum	0.079	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:31	4
Selenium	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:31	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:31	4

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:30	1

Client Sample ID: FC-CCR-MW74-31718

Lab Sample ID: 550-99693-3

Date Collected: 03/17/18 10:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	3.2	D1	2.0	mg/L			03/20/18 21:45	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 00:34	1
Lithium	0.47		0.20	mg/L		03/21/18 05:58	03/22/18 23:23	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:34	4
Arsenic	0.0034	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:34	4
Barium	0.020	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:34	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:34	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:34	4
Cobalt	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:34	4
Lead	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:34	4
Molybdenum	0.016	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:34	4
Selenium	0.085	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:34	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:34	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:32	1

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

Date Collected: 03/17/18 12:27

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.7	D1	1.6	mg/L			03/20/18 22:04	4

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 00:40	1
Lithium	0.43		0.20	mg/L		03/21/18 05:58	03/22/18 23:29	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:36	4
Arsenic	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:36	4
Barium	0.018	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:36	4
Cadmium	0.0020	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:36	4

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

Date Collected: 03/17/18 12:27

Matrix: Water

Date Received: 03/19/18 06:55

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:36	4
Cobalt	0.044	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:36	4
Lead	0.0030	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:36	4
Molybdenum	0.16	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:36	4
Selenium	0.0023	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:36	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:36	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:34	1

Client Sample ID: FC-CCR-MW7-31718

Lab Sample ID: 550-99693-5

Date Collected: 03/17/18 13:10

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	4.0	mg/L			03/20/18 02:53	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 00:45	1
Lithium	0.92		0.20	mg/L		03/21/18 05:58	03/22/18 23:35	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:38	4
Arsenic	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:38	4
Barium	0.014	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:38	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:38	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:38	4
Cobalt	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:38	4
Lead	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:38	4
Molybdenum	0.0043	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:38	4
Selenium	0.0047	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:38	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:38	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:35	1

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	1.6	mg/L			03/20/18 22:22	4

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 01:00	1
Lithium	0.39		0.20	mg/L		03/21/18 05:58	03/22/18 23:41	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:41	4
Arsenic	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:41	4
Barium	0.014	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:41	4
Cadmium	0.0010	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:41	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 08:54	03/27/18 09:41	4
Cobalt	0.016	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:41	4
Lead	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:41	4
Molybdenum	0.079	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:41	4
Selenium	ND	D1	0.0020	mg/L		03/21/18 08:54	03/27/18 09:41	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 08:54	03/27/18 09:41	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:37	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-142195/30
Matrix: Water
Analysis Batch: 142195

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			03/19/18 21:59	1

Lab Sample ID: LCS 550-142195/31
Matrix: Water
Analysis Batch: 142195

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.30		mg/L		108	90 - 110

Lab Sample ID: LCSD 550-142195/32
Matrix: Water
Analysis Batch: 142195

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.29		mg/L		107	90 - 110	0	20

Lab Sample ID: 550-99693-1 MS
Matrix: Water
Analysis Batch: 142195

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	40.0	47.7	D1	mg/L		116	80 - 120

Lab Sample ID: 550-99693-1 MSD
Matrix: Water
Analysis Batch: 142195

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 D5	40.0	41.8	D1	mg/L		101	80 - 120	13	20

Lab Sample ID: MB 550-142283/2
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			03/20/18 15:19	1

Lab Sample ID: LCS 550-142283/5
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.27		mg/L		107	90 - 110

Lab Sample ID: LCSD 550-142283/6
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.28		mg/L		107	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Lab Sample ID: 550-99663-A-5 MS
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	7.7		4.00	11.4		mg/L		93	80 - 120

Lab Sample ID: 550-99663-A-5 MSD
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	7.7		4.00	11.5		mg/L		95	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-142359/1-A
Matrix: Water
Analysis Batch: 142508

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142359

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:58	03/22/18 00:02	1

Lab Sample ID: MB 550-142359/1-A
Matrix: Water
Analysis Batch: 142637

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142359

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		03/21/18 05:58	03/22/18 22:40	1

Lab Sample ID: LCS 550-142359/2-A
Matrix: Water
Analysis Batch: 142508

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	1.00	0.985		mg/L		98	85 - 115

Lab Sample ID: LCS 550-142359/2-A
Matrix: Water
Analysis Batch: 142637

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	0.987		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-142359/3-A
Matrix: Water
Analysis Batch: 142508

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	1.00	0.958		mg/L		96	85 - 115	3	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCSD 550-142359/3-A
Matrix: Water
Analysis Batch: 142637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	1.00	0.989		mg/L		99	85 - 115	0	20

Lab Sample ID: 550-99693-1 MS
Matrix: Water
Analysis Batch: 142508

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Beryllium	ND		1.00	0.874		mg/L		87	70 - 130

Lab Sample ID: 550-99693-1 MS
Matrix: Water
Analysis Batch: 142637

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lithium	1.1		1.00	2.08		mg/L		93	70 - 130

Lab Sample ID: 550-99693-1 MSD
Matrix: Water
Analysis Batch: 142508

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	ND		1.00	0.907		mg/L		91	70 - 130	4	20

Lab Sample ID: 550-99693-1 MSD
Matrix: Water
Analysis Batch: 142637

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142359

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	1.1		1.00	2.14		mg/L		100	70 - 130	3	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-142369/1-A
Matrix: Water
Analysis Batch: 142931

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142369

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		03/21/18 08:54	03/27/18 09:25	1
Arsenic	ND		0.00050	mg/L		03/21/18 08:54	03/27/18 09:25	1
Barium	ND		0.00050	mg/L		03/21/18 08:54	03/27/18 09:25	1
Cadmium	ND		0.00010	mg/L		03/21/18 08:54	03/27/18 09:25	1
Chromium	ND		0.0010	mg/L		03/21/18 08:54	03/27/18 09:25	1
Cobalt	ND		0.00050	mg/L		03/21/18 08:54	03/27/18 09:25	1
Lead	ND		0.00050	mg/L		03/21/18 08:54	03/27/18 09:25	1
Molybdenum	ND		0.00050	mg/L		03/21/18 08:54	03/27/18 09:25	1
Selenium	ND		0.00050	mg/L		03/21/18 08:54	03/27/18 09:25	1
Thallium	ND		0.00010	mg/L		03/21/18 08:54	03/27/18 09:25	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 550-142369/2-A
Matrix: Water
Analysis Batch: 142931

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142369

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0958		mg/L		96	85 - 115
Arsenic	0.100	0.0963		mg/L		96	85 - 115
Barium	0.100	0.0956		mg/L		96	85 - 115
Cadmium	0.100	0.0956		mg/L		96	85 - 115
Chromium	0.100	0.0964		mg/L		96	85 - 115
Cobalt	0.100	0.0955		mg/L		95	85 - 115
Lead	0.100	0.0951		mg/L		95	85 - 115
Molybdenum	0.100	0.0947		mg/L		95	85 - 115
Selenium	0.100	0.0952		mg/L		95	85 - 115
Thallium	0.100	0.0943		mg/L		94	85 - 115

Lab Sample ID: LCSD 550-142369/3-A
Matrix: Water
Analysis Batch: 142931

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142369

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.0956		mg/L		96	85 - 115	0	20
Arsenic	0.100	0.0968		mg/L		97	85 - 115	1	20
Barium	0.100	0.0961		mg/L		96	85 - 115	1	20
Cadmium	0.100	0.0952		mg/L		95	85 - 115	0	20
Chromium	0.100	0.0963		mg/L		96	85 - 115	0	20
Cobalt	0.100	0.0957		mg/L		96	85 - 115	0	20
Lead	0.100	0.0948		mg/L		95	85 - 115	0	20
Molybdenum	0.100	0.0939		mg/L		94	85 - 115	1	20
Selenium	0.100	0.0949		mg/L		95	85 - 115	0	20
Thallium	0.100	0.0949		mg/L		95	85 - 115	1	20

Lab Sample ID: 550-99693-1 MS
Matrix: Water
Analysis Batch: 142907

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142369

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.0985		mg/L		98	70 - 130
Arsenic	ND		0.100	0.108		mg/L		108	70 - 130
Barium	0.021		0.100	0.118		mg/L		98	70 - 130
Cadmium	ND		0.100	0.0882		mg/L		88	70 - 130
Chromium	ND		0.100	0.0964		mg/L		96	70 - 130
Cobalt	0.0023		0.100	0.0916		mg/L		89	70 - 130
Lead	ND		0.100	0.0840		mg/L		84	70 - 130
Molybdenum	0.021		0.100	0.115		mg/L		94	70 - 130
Selenium	ND	M1	0.100	0.132	M1	mg/L		131	70 - 130
Thallium	0.0015		0.100	0.0855		mg/L		84	70 - 130

Lab Sample ID: 550-99693-1 MSD
Matrix: Water
Analysis Batch: 142907

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142369

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND		0.100	0.0999		mg/L		100	70 - 130	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-99693-1 MSD
Matrix: Water
Analysis Batch: 142907

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142369

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	ND		0.100	0.110		mg/L		110	70 - 130	2	20
Barium	0.021		0.100	0.119		mg/L		98	70 - 130	0	20
Cadmium	ND		0.100	0.0890		mg/L		89	70 - 130	1	20
Chromium	ND		0.100	0.0967		mg/L		97	70 - 130	0	20
Cobalt	0.0023		0.100	0.0919		mg/L		90	70 - 130	0	20
Lead	ND		0.100	0.0850		mg/L		85	70 - 130	1	20
Molybdenum	0.021		0.100	0.116		mg/L		95	70 - 130	1	20
Selenium	ND	M1	0.100	0.133	M1	mg/L		132	70 - 130	1	20
Thallium	0.0015		0.100	0.0862		mg/L		85	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-142719/1-A
Matrix: Water
Analysis Batch: 142776

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142719

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:44	03/24/18 18:21	1

Lab Sample ID: LCS 550-142719/2-A
Matrix: Water
Analysis Batch: 142776

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142719

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	0.0100	0.0105		mg/L		105	85 - 115

Lab Sample ID: LCSD 550-142719/3-A
Matrix: Water
Analysis Batch: 142776

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142719

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	0.0100	0.0104		mg/L		104	85 - 115	1	20

Lab Sample ID: 550-99693-1 MS
Matrix: Water
Analysis Batch: 142776

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142719

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	ND		0.0100	0.00964		mg/L		96	70 - 130

Lab Sample ID: 550-99693-1 MSD
Matrix: Water
Analysis Batch: 142776

Client Sample ID: FC-CCR-MW49A-31718
Prep Type: Total/NA
Prep Batch: 142719

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	ND		0.0100	0.00932		mg/L		93	70 - 130	3	20

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

HPLC/IC

Analysis Batch: 142195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	300.0	
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	300.0	
MB 550-142195/30	Method Blank	Total/NA	Water	300.0	
LCS 550-142195/31	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-142195/32	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	300.0	
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	300.0	

Analysis Batch: 142283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	300.0	
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	300.0	
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	300.0	
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	300.0	
MB 550-142283/2	Method Blank	Total/NA	Water	300.0	
LCS 550-142283/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-142283/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99663-A-5 MS	Matrix Spike	Total/NA	Water	300.0	
550-99663-A-5 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 142359

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	200.7	
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	200.7	
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	200.7	
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	200.7	
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	200.7	
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	200.7	
MB 550-142359/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-142359/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-142359/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	200.7	
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	200.7	

Prep Batch: 142369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	200.8	
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	200.8	
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	200.8	
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	200.8	
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	200.8	
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	200.8	
MB 550-142369/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-142369/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-142369/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	200.8	
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Metals (Continued)

Analysis Batch: 142508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	200.7 Rev 4.4	142359
MB 550-142359/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	142359
LCS 550-142359/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	142359
LCSD 550-142359/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	200.7 Rev 4.4	142359

Analysis Batch: 142637

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	200.7 Rev 4.4	142359
MB 550-142359/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	142359
LCS 550-142359/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	142359
LCSD 550-142359/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	200.7 Rev 4.4	142359
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	200.7 Rev 4.4	142359

Prep Batch: 142719

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	245.1	
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	245.1	
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	245.1	
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	245.1	
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	245.1	
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	245.1	
MB 550-142719/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-142719/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-142719/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	245.1	
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	245.1	

Analysis Batch: 142776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	245.1	142719
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	245.1	142719
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	245.1	142719
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	245.1	142719
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	245.1	142719
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	245.1	142719
MB 550-142719/1-A	Method Blank	Total/NA	Water	245.1	142719
LCS 550-142719/2-A	Lab Control Sample	Total/NA	Water	245.1	142719
LCSD 550-142719/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	142719

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Metals (Continued)

Analysis Batch: 142776 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	245.1	142719
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	245.1	142719

Analysis Batch: 142907

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	200.8 LL	142369
550-99693-1 MS	FC-CCR-MW49A-31718	Total/NA	Water	200.8 LL	142369
550-99693-1 MSD	FC-CCR-MW49A-31718	Total/NA	Water	200.8 LL	142369

Analysis Batch: 142931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	200.8 LL	142369
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	200.8 LL	142369
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	200.8 LL	142369
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	200.8 LL	142369
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	200.8 LL	142369
MB 550-142369/1-A	Method Blank	Total/NA	Water	200.8 LL	142369
LCS 550-142369/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	142369
LCSD 550-142369/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	142369

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-MW49A-31718

Lab Sample ID: 550-99693-1

Date Collected: 03/17/18 14:01

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142195	03/20/18 00:08	NBL	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142508	03/22/18 00:22	ARE	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142637	03/22/18 23:12	ARE	TAL PHX
Total/NA	Prep	200.8			142369	03/21/18 08:54	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142907	03/26/18 18:23	TEK	TAL PHX
Total/NA	Prep	245.1			142719	03/23/18 16:44	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142776	03/24/18 18:29	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	142283	03/20/18 21:27	NBL	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142508	03/22/18 00:28	ARE	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142637	03/22/18 23:18	ARE	TAL PHX
Total/NA	Prep	200.8			142369	03/21/18 08:54	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142931	03/27/18 09:31	TEK	TAL PHX
Total/NA	Prep	245.1			142719	03/23/18 16:44	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142776	03/24/18 18:30	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW74-31718

Lab Sample ID: 550-99693-3

Date Collected: 03/17/18 10:52

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	142283	03/20/18 21:45	NBL	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142508	03/22/18 00:34	ARE	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142637	03/22/18 23:23	ARE	TAL PHX
Total/NA	Prep	200.8			142369	03/21/18 08:54	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142931	03/27/18 09:34	TEK	TAL PHX
Total/NA	Prep	245.1			142719	03/23/18 16:44	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142776	03/24/18 18:32	EXZ	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

Date Collected: 03/17/18 12:27

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	142283	03/20/18 22:04	NBL	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142508	03/22/18 00:40	ARE	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142637	03/22/18 23:29	ARE	TAL PHX
Total/NA	Prep	200.8			142369	03/21/18 08:54	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142931	03/27/18 09:36	TEK	TAL PHX
Total/NA	Prep	245.1			142719	03/23/18 16:44	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142776	03/24/18 18:34	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW7-31718

Lab Sample ID: 550-99693-5

Date Collected: 03/17/18 13:10

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142195	03/20/18 02:53	NBL	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142508	03/22/18 00:45	ARE	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142637	03/22/18 23:35	ARE	TAL PHX
Total/NA	Prep	200.8			142369	03/21/18 08:54	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142931	03/27/18 09:38	TEK	TAL PHX
Total/NA	Prep	245.1			142719	03/23/18 16:44	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142776	03/24/18 18:35	EXZ	TAL PHX

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	142283	03/20/18 22:22	NBL	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142508	03/22/18 01:00	ARE	TAL PHX
Total/NA	Prep	200.7			142359	03/21/18 05:58	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142637	03/22/18 23:41	ARE	TAL PHX
Total/NA	Prep	200.8			142369	03/21/18 08:54	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142931	03/27/18 09:41	TEK	TAL PHX
Total/NA	Prep	245.1			142719	03/23/18 16:44	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142776	03/24/18 18:37	EXZ	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18

- 1
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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
245.1	Mercury (CVAA)	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

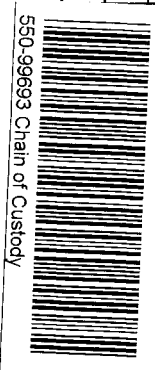
TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Chain of Custody Record

991693

Client Contact: APS Four Corners
 Project Manager: Doug Lavarnway
 Tel/Fax: 928-587-0319
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 Phone: TAT if different from Below: 7 Days
 Fax: 2 weeks
 Project Name: CCR 1 week
 E-Mail Address: 2 days
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Perform MS / MSD (Y / N)	Carrier:	Job No.	SDG No.
FC-CCR-MW49A-31718	3/17/2018	1401	G	W	4	EPA 200.7 (Be, Li)	3/18/2018	1 of 1 COCs	
FC-CCR-MW61-31718	3/17/2018	1146	G	W	4	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)			
FC-CCR-MW74-031718	3/17/2018	1052	G	W	4	932.0 Radium 226 and 228			
FC-CCR-MW75-031718	3/17/18	1227	G	W	4	EPA 245.1 (Hg)			
FC-CCR-MW7-31718	3/17/18	1310	G	W	4	EPA 300.0 (F)			
FC-CCR-FD02-31718	3/17/18	1146	G	W	4				



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification: Non-Hazard, Flammable, Skin Irritant, Poison, Unknown
 Special Instructions/QC Requirements & Comments:
 Do method 200.8 with collision cell

25/28/38

Relinquished by: [Signature] Company: APS Date/Time: 3/18/18 Received by: [Signature] Company: HA Date/Time: 3/19/18
 Relinquished by: [Signature] Company: APS Date/Time: 3/18/18 Received by: [Signature] Company: HA Date/Time: 3/19/18
 Relinquished by: [Signature] Company: APS Date/Time: 3/18/18 Received by: [Signature] Company: HA Date/Time: 3/19/18

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99693-1

Login Number: 99693
List Number: 1
Creator: Vilaboy, Monica

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-99693-2

Client Project/Site: CCR

Revision: 1

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

4/18/2018 2:46:43 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
H1	Sample analysis performed past holding time.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

Rad

Qualifier	Qualifier Description
X	Carrier is outside acceptance limits.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Job ID: 550-99693-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-99693-2

Comments

No additional comments.

Receipt

The samples were received on 3/19/2018 6:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 2.8° C and 3.8° C.

HPLC/IC

Method(s) 300.0: Reanalysis of the following sample was performed outside of the 28 day analytical holding time for Fluoride by method EPA 300.0 due to client requesting reanalysis at a lower dilution: FC-CCR-MW7-31718 (550-99693-5). As such, the data have been reported and qualified with D1 and H1 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RAD

Method(s) 903.0: Radium-226 Prep Batch 160-357651

The following samples have barium carrier above the 110% QC limit; (490-148546-6; 111%, 490-148546-8; 123%, 490-148546-11; 156%, 490-148546-11 MS; 149%, and 490-148546-11 MSD; 157%). There are high Total Dissolved Solid concentrations that could potentially interfere with the method chemistry (i.e. calcium, sodium, etc.). The LCS/LCSD (laboratory control sample/laboratory control sample duplicate) have acceptable spike recoveries demonstrating acceptable sample preparation and instrument performance. The samples have been truncated to 100% to reduce any potential bias a high carrier recovery may have. The data have been reported with this narrative.

(490-148546-K-11-A) and (490-148546-K-11-B MS)

Method(s) 904.0: Radium-228 Prep Batch 160-357654

The following samples have barium carrier above the 110% QC limit; (490-148546-6; 111%, 490-148546-8; 123%, 490-148546-11; 156%, 490-148546-11 MS; 149%, and 490-148546-11 MSD; 157%). There are high Total Dissolved Solid concentrations that could potentially interfere with the method chemistry (i.e. calcium, sodium, etc.). The LCS/LCSD (laboratory control sample/laboratory control sample duplicate) have acceptable spike recoveries demonstrating acceptable sample preparation and instrument performance. The samples have been truncated to 100% to reduce any potential bias a high carrier recovery may have. The data have been reported with this narrative.

(490-148546-K-11-C), (490-148546-K-11-D MS) and (490-148546-I-11-B MS)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99693-1	FC-CCR-MW49A-31718	Water	03/17/18 14:01	03/19/18 06:55
550-99693-2	FC-CCR-MW61-31718	Water	03/17/18 11:46	03/19/18 06:55
550-99693-3	FC-CCR-MW74-31718	Water	03/17/18 10:52	03/19/18 06:55
550-99693-4	FC-CCR-MW75-31718	Water	03/17/18 12:27	03/19/18 06:55
550-99693-5	FC-CCR-MW7-31718	Water	03/17/18 13:10	03/19/18 06:55
550-99693-6	FC-CCR-FD02-31718	Water	03/17/18 11:46	03/19/18 06:55

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-MW49A-31718

Lab Sample ID: 550-99693-1

No Detections.

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

No Detections.

Client Sample ID: FC-CCR-MW74-31718

Lab Sample ID: 550-99693-3

No Detections.

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

No Detections.

Client Sample ID: FC-CCR-MW7-31718

Lab Sample ID: 550-99693-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.49	D1 E4 H1	0.80	0.093 mg/L	2		300.0	Total/NA

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-MW49A-31718

Lab Sample ID: 550-99693-1

Date Collected: 03/17/18 14:01

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.335		0.101	0.106	1.00	0.0831	pCi/L	03/26/18 10:43	04/17/18 08:02	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					03/26/18 10:43	04/17/18 08:02	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.88		0.334	0.376	1.00	0.350	pCi/L	03/26/18 11:04	04/04/18 18:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					03/26/18 11:04	04/04/18 18:01	1
Y Carrier	88.6		40 - 110					03/26/18 11:04	04/04/18 18:01	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.21		0.349	0.391	5.00	0.350	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.358		0.101	0.106	1.00	0.0685	pCi/L	03/26/18 10:43	04/17/18 08:02	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	106		40 - 110					03/26/18 10:43	04/17/18 08:02	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.839		0.262	0.273	1.00	0.341	pCi/L	03/26/18 11:04	04/04/18 18:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	106		40 - 110					03/26/18 11:04	04/04/18 18:01	1
Y Carrier	85.2		40 - 110					03/26/18 11:04	04/04/18 18:01	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.20		0.281	0.293	5.00	0.341	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-MW74-31718

Lab Sample ID: 550-99693-3

Date Collected: 03/17/18 10:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.200		0.0854	0.0872	1.00	0.0906	pCi/L	03/26/18 10:43	04/17/18 08:02	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					03/26/18 10:43	04/17/18 08:02	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.643		0.251	0.258	1.00	0.349	pCi/L	03/26/18 11:04	04/04/18 18:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					03/26/18 11:04	04/04/18 18:01	1
Y Carrier	86.7		40 - 110					03/26/18 11:04	04/04/18 18:01	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.843		0.265	0.272	5.00	0.349	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

Date Collected: 03/17/18 12:27

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.413		0.103	0.110	1.00	0.0686	pCi/L	03/26/18 10:43	04/17/18 09:15	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	107		40 - 110					03/26/18 10:43	04/17/18 09:15	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.817		0.258	0.268	1.00	0.337	pCi/L	03/26/18 11:04	04/04/18 18:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	107		40 - 110					03/26/18 11:04	04/04/18 18:01	1
Y Carrier	86.0		40 - 110					03/26/18 11:04	04/04/18 18:01	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.23		0.278	0.290	5.00	0.337	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-MW7-31718

Lab Sample ID: 550-99693-5

Date Collected: 03/17/18 13:10

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.49	D1 E4 H1	0.80	0.093 mg/L			04/16/18 17:41	2

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.221		0.0813	0.0837	1.00	0.0764	pCi/L	03/26/18 10:43	04/17/18 09:15	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	108		40 - 110					03/26/18 10:43	04/17/18 09:15	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.12		0.290	0.308	1.00	0.371	pCi/L	03/26/18 11:04	04/04/18 18:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	108		40 - 110					03/26/18 11:04	04/04/18 18:01	1
Y Carrier	90.8		40 - 110					03/26/18 11:04	04/04/18 18:01	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.34		0.301	0.319	5.00	0.371	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.305		0.0887	0.0929	1.00	0.0618	pCi/L	03/26/18 10:43	04/17/18 09:15	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 10:43	04/17/18 09:15	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.712		0.225	0.234	1.00	0.289	pCi/L	03/26/18 11:04	04/04/18 17:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 11:04	04/04/18 17:57	1
Y Carrier	88.6		40 - 110					03/26/18 11:04	04/04/18 17:57	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.02		0.242	0.252	5.00	0.289	pCi/L		04/18/18 12:22	1

Tracer/Carrier Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	
490-148546-I-11-A MSD	Matrix Spike Duplicate	157 X	
490-148546-K-11-B MS	Matrix Spike	149 X	
550-99693-1	FC-CCR-MW49A-31718	104	
550-99693-2	FC-CCR-MW61-31718	106	
550-99693-3	FC-CCR-MW74-31718	104	
550-99693-4	FC-CCR-MW75-31718	107	
550-99693-5	FC-CCR-MW7-31718	108	
550-99693-6	FC-CCR-FD02-31718	109	
LCS 160-357651/1-A	Lab Control Sample	94.4	
MB 160-357651/18-A	Method Blank	102	

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
490-148546-I-11-B MSD	Matrix Spike Duplicate	157 X	89.7
490-148546-K-11-D MS	Matrix Spike	149 X	90.1
550-99693-1	FC-CCR-MW49A-31718	104	88.6
550-99693-2	FC-CCR-MW61-31718	106	85.2
550-99693-3	FC-CCR-MW74-31718	104	86.7
550-99693-4	FC-CCR-MW75-31718	107	86.0
550-99693-5	FC-CCR-MW7-31718	108	90.8
550-99693-6	FC-CCR-FD02-31718	109	88.6
LCS 160-357654/1-A	Lab Control Sample	94.4	91.2
MB 160-357654/18-A	Method Blank	102	93.8

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-144647/2
Matrix: Water
Analysis Batch: 144647

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	E8	0.40	0.046 mg/L			04/16/18 16:09	1

Lab Sample ID: LCS 550-144647/5
Matrix: Water
Analysis Batch: 144647

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.04		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-144647/6
Matrix: Water
Analysis Batch: 144647

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.03		mg/L		101	90 - 110	0	20

Lab Sample ID: 550-101139-H-1 MS
Matrix: Water
Analysis Batch: 144647

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	0.57		4.00	4.86		mg/L		107	80 - 120

Lab Sample ID: 550-101139-H-1 MSD
Matrix: Water
Analysis Batch: 144647

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	0.57		4.00	4.89		mg/L		108	80 - 120	1	20

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-357651/18-A
Matrix: Water
Analysis Batch: 361425

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 357651

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.009950	E8	0.0307	0.0307	1.00	0.0627	pCi/L	03/26/18 10:43	04/17/18 09:16	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110	03/26/18 10:43	04/17/18 09:16	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCS 160-357651/1-A
Matrix: Water
Analysis Batch: 361460

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 357651

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	
Radium-226	11.8	12.69		1.29	1.00	0.0943	pCi/L	107	68 - 137	
Carrier	%Yield	LCS Qualifier	Limits							
Ba Carrier	94.4		40 - 110							

Lab Sample ID: 490-148546-I-11-A MSD
Matrix: Water
Analysis Batch: 361460

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 357651

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226	27.2		11.8	42.30		4.00	1.00	0.111	pCi/L	128	75 - 138	0.15	1
Carrier	%Yield	MSD Qualifier	Limits										
Ba Carrier	157	X	40 - 110										

Lab Sample ID: 490-148546-K-11-B MS
Matrix: Water
Analysis Batch: 361460

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 357651

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	27.2		11.8	41.13		3.90	1.00	0.118	pCi/L	118	75 - 138
Carrier	%Yield	MS Qualifier	Limits								
Ba Carrier	149	X	40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-357654/18-A
Matrix: Water
Analysis Batch: 358771

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 357654

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.04034	E8	0.175	0.175	1.00	0.322	pCi/L	03/26/18 11:04	04/04/18 17:58	1
Carrier	%Yield	MB Qualifier	Limits							
Ba Carrier	102		40 - 110							
Y Carrier	93.8		40 - 110							
								Prepared	Analyzed	Dil Fac
								03/26/18 11:04	04/04/18 17:58	1
								03/26/18 11:04	04/04/18 17:58	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-357654/1-A
Matrix: Water
Analysis Batch: 358770

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 357654

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	8.42	8.845		1.04	1.00	0.440	pCi/L	105	56 - 140
LCS LCS									
Carrier	%Yield	Qualifier	Limits						
Ba Carrier	94.4		40 - 110						
Y Carrier	91.2		40 - 110						

Lab Sample ID: 490-148546-I-11-B MSD
Matrix: Water
Analysis Batch: 358770

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 357654

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	26.5		8.43	36.60		3.58	1.00	0.353	pCi/L	119	45 - 150	0.29	1
MSD MSD													
Carrier	%Yield	Qualifier	Limits										
Ba Carrier	157	X	40 - 110										
Y Carrier	89.7		40 - 110										

Lab Sample ID: 490-148546-K-11-D MS
Matrix: Water
Analysis Batch: 358770

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 357654

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	26.5		8.42	38.72		3.78	1.00	0.402	pCi/L	145	45 - 150
MS MS											
Carrier	%Yield	Qualifier	Limits								
Ba Carrier	149	X	40 - 110								
Y Carrier	90.1		40 - 110								

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

HPLC/IC

Analysis Batch: 144647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	300.0	
MB 550-144647/2	Method Blank	Total/NA	Water	300.0	
LCS 550-144647/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-144647/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-101139-H-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-101139-H-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

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Prep Batch: 357651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	PrecSep-21	
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	PrecSep-21	
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	PrecSep-21	
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	PrecSep-21	
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	PrecSep-21	
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	PrecSep-21	
MB 160-357651/18-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-357651/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
490-148546-I-11-A MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep-21	
490-148546-K-11-B MS	Matrix Spike	Total/NA	Water	PrecSep-21	

Prep Batch: 357654

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99693-1	FC-CCR-MW49A-31718	Total/NA	Water	PrecSep_0	
550-99693-2	FC-CCR-MW61-31718	Total/NA	Water	PrecSep_0	
550-99693-3	FC-CCR-MW74-31718	Total/NA	Water	PrecSep_0	
550-99693-4	FC-CCR-MW75-31718	Total/NA	Water	PrecSep_0	
550-99693-5	FC-CCR-MW7-31718	Total/NA	Water	PrecSep_0	
550-99693-6	FC-CCR-FD02-31718	Total/NA	Water	PrecSep_0	
MB 160-357654/18-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-357654/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
490-148546-I-11-B MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep_0	
490-148546-K-11-D MS	Matrix Spike	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-MW49A-31718

Lab Sample ID: 550-99693-1

Date Collected: 03/17/18 14:01

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357651	03/26/18 10:43	TJT	TAL SL
Total/NA	Analysis	903.0		1	361460	04/17/18 08:02	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357654	03/26/18 11:04	TJT	TAL SL
Total/NA	Analysis	904.0		1	358770	04/04/18 18:01	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW61-31718

Lab Sample ID: 550-99693-2

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357651	03/26/18 10:43	TJT	TAL SL
Total/NA	Analysis	903.0		1	361460	04/17/18 08:02	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357654	03/26/18 11:04	TJT	TAL SL
Total/NA	Analysis	904.0		1	358770	04/04/18 18:01	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW74-31718

Lab Sample ID: 550-99693-3

Date Collected: 03/17/18 10:52

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357651	03/26/18 10:43	TJT	TAL SL
Total/NA	Analysis	903.0		1	361460	04/17/18 08:02	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357654	03/26/18 11:04	TJT	TAL SL
Total/NA	Analysis	904.0		1	358770	04/04/18 18:01	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW75-31718

Lab Sample ID: 550-99693-4

Date Collected: 03/17/18 12:27

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357651	03/26/18 10:43	TJT	TAL SL
Total/NA	Analysis	903.0		1	361425	04/17/18 09:15	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357654	03/26/18 11:04	TJT	TAL SL
Total/NA	Analysis	904.0		1	358770	04/04/18 18:01	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Client Sample ID: FC-CCR-MW7-31718

Lab Sample ID: 550-99693-5

Date Collected: 03/17/18 13:10

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	144647	04/16/18 17:41	NBL	TAL PHX
Total/NA	Prep	PrecSep-21			357651	03/26/18 10:43	TJT	TAL SL
Total/NA	Analysis	903.0		1	361425	04/17/18 09:15	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357654	03/26/18 11:04	TJT	TAL SL
Total/NA	Analysis	904.0		1	358770	04/04/18 18:01	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-FD02-31718

Lab Sample ID: 550-99693-6

Date Collected: 03/17/18 11:46

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357651	03/26/18 10:43	TJT	TAL SL
Total/NA	Analysis	903.0		1	361425	04/17/18 09:15	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357654	03/26/18 11:04	TJT	TAL SL
Total/NA	Analysis	904.0		1	358771	04/04/18 17:57	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18

Laboratory: TestAmerica St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	MO00054	06-30-18 *
Arizona	State Program	9	AZ0813	12-08-18
California	State Program	9	2886	06-30-18 *
Connecticut	State Program	1	PH-0241	03-31-19
Florida	NELAP	4	E87689	06-30-18 *
Illinois	NELAP	5	200023	11-30-18
Iowa	State Program	7	373	12-01-18
Kansas	NELAP	7	E-10236	10-31-18
Kentucky (DW)	State Program	4	90125	12-31-18
L-A-B	DoD ELAP		L2305	04-06-19
Louisiana	NELAP	6	04080	06-30-18
Louisiana (DW)	NELAP	6	LA180017	12-31-18
Maryland	State Program	3	310	09-30-18
Michigan	State Program	5	9005	06-30-18
Missouri	State Program	7	780	06-30-18
Nevada	State Program	9	MO000542018-1	07-31-18
New Jersey	NELAP	2	MO002	06-30-18 *
New York	NELAP	2	11616	03-31-19
North Dakota	State Program	8	R207	06-30-18
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-18
Pennsylvania	NELAP	3	68-00540	02-28-19
South Carolina	State Program	4	85002001	06-30-18
Texas	NELAP	6	T104704193-17-11	07-31-18
US Fish & Wildlife	Federal		058448	08-31-18
USDA	Federal		P330-17-0028	02-02-20
Utah	NELAP	8	MO000542016-8	07-31-18
Virginia	NELAP	3	460230	06-14-18 *
Washington	State Program	10	C592	08-30-18
West Virginia DEP	State Program	3	381	08-31-18 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-2

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

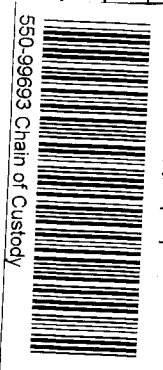
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Chain of Custody Record

991693

Client Contact: APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416
 Project Manager: Doug Lavarnway
 Tel/Fax: 928-587-0319
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 Phone: TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Project Name: CCR
 E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Perform MS / MSD (Y / N)	Lab Contact: Ken Baker	Carrier:	Job No.	SDG No.	Sample Specific Notes:
FC-CCR-MW49A-31718	3/17/2018	1401	G	W	4	EPA 200.7 (Be, Li) 200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl) 932.0 Radium 226 and 228 EPA 245.1 (Hg) EPA 300.0 (F)		3/18/2018	1 of 1 COCs		
FC-CCR-MW61-31718	3/17/2018	1146	G	W	4						
FC-CCR-MW74-031718	3/17/2018	1052	G	W	4						
FC-CCR-MW75-031718	3/17/18	1227	G	W	4						
FC-CCR-MW7-31718	3/17/18	1310	G	W	4						
FC-CCR-FD02-31718	3/17/18	1146	G	W	4						



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification: Non-Hazard, Flammable, Skin Irritant, Poison, Unknown
 Special Instructions/QC Requirements & Comments:
 Do method 200.8 with collision cell

25/28/38

Relinquished by: [Signature] Company: APS Date/Time: 3/18/18 Received by: [Signature] Company: HA Date/Time: 3/19/18
 Relinquished by: [Signature] Company: APS Date/Time: 3/18/18 Received by: [Signature] Company: HA Date/Time: 3/19/18
 Relinquished by: [Signature] Company: APS Date/Time: 3/18/18 Received by: [Signature] Company: HA Date/Time: 3/19/18

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler:	Lab PM:	Carrier Tracking No(s):	COC No:						
Client Contact:		Phone:	Baker, Ken		550-20534.1						
Shipping/Receiving			E-Mail:	State of Origin:	Page:						
Company:			ken.baker@testamericainc.com	Arizona	Page 1 of 1						
TestAmerica Laboratories, Inc.			Accelerations Required (See note):	Job #:	550-99693-1						
Address:		Due Date Requested:	State Program - Arizona	Preservation Codes:							
13715 Rider Trail North,		3/28/2018		M - Hexane N - None O - AsNaO2 P - Na2SO4 Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA L - EDA Z - other (specify)							
City:		TAT Requested (days):	Analysis Requested								
Earth City											
State, Zip											
MO, 63045											
Phone:		PO #:									
314-298-8566(Tel) 314-298-8757(Fax)		WO #:									
Email:		Project #:									
		55009706									
Site:		SSOW#:									
Arizona Public Service											
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=water, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PreSep_21 Radium-226 (GFPC)	904.0/PreSep_0 Radium-228 (GFPC)	Total Number of Containers	Special Instructions/Note:
FC-CCR-MW49A-31718 (550-99693-1)	3/17/18	14:01	Arizona	Water	Water	X	X		2		
FC-CCR-MW61-31718 (550-99693-2)	3/17/18	11:46	Arizona	Water	Water	X	X		2		
FC-CCR-MW74-31718 (550-99693-3)	3/17/18	10:52	Arizona	Water	Water	X	X		2		
FC-CCR-MW75-31718 (550-99693-4)	3/17/18	12:27	Arizona	Water	Water	X	X		2		
FC-CCR-MW7-31718 (550-99693-5)	3/17/18	13:10	Arizona	Water	Water	X	X		2		
FC-CCR-FD02-31718 (550-99693-6)	3/17/18	11:46	Arizona	Water	Water	X	X		2		
<p>Possible Hazard Identification <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months</p> <p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</p> <p>Special Instructions/QC Requirements:</p>											
<p>Deliverable Requested: I, II, III, IV, Other (specify) _____ Primary Deliverable Rank: 2</p> <p>Empty Kit Relinquished by: _____ Date: _____</p> <p>Relinquished by: <i>[Signature]</i> Date/Time: 3:35 PM 3/18/18 Company: _____</p> <p>Relinquished by: <i>[Signature]</i> Date/Time: _____ Company: _____</p> <p>Relinquished by: _____ Date/Time: _____ Company: _____</p> <p>Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Custody Seal No.: _____</p> <p>Cooler Temperature(s) °C and Other Remarks: _____</p>											



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99693-2

Login Number: 99693
List Number: 1
Creator: Vilaboy, Monica

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99693-2

Login Number: 99693
List Number: 2
Creator: Taylor, Kristene N

List Source: TestAmerica St. Louis
List Creation: 03/20/18 05:14 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.3,21.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-99693-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

7/12/2018 7:32:31 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Table of Contents

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-3

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-3

Job ID: 550-99693-3

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-99693-3**

Comments

No additional comments.

Receipt

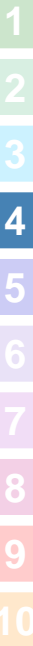
The samples were received on 3/19/2018 6:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 2.8° C and 3.8° C.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.



Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99693-2	FC-CCR-MW61-31718	Water	03/17/18 11:46	03/19/18 06:55
550-99693-5	FC-CCR-MW7-31718	Water	03/17/18 13:10	03/19/18 06:55

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-3

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99693-3

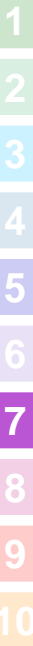
Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

Protocol References:

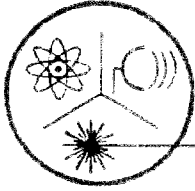
None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225



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Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
 Website: www.radsafe.com

(480) 897-9459
 FAX (480) 892-5445


Radiochemical Activity in Water (pCi/L)

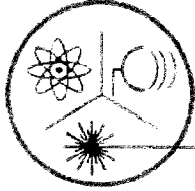
TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: March 17, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW49A-31718 (550-99693-1)	< 0.8	< 0.8	< 0.8

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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 _____ 6/19/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

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FAX (480) 892-5445


Radiochemical Activity in Water (pCi/L)

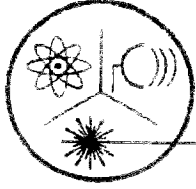
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 17, 2018
Sample Received: June 04, 2018
Analysis Completed: June 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW61-31718 (550-99693-2)	< 0.9	< 0.8	< 0.9

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/21/2018
Robert L. Metzger, Ph.D., C.H.P. Date
Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
 Website: www.radsafe.com

(480) 897-9459
 FAX (480) 892-5446


Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: March 17, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW74-31718 (550-99693-3)	< 0.9	< 0.8	< 0.9

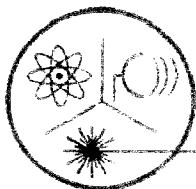
Date of Analysis	6/7/2018	6/7/2018	6/7/2018
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 Robert L. Metzger, Ph.D., C.H.P.

6/19/2018

Date

Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

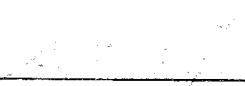
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 17, 2018
Sample Received: June 04, 2018
Analysis Completed: June 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW7-31718 (550-99693-5)	< 0.9	< 0.8	< 0.9

Date of Analysis	6/7/2018	6/7/2018	6/7/2018
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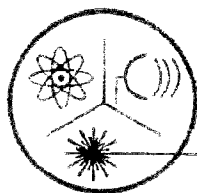

Robert L. Metzger, Ph.D., C.H.P.

6/21/2018

Date

Laboratory License Number AZ0462

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Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85226-1121
 Website: www.radsafe.com

(480) 897-9459
 FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: March 17, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD02-31718 (550-99693-6)	< 0.9	< 0.8	< 0.9

Date of Analysis	6/7/2018	6/7/2018	6/7/2018
------------------	----------	----------	----------

Robert L. Metzger
 Robert L. Metzger, Ph.D., C.H.P.

6/19/2018
 Date

Laboratory License Number AZ0462

TestAmerica Phoenix
 4625 East Colton Cir Blvd Suite 100
 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record



TestAmerica

Client Information (Sub Contract Lab)		Sampler	Lab Pk:	Center (Shipping Address)	DOC No.					
Client Contact: Baker, Ken Shipping/Receiving: Ken Baker Radiation Safety Eng., Inc. Address: 3245 North Washington Street City: Phoenix, AZ 85026 State: AZ Phone: (602) 437-3340 Email: ken.baker@teslamerica.com		Phone: Ken Baker E-Mail: ken.baker@teslamerica.com	Baker, Ken	Phoenix, AZ 85026	150-21275.1					
Due Date Requested: 5/16/2018 TAT Requested (days): Project Name: APS - Four Corners CCR Site: Arizona Public Service		Company: Radiation Safety Eng., Inc. Address: 3245 North Washington Street City: Phoenix, AZ 85026 State: AZ Phone: (602) 437-3340 Email: ken.baker@teslamerica.com	Lab Pk: Baker, Ken E-Mail: ken.baker@teslamerica.com	Center (Shipping Address): Phoenix, AZ 85026	Page 1 of 1 Job # 550-96693-3					
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=Water, F=Soil, O=Other)	Preservation Code	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Analysis Requested	Special Instructions/Note
FC-CCR-MW49A-31718 (550-90593-1)	3/17/18	14:01	Arizona	Water	Water		X			Job 3
FC-CCR-MW74-31718 (550-99693-3)	3/17/18	10:52	Arizona	Water	Water		X			Job 2
FC-CCR-MW75-31718 (550-99693-4)	3/17/18	12:27	Arizona	Water	Water		X			Job 3
FC-CCR-FD02-31718 (550-99693-6)	3/17/18	11:46	Arizona	Water	Water		X			Job 3
Total: Number of Containers: 1 Sub (Radium 226/228) Radium 226/228: X Field Filtered Sample (Yes or No): X Perform MS/MSD (Yes or No): X										
Preservation Codes: A - HCl B - HNO3 C - No. acceptable D - Filtered Acid E - NaHSO4 F - Bleach G - Ammonia H - Acetic Acid I - H2O2 J - Di-99 Water K - FDTA L - CDS Other:										
Analysis Requested: Accreditations Required (See note): State Program - Arizona										
Possible Hazard Identification: Unconfirmed Deliverable Requested: I, II, III, IV, Other (Specify) Empty Kit Relinquished by: Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]										
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For [] Months Special Instructions/OC Requirements: Primary Deliverable Rank: 2 Date: [] Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]										
Customary Seal Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Customary Seal No: [] Carrier Temperature: C and Other (Specify):										



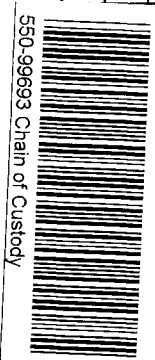
Chain of Custody Record

991693

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Doug Lavarnway	Site Contact: Doug Lavarnway	Carrier:	3/18/2018	COC No:
PO Box 355, MS 4915	Tel/Fax: 928-587-0319	Lab Contact: Ken Baker			
Fruitland, NM 87416	Analysis Turnaround Time				
Phone:	Calendar (C) or Work Days (W)				
Fax:	TAT if different from Below				
Project Name: CCR	7 Days				
E-Mail Address:	2 weeks				
	1 week				
	2 days				
	1 day				

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Perform MS / MSD (Y / N)	SDG No.	Sample Specific Notes
FC-CCR-MW49A-31718	3/17/2018	1401	G	W	4	EPA 200.7 (Be, Li)		
FC-CCR-MW61-31718	3/17/2018	1146	G	W	4	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)		
FC-CCR-MW74-031718	3/17/2018	1052	G	W	4	932.0 Radium 226 and 228		
FC-CCR-MW75-031718	3/17/18	1227	G	W	4	EPA 245.1 (Hg)		
FC-CCR-MW7-31718	3/17/18	1310	G	W	4	EPA 300.0 (F)		
FC-CCR-FD02-31718	3/17/18	1146	G	W	4			



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6= Other

Possible Hazard Identification: Non-Hazard, Flammable, Skin Irritant, Poison, Unknown

Special Instructions/QC Requirements & Comments:

Do method 200.8 with collision cell

25/28/38

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
<i>[Signature]</i>	APS	3/18/13 3:00	<i>[Signature]</i>	HA	3/19/18 6:55
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99693-3

Login Number: 99693
List Number: 1
Creator: Vilaboy, Monica

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-103742-1

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/28/2018 9:05:56 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

TotalAccess

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
D2	Sample required dilution due to high concentration of analyte.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Job ID: 550-103742-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103742-1**

Comments

No additional comments.

Receipt

The samples were received on 6/4/2018 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.8° C, 1.8° C, 2.0° C and 2.0° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW-7-6118 (550-103742-1) and FC-CCR-MW-49A-6118 (550-103742-3). The analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103742-1	FC-CCR-MW-7-6118	Water	06/01/18 12:07	06/04/18 13:25
550-103742-2	FC-CCR-MW-8-6118	Water	06/01/18 11:19	06/04/18 13:25
550-103742-3	FC-CCR-MW-49A-6118	Water	06/01/18 12:49	06/04/18 13:25
550-103742-4	FC-CCR-MW-61-6118	Water	06/01/18 09:26	06/04/18 13:25
550-103742-5	FC-CCR-FD01-6118	Water	06/01/18 09:26	06/04/18 13:25
550-103742-6	FC-CCR-MW-74-6118	Water	06/01/18 08:20	06/04/18 13:25
550-103742-7	FC-CCR-MW-75-6118	Water	06/01/18 10:38	06/04/18 13:25

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-7-6118

Lab Sample ID: 550-103742-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	580	D2	400	mg/L	200		300.0	Total/NA
Sulfate	6400	D2	400	mg/L	200		300.0	Total/NA
Boron	7.6	M3	0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	360	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	470	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	34		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1700	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	510		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	510		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	10000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-8-6118

Lab Sample ID: 550-103742-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1100	D2	400	mg/L	200		300.0	Total/NA
Fluoride	0.91	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	9800	D2	400	mg/L	200		300.0	Total/NA
Boron	15		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	420		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	750		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	37		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1300	D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	510		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	510		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	15000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-49A-6118

Lab Sample ID: 550-103742-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	560	D2	400	mg/L	200		300.0	Total/NA
Sulfate	18000	D2	400	mg/L	200		300.0	Total/NA
Boron	2.5		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	380		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2800	D2	10	mg/L	5		200.7 Rev 4.4	Total/NA
Potassium	70		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	6400	D2	5.0	mg/L	10		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	750		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	750		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	26000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	330	D1	4.0	mg/L	2		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-61-6118 (Continued)

Lab Sample ID: 550-103742-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3500	D2	400	mg/L	200		300.0	Total/NA
Boron	38		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	19		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	980		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	91		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	91		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	5600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD01-6118

Lab Sample ID: 550-103742-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	330	D1	4.0	mg/L	2		300.0	Total/NA
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3500	D2	400	mg/L	200		300.0	Total/NA
Boron	39		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	480		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	20		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	980		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	91		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	89		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	5400	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.7	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	460	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.1	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	1.5		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	400		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	870		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	22		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	3100	D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	450		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	450		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	17000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-75-6118

Lab Sample ID: 550-103742-7

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-75-6118 (Continued)

Lab Sample ID: 550-103742-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	290	D1	4.0	mg/L	2		300.0	Total/NA
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	4300	D2	400	mg/L	200		300.0	Total/NA
Boron	24		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	430		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	210		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	21		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1100		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	98		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	98		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	6400	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-7-6118

Lab Sample ID: 550-103742-1

Date Collected: 06/01/18 12:07

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	580	D2	400	mg/L			06/05/18 01:31	200
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 01:04	2
Sulfate	6400	D2	400	mg/L			06/05/18 01:31	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	7.6	M3	0.050	mg/L		06/05/18 11:56	06/07/18 20:08	1
Calcium	360	M3	2.0	mg/L		06/05/18 11:56	06/06/18 20:15	1
Magnesium	470	M3	2.0	mg/L		06/05/18 11:56	06/06/18 20:15	1
Potassium	34		0.50	mg/L		06/05/18 11:56	06/07/18 20:08	1
Sodium	1700	M3	0.50	mg/L		06/05/18 11:56	06/07/18 20:08	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	510		6.0	mg/L			06/06/18 16:17	1
Bicarbonate Alkalinity as CaCO3	510		6.0	mg/L			06/06/18 16:17	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 16:17	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 16:17	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 16:17	1
Total Dissolved Solids	10000	D2	100	mg/L			06/05/18 08:44	1
pH	7.4	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.5	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-8-6118

Lab Sample ID: 550-103742-2

Date Collected: 06/01/18 11:19

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1100	D2	400	mg/L			06/05/18 04:15	200
Fluoride	0.91	D1	0.80	mg/L			06/05/18 03:48	2
Sulfate	9800	D2	400	mg/L			06/05/18 04:15	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	15		0.050	mg/L		06/05/18 11:56	06/07/18 21:59	1
Calcium	420		2.0	mg/L		06/05/18 11:56	06/06/18 21:14	1
Magnesium	750		2.0	mg/L		06/05/18 11:56	06/06/18 21:14	1
Potassium	37		0.50	mg/L		06/05/18 11:56	06/07/18 21:59	1
Sodium	1300	D2	1.0	mg/L		06/05/18 11:56	06/07/18 21:53	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	510		6.0	mg/L			06/06/18 17:25	1
Bicarbonate Alkalinity as CaCO3	510		6.0	mg/L			06/06/18 17:25	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:25	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 17:25	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:25	1
Total Dissolved Solids	15000	D2	200	mg/L			06/05/18 08:44	1
pH	7.3	H5	1.7	SU			06/05/18 11:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-8-6118

Lab Sample ID: 550-103742-2

Date Collected: 06/01/18 11:19

Matrix: Water

Date Received: 06/04/18 13:25

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	20.4	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-49A-6118

Lab Sample ID: 550-103742-3

Date Collected: 06/01/18 12:49

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	560	D2	400	mg/L			06/05/18 05:10	200
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 04:43	2
Sulfate	18000	D2	400	mg/L			06/05/18 05:10	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5		0.050	mg/L		06/05/18 11:56	06/07/18 22:11	1
Calcium	380		2.0	mg/L		06/05/18 11:56	06/06/18 21:20	1
Magnesium	2800	D2	10	mg/L		06/05/18 11:56	06/07/18 22:05	5
Potassium	70		0.50	mg/L		06/05/18 11:56	06/07/18 22:11	1
Sodium	6400	D2	5.0	mg/L		06/05/18 11:56	06/12/18 12:43	10

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	750		6.0	mg/L			06/10/18 12:30	1
Bicarbonate Alkalinity as CaCO3	750		6.0	mg/L			06/10/18 12:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/10/18 12:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Total Dissolved Solids	26000	D2	200	mg/L			06/05/18 08:44	1
pH	7.4	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.4	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	330	D1	4.0	mg/L			06/05/18 05:38	2
Fluoride	1.3	D1	0.80	mg/L			06/05/18 05:38	2
Sulfate	3500	D2	400	mg/L			06/05/18 06:05	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	38		0.050	mg/L		06/05/18 11:56	06/07/18 22:17	1
Calcium	470		2.0	mg/L		06/05/18 11:56	06/06/18 21:26	1
Magnesium	120		2.0	mg/L		06/05/18 11:56	06/06/18 21:26	1
Potassium	19		0.50	mg/L		06/05/18 11:56	06/07/18 22:17	1
Sodium	980		0.50	mg/L		06/05/18 11:56	06/07/18 22:17	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	91		6.0	mg/L			06/06/18 17:45	1
Bicarbonate Alkalinity as CaCO3	91		6.0	mg/L			06/06/18 17:45	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:45	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 17:45	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:45	1
Total Dissolved Solids	5600	D2	100	mg/L			06/05/18 08:44	1
pH	8.5	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.4	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-FD01-6118

Lab Sample ID: 550-103742-5

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	330	D1	4.0	mg/L			06/05/18 06:32	2
Fluoride	1.3	D1	0.80	mg/L			06/05/18 06:32	2
Sulfate	3500	D2	400	mg/L			06/05/18 07:00	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	39		0.050	mg/L		06/05/18 11:56	06/07/18 22:23	1
Calcium	480		2.0	mg/L		06/05/18 11:56	06/06/18 21:32	1
Magnesium	120		2.0	mg/L		06/05/18 11:56	06/06/18 21:32	1
Potassium	20		0.50	mg/L		06/05/18 11:56	06/07/18 22:23	1
Sodium	980		0.50	mg/L		06/05/18 11:56	06/07/18 22:23	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	91		6.0	mg/L			06/06/18 17:53	1
Bicarbonate Alkalinity as CaCO3	89		6.0	mg/L			06/06/18 17:53	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:53	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 17:53	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:53	1
Total Dissolved Solids	5400	D2	100	mg/L			06/05/18 08:44	1
pH	8.5	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.7	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Date Collected: 06/01/18 08:20

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	460	D2	400	mg/L			06/05/18 07:55	200
Fluoride	2.1	D1	0.80	mg/L			06/05/18 07:27	2
Sulfate	11000	D2	400	mg/L			06/05/18 07:55	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.5		0.050	mg/L		06/05/18 11:56	06/07/18 22:34	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Date Collected: 06/01/18 08:20

Matrix: Water

Date Received: 06/04/18 13:25

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	400		2.0	mg/L		06/05/18 11:56	06/06/18 21:38	1
Magnesium	870		2.0	mg/L		06/05/18 11:56	06/06/18 21:38	1
Potassium	22		0.50	mg/L		06/05/18 11:56	06/07/18 22:34	1
Sodium	3100	D2	1.0	mg/L		06/05/18 11:56	06/07/18 22:28	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	450		6.0	mg/L			06/06/18 18:04	1
Bicarbonate Alkalinity as CaCO3	450		6.0	mg/L			06/06/18 18:04	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:04	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 18:04	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:04	1
Total Dissolved Solids	17000	D2	100	mg/L			06/05/18 08:44	1
pH	7.7	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.5	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-75-6118

Lab Sample ID: 550-103742-7

Date Collected: 06/01/18 10:38

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	290	D1	4.0	mg/L			06/05/18 09:17	2
Fluoride	1.2	D1	0.80	mg/L			06/05/18 09:17	2
Sulfate	4300	D2	400	mg/L			06/05/18 09:44	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	24		0.050	mg/L		06/05/18 11:56	06/07/18 22:40	1
Calcium	430		2.0	mg/L		06/05/18 11:56	06/06/18 21:44	1
Magnesium	210		2.0	mg/L		06/05/18 11:56	06/06/18 21:44	1
Potassium	21		0.50	mg/L		06/05/18 11:56	06/07/18 22:40	1
Sodium	1100		0.50	mg/L		06/05/18 11:56	06/07/18 22:40	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	98		6.0	mg/L			06/06/18 18:46	1
Bicarbonate Alkalinity as CaCO3	98		6.0	mg/L			06/06/18 18:46	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:46	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 18:46	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:46	1
Total Dissolved Solids	6400	D2	100	mg/L			06/05/18 08:44	1
pH	8.2	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.5	H5	0.1	Degrees C			06/05/18 11:50	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148810/2
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			06/04/18 14:33	1
Fluoride	ND		0.40	mg/L			06/04/18 14:33	1
Sulfate	ND		2.0	mg/L			06/04/18 14:33	1

Lab Sample ID: LCS 550-148810/5
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.4		mg/L		102	90 - 110
Fluoride	4.00	4.18		mg/L		104	90 - 110
Sulfate	20.0	20.8		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148810/6
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	20.4		mg/L		102	90 - 110	0	20
Fluoride	4.00	4.18		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.8		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103742-1 MS
Matrix: Water
Analysis Batch: 148810

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	580	D2	4000	4920	D2	mg/L		108	80 - 120
Fluoride	ND	D1	800	873	D1	mg/L		109	80 - 120
Sulfate	6400	D2	4000	10700	D2	mg/L		108	80 - 120

Lab Sample ID: 550-103742-1 MSD
Matrix: Water
Analysis Batch: 148810

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	580	D2	4000	4910	D2	mg/L		108	80 - 120	0	20
Fluoride	ND	D1	800	865	D1	mg/L		108	80 - 120	1	20
Sulfate	6400	D2	4000	10700	D2	mg/L		109	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-148863/1-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148863

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/05/18 11:56	06/06/18 19:37	1
Calcium	ND		2.0	mg/L		06/05/18 11:56	06/06/18 19:37	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: MB 550-148863/1-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148863

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		2.0	mg/L		06/05/18 11:56	06/06/18 19:37	1

Lab Sample ID: MB 550-148863/1-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148863

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/05/18 11:56	06/07/18 19:12	1
Magnesium	ND		2.0	mg/L		06/05/18 11:56	06/07/18 19:12	1
Potassium	ND		0.50	mg/L		06/05/18 11:56	06/07/18 19:12	1
Sodium	ND		0.50	mg/L		06/05/18 11:56	06/07/18 19:12	1

Lab Sample ID: LCS 550-148863/2-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.906		mg/L		91	85 - 115
Calcium	21.0	20.2		mg/L		96	85 - 115
Magnesium	21.0	19.7		mg/L		94	85 - 115

Lab Sample ID: LCS 550-148863/2-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.935		mg/L		94	85 - 115
Magnesium	21.0	20.1		mg/L		96	85 - 115
Potassium	20.0	18.8		mg/L		94	85 - 115
Sodium	20.0	18.6		mg/L		93	85 - 115

Lab Sample ID: LCSD 550-148863/3-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Boron	1.00	0.927		mg/L		93	85 - 115	2	20
Calcium	21.0	20.4		mg/L		97	85 - 115	1	20
Magnesium	21.0	20.0		mg/L		95	85 - 115	1	20

Lab Sample ID: LCSD 550-148863/3-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Boron	1.00	0.957		mg/L		96	85 - 115	2	20
Magnesium	21.0	20.5		mg/L		97	85 - 115	2	20
Potassium	20.0	19.1		mg/L		96	85 - 115	2	20
Sodium	20.0	18.7		mg/L		93	85 - 115	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-103741-D-1-A MS

Matrix: Water
Analysis Batch: 149141

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 148863
%Rec.

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Calcium	430	M3	21.0	426	M3	mg/L		-14	70 - 130
Sodium	630	M3	20.0	622	M3	mg/L		-21	70 - 130

Lab Sample ID: 550-103741-D-1-A MS ^5

Matrix: Water
Analysis Batch: 149141

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 148863
%Rec.

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Boron	150	M3 D2	1.00	141	M3	mg/L		-916	70 - 130
Magnesium	2800	M3 D2	21.0	2630	M3	mg/L		-730	70 - 130

Lab Sample ID: 550-103741-D-1-B MSD

Matrix: Water
Analysis Batch: 149141

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 148863
%Rec.

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Potassium	39		20.0	58.2		mg/L		95	70 - 130	1	20
Sodium	630	M3	20.0	618	M3	mg/L		-40	70 - 130	1	20

Lab Sample ID: 550-103741-D-1-B MSD ^5

Matrix: Water
Analysis Batch: 149141

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 148863
%Rec.

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Boron	150	M3 D2	1.00	150	M3	mg/L		-30	70 - 130	6	20
Magnesium	2800	M3 D2	21.0	2760	M3	mg/L		-127	70 - 130	5	20

Lab Sample ID: 550-103742-1 MS

Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148863
%Rec.

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Boron	7.7	M3	1.00	8.30	M3	mg/L		64	70 - 130
Calcium	360	M3	21.0	361	M3	mg/L		19	70 - 130
Magnesium	470	M3	21.0	472	M3	mg/L		26	70 - 130

Lab Sample ID: 550-103742-1 MS

Matrix: Water
Analysis Batch: 149141

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148863
%Rec.

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Potassium	34		20.0	53.2		mg/L		98	70 - 130
Sodium	1700	M3	20.0	1690	M3	mg/L		-263	70 - 130

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-103742-1 MSD

Matrix: Water

Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-7-6118

Prep Type: Total/NA

Prep Batch: 148863

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier							
Boron	7.7	M3	1.00	8.39	M3	mg/L		73		70 - 130	1	20
Calcium	360	M3	21.0	363	M3	mg/L		32		70 - 130	1	20
Magnesium	470	M3	21.0	474	M3	mg/L		35		70 - 130	0	20

Lab Sample ID: 550-103742-1 MSD

Matrix: Water

Analysis Batch: 149141

Client Sample ID: FC-CCR-MW-7-6118

Prep Type: Total/NA

Prep Batch: 148863

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier							
Potassium	34		20.0	53.1		mg/L		98		70 - 130	0	20
Sodium	1700	M3	20.0	1720	M3	mg/L		-119		70 - 130	2	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-149023/31

Matrix: Water

Analysis Batch: 149023

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:19	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:19	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:19	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 18:19	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 18:19	1

Lab Sample ID: MB 550-149023/5

Matrix: Water

Analysis Batch: 149023

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 13:52	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1

Lab Sample ID: LCS 550-149023/30

Matrix: Water

Analysis Batch: 149023

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
Alkalinity as CaCO3	250	257		mg/L		103	90 - 110

Lab Sample ID: LCS 550-149023/4

Matrix: Water

Analysis Batch: 149023

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
Alkalinity as CaCO3	250	256		mg/L		102	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Lab Sample ID: LCSD 550-149023/17
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	258		mg/L		103	90 - 110	1	20

Lab Sample ID: LCSD 550-149023/35
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	258		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-103742-1 DU
Matrix: Water
Analysis Batch: 149023

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	510		514		mg/L		0.07	20
Bicarbonate Alkalinity as CaCO3	510		514		mg/L		0.07	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Lab Sample ID: 550-103743-E-1 DU
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	240		245		mg/L		0	20
Bicarbonate Alkalinity as CaCO3	240		245		mg/L		0	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Lab Sample ID: MB 550-149226/1
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/10/18 12:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1

Lab Sample ID: LCS 550-149226/2
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	250	244		mg/L		98	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCSD 550-149226/5
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	250		mg/L		100	90 - 110	2	20

Lab Sample ID: 550-103738-A-1 DU
Matrix: Water
Analysis Batch: 149227

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	750		700		mg/L		7	20
Bicarbonate Alkalinity as CaCO3	750		700		mg/L		7	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-148821/1
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			06/05/18 08:44	1

Lab Sample ID: LCS 550-148821/2
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	990		mg/L		99	90 - 110

Lab Sample ID: LCSD 550-148821/3
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	986		mg/L		99	90 - 110	0	10

Lab Sample ID: 550-103742-1 DU
Matrix: Water
Analysis Batch: 148821

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	10000	D2	9960	D2	mg/L		5	10

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-148864/13
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.1		SU		100.7	98.5 - 101.5

Lab Sample ID: LCSSRM 550-148864/25
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.1		SU		100.9	98.5 - 101.5

Lab Sample ID: LCSSRM 550-148864/30
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.1		SU		101.0	98.5 - 101.5

Lab Sample ID: 550-103742-1 DU
Matrix: Water
Analysis Batch: 148864

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.4	H5	7.4	H5	SU		0	5
Temperature	20.5	H5	20.5	H5	Degrees C		0	

Lab Sample ID: 550-103742-5 DU
Matrix: Water
Analysis Batch: 148864

Client Sample ID: FC-CCR-FD01-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	8.5	H5	8.5	H5	SU		0	5
Temperature	20.7	H5	20.7	H5	Degrees C		0	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

HPLC/IC

Analysis Batch: 148810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	300.0	
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	300.0	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	300.0	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	300.0	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	300.0	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	300.0	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	300.0	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	300.0	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	300.0	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	300.0	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	300.0	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	300.0	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	300.0	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	300.0	
MB 550-148810/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148810/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148810/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103742-1 MS	FC-CCR-MW-7-6118	Total/NA	Water	300.0	
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	300.0	

Metals

Prep Batch: 148863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.7	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.7	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.7	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.7	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.7	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.7	
MB 550-148863/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-148863/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-148863/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103741-D-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-103741-D-1-A MS ^5	Matrix Spike	Total/NA	Water	200.7	
550-103741-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	
550-103741-D-1-B MSD ^5	Matrix Spike Duplicate	Total/NA	Water	200.7	
550-103742-1 MS	FC-CCR-MW-7-6118	Total/NA	Water	200.7	
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.7	

Analysis Batch: 149071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.7 Rev 4.4	148863

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Metals (Continued)

Analysis Batch: 149071 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-148863/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148863
LCS 550-148863/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148863
LCSD 550-148863/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-1 MS	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863

Analysis Batch: 149141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.7 Rev 4.4	148863
MB 550-148863/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148863
LCS 550-148863/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148863
LCSD 550-148863/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-D-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-D-1-A MS ^5	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-D-1-B MSD ^5	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-1 MS	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863

Analysis Batch: 149397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7 Rev 4.4	148863

General Chemistry

Analysis Batch: 148821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	SM 2540C	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	SM 2540C	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	SM 2540C	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	SM 2540C	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	SM 2540C	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	SM 2540C	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	SM 2540C	
MB 550-148821/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-148821/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-148821/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103742-1 DU	FC-CCR-MW-7-6118	Total/NA	Water	SM 2540C	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

General Chemistry (Continued)

Analysis Batch: 148864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	SM 4500 H+ B	
LCSRM 550-148864/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSRM 550-148864/25	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSRM 550-148864/30	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-103742-1 DU	FC-CCR-MW-7-6118	Total/NA	Water	SM 4500 H+ B	
550-103742-5 DU	FC-CCR-FD01-6118	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 149023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	SM 2320B	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	SM 2320B	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	SM 2320B	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	SM 2320B	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	SM 2320B	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	SM 2320B	
MB 550-149023/31	Method Blank	Total/NA	Water	SM 2320B	
MB 550-149023/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149023/30	Lab Control Sample	Total/NA	Water	SM 2320B	
LCS 550-149023/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149023/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
LCSD 550-149023/35	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103742-1 DU	FC-CCR-MW-7-6118	Total/NA	Water	SM 2320B	
550-103743-E-1 DU	Duplicate	Total/NA	Water	SM 2320B	

Analysis Batch: 149226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-149226/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149226/2	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149226/5	Lab Control Sample Dup	Total/NA	Water	SM 2320B	

Analysis Batch: 149227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	SM 2320B	
550-103738-A-1 DU	Duplicate	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-7-6118

Lab Sample ID: 550-103742-1

Date Collected: 06/01/18 12:07

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 01:04	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 01:31	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:15	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 20:08	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 16:17	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-8-6118

Lab Sample ID: 550-103742-2

Date Collected: 06/01/18 11:19

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 03:48	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 04:15	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:14	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	149141	06/07/18 21:53	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 21:59	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 17:25	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-49A-6118

Lab Sample ID: 550-103742-3

Date Collected: 06/01/18 12:49

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 04:43	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 05:10	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:20	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		5	149141	06/07/18 22:05	SGO	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-49A-6118

Lab Sample ID: 550-103742-3

Date Collected: 06/01/18 12:49

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 22:11	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		10	149397	06/12/18 12:43	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	149227	06/10/18 12:30	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 05:38	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 06:05	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:26	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 22:17	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 17:45	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-FD01-6118

Lab Sample ID: 550-103742-5

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 06:32	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 07:00	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:32	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 22:23	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 17:53	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Date Collected: 06/01/18 08:20

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 07:27	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 07:55	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:38	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	149141	06/07/18 22:28	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 22:34	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 18:04	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-75-6118

Lab Sample ID: 550-103742-7

Date Collected: 06/01/18 10:38

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 09:17	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 09:44	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:44	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 22:40	SGO	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 18:46	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

1

2

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15

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-1
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2320B	Alkalinity	SM	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

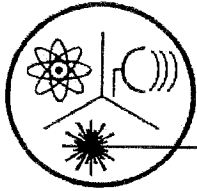
EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



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Website: www.radsafe.com

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FAX (480) 892-5446

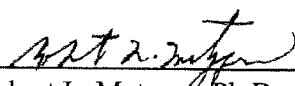
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

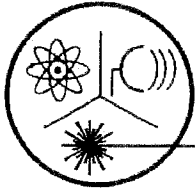
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-7-6118 (550-103742-1)	0.5 ± 0.2	0.8 ± 0.3	1.3 ± 0.4

Date of Analysis	6/6/2018	6/6/2018	6/6/2018



 Robert L. Metzger, Ph.D., C.H.P. Date: 6/18/2018
 Laboratory License Number AZ0462



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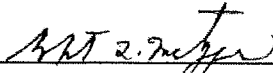
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

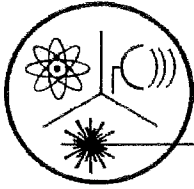
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-8-6118 (550-103742-2)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462



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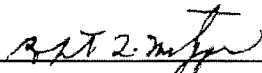
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

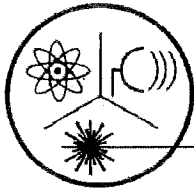
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-49A-6118 (550-103742-3)	< 0.5	1.5 ± 0.3	1.5 ± 0.3

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462



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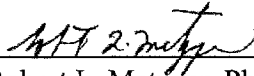
Radiochemical Activity in Water (pCi/L)

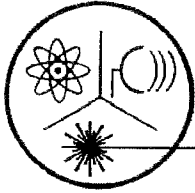
TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: June 01, 2018
 Sample Received: June 05, 2018
 Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-61-6118 (550-103742-4)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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 Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
 Date
 Laboratory License Number AZ0462



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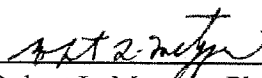
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

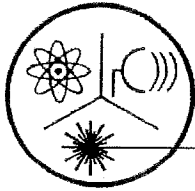
Sampling Date: June 01, 2018
 Sample Received: June 05, 2018
 Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-6118 (550-103742-5)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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 Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
 Date

Laboratory License Number AZ0462



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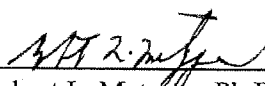
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

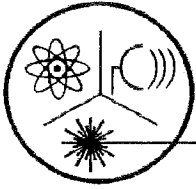
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-74-6118 (550-103742-6)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

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FAX (480) 892-5446

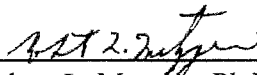
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-75-6118 (550-103742-7)	< 0.5	1.4 ± 0.3	1.4 ± 0.3

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462

Chain of Custody Record



THE TESTAMERICA LABORATORIES

Client Information (Sub Contract Lab)		Lab PM: Baker, Ken	Carrier Tracking No(s): 550-21311.1							
Client Contact: Shipping/Receiving		E-Mail: ken.baker@testamericainc.com	State of Origin: Arizona							
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona								
Address: 3245 North Washington Street, City: Chandler, State, Zip: AZ, 85225		Due Date Requested: 6/13/2018								
Phone: PO #:		TAT Requested (days):								
Email: WD #:		Project #: 55009706								
Project Name: APS - Four Corners CCR		SSOW#: Arizona Public Service								
Site: Arizona Public Service		Preservation Codes:								
<p>Analysis Requested</p> <p>M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - H2SO4 S - Amchlor T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 X - EDTA Y - EDA Z - other (specify)</p>		<p>Other:</p>								
<p>Sample Identification - Client ID (Lab ID)</p>		<p>Special Instructions/Note:</p>								
FC-CCR-MW-7-6118 (550-103742-1)	6/1/18	12:07	Mountain	Water	Field Filtered Sample (Yes or No)	Sub (Radium 226/228) Radium 226/228	Perfrom MS/SD (Yes or No)	Total Number of Containers	Job 3	604987
FC-CCR-MW-8-6118 (550-103742-2)	6/1/18	11:19	Mountain	Water	X	X	X	2	Job 3	604988
FC-CCR-MW-49A-6118 (550-103742-3)	6/1/18	12:49	Mountain	Water	X	X	X	2	Job 3	604989
FC-CCR-MW-61-6118 (550-103742-4)	6/1/18	09:26	Mountain	Water	X	X	X	2	Job 3	604990
FC-CCR-FD01-6118 (550-103742-5)	6/1/18	08:20	Mountain	Water	X	X	X	2	Job 3	604991
FC-CCR-MW-74-6118 (550-103742-6)	6/1/18	10:38	Mountain	Water	X	X	X	2	Job 3	604992
FC-CCR-MW-75-6118 (550-103742-7)	6/1/18		Mountain	Water	X	X	X	2	Job 3	604993
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.</p>										
<p>Possible Hazard Identification</p> <p>Unconfirmed</p> <p>Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2</p> <p>Empty Kit Relinquished by: _____ Date: _____</p> <p>Relinquished by: <i>Allen Matonis</i> Date: <i>6-5-18 9:54 AM</i> Company: <i>Test America</i></p> <p>Relinquished by: _____ Date/Time: _____ Company: _____</p> <p>Relinquished by: _____ Date/Time: _____ Company: _____</p> <p>Custody Seals Intact: _____ Custody Seal No.: _____</p> <p>Δ Yes Δ No Cooler Temperature(s) °C and Other Remarks:</p>										
<p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</p> <p><input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months</p> <p>Special Instructions/QC Requirements:</p> <p>Method of Shipment: _____ Date: _____</p> <p>Received by: _____ Date/Time: _____ Company: _____</p> <p>Received by: _____ Date/Time: _____ Company: _____</p> <p>Received by: _____ Date/Time: _____ Company: _____</p>										



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103742-1

SDG Number: Cholla

Login Number: 103742

List Number: 1

Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-103742-2

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/28/2018 4:04:57 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Job ID: 550-103742-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-103742-2

Comments

No additional comments.

Receipt

The samples were received on 6/4/2018 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.8° C, 1.8° C, 2.0° C and 2.0° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW-7-6118 (550-103742-1) and FC-CCR-MW-49A-6118 (550-103742-3). The analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method(s) 200.8 LL: The following samples were diluted due to the nature of the sample matrix: FC-CCR-MW-7-6118 (550-103742-1), FC-CCR-MW-8-6118 (550-103742-2), FC-CCR-MW-49A-6118 (550-103742-3), FC-CCR-MW-61-6118 (550-103742-4), FC-CCR-FD01-6118 (550-103742-5), FC-CCR-MW-74-6118 (550-103742-6) and FC-CCR-MW-75-6118 (550-103742-7). Elevated reporting limits (RLs) are provided. Samples were run at a x1, x4, x10, x20 dilutions. The x20 was the lowest dilution for which the internal standards did not fail.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103742-1	FC-CCR-MW-7-6118	Water	06/01/18 12:07	06/04/18 13:25
550-103742-2	FC-CCR-MW-8-6118	Water	06/01/18 11:19	06/04/18 13:25
550-103742-3	FC-CCR-MW-49A-6118	Water	06/01/18 12:49	06/04/18 13:25
550-103742-4	FC-CCR-MW-61-6118	Water	06/01/18 09:26	06/04/18 13:25
550-103742-5	FC-CCR-FD01-6118	Water	06/01/18 09:26	06/04/18 13:25
550-103742-6	FC-CCR-MW-74-6118	Water	06/01/18 08:20	06/04/18 13:25
550-103742-7	FC-CCR-MW-75-6118	Water	06/01/18 10:38	06/04/18 13:25



Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-7-6118

Lab Sample ID: 550-103742-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.83		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.017	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-8-6118

Lab Sample ID: 550-103742-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.91	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	1.2		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.011	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.011	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-49A-6118

Lab Sample ID: 550-103742-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.1		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.022	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.018	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.36		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.017	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.085	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD01-6118

Lab Sample ID: 550-103742-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.36		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.017	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.082	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.1	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.49		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.019	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.015	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.089	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-75-6118

Lab Sample ID: 550-103742-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.40		0.20	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-75-6118 (Continued)

Lab Sample ID: 550-103742-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.020	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cadmium	0.0024	D1	0.0020	mg/L	20		200.8 LL	Total/NA
Cobalt	0.048	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.17	D1	0.010	mg/L	20		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

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Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-7-6118

Lab Sample ID: 550-103742-1

Date Collected: 06/01/18 12:07

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 01:04	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.83		0.20	mg/L		06/05/18 11:56	06/06/18 20:15	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:41	20
Barium	0.017	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:41	20
Cadmium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 10:41	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:41	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:41	20
Molybdenum	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:41	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:29	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 10:41	20

Client Sample ID: FC-CCR-MW-8-6118

Lab Sample ID: 550-103742-2

Date Collected: 06/01/18 11:19

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.91	D1	0.80	mg/L			06/05/18 03:48	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.2		0.20	mg/L		06/05/18 11:56	06/06/18 21:14	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:15	20
Barium	0.011	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:15	20
Cadmium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:15	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:15	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:15	20
Molybdenum	0.011	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:15	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:59	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:15	20

Client Sample ID: FC-CCR-MW-49A-6118

Lab Sample ID: 550-103742-3

Date Collected: 06/01/18 12:49

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 04:43	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.1		0.20	mg/L		06/05/18 11:56	06/06/18 21:20	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:17	20
Barium	0.022	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:17	20
Cadmium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:17	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:17	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:17	20
Molybdenum	0.018	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:17	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 14:01	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:17	20

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	D1	0.80	mg/L			06/05/18 05:38	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.36		0.20	mg/L		06/05/18 11:56	06/06/18 21:26	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:19	20
Barium	0.014	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:19	20
Cadmium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:19	20
Cobalt	0.017	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:19	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:19	20
Molybdenum	0.085	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:19	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 14:04	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:19	20

Client Sample ID: FC-CCR-FD01-6118

Lab Sample ID: 550-103742-5

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	D1	0.80	mg/L			06/05/18 06:32	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.36		0.20	mg/L		06/05/18 11:56	06/06/18 21:32	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:22	20
Barium	0.014	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:22	20
Cadmium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:22	20
Cobalt	0.017	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:22	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:22	20
Molybdenum	0.082	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:22	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 14:06	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:22	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Date Collected: 06/01/18 08:20

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.1	D1	0.80	mg/L			06/05/18 07:27	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.49		0.20	mg/L		06/05/18 11:56	06/06/18 21:38	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:24	20
Barium	0.019	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:24	20
Cadmium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:24	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:24	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:24	20
Molybdenum	0.015	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:24	20
Selenium	0.089	D1	0.010	mg/L		06/05/18 08:55	06/23/18 14:08	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:24	20

Client Sample ID: FC-CCR-MW-75-6118

Lab Sample ID: 550-103742-7

Date Collected: 06/01/18 10:38

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.2	D1	0.80	mg/L			06/05/18 09:17	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.40		0.20	mg/L		06/05/18 11:56	06/06/18 21:44	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:26	20
Barium	0.020	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:26	20
Cadmium	0.0024	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:26	20
Cobalt	0.048	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:26	20
Lead	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:26	20
Molybdenum	0.17	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:26	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 14:10	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:26	20

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-103742-1 MSD
Matrix: Water
Analysis Batch: 148810

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1	800	865	D1	mg/L		108	80 - 120	1	20

Lab Sample ID: 550-103742-1MS
Matrix: Water
Analysis Batch: 148810

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1	800	873	D1	mg/L		109	80 - 120		

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: 550-103742-1 MSD
Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.832		1.00	1.81		mg/L		98	70 - 130	1	20

Lab Sample ID: 550-103742-1MS
Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.832		1.00	1.80		mg/L		97	70 - 130		

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-148822/1-A
Matrix: Water
Analysis Batch: 149720

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148822

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Barium	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Cadmium	ND		0.00010	mg/L		06/05/18 08:55	06/15/18 10:27	1
Cobalt	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Lead	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Molybdenum	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Thallium	ND		0.00010	mg/L		06/05/18 08:55	06/15/18 10:27	1

Lab Sample ID: MB 550-148822/1-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148822

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1
Barium	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1
Cadmium	ND		0.00010	mg/L		06/05/18 08:55	06/23/18 13:16	1
Cobalt	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 550-148822/1-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148822

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1
Molybdenum	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1
Selenium	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1
Thallium	ND		0.00010	mg/L		06/05/18 08:55	06/23/18 13:16	1

Lab Sample ID: LCS 550-148822/2-A
Matrix: Water
Analysis Batch: 149720

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.102		mg/L		102	85 - 115
Barium	0.100	0.0990		mg/L		99	85 - 115
Cadmium	0.100	0.0966		mg/L		97	85 - 115
Cobalt	0.100	0.0995		mg/L		100	85 - 115
Lead	0.100	0.0991		mg/L		99	85 - 115
Molybdenum	0.100	0.0982		mg/L		98	85 - 115
Thallium	0.100	0.0988		mg/L		99	85 - 115

Lab Sample ID: LCS 550-148822/2-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.102		mg/L		102	85 - 115
Barium	0.100	0.102		mg/L		102	85 - 115
Cadmium	0.100	0.102		mg/L		102	85 - 115
Cobalt	0.100	0.102		mg/L		102	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Molybdenum	0.100	0.103		mg/L		103	85 - 115
Selenium	0.100	0.101		mg/L		101	85 - 115
Thallium	0.100	0.102		mg/L		102	85 - 115

Lab Sample ID: LCSD 550-148822/3-A
Matrix: Water
Analysis Batch: 149720

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.100	0.0961		mg/L		96	85 - 115	6	20
Barium	0.100	0.0988		mg/L		99	85 - 115	0	20
Cadmium	0.100	0.100		mg/L		100	85 - 115	4	20
Cobalt	0.100	0.0964		mg/L		96	85 - 115	3	20
Lead	0.100	0.0988		mg/L		99	85 - 115	0	20
Molybdenum	0.100	0.0989		mg/L		99	85 - 115	1	20
Thallium	0.100	0.0973		mg/L		97	85 - 115	2	20

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSD 550-148822/3-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Selenium	0.100	0.101		mg/L		101	85 - 115	0	20

Lab Sample ID: 550-103742-1 MSD
Matrix: Water
Analysis Batch: 149720

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	ND	D1	0.100	0.102		mg/L		102	70 - 130	3	20
Barium	0.017	D1	0.100	0.122		mg/L		105	70 - 130	2	20
Cadmium	ND	D1	0.100	0.105		mg/L		105	70 - 130	2	20
Cobalt	ND	D1	0.100	0.0973		mg/L		97	70 - 130	1	20
Lead	ND	D1	0.100	0.101		mg/L		101	70 - 130	0	20
Molybdenum	ND	D1	0.100	0.114		mg/L		107	70 - 130	2	20
Thallium	ND	D1	0.100	0.0966		mg/L		97	70 - 130	0	20

Lab Sample ID: 550-103742-1 MSD
Matrix: Water
Analysis Batch: 150245

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Selenium	ND	D1	0.100	0.107	D1	mg/L		104	70 - 130	2	20

Lab Sample ID: 550-103742-1MS
Matrix: Water
Analysis Batch: 149720

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	ND	D1	0.100	0.0991		mg/L		99	70 - 130
Barium	0.017	D1	0.100	0.119		mg/L		102	70 - 130
Cadmium	ND	D1	0.100	0.103		mg/L		103	70 - 130
Cobalt	ND	D1	0.100	0.0961		mg/L		96	70 - 130
Lead	ND	D1	0.100	0.101		mg/L		101	70 - 130
Molybdenum	ND	D1	0.100	0.111		mg/L		105	70 - 130
Thallium	ND	D1	0.100	0.0963		mg/L		96	70 - 130

Lab Sample ID: 550-103742-1MS
Matrix: Water
Analysis Batch: 150245

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Selenium	ND	D1	0.100	0.109	D1	mg/L		106	70 - 130

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-148891/1-A
Matrix: Water
Analysis Batch: 149005

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148891

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:43	06/06/18 16:51	1

Lab Sample ID: LCS 550-148891/2-A
Matrix: Water
Analysis Batch: 149005

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148891

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Hg	0.0100	0.0107		mg/L		107	85 - 115

Lab Sample ID: LCSD 550-148891/3-A
Matrix: Water
Analysis Batch: 149005

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148891

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	0.0100	0.0106		mg/L		106	85 - 115	1	20

Lab Sample ID: 550-103742-1MS
Matrix: Water
Analysis Batch: 149005

Client Sample ID: FC-CCR-MW-7-6118
Prep Type: Total/NA
Prep Batch: 148891

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Hg	0.0029	M2	0.0100	0.00904	M2	mg/L		61	70 - 130

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

HPLC/IC

Analysis Batch: 148810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	300.0	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	300.0	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	300.0	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	300.0	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	300.0	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	300.0	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	300.0	
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	300.0	
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	300.0	

Metals

Prep Batch: 148822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.8	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.8	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.8	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.8	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.8	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.8	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.8	
MB 550-148822/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-148822/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-148822/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.8	
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	200.8	

Prep Batch: 148863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.7	
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.7	
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7	
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.7	
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.7	
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.7	
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.7	
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.7	
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	200.7	

Prep Batch: 148891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-148891/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-148891/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-148891/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	245.1	

Analysis Batch: 149005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-148891/1-A	Method Blank	Total/NA	Water	245.1	148891
LCS 550-148891/2-A	Lab Control Sample	Total/NA	Water	245.1	148891

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 149005 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 550-148891/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	148891
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	245.1	148891

Analysis Batch: 149071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	200.7 Rev 4.4	148863

Analysis Batch: 149720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.8 LL	148822
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.8 LL	148822
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.8 LL	148822
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.8 LL	148822
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.8 LL	148822
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.8 LL	148822
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.8 LL	148822
MB 550-148822/1-A	Method Blank	Total/NA	Water	200.8 LL	148822
LCS 550-148822/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	148822
LCSD 550-148822/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	148822
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.8 LL	148822
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	200.8 LL	148822

Analysis Batch: 150245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103742-1	FC-CCR-MW-7-6118	Total/NA	Water	200.8 LL	148822
550-103742-2	FC-CCR-MW-8-6118	Total/NA	Water	200.8 LL	148822
550-103742-3	FC-CCR-MW-49A-6118	Total/NA	Water	200.8 LL	148822
550-103742-4	FC-CCR-MW-61-6118	Total/NA	Water	200.8 LL	148822
550-103742-5	FC-CCR-FD01-6118	Total/NA	Water	200.8 LL	148822
550-103742-6	FC-CCR-MW-74-6118	Total/NA	Water	200.8 LL	148822
550-103742-7	FC-CCR-MW-75-6118	Total/NA	Water	200.8 LL	148822
MB 550-148822/1-A	Method Blank	Total/NA	Water	200.8 LL	148822
LCS 550-148822/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	148822
LCSD 550-148822/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	148822
550-103742-1 MSD	FC-CCR-MW-7-6118	Total/NA	Water	200.8 LL	148822
550-103742-1MS	FC-CCR-MW-7-6118	Total/NA	Water	200.8 LL	148822

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-7-6118

Date Collected: 06/01/18 12:07

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103742-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 01:04	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:15	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 10:41	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:29	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-8-6118

Date Collected: 06/01/18 11:19

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103742-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 03:48	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:14	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:15	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:59	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-49A-6118

Date Collected: 06/01/18 12:49

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103742-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 04:43	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:20	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:17	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 14:01	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-61-6118

Date Collected: 06/01/18 09:26

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103742-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 05:38	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:26	ARE	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-61-6118

Lab Sample ID: 550-103742-4

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:19	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 14:04	TEK	TAL PHX

Client Sample ID: FC-CCR-FD01-6118

Lab Sample ID: 550-103742-5

Date Collected: 06/01/18 09:26

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 06:32	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:32	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:22	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 14:06	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-74-6118

Lab Sample ID: 550-103742-6

Date Collected: 06/01/18 08:20

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 07:27	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:38	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:24	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 14:08	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-75-6118

Lab Sample ID: 550-103742-7

Date Collected: 06/01/18 10:38

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 09:17	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:44	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:26	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 14:10	TEK	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103742-2
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
245.1	Mercury (CVAA)	EPA	TAL PHX
Subcontract	Radium 226/228	None	Radiation
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX
245.1	Preparation, Mercury	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

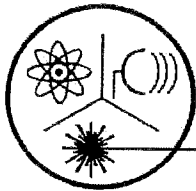
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



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Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

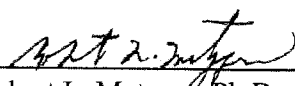
Radiochemical Activity in Water (pCi/L)

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4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

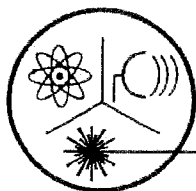
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-7-6118 (550-103742-1)	0.5 ± 0.2	0.8 ± 0.3	1.3 ± 0.4

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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 Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
 Date

Laboratory License Number AZ0462



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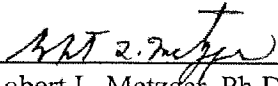
Radiochemical Activity in Water (pCi/L)

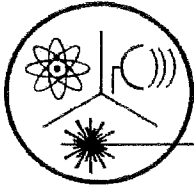
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-8-6118 (550-103742-2)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date
Laboratory License Number AZ0462



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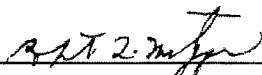
Radiochemical Activity in Water (pCi/L)

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Phoenix, AZ 85040

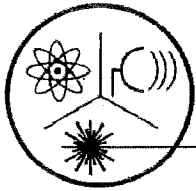
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-49A-6118 (550-103742-3)	< 0.5	1.5 ± 0.3	1.5 ± 0.3

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462



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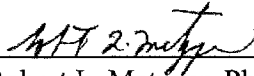
Radiochemical Activity in Water (pCi/L)

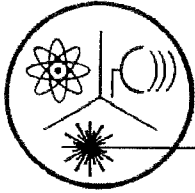
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-61-6118 (550-103742-4)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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 Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
 Date
 Laboratory License Number AZ0462



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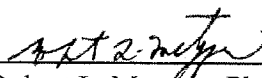
Radiochemical Activity in Water (pCi/L)

TestAmerica
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Phoenix, AZ 85040

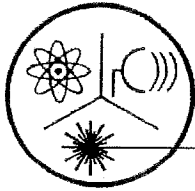
Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-6118 (550-103742-5)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462



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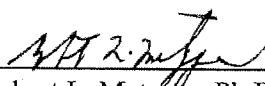
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 01, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-74-6118 (550-103742-6)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462

Chain of Custody Record

Client Information (Sub Contract Lab)		Lab PM: Baker, Ken	Carrier Tracking No(s): 550-21311.1					
Client Contact: Shipping/Receiving		E-Mail: ken.baker@testamericainc.com	State of Origin: Arizona					
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona						
Address: 3245 North Washington Street, City: Chandler, State, Zip: AZ, 85225		Due Date Requested: 6/13/2018						
Phone: PO #:		TAT Requested (days):						
Email: WD #:		Project #: 55009706						
Project Name: APS - Four Corners CCR		SSOW#: Arizona Public Service						
Site: Arizona Public Service		Preservation Codes:						
<p>Analysis Requested</p> <p>M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 X - EDTA L - EDA Z - other (specify)</p>		<p>Analysis Requested</p> <p>A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:</p>						
<p>Sample Identification - Client ID (Lab ID)</p> <p>FC-CCR-MW-7-6118 (550-103742-1) FC-CCR-MW-8-6118 (550-103742-2) FC-CCR-MW-49A-6118 (550-103742-3) FC-CCR-MW-61-6118 (550-103742-4) FC-CCR-FD01-6118 (550-103742-5) FC-CCR-MW-74-6118 (550-103742-6) FC-CCR-MW-75-6118 (550-103742-7)</p>		<p>Field Filtered Sample (Yes or No)</p> <p>Sub (Radium 226/228) Radium 226/228</p>						
Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=water, B=soil, D=water/soil, B=BIOSOL, B=BIOSOL, REAL)	Field Filtered Sample (Yes or No)	Sub (Radium 226/228) Radium 226/228	Permit MS/SD (Yes or No)	Total Number of Containers	Special Instructions/Note:
6/1/18	12:07 Mountain	Water	Water	X	X	X	2	Job 3 604987
6/1/18	11:19 Mountain	Water	Water	X	X	X	2	Job 3 604988
6/1/18	12:49 Mountain	Water	Water	X	X	X	2	Job 3 604989
6/1/18	09:26 Mountain	Water	Water	X	X	X	2	Job 3 604990
6/1/18	08:20 Mountain	Water	Water	X	X	X	2	Job 3 604991
6/1/18	10:38 Mountain	Water	Water	X	X	X	2	Job 3 604992
6/1/18	Mountain	Water	Water	X	X	X	2	Job 3 604993
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.</p>								
<p>Possible Hazard Identification</p> <p>Unconfirmed</p> <p>Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2</p> <p>Empty Kit Relinquished by: _____ Date: _____</p> <p>Relinquished by: Allen Matonis Date: 6-5-18 9:54 AM Company: Test America</p> <p>Relinquished by: _____ Date/Time: 6/5/18 9:50 Company: _____</p> <p>Relinquished by: _____ Date/Time: _____ Company: _____</p> <p>Custody Seals Intact: _____ Custody Seal No.: _____</p> <p>Δ Yes Δ No Cooler Temperature(s) °C and Other Remarks:</p>								
<p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</p> <p>Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months</p> <p>Special Instructions/QC Requirements:</p>								



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103742-2

SDG Number: Cholla

Login Number: 103742

List Number: 1

Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113026-1

Client Project/Site: APS - Four Corners CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/30/2018 5:18:48 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Job ID: 550-113026-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-113026-1

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.9° C and 3.6° C.

HPLC/IC

Method(s) 300.0: The following sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW49A-11418 (550-113026-5). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

Method(s) 300.0: Fluoride by method EPA 300.0 was reanalyzed for the following sample at a lower dilution per the client's request to meet the minimum detection limit of 0.80 mg/L; FC-CCR-MW7-11418 (550-113026-1), FC-CCR-MW8-11418 (550-113026-2) and FC-CCR-MW49A-11418 (550-113026-5).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113026-1	FC-CCR-MW7-11418	Water	11/04/18 09:02	11/07/18 13:00
550-113026-2	FC-CCR-MW8-11418	Water	11/04/18 08:19	11/07/18 13:00
550-113026-3	FC-CCR-MW61-11318	Water	11/03/18 14:44	11/07/18 13:00
550-113026-4	FC-CCR-MW75-11318	Water	11/03/18 15:25	11/07/18 13:00
550-113026-5	FC-CCR-MW49A-11418	Water	11/04/18 09:59	11/07/18 13:00

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Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Client Sample ID: FC-CCR-MW7-11418

Lab Sample ID: 550-113026-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	680	D2	400	mg/L	200		300.0	Total/NA
Sulfate	6100	D2	400	mg/L	200		300.0	Total/NA
Boron	7.4	M3	0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	320	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	9900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW8-11418

Lab Sample ID: 550-113026-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1200	D2	400	mg/L	200		300.0	Total/NA
Sulfate	10000	D2	400	mg/L	200		300.0	Total/NA
Boron	14		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	390		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	15000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW61-11318

Lab Sample ID: 550-113026-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	340	D1	10	mg/L	5		300.0	Total/NA
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3600	D2	400	mg/L	200		300.0	Total/NA
Boron	37		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	5300	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.6	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW75-11318

Lab Sample ID: 550-113026-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	310	D1	10	mg/L	5		300.0	Total/NA
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	4300	D2	400	mg/L	200		300.0	Total/NA
Boron	24	M3	0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	430	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	6200	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW49A-11418

Lab Sample ID: 550-113026-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	590	D2	400	mg/L	200		300.0	Total/NA
Sulfate	19000	D2	400	mg/L	200		300.0	Total/NA
Boron	1.8		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	380		2.0	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Client Sample ID: FC-CCR-MW49A-11418 (Continued)

Lab Sample ID: 550-113026-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	27000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Client Sample ID: FC-CCR-MW7-11418

Lab Sample ID: 550-113026-1

Date Collected: 11/04/18 09:02

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	680	D2	400	mg/L			11/14/18 11:11	200
Fluoride	ND	D1 D5 M2	0.80	mg/L			11/28/18 02:55	2
Sulfate	6100	D2	400	mg/L			11/14/18 11:11	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	7.4	M3	0.050	mg/L		11/09/18 07:33	11/13/18 13:31	1
Calcium	320	M3	2.0	mg/L		11/09/18 07:33	11/13/18 13:31	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	9900	D2	100	mg/L			11/08/18 12:33	1
pH	7.4	H5	1.7	SU			11/12/18 13:18	1
Temperature	13.0	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-MW8-11418

Lab Sample ID: 550-113026-2

Date Collected: 11/04/18 08:19

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1200	D2	400	mg/L			11/14/18 15:57	200
Fluoride	ND	D1 D5	0.80	mg/L			11/28/18 02:00	2
Sulfate	10000	D2	400	mg/L			11/14/18 15:57	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	14		0.050	mg/L		11/09/18 07:33	11/13/18 13:54	1
Calcium	390		2.0	mg/L		11/09/18 07:33	11/13/18 13:54	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	15000	D2	200	mg/L			11/08/18 12:33	1
pH	7.3	H5	1.7	SU			11/12/18 13:18	1
Temperature	12.2	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-MW61-11318

Lab Sample ID: 550-113026-3

Date Collected: 11/03/18 14:44

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	340	D1	10	mg/L			11/14/18 16:15	5
Fluoride	1.3	D1	0.80	mg/L			11/17/18 04:24	2
Sulfate	3600	D2	400	mg/L			11/14/18 16:34	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	37		0.050	mg/L		11/09/18 07:33	11/13/18 14:00	1
Calcium	470		2.0	mg/L		11/09/18 07:33	11/13/18 14:00	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Client Sample ID: FC-CCR-MW61-11318

Lab Sample ID: 550-113026-3

Date Collected: 11/03/18 14:44

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5300	D2	100	mg/L			11/08/18 12:33	1
pH	8.6	H5	1.7	SU			11/12/18 13:18	1
Temperature	12.5	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-MW75-11318

Lab Sample ID: 550-113026-4

Date Collected: 11/03/18 15:25

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	310	D1	10	mg/L			11/21/18 04:35	5
Fluoride	1.2	D1	0.80	mg/L			11/20/18 20:52	2
Sulfate	4300	D2	400	mg/L			11/21/18 05:57	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	24	M3	0.050	mg/L		11/09/18 07:33	11/13/18 13:48	1
Calcium	430	M3	2.0	mg/L		11/09/18 07:33	11/13/18 13:48	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	6200	D2	100	mg/L			11/08/18 12:33	1
pH	8.3	H5	1.7	SU			11/12/18 13:18	1
Temperature	12.5	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-MW49A-11418

Lab Sample ID: 550-113026-5

Date Collected: 11/04/18 09:59

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	590	D2	400	mg/L			11/14/18 15:20	200
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 20:07	2
Sulfate	19000	D2	400	mg/L			11/14/18 15:20	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.8		0.050	mg/L		11/09/18 07:33	11/13/18 14:06	1
Calcium	380		2.0	mg/L		11/09/18 07:33	11/13/18 14:06	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	27000	D2	200	mg/L			11/09/18 10:22	1
pH	7.4	H5	1.7	SU			11/12/18 13:18	1
Temperature	12.8	H5	0.1	Degrees C			11/12/18 13:18	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-161852/1042
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/14/18 06:17	1
Fluoride	ND		0.40	mg/L			11/14/18 06:17	1
Sulfate	ND		2.0	mg/L			11/14/18 06:17	1

Lab Sample ID: LCS 550-161852/73
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.5		mg/L		107	90 - 110
Fluoride	4.00	4.16		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-161852/74
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.4		mg/L		107	90 - 110	0	20
Fluoride	4.00	4.16		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-113012-A-1 MS ^2
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.3	D1	8.00	9.67	D1	mg/L		104	80 - 120

Lab Sample ID: 550-113012-A-1 MS ^200
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	800	D2	4000	5340	D2	mg/L		114	80 - 120
Sulfate	1200	D2	4000	5490	D2	mg/L		107	80 - 120

Lab Sample ID: 550-113012-A-1 MSD ^2
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.3	D1	8.00	9.79	D1	mg/L		106	80 - 120	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113012-A-1 MSD ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	800	D2	4000	5310	D2	mg/L		113	80 - 120	1	20
Sulfate	1200	D2	4000	5460	D2	mg/L		107	80 - 120	1	20

Lab Sample ID: 550-113026-1 MS

Matrix: Water
Analysis Batch: 161852

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	20.0	20.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113026-1 MS

Matrix: Water
Analysis Batch: 161852

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	680	D2	4000	5160	D2	mg/L		112	80 - 120
Sulfate	6100	D2	4000	10400	D2	mg/L		108	80 - 120

Lab Sample ID: 550-113026-1 MSD

Matrix: Water
Analysis Batch: 161852

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 D5	20.0	21.0	D1	mg/L		103	80 - 120	1	20

Lab Sample ID: 550-113026-1 MSD

Matrix: Water
Analysis Batch: 161852

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	680	D2	4000	5200	D2	mg/L		113	80 - 120	1	20
Sulfate	6100	D2	4000	10400	D2	mg/L		110	80 - 120	1	20

Lab Sample ID: MB 550-162250/2

Matrix: Water
Analysis Batch: 162250

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/16/18 19:31	1
Fluoride	ND		0.40	mg/L			11/16/18 19:31	1
Sulfate	ND		2.0	mg/L			11/16/18 19:31	1

Lab Sample ID: LCS 550-162250/5

Matrix: Water
Analysis Batch: 162250

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.4		mg/L		107	90 - 110
Fluoride	4.00	4.11		mg/L		103	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-162250/5
Matrix: Water
Analysis Batch: 162250

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-162250/6
Matrix: Water
Analysis Batch: 162250

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.4		mg/L		107	90 - 110	0	20
Fluoride	4.00	4.10		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-113529-A-1 MS
Matrix: Water
Analysis Batch: 162250

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	2.2		4.00	6.28		mg/L		102	80 - 120

Lab Sample ID: 550-113529-A-1 MS ^100
Matrix: Water
Analysis Batch: 162250

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	ND	D1	2000	2430	D1	mg/L		112	80 - 120
Sulfate	1400	D2	2000	3570	D2	mg/L		110	80 - 120

Lab Sample ID: 550-113529-A-1 MSD
Matrix: Water
Analysis Batch: 162250

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	2.2		4.00	6.21		mg/L		100	80 - 120	1	20

Lab Sample ID: 550-113529-A-1 MSD ^100
Matrix: Water
Analysis Batch: 162250

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	ND	D1	2000	2440	D1	mg/L		112	80 - 120	0	20
Sulfate	1400	D2	2000	3570	D2	mg/L		110	80 - 120	0	20

Lab Sample ID: MB 550-162493/2
Matrix: Water
Analysis Batch: 162493

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/20/18 17:37	1
Fluoride	ND		0.40	mg/L			11/20/18 17:37	1
Sulfate	ND		2.0	mg/L			11/20/18 17:37	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-162493/5
Matrix: Water
Analysis Batch: 162493

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.2		mg/L		101	90 - 110
Fluoride	4.00	4.03		mg/L		101	90 - 110
Sulfate	20.0	20.2		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-162493/6
Matrix: Water
Analysis Batch: 162493

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	20.2		mg/L		101	90 - 110	0	20
Fluoride	4.00	4.04		mg/L		101	90 - 110	0	20
Sulfate	20.0	20.2		mg/L		101	90 - 110	0	20

Lab Sample ID: 550-113026-4 MS
Matrix: Water
Analysis Batch: 162493

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	310	D1	100	416	D1	mg/L		108	80 - 120

Lab Sample ID: 550-113026-4 MS
Matrix: Water
Analysis Batch: 162493

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	4300	D2	4000	8460	D2	mg/L		104	80 - 120

Lab Sample ID: 550-113026-4 MSD
Matrix: Water
Analysis Batch: 162493

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	310	D1	100	415	D1	mg/L		107	80 - 120	0	20

Lab Sample ID: 550-113026-4 MSD
Matrix: Water
Analysis Batch: 162493

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	4300	D2	4000	8450	D2	mg/L		104	80 - 120	0	20

Lab Sample ID: MB 550-162499/2
Matrix: Water
Analysis Batch: 162499

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/20/18 18:25	1
Fluoride	ND		0.40	mg/L			11/20/18 18:25	1
Sulfate	ND		2.0	mg/L			11/20/18 18:25	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-162499/5
Matrix: Water
Analysis Batch: 162499

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.4		mg/L		107	90 - 110
Fluoride	4.00	4.12		mg/L		103	90 - 110
Sulfate	20.0	20.6		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-162499/6
Matrix: Water
Analysis Batch: 162499

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.5		mg/L		107	90 - 110	0	20
Fluoride	4.00	4.14		mg/L		103	90 - 110	1	20
Sulfate	20.0	20.6		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-113026-4 MS
Matrix: Water
Analysis Batch: 162499

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.2	D1	8.00	9.18	D1	mg/L		100	80 - 120

Lab Sample ID: 550-113026-4 MSD
Matrix: Water
Analysis Batch: 162499

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.2	D1	8.00	9.26	D1	mg/L		101	80 - 120	1	20

Lab Sample ID: MB 550-163090/2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/27/18 20:10	1
Fluoride	ND		0.40	mg/L			11/27/18 20:10	1
Sulfate	ND		2.0	mg/L			11/27/18 20:10	1

Lab Sample ID: LCS 550-163090/5
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.3		mg/L		107	90 - 110
Fluoride	4.00	4.11		mg/L		103	90 - 110
Sulfate	20.0	20.4		mg/L		102	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 550-163090/6
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.3		mg/L		107	90 - 110	0	20
Fluoride	4.00	4.10		mg/L		102	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-113026-1 MS
Matrix: Water
Analysis Batch: 163090

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 M2 D5	8.00	6.47	D1 M2	mg/L		77	80 - 120

Lab Sample ID: 550-113026-1 MS
Matrix: Water
Analysis Batch: 163090

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	800	D2	4000	5310	D2	mg/L		113	80 - 120
Sulfate	6300	D2	4000	10600	D2	mg/L		109	80 - 120

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 163090

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 M2 D5	8.00	6.80	D1	mg/L		81	80 - 120	5	20

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 163090

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	800	D2	4000	5340	D2	mg/L		114	80 - 120	1	20
Sulfate	6300	D2	4000	10600	D2	mg/L		108	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-161452/1-A
Matrix: Water
Analysis Batch: 161800

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161452

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		11/09/18 07:33	11/13/18 13:11	1
Calcium	ND		2.0	mg/L		11/09/18 07:33	11/13/18 13:11	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-161452/2-A
Matrix: Water
Analysis Batch: 161800

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161452
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.923		mg/L		92	85 - 115
Calcium	21.0	20.4		mg/L		97	85 - 115

Lab Sample ID: LCSD 550-161452/3-A
Matrix: Water
Analysis Batch: 161800

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161452
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.942		mg/L		94	85 - 115	2	20
Calcium	21.0	20.7		mg/L		99	85 - 115	2	20

Lab Sample ID: 550-113026-1 MS
Matrix: Water
Analysis Batch: 161800

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161452
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	7.4	M3	1.00	8.17	M3	mg/L		81	70 - 130
Calcium	320	M3	21.0	338	M3	mg/L		95	70 - 130

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 161800

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161452
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	7.4	M3	1.00	7.97	M3	mg/L		61	70 - 130	2	20
Calcium	320	M3	21.0	326	M3	mg/L		40	70 - 130	4	20

Lab Sample ID: 550-113026-4 MS
Matrix: Water
Analysis Batch: 161800

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA
Prep Batch: 161452
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	24	M3	0.100	23.3	M3	mg/L		-578	70 - 130
Calcium	430	M3	2.10	426	M3	mg/L		-172	70 - 130

Lab Sample ID: 550-113026-4 MSD
Matrix: Water
Analysis Batch: 161800

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA
Prep Batch: 161452
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	24	M3	0.100	23.2	M3	mg/L		-623	70 - 130	0	20
Calcium	430	M3	2.10	427	M3	mg/L		-115	70 - 130	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-161396/1
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			11/08/18 12:33	1

Lab Sample ID: LCS 550-161396/2
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	974		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-161396/3
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	974		mg/L		97	90 - 110	0	10

Lab Sample ID: 550-113026-4 DU
Matrix: Water
Analysis Batch: 161396

Client Sample ID: FC-CCR-MW75-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	6200	D2	6210	D2	mg/L		0.5	10

Lab Sample ID: MB 550-161467/1
Matrix: Water
Analysis Batch: 161467

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			11/09/18 10:22	1

Lab Sample ID: LCS 550-161467/2
Matrix: Water
Analysis Batch: 161467

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	988		mg/L		99	90 - 110

Lab Sample ID: LCSD 550-161467/3
Matrix: Water
Analysis Batch: 161467

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	982		mg/L		98	90 - 110	1	10

Lab Sample ID: 550-113012-A-1 DU
Matrix: Water
Analysis Batch: 161467

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	3200	D2	3080	D2	mg/L		3	10

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-161638/12
 Matrix: Water
 Analysis Batch: 161638

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.3	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161638/23
 Matrix: Water
 Analysis Batch: 161638

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.3	98.5 - 101.5

Lab Sample ID: 550-113026-4 DU
 Matrix: Water
 Analysis Batch: 161638

Client Sample ID: FC-CCR-MW75-11318
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	8.3	H5	8.3	H5	SU		0.1	5
Temperature	12.5	H5	12.6	H5	Degrees C		0.8	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

HPLC/IC

Analysis Batch: 161852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	300.0	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	300.0	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	300.0	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	300.0	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	300.0	
MB 550-161852/1042	Method Blank	Total/NA	Water	300.0	
LCS 550-161852/73	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-161852/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113012-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113012-A-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	300.0	

Analysis Batch: 162250

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	300.0	
MB 550-162250/2	Method Blank	Total/NA	Water	300.0	
LCS 550-162250/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-162250/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113529-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-113529-A-1 MS ^100	Matrix Spike	Total/NA	Water	300.0	
550-113529-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113529-A-1 MSD ^100	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 162493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	300.0	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	300.0	
MB 550-162493/2	Method Blank	Total/NA	Water	300.0	
LCS 550-162493/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-162493/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	300.0	
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	300.0	
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	300.0	
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	300.0	

Analysis Batch: 162499

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	300.0	
MB 550-162499/2	Method Blank	Total/NA	Water	300.0	
LCS 550-162499/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-162499/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	300.0	
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	300.0	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

HPLC/IC (Continued)

Analysis Batch: 163090

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	300.0	
MB 550-163090/2	Method Blank	Total/NA	Water	300.0	
LCS 550-163090/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-163090/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	300.0	

Metals

Prep Batch: 161452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.7	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	200.7	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	200.7	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	200.7	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	200.7	
MB 550-161452/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-161452/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCS 550-161452/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.7	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	200.7	
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	200.7	
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	200.7	

Analysis Batch: 161800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	200.7 Rev 4.4	161452
MB 550-161452/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	161452
LCS 550-161452/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	161452
LCS 550-161452/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	200.7 Rev 4.4	161452

General Chemistry

Analysis Batch: 161396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	SM 2540C	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	SM 2540C	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	SM 2540C	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	SM 2540C	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

General Chemistry (Continued)

Analysis Batch: 161396 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-161396/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-161396/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-161396/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-113026-4 DU	FC-CCR-MW75-11318	Total/NA	Water	SM 2540C	

Analysis Batch: 161467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	SM 2540C	
MB 550-161467/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-161467/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-161467/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-113012-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 161638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	SM 4500 H+ B	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	SM 4500 H+ B	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	SM 4500 H+ B	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	SM 4500 H+ B	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161638/12	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161638/23	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-113026-4 DU	FC-CCR-MW75-11318	Total/NA	Water	SM 4500 H+ B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Client Sample ID: FC-CCR-MW7-11418

Lab Sample ID: 550-113026-1

Date Collected: 11/04/18 09:02

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	161852	11/14/18 11:11	NEL	TAL PHX
Total/NA	Analysis	300.0		2	163090	11/28/18 02:55	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 13:31	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW8-11418

Lab Sample ID: 550-113026-2

Date Collected: 11/04/18 08:19

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	161852	11/14/18 15:57	NEL	TAL PHX
Total/NA	Analysis	300.0		2	163090	11/28/18 02:00	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 13:54	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW61-11318

Lab Sample ID: 550-113026-3

Date Collected: 11/03/18 14:44

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 16:15	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161852	11/14/18 16:34	NEL	TAL PHX
Total/NA	Analysis	300.0		2	162250	11/17/18 04:24	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 14:00	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Client Sample ID: FC-CCR-MW75-11318

Lab Sample ID: 550-113026-4

Date Collected: 11/03/18 15:25

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	162499	11/20/18 20:52	NEL	TAL PHX
Total/NA	Analysis	300.0		5	162493	11/21/18 04:35	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/21/18 05:57	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 13:48	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW49A-11418

Lab Sample ID: 550-113026-5

Date Collected: 11/04/18 09:59

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	161852	11/14/18 15:20	NEL	TAL PHX
Total/NA	Analysis	300.0		2	161852	11/14/18 20:07	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 14:06	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161467	(Start) 11/09/18 10:22 (End) 11/12/18 10:30	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"


Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Chain of Custody Record

phone 602.437.3340 fax 623.445.6192

TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Doug Lavarrway		Site Contact: Doug Lavarrway		Date: 11/7/2018		COC No: 1 of 1 COCS	
APPS Four Corners		Tel/Fax: 928-288-1394		Lab Contact: Ken Baker		Carrier:		Job No. 113026	
PO Box 355, MS 4915		Analysis Turnaround Time		Calendar (C) or Work Days (W)		TAT if different from Below		SDG No.	
Fruitland, NM 87416		7 Days		2 weeks		1 week		2 days	
Phone:		1 day		2 weeks		1 week		2 days	
Fax:		1 day		2 weeks		1 week		2 days	
Project Name: CCR		1 day		2 weeks		1 week		2 days	
E-Mail Address:		1 day		2 weeks		1 week		2 days	
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Perform MS / MSD (Y / N)	
FC-CCR-MW7-11418	11/4/2018	902	G	W	2	N	EPA 200.7 (B, Ca)	X	X
FC-CCR-MW8-11418	11/4/2018	819	G	W	2	N	EPA 300.0 (Cl, F, SO4)	X	X
FC-CCR-MW61-11318	11/3/2018	1444	G	W	2	N	SM 2540C (TDS)	X	X
FC-CCR-MW75-11318	11/3/18	1525	G	W	2	N	SM 4500-HB (pH)	X	X
FC-CCR-MW49A-11418	11/4/18	959	G	W	2	N		X	X
<div style="text-align: center;">  <p>550-113026 Chain of Custody</p> </div>									
Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____ Possible Hazard Identification: <input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown									
Special Instructions/QC Requirements & Comments: Need Fluoride reporting limit ≤ 0.8 mg/L <div style="text-align: center; font-size: 2em;">3.6 (290) PC</div>									
Relinquished by: Doug Lavarrway		Company: APPS		Date/Time: 11/7/2018		Received by: [Signature]		Company: [Signature]	
Relinquished by:		Company:		Date/Time:		Received by:		Company:	
Relinquished by:		Company:		Date/Time:		Received by:		Company:	

Chain of Custody Record

phone 602.437.3340 fax 623.445.6192

TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarney** Project Manager: **Doug Lavarney** Site Contact: **Doug Lavarney** Date: **11/7/2018**

PO Box 355, MS 4915 Tel/Fax: 928-587-0319 Analysis Turnaround Time Lab Contact: **Ken Baker** Carrier: **CCOC**

Fulland, NM 87416 Calendar (C) or Work Days (W) Job No. **113026**

Phone: FAX: TAT if different from below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 SDG No.

Project Name: **CCR** E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Perform MS / MSD (Y / N)	Carrier	Sample Specific Notes
FC-CCR-MW7-11418	11/4/2018	902	G	W	4	N	X	X	
FC-CCR-MW8-11418	11/4/2018	819	G	W	4	N	X	X	
FC-CCR-MW61-11318	11/3/2018	1444	G	W	4	N	X	X	
FC-CCR-MW75-11318	11/3/18	1525	G	W	4	N	X	X	
FC-CCR-MW49A-11418	11/4/18	959	G	W	4	N	X	X	

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Link Return To Client Disposal By Lab Archive For Months

Special Instructions/QC Requirements & Comments: **3.6%, 2.9%**

Method 200.8 with collision cell Radium analyzed by Radiation Safety

Relinquished by: **Dave Lavarney** Company: **APS** Date/Time: **11/7/2018 5:05a**

Relinquished by: **[Signature]** Company: **[Signature]** Date/Time: **11-7-18 1300**

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113026-1

Login Number: 113026

List Number: 1

Creator: Maycock, Lisa

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113026-2

Client Project/Site: APS - Four Corners CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/21/2018 4:09:38 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
B7	Target analyte detected in method blank at or above method reporting limit. Concentration found in the sample was 10 times above the concentration found in the blank.
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
B1	Target analyte detected in method blank at or above the method reporting limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Job ID: 550-113026-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-113026-2

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.9° C and 3.6° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW7-11418 (550-113026-1), FC-CCR-MW8-11418 (550-113026-2) and FC-CCR-MW49A-11418 (550-113026-5). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Sample Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113026-1	FC-CCR-MW7-11418	Water	11/04/18 09:02	11/07/18 13:00
550-113026-2	FC-CCR-MW8-11418	Water	11/04/18 08:19	11/07/18 13:00
550-113026-3	FC-CCR-MW61-11318	Water	11/03/18 14:44	11/07/18 13:00
550-113026-4	FC-CCR-MW75-11318	Water	11/03/18 15:25	11/07/18 13:00
550-113026-5	FC-CCR-MW49A-11418	Water	11/04/18 09:59	11/07/18 13:00

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Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Client Sample ID: FC-CCR-MW7-11418

Lab Sample ID: 550-113026-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.83		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014	B7	0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.00056		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0070		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0035		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00010		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW8-11418

Lab Sample ID: 550-113026-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.1		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.00064		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0090		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00015		0.00010	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.011		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0014		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW61-11318

Lab Sample ID: 550-113026-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.35		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.00084		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.015		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00088		0.00010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.018		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.00086		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.090		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.00061		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00016		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW75-11318

Lab Sample ID: 550-113026-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.39	M1	0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.00060		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.017		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0018		0.00010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.045		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0030		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.18		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0026		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00018		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW49A-11418

Lab Sample ID: 550-113026-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.2		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0012		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.020		0.00050	mg/L	1		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Client Sample ID: FC-CCR-MW49A-11418 (Continued)

Lab Sample ID: 550-113026-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.00027		0.00010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.014		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0016		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.0016		0.00010	mg/L	1		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

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Client Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Client Sample ID: FC-CCR-MW7-11418

Lab Sample ID: 550-113026-1

Date Collected: 11/04/18 09:02

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 10:53	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.83		0.20	mg/L		11/09/18 07:33	11/13/18 13:31	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		11/11/18 11:15	11/12/18 12:31	1
Barium	0.014	B7	0.00050	mg/L		11/11/18 11:15	11/12/18 12:31	1
Cadmium	ND		0.00010	mg/L		11/11/18 11:15	11/12/18 12:31	1
Cobalt	0.00056		0.00050	mg/L		11/11/18 11:15	11/12/18 12:31	1
Lead	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:10	1
Molybdenum	0.0070		0.00050	mg/L		11/11/18 11:15	11/12/18 12:31	1
Selenium	0.0035		0.00050	mg/L		11/11/18 11:15	11/12/18 12:31	1
Thallium	0.00010		0.00010	mg/L		11/11/18 11:15	11/12/18 12:31	1

Client Sample ID: FC-CCR-MW8-11418

Lab Sample ID: 550-113026-2

Date Collected: 11/04/18 08:19

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 15:38	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.1		0.20	mg/L		11/09/18 07:33	11/13/18 13:54	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00064		0.00050	mg/L		11/11/18 11:15	11/19/18 22:17	1
Barium	0.0090		0.00050	mg/L		11/11/18 11:15	11/19/18 22:17	1
Cadmium	0.00015		0.00010	mg/L		11/11/18 11:15	11/19/18 22:17	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:17	1
Lead	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:17	1
Molybdenum	0.011		0.00050	mg/L		11/11/18 11:15	11/19/18 22:17	1
Selenium	0.0014		0.00050	mg/L		11/11/18 11:15	11/19/18 22:17	1
Thallium	ND		0.00010	mg/L		11/11/18 11:15	11/19/18 22:17	1

Client Sample ID: FC-CCR-MW61-11318

Lab Sample ID: 550-113026-3

Date Collected: 11/03/18 14:44

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 16:15	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.35		0.20	mg/L		11/09/18 07:33	11/13/18 14:00	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00084		0.00050	mg/L		11/11/18 11:15	11/19/18 22:19	1
Barium	0.015		0.00050	mg/L		11/11/18 11:15	11/19/18 22:19	1
Cadmium	0.00088		0.00010	mg/L		11/11/18 11:15	11/19/18 22:19	1
Cobalt	0.018		0.00050	mg/L		11/11/18 11:15	11/19/18 22:19	1
Lead	0.00086		0.00050	mg/L		11/11/18 11:15	11/19/18 22:19	1
Molybdenum	0.090		0.00050	mg/L		11/11/18 11:15	11/19/18 22:19	1
Selenium	0.00061		0.00050	mg/L		11/11/18 11:15	11/19/18 22:19	1
Thallium	0.00016		0.00010	mg/L		11/11/18 11:15	11/19/18 22:19	1

Client Sample ID: FC-CCR-MW75-11318

Lab Sample ID: 550-113026-4

Date Collected: 11/03/18 15:25

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.2	D1	0.80	mg/L			11/14/18 19:49	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.39	M1	0.20	mg/L		11/09/18 07:33	11/13/18 13:48	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00060		0.00050	mg/L		11/11/18 11:15	11/19/18 22:22	1
Barium	0.017		0.00050	mg/L		11/11/18 11:15	11/19/18 22:22	1
Cadmium	0.0018		0.00010	mg/L		11/11/18 11:15	11/19/18 22:22	1
Cobalt	0.045		0.00050	mg/L		11/11/18 11:15	11/19/18 22:22	1
Lead	0.0030		0.00050	mg/L		11/11/18 11:15	11/19/18 22:22	1
Molybdenum	0.18		0.00050	mg/L		11/11/18 11:15	11/19/18 22:22	1
Selenium	0.0026		0.00050	mg/L		11/11/18 11:15	11/19/18 22:22	1
Thallium	0.00018		0.00010	mg/L		11/11/18 11:15	11/19/18 22:22	1

Client Sample ID: FC-CCR-MW49A-11418

Lab Sample ID: 550-113026-5

Date Collected: 11/04/18 09:59

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 15:02	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.2		0.20	mg/L		11/09/18 07:33	11/13/18 14:06	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0012		0.00050	mg/L		11/11/18 11:15	11/19/18 22:24	1
Barium	0.020		0.00050	mg/L		11/11/18 11:15	11/19/18 22:24	1
Cadmium	0.00027		0.00010	mg/L		11/11/18 11:15	11/19/18 22:24	1
Cobalt	0.0020		0.00050	mg/L		11/11/18 11:15	11/19/18 22:24	1
Lead	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:24	1
Molybdenum	0.014		0.00050	mg/L		11/11/18 11:15	11/19/18 22:24	1
Selenium	0.0016		0.00050	mg/L		11/11/18 11:15	11/19/18 22:24	1
Thallium	0.0016		0.00010	mg/L		11/11/18 11:15	11/19/18 22:24	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-161852/1042
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			11/14/18 06:17	1

Lab Sample ID: LCS 550-161852/73
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.16		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-161852/74
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.16		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-113012-A-1 MS ^2
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.3	D1	8.00	9.67	D1	mg/L		104	80 - 120

Lab Sample ID: 550-113012-A-1 MSD ^2
Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.3	D1	8.00	9.79	D1	mg/L		106	80 - 120	1	20

Lab Sample ID: 550-113026-1 MS
Matrix: Water
Analysis Batch: 161852

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	20.0	20.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 161852

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 D5	20.0	21.0	D1	mg/L		103	80 - 120	1	20

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-161452/1-A
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		11/09/18 07:33	11/13/18 13:11	1

Lab Sample ID: LCS 550-161452/2-A
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Lithium	1.00	0.925		mg/L		92	85 - 115

Lab Sample ID: LCSD 550-161452/3-A
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	1.00	0.934		mg/L		93	85 - 115	1	20

Lab Sample ID: 550-113026-1 MS
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: FC-CCR-MW7-11418
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lithium	0.83		1.00	1.76		mg/L		93	70 - 130

Lab Sample ID: 550-113026-1 MSD
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: FC-CCR-MW7-11418
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	0.83		1.00	1.78		mg/L		95	70 - 130	1	20

Lab Sample ID: 550-113026-4 MS
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: FC-CCR-MW75-11318
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lithium	0.39	M1	0.100	1.32	M1	mg/L		926	70 - 130

Lab Sample ID: 550-113026-4 MSD
 Matrix: Water
 Analysis Batch: 161800

Client Sample ID: FC-CCR-MW75-11318
 Prep Type: Total/NA
 Prep Batch: 161452

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	0.39	M1	0.100	1.32	M1	mg/L		931	70 - 130	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-161587/1-A
Matrix: Water
Analysis Batch: 161641

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161587

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		11/11/18 11:15	11/12/18 12:24	1
Barium	0.000556	B1	0.00050	mg/L		11/11/18 11:15	11/12/18 12:24	1
Cadmium	ND		0.00010	mg/L		11/11/18 11:15	11/12/18 12:24	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:15	11/12/18 12:24	1
Molybdenum	ND		0.00050	mg/L		11/11/18 11:15	11/12/18 12:24	1
Selenium	ND		0.00050	mg/L		11/11/18 11:15	11/12/18 12:24	1
Thallium	ND		0.00010	mg/L		11/11/18 11:15	11/12/18 12:24	1

Lab Sample ID: MB 550-161587/1-A
Matrix: Water
Analysis Batch: 162387

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161587

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:03	1
Barium	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:03	1
Cadmium	ND		0.00010	mg/L		11/11/18 11:15	11/19/18 22:03	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:03	1
Lead	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:03	1
Molybdenum	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:03	1
Selenium	ND		0.00050	mg/L		11/11/18 11:15	11/19/18 22:03	1
Thallium	ND		0.00010	mg/L		11/11/18 11:15	11/19/18 22:03	1

Lab Sample ID: LCS 550-161587/2-A
Matrix: Water
Analysis Batch: 161641

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.101		mg/L		101	85 - 115
Barium	0.100	0.101		mg/L		101	85 - 115
Cadmium	0.100	0.101		mg/L		101	85 - 115
Cobalt	0.100	0.100		mg/L		100	85 - 115
Molybdenum	0.100	0.101		mg/L		101	85 - 115
Selenium	0.100	0.100		mg/L		100	85 - 115
Thallium	0.100	0.101		mg/L		101	85 - 115

Lab Sample ID: LCS 550-161587/2-A
Matrix: Water
Analysis Batch: 162387

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.100		mg/L		100	85 - 115
Barium	0.100	0.0935		mg/L		93	85 - 115
Cadmium	0.100	0.0991		mg/L		99	85 - 115
Cobalt	0.100	0.101		mg/L		101	85 - 115
Lead	0.100	0.0981		mg/L		98	85 - 115
Molybdenum	0.100	0.102		mg/L		102	85 - 115
Selenium	0.100	0.102		mg/L		102	85 - 115
Thallium	0.100	0.0973		mg/L		97	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSD 550-161587/3-A
Matrix: Water
Analysis Batch: 161641

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD	
									%Rec.	Limit
Arsenic	0.100	0.100		mg/L		100	85 - 115	1		20
Barium	0.100	0.0999		mg/L		100	85 - 115	1		20
Cadmium	0.100	0.101		mg/L		101	85 - 115	0		20
Cobalt	0.100	0.100		mg/L		100	85 - 115	0		20
Molybdenum	0.100	0.101		mg/L		101	85 - 115	1		20
Selenium	0.100	0.0973		mg/L		97	85 - 115	3		20
Thallium	0.100	0.100		mg/L		100	85 - 115	1		20

Lab Sample ID: LCSD 550-161587/3-A
Matrix: Water
Analysis Batch: 162387

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD	
									%Rec.	Limit
Arsenic	0.100	0.0988		mg/L		99	85 - 115	1		20
Barium	0.100	0.0930		mg/L		93	85 - 115	0		20
Cadmium	0.100	0.0980		mg/L		98	85 - 115	1		20
Cobalt	0.100	0.0991		mg/L		99	85 - 115	2		20
Lead	0.100	0.0967		mg/L		97	85 - 115	1		20
Molybdenum	0.100	0.102		mg/L		102	85 - 115	1		20
Selenium	0.100	0.102		mg/L		102	85 - 115	0		20
Thallium	0.100	0.0967		mg/L		97	85 - 115	1		20

Lab Sample ID: 550-113026-1 MS
Matrix: Water
Analysis Batch: 161641

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	
										%Rec.	Limit
Arsenic	ND		0.100	0.111		mg/L		110	70 - 130		
Barium	0.014	B7	0.100	0.112		mg/L		98	70 - 130		
Cadmium	ND		0.100	0.0911		mg/L		91	70 - 130		
Cobalt	0.00056		0.100	0.0962		mg/L		96	70 - 130		
Molybdenum	0.0070		0.100	0.113		mg/L		106	70 - 130		
Selenium	0.0035		0.100	0.132		mg/L		128	70 - 130		
Thallium	0.00010		0.100	0.0881		mg/L		88	70 - 130		

Lab Sample ID: 550-113026-1 MS
Matrix: Water
Analysis Batch: 162387

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	
										%Rec.	Limit
Lead	ND		0.100	0.0855		mg/L		85	70 - 130		

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 161641

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Barium	0.014	B7	0.100	0.114		mg/L		100	70 - 130	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 161641

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Cadmium	ND		0.100	0.0924		mg/L		92	70 - 130	1	20
Cobalt	0.00056		0.100	0.0968		mg/L		96	70 - 130	1	20
Molybdenum	0.0070		0.100	0.114		mg/L		107	70 - 130	1	20
Selenium	0.0035		0.100	0.133		mg/L		129	70 - 130	1	20
Thallium	0.00010		0.100	0.0885		mg/L		88	70 - 130	0	20

Method: 200.8 LL - Metals (ICP/MS) - DL

Lab Sample ID: 550-113026-1 MSD
Matrix: Water
Analysis Batch: 162387

Client Sample ID: FC-CCR-MW7-11418
Prep Type: Total/NA
Prep Batch: 161587

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Lead - DL	ND		0.100	0.0853		mg/L		85	70 - 130	0	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

HPLC/IC

Analysis Batch: 161852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	300.0	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	300.0	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	300.0	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	300.0	
MB 550-161852/1042	Method Blank	Total/NA	Water	300.0	
LCS 550-161852/73	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161852/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113012-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	300.0	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	300.0	

Metals

Prep Batch: 161452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.7	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	200.7	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	200.7	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	200.7	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	200.7	
MB 550-161452/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-161452/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-161452/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.7	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	200.7	
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	200.7	
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	200.7	

Prep Batch: 161587

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.8	
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	200.8	
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	200.8	
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	200.8	
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	200.8	
MB 550-161587/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-161587/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-161587/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.8	
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	200.8	
550-113026-1 MSD - DL	FC-CCR-MW7-11418	Total/NA	Water	200.8	

Analysis Batch: 161641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.8 LL	161587
MB 550-161587/1-A	Method Blank	Total/NA	Water	200.8 LL	161587
LCS 550-161587/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	161587
LCSD 550-161587/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	161587

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
 Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Metals (Continued)

Analysis Batch: 161641 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.8 LL	161587
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	200.8 LL	161587

Analysis Batch: 161800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	200.7 Rev 4.4	161452
MB 550-161452/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	161452
LCS 550-161452/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	161452
LCSD 550-161452/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-1 MSD	FC-CCR-MW7-11418	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-4 MS	FC-CCR-MW75-11318	Total/NA	Water	200.7 Rev 4.4	161452
550-113026-4 MSD	FC-CCR-MW75-11318	Total/NA	Water	200.7 Rev 4.4	161452

Analysis Batch: 162387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113026-1	FC-CCR-MW7-11418	Total/NA	Water	200.8 LL	161587
550-113026-2	FC-CCR-MW8-11418	Total/NA	Water	200.8 LL	161587
550-113026-3	FC-CCR-MW61-11318	Total/NA	Water	200.8 LL	161587
550-113026-4	FC-CCR-MW75-11318	Total/NA	Water	200.8 LL	161587
550-113026-5	FC-CCR-MW49A-11418	Total/NA	Water	200.8 LL	161587
MB 550-161587/1-A	Method Blank	Total/NA	Water	200.8 LL	161587
LCS 550-161587/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	161587
LCSD 550-161587/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	161587
550-113026-1 MS	FC-CCR-MW7-11418	Total/NA	Water	200.8 LL	161587
550-113026-1 MSD - DL	FC-CCR-MW7-11418	Total/NA	Water	200.8 LL	161587

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Client Sample ID: FC-CCR-MW7-11418

Date Collected: 11/04/18 09:02

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113026-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 10:53	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 13:31	ARE	TAL PHX
Total/NA	Prep	200.8			161587	11/11/18 11:15	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161641	11/12/18 12:31	TEK	TAL PHX
Total/NA	Prep	200.8			161587	11/11/18 11:15	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:10	TEK	TAL PHX

Client Sample ID: FC-CCR-MW8-11418

Date Collected: 11/04/18 08:19

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113026-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 15:38	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 13:54	ARE	TAL PHX
Total/NA	Prep	200.8			161587	11/11/18 11:15	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:17	TEK	TAL PHX

Client Sample ID: FC-CCR-MW61-11318

Date Collected: 11/03/18 14:44

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113026-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 16:15	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 14:00	ARE	TAL PHX
Total/NA	Prep	200.8			161587	11/11/18 11:15	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:19	TEK	TAL PHX

Client Sample ID: FC-CCR-MW75-11318

Date Collected: 11/03/18 15:25

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113026-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161852	11/14/18 19:49	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 13:48	ARE	TAL PHX
Total/NA	Prep	200.8			161587	11/11/18 11:15	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:22	TEK	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Client Sample ID: FC-CCR-MW49A-11418

Lab Sample ID: 550-113026-5

Date Collected: 11/04/18 09:59

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 15:02	NEL	TAL PHX
Total/NA	Prep	200.7			161452	11/09/18 07:33	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161800	11/13/18 14:06	ARE	TAL PHX
Total/NA	Prep	200.8			161587	11/11/18 11:15	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:24	TEK	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-2

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Chain of Custody Record

phone 602.437.3340 fax 623.445.6192

TestAmerica Laboratories, Inc.

Client Contact: **Project Manager: Doug Lavarney** Site Contact: **Doug Lavarney** Date: **11/7/2018**

PO Box 355, MS 4915 Tel/Fax: **928-587-0319** Lab Contact: **Ken Baker** Carrier:

Fulland, NM 87416 Calendar (C) or Work Days (W) **113026** Job No. **113026**

Phone: FAX: 2 weeks 1 week 2 days 1 day
 Project Name: **CCR** E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample
FC-CCR-MW7-11418	11/4/2018	902	G	W	4	N X X X X X
FC-CCR-MW8-11418	11/4/2018	819	G	W	4	N X X X X X
FC-CCR-MW61-11318	11/3/2018	1444	G	W	4	N X X X X X
FC-CCR-MW75-11318	11/3/18	1525	G	W	4	N X X X X X
FC-CCR-MW49A-11418	11/4/18	959	G	W	4	N X X X X X

Sample Specific Notes:

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Link

Special Instructions/QC Requirements & Comments:

Method 200.8 with collision cell
 Radium analyzed by Radiation Safety

Relinquished by: **Dave Lavarney** Company: **APS** Date/Time: **11/7/2018** Received by: **Ken Baker** Company: **Test** Date/Time: **11/7/18 5:05a**

Relinquished by: **Dave Lavarney** Company: **APS** Date/Time: **11/7/2018** Received by: **Ken Baker** Company: **Test** Date/Time: **11-7-18 1300**

Relinquished by: **Dave Lavarney** Company: **APS** Date/Time: **11/7/2018** Received by: **Ken Baker** Company: **Test** Date/Time: **11-7-18 1300**

3.6%, 2.9%) R2

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113026-2

Login Number: 113026

List Source: TestAmerica Phoenix

List Number: 1

Creator: Maycock, Lisa

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113026-3

Client Project/Site: APS - Four Corners CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/20/2018 10:25:17 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

TotalAccess

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Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-3

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-3

Job ID: 550-113026-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-113026-3

Comments

No additional comments.

Receipt

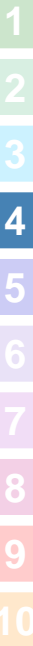
The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.9° C and 3.6° C.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.



Sample Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113026-1	FC-CCR-MW7-11418	Water	11/04/18 09:02	11/07/18 13:00
550-113026-2	FC-CCR-MW8-11418	Water	11/04/18 08:19	11/07/18 13:00
550-113026-3	FC-CCR-MW61-11318	Water	11/03/18 14:44	11/07/18 13:00
550-113026-4	FC-CCR-MW75-11318	Water	11/03/18 15:25	11/07/18 13:00
550-113026-5	FC-CCR-MW49A-11418	Water	11/04/18 09:59	11/07/18 13:00

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-3

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: APS - Four Corners CCR

TestAmerica Job ID: 550-113026-3

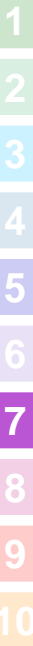
Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

Protocol References:

None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225





Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

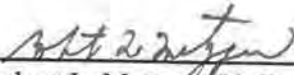
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 04, 2018
Sample Received: November 08, 2018
Analysis Completed: November 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW7-11418 (550-113026-1)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Robert L. Metzger, Ph.D., C.H.P.

11/19/2018

Date

Laboratory License Number AZ0462

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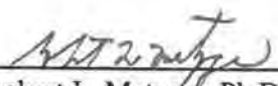
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 04, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW8-11418 (550-113026-2)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/19/2018
 Date
 Laboratory License Number AZ0462

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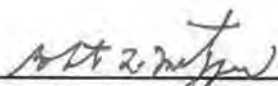
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 03, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW61-11318 (550-113026-3)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/19/2018
 Date
 Laboratory License Number AZ0462



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Website: www.radsafe.com

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FAX (480) 892-5446

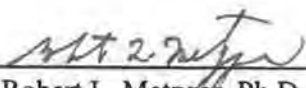
Radiochemical Activity in Water (pCi/L)

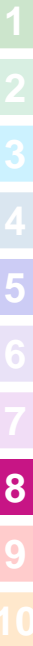
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW75-11318 (550-113026-4)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/19/2018
 Date
 Laboratory License Number AZ0462



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Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
 Website: www.radsafe.com

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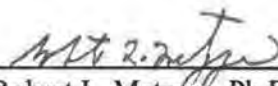
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 04, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 19, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW49A-11418 (550-113026-5)	< 0.5	1.4 ± 0.3	1.4 ± 0.3

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/19/2018
 Date
 Laboratory License Number AZ0462

TestAmerica Phoenix
 4625 East Cotton Cir Blvd Suite 189
 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)		Sampler: Lab PM: Baker, Ken	
Client Contact: Shipping/Receiving		E-Mail: ken.baker@testamericainc.com	
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona	
Address: 3245 North Washington Street,		Carrier Tracking No(s):	
City: Chandler	State: AZ	COC No: 550-22779.1	
Zip: 85225	Phone:	Page: Page 1 of 1	
Email:	Project #:	Job #: 550-113026-1	
Project Name: APS - Four Corners CCR	Site: Arizona Public Service	Preservation Codes:	
Project #: 55009706	SSON#:	A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - Adh/O2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Azotone V - NCA W - pH 4.5 X - other (specify)	
Due Date Requested: 11/16/2018		Analysis Requested	
TAT Requested (days):		Total Number of Containers	
PO #:	Field Filtered Sample (Yes or No)	SUB (Radium 226/228) Radium 226/228	
WO #:	Form MS/MSD (Yes or No)		
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Snow/Ice, Other)
11/4/18	09:02 Arizona	Water	Water
11/4/18	08:19 Arizona	Water	Water
11/3/18	14:44 Arizona	Water	Water
11/3/18	15:25 Arizona	Water	Water
11/4/18	09:59 Arizona	Water	Water
Sample Identification - Client ID (Lab ID)		Special Instructions/Note:	
FC-CCR-MW7-11418 (550-113026-1) # 61256		Job 3	
FC-CCR-MW8-11418 (550-113026-2) # 61257		Job 3	
FC-CCR-MW61-11318 (550-113028-3) # 61258		Job 3	
FC-CCR-MW75-11318 (550-113026-4) # 61259		Job 3	
FC-CCR-MW49A-11418 (550-113026-5) # 61260		Job 3	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/method/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification

Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) _____ Primary Deliverable Rank: 2
 Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: M. Mathis Date/Time: 11/18/18 09:51A Company: DCS Company
 Relinquished by: _____ Date/Time: _____ Company: _____
 Custody Seal Intact: _____ Custody Seal No.: _____
 Δ Yes Δ No

Received by: Scarlett D. Cantu Date/Time: 11/18/18 9:51 Company: USE Company
 Received by: _____ Date/Time: _____ Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Cooler Temperature(s): °C and Other Remarks: _____


Special Instructions/OC Requirements: _____
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Method of Shipment: _____
 Time: _____



Chain of Custody Record

phone 602.437.3340 fax 623.445.6192

TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Doug Lavarrway		Site Contact: Doug Lavarrway		Date: 11/7/2018		COC No: 1 of 1 COCS	
APPS Four Corners		Tel/Fax: 928-288-1394		Lab Contact: Ken Baker		Carrier:		Job No. 113026	
PO Box 355, MS 4915		Analysis Turnaround Time		Perform MS / MSD (Y / N)		EPA 200.7 (B, Ca)		EPA 300.0 (Cl, F, SO4)	
Fruitland, NM 87416		Calendar (C) or Work Days (W) _____		SM 2540C (TDS)		SM 4500-HB (pH)		SDG No.	
Phone:		TAT if different from Below _____ 7 Days _____		EPA 200.7 (B, Ca)		EPA 300.0 (Cl, F, SO4)		SM 2540C (TDS)	
Fax:		<input type="checkbox"/> 2 weeks		SM 2540C (TDS)		SM 4500-HB (pH)		SM 4500-HB (pH)	
Project Name: CCR		<input type="checkbox"/> 1 week		SM 4500-HB (pH)		SM 4500-HB (pH)		SM 4500-HB (pH)	
E-Mail Address:		<input type="checkbox"/> 2 days		SM 4500-HB (pH)		SM 4500-HB (pH)		SM 4500-HB (pH)	
		<input type="checkbox"/> 1 day		SM 4500-HB (pH)		SM 4500-HB (pH)		SM 4500-HB (pH)	
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Sample Specific Notes		
FC-CCR-MW7-11418	11/4/2018	902	G	W	2	N	X	X	X
FC-CCR-MW8-11418	11/4/2018	819	G	W	2	N	X	X	X
FC-CCR-MW61-11318	11/3/2018	1444	G	W	2	N	X	X	X
FC-CCR-MW75-11318	11/3/18	1525	G	W	2	N	X	X	X
FC-CCR-MW49A-11418	11/4/18	959	G	W	2	N	X	X	X
<p>Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____</p> <p>Possible Hazard Identification: <input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown</p> <p>Special Instructions/QC Requirements & Comments: Need Fluoride reporting limit ≤ 0.8 mg/L</p>									
<p>Relinquished by: Doug Lavarrway Company: APPS Date/Time: 11/7/2018 Received by: [Signature] Company: [Signature] Date/Time: 11/7/18 8:05am</p> <p>Relinquished by: Company: Date/Time: Received by: [Signature] Company: [Signature] Date/Time: 11-7-18 1500</p>									
<p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</p> <p><input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months</p> <p>3.6 (290C) PC</p> <p>550-113026 Chain of Custody</p> 									

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113026-3

Login Number: 113026

List Source: TestAmerica Phoenix

List Number: 1

Creator: Maycock, Lisa

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-115113-1

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

1/21/2019 12:23:02 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Job ID: 550-115113-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-115113-1

Comments

No additional comments.

Receipt

The samples were received on 12/18/2018 12:33 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.2° C and 3.7° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW38R-121518 (550-115113-2), FC-CCR-MW57-121518 (550-115113-3), FC-CCR-MW17R-121718 (550-115113-5), FC-CCR-DMX4-121618 (550-115113-6), FC-CCR-FD02-121618 (550-115113-7), FC-CCR-MW56-121618 (550-115113-8) and FC-CCR-MW15-121618 (550-115113-9). The samples contained high concentrations of Chloride and Sulfate which exceeded the instrument's maximum column capacity. Fluoride was not detected in the diluted samples. As such, elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-115113-1	FC-CCR-MW75-121518	Water	12/15/18 16:27	12/18/18 12:33
550-115113-2	FC-CCR-MW38R-121518	Water	12/15/18 14:14	12/18/18 12:33
550-115113-3	FC-CCR-MW57-121518	Water	12/15/18 13:15	12/18/18 12:33
550-115113-4	FC-CCR-MW61-121518	Water	12/15/18 15:39	12/18/18 12:33
550-115113-5	FC-CCR-MW17R-121718	Water	12/17/18 07:47	12/18/18 12:33
550-115113-6	FC-CCR-DMX4-121618	Water	12/16/18 12:41	12/18/18 12:33
550-115113-7	FC-CCR-FD02-121618	Water	12/16/18 12:41	12/18/18 12:33
550-115113-8	FC-CCR-MW56-121618	Water	12/16/18 14:17	12/18/18 12:33
550-115113-9	FC-CCR-MW15-121618	Water	12/16/18 09:51	12/18/18 12:33

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW75-121518

Lab Sample ID: 550-115113-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	280	D2	200	mg/L	100		300.0	Total/NA
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	4300	D2	400	mg/L	200		300.0	Total/NA
Boron	25	M3	0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	450	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	220	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	21		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1200	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	87		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	87		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	6600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	440	D2	400	mg/L	200		300.0	Total/NA
Sulfate	8900	D2	400	mg/L	200		300.0	Total/NA
Boron	19		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	410		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	680		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	39		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2500	D2	2.0	mg/L	4		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	270		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	270		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	13000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.6	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	7.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	510	D2	400	mg/L	200		300.0	Total/NA
Sulfate	7800	D2	400	mg/L	200		300.0	Total/NA
Boron	2.1		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	430		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	610		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	42		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2200		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	470		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	470		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	12000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	310	D2	200	mg/L	100		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW61-121518 (Continued)

Lab Sample ID: 550-115113-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3500	D2	400	mg/L	200		300.0	Total/NA
Boron	40		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	490		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	20		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1000		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	85		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	75		6.0	mg/L	1		SM 2320B	Total/NA
Carbonate Alkalinity as CaCO3	9.8		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	5500	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW17R-121718

Lab Sample ID: 550-115113-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	400	D2	400	mg/L	200		300.0	Total/NA
Sulfate	4000	D2	400	mg/L	200		300.0	Total/NA
Boron	38		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	450		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	260		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	19		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1000		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	130		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	130		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	6200	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	780	D2	400	mg/L	200		300.0	Total/NA
Sulfate	9100	D2	400	mg/L	200		300.0	Total/NA
Boron	2.6		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	420		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	730		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	40		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2800	D2	2.0	mg/L	4		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	380		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	380		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	15000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD02-121618

Lab Sample ID: 550-115113-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	790	D2	400	mg/L	200		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-FD02-121618 (Continued)

Lab Sample ID: 550-115113-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	9300	D2	400	mg/L	200		300.0	Total/NA
Boron	2.5		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	420		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	720		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	40		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2900	D2	2.0	mg/L	4		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	390		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	390		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	14000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	10.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1500	D2	400	mg/L	200		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	3.0		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	420		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1300	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	54		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	3400	D2	2.0	mg/L	4		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	650		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	650		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	19000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	10.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	990	D2	400	mg/L	200		300.0	Total/NA
Sulfate	6500	D2	400	mg/L	200		300.0	Total/NA
Boron	8.8		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	440		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	550		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	38		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2100		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	610		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	610		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	12000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW75-121518

Lab Sample ID: 550-115113-1

Date Collected: 12/15/18 16:27

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	280	D2	200	mg/L			12/27/18 00:41	100
Fluoride	1.2	D1	0.80	mg/L			12/22/18 03:57	2
Sulfate	4300	D2	400	mg/L			12/22/18 04:52	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	25	M3	0.050	mg/L		12/20/18 10:34	12/29/18 02:09	1
Calcium	450	M3	2.0	mg/L		12/20/18 10:34	12/27/18 11:56	1
Magnesium	220	M3	2.0	mg/L		12/20/18 10:34	12/27/18 11:56	1
Potassium	21		0.50	mg/L		12/20/18 10:34	12/27/18 11:56	1
Sodium	1200	M3	0.50	mg/L		12/20/18 10:34	12/27/18 11:56	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	87		6.0	mg/L			12/19/18 14:35	1
Bicarbonate Alkalinity as CaCO3	87		6.0	mg/L			12/19/18 14:35	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:35	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 14:35	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:35	1
Total Dissolved Solids	6600	D2	100	mg/L			12/19/18 11:51	1
pH	8.4	H5	1.7	SU			12/27/18 14:17	1
Temperature	12.6	H5	0.1	Degrees C			12/27/18 14:17	1

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Date Collected: 12/15/18 14:14

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	440	D2	400	mg/L			12/22/18 01:48	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 01:30	2
Sulfate	8900	D2	400	mg/L			12/22/18 01:48	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	19		0.050	mg/L		12/20/18 10:34	12/29/18 03:22	1
Calcium	410		2.0	mg/L		12/20/18 10:34	12/27/18 12:45	1
Magnesium	680		2.0	mg/L		12/20/18 10:34	12/27/18 12:45	1
Potassium	39		0.50	mg/L		12/20/18 10:34	12/27/18 12:45	1
Sodium	2500	D2	2.0	mg/L		12/20/18 10:34	12/29/18 03:16	4

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	270		6.0	mg/L			12/19/18 14:53	1
Bicarbonate Alkalinity as CaCO3	270		6.0	mg/L			12/19/18 14:53	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:53	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 14:53	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:53	1
Total Dissolved Solids	13000	D2	100	mg/L			12/19/18 11:51	1
pH	7.6	H5	1.7	SU			12/26/18 14:18	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Date Collected: 12/15/18 14:14

Matrix: Water

Date Received: 12/18/18 12:33

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	7.8	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Date Collected: 12/15/18 13:15

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	510	D2	400	mg/L			12/22/18 02:25	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 02:06	2
Sulfate	7800	D2	400	mg/L			12/22/18 02:25	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.1		0.050	mg/L		12/20/18 10:34	12/29/18 03:28	1
Calcium	430		2.0	mg/L		12/20/18 10:34	12/27/18 12:51	1
Magnesium	610		2.0	mg/L		12/20/18 10:34	12/27/18 12:51	1
Potassium	42		0.50	mg/L		12/20/18 10:34	12/27/18 12:51	1
Sodium	2200		0.50	mg/L		12/20/18 10:34	12/27/18 12:51	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	470		6.0	mg/L			12/19/18 15:03	1
Bicarbonate Alkalinity as CaCO3	470		6.0	mg/L			12/19/18 15:03	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:03	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 15:03	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:03	1
Total Dissolved Solids	12000	D2	100	mg/L			12/19/18 11:51	1
pH	7.5	H5	1.7	SU			12/26/18 14:18	1
Temperature	9.6	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Date Collected: 12/15/18 15:39

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	310	D2	200	mg/L			12/26/18 23:27	100
Fluoride	1.3	D1	0.80	mg/L			12/22/18 02:43	2
Sulfate	3500	D2	400	mg/L			12/22/18 03:02	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	40		0.050	mg/L		12/20/18 10:34	12/29/18 03:39	1
Calcium	490		2.0	mg/L		12/20/18 10:34	12/27/18 12:57	1
Magnesium	120		2.0	mg/L		12/20/18 10:34	12/27/18 12:57	1
Potassium	20		0.50	mg/L		12/20/18 10:34	12/27/18 12:57	1
Sodium	1000		0.50	mg/L		12/20/18 10:34	12/27/18 12:57	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Date Collected: 12/15/18 15:39

Matrix: Water

Date Received: 12/18/18 12:33

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	85		6.0	mg/L			12/19/18 15:11	1
Bicarbonate Alkalinity as CaCO3	75		6.0	mg/L			12/19/18 15:11	1
Carbonate Alkalinity as CaCO3	9.8		6.0	mg/L			12/19/18 15:11	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 15:11	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:11	1
Total Dissolved Solids	5500	D2	100	mg/L			12/19/18 11:51	1
pH	8.7	H5	1.7	SU			12/26/18 14:18	1
Temperature	9.8	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW17R-121718

Lab Sample ID: 550-115113-5

Date Collected: 12/17/18 07:47

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	400	D2	400	mg/L			12/22/18 07:56	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 07:38	2
Sulfate	4000	D2	400	mg/L			12/22/18 07:56	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	38		0.050	mg/L		12/20/18 10:34	12/29/18 03:45	1
Calcium	450		2.0	mg/L		12/20/18 10:34	12/27/18 13:03	1
Magnesium	260		2.0	mg/L		12/20/18 10:34	12/27/18 13:03	1
Potassium	19		0.50	mg/L		12/20/18 10:34	12/27/18 13:03	1
Sodium	1000		0.50	mg/L		12/20/18 10:34	12/27/18 13:03	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	130		6.0	mg/L			12/19/18 15:19	1
Bicarbonate Alkalinity as CaCO3	130		6.0	mg/L			12/19/18 15:19	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:19	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 15:19	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:19	1
Total Dissolved Solids	6200	D2	100	mg/L			12/19/18 11:56	1
pH	7.5	H5	1.7	SU			12/26/18 14:18	1
Temperature	9.6	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	780	D2	400	mg/L			12/22/18 08:33	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 08:15	2
Sulfate	9100	D2	400	mg/L			12/22/18 08:33	200

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.6		0.050	mg/L		12/20/18 10:34	12/29/18 03:57	1
Calcium	420		2.0	mg/L		12/20/18 10:34	12/27/18 13:09	1
Magnesium	730		2.0	mg/L		12/20/18 10:34	12/27/18 13:09	1
Potassium	40		0.50	mg/L		12/20/18 10:34	12/27/18 13:09	1
Sodium	2800	D2	2.0	mg/L		12/20/18 10:34	12/29/18 03:51	4

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	380		6.0	mg/L			12/19/18 15:30	1
Bicarbonate Alkalinity as CaCO3	380		6.0	mg/L			12/19/18 15:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 15:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:30	1
Total Dissolved Solids	15000	D2	100	mg/L			12/19/18 11:51	1
pH	7.7	H5	1.7	SU			12/26/18 14:18	1
Temperature	9.8	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-FD02-121618

Lab Sample ID: 550-115113-7

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	790	D2	400	mg/L			12/22/18 09:10	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 08:51	2
Sulfate	9300	D2	400	mg/L			12/22/18 09:10	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5		0.050	mg/L		12/20/18 10:34	12/29/18 04:09	1
Calcium	420		2.0	mg/L		12/20/18 10:34	12/27/18 13:20	1
Magnesium	720		2.0	mg/L		12/20/18 10:34	12/27/18 13:20	1
Potassium	40		0.50	mg/L		12/20/18 10:34	12/27/18 13:20	1
Sodium	2900	D2	2.0	mg/L		12/20/18 10:34	12/29/18 04:03	4

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	390		6.0	mg/L			12/19/18 15:40	1
Bicarbonate Alkalinity as CaCO3	390		6.0	mg/L			12/19/18 15:40	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:40	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 15:40	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 15:40	1
Total Dissolved Solids	14000	D2	100	mg/L			12/19/18 11:51	1
pH	7.7	H5	1.7	SU			12/26/18 14:18	1
Temperature	10.5	H5	0.1	Degrees C			12/26/18 14:18	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Date Collected: 12/16/18 14:17

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1500	D2	400	mg/L			12/22/18 09:47	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 09:28	2
Sulfate	12000	D2	400	mg/L			12/22/18 09:47	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.0		0.050	mg/L		12/20/18 10:34	12/29/18 04:20	1
Calcium	420		2.0	mg/L		12/20/18 10:34	12/27/18 13:26	1
Magnesium	1300	D2	8.0	mg/L		12/20/18 10:34	12/29/18 04:15	4
Potassium	54		0.50	mg/L		12/20/18 10:34	12/27/18 13:26	1
Sodium	3400	D2	2.0	mg/L		12/20/18 10:34	12/29/18 04:15	4

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	650		6.0	mg/L			12/19/18 16:24	1
Bicarbonate Alkalinity as CaCO3	650		6.0	mg/L			12/19/18 16:24	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:24	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 16:24	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:24	1
Total Dissolved Solids	19000	D2	200	mg/L			12/19/18 11:51	1
pH	7.1	H5	1.7	SU			12/26/18 14:18	1
Temperature	10.1	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Date Collected: 12/16/18 09:51

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	990	D2	400	mg/L			12/22/18 10:23	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 10:05	2
Sulfate	6500	D2	400	mg/L			12/22/18 10:23	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	8.8		0.050	mg/L		12/20/18 10:34	12/29/18 04:26	1
Calcium	440		2.0	mg/L		12/20/18 10:34	12/27/18 13:32	1
Magnesium	550		2.0	mg/L		12/20/18 10:34	12/27/18 13:32	1
Potassium	38		0.50	mg/L		12/20/18 10:34	12/27/18 13:32	1
Sodium	2100		0.50	mg/L		12/20/18 10:34	12/27/18 13:32	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	610		6.0	mg/L			12/19/18 16:36	1
Bicarbonate Alkalinity as CaCO3	610		6.0	mg/L			12/19/18 16:36	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:36	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 16:36	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:36	1
Total Dissolved Solids	12000	D2	100	mg/L			12/19/18 11:51	1
pH	7.2	H5	1.7	SU			12/26/18 14:18	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Date Collected: 12/16/18 09:51

Matrix: Water

Date Received: 12/18/18 12:33

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	11.2	H5	0.1	Degrees C			12/26/18 14:18	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-165329/2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			12/21/18 19:03	1
Fluoride	ND		0.40	mg/L			12/21/18 19:03	1
Sulfate	ND		2.0	mg/L			12/21/18 19:03	1

Lab Sample ID: LCS 550-165329/5
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.9		mg/L		105	90 - 110
Fluoride	4.00	4.06		mg/L		101	90 - 110
Sulfate	20.0	20.0		mg/L		100	90 - 110

Lab Sample ID: LCSD 550-165329/6
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.0		mg/L		105	90 - 110	0	20
Fluoride	4.00	4.06		mg/L		101	90 - 110	0	20
Sulfate	20.0	20.1		mg/L		100	90 - 110	0	20

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 165329

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.2		8.00	9.53	D1	mg/L		103	80 - 120

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 165329

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	4300	D2	4000	8450	D2	mg/L		103	80 - 120

Lab Sample ID: 550-115113-1 MSD
Matrix: Water
Analysis Batch: 165329

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.2		8.00	9.49	D1	mg/L		103	80 - 120	0	20

Lab Sample ID: 550-115113-1 MSD
Matrix: Water
Analysis Batch: 165329

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	4300	D2	4000	8420	D2	mg/L		102	80 - 120	NC	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-115114-B-1 MS ^200

Matrix: Water

Analysis Batch: 165329

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	3400	D2	4000	7370	D2	mg/L		100	80 - 120

Lab Sample ID: 550-115114-B-1 MSD ^200

Matrix: Water

Analysis Batch: 165329

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	3400	D2	4000	7350	D2	mg/L		100	80 - 120	0	20

Lab Sample ID: 550-115115-B-1 MS ^200

Matrix: Water

Analysis Batch: 165329

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2300	D2	4000	6670	D2	mg/L		109	80 - 120
Sulfate	14000	D2	4000	17200	D2	mg/L		86	80 - 120

Lab Sample ID: 550-115115-B-1 MSD ^200

Matrix: Water

Analysis Batch: 165329

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2300	D2	4000	6640	D2	mg/L		108	80 - 120	0	20
Sulfate	14000	D2	4000	17100	D2	mg/L		84	80 - 120	0	20

Lab Sample ID: MB 550-165473/1024

Matrix: Water

Analysis Batch: 165473

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			12/26/18 20:42	1
Fluoride	ND		0.40	mg/L			12/26/18 20:42	1
Sulfate	ND		2.0	mg/L			12/26/18 20:42	1

Lab Sample ID: LCS 550-165473/25

Matrix: Water

Analysis Batch: 165473

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.3		mg/L		106	90 - 110
Fluoride	4.00	4.09		mg/L		102	90 - 110
Sulfate	20.0	20.3		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-165473/26

Matrix: Water

Analysis Batch: 165473

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.3		mg/L		106	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 550-165473/26
Matrix: Water
Analysis Batch: 165473

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.10		mg/L		102	90 - 110	0	20
Sulfate	20.0	20.3		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	280	D2	2000	2430	D2	mg/L		108	80 - 120

Lab Sample ID: 550-115113-1 MSD
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	280	D2	2000	2430	D2	mg/L		108	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164986/1-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164986

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		2.0	mg/L		12/20/18 10:34	12/27/18 11:36	1
Magnesium	ND		2.0	mg/L		12/20/18 10:34	12/27/18 11:36	1
Potassium	ND		0.50	mg/L		12/20/18 10:34	12/27/18 11:36	1
Sodium	ND		0.50	mg/L		12/20/18 10:34	12/27/18 11:36	1

Lab Sample ID: LCS 550-164986/2-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	21.0	22.0		mg/L		105	85 - 115
Magnesium	21.0	21.2		mg/L		101	85 - 115
Potassium	20.0	20.2		mg/L		101	85 - 115
Sodium	20.0	19.9		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-164986/3-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	21.0	21.6		mg/L		103	85 - 115	2	20
Magnesium	21.0	20.9		mg/L		100	85 - 115	2	20
Potassium	20.0	19.9		mg/L		100	85 - 115	2	20
Sodium	20.0	19.5		mg/L		98	85 - 115	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-115113-1 MS

Matrix: Water

Analysis Batch: 165571

Client Sample ID: FC-CCR-MW75-121518

Prep Type: Total/NA

Prep Batch: 164986

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Calcium	450	M3	21.0	471	M3	mg/L		86	70 - 130
Magnesium	220	M3	21.0	243	M3	mg/L		101	70 - 130
Potassium	21		20.0	42.8		mg/L		107	70 - 130
Sodium	1200	M3	20.0	1250	M3	mg/L		220	70 - 130

Lab Sample ID: 550-115113-1 MS

Matrix: Water

Analysis Batch: 165722

Client Sample ID: FC-CCR-MW75-121518

Prep Type: Total/NA

Prep Batch: 164986

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Boron	25	M3	1.00	25.3	M3	mg/L		34	70 - 130

Lab Sample ID: 550-115113-1 MSD

Matrix: Water

Analysis Batch: 165571

Client Sample ID: FC-CCR-MW75-121518

Prep Type: Total/NA

Prep Batch: 164986

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Calcium	450	M3	21.0	447	M3	mg/L		-32	70 - 130	5	20
Magnesium	220	M3	21.0	229	M3	mg/L		36	70 - 130	6	20
Potassium	21		20.0	40.5		mg/L		95	70 - 130	6	20
Sodium	1200	M3	20.0	1150	M3	mg/L		-278	70 - 130	8	20

Lab Sample ID: 550-115113-1 MSD

Matrix: Water

Analysis Batch: 165722

Client Sample ID: FC-CCR-MW75-121518

Prep Type: Total/NA

Prep Batch: 164986

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Boron	25	M3	1.00	24.4	M3	mg/L		-62	70 - 130	4	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-164955/5

Matrix: Water

Analysis Batch: 164955

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 14:01	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1

Lab Sample ID: LCS 550-164955/4

Matrix: Water

Analysis Batch: 164955

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike	LCS		Unit	D	%Rec	%Rec.
		Result	Qualifier				
Alkalinity as CaCO3	250	249		mg/L		100	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCSD 550-164955/17
Matrix: Water
Analysis Batch: 164955

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	259		mg/L		104	90 - 110	4	20

Lab Sample ID: 550-115104-C-1 DU
Matrix: Water
Analysis Batch: 164955

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	24		26.1		mg/L		6	20
Bicarbonate Alkalinity as CaCO3	24		26.1		mg/L		6	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Lab Sample ID: 550-115113-1 DU
Matrix: Water
Analysis Batch: 164955

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	87		86.6		mg/L		0.9	20
Bicarbonate Alkalinity as CaCO3	87		86.6		mg/L		0.9	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Lab Sample ID: 550-115114-A-1 DU
Matrix: Water
Analysis Batch: 164955

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	250		242		mg/L		1	20
Bicarbonate Alkalinity as CaCO3	250		242		mg/L		1	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-164875/1
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			12/19/18 11:51	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 550-164875/2
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	972		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-164875/3
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	974		mg/L		97	90 - 110	0	10

Lab Sample ID: 550-115113-1 DU
Matrix: Water
Analysis Batch: 164875

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	6600	D2	6310	D2	mg/L		4	10

Lab Sample ID: 550-115114-B-1 DU
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	5200	D2	5060	D2	mg/L		3	10

Lab Sample ID: MB 550-164877/1
Matrix: Water
Analysis Batch: 164877

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			12/19/18 11:56	1

Lab Sample ID: LCS 550-164877/2
Matrix: Water
Analysis Batch: 164877

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	966		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-164877/3
Matrix: Water
Analysis Batch: 164877

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	976		mg/L		98	90 - 110	1	10

Lab Sample ID: 550-115116-A-1 DU
Matrix: Water
Analysis Batch: 164877

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	ND		ND		mg/L		NC	10

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-165356/1
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99.9	98.5 - 101.5

Lab Sample ID: LCSSRM 550-165356/13
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.0	98.5 - 101.5

Lab Sample ID: 550-115114-B-1 DU
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.5	H5	7.5	H5	SU		0.1	5
Temperature	10.6	H5	11.0	H5	Degrees C		4	

Lab Sample ID: LCSSRM 550-165497/1
Matrix: Water
Analysis Batch: 165497

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99.9	98.5 - 101.5

Lab Sample ID: LCSSRM 550-165497/13
Matrix: Water
Analysis Batch: 165497

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.4	98.5 - 101.5

Lab Sample ID: 550-115113-1 DU
Matrix: Water
Analysis Batch: 165497

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	8.4	H5	8.3	H5	SU		0.2	5
Temperature	12.6	H5	11.5	H5	Degrees C		9	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

HPLC/IC

Analysis Batch: 165329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	300.0	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	300.0	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	300.0	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	300.0	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	300.0	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	300.0	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	300.0	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	300.0	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	300.0	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	300.0	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	300.0	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	300.0	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	300.0	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	300.0	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	300.0	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	300.0	
MB 550-165329/2	Method Blank	Total/NA	Water	300.0	
LCS 550-165329/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-165329/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115114-B-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-115114-B-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-115115-B-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-115115-B-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 165473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	300.0	
MB 550-165473/1024	Method Blank	Total/NA	Water	300.0	
LCS 550-165473/25	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-165473/26	Lab Control Sample Dup	Total/NA	Water	300.0	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	300.0	

Metals

Prep Batch: 164986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.7	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.7	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.7	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.7	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Metals (Continued)

Prep Batch: 164986 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.7	
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.7	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.7	

Analysis Batch: 165571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.7 Rev 4.4	164986
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164986
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164986
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986

Analysis Batch: 165722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986

General Chemistry

Analysis Batch: 164875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	SM 2540C	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	SM 2540C	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

General Chemistry (Continued)

Analysis Batch: 164875 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	SM 2540C	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	SM 2540C	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	SM 2540C	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	SM 2540C	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	SM 2540C	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	SM 2540C	
MB 550-164875/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-164875/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-164875/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-115113-1 DU	FC-CCR-MW75-121518	Total/NA	Water	SM 2540C	
550-115114-B-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 164877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	SM 2540C	
MB 550-164877/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-164877/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-164877/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-115116-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 164955

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	SM 2320B	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	SM 2320B	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	SM 2320B	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	SM 2320B	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	SM 2320B	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	SM 2320B	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	SM 2320B	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	SM 2320B	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	SM 2320B	
MB 550-164955/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-164955/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-164955/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-115104-C-1 DU	Duplicate	Total/NA	Water	SM 2320B	
550-115113-1 DU	FC-CCR-MW75-121518	Total/NA	Water	SM 2320B	
550-115114-A-1 DU	Duplicate	Total/NA	Water	SM 2320B	

Analysis Batch: 165356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	SM 4500 H+ B	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	SM 4500 H+ B	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	SM 4500 H+ B	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	SM 4500 H+ B	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	SM 4500 H+ B	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	SM 4500 H+ B	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	SM 4500 H+ B	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165356/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165356/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-115114-B-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Analysis Batch: 165497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165497/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165497/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-115113-1 DU	FC-CCR-MW75-121518	Total/NA	Water	SM 4500 H+ B	

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Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW75-121518

Lab Sample ID: 550-115113-1

Date Collected: 12/15/18 16:27

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 03:57	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 04:52	NEL	TAL PHX
Total/NA	Analysis	300.0		100	165473	12/27/18 00:41	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 11:56	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 02:09	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 14:35	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165497	12/27/18 14:17	MRR	TAL PHX

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Date Collected: 12/15/18 14:14

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 01:30	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 01:48	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:45	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 03:16	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:22	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 14:53	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Date Collected: 12/15/18 13:15

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 02:06	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 02:25	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:51	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Date Collected: 12/15/18 13:15

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:28	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 15:03	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	12/19/18 11:51 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Date Collected: 12/15/18 15:39

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 02:43	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 03:02	NEL	TAL PHX
Total/NA	Analysis	300.0		100	165473	12/26/18 23:27	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:57	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:39	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 15:11	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	12/19/18 11:51 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW17R-121718

Lab Sample ID: 550-115113-5

Date Collected: 12/17/18 07:47

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 07:38	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 07:56	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:03	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:45	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 15:19	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164877	12/19/18 11:56 12/20/18 10:00	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 08:15	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 08:33	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:09	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 03:51	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:57	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 15:30	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-FD02-121618

Lab Sample ID: 550-115113-7

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 08:51	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 09:10	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:20	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:03	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:09	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 15:40	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Date Collected: 12/16/18 14:17

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 09:28	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 09:47	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:26	SRA	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Date Collected: 12/16/18 14:17

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:15	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:20	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 16:24	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875		YET	TAL PHX
					(Start)	12/19/18 11:51		
					(End)	12/20/18 09:05		
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Date Collected: 12/16/18 09:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 10:05	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 10:23	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:32	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:26	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 16:36	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875		YET	TAL PHX
					(Start)	12/19/18 11:51		
					(End)	12/20/18 09:05		
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-1
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2320B	Alkalinity	SM	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

115113



Regulatory Program: **CCR**

CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarrway	Lab Contact:	Doug Lavarrway	Carrier:	12/17/2018	COC No:	1 of 1 COCS
4801 Cholla Lake Road	928-587-0319	Perform MS / MSD (Y / N)					
Joseph City, Az 86032		EPA 200.7 (Li, Mg, SiO2)					
(928) 587-0319	Phone	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti)					
(xxx) xxx-xxxx	FAX	EPA 300.0 (F)					
Project Name: CCR							
Site: Cholla							
P O #							

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)		Perform MS / MSD (Y / N)	
						Y	N	Y	N
-1	12/15/2018	1627	G	W	2	X	X	X	X
-2	12/15/2018	1414	G	W	2	X	X	X	X
-3	12/15/2018	1315	G	W	2	X	X	X	X
-4	12/15/2018	1539	G	W	2	X	X	X	X
-5	12/17/2018	747	G	W	2	X	X	X	X
-6	12/16/2018	1241	G	W	2	X	X	X	X
-7	12/16/2018	1241	G	W	2	X	X	X	X
-8	12/16/2018	1417	G	W	2	X	X	X	X
-9	12/16/2018	951	G	W	2	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments: Method 200.8 with collision cell.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Return to Client Disposal by Lab Archive for _____ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Custody Seals Intact:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:		Cooler Temp. (°C):	Obs'd:	Corrd:	22	Therm ID No.:	3.7
Relinquished by:	Doug Lavarrway	Company:	APS	Date/Time:	12/18/2018	Received by:		Company:	TAPHX
Relinquished by:		Company:		Date/Time:		Received in Laboratory by:		Company:	
Relinquished by:		Company:		Date/Time:				Date/Time:	12/18/18 12:33

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Phoenix

4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

115113



TestAmerica Laboratories, Inc.

1/21/2019

Regulatory Program:

CCR

Client Contact

Doug Lavarrway

Doug Lavarrway

Carrier:

12/17/2018

COC No: 1 of 1 COCs

4801 Cholla Lake Road

Joseph City, Az 86032

Analysis Turnaround Time

Lab Contact:

Carrier:

Sampler:

(928) 587-0319

Phone

TAT if different from Below

For Lab Use Only:

Carrier:

Walk-in Client

(xxx) xxx-xxxx

FAX

Project Name: CCR

Lab Sampling:

Carrier:

Job / SDG No.:

Site: Cholla

P O #

Filtered Sample (Y / N)

Carrier:

Sample Specific Notes:

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	EPA 200.7 Rev 4.4 (B, Ca, Na, K, Mg)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)	SM 2320B (HCO3)	Alkalinity	Carbonate as CaCO3	Bicarbonate as CaCO3
-1 FC-CCR-MW75-121518	12/15/2018	1627 G		W	2	N	X	X	X	X	X	X	X	X	X
-2 FC-CCR-MW39R-121518	12/15/2018	1414 G		W	2	N	X	X	X	X	X	X	X	X	X
-3 FC-CCR-MW57-121518	12/15/2018	1315 G		W	2	N	X	X	X	X	X	X	X	X	X
-4 FC-CCR-MW61-121518	12/15/2018	1539 G		W	2	N	X	X	X	X	X	X	X	X	X
-5 FC-CCR-MW17R-121718	12/17/2018	747 G		W	2	N	X	X	X	X	X	X	X	X	X
-6 FC-CCR-DMX4-121618	12/16/2018	1241 G		W	2	N	X	X	X	X	X	X	X	X	X
-7 FC-CCR-FD02-121618	12/16/2018	1241 G		W	2	N	X	X	X	X	X	X	X	X	X
-8 FC-CCR-MW56-121618	12/16/2018	1417 G		W	2	N	X	X	X	X	X	X	X	X	X
-9 FC-CCR-MW15-121618	12/16/2018	951 G		W	2	N	X	X	X	X	X	X	X	X	X

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=NaOH, 6= Other

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please list any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments:

Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No

Relinquished by: *Doug Lavarrway* Company: *APS* Date/Time: *12/18/2018 03:33* Received by: *[Signature]* Date/Time: *12/18/18 12:13P*

Relinquished by: _____ Company: _____ Date/Time: _____

Cooler Temp. (°C): Obs'd: _____ Term ID No: _____

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115113-1

SDG Number: Cholla

Login Number: 115113

List Number: 1

Creator: Maycock, Lisa

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-115113-2

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

1/21/2019 1:17:31 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

Total Access

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Job ID: 550-115113-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-115113-2

Comments

No additional comments.

Receipt

The samples were received on 12/18/2018 12:33 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.2° C and 3.7° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW38R-121518 (550-115113-2), FC-CCR-MW57-121518 (550-115113-3), FC-CCR-MW17R-121718 (550-115113-5), FC-CCR-DMX4-121618 (550-115113-6), FC-CCR-FD02-121618 (550-115113-7), FC-CCR-MW56-121618 (550-115113-8) and FC-CCR-MW15-121618 (550-115113-9). The samples contained high concentrations of Chloride and Sulfate which exceeded the instrument's maximum column capacity. Fluoride was not detected in the diluted samples. As such, elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-115113-1	FC-CCR-MW75-121518	Water	12/15/18 16:27	12/18/18 12:33
550-115113-2	FC-CCR-MW38R-121518	Water	12/15/18 14:14	12/18/18 12:33
550-115113-3	FC-CCR-MW57-121518	Water	12/15/18 13:15	12/18/18 12:33
550-115113-4	FC-CCR-MW61-121518	Water	12/15/18 15:39	12/18/18 12:33
550-115113-5	FC-CCR-MW17R-121718	Water	12/17/18 07:47	12/18/18 12:33
550-115113-6	FC-CCR-DMX4-121618	Water	12/16/18 12:41	12/18/18 12:33
550-115113-7	FC-CCR-FD02-121618	Water	12/16/18 12:41	12/18/18 12:33
550-115113-8	FC-CCR-MW56-121618	Water	12/16/18 14:17	12/18/18 12:33
550-115113-9	FC-CCR-MW15-121618	Water	12/16/18 09:51	12/18/18 12:33

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW75-121518

Lab Sample ID: 550-115113-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.41		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	220		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	6.9		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.022	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.046	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.17	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.026	D1 M1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.80		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	680		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	17		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.026	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.093	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.044	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.80		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	610		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	17		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.023	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.022	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	7.7		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.019	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.022	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.10	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.023	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW17R-121718

Lab Sample ID: 550-115113-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.41		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	260		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	14		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.027	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.091	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.019	D1	0.010	mg/L	20		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.67		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	730		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	11		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.016	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.013	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.027	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD02-121618

Lab Sample ID: 550-115113-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.66		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	720		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	11		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.015	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.013	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.026	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.1		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1300	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	20		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.029	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.21	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.91		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	550		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	14		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.022	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.016	D1	0.010	mg/L	20		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW75-121518

Lab Sample ID: 550-115113-1

Date Collected: 12/15/18 16:27

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.2	D1	0.80	mg/L			12/22/18 03:57	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.41		0.20	mg/L		12/20/18 10:34	12/27/18 11:56	1
Magnesium	220		2.0	mg/L		12/20/18 10:34	12/27/18 11:56	1
SiO2, Silica	6.9		0.21	mg/L		12/20/18 10:34	12/29/18 02:09	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:02	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:18	20
Barium	0.022	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:18	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:02	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:02	20
Cobalt	0.046	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:02	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:02	20
Molybdenum	0.17	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:02	20
Selenium	0.026	D1 M1	0.010	mg/L		12/19/18 10:53	01/16/19 01:02	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:02	20

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Date Collected: 12/15/18 14:14

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 01:30	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.80		0.20	mg/L		12/20/18 10:34	12/27/18 12:45	1
Magnesium	680		2.0	mg/L		12/20/18 10:34	12/27/18 12:45	1
SiO2, Silica	17		0.21	mg/L		12/20/18 10:34	12/29/18 03:22	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:08	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:25	20
Barium	0.026	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:25	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:08	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:08	20
Cobalt	0.093	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:08	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:08	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:08	20
Selenium	0.044	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:08	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:08	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Date Collected: 12/15/18 13:15

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 02:06	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.80		0.20	mg/L		12/20/18 10:34	12/27/18 12:51	1
Magnesium	610		2.0	mg/L		12/20/18 10:34	12/27/18 12:51	1
SiO2, Silica	17		0.21	mg/L		12/20/18 10:34	12/29/18 03:28	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:11	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:27	20
Barium	0.023	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:27	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:11	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:11	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:11	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:11	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:11	20
Selenium	0.022	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:11	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:11	20

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Date Collected: 12/15/18 15:39

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	D1	0.80	mg/L			12/22/18 02:43	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.37		0.20	mg/L		12/20/18 10:34	12/27/18 12:57	1
Magnesium	120		2.0	mg/L		12/20/18 10:34	12/27/18 12:57	1
SiO2, Silica	7.7		0.21	mg/L		12/20/18 10:34	12/29/18 03:39	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:13	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:30	20
Barium	0.019	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:30	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:13	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:13	20
Cobalt	0.022	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:13	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:13	20
Molybdenum	0.10	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:13	20
Selenium	0.023	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:13	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:13	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW17R-121718

Lab Sample ID: 550-115113-5

Date Collected: 12/17/18 07:47

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 07:38	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.41		0.20	mg/L		12/20/18 10:34	12/27/18 13:03	1
Magnesium	260		2.0	mg/L		12/20/18 10:34	12/27/18 13:03	1
SiO ₂ , Silica	14		0.21	mg/L		12/20/18 10:34	12/29/18 03:45	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:15	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:32	20
Barium	0.027	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:32	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:15	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:15	20
Cobalt	0.091	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:15	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:15	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:15	20
Selenium	0.019	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:15	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:15	20

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 08:15	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.67		0.20	mg/L		12/20/18 10:34	12/27/18 13:09	1
Magnesium	730		2.0	mg/L		12/20/18 10:34	12/27/18 13:09	1
SiO ₂ , Silica	11		0.21	mg/L		12/20/18 10:34	12/29/18 03:57	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:18	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:34	20
Barium	0.016	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:34	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:18	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:18	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:18	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:18	20
Molybdenum	0.013	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:18	20
Selenium	0.027	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:18	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:18	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-FD02-121618

Lab Sample ID: 550-115113-7

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 08:51	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.66		0.20	mg/L		12/20/18 10:34	12/27/18 13:20	1
Magnesium	720		2.0	mg/L		12/20/18 10:34	12/27/18 13:20	1
SiO ₂ , Silica	11		0.21	mg/L		12/20/18 10:34	12/29/18 04:09	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:20	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:37	20
Barium	0.015	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:37	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:20	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:20	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:20	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:20	20
Molybdenum	0.013	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:20	20
Selenium	0.026	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:20	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:20	20

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Date Collected: 12/16/18 14:17

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 09:28	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.1		0.20	mg/L		12/20/18 10:34	12/27/18 13:26	1
Magnesium	1300	D2	8.0	mg/L		12/20/18 10:34	12/29/18 04:15	4
SiO ₂ , Silica	20		0.21	mg/L		12/20/18 10:34	12/29/18 04:20	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:22	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:39	20
Barium	0.029	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:39	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:22	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:22	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:22	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:22	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:22	20
Selenium	0.21	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:22	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:22	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Date Collected: 12/16/18 09:51

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 10:05	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.91		0.20	mg/L		12/20/18 10:34	12/27/18 13:32	1
Magnesium	550		2.0	mg/L		12/20/18 10:34	12/27/18 13:32	1
SiO2, Silica	14		0.21	mg/L		12/20/18 10:34	12/29/18 04:26	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:25	20
Arsenic	ND	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:41	20
Barium	0.022	D1	0.010	mg/L		01/17/19 05:40	01/17/19 19:41	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:25	20
Chromium	ND	D1	0.020	mg/L		12/19/18 10:53	01/16/19 01:25	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:25	20
Lead	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:25	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:25	20
Selenium	0.016	D1	0.010	mg/L		12/19/18 10:53	01/16/19 01:25	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 10:53	01/16/19 01:25	20

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 165329

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.2	D1	8.00	9.53	D1	mg/L		103	80 - 120

Lab Sample ID: 550-115113-1 MSD
Matrix: Water
Analysis Batch: 165329

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.2	D1	8.00	9.49	D1	mg/L		103	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164986/1-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164986

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
SiO2, Silica	ND		0.21	mg/L		12/20/18 10:34	12/29/18 01:49	1

Lab Sample ID: LCS 550-164986/2-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
SiO2, Silica	10.7	10.6		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-164986/3-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
SiO2, Silica	10.7	10.5		mg/L		98	85 - 115	1	20

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.410		1.00	1.45		mg/L		104	70 - 130
Magnesium	222		21.0	243	M3	mg/L		101	70 - 130

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
SiO2, Silica	6.93		10.7	17.9		mg/L		102	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-115113-1 MSD
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	-0.0000443		1.00	0.981		mg/L		98	70 - 130	4	20
Lithium	0.410		1.00	1.37		mg/L		96	70 - 130	6	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-164866/1-A
Matrix: Water
Analysis Batch: 166805

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164866

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		12/19/18 10:53	01/16/19 00:55	1
Barium	ND		0.00050	mg/L		12/19/18 10:53	01/16/19 00:55	1
Cadmium	ND		0.00010	mg/L		12/19/18 10:53	01/16/19 00:55	1
Chromium	ND		0.0010	mg/L		12/19/18 10:53	01/16/19 00:55	1
Cobalt	ND		0.00050	mg/L		12/19/18 10:53	01/16/19 00:55	1
Lead	ND		0.00050	mg/L		12/19/18 10:53	01/16/19 00:55	1
Molybdenum	ND		0.00050	mg/L		12/19/18 10:53	01/16/19 00:55	1
Selenium	ND		0.00050	mg/L		12/19/18 10:53	01/16/19 00:55	1
Thallium	ND		0.00010	mg/L		12/19/18 10:53	01/16/19 00:55	1

Lab Sample ID: LCS 550-164866/2-A
Matrix: Water
Analysis Batch: 166805

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164866

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.105		mg/L		105	85 - 115
Cadmium	0.100	0.105		mg/L		105	85 - 115
Chromium	0.100	0.105		mg/L		105	85 - 115
Cobalt	0.100	0.104		mg/L		104	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Molybdenum	0.100	0.105		mg/L		105	85 - 115
Selenium	0.100	0.105		mg/L		105	85 - 115
Thallium	0.100	0.105		mg/L		105	85 - 115

Lab Sample ID: LCSD 550-164866/3-A
Matrix: Water
Analysis Batch: 166805

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164866

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.104		mg/L		104	85 - 115	1	20
Cadmium	0.100	0.104		mg/L		104	85 - 115	1	20
Chromium	0.100	0.104		mg/L		104	85 - 115	1	20
Cobalt	0.100	0.103		mg/L		103	85 - 115	2	20
Lead	0.100	0.102		mg/L		102	85 - 115	0	20
Molybdenum	0.100	0.104		mg/L		104	85 - 115	1	20
Selenium	0.100	0.104		mg/L		104	85 - 115	2	20
Thallium	0.100	0.106		mg/L		106	85 - 115	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-115113-1 MS

Matrix: Water

Analysis Batch: 166805

Client Sample ID: FC-CCR-MW75-121518

Prep Type: Total/NA

Prep Batch: 164866

Analyte	Sample		Spike Added	MS MS		Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier		Result	Qualifier					
Antimony	ND	D1	0.100	0.0991	D1	mg/L		99	70 - 130	
Cadmium	ND	D1	0.100	0.0988	D1	mg/L		98	70 - 130	
Chromium	ND	D1	0.100	0.0998	D1	mg/L		100	70 - 130	
Cobalt	0.046	D1	0.100	0.141	D1	mg/L		94	70 - 130	
Lead	ND	D1	0.100	0.0943	D1	mg/L		94	70 - 130	
Molybdenum	0.17	D1	0.100	0.270	D1	mg/L		97	70 - 130	
Selenium	0.026	M1 D1	0.100	0.197	D1 M1	mg/L		171	70 - 130	
Thallium	ND	D1	0.100	0.0952	D1	mg/L		95	70 - 130	

Lab Sample ID: 550-115113-1 MSD

Matrix: Water

Analysis Batch: 166805

Client Sample ID: FC-CCR-MW75-121518

Prep Type: Total/NA

Prep Batch: 164866

Analyte	Sample		Spike Added	MSD MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Antimony	ND	D1	0.100	0.100	D1	mg/L		100	70 - 130	1	20
Cadmium	ND	D1	0.100	0.103	D1	mg/L		102	70 - 130	4	20
Chromium	ND	D1	0.100	0.100	D1	mg/L		100	70 - 130	1	20
Cobalt	0.046	D1	0.100	0.142	D1	mg/L		95	70 - 130	1	20
Lead	ND	D1	0.100	0.0957	D1	mg/L		96	70 - 130	2	20
Molybdenum	0.17	D1	0.100	0.271	D1	mg/L		98	70 - 130	0	20
Selenium	0.026	M1 D1	0.100	0.191	D1 M1	mg/L		165	70 - 130	3	20
Thallium	ND	D1	0.100	0.0968	D1	mg/L		97	70 - 130	2	20

Lab Sample ID: MB 550-166919/1-A

Matrix: Water

Analysis Batch: 167014

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 166919

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Arsenic	ND		0.00050	mg/L		01/17/19 05:40	01/17/19 19:12	1
Barium	ND		0.00050	mg/L		01/17/19 05:40	01/17/19 19:12	1
Lead	ND		0.00050	mg/L		01/17/19 05:40	01/17/19 19:12	1

Lab Sample ID: LCS 550-166919/2-A

Matrix: Water

Analysis Batch: 167014

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 166919

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Arsenic	0.100	0.100		mg/L		100	85 - 115	
Barium	0.100	0.104		mg/L		104	85 - 115	
Lead	0.100	0.0981		mg/L		98	85 - 115	

Lab Sample ID: LCSD 550-166919/3-A

Matrix: Water

Analysis Batch: 167014

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 166919

Analyte	Spike Added	LCSD LCSD		Unit	D	%Rec	Limits	RPD	Limit
		Result	Qualifier						
Arsenic	0.100	0.0988		mg/L		99	85 - 115	1	20
Barium	0.100	0.106		mg/L		106	85 - 115	2	20
Lead	0.100	0.0984		mg/L		98	85 - 115	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Lab Sample ID: 550-115113-1 MS
Matrix: Water
Analysis Batch: 167014

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA
Prep Batch: 166919

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	ND	D1	0.100	0.114		mg/L		114	70 - 130
Barium	0.022	D1	0.100	0.137		mg/L		115	70 - 130

Lab Sample ID: 550-115113-1 MSD
Matrix: Water
Analysis Batch: 167014

Client Sample ID: FC-CCR-MW75-121518
Prep Type: Total/NA
Prep Batch: 166919

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	ND	D1	0.100	0.111		mg/L		111	70 - 130	2	20
Barium	0.022	D1	0.100	0.144		mg/L		122	70 - 130	5	20



QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

HPLC/IC

Analysis Batch: 165329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	300.0	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	300.0	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	300.0	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	300.0	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	300.0	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	300.0	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	300.0	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	300.0	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	300.0	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	300.0	

Metals

Prep Batch: 164866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.8	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.8	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.8	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.8	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.8	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.8	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.8	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.8	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.8	
MB 550-164866/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-164866/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-164866/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.8	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.8	

Prep Batch: 164986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.7	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.7	
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.7	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.7	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.7	
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.7	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.7	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 165571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986

Analysis Batch: 165722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.7 Rev 4.4	164986
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164986
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164986
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164986
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.7 Rev 4.4	164986

Analysis Batch: 166805

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.8 LL	164866
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.8 LL	164866
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.8 LL	164866
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.8 LL	164866
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.8 LL	164866
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.8 LL	164866
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.8 LL	164866
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.8 LL	164866
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.8 LL	164866
MB 550-164866/1-A	Method Blank	Total/NA	Water	200.8 LL	164866
LCS 550-164866/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	164866
LCSD 550-164866/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	164866
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.8 LL	164866
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.8 LL	164866

Prep Batch: 166919

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.8	
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.8	
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Metals (Continued)

Prep Batch: 166919 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.8	
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.8	
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.8	
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.8	
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.8	
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.8	
MB 550-166919/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-166919/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-166919/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.8	
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.8	

Analysis Batch: 167014

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115113-1	FC-CCR-MW75-121518	Total/NA	Water	200.8 LL	166919
550-115113-2	FC-CCR-MW38R-121518	Total/NA	Water	200.8 LL	166919
550-115113-3	FC-CCR-MW57-121518	Total/NA	Water	200.8 LL	166919
550-115113-4	FC-CCR-MW61-121518	Total/NA	Water	200.8 LL	166919
550-115113-5	FC-CCR-MW17R-121718	Total/NA	Water	200.8 LL	166919
550-115113-6	FC-CCR-DMX4-121618	Total/NA	Water	200.8 LL	166919
550-115113-7	FC-CCR-FD02-121618	Total/NA	Water	200.8 LL	166919
550-115113-8	FC-CCR-MW56-121618	Total/NA	Water	200.8 LL	166919
550-115113-9	FC-CCR-MW15-121618	Total/NA	Water	200.8 LL	166919
MB 550-166919/1-A	Method Blank	Total/NA	Water	200.8 LL	166919
LCS 550-166919/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	166919
LCSD 550-166919/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	166919
550-115113-1 MS	FC-CCR-MW75-121518	Total/NA	Water	200.8 LL	166919
550-115113-1 MSD	FC-CCR-MW75-121518	Total/NA	Water	200.8 LL	166919

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW75-121518

Lab Sample ID: 550-115113-1

Date Collected: 12/15/18 16:27

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 03:57	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 11:56	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 02:09	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:02	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:18	ARE	TAL PHX

Client Sample ID: FC-CCR-MW38R-121518

Lab Sample ID: 550-115113-2

Date Collected: 12/15/18 14:14

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 01:30	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:45	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:22	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:08	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:25	ARE	TAL PHX

Client Sample ID: FC-CCR-MW57-121518

Lab Sample ID: 550-115113-3

Date Collected: 12/15/18 13:15

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 02:06	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:51	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:28	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:11	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:27	ARE	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-MW61-121518

Lab Sample ID: 550-115113-4

Date Collected: 12/15/18 15:39

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 02:43	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:57	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:39	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:13	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:30	ARE	TAL PHX

Client Sample ID: FC-CCR-MW17R-121718

Lab Sample ID: 550-115113-5

Date Collected: 12/17/18 07:47

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 07:38	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:03	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:45	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:15	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:32	ARE	TAL PHX

Client Sample ID: FC-CCR-DMX4-121618

Lab Sample ID: 550-115113-6

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 08:15	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:09	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 03:57	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:18	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:34	ARE	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Client Sample ID: FC-CCR-FD02-121618

Lab Sample ID: 550-115113-7

Date Collected: 12/16/18 12:41

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 08:51	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:20	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:09	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:20	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:37	ARE	TAL PHX

Client Sample ID: FC-CCR-MW56-121618

Lab Sample ID: 550-115113-8

Date Collected: 12/16/18 14:17

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 09:28	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:26	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:15	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:20	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:22	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:39	ARE	TAL PHX

Client Sample ID: FC-CCR-MW15-121618

Lab Sample ID: 550-115113-9

Date Collected: 12/16/18 09:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 10:05	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:32	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:26	SRA	TAL PHX
Total/NA	Prep	200.8			164866	12/19/18 10:53	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166805	01/16/19 01:25	ARE	TAL PHX
Total/NA	Prep	200.8			166919	01/17/19 05:40	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	167014	01/17/19 19:41	ARE	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115113-2
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

115113



Regulatory Program: CCR

CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarway	Lab Contact:	Doug Lavarway	Carrier:	12/17/2018	COC No:	1 of 1 COCS
4801 Cholla Lake Road	928-587-0319	Perform MS / MSD (Y / N)					
Joseph City, Az 86032		EPA 200.7 (Li, Mg, SiO2)					
(928) 587-0319	Phone	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti)					
(xxx) xxx-xxxx	FAX	EPA 300.0 (F)					
Project Name: CCR							
Site: Cholla							
P O #							

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)		Perform MS / MSD (Y / N)	
						Y	N	Y	N
-1 FC-CCR-MW75-121518	12/15/2018	1627 G		W	2	X	X	X	X
-2 FC-CCR-MW39R-121518	12/15/2018	1414 G		W	2	X	X	X	X
-3 FC-CCR-MW57-121518	12/15/2018	1315 G		W	2	X	X	X	X
-4 FC-CCR-MW61-121518	12/15/2018	1539 G		W	2	X	X	X	X
-5 FC-CCR-MW17R-121718	12/17/2018	747 G		W	2	X	X	X	X
-6 FC-CCR-DMX4-121618	12/16/2018	1241 G		W	2	X	X	X	X
-7 FC-CCR-FD02-121618	12/16/2018	1241 G		W	2	X	X	X	X
-8 FC-CCR-MW56-121618	12/16/2018	1417 G		W	2	X	X	X	X
-9 FC-CCR-MW15-121618	12/16/2018	951 G		W	2	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments: Method 200.8 with collision cell.

Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No

Relinquished by: Doug Lavarway Company: APS Date/Time: 12/18/2018 Received by: [Signature] Date/Time: 12/18/2018

Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Date/Time: _____

Cooler Temp. (°C): Obs'd: _____ Therm ID No.: _____

2-2-c

100

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115113-2

SDG Number: Cholla

Login Number: 115113

List Number: 1

Creator: Maycock, Lisa

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-115115-2

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

1/22/2019 12:38:12 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
D1	Sample required dilution due to matrix.
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Job ID: 550-115115-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-115115-2

Comments

No additional comments.

Receipt

The samples were received on 12/18/2018 12:33 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.2° C and 3.7° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-DMX6-121618 (550-115115-1), FC-CCR-DMX6-121618 (550-115115-1[MS]) and FC-CCR-DMX6-121618 (550-115115-1[MSD]). The samples contained high concentrations of Chloride and Sulfate which exceeded the instrument's maximum column capacity. Fluoride was not detected in the diluted samples. As such, elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW7-121718 (550-115115-2), FC-CCR-MW6-121618 (550-115115-3) and FC-CCR-MW16-121618 (550-115115-4). The samples contained high concentrations of Chloride and Sulfate which exceeded the instrument's maximum column capacity. Fluoride was not detected in the diluted samples. As such, elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-115115-1	FC-CCR-DMX6-121618	Water	12/16/18 10:36	12/18/18 12:33
550-115115-2	FC-CCR-MW7-121718	Water	12/17/18 08:56	12/18/18 12:33
550-115115-3	FC-CCR-MW6-121618	Water	12/16/18 11:49	12/18/18 12:33
550-115115-4	FC-CCR-MW16-121618	Water	12/16/18 08:54	12/18/18 12:33

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Client Sample ID: FC-CCR-DMX6-121618

Lab Sample ID: 550-115115-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.7		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	560		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	17	D2	0.86	mg/L	4		200.7 Rev 4.4	Total/NA
Barium	0.025	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.014	D1 M1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW7-121718

Lab Sample ID: 550-115115-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.84		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	420		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	15		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.015	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.022	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW6-121618

Lab Sample ID: 550-115115-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.1		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	600		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	10		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.020	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.015	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW16-121618

Lab Sample ID: 550-115115-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	1.1		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1200	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	12		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.026	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.060	D1	0.010	mg/L	20		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Client Sample ID: FC-CCR-DMX6-121618

Lab Sample ID: 550-115115-1

Date Collected: 12/16/18 10:36

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/27/18 01:54	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.7		0.20	mg/L		12/20/18 10:34	12/27/18 12:31	1
Magnesium	560		2.0	mg/L		12/20/18 10:34	12/27/18 12:31	1
SiO2, Silica	17	D2	0.86	mg/L		12/20/18 10:34	12/29/18 02:56	4

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 21:42	20
Arsenic	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:42	20
Barium	0.025	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:42	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 21:42	20
Chromium	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 21:42	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:42	20
Lead	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:42	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:42	20
Selenium	0.014	D1 M1	0.010	mg/L		12/19/18 11:06	01/16/19 23:01	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 21:42	20

Client Sample ID: FC-CCR-MW7-121718

Lab Sample ID: 550-115115-2

Date Collected: 12/17/18 08:56

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 05:47	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.84		0.20	mg/L		12/20/18 10:34	12/27/18 14:02	1
Magnesium	420		2.0	mg/L		12/20/18 10:34	12/27/18 14:02	1
SiO2, Silica	15		0.21	mg/L		12/20/18 10:34	12/29/18 05:22	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 21:57	20
Arsenic	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:57	20
Barium	0.015	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:57	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 21:57	20
Chromium	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 21:57	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:57	20
Lead	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:57	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 21:57	20
Selenium	0.022	D1	0.010	mg/L		12/19/18 11:06	01/16/19 23:16	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 21:57	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Client Sample ID: FC-CCR-MW6-121618

Lab Sample ID: 550-115115-3

Date Collected: 12/16/18 11:49

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 06:24	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.1		0.20	mg/L		12/20/18 10:34	12/27/18 14:08	1
Magnesium	600		2.0	mg/L		12/20/18 10:34	12/27/18 14:08	1
SiO2, Silica	10		0.21	mg/L		12/20/18 10:34	12/29/18 05:34	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 22:00	20
Arsenic	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:00	20
Barium	0.020	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:00	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 22:00	20
Chromium	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 22:00	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:00	20
Lead	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:00	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:00	20
Selenium	0.015	D1	0.010	mg/L		12/19/18 11:06	01/16/19 23:18	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 22:00	20

Client Sample ID: FC-CCR-MW16-121618

Lab Sample ID: 550-115115-4

Date Collected: 12/16/18 08:54

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 13:09	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	1.1		0.20	mg/L		12/20/18 10:34	12/27/18 14:14	1
Magnesium	1200	D2	8.0	mg/L		12/20/18 10:34	12/29/18 05:40	4
SiO2, Silica	12		0.21	mg/L		12/20/18 10:34	12/29/18 05:46	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 22:02	20
Arsenic	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:02	20
Barium	0.026	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:02	20
Cadmium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 22:02	20
Chromium	ND	D1	0.020	mg/L		12/19/18 11:06	01/14/19 22:02	20
Cobalt	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:02	20
Lead	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:02	20
Molybdenum	ND	D1	0.010	mg/L		12/19/18 11:06	01/14/19 22:02	20
Selenium	0.060	D1	0.010	mg/L		12/19/18 11:06	01/16/19 23:21	20
Thallium	ND	D1	0.0020	mg/L		12/19/18 11:06	01/14/19 22:02	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-115115-1 MS
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-DMX6-121618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND		8.00	7.91	D1	mg/L		93	80 - 120

Lab Sample ID: 550-115115-1 MSD
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-DMX6-121618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND		8.00	7.98	D1	mg/L		94	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164986/1-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164986

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		12/20/18 10:34	12/27/18 11:36	1
Magnesium	ND		2.0	mg/L		12/20/18 10:34	12/27/18 11:36	1

Lab Sample ID: MB 550-164986/1-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164986

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	ND		0.21	mg/L		12/20/18 10:34	12/29/18 01:49	1

Lab Sample ID: LCS 550-164986/2-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	1.03		mg/L		103	85 - 115
Magnesium	21.0	21.2		mg/L		101	85 - 115

Lab Sample ID: LCS 550-164986/2-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
SiO ₂ , Silica	10.7	10.6		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-164986/3-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	1.00	1.02		mg/L		102	85 - 115	1	20
Magnesium	21.0	20.9		mg/L		100	85 - 115	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCSD 550-164986/3-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
SiO2, Silica	10.7	10.5		mg/L		98	85 - 115	1	20

Lab Sample ID: 550-115115-1 MS
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-DMX6-121618
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.67		1.00	2.54		mg/L		87	70 - 130
Magnesium	559		21.0	556	M3	mg/L		-12	70 - 130

Lab Sample ID: 550-115115-1 MS
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-DMX6-121618
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
SiO2, Silica	17.1		10.7	28.5		mg/L		107	70 - 130

Lab Sample ID: 550-115115-1 MSD
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-DMX6-121618
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	1.67		1.00	2.59		mg/L		92	70 - 130	2	20
Magnesium	559		21.0	559	M3	mg/L		0.3	70 - 130	0	20

Lab Sample ID: 550-115115-1 MSD
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-DMX6-121618
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
SiO2, Silica	17.1		10.7	28.1		mg/L		103	70 - 130	2	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-164867/1-A
Matrix: Water
Analysis Batch: 166694

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164867

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		12/19/18 11:06	01/14/19 21:35	1
Arsenic	ND		0.00050	mg/L		12/19/18 11:06	01/14/19 21:35	1
Barium	ND		0.00050	mg/L		12/19/18 11:06	01/14/19 21:35	1
Cadmium	ND		0.00010	mg/L		12/19/18 11:06	01/14/19 21:35	1
Chromium	ND		0.0010	mg/L		12/19/18 11:06	01/14/19 21:35	1
Cobalt	ND		0.00050	mg/L		12/19/18 11:06	01/14/19 21:35	1
Lead	ND		0.00050	mg/L		12/19/18 11:06	01/14/19 21:35	1
Molybdenum	ND		0.00050	mg/L		12/19/18 11:06	01/14/19 21:35	1
Thallium	ND		0.00010	mg/L		12/19/18 11:06	01/14/19 21:35	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 550-164867/1-A
Matrix: Water
Analysis Batch: 166913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164867

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.00050	mg/L		12/19/18 11:06	01/16/19 22:54	1

Lab Sample ID: LCS 550-164867/2-A
Matrix: Water
Analysis Batch: 166694

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164867

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.107		mg/L		107	85 - 115
Arsenic	0.100	0.102		mg/L		102	85 - 115
Barium	0.100	0.100		mg/L		100	85 - 115
Cadmium	0.100	0.107		mg/L		107	85 - 115
Chromium	0.100	0.104		mg/L		104	85 - 115
Cobalt	0.100	0.103		mg/L		103	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Molybdenum	0.100	0.105		mg/L		105	85 - 115
Thallium	0.100	0.104		mg/L		104	85 - 115

Lab Sample ID: LCS 550-164867/2-A
Matrix: Water
Analysis Batch: 166913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164867

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Selenium	0.100	0.102		mg/L		102	85 - 115

Lab Sample ID: LCSD 550-164867/3-A
Matrix: Water
Analysis Batch: 166694

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164867

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.105		mg/L		105	85 - 115	1	20
Arsenic	0.100	0.103		mg/L		103	85 - 115	1	20
Barium	0.100	0.0958		mg/L		96	85 - 115	4	20
Cadmium	0.100	0.104		mg/L		104	85 - 115	2	20
Chromium	0.100	0.104		mg/L		104	85 - 115	0	20
Cobalt	0.100	0.103		mg/L		103	85 - 115	1	20
Lead	0.100	0.0999		mg/L		100	85 - 115	1	20
Molybdenum	0.100	0.104		mg/L		104	85 - 115	1	20
Thallium	0.100	0.102		mg/L		102	85 - 115	2	20

Lab Sample ID: LCSD 550-164867/3-A
Matrix: Water
Analysis Batch: 166913

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164867

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Selenium	0.100	0.104		mg/L		104	85 - 115	1	20

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-115115-1 MS

Matrix: Water

Analysis Batch: 166694

Client Sample ID: FC-CCR-DMX6-121618

Prep Type: Total/NA

Prep Batch: 164867

Analyte	Sample		Spike Added	MS MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Antimony	ND	D1	0.100	0.123		mg/L		123	70 - 130
Arsenic	ND	D1	0.100	0.125		mg/L		125	70 - 130
Barium	0.025	D1	0.100	0.122		mg/L		97	70 - 130
Cadmium	ND	D1	0.100	0.115		mg/L		114	70 - 130
Chromium	ND	D1	0.100	0.118		mg/L		118	70 - 130
Cobalt	ND	D1	0.100	0.117		mg/L		113	70 - 130
Lead	ND	D1	0.100	0.105		mg/L		105	70 - 130
Molybdenum	ND	D1	0.100	0.129		mg/L		123	70 - 130
Thallium	ND	D1	0.100	0.107		mg/L		107	70 - 130

Lab Sample ID: 550-115115-1 MS

Matrix: Water

Analysis Batch: 166913

Client Sample ID: FC-CCR-DMX6-121618

Prep Type: Total/NA

Prep Batch: 164867

Analyte	Sample		Spike Added	MS MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Selenium	0.014	M1 D1	0.100	0.234	M1	mg/L		220	70 - 130

Lab Sample ID: 550-115115-1 MSD

Matrix: Water

Analysis Batch: 166694

Client Sample ID: FC-CCR-DMX6-121618

Prep Type: Total/NA

Prep Batch: 164867

Analyte	Sample		Spike Added	MSD MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Antimony	ND	D1	0.100	0.117		mg/L		117	70 - 130	5	20
Arsenic	ND	D1	0.100	0.126		mg/L		126	70 - 130	1	20
Barium	0.025	D1	0.100	0.118		mg/L		93	70 - 130	3	20
Cadmium	ND	D1	0.100	0.107		mg/L		106	70 - 130	7	20
Chromium	ND	D1	0.100	0.113		mg/L		113	70 - 130	5	20
Cobalt	ND	D1	0.100	0.112		mg/L		108	70 - 130	5	20
Lead	ND	D1	0.100	0.0991		mg/L		99	70 - 130	6	20
Molybdenum	ND	D1	0.100	0.118		mg/L		113	70 - 130	8	20
Thallium	ND	D1	0.100	0.101		mg/L		101	70 - 130	5	20

Lab Sample ID: 550-115115-1 MSD

Matrix: Water

Analysis Batch: 166913

Client Sample ID: FC-CCR-DMX6-121618

Prep Type: Total/NA

Prep Batch: 164867

Analyte	Sample		Spike Added	MSD MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Selenium	0.014	M1 D1	0.100	0.194	M1	mg/L		180	70 - 130	19	20

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

HPLC/IC

Analysis Batch: 165329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	300.0	
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	300.0	
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	300.0	

Analysis Batch: 165473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	300.0	
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	300.0	
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	300.0	

Metals

Prep Batch: 164867

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	200.8	
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	200.8	
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	200.8	
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.8	
MB 550-164867/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-164867/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-164867/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	200.8	
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	200.8	

Prep Batch: 164986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	200.7	
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	200.7	
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	200.7	
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.7	
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	200.7	
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	200.7	

Analysis Batch: 165571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.7 Rev 4.4	164986
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164986
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164986
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	200.7 Rev 4.4	164986

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 165722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.7 Rev 4.4	164986
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164986
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164986
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	200.7 Rev 4.4	164986
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	200.7 Rev 4.4	164986

Analysis Batch: 166694

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	200.8 LL	164867
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	200.8 LL	164867
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	200.8 LL	164867
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.8 LL	164867
MB 550-164867/1-A	Method Blank	Total/NA	Water	200.8 LL	164867
LCS 550-164867/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	164867
LCSD 550-164867/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	164867
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	200.8 LL	164867
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	200.8 LL	164867

Analysis Batch: 166913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115115-1	FC-CCR-DMX6-121618	Total/NA	Water	200.8 LL	164867
550-115115-2	FC-CCR-MW7-121718	Total/NA	Water	200.8 LL	164867
550-115115-3	FC-CCR-MW6-121618	Total/NA	Water	200.8 LL	164867
550-115115-4	FC-CCR-MW16-121618	Total/NA	Water	200.8 LL	164867
MB 550-164867/1-A	Method Blank	Total/NA	Water	200.8 LL	164867
LCS 550-164867/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	164867
LCSD 550-164867/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	164867
550-115115-1 MS	FC-CCR-DMX6-121618	Total/NA	Water	200.8 LL	164867
550-115115-1 MSD	FC-CCR-DMX6-121618	Total/NA	Water	200.8 LL	164867

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Client Sample ID: FC-CCR-DMX6-121618

Lab Sample ID: 550-115115-1

Date Collected: 12/16/18 10:36

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165473	12/27/18 01:54	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:31	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 02:56	SRA	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166694	01/14/19 21:42	ARE	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166913	01/16/19 23:01	ARE	TAL PHX

Client Sample ID: FC-CCR-MW7-121718

Lab Sample ID: 550-115115-2

Date Collected: 12/17/18 08:56

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 05:47	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 14:02	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 05:22	SRA	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166694	01/14/19 21:57	ARE	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166913	01/16/19 23:16	ARE	TAL PHX

Client Sample ID: FC-CCR-MW6-121618

Lab Sample ID: 550-115115-3

Date Collected: 12/16/18 11:49

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 06:24	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 14:08	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 05:34	SRA	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166694	01/14/19 22:00	ARE	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166913	01/16/19 23:18	ARE	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Client Sample ID: FC-CCR-MW16-121618

Lab Sample ID: 550-115115-4

Date Collected: 12/16/18 08:54

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 13:09	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 14:14	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 05:40	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 05:46	SRA	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166694	01/14/19 22:02	ARE	TAL PHX
Total/NA	Prep	200.8			164867	12/19/18 11:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	166913	01/16/19 23:21	ARE	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115115-2
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix

4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

115115



TestAmerica Laboratories, Inc.

Regulatory Program:

CCR

Client Contact

Doug Lavarway
 928-587-0319

Doug Lavarway

12/18/2018

COC No.:

APS Cholla

Analysis Turnaround Time

Lab Contact:

Carrier:

1 of 1 COCs

4801 Cholla Lake Road

Joseph City, Az 86032

Perform MS / MSD (Y / N)

EPA 200.7 (Li, Mg, SiO2)

Sampler:

(928) 587-0319 Phone

TAT if different from Below

200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)

EPA 300.0 (F)

For Lab Use Only:

(xxx) xxx-xxxx FAX

Project Name: CCR

Site: Cholla

Job / SDG No.:

P O #

Sample Identification	Sample Date	Sample Time	Sample Type (G-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	EPA 200.7 (Li, Mg, SiO2)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)	Sample Specific Notes:
-1	12/16/2018	1036 G		W	2	N	X	X	X	X	
-2	12/17/2018	856 G		W	2	N	X	X	X	X	
-3	12/16/2018	1149 G		W	2	N	X	X	X	X	
-4	12/16/2018	854 G		W	2	N	X	X	X	X	



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments: Method 200.8 with collision cell

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Custody Seals Intact: Yes No

Custody Seal No.:

Cooler Temp. (°C): Obs'd: _____ Cor'd: 22/37°C

Therm ID No.:

Relinquished by: *Doug Lavarway*

Company: APS

Date/Time: 12/18/2018

Received by: _____

Company: TAPHX

Date/Time: 12/18/18

Relinquished by: _____

Company: _____

Date/Time: _____

Received by: _____

Company: TAPHX

Date/Time: 12/18/18

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115115-2

SDG Number: Cholla

Login Number: 115115

List Number: 1

Creator: Maycock, Lisa

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-99692-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

3/28/2018 9:44:26 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Job ID: 550-99692-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-99692-1**

Comments

No additional comments.

Receipt

The samples were received on 3/19/2018 6:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 2.8° C and 3.8° C.

HPLC/IC

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99692-1	FC-CCR-MW66-31618	Water	03/16/18 12:52	03/19/18 06:55
550-99692-2	FC-CCR-MW67-31618	Water	03/16/18 16:53	03/19/18 06:55
550-99692-3	FC-CCR-MW68-31618	Water	03/16/18 16:20	03/19/18 06:55
550-99692-4	FC-CCR-MW69-31618	Water	03/16/18 15:45	03/19/18 06:55
550-99692-5	FC-CCR-MW70-31618	Water	03/16/18 13:41	03/19/18 06:55
550-99692-6	FC-CCR-MW71-31618	Water	03/16/18 17:40	03/19/18 06:55
550-99692-7	FC-CCR-MW72-31618	Water	03/16/18 14:33	03/19/18 06:55
550-99692-8	FC-CCR-MW73-31618	Water	03/16/18 18:18	03/19/18 06:55
550-99692-9	FC-CCR-FD01-31618	Water	03/16/18 12:52	03/19/18 06:55



Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW66-31618

Lab Sample ID: 550-99692-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	41	D1	8.0	mg/L	20		300.0	Total/NA
Lithium	0.38		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0050	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.020	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0085	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.022	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Thallium	0.00054	D1	0.00040	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	31	D2	4.0	mg/L	10		300.0	Total/NA
Lithium	0.55		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0046	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.019	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0072	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.044	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.0064	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Thallium	0.00063	D1	0.00040	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW68-31618

Lab Sample ID: 550-99692-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	14	D1	4.0	mg/L	10		300.0	Total/NA
Lithium	0.40		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0075	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.0072	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.0064	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.27	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Thallium	0.00048	D1	0.00040	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	29	D2	4.0	mg/L	10		300.0	Total/NA
Lithium	0.52		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0089	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.014	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0054	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.014	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.011	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW70-31618

Lab Sample ID: 550-99692-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.2	D1	1.6	mg/L	4		300.0	Total/NA
Lithium	0.32		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0088	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.0093	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0054	D1	0.0020	mg/L	4		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW70-31618 (Continued)

Lab Sample ID: 550-99692-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Molybdenum	0.0048	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.20	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.010	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.011	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.28	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW72-31618

Lab Sample ID: 550-99692-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0067	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.0082	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0025	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.11	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Thallium	0.0010	D1	0.00040	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW73-31618

Lab Sample ID: 550-99692-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.25		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0034	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.020	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0057	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Selenium	0.017	D1	0.0020	mg/L	4		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	38	D2	4.0	mg/L	10		300.0	Total/NA
Lithium	0.39		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0067	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.021	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Cobalt	0.0088	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.022	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Thallium	0.00048	D1	0.00040	mg/L	4		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW66-31618

Lab Sample ID: 550-99692-1

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	41	D1	8.0	mg/L			03/19/18 15:51	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:27	1
Lithium	0.38		0.20	mg/L		03/21/18 05:52	03/23/18 00:50	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:34	4
Arsenic	0.0050	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:34	4
Barium	0.020	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:34	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:34	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:34	4
Cobalt	0.0085	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:34	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:34	4
Molybdenum	0.022	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:34	4
Selenium	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:34	4
Thallium	0.00054	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:34	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:06	1

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

Date Collected: 03/16/18 16:53

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	31	D2	4.0	mg/L			03/19/18 16:46	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:33	1
Lithium	0.55		0.20	mg/L		03/21/18 05:52	03/23/18 00:56	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:41	4
Arsenic	0.0046	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:41	4
Barium	0.019	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:41	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:41	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:41	4
Cobalt	0.0072	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:41	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:41	4
Molybdenum	0.044	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:41	4
Selenium	0.0064	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:41	4
Thallium	0.00063	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:41	4

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

Date Collected: 03/16/18 16:53

Matrix: Water

Date Received: 03/19/18 06:55

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:08	1

Client Sample ID: FC-CCR-MW68-31618

Lab Sample ID: 550-99692-3

Date Collected: 03/16/18 16:20

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	14	D1	4.0	mg/L			03/19/18 17:04	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:39	1
Lithium	0.40		0.20	mg/L		03/21/18 05:52	03/23/18 01:02	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:44	4
Arsenic	0.0075	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:44	4
Barium	0.0072	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:44	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:44	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:44	4
Cobalt	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:44	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:44	4
Molybdenum	0.0064	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:44	4
Selenium	0.27	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:44	4
Thallium	0.00048	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:44	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:09	1

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

Date Collected: 03/16/18 15:45

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	29	D2	4.0	mg/L			03/20/18 20:32	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:45	1
Lithium	0.52		0.20	mg/L		03/21/18 05:52	03/23/18 01:08	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:46	4
Arsenic	0.0089	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:46	4
Barium	0.014	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:46	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:46	4

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

Date Collected: 03/16/18 15:45

Matrix: Water

Date Received: 03/19/18 06:55

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:46	4
Cobalt	0.0054	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:46	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:46	4
Molybdenum	0.014	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:46	4
Selenium	0.011	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:46	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:46	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:11	1

Client Sample ID: FC-CCR-MW70-31618

Lab Sample ID: 550-99692-5

Date Collected: 03/16/18 13:41

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.2	D1	1.6	mg/L			03/20/18 20:50	4

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:51	1
Lithium	0.32		0.20	mg/L		03/21/18 05:52	03/23/18 01:14	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:48	4
Arsenic	0.0088	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:48	4
Barium	0.0093	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:48	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:48	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:48	4
Cobalt	0.0054	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:48	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:48	4
Molybdenum	0.0048	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:48	4
Selenium	0.20	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:48	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:48	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:16	1

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

Date Collected: 03/16/18 17:40

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	4.0	mg/L			03/19/18 19:13	10

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

Date Collected: 03/16/18 17:40

Matrix: Water

Date Received: 03/19/18 06:55

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:57	1
Lithium	0.37		0.20	mg/L		03/21/18 05:52	03/23/18 01:20	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:51	4
Arsenic	0.010	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:51	4
Barium	0.011	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:51	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:51	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:51	4
Cobalt	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:51	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:51	4
Molybdenum	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:51	4
Selenium	0.28	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:51	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:51	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:13	1

Client Sample ID: FC-CCR-MW72-31618

Lab Sample ID: 550-99692-7

Date Collected: 03/16/18 14:33

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	4.0	mg/L			03/19/18 19:31	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 04:03	1
Lithium	0.37		0.20	mg/L		03/21/18 05:52	03/23/18 01:26	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:57	4
Arsenic	0.0067	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:57	4
Barium	0.0082	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:57	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:57	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 18:57	4
Cobalt	0.0025	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:57	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:57	4
Molybdenum	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:57	4
Selenium	0.11	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 18:57	4
Thallium	0.0010	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 18:57	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:14	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW73-31618

Lab Sample ID: 550-99692-8

Date Collected: 03/16/18 18:18

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	4.0	mg/L			03/19/18 19:50	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 04:09	1
Lithium	0.25		0.20	mg/L		03/21/18 05:52	03/23/18 01:32	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 19:00	4
Arsenic	0.0034	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:00	4
Barium	0.020	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:00	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 19:00	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 19:00	4
Cobalt	0.0057	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:00	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:00	4
Molybdenum	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:00	4
Selenium	0.017	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:00	4
Thallium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 19:00	4

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:17	1

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	38	D2	4.0	mg/L			03/20/18 21:09	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 04:14	1
Lithium	0.39		0.20	mg/L		03/21/18 05:52	03/23/18 01:37	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 19:02	4
Arsenic	0.0067	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:02	4
Barium	0.021	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:02	4
Cadmium	ND	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 19:02	4
Chromium	ND	D1	0.0040	mg/L		03/21/18 09:00	03/26/18 19:02	4
Cobalt	0.0088	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:02	4
Lead	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:02	4
Molybdenum	0.022	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:02	4
Selenium	ND	D1	0.0020	mg/L		03/21/18 09:00	03/26/18 19:02	4
Thallium	0.00048	D1	0.00040	mg/L		03/21/18 09:00	03/26/18 19:02	4

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 22:19	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-142194/2
Matrix: Water
Analysis Batch: 142194

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			03/19/18 13:23	1

Lab Sample ID: LCS 550-142194/5
Matrix: Water
Analysis Batch: 142194

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.24		mg/L		106	90 - 110

Lab Sample ID: LCSD 550-142194/6
Matrix: Water
Analysis Batch: 142194

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.25		mg/L		106	90 - 110	0	20

Lab Sample ID: 550-99692-1 MS
Matrix: Water
Analysis Batch: 142194

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	41	D1	80.0	124	D1	mg/L		105	80 - 120

Lab Sample ID: 550-99692-1 MSD
Matrix: Water
Analysis Batch: 142194

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	41	D1	80.0	119	D1	mg/L		97	80 - 120	5	20

Lab Sample ID: MB 550-142283/2
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			03/20/18 15:19	1

Lab Sample ID: LCS 550-142283/5
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.27		mg/L		107	90 - 110

Lab Sample ID: LCSD 550-142283/6
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.28		mg/L		107	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Lab Sample ID: 550-99663-A-5 MS
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	7.7		4.00	11.4		mg/L		93	80 - 120

Lab Sample ID: 550-99663-A-5 MSD
Matrix: Water
Analysis Batch: 142283

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	7.7		4.00	11.5		mg/L		95	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-142358/1-A
Matrix: Water
Analysis Batch: 142510

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142358

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		03/21/18 05:52	03/22/18 03:07	1

Lab Sample ID: MB 550-142358/1-A
Matrix: Water
Analysis Batch: 142638

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142358

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		03/21/18 05:52	03/23/18 00:12	1

Lab Sample ID: LCS 550-142358/2-A
Matrix: Water
Analysis Batch: 142510

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	1.00	1.02		mg/L		102	85 - 115

Lab Sample ID: LCS 550-142358/2-A
Matrix: Water
Analysis Batch: 142638

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	0.988		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-142358/3-A
Matrix: Water
Analysis Batch: 142510

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	1.00	1.03		mg/L		103	85 - 115	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCSD 550-142358/3-A
Matrix: Water
Analysis Batch: 142638

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	1.00	1.01		mg/L		101	85 - 115	2	20

Lab Sample ID: 550-99692-1 MS
Matrix: Water
Analysis Batch: 142510

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Beryllium	ND		1.00	0.980		mg/L		98	70 - 130

Lab Sample ID: 550-99692-1 MS
Matrix: Water
Analysis Batch: 142638

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lithium	0.38		1.00	1.41		mg/L		103	70 - 130

Lab Sample ID: 550-99692-1 MSD
Matrix: Water
Analysis Batch: 142510

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	ND		1.00	0.959		mg/L		96	70 - 130	2	20

Lab Sample ID: 550-99692-1 MSD
Matrix: Water
Analysis Batch: 142638

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142358

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	0.38		1.00	1.43		mg/L		106	70 - 130	2	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-142370/1-A
Matrix: Water
Analysis Batch: 142932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142370

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		03/21/18 09:00	03/27/18 09:43	1
Arsenic	ND		0.00050	mg/L		03/21/18 09:00	03/27/18 09:43	1
Barium	ND		0.00050	mg/L		03/21/18 09:00	03/27/18 09:43	1
Cadmium	ND		0.00010	mg/L		03/21/18 09:00	03/27/18 09:43	1
Chromium	ND		0.0010	mg/L		03/21/18 09:00	03/27/18 09:43	1
Cobalt	ND		0.00050	mg/L		03/21/18 09:00	03/27/18 09:43	1
Lead	ND		0.00050	mg/L		03/21/18 09:00	03/27/18 09:43	1
Molybdenum	ND		0.00050	mg/L		03/21/18 09:00	03/27/18 09:43	1
Selenium	ND		0.00050	mg/L		03/21/18 09:00	03/27/18 09:43	1
Thallium	ND		0.00010	mg/L		03/21/18 09:00	03/27/18 09:43	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 550-142370/2-A
Matrix: Water
Analysis Batch: 142932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142370

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0954		mg/L		95	85 - 115
Arsenic	0.100	0.0963		mg/L		96	85 - 115
Barium	0.100	0.0955		mg/L		96	85 - 115
Cadmium	0.100	0.0961		mg/L		96	85 - 115
Chromium	0.100	0.0981		mg/L		98	85 - 115
Cobalt	0.100	0.0972		mg/L		97	85 - 115
Lead	0.100	0.0966		mg/L		97	85 - 115
Molybdenum	0.100	0.0955		mg/L		96	85 - 115
Selenium	0.100	0.0965		mg/L		96	85 - 115
Thallium	0.100	0.0954		mg/L		95	85 - 115

Lab Sample ID: LCSD 550-142370/3-A
Matrix: Water
Analysis Batch: 142932

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142370

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.0949		mg/L		95	85 - 115	1	20
Arsenic	0.100	0.0941		mg/L		94	85 - 115	2	20
Barium	0.100	0.0947		mg/L		95	85 - 115	1	20
Cadmium	0.100	0.0949		mg/L		95	85 - 115	1	20
Chromium	0.100	0.0959		mg/L		96	85 - 115	2	20
Cobalt	0.100	0.0949		mg/L		95	85 - 115	2	20
Lead	0.100	0.0949		mg/L		95	85 - 115	2	20
Molybdenum	0.100	0.0940		mg/L		94	85 - 115	2	20
Selenium	0.100	0.0937		mg/L		94	85 - 115	3	20
Thallium	0.100	0.0949		mg/L		95	85 - 115	1	20

Lab Sample ID: 550-99692-1 MS
Matrix: Water
Analysis Batch: 142908

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142370

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND	D1	0.100	0.0976	D1	mg/L		97	70 - 130
Arsenic	0.0050	D1	0.100	0.114	D1	mg/L		109	70 - 130
Barium	0.020	D1	0.100	0.119	D1	mg/L		99	70 - 130
Cadmium	ND	D1	0.100	0.0935	D1	mg/L		94	70 - 130
Chromium	ND	D1	0.100	0.102	D1	mg/L		102	70 - 130
Cobalt	0.0085	D1	0.100	0.105	D1	mg/L		96	70 - 130
Lead	ND	D1	0.100	0.0890	D1	mg/L		89	70 - 130
Molybdenum	0.022	D1	0.100	0.127	D1	mg/L		104	70 - 130
Selenium	ND	D1	0.100	0.130	D1	mg/L		129	70 - 130
Thallium	0.00054	D1	0.100	0.0907	D1	mg/L		90	70 - 130

Lab Sample ID: 550-99692-1 MSD
Matrix: Water
Analysis Batch: 142908

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142370

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND	D1	0.100	0.0995	D1	mg/L		99	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-99692-1 MSD
Matrix: Water
Analysis Batch: 142908

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142370

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.0050	D1	0.100	0.118	D1	mg/L		113	70 - 130	4	20
Barium	0.020	D1	0.100	0.121	D1	mg/L		101	70 - 130	2	20
Cadmium	ND	D1	0.100	0.0950	D1	mg/L		95	70 - 130	2	20
Chromium	ND	D1	0.100	0.104	D1	mg/L		104	70 - 130	1	20
Cobalt	0.0085	D1	0.100	0.106	D1	mg/L		98	70 - 130	2	20
Lead	ND	D1	0.100	0.0900	D1	mg/L		90	70 - 130	1	20
Molybdenum	0.022	D1	0.100	0.127	D1	mg/L		105	70 - 130	1	20
Selenium	ND	D1	0.100	0.130	D1	mg/L		128	70 - 130	0	20
Thallium	0.00054	D1	0.100	0.0916	D1	mg/L		91	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-142716/1-A
Matrix: Water
Analysis Batch: 142779

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142716

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		03/23/18 16:39	03/24/18 21:59	1

Lab Sample ID: LCS 550-142716/2-A
Matrix: Water
Analysis Batch: 142779

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142716

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	0.0100	0.0102		mg/L		102	85 - 115

Lab Sample ID: LCSD 550-142716/3-A
Matrix: Water
Analysis Batch: 142779

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 142716

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	0.0100	0.0104		mg/L		104	85 - 115	2	20

Lab Sample ID: 550-99692-1 MS
Matrix: Water
Analysis Batch: 142779

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142716

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	ND		0.0100	0.00710		mg/L		71	70 - 130

Lab Sample ID: 550-99692-1 MSD
Matrix: Water
Analysis Batch: 142779

Client Sample ID: FC-CCR-MW66-31618
Prep Type: Total/NA
Prep Batch: 142716

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	ND		0.0100	0.00743		mg/L		74	70 - 130	4	20

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

HPLC/IC

Analysis Batch: 142194

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	300.0	
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	300.0	
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	300.0	
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	300.0	
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	300.0	
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	300.0	
MB 550-142194/2	Method Blank	Total/NA	Water	300.0	
LCS 550-142194/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-142194/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	300.0	
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	300.0	

Analysis Batch: 142283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	300.0	
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	300.0	
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	300.0	
MB 550-142283/2	Method Blank	Total/NA	Water	300.0	
LCS 550-142283/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-142283/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99663-A-5 MS	Matrix Spike	Total/NA	Water	300.0	
550-99663-A-5 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 142358

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	200.7	
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	200.7	
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	200.7	
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	200.7	
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	200.7	
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	200.7	
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	200.7	
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	200.7	
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	200.7	
MB 550-142358/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-142358/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-142358/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	200.7	
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	200.7	

Prep Batch: 142370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	200.8	
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	200.8	
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	200.8	
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	200.8	
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	200.8	
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Metals (Continued)

Prep Batch: 142370 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	200.8	
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	200.8	
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	200.8	
MB 550-142370/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-142370/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-142370/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	200.8	
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	200.8	

Analysis Batch: 142510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	200.7 Rev 4.4	142358
MB 550-142358/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	142358
LCS 550-142358/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	142358
LCSD 550-142358/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	200.7 Rev 4.4	142358

Analysis Batch: 142638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	200.7 Rev 4.4	142358
MB 550-142358/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	142358
LCS 550-142358/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	142358
LCSD 550-142358/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	200.7 Rev 4.4	142358
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	200.7 Rev 4.4	142358

Prep Batch: 142716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	245.1	
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	245.1	
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	245.1	
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	245.1	
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	245.1	
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	245.1	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Metals (Continued)

Prep Batch: 142716 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	245.1	
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	245.1	
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	245.1	
MB 550-142716/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-142716/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-142716/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	245.1	
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	245.1	

Analysis Batch: 142779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	245.1	142716
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	245.1	142716
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	245.1	142716
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	245.1	142716
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	245.1	142716
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	245.1	142716
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	245.1	142716
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	245.1	142716
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	245.1	142716
MB 550-142716/1-A	Method Blank	Total/NA	Water	245.1	142716
LCS 550-142716/2-A	Lab Control Sample	Total/NA	Water	245.1	142716
LCSD 550-142716/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	142716
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	245.1	142716
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	245.1	142716

Analysis Batch: 142908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	200.8 LL	142370
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	200.8 LL	142370
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	200.8 LL	142370
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	200.8 LL	142370
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	200.8 LL	142370
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	200.8 LL	142370
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	200.8 LL	142370
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	200.8 LL	142370
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	200.8 LL	142370
550-99692-1 MS	FC-CCR-MW66-31618	Total/NA	Water	200.8 LL	142370
550-99692-1 MSD	FC-CCR-MW66-31618	Total/NA	Water	200.8 LL	142370

Analysis Batch: 142932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-142370/1-A	Method Blank	Total/NA	Water	200.8 LL	142370
LCS 550-142370/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	142370
LCSD 550-142370/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	142370

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW66-31618

Lab Sample ID: 550-99692-1

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	142194	03/19/18 15:51	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 03:27	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 00:50	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:34	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:06	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

Date Collected: 03/16/18 16:53

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142194	03/19/18 16:46	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 03:33	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 00:56	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:41	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:08	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW68-31618

Lab Sample ID: 550-99692-3

Date Collected: 03/16/18 16:20

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142194	03/19/18 17:04	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 03:39	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:02	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:44	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:09	EXZ	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

Date Collected: 03/16/18 15:45

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142283	03/20/18 20:32	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 03:45	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:08	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:46	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:11	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW70-31618

Lab Sample ID: 550-99692-5

Date Collected: 03/16/18 13:41

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	142283	03/20/18 20:50	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 03:51	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:14	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:48	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:16	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

Date Collected: 03/16/18 17:40

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142194	03/19/18 19:13	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 03:57	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:20	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:51	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:13	EXZ	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Client Sample ID: FC-CCR-MW72-31618

Lab Sample ID: 550-99692-7

Date Collected: 03/16/18 14:33

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142194	03/19/18 19:31	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 04:03	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:26	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 18:57	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:14	EXZ	TAL PHX

Client Sample ID: FC-CCR-MW73-31618

Lab Sample ID: 550-99692-8

Date Collected: 03/16/18 18:18

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142194	03/19/18 19:50	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 04:09	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:32	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 19:00	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:17	EXZ	TAL PHX

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	142283	03/20/18 21:09	NBL	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142510	03/22/18 04:14	ARE	TAL PHX
Total/NA	Prep	200.7			142358	03/21/18 05:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	142638	03/23/18 01:37	ARE	TAL PHX
Total/NA	Prep	200.8			142370	03/21/18 09:00	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	142908	03/26/18 19:02	TEK	TAL PHX
Total/NA	Prep	245.1			142716	03/23/18 16:39	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	142779	03/24/18 22:19	EXZ	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
245.1	Mercury (CVAA)	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix
 4645 E Cotton Cir Bldg 3
 Phoenix, AZ 85040

phone 602.437.3340 fax 623.445.6192

Chain of Custody Record

9991692

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact: **Client Contact**
 Project Manager: **Doug Lavarney**
 Tel/Fax: **928-587-0319**
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Project Name: **CCR**
 E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Perform MS / MSD (Y / N)	Carrier:	COC No.
FC-CCR-MW66-31618	3/16/2018	1252	G	W	4	EPA 200.7 (Be, Li) 200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl) 932.0 Radium 226 and 228 EPA 245.1 (Hg) EPA 300.0 (F)	3/18/2018	1 of 1 COCs
FC-CCR-MW67-31618	3/16/2018	1653	G	W	4			
FC-CCR-MW68-31618	3/16/2018	1620	G	W	4			
FC-CCR-MW69-31618	3/16/2018	1545	G	W	4			
FC-CCR-MW70-31618	3/16/2018	1341	G	W	4			
FC-CCR-MW71-31618	3/16/2018	1740	G	W	4			
FC-CCR-MW72-31618	3/16/2018	1433	G	W	4			
FC-CCR-MW73-31618	3/16/2018	1818	G	W	4			
FC-CCR-FD01-31618	3/16/18	1252	G	W	4			



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Polystyrene Ultrasonic
 Special Instructions/QC Requirements & Comments:
 Do method 200.8 with collision cell

Reinquired by: **APPS** Company: **APPS** Date/Time: **3/18/18 13:36** Received by: **[Signature]** Company: **FA** Date/Time: **3/19/18 6:55**
 Reinquired by: **[Signature]** Company: **[Signature]** Date/Time: **[Signature]** Received by: **[Signature]** Company: **[Signature]** Date/Time: **[Signature]**
 Reinquired by: **[Signature]** Company: **[Signature]** Date/Time: **[Signature]** Received by: **[Signature]** Company: **[Signature]** Date/Time: **[Signature]**

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99692-1

Login Number: 99692
List Number: 1
Creator: Vilaboy, Monica

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-99692-2

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

4/23/2018 3:05:11 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
X	Carrier is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Job ID: 550-99692-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-99692-2

Comments

No additional comments.

Receipt

The samples were received on 3/19/2018 6:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 2.8° C and 3.8° C.

RAD

Method(s) 903.0: Radium-226 Prep Batch 160-357667:

The following samples have barium carrier recoveries above the 110% QC limit; (550-99692-5: 114%, and 550-99692-9: 114%). A native barium correction was applied, however, there could be other salt-like compounds present in the samples that can interfere with the barium sulfate recovery (see prep NCM 136002). The LCS (laboratory control sample) has an acceptable spike recovery demonstrating acceptable sample preparation and instrument performance. The samples have been truncated to 100% to reduce any potential bias a high carrier recovery may have. The data have been reported with this narrative.

FC-CCR-MW70-31618 (550-99692-5) and FC-CCR-FD01-31618 (550-99692-9)

Method(s) 904.0: Radium-228 Prep Batch 160-357670:

The following samples have barium carrier recoveries above the 110% QC limit; (550-99692-5: 114%, and 550-99692-9: 114%). A native barium correction was applied, however, there could be other salt-like compounds present in the samples that can interfere with the barium sulfate recovery (see prep NCM 136001). The LCS (laboratory control sample) has an acceptable spike recovery demonstrating acceptable sample preparation and instrument performance. The samples have been truncated to 100% to reduce any potential bias a high carrier recovery may have. The data have been reported with this narrative.

FC-CCR-MW70-31618 (550-99692-5) and FC-CCR-FD01-31618 (550-99692-9)

Method(s) PrecSep_0: Radium-228 Prep Batch 160-357670:

The barium carrier recovery is outside the <> upper control limit (110%) for the following samples: FC-CCR-MW70-31618 (550-99692-5) and FC-CCR-FD01-31618 (550-99692-9). The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference. The pellets were noted as larger during the out of ingrowth process.

Method(s) PrecSep-21: Radium-226 Prep Batch 160-357667:

The barium carrier recovery is outside the <> upper control limit (110%) for the following samples: FC-CCR-MW70-31618 (550-99692-5) and FC-CCR-FD01-31618 (550-99692-9). The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference. The pellets were noted as larger during the out of ingrowth process.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99692-1	FC-CCR-MW66-31618	Water	03/16/18 12:52	03/19/18 06:55
550-99692-2	FC-CCR-MW67-31618	Water	03/16/18 16:53	03/19/18 06:55
550-99692-3	FC-CCR-MW68-31618	Water	03/16/18 16:20	03/19/18 06:55
550-99692-4	FC-CCR-MW69-31618	Water	03/16/18 15:45	03/19/18 06:55
550-99692-5	FC-CCR-MW70-31618	Water	03/16/18 13:41	03/19/18 06:55
550-99692-6	FC-CCR-MW71-31618	Water	03/16/18 17:40	03/19/18 06:55
550-99692-7	FC-CCR-MW72-31618	Water	03/16/18 14:33	03/19/18 06:55
550-99692-8	FC-CCR-MW73-31618	Water	03/16/18 18:18	03/19/18 06:55
550-99692-9	FC-CCR-FD01-31618	Water	03/16/18 12:52	03/19/18 06:55

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW66-31618

Lab Sample ID: 550-99692-1

No Detections.

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

No Detections.

Client Sample ID: FC-CCR-MW68-31618

Lab Sample ID: 550-99692-3

No Detections.

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

No Detections.

Client Sample ID: FC-CCR-MW70-31618

Lab Sample ID: 550-99692-5

No Detections.

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

No Detections.

Client Sample ID: FC-CCR-MW72-31618

Lab Sample ID: 550-99692-7

No Detections.

Client Sample ID: FC-CCR-MW73-31618

Lab Sample ID: 550-99692-8

No Detections.

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW66-31618

Lab Sample ID: 550-99692-1

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.26		0.171	0.205	1.00	0.0602	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.59		0.285	0.321	1.00	0.294	pCi/L	03/26/18 13:36	04/03/18 14:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:36	04/03/18 14:53	1
Y Carrier	92.7		40 - 110					03/26/18 13:36	04/03/18 14:53	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.86		0.332	0.381	5.00	0.294	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

Date Collected: 03/16/18 16:53

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.586		0.125	0.136	1.00	0.0870	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.50		0.290	0.321	1.00	0.312	pCi/L	03/26/18 13:36	04/03/18 14:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					03/26/18 13:36	04/03/18 14:53	1
Y Carrier	92.3		40 - 110					03/26/18 13:36	04/03/18 14:53	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.08		0.316	0.349	5.00	0.312	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW68-31618

Lab Sample ID: 550-99692-3

Date Collected: 03/16/18 16:20

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.403		0.106	0.112	1.00	0.0806	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.17		0.286	0.306	1.00	0.347	pCi/L	03/26/18 13:36	04/03/18 14:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110					03/26/18 13:36	04/03/18 14:53	1
Y Carrier	90.1		40 - 110					03/26/18 13:36	04/03/18 14:53	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.57		0.305	0.326	5.00	0.347	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

Date Collected: 03/16/18 15:45

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.35		0.181	0.218	1.00	0.0811	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	2.82		0.352	0.437	1.00	0.277	pCi/L	03/26/18 13:36	04/03/18 14:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:36	04/03/18 14:53	1
Y Carrier	90.1		40 - 110					03/26/18 13:36	04/03/18 14:53	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	4.18		0.396	0.488	5.00	0.277	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW70-31618

Lab Sample ID: 550-99692-5

Date Collected: 03/16/18 13:41

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.455		0.117	0.124	1.00	0.0931	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	114	X	40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.45		0.265	0.297	1.00	0.271	pCi/L	03/26/18 13:36	04/03/18 14:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	114	X	40 - 110					03/26/18 13:36	04/03/18 14:53	1
Y Carrier	92.7		40 - 110					03/26/18 13:36	04/03/18 14:53	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.10		0.323	0.359	5.00	0.308	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

Date Collected: 03/16/18 17:40

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.493		0.108	0.117	1.00	0.0581	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.688		0.230	0.238	1.00	0.304	pCi/L	03/26/18 13:36	04/03/18 14:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:36	04/03/18 14:54	1
Y Carrier	90.5		40 - 110					03/26/18 13:36	04/03/18 14:54	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.18		0.254	0.265	5.00	0.304	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW72-31618

Lab Sample ID: 550-99692-7

Date Collected: 03/16/18 14:33

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.602		0.122	0.134	1.00	0.0723	pCi/L	03/26/18 13:00	04/17/18 05:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	106		40 - 110					03/26/18 13:00	04/17/18 05:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	2.27		0.339	0.398	1.00	0.326	pCi/L	03/26/18 13:36	04/03/18 14:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	106		40 - 110					03/26/18 13:36	04/03/18 14:54	1
Y Carrier	93.5		40 - 110					03/26/18 13:36	04/03/18 14:54	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.87		0.360	0.420	5.00	0.326	pCi/L		04/18/18 12:22	1

Client Sample ID: FC-CCR-MW73-31618

Lab Sample ID: 550-99692-8

Date Collected: 03/16/18 18:18

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.739		0.134	0.149	1.00	0.0656	pCi/L	03/26/18 13:00	04/17/18 06:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	106		40 - 110					03/26/18 13:00	04/17/18 06:00	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	2.32		0.345	0.405	1.00	0.338	pCi/L	03/26/18 13:36	04/03/18 14:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	106		40 - 110					03/26/18 13:36	04/03/18 14:54	1
Y Carrier	92.7		40 - 110					03/26/18 13:36	04/03/18 14:54	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	3.06		0.370	0.432	5.00	0.338	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.42		0.190	0.229	1.00	0.0704	pCi/L	03/26/18 13:00	04/17/18 06:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	114	X	40 - 110					03/26/18 13:00	04/17/18 06:00	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	2.23		0.317	0.377	1.00	0.291	pCi/L	03/26/18 13:36	04/03/18 14:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	114	X	40 - 110					03/26/18 13:36	04/03/18 14:54	1
Y Carrier	92.3		40 - 110					03/26/18 13:36	04/03/18 14:54	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	3.96		0.409	0.488	5.00	0.332	pCi/L		04/18/18 12:22	1

Tracer/Carrier Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Percent Yield (Acceptance Limits)			
440-206741-A-1-B MSD	Matrix Spike Duplicate	92.9				
460-152183-F-1-M DU	Duplicate	98.5				
460-152183-J-1-A MS	Matrix Spike	98.8				
550-99692-1	FC-CCR-MW66-31618	109				
550-99692-2	FC-CCR-MW67-31618	104				
550-99692-3	FC-CCR-MW68-31618	103				
550-99692-4	FC-CCR-MW69-31618	109				
550-99692-5	FC-CCR-MW70-31618	114 X				
550-99692-6	FC-CCR-MW71-31618	109				
550-99692-7	FC-CCR-MW72-31618	106				
550-99692-8	FC-CCR-MW73-31618	106				
550-99692-9	FC-CCR-FD01-31618	114 X				
LCS 160-357667/1-A	Lab Control Sample	98.8				
MB 160-357667/19-A	Method Blank	109				

Tracer/Carrier Legend
Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)	Percent Yield (Acceptance Limits)			
440-206741-A-1-D MSD	Matrix Spike Duplicate	92.9	87.5				
460-152183-F-1-N DU	Duplicate	98.5	90.5				
460-152183-J-1-B MS	Matrix Spike	98.8	91.6				
550-99692-1	FC-CCR-MW66-31618	109	92.7				
550-99692-2	FC-CCR-MW67-31618	104	92.3				
550-99692-3	FC-CCR-MW68-31618	103	90.1				
550-99692-4	FC-CCR-MW69-31618	109	90.1				
550-99692-5	FC-CCR-MW70-31618	114 X	92.7				
550-99692-6	FC-CCR-MW71-31618	109	90.5				
550-99692-7	FC-CCR-MW72-31618	106	93.5				
550-99692-8	FC-CCR-MW73-31618	106	92.7				
550-99692-9	FC-CCR-FD01-31618	114 X	92.3				
LCS 160-357670/1-A	Lab Control Sample	98.8	89.3				
MB 160-357670/19-A	Method Blank	109	89.3				

Tracer/Carrier Legend
Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-357667/19-A
Matrix: Water
Analysis Batch: 361426

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 357667

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.007862	U	0.0388	0.0388	1.00	0.0769	pCi/L	03/26/18 13:00	04/17/18 06:00	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:00	04/17/18 06:00	1

Lab Sample ID: LCS 160-357667/1-A
Matrix: Water
Analysis Batch: 361425

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 357667

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	11.8	11.57		1.17	1.00	0.0731	pCi/L	98	68 - 137
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	98.8		40 - 110						

Lab Sample ID: 440-206741-A-1-B MSD
Matrix: Water
Analysis Batch: 361425

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 357667

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226	0.0263	U	11.8	10.10		1.05	1.00	0.0737	pCi/L	85	75 - 138	0.05	1
Carrier	MSD %Yield	MSD Qualifier	Limits										
Ba Carrier	92.9		40 - 110										

Lab Sample ID: 460-152183-J-1-A MS
Matrix: Water
Analysis Batch: 361426

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 357667

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	0.0469	U	11.8	10.03		1.03	1.00	0.0743	pCi/L	85	75 - 138
Carrier	MS %Yield	MS Qualifier	Limits								
Ba Carrier	98.8		40 - 110								

Lab Sample ID: 460-152183-F-1-M DU
Matrix: Water
Analysis Batch: 361425

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 357667

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.0469	U	0.04038	U	0.0486	1.00	0.0789	pCi/L	0.06	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: 460-152183-F-1-M DU
Matrix: Water
Analysis Batch: 361425

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 357667

	DU	DU	
Carrier	%Yield	Qualifier	Limits
Ba Carrier	98.5		40 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-357670/19-A
Matrix: Water
Analysis Batch: 358655

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 357670

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.2098	U	0.206	0.207	1.00	0.334	pCi/L	03/26/18 13:36	04/03/18 14:54	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					03/26/18 13:36	04/03/18 14:54	1
Y Carrier	89.3		40 - 110					03/26/18 13:36	04/03/18 14:54	1

Lab Sample ID: LCS 160-357670/1-A
Matrix: Water
Analysis Batch: 358655

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 357670

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	8.43	7.164		0.866	1.00	0.319	pCi/L	85	56 - 140
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	98.8		40 - 110						
Y Carrier	89.3		40 - 110						

Lab Sample ID: 440-206741-A-1-D MSD
Matrix: Water
Analysis Batch: 358655

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 357670

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	0.00415	U	8.43	8.755		1.03	1.00	0.352	pCi/L	104	45 - 150	1.01	1
Carrier	MSD %Yield	MSD Qualifier	Limits										
Ba Carrier	92.9		40 - 110										
Y Carrier	87.5		40 - 110										

Lab Sample ID: 460-152183-J-1-B MS
Matrix: Water
Analysis Batch: 358655

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 357670

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	0.184	U	8.42	7.468		0.896	1.00	0.357	pCi/L	86	45 - 150

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-99692-2

<i>Carrier</i>	<i>MS</i> <i>%Yield</i>	<i>MS</i> <i>Qualifier</i>	<i>Limits</i>
Ba Carrier	98.8		40 - 110
Y Carrier	91.6		40 - 110

Lab Sample ID: 460-152183-F-1-N DU
Matrix: Water
Analysis Batch: 358655

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 357670

<i>Analyte</i>	<i>Sample</i> <i>Result</i>	<i>Sample</i> <i>Qual</i>	<i>DU</i> <i>Result</i>	<i>DU</i> <i>Qual</i>	<i>Total</i> <i>Uncert.</i> <i>(2σ+/-)</i>	<i>RL</i>	<i>MDC</i>	<i>Unit</i>	<i>RER</i>	<i>RER</i> <i>Limit</i>
Radium-228	0.184	U	0.08239	U	0.205	1.00	0.353	pCi/L	0.26	1

<i>Carrier</i>	<i>DU</i> <i>%Yield</i>	<i>DU</i> <i>Qualifier</i>	<i>Limits</i>
Ba Carrier	98.5		40 - 110
Y Carrier	90.5		40 - 110

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QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Rad

Prep Batch: 357667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	PrecSep-21	
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	PrecSep-21	
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	PrecSep-21	
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	PrecSep-21	
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	PrecSep-21	
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	PrecSep-21	
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	PrecSep-21	
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	PrecSep-21	
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	PrecSep-21	
MB 160-357667/19-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-357667/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
440-206741-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep-21	
460-152183-J-1-A MS	Matrix Spike	Total/NA	Water	PrecSep-21	
460-152183-F-1-M DU	Duplicate	Total/NA	Water	PrecSep-21	

Prep Batch: 357670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99692-1	FC-CCR-MW66-31618	Total/NA	Water	PrecSep_0	
550-99692-2	FC-CCR-MW67-31618	Total/NA	Water	PrecSep_0	
550-99692-3	FC-CCR-MW68-31618	Total/NA	Water	PrecSep_0	
550-99692-4	FC-CCR-MW69-31618	Total/NA	Water	PrecSep_0	
550-99692-5	FC-CCR-MW70-31618	Total/NA	Water	PrecSep_0	
550-99692-6	FC-CCR-MW71-31618	Total/NA	Water	PrecSep_0	
550-99692-7	FC-CCR-MW72-31618	Total/NA	Water	PrecSep_0	
550-99692-8	FC-CCR-MW73-31618	Total/NA	Water	PrecSep_0	
550-99692-9	FC-CCR-FD01-31618	Total/NA	Water	PrecSep_0	
MB 160-357670/19-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-357670/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
440-206741-A-1-D MSD	Matrix Spike Duplicate	Total/NA	Water	PrecSep_0	
460-152183-J-1-B MS	Matrix Spike	Total/NA	Water	PrecSep_0	
460-152183-F-1-N DU	Duplicate	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW66-31618

Lab Sample ID: 550-99692-1

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:53	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW67-31618

Lab Sample ID: 550-99692-2

Date Collected: 03/16/18 16:53

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:53	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW68-31618

Lab Sample ID: 550-99692-3

Date Collected: 03/16/18 16:20

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:53	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW69-31618

Lab Sample ID: 550-99692-4

Date Collected: 03/16/18 15:45

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:53	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-MW70-31618

Lab Sample ID: 550-99692-5

Date Collected: 03/16/18 13:41

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:53	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW71-31618

Lab Sample ID: 550-99692-6

Date Collected: 03/16/18 17:40

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:54	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW72-31618

Lab Sample ID: 550-99692-7

Date Collected: 03/16/18 14:33

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 05:59	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:54	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: FC-CCR-MW73-31618

Lab Sample ID: 550-99692-8

Date Collected: 03/16/18 18:18

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 06:00	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:54	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Client Sample ID: FC-CCR-FD01-31618

Lab Sample ID: 550-99692-9

Date Collected: 03/16/18 12:52

Matrix: Water

Date Received: 03/19/18 06:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			357667	03/26/18 13:00	TJT	TAL SL
Total/NA	Analysis	903.0		1	361426	04/17/18 06:00	RTM	TAL SL
Total/NA	Prep	PrecSep_0			357670	03/26/18 13:36	TJT	TAL SL
Total/NA	Analysis	904.0		1	358655	04/03/18 14:54	RTM	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18

Laboratory: TestAmerica St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	MO00054	06-30-18 *
Arizona	State Program	9	AZ0813	12-08-18
California	State Program	9	2886	06-30-18 *
Connecticut	State Program	1	PH-0241	03-31-19
Florida	NELAP	4	E87689	06-30-18 *
Illinois	NELAP	5	200023	11-30-18
Iowa	State Program	7	373	12-01-18
Kansas	NELAP	7	E-10236	10-31-18
Kentucky (DW)	State Program	4	90125	12-31-18
L-A-B	DoD ELAP		L2305	04-06-19
Louisiana	NELAP	6	04080	06-30-18
Louisiana (DW)	NELAP	6	LA180017	12-31-18
Maryland	State Program	3	310	09-30-18
Michigan	State Program	5	9005	06-30-18
Missouri	State Program	7	780	06-30-18
Nevada	State Program	9	MO000542018-1	07-31-18
New Jersey	NELAP	2	MO002	06-30-18 *
New York	NELAP	2	11616	03-31-19
North Dakota	State Program	8	R207	06-30-18
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-18
Pennsylvania	NELAP	3	68-00540	02-28-19
South Carolina	State Program	4	85002001	06-30-18
Texas	NELAP	6	T104704193-17-11	07-31-18
US Fish & Wildlife	Federal		058448	08-31-18
USDA	Federal		P330-17-0028	02-02-20
Utah	NELAP	8	MO000542016-8	07-31-18
Virginia	NELAP	3	460230	06-14-18 *
Washington	State Program	10	C592	08-30-18
West Virginia DEP	State Program	3	381	08-31-18 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica Phoenix
 4645 E Cotton Cir Bldg 3
 Phoenix, AZ 85040

phone 602.437.3340 fax 623.445.6192

Chain of Custody Record

9991692

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact: **Client Contact**
 Project Manager: **Doug Lavarney**
 Tel/Fax: **928-587-0319**
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Project Name: **CCR**
 E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Perform MS / MSD (Y / N)	EPA 200.7 (Be, Li)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	932.0 Radium 226 and 228	EPA 245.1 (Hg)	EPA 300.0 (F)
FC-CCR-MW66-31618	3/16/2018	1252	G	W	4	N	X	X	X	X	X
FC-CCR-MW67-31618	3/16/2018	1653	G	W	4	N	X	X	X	X	X
FC-CCR-MW68-31618	3/16/2018	1620	G	W	4	N	X	X	X	X	X
FC-CCR-MW69-31618	3/16/2018	1545	G	W	4	N	X	X	X	X	X
FC-CCR-MW70-31618	3/16/2018	1341	G	W	4	N	X	X	X	X	X
FC-CCR-MW71-31618	3/16/2018	1740	G	W	4	N	X	X	X	X	X
FC-CCR-MW72-31618	3/16/2018	1433	G	W	4	N	X	X	X	X	X
FC-CCR-MW73-31618	3/16/2018	1818	G	W	4	N	X	X	X	X	X
FC-CCR-FD01-31618	3/16/18	1252	G	W	4	N	X	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Polysty B Ultrasonic
 Special Instructions/QC Requirements & Comments:
 Do method 200.8 with collision cell

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Relinquished by: *Doug Lavarney* Company: *APS* Date/Time: *3/18/18 13:36* Received by: *[Signature]* Company: *FR* Date/Time: *3/19/18 6:55*
 Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: _____ Date/Time: _____
 Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: _____ Date/Time: _____

2.5/28/3.8

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler:		Lab PM:		Carrier Tracking No(s):					
Company: TestAmerica Laboratories, Inc.		Baker, Ken		550-20534.1							
Address: 13715 Rider Trail North,		Phone: ken.baker@testamericainc.com		State of Origin: Arizona							
City: Earth City		E-Mail: ken.baker@testamericainc.com		Page: Page 1 of 1							
State, Zip: MO, 63045		Accreditations Required (See note): State Program - Arizona		Job #: 550-99692-1							
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		Due Date Requested: 3/28/2018		Analysis Requested		Preservation Codes:					
Email:		TAT Requested (days):		Field Filtered Sample (Yes or No)		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Arniclor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:					
Project #: 55009705		PO #:		Perform MS/MSD (Yes or No)		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)					
Site: Arizona Public Service		WO #:		903.0/PreSep_21 Radium-226 (GFPC)		Total Number of containers					
		Project #:		904.0/PreSep_0 Radium-228 (GFPC)		Special Instructions/Note:					
		SSOW#:									
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastewat, B=BIOTISSUE, A=AIR)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PreSep_21 Radium-226 (GFPC)	904.0/PreSep_0 Radium-228 (GFPC)	Total Number of containers	Special Instructions/Note:
FC-CCR-MW66-31618 (550-99692-1)	3/16/18	12:52 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW67-31618 (550-99692-2)	3/16/18	16:53 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW68-31618 (550-99692-3)	3/16/18	16:20 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW69-31618 (550-99692-4)	3/16/18	15:45 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW70-31618 (550-99692-5)	3/16/18	13:41 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW71-31618 (550-99692-6)	3/16/18	17:40 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW72-31618 (550-99692-7)	3/16/18	14:33 Arizona	Water	Water		X	X	X		2	
FC-CCR-MW73-31618 (550-99692-8)	3/16/18	18:18 Arizona	Water	Water		X	X	X		2	
FC-CCR-FD01-31618 (550-99692-9)	3/16/18	12:52 Arizona	Water	Water		X	X	X		2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2
 Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: *3/19/18* Date/Time: *13:35* Company: *LAB*
 Relinquished by: *3/19/18* Date/Time: *13:35* Company: *LAB*
 Relinquished by: _____ Date/Time: _____ Company: _____
 Custody Seals Intact: _____ Custody Seal No.: _____
 Δ Yes Δ No
 Cooler Temperature(s) °C and Other Remarks: _____

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements: _____

Received by: *Autism Taylor* Date/Time: *3/20/18* Company: *LAB*
 Received by: _____ Date/Time: _____ Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Cooler Temperature(s) °C and Other Remarks: _____



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99692-2

Login Number: 99692
List Number: 1
Creator: Vilaboy, Monica

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99692-2

Login Number: 99692
List Number: 2
Creator: Taylor, Kristene N

List Source: TestAmerica St. Louis
List Creation: 03/20/18 04:55 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.3,21.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-99692-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/12/2018 1:13:25 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-3

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-3

Job ID: 550-99692-3

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-99692-3**

Comments

No additional comments.

Receipt

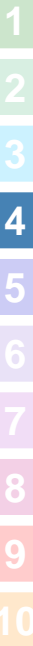
The samples were received on 3/19/2018 6:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.5° C, 2.8° C and 3.8° C.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.



Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99692-1	FC-CCR-MW66-31618	Water	03/16/18 12:52	03/19/18 06:55
550-99692-2	FC-CCR-MW67-31618	Water	03/16/18 16:53	03/19/18 06:55
550-99692-3	FC-CCR-MW68-31618	Water	03/16/18 16:20	03/19/18 06:55
550-99692-4	FC-CCR-MW69-31618	Water	03/16/18 15:45	03/19/18 06:55
550-99692-5	FC-CCR-MW70-31618	Water	03/16/18 13:41	03/19/18 06:55
550-99692-6	FC-CCR-MW71-31618	Water	03/16/18 17:40	03/19/18 06:55
550-99692-7	FC-CCR-MW72-31618	Water	03/16/18 14:33	03/19/18 06:55
550-99692-8	FC-CCR-MW73-31618	Water	03/16/18 18:18	03/19/18 06:55
550-99692-9	FC-CCR-FD01-31618	Water	03/16/18 12:52	03/19/18 06:55

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-3

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-99692-3

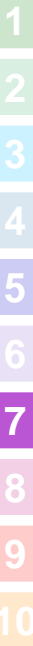
Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

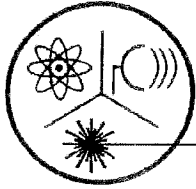
Protocol References:

None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225





Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

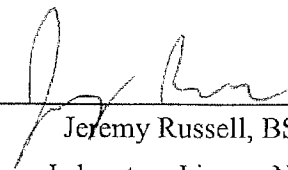
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

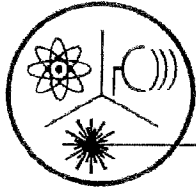
Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW66-31618 (550-99692-1)	< 1.5	< 1.5	< 1.5

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

6/11/2018
Date



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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW67-31618 (550-99692-2)	< 1.2	0.9 ± 0.1	0.9 ± 0.1

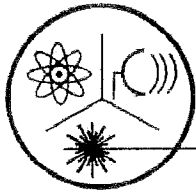
Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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Jeremy Russell, BSE

6/11/2018

Date

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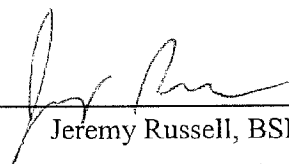
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

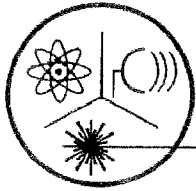
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW68-31618 (550-99692-3)	< 1.2	1.0 ± 0.1	1.0 ± 0.1

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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6/11/2018
Date

Laboratory License Number AZ0462



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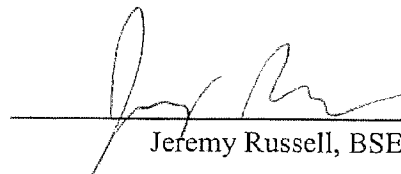
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW69-31618 (550-99692-4)	1.6 ± 0.1	3.8 ± 0.1	5.4 ± 0.1

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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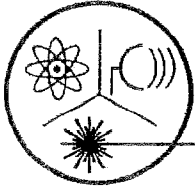


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6/11/2018

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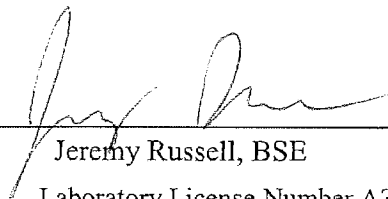
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

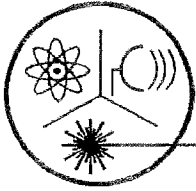
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW70-31618 (550-99692-5)	< 1.1	2.6 ± 0.1	2.6 ± 0.1

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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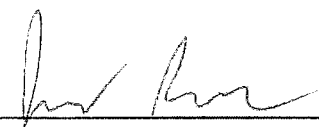
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

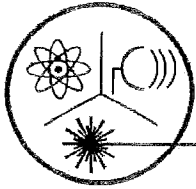
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW71-31618 (550-99692-6)	< 1.0	0.8 ± 0.1	0.8 ± 0.1

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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6/11/2018
Date



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Radiochemical Activity in Water (pCi/L)

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4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW72-31618 (550-99692-7)	< 1.0	1.9 ± 0.1	1.9 ± 0.1

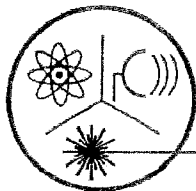
Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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Jeremy Russell, BSE

6/11/2018

Date

Laboratory License Number AZ0462



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Website: www.radsafe.com

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FAX (480) 892-5446

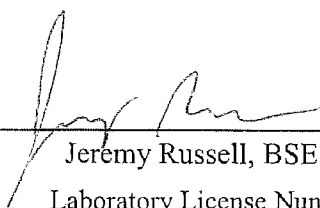
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

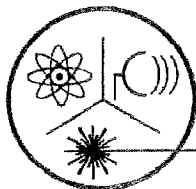
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW73-31618 (550-99692-8)	< 1.0	2.6 ± 0.1	2.6 ± 0.1

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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6/11/2018
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FAX (480) 892-5446

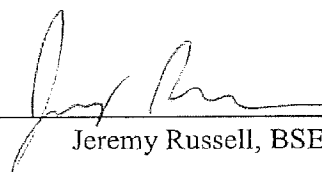
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: March 16, 2018
Sample Received: May 30, 2018
Analysis Completed: June 11, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-31618 (550-99692-9)	1.4 ± 0.1	2.6 ± 0.1	4.0 ± 0.1

Date of Analysis	6/1/2018	6/1/2018	6/1/2018
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Jeremy Russell, BSE

6/11/2018
Date

Laboratory License Number AZ0462

TestAmerica Phoenix
 4625 East Cotton Cir Blvd Suite 189
 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303



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Chain of Custody Record

Client Information (Sub Contract Lab)		Sampler: Baker, Ken	Lab P.M.: Baker, Ken	Camera Tracking No(s): 550-21277.1	COC No: 550-21277.1	
Client Contact: Shipping/Receiving		Phone: ken.baker@testamericainc.com	E-Mail: ken.baker@testamericainc.com	State of Origin: Arizona	Page: Page 1 of 1	
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona		Job #: 550-99692-3		
Address: 3245 North Washington Street, Chandler, AZ, 85225		Due Date Requested: 6/11/2018		Preservation Codes: M - Hexane N - Nona O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)		
City: Chandler		TAT Requested (days):		Analysis Requested:		
State Zip: AZ, 85225		PO #:		Total Number of Containers		
Phone:		WO #:		Field Filtered Sample (Yes or No)		
Email:		Project #: 55009706		Perform MS/MSD (Yes or No)		
Project Name: APS - Four Corners CCR		Site: Arizona Public Service		SUB (Radium 226/228) Radium 226/228		
Site: Arizona Public Service		SSOW#:		Special Instructions/Note:		
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, Solid, or seasonal)	Preservation Code
FC-CCR-MW66-31618 (550-99692-1)	60431	3/16/18	12:52 Arizona	Water	Water	Water
FC-CCR-MW67-31618 (550-99692-2)	60432	3/16/18	16:53 Arizona	Water	Water	Water
FC-CCR-MW68-31618 (550-99692-3)	60433	3/16/18	16:20 Arizona	Water	Water	Water
FC-CCR-MW69-31618 (550-99692-4)	60434	3/16/18	15:45 Arizona	Water	Water	Water
FC-CCR-MW70-31618 (550-99692-5)	60435	3/16/18	13:41 Arizona	Water	Water	Water
FC-CCR-MW71-31618 (550-99692-6)	60436	3/16/18	17:40 Arizona	Water	Water	Water
FC-CCR-MW72-31618 (550-99692-7)	60437	3/16/18	14:33 Arizona	Water	Water	Water
FC-CCR-MW73-31618 (550-99692-8)	60438	3/16/18	18:18 Arizona	Water	Water	Water
FC-CCR-FD01-31618 (550-99692-9)	60439	3/16/18	12:52 Arizona	Water	Water	Water
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.</p>						
Possible Hazard Identification						
Unconfirmed						
Deliverable Requested: I, II, III, IV, Other (specify)						
Special Instructions/OC Requirements:						
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)						
<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months						
Method of Shipment:						
Date:						
Relinquished by: _____ Date/Time: _____ Company: _____						
Relinquished by: _____ Date/Time: _____ Company: _____						
Relinquished by: _____ Date/Time: _____ Company: _____						
Custody Seals Intact: _____ Custody Seal No.: _____						
<input type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temperature(s) °C and Other Remarks:						



TestAmerica Phoenix
 4645 E Cotton Cir Bldg 3
 Phoenix, AZ 85040

phone 602.437.3340 fax 623.445.6192

Chain of Custody Record

9991692

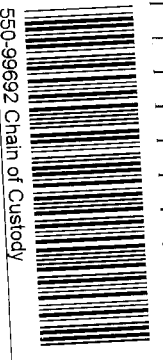
TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarney**
 Project Manager: **Doug Lavarney**
 Tel/Fax: **928-587-0319**
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day

Project Name: **CCR**
 E-Mail Address:

SDG No.

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Perform MS / MSD (Y / N)	Carrier:	COC No.
FC-CCR-MW66-31618	3/16/2018	1252	G	W	4	EPA 200.7 (Be, Li) 200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl) 932.0 Radium 226 and 228 EPA 245.1 (Hg) EPA 300.0 (F)	3/18/2018	1 of 1 COCs
FC-CCR-MW67-31618	3/16/2018	1653	G	W	4			
FC-CCR-MW68-31618	3/16/2018	1620	G	W	4			
FC-CCR-MW69-31618	3/16/2018	1545	G	W	4			
FC-CCR-MW70-31618	3/16/2018	1341	G	W	4			
FC-CCR-MW71-31618	3/16/2018	1740	G	W	4			
FC-CCR-MW72-31618	3/16/2018	1433	G	W	4			
FC-CCR-MW73-31618	3/16/2018	1818	G	W	4			
FC-CCR-FD01-31618	3/16/18	1252	G	W	4			



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Special Instructions/QC Requirements & Comments:
 Do method 200.8 with collision cell

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

Reinquired by: **Doug Lavarney** Company: **APS** Date/Time: **3/18/18 13:36** Received by: **[Signature]** Company: **FA** Date/Time: **3/19/18 6:55**

Reinquired by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: _____ Date/Time: _____

Reinquired by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: _____ Date/Time: _____

2.5/28/3.8

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99692-3

Login Number: 99692
List Number: 1
Creator: Vilaboy, Monica

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-103741-1

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/20/2018 10:29:54 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Method Summary	33
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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Job ID: 550-103741-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103741-1**

Comments

No additional comments.

Receipt

The samples were received on 6/4/2018 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.8° C, 2.0° C, 2.0° C and 2.0° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW-71-6218 (550-103741-7), FC-CCR-MW-72-6218 (550-103741-8) and FC-CCR-MW-73-6218 (550-103741-9). The analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103741-1	FC-CCR-MW-66-53118	Water	05/31/18 14:14	06/04/18 13:25
550-103741-2	FC-CCR-MW-67-6218	Water	06/02/18 09:25	06/04/18 13:25
550-103741-3	FC-CCR-MW-68-6218	Water	06/02/18 08:57	06/04/18 13:25
550-103741-4	FC-CCR-MW-69-6218	Water	06/02/18 08:16	06/04/18 13:25
550-103741-5	FC-CCR-FD02-6218	Water	06/02/18 08:16	06/04/18 13:25
550-103741-6	FC-CCR-MW-70-53118	Water	05/31/18 14:52	06/04/18 13:25
550-103741-7	FC-CCR-MW-71-6218	Water	06/02/18 10:25	06/04/18 13:25
550-103741-8	FC-CCR-MW-72-6218	Water	06/02/18 11:07	06/04/18 13:25
550-103741-9	FC-CCR-MW-73-6218	Water	06/02/18 11:45	06/04/18 13:25

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-66-53118

Lab Sample ID: 550-103741-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1800	D2	400	mg/L	200		300.0	Total/NA
Fluoride	25	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	150	D2 M3	0.25	mg/L	5		200.7 Rev 4.4	Total/NA
Calcium	440	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2800	D2 M3	10	mg/L	5		200.7 Rev 4.4	Total/NA
Potassium	39		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	630	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	300		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	300		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	19000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-67-6218

Lab Sample ID: 550-103741-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000	D2	400	mg/L	200		300.0	Total/NA
Fluoride	25	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	15000	D2	400	mg/L	200		300.0	Total/NA
Boron	200	D2	0.25	mg/L	5		200.7 Rev 4.4	Total/NA
Calcium	430		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	3500	D2	10	mg/L	5		200.7 Rev 4.4	Total/NA
Potassium	43		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	940		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	350		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	350		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	23000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-68-6218

Lab Sample ID: 550-103741-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1500	D2	400	mg/L	200		300.0	Total/NA
Fluoride	12	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	10000	D2	400	mg/L	200		300.0	Total/NA
Boron	130	D2	0.25	mg/L	5		200.7 Rev 4.4	Total/NA
Calcium	430		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2300	D2	10	mg/L	5		200.7 Rev 4.4	Total/NA
Potassium	17		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	650		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	570		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	570		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	17000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.9	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-69-6218

Lab Sample ID: 550-103741-4

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-69-6218 (Continued)

Lab Sample ID: 550-103741-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	400	mg/L	200		300.0	Total/NA
Fluoride	21	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	120	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	430		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2600	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	38		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	680		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	360		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	360		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	18000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD02-6218

Lab Sample ID: 550-103741-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1300	D2	400	mg/L	200		300.0	Total/NA
Fluoride	21	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	130	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	430		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2500	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	38		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	680		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	350		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	350		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	18000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-70-53118

Lab Sample ID: 550-103741-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1100	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.8	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	6500	D2	400	mg/L	200		300.0	Total/NA
Boron	100	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	490		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1300	D2	4.0	mg/L	2		200.7 Rev 4.4	Total/NA
Potassium	17		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	780		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	520		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	520		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	11000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.9	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-71-6218 (Continued)

Lab Sample ID: 550-103741-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	520	D2	400	mg/L	200		300.0	Total/NA
Sulfate	10000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.55		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	420		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2000	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	27		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1000		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	430		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	430		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	15000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	450	D2	400	mg/L	200		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	410		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	2300	D2	10	mg/L	5		200.7 Rev 4.4	Total/NA
Potassium	26		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	670		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	610		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	610		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.3	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW-73-6218

Lab Sample ID: 550-103741-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	550	D2	400	mg/L	200		300.0	Total/NA
Sulfate	7100	D2	400	mg/L	200		300.0	Total/NA
Boron	1.6		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	460		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	710		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	34		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1600		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	800		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	800		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	12000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.9	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-66-53118

Lab Sample ID: 550-103741-1

Date Collected: 05/31/18 14:14

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1800	D2	400	mg/L			06/07/18 23:52	200
Fluoride	25	D1	0.80	mg/L			06/07/18 23:24	2
Sulfate	12000	D2	400	mg/L			06/07/18 23:52	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	150	D2 M3	0.25	mg/L		06/05/18 11:56	06/07/18 19:44	5
Calcium	440	M3	2.0	mg/L		06/05/18 11:56	06/06/18 19:57	1
Magnesium	2800	D2 M3	10	mg/L		06/05/18 11:56	06/07/18 19:44	5
Potassium	39		0.50	mg/L		06/05/18 11:56	06/07/18 19:50	1
Sodium	630	M3	0.50	mg/L		06/05/18 11:56	06/07/18 19:50	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:00	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	300		6.0	mg/L			06/06/18 14:59	1
Bicarbonate Alkalinity as CaCO3	300		6.0	mg/L			06/06/18 14:59	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:59	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 14:59	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 14:59	1
Total Dissolved Solids	19000	D2	100	mg/L			06/05/18 08:44	1
pH	7.2	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.2	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-67-6218

Lab Sample ID: 550-103741-2

Date Collected: 06/02/18 09:25

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000	D2	400	mg/L			06/08/18 01:41	200
Fluoride	25	D1	0.80	mg/L			06/08/18 01:14	2
Sulfate	15000	D2	400	mg/L			06/08/18 01:41	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	200	D2	0.25	mg/L		06/05/18 11:56	06/07/18 20:14	5
Calcium	430		2.0	mg/L		06/05/18 11:56	06/06/18 20:21	1
Magnesium	3500	D2	10	mg/L		06/05/18 11:56	06/07/18 20:14	5
Potassium	43		0.50	mg/L		06/05/18 11:56	06/07/18 20:19	1
Sodium	940		0.50	mg/L		06/05/18 11:56	06/07/18 20:19	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:01	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-67-6218

Lab Sample ID: 550-103741-2

Date Collected: 06/02/18 09:25

Matrix: Water

Date Received: 06/04/18 13:25

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	350		6.0	mg/L			06/06/18 15:19	1
Bicarbonate Alkalinity as CaCO3	350		6.0	mg/L			06/06/18 15:19	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:19	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 15:19	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:19	1
Total Dissolved Solids	23000	D2	200	mg/L			06/05/18 08:44	1
pH	7.1	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.1	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-68-6218

Lab Sample ID: 550-103741-3

Date Collected: 06/02/18 08:57

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1500	D2	400	mg/L			06/08/18 02:36	200
Fluoride	12	D1	0.80	mg/L			06/08/18 02:09	2
Sulfate	10000	D2	400	mg/L			06/08/18 02:36	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	130	D2	0.25	mg/L		06/05/18 11:56	06/07/18 20:25	5
Calcium	430		2.0	mg/L		06/05/18 11:56	06/06/18 20:27	1
Magnesium	2300	D2	10	mg/L		06/05/18 11:56	06/07/18 20:25	5
Potassium	17		0.50	mg/L		06/05/18 11:56	06/07/18 20:31	1
Sodium	650		0.50	mg/L		06/05/18 11:56	06/07/18 20:31	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:03	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	570		6.0	mg/L			06/06/18 15:30	1
Bicarbonate Alkalinity as CaCO3	570		6.0	mg/L			06/06/18 15:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 15:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:30	1
Total Dissolved Solids	17000	D2	100	mg/L			06/05/18 08:44	1
pH	6.9	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.0	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-69-6218

Lab Sample ID: 550-103741-4

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	400	mg/L			06/08/18 03:31	200
Fluoride	21	D1	0.80	mg/L			06/08/18 03:04	2
Sulfate	12000	D2	400	mg/L			06/08/18 03:31	200

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	120	D2	0.10	mg/L		06/05/18 11:56	06/07/18 20:37	2
Calcium	430		2.0	mg/L		06/05/18 11:56	06/06/18 20:33	1
Magnesium	2600	D2	8.0	mg/L		06/05/18 11:56	06/12/18 12:26	4
Potassium	38		0.50	mg/L		06/05/18 11:56	06/07/18 20:48	1
Sodium	680		0.50	mg/L		06/05/18 11:56	06/07/18 20:48	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:04	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	360		6.0	mg/L			06/06/18 15:40	1
Bicarbonate Alkalinity as CaCO3	360		6.0	mg/L			06/06/18 15:40	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:40	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 15:40	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:40	1
Total Dissolved Solids	18000	D2	100	mg/L			06/05/18 08:44	1
pH	7.3	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.0	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-FD02-6218

Lab Sample ID: 550-103741-5

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1300	D2	400	mg/L			06/08/18 05:21	200
Fluoride	21	D1	0.80	mg/L			06/08/18 04:53	2
Sulfate	12000	D2	400	mg/L			06/08/18 05:21	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	130	D2	0.10	mg/L		06/05/18 11:56	06/07/18 20:54	2
Calcium	430		2.0	mg/L		06/05/18 11:56	06/06/18 20:39	1
Magnesium	2500	D2	8.0	mg/L		06/05/18 11:56	06/12/18 12:31	4
Potassium	38		0.50	mg/L		06/05/18 11:56	06/07/18 21:00	1
Sodium	680		0.50	mg/L		06/05/18 11:56	06/07/18 21:00	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:06	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	350		6.0	mg/L			06/06/18 15:50	1
Bicarbonate Alkalinity as CaCO3	350		6.0	mg/L			06/06/18 15:50	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:50	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 15:50	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 15:50	1
Total Dissolved Solids	18000	D2	100	mg/L			06/05/18 08:44	1
pH	7.3	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.4	H5	0.1	Degrees C			06/05/18 11:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-70-53118

Lab Sample ID: 550-103741-6

Date Collected: 05/31/18 14:52

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1100	D2	400	mg/L			06/08/18 06:15	200
Fluoride	1.8	D1	0.80	mg/L			06/08/18 05:48	2
Sulfate	6500	D2	400	mg/L			06/08/18 06:15	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	100	D2	0.10	mg/L		06/05/18 11:56	06/07/18 21:06	2
Calcium	490		2.0	mg/L		06/05/18 11:56	06/06/18 20:50	1
Magnesium	1300	D2	4.0	mg/L		06/05/18 11:56	06/07/18 21:06	2
Potassium	17		0.50	mg/L		06/05/18 11:56	06/07/18 21:12	1
Sodium	780		0.50	mg/L		06/05/18 11:56	06/07/18 21:12	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:08	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	520		6.0	mg/L			06/06/18 16:39	1
Bicarbonate Alkalinity as CaCO3	520		6.0	mg/L			06/06/18 16:39	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 16:39	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 16:39	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 16:39	1
Total Dissolved Solids	11000	D2	100	mg/L			06/05/18 08:44	1
pH	6.9	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.2	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

Date Collected: 06/02/18 10:25

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	520	D2	400	mg/L			06/05/18 10:39	200
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 10:12	2
Sulfate	10000	D2	400	mg/L			06/05/18 10:39	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.55		0.050	mg/L		06/05/18 11:56	06/07/18 21:24	1
Calcium	420		2.0	mg/L		06/05/18 11:56	06/06/18 20:56	1
Magnesium	2000	D2	8.0	mg/L		06/05/18 11:56	06/12/18 12:37	4
Potassium	27		0.50	mg/L		06/05/18 11:56	06/07/18 21:24	1
Sodium	1000		0.50	mg/L		06/05/18 11:56	06/07/18 21:24	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:09	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

Date Collected: 06/02/18 10:25

Matrix: Water

Date Received: 06/04/18 13:25

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	430		6.0	mg/L			06/06/18 16:49	1
Bicarbonate Alkalinity as CaCO3	430		6.0	mg/L			06/06/18 16:49	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 16:49	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 16:49	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 16:49	1
Total Dissolved Solids	15000	D2	100	mg/L			06/05/18 08:44	1
pH	7.1	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.2	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Date Collected: 06/02/18 11:07

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	450	D2	400	mg/L			06/05/18 11:34	200
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 11:07	2
Sulfate	11000	D2	400	mg/L			06/05/18 11:34	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.21		0.050	mg/L		06/05/18 11:56	06/07/18 21:35	1
Calcium	410		2.0	mg/L		06/05/18 11:56	06/06/18 21:02	1
Magnesium	2300	D2	10	mg/L		06/05/18 11:56	06/07/18 21:30	5
Potassium	26		0.50	mg/L		06/05/18 11:56	06/07/18 21:35	1
Sodium	670		0.50	mg/L		06/05/18 11:56	06/07/18 21:35	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:11	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	610		6.0	mg/L			06/06/18 17:01	1
Bicarbonate Alkalinity as CaCO3	610		6.0	mg/L			06/06/18 17:01	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:01	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 17:01	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 17:01	1
Total Dissolved Solids	16000	D2	100	mg/L			06/05/18 08:44	1
pH	7.0	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.3	H5	0.1	Degrees C			06/05/18 11:50	1

Client Sample ID: FC-CCR-MW-73-6218

Lab Sample ID: 550-103741-9

Date Collected: 06/02/18 11:45

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	550	D2	400	mg/L			06/05/18 12:29	200
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 12:01	2
Sulfate	7100	D2	400	mg/L			06/05/18 12:29	200

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103741-1
 SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.6		0.050	mg/L		06/05/18 11:56	06/07/18 21:41	1
Calcium	460		2.0	mg/L		06/05/18 11:56	06/06/18 21:08	1
Magnesium	710		2.0	mg/L		06/05/18 11:56	06/06/18 21:08	1
Potassium	34		0.50	mg/L		06/05/18 11:56	06/07/18 21:41	1
Sodium	1600		0.50	mg/L		06/05/18 11:56	06/07/18 21:41	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 16:12	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	800		6.0	mg/L			06/10/18 12:30	1
Bicarbonate Alkalinity as CaCO3	800		6.0	mg/L			06/10/18 12:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/10/18 12:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Total Dissolved Solids	12000	D2	100	mg/L			06/05/18 08:44	1
pH	6.9	H5	1.7	SU			06/05/18 11:50	1
Temperature	20.2	H5	0.1	Degrees C			06/05/18 11:50	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148810/2
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			06/04/18 14:33	1
Fluoride	ND		0.40	mg/L			06/04/18 14:33	1
Sulfate	ND		2.0	mg/L			06/04/18 14:33	1

Lab Sample ID: LCS 550-148810/5
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.4		mg/L		102	90 - 110
Fluoride	4.00	4.18		mg/L		104	90 - 110
Sulfate	20.0	20.8		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148810/6
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	20.4		mg/L		102	90 - 110	0	20
Fluoride	4.00	4.18		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.8		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103742-C-1 MS ^200
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	580	D2	4000	4920	D2	mg/L		108	80 - 120
Fluoride	ND	D1	800	873	D1	mg/L		109	80 - 120
Sulfate	6400	D2	4000	10700	D2	mg/L		108	80 - 120

Lab Sample ID: 550-103742-C-1 MSD ^200
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	580	D2	4000	4910	D2	mg/L		108	80 - 120	0	20
Fluoride	ND	D1	800	865	D1	mg/L		108	80 - 120	1	20
Sulfate	6400	D2	4000	10700	D2	mg/L		109	80 - 120	0	20

Lab Sample ID: MB 550-149123/2
Matrix: Water
Analysis Batch: 149123

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			06/07/18 15:38	1
Fluoride	ND		0.40	mg/L			06/07/18 15:38	1
Sulfate	ND		2.0	mg/L			06/07/18 15:38	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-149123/5
Matrix: Water
Analysis Batch: 149123

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.3		mg/L		102	90 - 110
Fluoride	4.00	4.18		mg/L		104	90 - 110
Sulfate	20.0	20.8		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-149123/6
Matrix: Water
Analysis Batch: 149123

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	20.3		mg/L		102	90 - 110	0	20
Fluoride	4.00	4.18		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.8		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149123

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1800	D2	4000	6160	D2	mg/L		110	80 - 120
Fluoride	ND	D1	800	871	D1	mg/L		106	80 - 120
Sulfate	12000	D2	4000	16200	D2	mg/L		109	80 - 120

Lab Sample ID: 550-103741-1 MSD
Matrix: Water
Analysis Batch: 149123

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1800	D2	4000	6120	D2	mg/L		108	80 - 120	1	20
Fluoride	ND	D1	800	864	D1	mg/L		105	80 - 120	1	20
Sulfate	12000	D2	4000	16000	D2	mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-148863/1-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148863

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/05/18 11:56	06/06/18 19:37	1
Calcium	ND		2.0	mg/L		06/05/18 11:56	06/06/18 19:37	1
Magnesium	ND		2.0	mg/L		06/05/18 11:56	06/06/18 19:37	1

Lab Sample ID: MB 550-148863/1-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148863

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/05/18 11:56	06/07/18 19:12	1
Magnesium	ND		2.0	mg/L		06/05/18 11:56	06/07/18 19:12	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: MB 550-148863/1-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148863

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND		0.50	mg/L		06/05/18 11:56	06/07/18 19:12	1
Sodium	ND		0.50	mg/L		06/05/18 11:56	06/07/18 19:12	1

Lab Sample ID: LCS 550-148863/2-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.906		mg/L		91	85 - 115
Calcium	21.0	20.2		mg/L		96	85 - 115
Magnesium	21.0	19.7		mg/L		94	85 - 115

Lab Sample ID: LCS 550-148863/2-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.935		mg/L		94	85 - 115
Magnesium	21.0	20.1		mg/L		96	85 - 115
Potassium	20.0	18.8		mg/L		94	85 - 115
Sodium	20.0	18.6		mg/L		93	85 - 115

Lab Sample ID: LCSD 550-148863/3-A
Matrix: Water
Analysis Batch: 149071

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.927		mg/L		93	85 - 115	2	20
Calcium	21.0	20.4		mg/L		97	85 - 115	1	20
Magnesium	21.0	20.0		mg/L		95	85 - 115	1	20

Lab Sample ID: LCSD 550-148863/3-A
Matrix: Water
Analysis Batch: 149141

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.957		mg/L		96	85 - 115	2	20
Magnesium	21.0	20.5		mg/L		97	85 - 115	2	20
Potassium	20.0	19.1		mg/L		96	85 - 115	2	20
Sodium	20.0	18.7		mg/L		93	85 - 115	1	20

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Calcium	440	M3	21.0	428	M3	mg/L		-40	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-103741-1 MS

Matrix: Water
Analysis Batch: 149141

Client Sample ID: FC-CCR-MW-66-53118

Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Boron	150	M3 D2	1.00	141	M3	mg/L		-916	70 - 130
Magnesium	2800	M3 D2	21.0	2630	M3	mg/L		-730	70 - 130

Lab Sample ID: 550-103741-1 MS

Matrix: Water
Analysis Batch: 149141

Client Sample ID: FC-CCR-MW-66-53118

Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Potassium	39		20.0	58.6		mg/L		96	70 - 130
Sodium	630	M3	20.0	622	M3	mg/L		-21	70 - 130

Lab Sample ID: 550-103741-1 MSD

Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-66-53118

Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Calcium	440	M3	21.0	424	M3	mg/L		-59	70 - 130	1	20

Lab Sample ID: 550-103741-1 MSD

Matrix: Water
Analysis Batch: 149141

Client Sample ID: FC-CCR-MW-66-53118

Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Boron	150	M3 D2	1.00	150	M3	mg/L		-30	70 - 130	6	20
Magnesium	2800	M3 D2	21.0	2760	M3	mg/L		-127	70 - 130	5	20

Lab Sample ID: 550-103741-1 MSD

Matrix: Water
Analysis Batch: 149141

Client Sample ID: FC-CCR-MW-66-53118

Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Potassium	39		20.0	58.2		mg/L		95	70 - 130	1	20
Sodium	630	M3	20.0	618	M3	mg/L		-40	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-148890/1-A

Matrix: Water
Analysis Batch: 149203

Client Sample ID: Method Blank

Prep Type: Total/NA
Prep Batch: 148890

Analyte	MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Hg	ND		0.00020	mg/L		06/05/18 14:38	06/08/18 15:52	1

Lab Sample ID: LCS 550-148890/2-A

Matrix: Water
Analysis Batch: 149203

Client Sample ID: Lab Control Sample

Prep Type: Total/NA
Prep Batch: 148890

Analyte	Spike	LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
Hg	0.0100	0.0103		mg/L		103	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: 245.1 - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 550-148890/3-A
Matrix: Water
Analysis Batch: 149203

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148890

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	0.0100	0.0102		mg/L		102	85 - 115	1	20

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149203

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148890

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	ND		0.0100	0.00771		mg/L		77	70 - 130		

Lab Sample ID: 550-103741-1 MSD
Matrix: Water
Analysis Batch: 149203

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148890

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	ND		0.0100	0.00714		mg/L		71	70 - 130	8	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-149023/5
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/06/18 13:52	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/06/18 13:52	1

Lab Sample ID: LCS 550-149023/4
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Alkalinity as CaCO3	250	256		mg/L		102	90 - 110		

Lab Sample ID: LCSD 550-149023/17
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Alkalinity as CaCO3	250	258		mg/L		103	90 - 110	1	20

Lab Sample ID: 550-103741-1 DU
Matrix: Water
Analysis Batch: 149023

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Alkalinity as CaCO3	300		305		mg/L		0.1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 550-103741-1 DU
Matrix: Water
Analysis Batch: 149023

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Bicarbonate Alkalinity as CaCO3	300		305		mg/L		0.1	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Lab Sample ID: 550-103742-D-1 DU
Matrix: Water
Analysis Batch: 149023

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity as CaCO3	510		514		mg/L		0.07	20
Bicarbonate Alkalinity as CaCO3	510		514		mg/L		0.07	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Lab Sample ID: MB 550-149226/1
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/10/18 12:30	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/10/18 12:30	1

Lab Sample ID: LCS 550-149226/2
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

Lab Sample ID: LCSD 550-149226/5
Matrix: Water
Analysis Batch: 149226

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit

Lab Sample ID: 550-103738-A-1 DU
Matrix: Water
Analysis Batch: 149227

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity as CaCO3	750		700		mg/L		7	20
Bicarbonate Alkalinity as CaCO3	750		700		mg/L		7	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 550-103738-A-1 DU
Matrix: Water
Analysis Batch: 149227

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-148821/1
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			06/05/18 08:44	1

Lab Sample ID: LCS 550-148821/2
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	990		mg/L		99	90 - 110

Lab Sample ID: LCSD 550-148821/3
Matrix: Water
Analysis Batch: 148821

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Total Dissolved Solids	1000	986		mg/L		99	90 - 110	0	10

Lab Sample ID: 550-103741-1 DU
Matrix: Water
Analysis Batch: 148821

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	19000	D2	18900	D2	mg/L		0.05	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-148864/1
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.3	98.5 - 101.5

Lab Sample ID: LCSSRM 550-148864/13
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.1		SU		100.7	98.5 - 101.5

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103741-1
 SDG: Cholla

Lab Sample ID: LCSSRM 550-148864/25
Matrix: Water
Analysis Batch: 148864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.1		SU		100.9	98.5 - 101.5

Lab Sample ID: 550-103741-1 DU
Matrix: Water
Analysis Batch: 148864

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.2	H5	7.2	H5	SU		0.1	5
Temperature	20.2	H5	20.2	H5	Degrees C		0	

Lab Sample ID: 550-103741-5 DU
Matrix: Water
Analysis Batch: 148864

Client Sample ID: FC-CCR-FD02-6218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.3	H5	7.3	H5	SU		0	5
Temperature	20.4	H5	20.3	H5	Degrees C		0.5	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

HPLC/IC

Analysis Batch: 148810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	300.0	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	300.0	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	300.0	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	300.0	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	300.0	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	300.0	
MB 550-148810/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148810/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148810/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103742-C-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-103742-C-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 149123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	300.0	
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	300.0	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	300.0	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	300.0	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	300.0	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	300.0	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	300.0	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	300.0	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	300.0	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	300.0	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	300.0	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	300.0	
MB 550-149123/2	Method Blank	Total/NA	Water	300.0	
LCS 550-149123/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-149123/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	300.0	
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	300.0	

Metals

Prep Batch: 148863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.7	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.7	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.7	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.7	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.7	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.7	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.7	
MB 550-148863/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-148863/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-148863/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.7	
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.7	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Metals (Continued)

Prep Batch: 148890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	245.1	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	245.1	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	245.1	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	245.1	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	245.1	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	245.1	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	245.1	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	245.1	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	245.1	
MB 550-148890/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-148890/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-148890/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	245.1	
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	245.1	

Analysis Batch: 149071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.7 Rev 4.4	148863
MB 550-148863/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148863
LCS 550-148863/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148863
LCSD 550-148863/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863

Analysis Batch: 149141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.7 Rev 4.4	148863
MB 550-148863/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148863

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Metals (Continued)

Analysis Batch: 149141 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 550-148863/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148863
LCSD 550-148863/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863

Analysis Batch: 149203

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	245.1	148890
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	245.1	148890
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	245.1	148890
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	245.1	148890
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	245.1	148890
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	245.1	148890
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	245.1	148890
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	245.1	148890
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	245.1	148890
MB 550-148890/1-A	Method Blank	Total/NA	Water	245.1	148890
LCS 550-148890/2-A	Lab Control Sample	Total/NA	Water	245.1	148890
LCSD 550-148890/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	148890
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	245.1	148890
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	245.1	148890

Analysis Batch: 149397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.7 Rev 4.4	148863

General Chemistry

Analysis Batch: 148821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	SM 2540C	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	SM 2540C	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	SM 2540C	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	SM 2540C	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	SM 2540C	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	SM 2540C	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	SM 2540C	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	SM 2540C	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	SM 2540C	
MB 550-148821/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-148821/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-148821/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103741-1 DU	FC-CCR-MW-66-53118	Total/NA	Water	SM 2540C	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

General Chemistry (Continued)

Analysis Batch: 148864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	SM 4500 H+ B	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	SM 4500 H+ B	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	SM 4500 H+ B	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	SM 4500 H+ B	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	SM 4500 H+ B	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	SM 4500 H+ B	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	SM 4500 H+ B	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	SM 4500 H+ B	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	SM 4500 H+ B	
LCSRM 550-148864/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSRM 550-148864/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSRM 550-148864/25	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-103741-1 DU	FC-CCR-MW-66-53118	Total/NA	Water	SM 4500 H+ B	
550-103741-5 DU	FC-CCR-FD02-6218	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 149023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	SM 2320B	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	SM 2320B	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	SM 2320B	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	SM 2320B	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	SM 2320B	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	SM 2320B	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	SM 2320B	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	SM 2320B	
MB 550-149023/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149023/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149023/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103741-1 DU	FC-CCR-MW-66-53118	Total/NA	Water	SM 2320B	
550-103742-D-1 DU	Duplicate	Total/NA	Water	SM 2320B	

Analysis Batch: 149226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-149226/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149226/2	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149226/5	Lab Control Sample Dup	Total/NA	Water	SM 2320B	

Analysis Batch: 149227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	SM 2320B	
550-103738-A-1 DU	Duplicate	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-66-53118

Lab Sample ID: 550-103741-1

Date Collected: 05/31/18 14:14

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/07/18 23:24	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149123	06/07/18 23:52	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 19:57	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		5	149141	06/07/18 19:44	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 19:50	SGO	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:00	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 14:59	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-67-6218

Lab Sample ID: 550-103741-2

Date Collected: 06/02/18 09:25

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 01:14	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149123	06/08/18 01:41	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:21	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		5	149141	06/07/18 20:14	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 20:19	SGO	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:01	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 15:19	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-68-6218

Lab Sample ID: 550-103741-3

Date Collected: 06/02/18 08:57

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 02:09	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149123	06/08/18 02:36	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:27	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		5	149141	06/07/18 20:25	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 20:31	SGO	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:03	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 15:30	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-69-6218

Lab Sample ID: 550-103741-4

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 03:04	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149123	06/08/18 03:31	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:33	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	149141	06/07/18 20:37	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 20:48	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	149397	06/12/18 12:26	ARE	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:04	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 15:40	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-FD02-6218

Lab Sample ID: 550-103741-5

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 04:53	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149123	06/08/18 05:21	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:39	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	149141	06/07/18 20:54	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 21:00	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	149397	06/12/18 12:31	ARE	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:06	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 15:50	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-70-53118

Lab Sample ID: 550-103741-6

Date Collected: 05/31/18 14:52

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 05:48	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149123	06/08/18 06:15	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:50	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	149141	06/07/18 21:06	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 21:12	SGO	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:08	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 16:39	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821	(Start) 06/05/18 08:44 (End) 06/06/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

Date Collected: 06/02/18 10:25

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 10:12	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 10:39	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:56	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 21:24	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	149397	06/12/18 12:37	ARE	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:09	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 16:49	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
						(Start) 06/05/18 08:44		
						(End) 06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Date Collected: 06/02/18 11:07

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 11:07	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148810	06/05/18 11:34	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:02	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		5	149141	06/07/18 21:30	SGO	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 21:35	SGO	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:11	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149023	06/06/18 17:01	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
						(Start) 06/05/18 08:44		
						(End) 06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Client Sample ID: FC-CCR-MW-73-6218

Lab Sample ID: 550-103741-9

Date Collected: 06/02/18 11:45

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 12:01	NBL	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103741-1
 SDG: Cholla

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	148810	06/05/18 12:29	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:08	ARE	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149141	06/07/18 21:41	SGO	TAL PHX
Total/NA	Prep	245.1			148890	06/05/18 14:38	JTG	TAL PHX
Total/NA	Analysis	245.1		1	149203	06/08/18 16:12	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	149227	06/10/18 12:30	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	148821		YET	TAL PHX
					(Start)	06/05/18 08:44		
					(End)	06/06/18 10:20		
Total/NA	Analysis	SM 4500 H+ B		1	148864	06/05/18 11:50	BDN	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

- 1
- 2
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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-1
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
245.1	Mercury (CVAA)	EPA	TAL PHX
SM 2320B	Alkalinity	SM	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX
245.1	Preparation, Mercury	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3940 fax 602.454.9303

Chain of Custody Record

103741-1
Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarway	928-587-0319	Doug Lavarway	6/3/2018	Carrier:	COG No:	1 of 1 COCs
End of County Road 6675	Analysis Turnaround Time		Lab Contact:			Sampler:	
Frulland, New Mexico 87416						For Lab Use Only:	
(928) 587-0319 Phone	TAT if different from Below		EPA 200.7 Rev 4.4 (B, Ca, Na, K, Mg)			Walk-In Client:	
(xxx) xxx-xxxx FAX			EPA 300.0 (Cl, F, SO4)			Lab Sampling:	
Project Name: CCR			SM 2540C (TDS)			Job / SDG No.:	
Site: Cholla			SM 4500-HB (pH)				
P O #			SM 2320B (HCO3)				

Sample Identification	Sample Date	Sample Time	Sample Type (cc-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Carrier:	COG No:
FC-CCR-MW-66-53118	5/31/2018	1414 G	W	W	2	N	X		
FC-CCR-MW-67-6218	6/2/2018	925 G	W	W	2	N	X		
FC-CCR-MW-68-6218	6/2/2018	857 G	W	W	2	N	X		
FC-CCR-MW-69-6218	6/2/2018	816 G	W	W	2	N	X		
FC-CCR-FD02-6218	6/2/2018	816 G	W	W	2	N	X		
FC-CCR-MW-70-53118	5/31/2018	1452 G	W	W	2	N	X		
FC-CCR-MW-71-6218	6/2/2018	1025 G	W	W	2	N	X		
FC-CCR-MW-72-6218	6/2/2018	1107 G	W	W	2	N	X		
FC-CCR-MW-73-6218	6/2/2018	1145 G	W	W	2	N	X		



Preservation Used: 1-HCl; 2-HCl; 3-H2SO4; 4-HNO3; 5-NaOH; 6-Other
Possible Hazard Identification:
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

TAPAX

Custody Seals Intact:	Custody Seal No.:	Cooler Temp. (°C):	Obsd.:	Corrd.:	Therm ID No.:
Relinquished by:	Company:	Received by:	Received In Laboratory by:	Company:	Date/Time:
Relinquished by:	Company:	Received by:	Received In Laboratory by:	Company:	Date/Time:
Relinquished by:	Company:	Received by:	Received In Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103741-1

SDG Number: Cholla

Login Number: 103741

List Number: 1

Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-103741-2

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/28/2018 8:34:11 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Job ID: 550-103741-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-103741-2

Comments

No additional comments.

Receipt

The samples were received on 6/4/2018 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.8° C, 2.0° C, 2.0° C and 2.0° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW-71-6218 (550-103741-7), FC-CCR-MW-72-6218 (550-103741-8) and FC-CCR-MW-73-6218 (550-103741-9). The analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method(s) 200.8 LL: The following samples were diluted due to the nature of the sample matrix: FC-CCR-MW-66-53118 (550-103741-1), FC-CCR-MW-67-6218 (550-103741-2), FC-CCR-MW-68-6218 (550-103741-3), FC-CCR-MW-69-6218 (550-103741-4), FC-CCR-FD02-6218 (550-103741-5), FC-CCR-MW-70-53118 (550-103741-6), FC-CCR-MW-71-6218 (550-103741-7), FC-CCR-MW-72-6218 (550-103741-8) and FC-CCR-MW-73-6218 (550-103741-9). Elevated reporting limits (RLs) are provided. Samples were run at a x1, x4, x10, x20 dilutions. The x20 was the lowest dilution for which the internal standards did not fail.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103741-1	FC-CCR-MW-66-53118	Water	05/31/18 14:14	06/04/18 13:25
550-103741-2	FC-CCR-MW-67-6218	Water	06/02/18 09:25	06/04/18 13:25
550-103741-3	FC-CCR-MW-68-6218	Water	06/02/18 08:57	06/04/18 13:25
550-103741-4	FC-CCR-MW-69-6218	Water	06/02/18 08:16	06/04/18 13:25
550-103741-5	FC-CCR-FD02-6218	Water	06/02/18 08:16	06/04/18 13:25
550-103741-6	FC-CCR-MW-70-53118	Water	05/31/18 14:52	06/04/18 13:25
550-103741-7	FC-CCR-MW-71-6218	Water	06/02/18 10:25	06/04/18 13:25
550-103741-8	FC-CCR-MW-72-6218	Water	06/02/18 11:07	06/04/18 13:25
550-103741-9	FC-CCR-MW-73-6218	Water	06/02/18 11:45	06/04/18 13:25

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-66-53118

Lab Sample ID: 550-103741-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	25	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.36		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.020	D1	0.010	mg/L	20		200.8 LL	Total/NA
Cobalt	0.010	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.015	D1	0.010	mg/L	20		200.8 LL	Total/NA
Thallium	0.0025	D1	0.0020	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-67-6218

Lab Sample ID: 550-103741-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	25	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.50		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.020	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.041	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-68-6218

Lab Sample ID: 550-103741-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	12	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.38		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Selenium	0.24	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-69-6218

Lab Sample ID: 550-103741-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	21	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.49		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.016	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.016	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.014	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD02-6218

Lab Sample ID: 550-103741-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	21	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.49		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014	D1	0.010	mg/L	20		200.8 LL	Total/NA
Molybdenum	0.015	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.013	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-70-53118

Lab Sample ID: 550-103741-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.8	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.30		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.012	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.18	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-71-6218 (Continued)

Lab Sample ID: 550-103741-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.32		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.012	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.20	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.35		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Selenium	0.10	D1	0.010	mg/L	20		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW-73-6218

Lab Sample ID: 550-103741-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.26		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.023	D1	0.010	mg/L	20		200.8 LL	Total/NA
Selenium	0.011	D1	0.010	mg/L	20		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-66-53118

Lab Sample ID: 550-103741-1

Date Collected: 05/31/18 14:14

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	25	D1	0.80	mg/L			06/07/18 23:24	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.36		0.20	mg/L		06/05/18 11:56	06/06/18 19:57	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:34	20
Barium	0.020	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:34	20
Cobalt	0.010	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:34	20
Molybdenum	0.015	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:34	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:23	20
Thallium	0.0025	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 10:34	20

Client Sample ID: FC-CCR-MW-67-6218

Lab Sample ID: 550-103741-2

Date Collected: 06/02/18 09:25

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	25	D1	0.80	mg/L			06/08/18 01:14	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.50		0.20	mg/L		06/05/18 11:56	06/06/18 20:21	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:48	20
Barium	0.020	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:48	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:48	20
Molybdenum	0.041	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:48	20
Selenium	ND	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:36	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 10:48	20

Client Sample ID: FC-CCR-MW-68-6218

Lab Sample ID: 550-103741-3

Date Collected: 06/02/18 08:57

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	12	D1	0.80	mg/L			06/08/18 02:09	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.38		0.20	mg/L		06/05/18 11:56	06/06/18 20:27	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 10:50	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-68-6218

Lab Sample ID: 550-103741-3

Date Collected: 06/02/18 08:57

Matrix: Water

Date Received: 06/04/18 13:25

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:50	20
Cobalt	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:50	20
Molybdenum	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:50	20
Selenium	0.24	D1	0.010	mg/L	-	06/05/18 08:55	06/23/18 13:39	20
Thallium	ND	D1	0.0020	mg/L	-	06/05/18 08:55	06/15/18 10:50	20

Client Sample ID: FC-CCR-MW-69-6218

Lab Sample ID: 550-103741-4

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	21	D1	0.80	mg/L	-		06/08/18 03:04	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.49		0.20	mg/L	-	06/05/18 11:56	06/06/18 20:33	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:52	20
Barium	0.016	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:52	20
Cobalt	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:52	20
Molybdenum	0.016	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:52	20
Selenium	0.014	D1	0.010	mg/L	-	06/05/18 08:55	06/23/18 13:41	20
Thallium	ND	D1	0.0020	mg/L	-	06/05/18 08:55	06/15/18 10:52	20

Client Sample ID: FC-CCR-FD02-6218

Lab Sample ID: 550-103741-5

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	21	D1	0.80	mg/L	-		06/08/18 04:53	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.49		0.20	mg/L	-	06/05/18 11:56	06/06/18 20:39	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:59	20
Barium	0.014	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:59	20
Cobalt	ND	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:59	20
Molybdenum	0.015	D1	0.010	mg/L	-	06/05/18 08:55	06/15/18 10:59	20
Selenium	0.013	D1	0.010	mg/L	-	06/05/18 08:55	06/23/18 13:43	20
Thallium	ND	D1	0.0020	mg/L	-	06/05/18 08:55	06/15/18 10:59	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-70-53118

Lab Sample ID: 550-103741-6

Date Collected: 05/31/18 14:52

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.8	D1	0.80	mg/L			06/08/18 05:48	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.30		0.20	mg/L		06/05/18 11:56	06/06/18 20:50	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:01	20
Barium	0.012	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:01	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:01	20
Molybdenum	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:01	20
Selenium	0.18	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:50	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:01	20

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

Date Collected: 06/02/18 10:25

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 10:12	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.32		0.20	mg/L		06/05/18 11:56	06/06/18 20:56	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.012	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:04	20
Barium	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:04	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:04	20
Molybdenum	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:04	20
Selenium	0.20	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:52	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:04	20

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Date Collected: 06/02/18 11:07

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 11:07	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.35		0.20	mg/L		06/05/18 11:56	06/06/18 21:02	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:06	20

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Date Collected: 06/02/18 11:07

Matrix: Water

Date Received: 06/04/18 13:25

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:06	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:06	20
Molybdenum	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:06	20
Selenium	0.10	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:54	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:06	20

Client Sample ID: FC-CCR-MW-73-6218

Lab Sample ID: 550-103741-9

Date Collected: 06/02/18 11:45

Matrix: Water

Date Received: 06/04/18 13:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			06/05/18 12:01	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.26		0.20	mg/L		06/05/18 11:56	06/06/18 21:08	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:08	20
Barium	0.023	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:08	20
Cobalt	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:08	20
Molybdenum	ND	D1	0.010	mg/L		06/05/18 08:55	06/15/18 11:08	20
Selenium	0.011	D1	0.010	mg/L		06/05/18 08:55	06/23/18 13:57	20
Thallium	ND	D1	0.0020	mg/L		06/05/18 08:55	06/15/18 11:08	20

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148810/2
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			06/04/18 14:33	1

Lab Sample ID: LCS 550-148810/5
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.18		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148810/6
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.18		mg/L		105	90 - 110	0	20

Lab Sample ID: 550-103742-C-1 MS ^200
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1	800	873	D1	mg/L		109	80 - 120

Lab Sample ID: 550-103742-C-1 MSD ^200
Matrix: Water
Analysis Batch: 148810

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1	800	865	D1	mg/L		108	80 - 120	1	20

Lab Sample ID: MB 550-149123/2
Matrix: Water
Analysis Batch: 149123

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			06/07/18 15:38	1

Lab Sample ID: LCS 550-149123/5
Matrix: Water
Analysis Batch: 149123

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.18		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-149123/6
Matrix: Water
Analysis Batch: 149123

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.18		mg/L		105	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149123

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1	800	871	D1	mg/L		106	80 - 120

Lab Sample ID: 550-103741-1 MSD
Matrix: Water
Analysis Batch: 149123

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Fluoride	ND	D1	800	864	D1	mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	-0.000277		1.00	0.899		mg/L		90	70 - 130
Lithium	0.363		1.00	1.38		mg/L		101	70 - 130

Lab Sample ID: 550-103741-1 MSD
Matrix: Water
Analysis Batch: 149071

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148863

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Beryllium	-0.000277		1.00	0.906		mg/L		91	70 - 130	1	20
Lithium	0.363		1.00	1.37		mg/L		101	70 - 130	1	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-148822/1-A
Matrix: Water
Analysis Batch: 149720

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148822

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		06/05/18 08:55	06/15/18 10:27	1
Arsenic	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Barium	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Cadmium	ND		0.00010	mg/L		06/05/18 08:55	06/15/18 10:27	1
Cobalt	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Lead	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Molybdenum	ND		0.00050	mg/L		06/05/18 08:55	06/15/18 10:27	1
Thallium	ND		0.00010	mg/L		06/05/18 08:55	06/15/18 10:27	1

Lab Sample ID: MB 550-148822/1-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148822

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0010	mg/L		06/05/18 08:55	06/23/18 13:16	1
Selenium	ND		0.00050	mg/L		06/05/18 08:55	06/23/18 13:16	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 550-148822/2-A
Matrix: Water
Analysis Batch: 149720

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
Antimony	0.100	0.0976		mg/L		98	85 - 115	
Arsenic	0.100	0.102		mg/L		102	85 - 115	
Barium	0.100	0.0990		mg/L		99	85 - 115	
Cadmium	0.100	0.0966		mg/L		97	85 - 115	
Cobalt	0.100	0.0995		mg/L		100	85 - 115	
Lead	0.100	0.0991		mg/L		99	85 - 115	
Molybdenum	0.100	0.0982		mg/L		98	85 - 115	
Thallium	0.100	0.0988		mg/L		99	85 - 115	

Lab Sample ID: LCS 550-148822/2-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
Chromium	0.100	0.102		mg/L		102	85 - 115	
Selenium	0.100	0.101		mg/L		101	85 - 115	

Lab Sample ID: LCSD 550-148822/3-A
Matrix: Water
Analysis Batch: 149720

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.0998		mg/L		100	85 - 115	2	20
Arsenic	0.100	0.0961		mg/L		96	85 - 115	6	20
Barium	0.100	0.0988		mg/L		99	85 - 115	0	20
Cadmium	0.100	0.100		mg/L		100	85 - 115	4	20
Cobalt	0.100	0.0964		mg/L		96	85 - 115	3	20
Lead	0.100	0.0988		mg/L		99	85 - 115	0	20
Molybdenum	0.100	0.0989		mg/L		99	85 - 115	1	20
Thallium	0.100	0.0973		mg/L		97	85 - 115	2	20

Lab Sample ID: LCSD 550-148822/3-A
Matrix: Water
Analysis Batch: 150245

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	0.100	0.101		mg/L		101	85 - 115	1	20
Selenium	0.100	0.101		mg/L		101	85 - 115	0	20

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149720

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148822

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND	D1	0.100	0.103		mg/L		101	70 - 130
Arsenic	ND	D1	0.100	0.103		mg/L		103	70 - 130
Barium	0.020	D1	0.100	0.121		mg/L		101	70 - 130
Cadmium	ND	D1	0.100	0.0977		mg/L		97	70 - 130
Cobalt	0.010	D1	0.100	0.104		mg/L		93	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 149720

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148822
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lead	ND	D1	0.100	0.0983		mg/L		94	70 - 130
Molybdenum	0.015	D1	0.100	0.114		mg/L		99	70 - 130
Thallium	0.0025	D1	0.100	0.0976		mg/L		95	70 - 130

Lab Sample ID: 550-103741-1 MS
Matrix: Water
Analysis Batch: 150245

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148822
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Chromium	ND	D1	0.100	0.112		mg/L		112	70 - 130
Selenium	ND	D1	0.100	0.116		mg/L		111	70 - 130

Lab Sample ID: 550-103741-1 MSD
Matrix: Water
Analysis Batch: 149720

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148822
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND	D1	0.100	0.101		mg/L		100	70 - 130	1	20
Arsenic	ND	D1	0.100	0.103		mg/L		103	70 - 130	0	20
Barium	0.020	D1	0.100	0.122		mg/L		101	70 - 130	0	20
Cadmium	ND	D1	0.100	0.0998		mg/L		99	70 - 130	2	20
Cobalt	0.010	D1	0.100	0.105		mg/L		94	70 - 130	1	20
Lead	ND	D1	0.100	0.0983		mg/L		94	70 - 130	0	20
Molybdenum	0.015	D1	0.100	0.113		mg/L		99	70 - 130	1	20
Thallium	0.0025	D1	0.100	0.0965		mg/L		94	70 - 130	1	20

Lab Sample ID: 550-103741-1 MSD
Matrix: Water
Analysis Batch: 150245

Client Sample ID: FC-CCR-MW-66-53118
Prep Type: Total/NA
Prep Batch: 148822
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chromium	ND	D1	0.100	0.101		mg/L		101	70 - 130	10	20
Selenium	ND	D1	0.100	0.110		mg/L		105	70 - 130	5	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

HPLC/IC

Analysis Batch: 148810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	300.0	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	300.0	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	300.0	
MB 550-148810/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148810/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148810/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103742-C-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-103742-C-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 149123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	300.0	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	300.0	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	300.0	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	300.0	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	300.0	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	300.0	
MB 550-149123/2	Method Blank	Total/NA	Water	300.0	
LCS 550-149123/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-149123/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	300.0	
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	300.0	

Metals

Prep Batch: 148822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.8	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.8	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.8	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.8	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.8	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.8	
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.8	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.8	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.8	
MB 550-148822/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-148822/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-148822/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.8	
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.8	

Prep Batch: 148863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.7	
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.7	
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.7	
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7	
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7	
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.7	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Metals (Continued)

Prep Batch: 148863 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.7	
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.7	
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.7	
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.7	
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.7	

Analysis Batch: 149071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.7 Rev 4.4	148863

Analysis Batch: 149720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.8 LL	148822
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.8 LL	148822
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.8 LL	148822
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.8 LL	148822
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.8 LL	148822
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.8 LL	148822
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.8 LL	148822
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.8 LL	148822
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.8 LL	148822
MB 550-148822/1-A	Method Blank	Total/NA	Water	200.8 LL	148822
LCS 550-148822/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	148822
LCSD 550-148822/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	148822
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.8 LL	148822
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.8 LL	148822

Analysis Batch: 150245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1	FC-CCR-MW-66-53118	Total/NA	Water	200.8 LL	148822
550-103741-2	FC-CCR-MW-67-6218	Total/NA	Water	200.8 LL	148822
550-103741-3	FC-CCR-MW-68-6218	Total/NA	Water	200.8 LL	148822
550-103741-4	FC-CCR-MW-69-6218	Total/NA	Water	200.8 LL	148822
550-103741-5	FC-CCR-FD02-6218	Total/NA	Water	200.8 LL	148822
550-103741-6	FC-CCR-MW-70-53118	Total/NA	Water	200.8 LL	148822
550-103741-7	FC-CCR-MW-71-6218	Total/NA	Water	200.8 LL	148822
550-103741-8	FC-CCR-MW-72-6218	Total/NA	Water	200.8 LL	148822
550-103741-9	FC-CCR-MW-73-6218	Total/NA	Water	200.8 LL	148822
MB 550-148822/1-A	Method Blank	Total/NA	Water	200.8 LL	148822
LCS 550-148822/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	148822
LCSD 550-148822/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	148822

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 150245 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103741-1 MS	FC-CCR-MW-66-53118	Total/NA	Water	200.8 LL	148822
550-103741-1 MSD	FC-CCR-MW-66-53118	Total/NA	Water	200.8 LL	148822

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Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-66-53118

Date Collected: 05/31/18 14:14

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103741-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/07/18 23:24	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 19:57	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 10:34	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:23	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-67-6218

Date Collected: 06/02/18 09:25

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103741-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 01:14	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:21	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 10:48	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:36	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-68-6218

Date Collected: 06/02/18 08:57

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103741-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 02:09	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:27	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 10:50	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:39	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-69-6218

Date Collected: 06/02/18 08:16

Date Received: 06/04/18 13:25

Lab Sample ID: 550-103741-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 03:04	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:33	ARE	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-69-6218

Lab Sample ID: 550-103741-4

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 10:52	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:41	TEK	TAL PHX

Client Sample ID: FC-CCR-FD02-6218

Lab Sample ID: 550-103741-5

Date Collected: 06/02/18 08:16

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 04:53	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:39	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 10:59	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:43	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-70-53118

Lab Sample ID: 550-103741-6

Date Collected: 05/31/18 14:52

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149123	06/08/18 05:48	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:50	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:01	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:50	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-71-6218

Lab Sample ID: 550-103741-7

Date Collected: 06/02/18 10:25

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 10:12	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 20:56	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:04	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:52	TEK	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Client Sample ID: FC-CCR-MW-72-6218

Lab Sample ID: 550-103741-8

Date Collected: 06/02/18 11:07

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 11:07	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:02	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:06	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:54	TEK	TAL PHX

Client Sample ID: FC-CCR-MW-73-6218

Lab Sample ID: 550-103741-9

Date Collected: 06/02/18 11:45

Matrix: Water

Date Received: 06/04/18 13:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148810	06/05/18 12:01	NBL	TAL PHX
Total/NA	Prep	200.7			148863	06/05/18 11:56	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149071	06/06/18 21:08	ARE	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	149720	06/15/18 11:08	TEK	TAL PHX
Total/NA	Prep	200.8			148822	06/05/18 08:55	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		20	150245	06/23/18 13:57	TEK	TAL PHX

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103741-2
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
Subcontract	Radium 226/228	None	Radiation
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

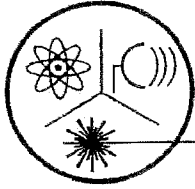
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Radiation Safety Engineering, Inc.

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Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

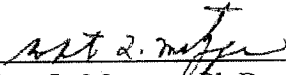
Radiochemical Activity in Water (pCi/L)

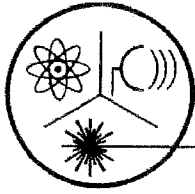
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: May 31, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-66-53118 (550-103741-1)	1.1 ± 0.2	1.0 ± 0.3	2.1 ± 0.4

Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date
Laboratory License Number AZ0462



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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-67-6218 (550-103741-2)	< 0.4	1.5 ± 0.3	1.5 ± 0.3

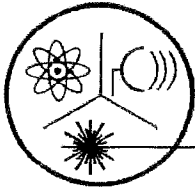
Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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Robert L. Metzger, Ph.D., C.H.P.

6/18/2018

Date

Laboratory License Number AZ0462



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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-68-6218 (550-103741-3)	0.6 ± 0.2	< 0.6	0.6 ± 0.2

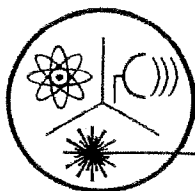
Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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6/18/2018

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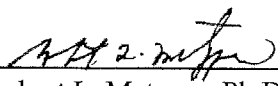
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-69-6218 (550-103741-4)	1.3 ± 0.2	3.3 ± 0.4	4.6 ± 0.4

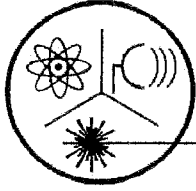
Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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Robert L. Metzger, Ph.D., C.H.P.

6/18/2018

Date

Laboratory License Number AZ0462



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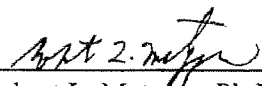
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

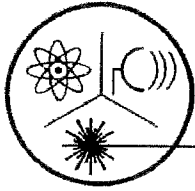
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD02-6218 (550-103741-5)	0.9 ± 0.2	2.2 ± 0.3	3.1 ± 0.4

Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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 Robert L. Metzger, Ph.D., C.H.P. Date

Laboratory License Number AZ0462



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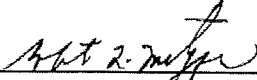
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: May 31, 2018
 Sample Received: June 05, 2018
 Analysis Completed: June 18, 2018

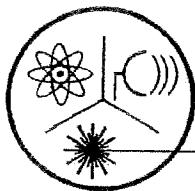
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-70-53118 (550-103741-6)	0.5 ± 0.2	2.3 ± 0.3	2.8 ± 0.4

Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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 Robert L. Metzger, Ph.D., C.H.P. Date

Laboratory License Number AZ0462



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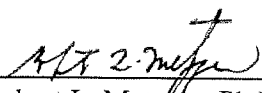
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
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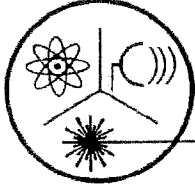
Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-71-6218 (550-103741-7)	0.4 ± 0.2	1.5 ± 0.3	1.9 ± 0.4

Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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 Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
 Date

Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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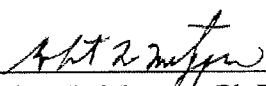
Radiochemical Activity in Water (pCi/L)

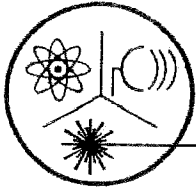
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-72-6218 (550-103741-8)	< 0.4	2.8 ± 0.3	2.8 ± 0.3

Date of Analysis	6/8/2018	6/8/2018	6/8/2018
------------------	----------	----------	----------


 Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
 Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

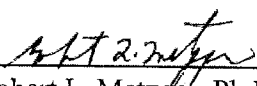
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: June 02, 2018
Sample Received: June 05, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW-73-6218 (550-103741-9)	0.8 ± 0.2	2.0 ± 0.3	2.8 ± 0.4

Date of Analysis	6/8/2018	6/8/2018	6/8/2018
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Robert L. Metzger, Ph.D., C.H.P. 6/18/2018
Date

Laboratory License Number AZ0462

Chain of Custody Record



THE TESTAMERICA LABORATORIAL SYSTEM

Client Contact: Baker, Ken
 Shipping/Receiving: ken.baker@testamerica.com
 State of Origin: Arizona

Company: Radiation Safety Eng., Inc.
 Address: 3245 North Washington Street,
 City: Chandler
 State, Zip: AZ, 85225
 Phone:
 Email:
 Project Name: APS - Four Corners CCR
 Site: Arizona Public Service

Lab Pk: Baker, Ken
 E-Mail: ken.baker@testamerica.com
 Accreditations Required (See note): State Program - Arizona

Carrier Tracking No(s):
 COC No: 550-21312-1
 Page: Page 1 of 1
 Job #: 550-103741-1
 Preservation Codes:
 A - HCL
 M - Hexane
 B - NaOH
 N - None
 C - Zn Acetate
 O - AsHClO2
 D - Nitric Acid
 P - Na2SO4S
 E - NaHSO4
 Q - Na2SO3
 F - MeOH
 R - Na2S2O3
 G - Amchlor
 S - H2SO4
 H - Ascorbic Acid
 T - TSP Dodecahydrate
 I - Ice
 U - Acetone
 J - DI Water
 V - MCAA
 K - EDTA
 W - pH 4.5
 L - EDA
 Z - other (specify)
 Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, B=soil, O=wastefoil, R=Residue, A=Asst)	Field Filtered Sample (Yes or No)	Perform MSD (Yes or No)	Sub (Radium 226/228)	Total Number of Containers	Special Instructions/Note:
FC-CCR-MW-66-53118 (550-103741-1)	5/31/18	14:14	Mountain	Water	X	X	X	2	604994
FC-CCR-MW-67-6218 (550-103741-2)	6/2/18	09:25	Mountain	Water	X	X	X	2	604995
FC-CCR-MW-68-6218 (550-103741-3)	6/2/18	08:57	Mountain	Water	X	X	X	2	604996
FC-CCR-MW-69-6218 (550-103741-4)	6/2/18	08:16	Mountain	Water	X	X	X	2	604997
FC-CCR-FD02-6218 (550-103741-5)	6/2/18	08:16	Mountain	Water	X	X	X	2	604998
FC-CCR-MW-70-53118 (550-103741-6)	5/31/18	14:52	Mountain	Water	X	X	X	2	604999
FC-CCR-MW-71-6218 (550-103741-7)	6/2/18	10:25	Mountain	Water	X	X	X	2	605000
FC-CCR-MW-72-6218 (550-103741-8)	6/2/18	11:07	Mountain	Water	X	X	X	2	605001
FC-CCR-MW-73-6218 (550-103741-9)	6/2/18	11:45	Mountain	Water	X	X	X	2	605002

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis in the matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

Empty Kit Relinquished by:
 Relinquished by: *Allan Mathis*
 Date/Time: 6-5-18 9:54 AM
 Company: Test America
 Relinquished by:
 Date/Time:
 Company:
 Relinquished by:
 Date/Time:
 Company:

Custody Seals Intact: Custody Seal No.:
 A Yes Δ No

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 169
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

103741-22

Client Contact	Doug Lavarnway	928-587-0319	Analysis Turnaround Time	Doug Lavarnway	Lab Contact:	Carrier:	6/3/2018	COC No:	1 of 1 COCs
End of County Road 6675	Fruitland, New Mexico 87416		TAT if different from Below	Sampler:					
(928) 587-0319	Phone			For Lab Use Only:					
(xxx) xxx-xxxx	FAX			Walk-In Client:					
Project Name: CCR	Site: Cholila		Lab Sampling:						
P O #			Job / SDG No.:						

Sample Identification	Sample Date	Sample Time	Sample Type (G-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)				Perform MS / MSD (Y / N)					
										EPA 200.7 (Li)	200.8 (As, Ba, Co, Mo, Se, Tl)	EPA Ra 226 + 228 combined	EPA 300.0 (F)		
FC-CCR-MW-66-53118	5/31/2018	1414 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-67-6218	6/2/2018	925 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-68-6218	6/2/2018	857 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-69-6218	6/2/2018	816 G		W	4	N	X	X	X	X	X				
FC-CCR-ED02-6218	6/2/2018	816 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-70-53118	5/31/2018	1452 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-71-6218	6/2/2018	1025 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-72-6218	6/2/2018	1107 G		W	4	N	X	X	X	X	X				
FC-CCR-MW-73-6218	6/2/2018	1145 G		W	4	N	X	X	X	X	X				

Preservation Used: ~~1-1ml 2-HCl+3-H2SO4+5-HNO3+5-NH4OH~~ Other: _____
Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/IOC Requirements & Comments: _____

Custody Seats Intact:	Company:	APPS	Date/Time:	6/4/18	Received by:	APPS	Received In Laboratory by:	APPS
Relinquished by:	Company:		Date/Time:		Received by:		Received In Laboratory by:	
Relinquished by:	Company:		Date/Time:		Received by:		Received In Laboratory by:	

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103741-2

SDG Number: Cholla

Login Number: 103741

List Number: 1

Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113007-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/26/2018 4:06:46 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Job ID: 550-113007-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-113007-1

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.9° C, 3.0° C and 3.8° C.

Receipt Exceptions

Received 3 pages of COCs from the courier.

Samples #6 - #9 only request Appendix I.

All of the other samples request Appendix I and II.

Client did provide sample containers if Appendix II is needed.

FC-CCR-MW62-11218 (550-113007-6), FC-CCR-MW63-11218 (550-113007-7), FC-CCR-MW64-11218 (550-113007-8) and FC-CCR-MW65-11218 (550-113007-9)

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW71-11318 (550-113007-10), FC-CCR-MW72-11318 (550-113007-11), FC-CCR-MW73-11318 (550-113007-12) and FC-CCR-FD01-11318 (550-113007-13). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

Method(s) 300.0: The following sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-FD02-11318 (550-113007-14). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113007-1	FC-CCR-MW66-11218	Water	11/02/18 13:28	11/07/18 13:00
550-113007-2	FC-CCR-MW67-11318	Water	11/03/18 09:57	11/07/18 13:00
550-113007-3	FC-CCR-MW68-11318	Water	11/03/18 11:01	11/07/18 13:00
550-113007-4	FC-CCR-MW69-11318	Water	11/03/18 08:49	11/07/18 13:00
550-113007-5	FC-CCR-MW70-11218	Water	11/02/18 15:32	11/07/18 13:00
550-113007-6	FC-CCR-MW62-11218	Water	11/02/18 14:10	11/07/18 13:00
550-113007-7	FC-CCR-MW63-112818	Water	11/02/18 14:49	11/07/18 13:00
550-113007-8	FC-CCR-MW64-11218	Water	11/02/18 12:52	11/07/18 13:00
550-113007-9	FC-CCR-MW65-11218	Water	11/02/18 12:08	11/07/18 13:00
550-113007-10	FC-CCR-MW71-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-11	FC-CCR-MW72-11318	Water	11/03/18 12:31	11/07/18 13:00
550-113007-12	FC-CCR-MW73-11318	Water	11/03/18 13:24	11/07/18 13:00
550-113007-13	FC-CCR-FD01-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-14	FC-CCR-FD02-11318	Water	11/03/18 12:31	11/07/18 13:00

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1800	D2	400	mg/L	200		300.0	Total/NA
Fluoride	25	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	140	D2 M3	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	470	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	20000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000	D2	400	mg/L	200		300.0	Total/NA
Fluoride	16	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	13000	D2	400	mg/L	200		300.0	Total/NA
Boron	170	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	19000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.7	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1500	D2	400	mg/L	200		300.0	Total/NA
Fluoride	12	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	150	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	460		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	18000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1200	D2	400	mg/L	200		300.0	Total/NA
Fluoride	11	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	8700	D2	400	mg/L	200		300.0	Total/NA
Boron	92	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	14000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1100	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.7	D1	0.80	mg/L	2		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW70-11218 (Continued)

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	6400	D2	400	mg/L	200		300.0	Total/NA
Boron	88	D2	0.10	mg/L	2		200.7 Rev 4.4	Total/NA
Calcium	510		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	11000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW62-11218

Lab Sample ID: 550-113007-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	110	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.5		0.40	mg/L	1		300.0	Total/NA
Sulfate	3300	D2	100	mg/L	50		300.0	Total/NA
Boron	2.4		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	550		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	5600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW63-112818

Lab Sample ID: 550-113007-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	88		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.9		0.40	mg/L	1		300.0	Total/NA
Sulfate	2800	D2	100	mg/L	50		300.0	Total/NA
Boron	1.9		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	550		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	4300	D2	40	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	15.3	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	50		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.4		0.40	mg/L	1		300.0	Total/NA
Sulfate	350	D2	100	mg/L	50		300.0	Total/NA
Boron	0.64		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	88		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	760		20	mg/L	1		SM 2540C	Total/NA
pH	7.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW65-11218

Lab Sample ID: 550-113007-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	51		2.0	mg/L	1		300.0	Total/NA
Fluoride	1.9		0.40	mg/L	1		300.0	Total/NA
Sulfate	420	D2	40	mg/L	20		300.0	Total/NA
Boron	0.77		0.050	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW65-11218 (Continued)

Lab Sample ID: 550-113007-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	100		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	940		20	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	520	D2	400	mg/L	200		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.56		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	450		10	mg/L	5		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.22		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	14.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	660	D2	200	mg/L	100		300.0	Total/NA
Sulfate	7500	D2	200	mg/L	100		300.0	Total/NA
Boron	1.7		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	480		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	12000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	8.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	520	D2	400	mg/L	200		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.54		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	450		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	7.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-FD02-11318 (Continued)

Lab Sample ID: 550-113007-14

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	450	D1	10	mg/L	5		300.0	Total/NA
Sulfate	11000	D2	400	mg/L	200		300.0	Total/NA
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	460		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	16000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	9.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Date Collected: 11/02/18 13:28

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1800	D2	400	mg/L			11/13/18 19:51	200
Fluoride	25	D1	2.0	mg/L			11/13/18 19:33	5
Sulfate	12000	D2	400	mg/L			11/13/18 19:51	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	140	D2 M3	0.20	mg/L		11/09/18 07:19	11/16/18 04:05	4
Calcium	470	M3	2.0	mg/L		11/09/18 07:19	11/14/18 21:27	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	20000	D2	100	mg/L			11/08/18 12:33	1
pH	7.3	H5	1.7	SU			11/09/18 16:54	1
Temperature	9.6	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Date Collected: 11/03/18 09:57

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000	D2	400	mg/L			11/13/18 21:42	200
Fluoride	16	D1	2.0	mg/L			11/13/18 21:23	5
Sulfate	13000	D2	400	mg/L			11/13/18 21:42	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	170	D2	0.20	mg/L		11/09/18 07:19	11/16/18 04:11	4
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 21:33	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	19000	D2	200	mg/L			11/08/18 12:33	1
pH	7.4	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.7	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1500	D2	400	mg/L			11/13/18 22:18	200
Fluoride	12	D1	2.0	mg/L			11/13/18 22:00	5
Sulfate	11000	D2	400	mg/L			11/13/18 22:18	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	150	D2	0.20	mg/L		11/09/18 07:19	11/16/18 04:17	4
Calcium	460		2.0	mg/L		11/09/18 07:19	11/14/18 21:39	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	18000	D2	100	mg/L			11/08/18 12:33	1
pH	7.2	H5	1.7	SU			11/09/18 16:54	1
Temperature	13.5	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Date Collected: 11/03/18 08:49

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1200	D2	400	mg/L			11/13/18 23:32	200
Fluoride	11	D1	2.0	mg/L			11/13/18 23:14	5
Sulfate	8700	D2	400	mg/L			11/13/18 23:32	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	92	D2	0.10	mg/L		11/09/18 07:19	11/16/18 04:22	2
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 21:45	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	14000	D2	100	mg/L			11/08/18 12:33	1
pH	7.3	H5	1.7	SU			11/09/18 16:54	1
Temperature	13.0	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1100	D2	400	mg/L			11/14/18 00:09	200
Fluoride	2.7	D1	0.80	mg/L			11/13/18 23:50	2
Sulfate	6400	D2	400	mg/L			11/14/18 00:09	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	88	D2	0.10	mg/L		11/09/18 07:19	11/16/18 04:28	2
Calcium	510		2.0	mg/L		11/09/18 07:19	11/14/18 21:51	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	11000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.2	H5	0.1	Degrees C			11/09/18 16:54	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW62-11218

Lab Sample ID: 550-113007-6

Date Collected: 11/02/18 14:10

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	110	D2	100	mg/L			11/14/18 00:46	50
Fluoride	1.5		0.40	mg/L			11/14/18 00:27	1
Sulfate	3300	D2	100	mg/L			11/14/18 00:46	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.4		0.050	mg/L		11/09/18 07:19	11/14/18 21:57	1
Calcium	550		2.0	mg/L		11/09/18 07:19	11/14/18 21:57	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5600	D2	100	mg/L			11/08/18 12:33	1
pH	6.8	H5	1.7	SU			11/09/18 16:54	1
Temperature	13.9	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW63-112818

Lab Sample ID: 550-113007-7

Date Collected: 11/02/18 14:49

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	88		2.0	mg/L			11/14/18 01:04	1
Fluoride	1.9		0.40	mg/L			11/14/18 01:04	1
Sulfate	2800	D2	100	mg/L			11/14/18 01:22	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.9		0.050	mg/L		11/09/18 07:19	11/14/18 22:02	1
Calcium	550		2.0	mg/L		11/09/18 07:19	11/14/18 22:02	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4300	D2	40	mg/L			11/08/18 12:33	1
pH	7.1	H5	1.7	SU			11/09/18 16:54	1
Temperature	15.3	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Date Collected: 11/02/18 12:52

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	50		2.0	mg/L			11/14/18 01:41	1
Fluoride	1.4		0.40	mg/L			11/14/18 01:41	1
Sulfate	350	D2	100	mg/L			11/14/18 01:59	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.64		0.050	mg/L		11/09/18 07:19	11/14/18 22:08	1
Calcium	88		2.0	mg/L		11/09/18 07:19	11/14/18 22:08	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Date Collected: 11/02/18 12:52

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	760		20	mg/L			11/08/18 12:33	1
pH	7.8	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.8	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW65-11218

Lab Sample ID: 550-113007-9

Date Collected: 11/02/18 12:08

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	51		2.0	mg/L			11/14/18 02:54	1
Fluoride	1.9		0.40	mg/L			11/14/18 02:54	1
Sulfate	420	D2	40	mg/L			11/14/18 03:13	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.77		0.050	mg/L		11/09/18 07:19	11/14/18 22:11	1
Calcium	100		2.0	mg/L		11/09/18 07:19	11/14/18 22:11	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	940		20	mg/L			11/08/18 12:33	1
pH	7.5	H5	1.7	SU			11/09/18 16:54	1
Temperature	12.9	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	520	D2	400	mg/L			11/14/18 03:50	200
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 03:31	5
Sulfate	11000	D2	400	mg/L			11/14/18 03:50	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.56		0.050	mg/L		11/09/18 07:19	11/14/18 22:14	1
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 22:14	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.8	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	450		10	mg/L			11/14/18 04:08	5
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 04:08	5
Sulfate	11000	D2	400	mg/L			11/14/18 04:26	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.22		0.050	mg/L		11/09/18 07:19	11/14/18 22:25	1
Calcium	470		2.0	mg/L		11/09/18 07:19	11/14/18 22:25	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/09/18 16:54	1
Temperature	14.8	H5	0.1	Degrees C			11/09/18 16:54	1

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	660	D2	200	mg/L			11/14/18 05:03	100
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 04:45	2
Sulfate	7500	D2	200	mg/L			11/14/18 05:03	100

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.7		0.050	mg/L		11/09/18 07:19	11/14/18 22:31	1
Calcium	480		2.0	mg/L		11/09/18 07:19	11/14/18 22:31	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	12000	D2	100	mg/L			11/08/18 12:33	1
pH	7.0	H5	1.7	SU			11/12/18 13:18	1
Temperature	8.6	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	520	D2	400	mg/L			11/14/18 05:40	200
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 05:22	2
Sulfate	11000	D2	400	mg/L			11/14/18 05:40	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.54		0.050	mg/L		11/09/18 07:19	11/14/18 22:37	1
Calcium	450		2.0	mg/L		11/09/18 07:19	11/14/18 22:37	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.2	H5	1.7	SU			11/12/18 13:18	1
Temperature	7.4	H5	0.1	Degrees C			11/12/18 13:18	1

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	450	D1	10	mg/L			11/14/18 06:35	5
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 06:35	5
Sulfate	11000	D2	400	mg/L			11/14/18 06:54	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.21		0.050	mg/L		11/09/18 07:19	11/14/18 22:43	1
Calcium	460		2.0	mg/L		11/09/18 07:19	11/14/18 22:43	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	16000	D2	100	mg/L			11/08/18 12:33	1
pH	7.1	H5	1.7	SU			11/12/18 13:18	1
Temperature	9.5	H5	0.1	Degrees C			11/12/18 13:18	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-161850/2

Matrix: Water

Analysis Batch: 161850

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/13/18 18:01	1
Fluoride	ND		0.40	mg/L			11/13/18 18:01	1
Sulfate	ND		2.0	mg/L			11/13/18 18:01	1

Lab Sample ID: LCS 550-161850/5

Matrix: Water

Analysis Batch: 161850

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.6		mg/L		108	90 - 110
Fluoride	4.00	4.12		mg/L		103	90 - 110
Sulfate	20.0	20.7		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-161850/6

Matrix: Water

Analysis Batch: 161850

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.5		mg/L		108	90 - 110	0	20
Fluoride	4.00	4.13		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.6		mg/L		103	90 - 110	1	20

Lab Sample ID: 550-113007-1 MS

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	25	D1	20.0	45.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113007-1 MS

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1800	D2	4000	6300	D2	mg/L		112	80 - 120
Sulfate	12000	D2	4000	15900	D2	mg/L		88	80 - 120

Lab Sample ID: 550-113007-1 MSD

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	25	D1	20.0	46.5	D1	mg/L		105	80 - 120	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113007-1 MSD

Matrix: Water

Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1800	D2	4000	6340	D2	mg/L		113	80 - 120	1	20
Sulfate	12000	D2	4000	16000	D2	mg/L		91	80 - 120	1	20

Lab Sample ID: MB 550-161852/1042

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			11/14/18 06:17	1
Fluoride	ND		0.40	mg/L			11/14/18 06:17	1
Sulfate	ND		2.0	mg/L			11/14/18 06:17	1

Lab Sample ID: LCS 550-161852/73

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.5		mg/L		107	90 - 110
Fluoride	4.00	4.16		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-161852/74

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.4		mg/L		107	90 - 110	0	20
Fluoride	4.00	4.16		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-113012-A-1 MS ^2

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.3	D1	8.00	9.67	D1	mg/L		104	80 - 120

Lab Sample ID: 550-113012-A-1 MS ^200

Matrix: Water

Analysis Batch: 161852

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	800	D2	4000	5340	D2	mg/L		114	80 - 120
Sulfate	1200	D2	4000	5490	D2	mg/L		107	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113012-A-1 MSD ^2

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.3	D1	8.00	9.79	D1	mg/L		106	80 - 120	1	20

Lab Sample ID: 550-113012-A-1 MSD ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	800	D2	4000	5310	D2	mg/L		113	80 - 120	1	20
Sulfate	1200	D2	4000	5460	D2	mg/L		107	80 - 120	1	20

Lab Sample ID: 550-113026-B-1 MS ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	680	D2	4000	5160	D2	mg/L		112	80 - 120		
Sulfate	6100	D2	4000	10400	D2	mg/L		108	80 - 120		

Lab Sample ID: 550-113026-B-1 MS ^5

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 D5	20.0	20.9	D1	mg/L		102	80 - 120		

Lab Sample ID: 550-113026-B-1 MSD ^200

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	680	D2	4000	5200	D2	mg/L		113	80 - 120	1	20
Sulfate	6100	D2	4000	10400	D2	mg/L		110	80 - 120	1	20

Lab Sample ID: 550-113026-B-1 MSD ^5

Matrix: Water
Analysis Batch: 161852

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 D5	20.0	21.0	D1	mg/L		103	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-161450/1-A

Matrix: Water
Analysis Batch: 161972

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161450

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		11/09/18 07:19	11/14/18 21:06	1
Calcium	ND		2.0	mg/L		11/09/18 07:19	11/14/18 21:06	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-161450/2-A
Matrix: Water
Analysis Batch: 161972

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.971		mg/L		97	85 - 115
Calcium	21.0	21.0		mg/L		100	85 - 115

Lab Sample ID: LCSD 550-161450/3-A
Matrix: Water
Analysis Batch: 161972

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.949		mg/L		95	85 - 115	2	20
Calcium	21.0	21.1		mg/L		100	85 - 115	0	20

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Calcium	470	M3	21.0	462	M3	mg/L		-45	70 - 130

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 162061

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	140	M3 D2	1.00	134	M3	mg/L		-514	70 - 130

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Calcium	470	M3	21.0	475	M3	mg/L		15	70 - 130	3	20

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 162061

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	140	M3 D2	1.00	142	M3	mg/L		282	70 - 130	6	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-161396/1
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			11/08/18 12:33	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 550-161396/2
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	974		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-161396/3
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	974		mg/L		97	90 - 110	0	10

Lab Sample ID: 550-113007-1 DU
Matrix: Water
Analysis Batch: 161396

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	20000	D2	19000	D2	mg/L		4	10

Lab Sample ID: 550-113026-A-4 DU
Matrix: Water
Analysis Batch: 161396

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	6200	D2	6210	D2	mg/L		0.5	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-161550/1
Matrix: Water
Analysis Batch: 161550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99.6	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161550/12
Matrix: Water
Analysis Batch: 161550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.1	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161550/24
Matrix: Water
Analysis Batch: 161550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.1	98.5 - 101.5

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: 550-113007-1 DU
Matrix: Water
Analysis Batch: 161550

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.3	H5	7.3	H5	SU		0.1	5
Temperature	9.6	H5	10.7	H5	Degrees C		11	

Lab Sample ID: 550-113007-11 DU
Matrix: Water
Analysis Batch: 161550

Client Sample ID: FC-CCR-MW72-11318
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.0	H5	7.1	H5	SU		0.7	5
Temperature	14.8	H5	15.7	H5	Degrees C		6	

Lab Sample ID: LCSSRM 550-161638/1
Matrix: Water
Analysis Batch: 161638

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits

Lab Sample ID: LCSSRM 550-161638/12
Matrix: Water
Analysis Batch: 161638

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits

Lab Sample ID: 550-113012-A-1 DU
Matrix: Water
Analysis Batch: 161638

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	9.7	H5	9.6	H5	SU		0.4	5
Temperature	10.2	H5	9.9	H5	Degrees C		3	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

HPLC/IC

Analysis Batch: 161850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	300.0	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	300.0	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	300.0	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	300.0	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	300.0	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	300.0	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	300.0	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	300.0	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	300.0	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	300.0	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	300.0	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	300.0	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	300.0	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	300.0	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	300.0	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	300.0	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	300.0	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	300.0	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	300.0	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	300.0	
MB 550-161850/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161850/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161850/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	300.0	

Analysis Batch: 161852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	300.0	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	300.0	
MB 550-161852/1042	Method Blank	Total/NA	Water	300.0	
LCS 550-161852/73	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161852/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113012-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113012-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113012-A-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-B-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113026-B-1 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-113026-B-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-B-1 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Metals

Prep Batch: 161450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	200.7	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	200.7	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	200.7	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	200.7	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7	
MB 550-161450/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-161450/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-161450/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7	

Analysis Batch: 161972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7 Rev 4.4	161450
MB 550-161450/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	161450
LCS 550-161450/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	161450
LCSD 550-161450/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450

Analysis Batch: 162061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

General Chemistry

Analysis Batch: 161396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	SM 2540C	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	SM 2540C	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	SM 2540C	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	SM 2540C	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	SM 2540C	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	SM 2540C	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	SM 2540C	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	SM 2540C	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	SM 2540C	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	SM 2540C	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	SM 2540C	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	SM 2540C	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	SM 2540C	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	SM 2540C	
MB 550-161396/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-161396/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-161396/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-113007-1 DU	FC-CCR-MW66-11218	Total/NA	Water	SM 2540C	
550-113026-A-4 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 161550

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-6	FC-CCR-MW62-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-7	FC-CCR-MW63-112818	Total/NA	Water	SM 4500 H+ B	
550-113007-8	FC-CCR-MW64-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-9	FC-CCR-MW65-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161550/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161550/12	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161550/24	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-113007-1 DU	FC-CCR-MW66-11218	Total/NA	Water	SM 4500 H+ B	
550-113007-11 DU	FC-CCR-MW72-11318	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 161638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	SM 4500 H+ B	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161638/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161638/12	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-113012-A-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Date Collected: 11/02/18 13:28

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 19:33	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 19:51	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:27	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	162061	11/16/18 04:05	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Date Collected: 11/03/18 09:57

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 21:23	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 21:42	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:33	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	162061	11/16/18 04:11	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 22:00	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 22:18	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:39	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	162061	11/16/18 04:17	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Date Collected: 11/03/18 08:49

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 23:14	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/13/18 23:32	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:45	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	162061	11/16/18 04:22	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/13/18 23:50	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 00:09	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:51	ARE	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	162061	11/16/18 04:28	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW62-11218

Lab Sample ID: 550-113007-6

Date Collected: 11/02/18 14:10

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 00:27	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161850	11/14/18 00:46	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:57	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW63-112818

Lab Sample ID: 550-113007-7

Date Collected: 11/02/18 14:49

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 01:04	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161850	11/14/18 01:22	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:02	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW64-11218

Lab Sample ID: 550-113007-8

Date Collected: 11/02/18 12:52

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 01:41	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161850	11/14/18 01:59	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:08	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW65-11218

Lab Sample ID: 550-113007-9

Date Collected: 11/02/18 12:08

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161850	11/14/18 02:54	NEL	TAL PHX
Total/NA	Analysis	300.0		20	161850	11/14/18 03:13	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:11	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 03:31	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 03:50	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:14	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 04:08	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 04:26	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:25	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161550	11/09/18 16:54	MRR	TAL PHX

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 04:45	NEL	TAL PHX
Total/NA	Analysis	300.0		100	161850	11/14/18 05:03	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:31	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396	(Start) 11/08/18 12:33 (End) 11/09/18 11:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 05:22	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161850	11/14/18 05:40	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:37	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 06:35	NEL	TAL PHX
Total/NA	Analysis	300.0		200	161852	11/14/18 06:54	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:43	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	161396		YET	TAL PHX
					(Start)	11/08/18 12:33		
					(End)	11/09/18 11:15		
Total/NA	Analysis	SM 4500 H+ B		1	161638	11/12/18 13:18	MRR	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW66-11218 (550-113007-1)	2.0 ± 0.3	0.9 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018

Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date





Radiation Safety Engineering, Inc.

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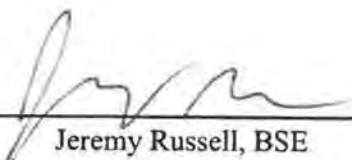
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW67-11318 (550-113007-2)	0.8 ± 0.2	0.8 ± 0.3	1.6 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
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Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW68-11318 (550-113007-3)	0.6 ± 0.2	1.3 ± 0.3	1.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
------------------	-----------	-----------	-----------

Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

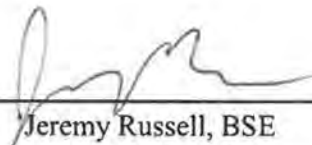
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW69-11318 (550-113007-4)	1.7 ± 0.2	1.3 ± 0.3	3.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018



 Jeremy Russell, BSE
 Laboratory License Number AZ0462

11/21/2018
 Date





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3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW70-11218 (550-113007-5)	0.7 ± 0.2	< 0.7	0.7 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date

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Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
 Website: www.radsafe.com

(480) 897-9459
 FAX (480) 892-5446

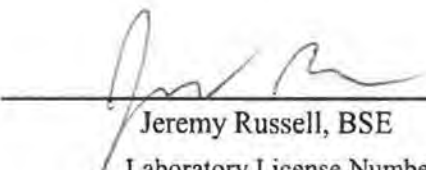
Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 03, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW71-11318 (550-113007-10)	1.2 ± 0.2	< 0.7	1.2 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

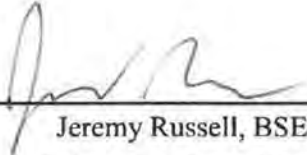
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW72-11318 (550-113007-11)	0.7 ± 0.2	1.0 ± 0.3	1.7 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

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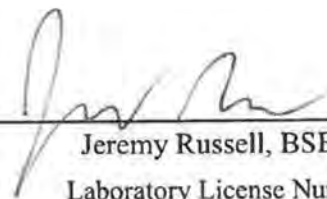
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW73-11318 (550-113007-12)	1.5 ± 0.2	1.4 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: www.radsafe.com

(480) 897-9459

FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-11318 (550-113007-13)	1.8 ± 0.2	< 0.7	1.8 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

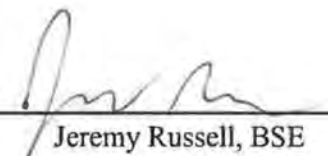
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD02-11318 (550-113007-14)	0.5 ± 0.2	1.5 ± 0.3	2.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



TestAmerica Phoenix
 4625 East Cotton Cir Blvd Suite 189
 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record

TestAmerica
PHYSICAL & ENVIRONMENTAL TESTING

SHIP (EAST) 9, ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)		Sampler	Lab PM	Carrier Tracking Note(s)	ECC No.			
Client Contact: Shipping/Receiving		Baker, Ken	Baker, Ken		550-22780.1			
Company: Radiation Safety Eng., Inc.		E-Mail: ken.baker@testamericainc.com		State of Origin: Arizona	Page: Page 1 of 2			
Address: 3245 North Washington Street, Chandler		Accreditations Required (See note): State Program - Arizona			Job #: 550-113007-1			
City: Chandler		Due Date Requested: 11/16/2018		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anichlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:				
State, Zip: AZ, 85225		TAT Requested (days):		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylsulfate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)				
Phone:		PO #:		Total Number of Containers				
Email:		WO #:		Job 3				
Project Name: CCR		Project #: 55009706		Job 3				
Site: Arizona Public Service		SSOW#:		Job 3				
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=Water, S=Soil, D=Dredge, O=Other)	Field Filtered Sample (Yes or No)	Field Filtered Sample (Yes or No)	Preservation Code:	Special Instructions/Note:
FC-CCR-MW66-11218 (550-113007-1) # 61261	11/2/18	13:28	Water	Water	X	X		
FC-CCR-MW67-11318 (550-113007-2) # 61262	11/3/18	08:57	Water	Water	X	X		
FC-CCR-MW68-11318 (550-113007-3) # 61263	11/3/18	11:01	Water	Water	X	X		
FC-CCR-MW69-11318 (550-113007-4) # 61264	11/3/18	08:49	Water	Water	X	X		
FC-CCR-MW70-11218 (550-113007-5) # 61265	11/2/18	15:32	Water	Water	X	X		
FC-CCR-MW71-11318 (550-113007-10) # 61266	11/3/18	11:45	Water	Water	X	X		
FC-CCR-MW72-11318 (550-113007-11) # 61267	11/3/18	12:31	Water	Water	X	X		
FC-CCR-MW73-11318 (550-113007-12) # 61268	11/3/18	13:24	Water	Water	X	X		
FC-CCR-FD01-11318 (550-113007-13) # 61269	11/3/18	11:45	Water	Water	X	X		

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontracted laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification

Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) _____ Primary Deliverable Rank: 2

Empty Kit Relinquished by: _____ Date: _____ Time: _____

Relinquished by: *M. McGinnis* Date/Time: 11/8/18 9:51 Company: *DES* Company: _____

Relinquished by: _____ Date/Time: 11/8/18 9:51 Company: _____

Relinquished by: _____ Date/Time: _____ Company: _____

Custody Seals Intact: _____ Custody Seal No.: _____

Δ Yes Δ No

Method of Shipment: _____ Date/Time: 11/8/18 9:51 Company: _____

Received by: _____ Date/Time: _____ Company: _____

Received by: _____ Date/Time: _____ Company: _____

Received by: _____ Date/Time: _____ Company: _____

Cooler Temperature(s) °C and Other Remarks: _____

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archiving For _____ Months

Special Instructions/OC Requirements: _____

113007

Chain of Custody Record

Phone 602.437.3340 Fax 623.445.6192

Client Contact
 APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416

Project Manager: Doug Lavarrway
 Tel/Fax: 928-288-1394

Analysis Turnaround Time
 Calendar (C) or Work Days (W) _____
 TAT if different from Below: ___ 7 Days ___
 2 weeks
 1 week
 2 days
 1 day

Project Name: CCR
E-Mail Address: _____

SDG No. _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample				
						Perform MS / MSD (Y / N)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
FC-CCR-MW66-11218	11/2/2018	1328	G	W	2	N	X	X	X	X
FC-CCR-MW67-11318	11/3/2018	957	G	W	2	N	X	X	X	X
FC-CCR-MW68-11318	11/3/2018	1101	G	W	2	N	X	X	X	X
FC-CCR-MW69-11318	11/3/18	849	G	W	2	N	X	X	X	X
FC-CCR-MW70-11218	11/2/18	1532	G	W	2	N	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unk/othr

Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

3.0°C, 3.8°C, 2.9°C

Relinquished by: Pass Lavarrway
 Company: APS
 Date/Time: 11/7/2018

Received by: Projevis
 Company: TADJ
 Date/Time: 11/7/18 8:05am

Relinquished by: _____
 Company: _____
 Date/Time: 11-2-18 (305)

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TestAmerica Phoenix

4645 E Cotton Cir Blvd Bldg 3
Phoenix, AZ 85040

Phone: 602.437.3340 Fax: 623.445.6192

113007

Chain of Custody Record



TestAmerica Laboratories, Inc.

Client Contact: **APS Four Corners**
 Project Manager: **Doug Lavarnway**
 Tel/Fax: **928-288-1394**
 PO Box 355, MS 4915
 Fruitland, NM 87416
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 Phone: _____
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Fax: _____
 Project Name: **CCR**
 E-Mail Address: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample				
						Perform MS / MSD (Y / N)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
FC-CCR-MW62-11218	11/2/2018	1410	G	W	2	N	X	X	X	X
FC-CCR-MW63-11218	11/2/2018	1449	G	W	2	N	X	X	X	X
FC-CCR-MW64-11218	11/2/2018	1252	G	W	2	N	X	X	X	X
FC-CCR-MW65-11218	11/2/2018	1208	G	W	2	N	X	X	X	X
FC-CCR-MW71-11318	11/3/18	1145	G	W	2	N	X	X	X	X
FC-CCR-MW72-11318	11/3/18	1231	G	W	2	N	X	X	X	X
FC-CCR-MW73-11318	11/3/18	1324	G	W	2	N	X	X	X	X
FC-CCR-FD01-11318	11/3/18	1145	G	W	2	N	X	X	X	X
FC-CCR-FD02-11318	11/3/18	1231	G	W	2	N	X	X	X	X

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other _____
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Unknown
 Special Instructions/QC Requirements & Comments:
 Return To Client Disposal By Lab Archive For _____ Months
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

(3,0°C, 3.8°C, 2.9°C) PC

Relinquished by: **Dee Lavarnway** Company: **APS** Date/Time: **11/7/2018** Received by: **Procyes** Company: **APS** Date/Time: **11/7/18 8:05am**
 Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: **APAC** Date/Time: **11-7-18 1300**

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113007-1

Login Number: 113007

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113007-2

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/27/2018 7:47:31 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Job ID: 550-113007-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-113007-2

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.9° C, 3.0° C and 3.8° C.

Receipt Exceptions

Received 3 pages of COCs from the courier.

Samples #6 - #9 only request Appendix I.

All of the other samples request Appendix I and II.

Client did provide sample containers if Appendix II is needed.

FC-CCR-MW62-11218 (550-113007-6), FC-CCR-MW63-112818 (550-113007-7), FC-CCR-MW64-11218 (550-113007-8) and FC-CCR-MW65-11218 (550-113007-9)

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW71-11318 (550-113007-10), FC-CCR-MW72-11318 (550-113007-11), FC-CCR-MW73-11318 (550-113007-12) and FC-CCR-FD01-11318 (550-113007-13). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

Method(s) 300.0: The following sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-FD02-11318 (550-113007-14). This analyte was not detected in the diluted samples. Elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Subcontract Work

Method Radium 226/228: This method was subcontracted to Radiation Safety. The subcontract laboratory certification is different from that of the facility issuing the final report.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113007-1	FC-CCR-MW66-11218	Water	11/02/18 13:28	11/07/18 13:00
550-113007-2	FC-CCR-MW67-11318	Water	11/03/18 09:57	11/07/18 13:00
550-113007-3	FC-CCR-MW68-11318	Water	11/03/18 11:01	11/07/18 13:00
550-113007-4	FC-CCR-MW69-11318	Water	11/03/18 08:49	11/07/18 13:00
550-113007-5	FC-CCR-MW70-11218	Water	11/02/18 15:32	11/07/18 13:00
550-113007-10	FC-CCR-MW71-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-11	FC-CCR-MW72-11318	Water	11/03/18 12:31	11/07/18 13:00
550-113007-12	FC-CCR-MW73-11318	Water	11/03/18 13:24	11/07/18 13:00
550-113007-13	FC-CCR-FD01-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-14	FC-CCR-FD02-11318	Water	11/03/18 12:31	11/07/18 13:00



Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	25	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.38		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0015		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.023		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.019		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0020	M1	0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.0011		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	16	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.39		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0016		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.017		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0061		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.037		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0043		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00078		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	12	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.42		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0030		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0081		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0038		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0078		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.11		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.0016		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW69-11318

Lab Sample ID: 550-113007-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	11	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.35		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0042		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0041		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.025		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00024		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.7	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.32		0.20	mg/L	1		200.7 Rev 4.4	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW70-11218 (Continued)

Lab Sample ID: 550-113007-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0043		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.010		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0041		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0064		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.19		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00029		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.35		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0046		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0098		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00079		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.27		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00031		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0031		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0075		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00078		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.13		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00088		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.31		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.022		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0078		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0026		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0062		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00020		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.34		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0068		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0095		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00065		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.31		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00030		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-FD02-11318 (Continued)

Lab Sample ID: 550-113007-14

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.37		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0026		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0075		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.00078		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.15		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00087		0.00010	mg/L	1		200.8 LL	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW66-11218

Lab Sample ID: 550-113007-1

Date Collected: 11/02/18 13:28

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	25	D1	2.0	mg/L			11/13/18 19:33	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.38		0.20	mg/L		11/09/18 07:19	11/14/18 21:27	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0015		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Barium	0.023		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Cobalt	0.012		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Molybdenum	0.019		0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Selenium	0.0020	M1	0.00050	mg/L		11/11/18 11:26	11/12/18 20:39	1
Thallium	0.0011		0.00010	mg/L		11/11/18 11:26	11/12/18 20:39	1

Client Sample ID: FC-CCR-MW67-11318

Lab Sample ID: 550-113007-2

Date Collected: 11/03/18 09:57

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	16	D1	2.0	mg/L			11/13/18 21:23	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.39		0.20	mg/L		11/09/18 07:19	11/14/18 21:33	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0016		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Barium	0.017		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Cobalt	0.0061		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Molybdenum	0.037		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Selenium	0.0043		0.00050	mg/L		11/11/18 11:26	11/12/18 20:48	1
Thallium	0.00078		0.00010	mg/L		11/11/18 11:26	11/12/18 20:48	1

Client Sample ID: FC-CCR-MW68-11318

Lab Sample ID: 550-113007-3

Date Collected: 11/03/18 11:01

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	12	D1	2.0	mg/L			11/13/18 22:00	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.42		0.20	mg/L		11/09/18 07:19	11/14/18 21:39	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0030		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW68-11318

Date Collected: 11/03/18 11:01

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-3

Matrix: Water

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0081		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Cobalt	0.0038		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Molybdenum	0.0078		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Selenium	0.11		0.00050	mg/L		11/11/18 11:26	11/12/18 20:50	1
Thallium	0.0016		0.00010	mg/L		11/11/18 11:26	11/12/18 20:50	1

Client Sample ID: FC-CCR-MW69-11318

Date Collected: 11/03/18 08:49

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-4

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	11	D1	2.0	mg/L			11/13/18 23:14	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.35		0.20	mg/L		11/09/18 07:19	11/14/18 21:45	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0042		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Barium	0.012		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Cobalt	0.0041		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Molybdenum	0.012		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Selenium	0.025		0.00050	mg/L		11/11/18 11:26	11/12/18 20:53	1
Thallium	0.00024		0.00010	mg/L		11/11/18 11:26	11/12/18 20:53	1

Client Sample ID: FC-CCR-MW70-11218

Date Collected: 11/02/18 15:32

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-5

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.7	D1	0.80	mg/L			11/13/18 23:50	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.32		0.20	mg/L		11/09/18 07:19	11/14/18 21:51	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0043		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Barium	0.010		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Cobalt	0.0041		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Molybdenum	0.0064		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Selenium	0.19		0.00050	mg/L		11/11/18 11:26	11/12/18 20:46	1
Thallium	0.00029		0.00010	mg/L		11/11/18 11:26	11/12/18 20:46	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 03:31	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.35		0.20	mg/L		11/09/18 07:19	11/14/18 22:14	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0046		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Barium	0.0098		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Molybdenum	0.00079		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Selenium	0.27		0.00050	mg/L		11/11/18 11:26	11/12/18 20:55	1
Thallium	0.00031		0.00010	mg/L		11/11/18 11:26	11/12/18 20:55	1

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 04:08	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.37		0.20	mg/L		11/09/18 07:19	11/14/18 22:25	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0031		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Barium	0.0075		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Cobalt	0.0020		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Molybdenum	0.00078		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Selenium	0.13		0.00050	mg/L		11/11/18 11:26	11/12/18 20:57	1
Thallium	0.00088		0.00010	mg/L		11/11/18 11:26	11/12/18 20:57	1

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 04:45	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.31		0.20	mg/L		11/09/18 07:19	11/14/18 22:31	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND	V1	0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.022		0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1
Cobalt	0.0078		0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1
Molybdenum	0.0026		0.00050	mg/L		11/11/18 11:26	11/12/18 21:07	1
Selenium	0.0062		0.00050	mg/L		11/11/18 11:26	11/14/18 21:16	1
Thallium	0.00020		0.00010	mg/L		11/11/18 11:26	11/12/18 21:07	1

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/14/18 05:22	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.34		0.20	mg/L		11/09/18 07:19	11/14/18 22:37	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0068		0.00050	mg/L		11/11/18 11:26	11/14/18 21:18	1
Barium	0.0095		0.00050	mg/L		11/11/18 11:26	11/12/18 21:09	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 21:09	1
Molybdenum	0.00065		0.00050	mg/L		11/11/18 11:26	11/12/18 21:09	1
Selenium	0.31		0.00050	mg/L		11/11/18 11:26	11/14/18 21:18	1
Thallium	0.00030		0.00010	mg/L		11/11/18 11:26	11/12/18 21:09	1

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			11/14/18 06:35	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.37		0.20	mg/L		11/09/18 07:19	11/14/18 22:43	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0026		0.00050	mg/L		11/11/18 11:26	11/14/18 21:20	1
Barium	0.0075		0.00050	mg/L		11/11/18 11:26	11/12/18 21:11	1
Cobalt	0.0020		0.00050	mg/L		11/11/18 11:26	11/12/18 21:11	1
Molybdenum	0.00078		0.00050	mg/L		11/11/18 11:26	11/12/18 21:11	1
Selenium	0.15		0.00050	mg/L		11/11/18 11:26	11/14/18 21:20	1
Thallium	0.00087		0.00010	mg/L		11/11/18 11:26	11/12/18 21:11	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	25		20.0	45.9	D1	mg/L		102	80 - 120

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161850

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	25		20.0	46.5	D1	mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.378		1.00	1.45		mg/L		107	70 - 130

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161972

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161450

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.378		1.00	1.42		mg/L		105	70 - 130	1	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-161588/1-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 161588

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		11/11/18 11:26	11/12/18 20:32	1
Arsenic	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Barium	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Cadmium	ND		0.00010	mg/L		11/11/18 11:26	11/12/18 20:32	1
Chromium	ND		0.0010	mg/L		11/11/18 11:26	11/12/18 20:32	1
Cobalt	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Lead	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Molybdenum	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Selenium	ND		0.00050	mg/L		11/11/18 11:26	11/12/18 20:32	1
Thallium	ND		0.00010	mg/L		11/11/18 11:26	11/12/18 20:32	1

Lab Sample ID: LCS 550-161588/2-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.100	0.0999		mg/L		100	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 550-161588/2-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.0962		mg/L		96	85 - 115
Barium	0.100	0.0976		mg/L		98	85 - 115
Cadmium	0.100	0.0974		mg/L		97	85 - 115
Chromium	0.100	0.0960		mg/L		96	85 - 115
Cobalt	0.100	0.0962		mg/L		96	85 - 115
Lead	0.100	0.0971		mg/L		97	85 - 115
Molybdenum	0.100	0.0970		mg/L		97	85 - 115
Selenium	0.100	0.0975		mg/L		98	85 - 115
Thallium	0.100	0.0974		mg/L		97	85 - 115

Lab Sample ID: LCSD 550-161588/3-A
Matrix: Water
Analysis Batch: 161708

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.100	0.0991		mg/L		99	85 - 115	1	20
Arsenic	0.100	0.0965		mg/L		96	85 - 115	0	20
Barium	0.100	0.0956		mg/L		96	85 - 115	2	20
Cadmium	0.100	0.0967		mg/L		97	85 - 115	1	20
Chromium	0.100	0.0963		mg/L		96	85 - 115	0	20
Cobalt	0.100	0.0964		mg/L		96	85 - 115	0	20
Lead	0.100	0.0971		mg/L		97	85 - 115	0	20
Molybdenum	0.100	0.0964		mg/L		96	85 - 115	1	20
Selenium	0.100	0.0981		mg/L		98	85 - 115	1	20
Thallium	0.100	0.0973		mg/L		97	85 - 115	0	20

Lab Sample ID: 550-113007-1 MS
Matrix: Water
Analysis Batch: 161708

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND		0.100	0.0997		mg/L		99	70 - 130
Arsenic	0.0015		0.100	0.112		mg/L		110	70 - 130
Barium	0.023		0.100	0.122		mg/L		100	70 - 130
Cadmium	ND		0.100	0.0891		mg/L		89	70 - 130
Chromium	0.0017		0.100	0.103		mg/L		102	70 - 130
Cobalt	0.012		0.100	0.103		mg/L		91	70 - 130
Lead	ND		0.100	0.0860		mg/L		86	70 - 130
Molybdenum	0.019		0.100	0.120		mg/L		102	70 - 130
Selenium	0.0020	M1	0.100	0.139	M1	mg/L		137	70 - 130
Thallium	0.0011		0.100	0.0886		mg/L		87	70 - 130

Lab Sample ID: 550-113007-1 MSD
Matrix: Water
Analysis Batch: 161708

Client Sample ID: FC-CCR-MW66-11218
Prep Type: Total/NA
Prep Batch: 161588

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	ND		0.100	0.0982		mg/L		98	70 - 130	1	20
Arsenic	0.0015		0.100	0.108		mg/L		106	70 - 130	4	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-113007-1 MSD

Matrix: Water

Analysis Batch: 161708

Client Sample ID: FC-CCR-MW66-11218

Prep Type: Total/NA

Prep Batch: 161588

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Barium	0.023		0.100	0.120		mg/L		97	70 - 130	2	20
Cadmium	ND		0.100	0.0866		mg/L		87	70 - 130	3	20
Chromium	0.0017		0.100	0.100		mg/L		98	70 - 130	3	20
Cobalt	0.012		0.100	0.101		mg/L		88	70 - 130	2	20
Lead	ND		0.100	0.0843		mg/L		84	70 - 130	2	20
Molybdenum	0.019		0.100	0.118		mg/L		99	70 - 130	2	20
Selenium	0.0020	M1	0.100	0.139	M1	mg/L		137	70 - 130	0	20
Thallium	0.0011		0.100	0.0867		mg/L		86	70 - 130	2	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

HPLC/IC

Analysis Batch: 161850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	300.0	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	300.0	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	300.0	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	300.0	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	300.0	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	300.0	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	300.0	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	300.0	

Analysis Batch: 161852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	300.0	

Metals

Prep Batch: 161450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7	

Prep Batch: 161588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.8	
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.8	
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.8	
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.8	
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.8	
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.8	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.8	
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.8	
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.8	
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.8	
MB 550-161588/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-161588/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-161588/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.8	
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Metals (Continued)

Analysis Batch: 161708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.8 LL	161588
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.8 LL	161588
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.8 LL	161588
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.8 LL	161588
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.8 LL	161588
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.8 LL	161588
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.8 LL	161588
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.8 LL	161588
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.8 LL	161588
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.8 LL	161588
MB 550-161588/1-A	Method Blank	Total/NA	Water	200.8 LL	161588
LCS 550-161588/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	161588
LCSD 550-161588/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	161588
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.8 LL	161588
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.8 LL	161588

Analysis Batch: 161944

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.8 LL	161588
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.8 LL	161588
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.8 LL	161588

Analysis Batch: 161972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-1	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-2	FC-CCR-MW67-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-3	FC-CCR-MW68-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-4	FC-CCR-MW69-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-5	FC-CCR-MW70-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-12	FC-CCR-MW73-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-13	FC-CCR-FD01-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-14	FC-CCR-FD02-11318	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MS	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450
550-113007-1 MSD	FC-CCR-MW66-11218	Total/NA	Water	200.7 Rev 4.4	161450

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW66-11218

Date Collected: 11/02/18 13:28

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 19:33	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:27	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:39	SLS	TAL PHX

Client Sample ID: FC-CCR-MW67-11318

Date Collected: 11/03/18 09:57

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 21:23	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:33	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:48	SLS	TAL PHX

Client Sample ID: FC-CCR-MW68-11318

Date Collected: 11/03/18 11:01

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 22:00	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:39	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:50	SLS	TAL PHX

Client Sample ID: FC-CCR-MW69-11318

Date Collected: 11/03/18 08:49

Date Received: 11/07/18 13:00

Lab Sample ID: 550-113007-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/13/18 23:14	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:45	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:53	SLS	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-MW70-11218

Lab Sample ID: 550-113007-5

Date Collected: 11/02/18 15:32

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/13/18 23:50	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 21:51	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:46	SLS	TAL PHX

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 03:31	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:14	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:55	SLS	TAL PHX

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161850	11/14/18 04:08	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:25	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 20:57	SLS	TAL PHX

Client Sample ID: FC-CCR-MW73-11318

Lab Sample ID: 550-113007-12

Date Collected: 11/03/18 13:24

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 04:45	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:31	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 21:07	SLS	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161944	11/14/18 21:16	TEK	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Client Sample ID: FC-CCR-FD01-11318

Lab Sample ID: 550-113007-13

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161850	11/14/18 05:22	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:37	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 21:09	SLS	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161944	11/14/18 21:18	TEK	TAL PHX

Client Sample ID: FC-CCR-FD02-11318

Lab Sample ID: 550-113007-14

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	161852	11/14/18 06:35	NEL	TAL PHX
Total/NA	Prep	200.7			161450	11/09/18 07:19	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	161972	11/14/18 22:43	ARE	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161708	11/12/18 21:11	SLS	TAL PHX
Total/NA	Prep	200.8			161588	11/11/18 11:26	SLS	TAL PHX
Total/NA	Analysis	200.8 LL		1	161944	11/14/18 21:20	TEK	TAL PHX

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-2

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
Subcontract	Radium 226/228	None	Radiation
200.7	Preparation, Total Metals	EPA	TAL PHX
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

Laboratory References:

Radiation = Radiation Safety, 3245 North Washington Street, Chandler, AZ 85225

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

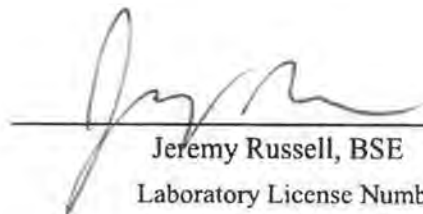
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW66-11218 (550-113007-1)	2.0 ± 0.3	0.9 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: www.redsafe.com

(480) 897-9459

FAX (480) 892-5446

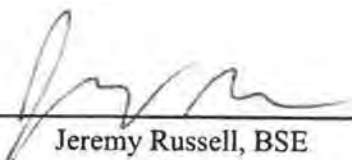
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW67-11318 (550-113007-2)	0.8 ± 0.2	0.8 ± 0.3	1.6 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radSAFE.com

(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW68-11318 (550-113007-3)	0.6 ± 0.2	1.3 ± 0.3	1.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW69-11318 (550-113007-4)	1.7 ± 0.2	1.3 ± 0.3	3.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

11/21/2018

Date

Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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(480) 897-9459
FAX (480) 892-5446

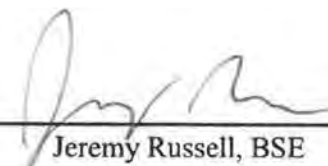
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 02, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW70-11218 (550-113007-5)	0.7 ± 0.2	< 0.7	0.7 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



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Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
 Website: www.radsafe.com

(480) 897-9459
 FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: November 03, 2018
 Sample Received: November 08, 2018
 Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW71-11318 (550-113007-10)	1.2 ± 0.2	< 0.7	1.2 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

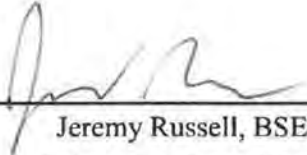
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW72-11318 (550-113007-11)	0.7 ± 0.2	1.0 ± 0.3	1.7 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462





Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

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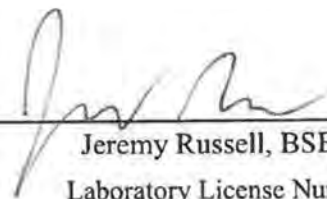
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW73-11318 (550-113007-12)	1.5 ± 0.2	1.4 ± 0.3	2.9 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE
Laboratory License Number AZ0462

11/21/2018
Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: www.radsafe.com

(480) 897-9459

FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD01-11318 (550-113007-13)	1.8 ± 0.2	< 0.7	1.8 ± 0.2

Date of Analysis	11/9/2018	11/9/2018	11/9/2018
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Jeremy Russell, BSE

Laboratory License Number AZ0462

11/21/2018

Date



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121
Website: www.radsafe.com

(480) 897-9459
FAX (480) 892-5446

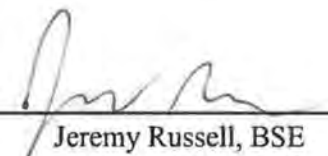
Radiochemical Activity in Water (pCi/L)

TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: November 03, 2018
Sample Received: November 08, 2018
Analysis Completed: November 21, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-FD02-11318 (550-113007-14)	0.5 ± 0.2	1.5 ± 0.3	2.0 ± 0.4

Date of Analysis	11/9/2018	11/9/2018	11/9/2018


 _____ 11/21/2018
 Jeremy Russell, BSE Date
 Laboratory License Number AZ0462



TestAmerica Phoenix
 4625 East Cotton Cir Blvd Suite 189
 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record

TestAmerica
PHYSICAL & ENVIRONMENTAL TESTING

SHIP (EAST) 9, ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)		Sampler	Lab PM	Carrier Tracking Note(s)	ECC No.					
Client Contact: Shipping/Receiving		Baker, Ken	Baker, Ken		550-22780.1					
Company: Radiation Safety Eng., Inc.		E-Mail: ken.baker@testamericainc.com		State of Origin: Arizona	Page: Page 1 of 2					
Address: 3245 North Washington Street, Chandler		Accreditations Required (See note): State Program - Arizona		Job #: 550-113007-1	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anichlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:					
City: AZ, 85225		Due Date Requested: 11/18/2018			M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylsulfate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)					
State Zip: AZ, 85225		TAT Requested (days):								
Phone:		PO #:								
Email:		WO #:								
Project Name: CCR		Project #: 55009706								
Site: Arizona Public Service		SSOW#:								
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=Water, S=Soil, D=Dredge, O=Other)	Field Filtered Sample (Yes or No)	Field Filtered Sample (Yes or No)	Platform MS/MSD (Yes or No)	SUB (Radium 226/228/ Radium 226/228)	Total Number of Containers	Special Instructions/Note:
FC-CCR-MW66-11218 (550-113007-1) # 61261	11/2/18	13:28	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW67-11318 (550-113007-2) # 61262	11/3/18	08:57	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW68-11318 (550-113007-3) # 61263	11/3/18	11:01	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW69-11318 (550-113007-4) # 61264	11/3/18	08:49	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW70-11218 (550-113007-5) # 61265	11/2/18	15:32	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW71-11318 (550-113007-10) # 61266	11/3/18	11:45	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW72-11318 (550-113007-11) # 61267	11/3/18	12:31	Water	Water	X	X	X	X	2	Job 3
FC-CCR-MW73-11318 (550-113007-12) # 61268	11/3/18	13:24	Water	Water	X	X	X	X	2	Job 3
FC-CCR-FD01-11318 (550-113007-13) # 61269	11/3/18	11:45	Water	Water	X	X	X	X	2	Job 3

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontracted laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification

Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) _____
 Primary Deliverable Rank: 2
 Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: M. McGinnis Date/Time: 11/8/18 9:51
 Relinquished by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Custody Seals Intact: _____ Custody Seal No.: _____
 Δ Yes Δ No

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archiving For _____ Months
 Special Instructions/OC Requirements: _____

Method of Shipment: _____
 Received by: _____ Date/Time: 11/8/18 9:51 Company: KSE
 Received by: _____ Date/Time: _____ Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Cooler Temperature(s) °C and Other Remarks: _____

113007

Chain of Custody Record

Phone 602.437.3340 Fax 623.445.6192

Client Contact
 APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416

Project Manager: Doug Lavarrway
 Tel/Fax: 928-288-1394

Analysis Turnaround Time
 Calendar (C) or Work Days (W) _____

Phone: _____
 TAT if different from Below: 7 Days

Fax: 2 weeks
 1 week
 2 days
 1 day

Project Name: CCR
E-Mail Address: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample				
						Perform MS / MSD (Y / N)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
FC-CCR-MW66-11218	11/2/2018	1328	G	W	2	N	X	X	X	X
FC-CCR-MW67-11318	11/3/2018	957	G	W	2	N	X	X	X	X
FC-CCR-MW68-11318	11/3/2018	1101	G	W	2	N	X	X	X	X
FC-CCR-MW69-11318	11/3/18	849	G	W	2	N	X	X	X	X
FC-CCR-MW70-11218	11/2/18	1532	G	W	2	N	X	X	X	X



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unk/othr

Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L

3.0°C, 3.8°C, 2.9°C

Relinquished by: Pass Lavarrway
 Company: APS
 Date/Time: 11/7/2018

Received by: Projevis
 Company: TADJ
 Date/Time: 11/7/18 8:05am

Relinquished by: _____
 Company: _____
 Date/Time: 11-2-18 (305)

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TestAmerica Phoenix

4645 E Cotton Cir Blvd Bldg 3
Phoenix, AZ 85040

Phone: 602.437.3340 Fax: 623.445.6192

113007

Chain of Custody Record



TestAmerica Laboratories, Inc.

Client Contact: APS Four Corners
 Project Manager: Doug Lavarnway
 Tel/Fax: 928-288-1394
 Analysis Turnaround Time
 Calendar (C) or Work Days (W)
 TAT if different from Below: 7 Days
 2 weeks
 1 week
 2 days
 1 day
 Project Name: CCR
 E-Mail Address:

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Lab Contact	Date	Carrier	SDG No.
FC-CCR-MW62-11218	11/2/2018	1410	G	W	2	Perform MS / MSD (Y / N)	Ken Baker	11/7/2018		
FC-CCR-MW63-11218	11/2/2018	1449	G	W	2	EPA 200.7 (B, Ca)				
FC-CCR-MW64-11218	11/2/2018	1252	G	W	2	EPA 300.0 (Cl, F, SO4)				
FC-CCR-MW65-11218	11/2/2018	1208	G	W	2	SM 2540C (TDS)				
FC-CCR-MW71-11318	11/3/18	1145	G	W	2	SM 4500-HB (pH)				
FC-CCR-MW72-11318	11/3/18	1231	G	W	2					
FC-CCR-MW73-11318	11/3/18	1324	G	W	2					
FC-CCR-FD01-11318	11/3/18	1145	G	W	2					
FC-CCR-FD02-11318	11/3/18	1231	G	W	2					

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other
 Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Unknown
 Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L

3,0°C, 3.8°C, 2.9°C PC

Relinquished by: Doug Lavarnway
 Company: APS
 Date/Time: 11/7/2018 8:05am
 Received by: [Signature]
 Company: [Signature]
 Date/Time: 11-7-18 1300

TestAmerica Phoenix
 4645 E. Cotton Cir Blvd Bldg 3
 Phoenix, AZ 85040

Phone 602-437-3340 Fax 623-445-6192

113007

Chain of Custody Record

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Doug Lavarnway		Site Contact: Doug Lavarnway		Date: 11/7/2018		COC No. _____ of _____ COCs	
APs Four Corners PO Box 355, MS 4915 Fruitland, NM 87416		Tel/Fax: 928-587-0319		Lab Contact: Ken Baker		Carrier:		Job No. _____	
Phone:		Calendar (C) or Work Days (W)		EPA 200.7 (Li)		EPA 200.8 (As, Ba, Co, Mo, Se, Tl)		SDG No. _____	
Fax:		TAT if different from Below _____ 7 Days		Radium 226 + 228 combined		EPA 300.0 (F)		Sample Specific Notes:	
Project Name: CCR		<input type="checkbox"/> 2 weeks		Perform MS / MSD (Y / N)					
E-Mail Address:		<input type="checkbox"/> 1 week		EPA 200.7 (Li)					
		<input type="checkbox"/> 2 days		200.8 (As, Ba, Co, Mo, Se, Tl)					
		<input type="checkbox"/> 1 day		Radium 226 + 228 combined					
				EPA 300.0 (F)					
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample		
FC-CCR-MW66-11218	-01	11/2/2018	1328	G	W	4	Perform MS / MSD (Y / N)		
FC-CCR-MW67-11318	-02	11/3/2018	957	G	W	4	EPA 200.7 (Li)		
FC-CCR-MW68-11318	-03	11/3/2018	1101	G	W	4	200.8 (As, Ba, Co, Mo, Se, Tl)		
FC-CCR-MW69-11318	-04	11/3/18	849	G	W	4	Radium 226 + 228 combined		
FC-CCR-MW70-11218	-05	11/2/18	1532	G	W	4	EPA 300.0 (F)		
FC-CCR-MW71-11318	-10	11/3/18	1145	G	W	4			
FC-CCR-MW72-11318	-11	11/3/18	1231	G	W	4			
FC-CCR-MW73-11318	-12	11/3/18	1324	G	W	4			
FC-CCR-FD01-11318	-13	11/3/18	1145	G	W	4			
FC-CCR-FD02-11318	-14	11/3/18	1231	G	W	4			
Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other							Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		
Possible Hazard Identification							<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
<input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant									
Special Instructions/OC Requirements & Comments:									
Method 200.8 with collision cell									
Radium analyzed by Radiation Safety									
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	
Dos Lavarnway	APs	11/7/2018	Prognos	APT	11/7/18	8:05a			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	

3.0°C, 7.8°C, 2.9°C) PC

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113007-2

Login Number: 113007

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-113007-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/30/2018 4:22:04 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Job ID: 550-113007-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-113007-3

Comments

No additional comments.

Receipt

The samples were received on 11/7/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.9° C, 3.0° C and 3.8° C.

Receipt Exceptions

Received 3 pages of COCs from the courier.

Samples #6 - #9 only request Appendix I.

All of the other samples request Appendix I and II.

Client did provide sample containers if Appendix II is needed.

FC-CCR-MW62-11218 (550-113007-6), FC-CCR-MW63-112818 (550-113007-7), FC-CCR-MW64-11218 (550-113007-8) and FC-CCR-MW65-11218 (550-113007-9)

HPLC/IC

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-113007-10	FC-CCR-MW71-11318	Water	11/03/18 11:45	11/07/18 13:00
550-113007-11	FC-CCR-MW72-11318	Water	11/03/18 12:31	11/07/18 13:00

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

No Detections.

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

No Detections.

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This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/28/18 01:23	2

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/28/18 01:41	2

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-163090/2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			11/27/18 20:10	1

Lab Sample ID: LCS 550-163090/5
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.11		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-163090/6
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.10		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-113026-A-1 MS ^2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 M2 D5	8.00	6.47	D1 M2	mg/L		77	80 - 120

Lab Sample ID: 550-113026-A-1 MSD ^2
Matrix: Water
Analysis Batch: 163090

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	D1 M2 D5	8.00	6.80	D1	mg/L		81	80 - 120	5	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

HPLC/IC

Analysis Batch: 163090

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-113007-10	FC-CCR-MW71-11318	Total/NA	Water	300.0	
550-113007-11	FC-CCR-MW72-11318	Total/NA	Water	300.0	
MB 550-163090/2	Method Blank	Total/NA	Water	300.0	
LCS 550-163090/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-163090/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-113026-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Client Sample ID: FC-CCR-MW71-11318

Lab Sample ID: 550-113007-10

Date Collected: 11/03/18 11:45

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	163090	11/28/18 01:23	NEL	TAL PHX

Client Sample ID: FC-CCR-MW72-11318

Lab Sample ID: 550-113007-11

Date Collected: 11/03/18 12:31

Matrix: Water

Date Received: 11/07/18 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	163090	11/28/18 01:41	NEL	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-113007-3

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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Chain of Custody Record

113007

Phone 602.437.3340 Fax 623.445.6192

Client Contact

Project Manager: Doug Lavarrway
 Tel/Fax: 928-288-1394

Site Contact: Doug Lavarrway
 Lab Contact: Ken Baker

Date: 11/7/2018

COC No: 1 of 1 COCs

PO Box 355, MS 4915
 Fruitland, NM 87416

Calendar (C) or Work Days (W)
 TAT if different from Below: 7 Days

Phone:
 Fax:
 Project Name: CCR
 E-Mail Address:

2 weeks
 1 week
 2 days
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.
FC-CCR-MW66-11218	11/2/2018	1328	G	W	2
FC-CCR-MW67-11318	11/3/2018	957	G	W	2
FC-CCR-MW68-11318	11/3/2018	1101	G	W	2
FC-CCR-MW69-11318	11/3/18	849	G	W	2
FC-CCR-MW70-11218	11/2/18	1532	G	W	2

Filtered Sample	Perform MS / MSD (Y / N)
EPA 200.7 (B, Ca)	X
EPA 300.0 (Cl, F, SO4)	X
SM 2540C (TDS)	X
SM 4500-HB (pH)	X



Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unk/othr
 Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

Special Instructions/QC Requirements & Comments:
 Need Fluoride reporting limit ≤ 0.8 mg/L

3.0°C, 3.8°C, 2.9°C PC

Relinquished by: Pass Lavarrway
 Company: APS
 Date/Time: 11/7/2018

Received by: P. Rogers
 Company: TADJ
 Date/Time: 11/7/18 8:05am

Relinquished by: [Signature]
 Company: [Signature]
 Date/Time: [Signature]

Received by: [Signature]
 Company: TADJ
 Date/Time: 11-2-18 (305)

TestAmerica Phoenix
4645 E Cotton Cir Blvd Bldg 3
Phoenix, AZ 85040

phone 602.437.3340 fax 623.445.6192

113007

Chain of Custody Record

TestAmerica Laboratories, Inc.



Client Contact
 APS Four Corners
 PO Box 355, MS 4915
 Fruitland, NM 87416
 Phone: _____
 Fax: _____
 Project Name: CCR
 E-Mail Address: _____

Project Manager: Doug Lavarnway
 Tel/Fax: 928-288-1394
 Analysis Turnaround Time
 Calendar (C) or Work Days (W) _____
 TAT if different from Below: _____ 7 Days
 2 weeks
 1 week
 2 days
 1 day

Site Contact: Doug Lavarnway
 Lab Contact: Ken Baker
 Date: 11/7/2018
 Carrier: _____

COC No: _____
 Job No: _____
 SDG No: _____

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample				
						Perform MS / MSD (Y / N)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
FC-CCR-MW62-11218	11/2/2018	1410	G	W	2	N	X	X	X	X
FC-CCR-MW63-11218	11/2/2018	1449	G	W	2	N	X	X	X	X
FC-CCR-MW64-11218	11/2/2018	1252	G	W	2	N	X	X	X	X
FC-CCR-MW65-11218	11/2/2018	1208	G	W	2	N	X	X	X	X
FC-CCR-MW71-11318	11/3/18	1145	G	W	2	N	X	X	X	X
FC-CCR-MW72-11318	11/3/18	1231	G	W	2	N	X	X	X	X
FC-CCR-MW73-11318	11/3/18	1324	G	W	2	N	X	X	X	X
FC-CCR-FD01-11318	11/3/18	1145	G	W	2	N	X	X	X	X
FC-CCR-FD02-11318	11/3/18	1231	G	W	2	N	X	X	X	X

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other _____

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unknown

Special Instructions/QC Requirements & Comments:
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months

(3,0°C, 3.8°C, 2.9°C) PC

Relinquished by: *Doug Lavarnway* Company: *APS* Date/Time: *11/7/2018* Received by: *[Signature]* Company: *Red J* Date/Time: *11/7/18 8:05am*

Relinquished by: _____ Company: _____ Date/Time: _____ Received by: *[Signature]* Company: *APAC* Date/Time: *11-7-18 1300*

TestAmerica Phoenix
 4645 E. Cotton Cir Blvd Bldg 3
 Phoenix, AZ 85040

Phone 602-437-3340 Fax 623-445-6192

113007

Chain of Custody Record

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Doug Lavarnway		Site Contact: Doug Lavarnway		Date: 11/7/2018		COC No. _____ of _____ COCs	
APs Four Corners PO Box 355, MS 4915 Fruitland, NM 87416		Tel/Fax: 928-587-0319		Lab Contact: Ken Baker		Carrier:		Job No. _____	
Phone:		Calendar (C) or Work Days (W)		EPA 200.7 (Li)		EPA 200.8 (As, Ba, Co, Mo, Se, Tl)		SDG No. _____	
Fax:		TAT if different from Below _____ 7 Days		Radium 226 + 228 combined		EPA 300.0 (F)		Sample Specific Notes:	
Project Name: CCR		<input type="checkbox"/> 2 weeks		Perform MS / MSD (Y / N)					
E-Mail Address:		<input type="checkbox"/> 1 week		EPA 200.7 (Li)					
		<input type="checkbox"/> 2 days		200.8 (As, Ba, Co, Mo, Se, Tl)					
		<input type="checkbox"/> 1 day		Radium 226 + 228 combined					
				EPA 300.0 (F)					
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample		
FC-CCR-MW66-11218	-01	11/2/2018	1328	G	W	4	Perform MS / MSD (Y / N)		
FC-CCR-MW67-11318	-02	11/3/2018	957	G	W	4	EPA 200.7 (Li)		
FC-CCR-MW68-11318	-03	11/3/2018	1101	G	W	4	200.8 (As, Ba, Co, Mo, Se, Tl)		
FC-CCR-MW69-11318	-04	11/3/18	849	G	W	4	Radium 226 + 228 combined		
FC-CCR-MW70-11218	-05	11/2/18	1532	G	W	4	EPA 300.0 (F)		
FC-CCR-MW71-11318	-10	11/3/18	1145	G	W	4			
FC-CCR-MW72-11318	-11	11/3/18	1231	G	W	4			
FC-CCR-MW73-11318	-12	11/3/18	1324	G	W	4			
FC-CCR-FD01-11318	-13	11/3/18	1145	G	W	4			
FC-CCR-FD02-11318	-14	11/3/18	1231	G	W	4			
Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other							Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		
Possible Hazard Identification							<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
<input type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Polymers <input type="checkbox"/> Linkages									
Special Instructions/QC Requirements & Comments:									
Method 200.8 with collision cell									
Radium analyzed by Radiation Safety									
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received by:
Dos Lavarnway	APs	11/7/2018	Prognos	APT	11/7/18	APT	APT	11-7-18	1305

3.0°C, 7.8°C, 2.9°C) PC

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-113007-3

Login Number: 113007

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-115114-1

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

1/17/2019 10:00:43 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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results through

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Job ID: 550-115114-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-115114-1

Comments

No additional comments.

Receipt

The samples were received on 12/18/2018 12:33 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.2° C and 3.7° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW84-121518 (550-115114-2), FC-CCR-MW85-121518 (550-115114-3), FC-CCR-MW86-121518 (550-115114-4) and FC-CCR-FD01-121518 (550-115114-5). The samples contained high concentrations of Chloride and Sulfate which exceeded the instrument's maximum column capacity. Fluoride was not detected in the diluted samples. As such, elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method(s) SM 2540C:

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-115114-1	FC-CCR-MW83-121518	Water	12/15/18 11:50	12/18/18 12:33
550-115114-2	FC-CCR-MW84-121518	Water	12/15/18 11:04	12/18/18 12:33
550-115114-3	FC-CCR-MW85-121518	Water	12/15/18 10:05	12/18/18 12:33
550-115114-4	FC-CCR-MW86-121518	Water	12/15/18 08:51	12/18/18 12:33
550-115114-5	FC-CCR-FD01-121518	Water	12/15/18 08:51	12/18/18 12:33

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW83-121518

Lab Sample ID: 550-115114-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	130	D2	4.0	mg/L	2		300.0	Total/NA
Fluoride	1.8	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3400	D2	400	mg/L	200		300.0	Total/NA
Boron	2.5		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	470	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	270	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.2		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	610	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	250		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	250		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	5200	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	10.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	400	mg/L	200		300.0	Total/NA
Sulfate	8300	D2	400	mg/L	200		300.0	Total/NA
Boron	110	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	490		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1800	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	33		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	660		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	410		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	410		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	14000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	680	D2	400	mg/L	200		300.0	Total/NA
Sulfate	5400	D2	400	mg/L	200		300.0	Total/NA
Boron	30		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	510		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	770		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	18		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	780		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	380		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	380		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	8700	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.3	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1300	D2	400	mg/L	200		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW86-121518 (Continued)

Lab Sample ID: 550-115114-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	9400	D2	400	mg/L	200		300.0	Total/NA
Boron	120	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	480		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1700	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	30		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	630		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	330		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	330		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	13000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.7	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FC-CCR-FD01-121518

Lab Sample ID: 550-115114-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1300	D2	400	mg/L	200		300.0	Total/NA
Sulfate	7900	D2	400	mg/L	200		300.0	Total/NA
Boron	120	D2	0.20	mg/L	4		200.7 Rev 4.4	Total/NA
Calcium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1700	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
Potassium	30		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	640		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	330		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	330		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	13000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW83-121518

Lab Sample ID: 550-115114-1

Date Collected: 12/15/18 11:50

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	130	D2	4.0	mg/L			12/26/18 21:37	2
Fluoride	1.8	D1	0.80	mg/L			12/26/18 21:37	2
Sulfate	3400	D2	400	mg/L			12/21/18 21:30	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	2.5		0.050	mg/L		12/20/18 10:34	12/29/18 02:26	1
Calcium	470	M3	2.0	mg/L		12/20/18 10:34	12/27/18 12:13	1
Magnesium	270	M3	2.0	mg/L		12/20/18 10:34	12/27/18 12:13	1
Potassium	3.2		0.50	mg/L		12/20/18 10:34	12/27/18 12:13	1
Sodium	610	M3	0.50	mg/L		12/20/18 10:34	12/27/18 12:13	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	250		6.0	mg/L			12/19/18 16:04	1
Bicarbonate Alkalinity as CaCO3	250		6.0	mg/L			12/19/18 16:04	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:04	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 16:04	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:04	1
Total Dissolved Solids	5200	D2	100	mg/L			12/19/18 11:51	1
pH	7.5	H5	1.7	SU			12/26/18 14:18	1
Temperature	10.6	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Date Collected: 12/15/18 11:04

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	400	mg/L			12/21/18 22:44	200
Fluoride	ND	D1 D5	0.80	mg/L			12/21/18 22:26	2
Sulfate	8300	D2	400	mg/L			12/21/18 22:44	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	110	D2	0.20	mg/L		12/20/18 10:34	12/29/18 04:32	4
Calcium	490		2.0	mg/L		12/20/18 10:34	12/27/18 13:38	1
Magnesium	1800	D2	8.0	mg/L		12/20/18 10:34	12/29/18 04:32	4
Potassium	33		0.50	mg/L		12/20/18 10:34	12/27/18 13:38	1
Sodium	660		0.50	mg/L		12/20/18 10:34	12/27/18 13:38	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	410		6.0	mg/L			12/19/18 16:46	1
Bicarbonate Alkalinity as CaCO3	410		6.0	mg/L			12/19/18 16:46	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:46	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 16:46	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:46	1
Total Dissolved Solids	14000	D2	100	mg/L			12/19/18 11:51	1
pH	7.1	H5	1.7	SU			12/26/18 14:18	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Date Collected: 12/15/18 11:04

Matrix: Water

Date Received: 12/18/18 12:33

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	12.6	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Date Collected: 12/15/18 10:05

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	680	D2	400	mg/L			12/21/18 23:21	200
Fluoride	ND	D1 D5	0.80	mg/L			12/21/18 23:02	2
Sulfate	5400	D2	400	mg/L			12/21/18 23:21	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	30		0.050	mg/L		12/20/18 10:34	12/29/18 04:53	1
Calcium	510		2.0	mg/L		12/20/18 10:34	12/27/18 13:44	1
Magnesium	770		2.0	mg/L		12/20/18 10:34	12/27/18 13:44	1
Potassium	18		0.50	mg/L		12/20/18 10:34	12/27/18 13:44	1
Sodium	780		0.50	mg/L		12/20/18 10:34	12/27/18 13:44	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	380		6.0	mg/L			12/19/18 16:56	1
Bicarbonate Alkalinity as CaCO3	380		6.0	mg/L			12/19/18 16:56	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:56	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 16:56	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 16:56	1
Total Dissolved Solids	8700	D2	100	mg/L			12/19/18 11:51	1
pH	7.3	H5	1.7	SU			12/26/18 14:18	1
Temperature	11.3	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1300	D2	400	mg/L			12/22/18 00:34	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 00:16	2
Sulfate	9400	D2	400	mg/L			12/22/18 00:34	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	120	D2	0.20	mg/L		12/20/18 10:34	12/29/18 04:59	4
Calcium	480		2.0	mg/L		12/20/18 10:34	12/27/18 13:50	1
Magnesium	1700	D2	8.0	mg/L		12/20/18 10:34	12/29/18 04:59	4
Potassium	30		0.50	mg/L		12/20/18 10:34	12/27/18 13:50	1
Sodium	630		0.50	mg/L		12/20/18 10:34	12/27/18 13:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	330		6.0	mg/L			12/19/18 17:05	1
Bicarbonate Alkalinity as CaCO3	330		6.0	mg/L			12/19/18 17:05	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 17:05	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 17:05	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 17:05	1
Total Dissolved Solids	13000	D2	100	mg/L			12/19/18 11:51	1
pH	7.1	H5	1.7	SU			12/26/18 14:18	1
Temperature	11.7	H5	0.1	Degrees C			12/26/18 14:18	1

Client Sample ID: FC-CCR-FD01-121518

Lab Sample ID: 550-115114-5

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1300	D2	400	mg/L			12/22/18 01:11	200
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 00:53	2
Sulfate	7900	D2	400	mg/L			12/22/18 01:11	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	120	D2	0.20	mg/L		12/20/18 10:34	12/29/18 05:10	4
Calcium	470		2.0	mg/L		12/20/18 10:34	12/27/18 13:56	1
Magnesium	1700	D2	8.0	mg/L		12/20/18 10:34	12/29/18 05:10	4
Potassium	30		0.50	mg/L		12/20/18 10:34	12/27/18 13:56	1
Sodium	640		0.50	mg/L		12/20/18 10:34	12/27/18 13:56	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	330		6.0	mg/L			12/19/18 17:15	1
Bicarbonate Alkalinity as CaCO3	330		6.0	mg/L			12/19/18 17:15	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 17:15	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 17:15	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 17:15	1
Total Dissolved Solids	13000	D2	100	mg/L			12/19/18 11:51	1
pH	7.2	H5	1.7	SU			12/26/18 14:18	1
Temperature	12.5	H5	0.1	Degrees C			12/26/18 14:18	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-165329/2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			12/21/18 19:03	1
Fluoride	ND		0.40	mg/L			12/21/18 19:03	1
Sulfate	ND		2.0	mg/L			12/21/18 19:03	1

Lab Sample ID: LCS 550-165329/5
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.9		mg/L		105	90 - 110
Fluoride	4.00	4.06		mg/L		101	90 - 110
Sulfate	20.0	20.0		mg/L		100	90 - 110

Lab Sample ID: LCSD 550-165329/6
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.0		mg/L		105	90 - 110	0	20
Fluoride	4.00	4.06		mg/L		101	90 - 110	0	20
Sulfate	20.0	20.1		mg/L		100	90 - 110	0	20

Lab Sample ID: 550-115113-B-1 MS ^2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.2	D1	8.00	9.53	D1	mg/L		103	80 - 120

Lab Sample ID: 550-115113-B-1 MS ^200
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	4300	D2	4000	8450	D2	mg/L		103	80 - 120

Lab Sample ID: 550-115113-B-1 MSD ^2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.2	D1	8.00	9.49	D1	mg/L		103	80 - 120	0	20

Lab Sample ID: 550-115113-B-1 MSD ^200
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	4300	D2	4000	8420	D2	mg/L		102	80 - 120	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-115114-1 MS

Matrix: Water

Analysis Batch: 165329

Client Sample ID: FC-CCR-MW83-121518

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	3400	D2	4000	7370	D2	mg/L		100	80 - 120

Lab Sample ID: 550-115114-1 MSD

Matrix: Water

Analysis Batch: 165329

Client Sample ID: FC-CCR-MW83-121518

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	3400	D2	4000	7350	D2	mg/L		100	80 - 120	0	20

Lab Sample ID: 550-115115-B-1 MS ^200

Matrix: Water

Analysis Batch: 165329

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2300	D2	4000	6670	D2	mg/L		109	80 - 120
Sulfate	14000	D2	4000	17200	D2	mg/L		86	80 - 120

Lab Sample ID: 550-115115-B-1 MSD ^200

Matrix: Water

Analysis Batch: 165329

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2300	D2	4000	6640	D2	mg/L		108	80 - 120	0	20
Sulfate	14000	D2	4000	17100	D2	mg/L		84	80 - 120	0	20

Lab Sample ID: MB 550-165473/1024

Matrix: Water

Analysis Batch: 165473

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		2.0	mg/L			12/26/18 20:42	1
Fluoride	ND		0.40	mg/L			12/26/18 20:42	1
Sulfate	ND		2.0	mg/L			12/26/18 20:42	1

Lab Sample ID: LCS 550-165473/25

Matrix: Water

Analysis Batch: 165473

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	21.3		mg/L		106	90 - 110
Fluoride	4.00	4.09		mg/L		102	90 - 110
Sulfate	20.0	20.3		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-165473/26

Matrix: Water

Analysis Batch: 165473

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	20.0	21.3		mg/L		106	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 550-165473/26
Matrix: Water
Analysis Batch: 165473

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.10		mg/L		102	90 - 110	0	20
Sulfate	20.0	20.3		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-115114-1 MS
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	130	D2	40.0	168	D2	mg/L		89	80 - 120
Fluoride	1.8	D1	8.00	9.94	D1	mg/L		101	80 - 120

Lab Sample ID: 550-115114-1 MSD
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	130	D2	40.0	168	D2	mg/L		89	80 - 120	0	20
Fluoride	1.8	D1	8.00	10.0	D1	mg/L		102	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164986/1-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164986

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		2.0	mg/L		12/20/18 10:34	12/27/18 11:36	1
Magnesium	ND		2.0	mg/L		12/20/18 10:34	12/27/18 11:36	1
Potassium	ND		0.50	mg/L		12/20/18 10:34	12/27/18 11:36	1
Sodium	ND		0.50	mg/L		12/20/18 10:34	12/27/18 11:36	1

Lab Sample ID: MB 550-164986/1-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164986

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		12/20/18 10:34	12/29/18 01:49	1

Lab Sample ID: LCS 550-164986/2-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	21.0	22.0		mg/L		105	85 - 115
Magnesium	21.0	21.2		mg/L		101	85 - 115
Potassium	20.0	20.2		mg/L		101	85 - 115
Sodium	20.0	19.9		mg/L		99	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-164986/2-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	1.00		mg/L		100	85 - 115

Lab Sample ID: LCSD 550-164986/3-A
Matrix: Water
Analysis Batch: 165571

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Calcium	21.0	21.6		mg/L		103	85 - 115	2	20
Magnesium	21.0	20.9		mg/L		100	85 - 115	2	20
Potassium	20.0	19.9		mg/L		100	85 - 115	2	20
Sodium	20.0	19.5		mg/L		98	85 - 115	2	20

Lab Sample ID: LCSD 550-164986/3-A
Matrix: Water
Analysis Batch: 165722

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.990		mg/L		99	85 - 115	1	20

Lab Sample ID: 550-115114-1 MS
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Calcium	470	M3	21.0	475	M3	mg/L		25	70 - 130
Magnesium	270	M3	21.0	285	M3	mg/L		56	70 - 130
Potassium	3.2		20.0	23.0		mg/L		99	70 - 130
Sodium	610	M3	20.0	606	M3	mg/L		-4	70 - 130

Lab Sample ID: 550-115114-1 MS
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	2.5		1.00	3.41		mg/L		94	70 - 130

Lab Sample ID: 550-115114-1 MSD
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Calcium	470	M3	21.0	467	M3	mg/L		-15	70 - 130	2	20
Magnesium	270	M3	21.0	281	M3	mg/L		33	70 - 130	2	20
Potassium	3.2		20.0	22.8		mg/L		98	70 - 130	1	20
Sodium	610	M3	20.0	595	M3	mg/L		-54	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-115114-1 MSD
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	2.5		1.00	3.43		mg/L		96	70 - 130	0	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-164955/5
Matrix: Water
Analysis Batch: 164955

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/19/18 14:01	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/19/18 14:01	1

Lab Sample ID: LCS 550-164955/4
Matrix: Water
Analysis Batch: 164955

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	250	249		mg/L		100	90 - 110

Lab Sample ID: LCSD 550-164955/17
Matrix: Water
Analysis Batch: 164955

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	259		mg/L		104	90 - 110	4	20

Lab Sample ID: 550-115114-1 DU
Matrix: Water
Analysis Batch: 164955

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	250		242		mg/L		1	20
Bicarbonate Alkalinity as CaCO3	250		242		mg/L		1	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Alkalinity, Phenolphthalein	ND		ND		mg/L		NC	20
Hydroxide Alkalinity as CaCO3	ND		ND		mg/L		NC	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 550-164875/1
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		20	mg/L			12/19/18 11:51	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 550-164875/2
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	972		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-164875/3
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	1000	974		mg/L		97	90 - 110	0	10

Lab Sample ID: 550-115113-B-1 DU
Matrix: Water
Analysis Batch: 164875

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	6600	D2	6310	D2	mg/L		4	10

Lab Sample ID: 550-115114-1 DU
Matrix: Water
Analysis Batch: 164875

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	5200	D2	5060	D2	mg/L		3	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-165356/1
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99.9	98.5 - 101.5

Lab Sample ID: LCSSRM 550-165356/13
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.0	98.5 - 101.5

Lab Sample ID: LCSSRM 550-165356/25
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100.4	98.5 - 101.5

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-115114-1
 SDG: Cholla

Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: 550-115114-1 DU
Matrix: Water
Analysis Batch: 165356

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.5	H5	7.5	H5	SU		0.1	5
Temperature	10.6	H5	11.0	H5	Degrees C		4	

Lab Sample ID: 550-115115-B-1 DU
Matrix: Water
Analysis Batch: 165356

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.3	H5	7.3	H5	SU		0	5
Temperature	13.4	H5	13.6	H5	Degrees C		1	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

HPLC/IC

Analysis Batch: 165329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	300.0	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	300.0	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	300.0	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	300.0	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	300.0	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	300.0	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	300.0	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	300.0	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	300.0	
MB 550-165329/2	Method Blank	Total/NA	Water	300.0	
LCS 550-165329/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-165329/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-115113-B-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-115113-B-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-115113-B-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-115113-B-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	300.0	
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	300.0	
550-115115-B-1 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-115115-B-1 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 165473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	300.0	
MB 550-165473/1024	Method Blank	Total/NA	Water	300.0	
LCS 550-165473/25	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-165473/26	Lab Control Sample Dup	Total/NA	Water	300.0	
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	300.0	
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	300.0	

Metals

Prep Batch: 164986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	200.7	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	200.7	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7	
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	200.7	
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	200.7	

Analysis Batch: 165571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	200.7 Rev 4.4	164986

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Metals (Continued)

Analysis Batch: 165571 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7 Rev 4.4	164986
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164986
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164986
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986

Analysis Batch: 165722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7 Rev 4.4	164986
MB 550-164986/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164986
LCS 550-164986/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164986
LCSD 550-164986/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986

General Chemistry

Analysis Batch: 164875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	SM 2540C	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	SM 2540C	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	SM 2540C	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	SM 2540C	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	SM 2540C	
MB 550-164875/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-164875/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-164875/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-115113-B-1 DU	Duplicate	Total/NA	Water	SM 2540C	
550-115114-1 DU	FC-CCR-MW83-121518	Total/NA	Water	SM 2540C	

Analysis Batch: 164955

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	SM 2320B	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	SM 2320B	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	SM 2320B	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	SM 2320B	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	SM 2320B	
MB 550-164955/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-164955/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-164955/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-115114-1 DU	FC-CCR-MW83-121518	Total/NA	Water	SM 2320B	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

General Chemistry (Continued)

Analysis Batch: 165356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	SM 4500 H+ B	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	SM 4500 H+ B	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	SM 4500 H+ B	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	SM 4500 H+ B	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165356/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165356/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-165356/25	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-115114-1 DU	FC-CCR-MW83-121518	Total/NA	Water	SM 4500 H+ B	
550-115115-B-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW83-121518

Lab Sample ID: 550-115114-1

Date Collected: 12/15/18 11:50

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	165329	12/21/18 21:30	NEL	TAL PHX
Total/NA	Analysis	300.0		2	165473	12/26/18 21:37	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:13	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 02:26	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 16:04	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	12/19/18 11:51 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Date Collected: 12/15/18 11:04

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/21/18 22:26	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/21/18 22:44	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:38	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:32	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 16:46	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	12/19/18 11:51 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Date Collected: 12/15/18 10:05

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/21/18 23:02	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/21/18 23:21	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:44	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:53	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 16:56	DGS	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Date Collected: 12/15/18 10:05

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 00:16	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 00:34	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:50	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:59	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 17:05	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Client Sample ID: FC-CCR-FD01-121518

Lab Sample ID: 550-115114-5

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 00:53	NEL	TAL PHX
Total/NA	Analysis	300.0		200	165329	12/22/18 01:11	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:56	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 05:10	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164955	12/19/18 17:15	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164875	(Start) 12/19/18 11:51 (End) 12/20/18 09:05	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	165356	12/26/18 14:18	MRR	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-1
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
SM 2320B	Alkalinity	SM	TAL PHX
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

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THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: CCR

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarway 928-587-0319 **Lab Contact:** Doug Lavarway 12/17/2018

Analysis Turnaround Time: TAT if different from Below

Carrier: 12/17/2018
COC No: 1 of 1 COCs
Sampler: _____
For Lab Use Only:
Walk-in Client: _____
Lab Sampling: _____
Job / SDG No.: _____

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)			Perform MS / MSD (Y / N)			
						EPA 200.7 (Li, Mg, SiO2)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)				
-1 FC-CCR-MW83-121518	12/15/2018	1150 G	W	W	2	N	X	X	X			
-2 FC-CCR-MW84-121518	12/15/2018	1104 G	W	W	2	N	X	X	X			
-3 FC-CCR-MW85-121518	12/15/2018	1005 G	W	W	2	N	X	X	X			
-4 FC-CCR-MW86-121518	12/15/2018	851 G	W	W	2	N	X	X	X			
-5 FC-CCR-FD01-121518	12/15/2018	851 G	W	W	2	N	X	X	X			



Preservation Used: 1=Ice, 2=HCI, 3=H2SO4, 4=HNO3, 5=NaOH, 6= Other _____
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments: Method 200.8 with collision cell.
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Cooler Temp. (°C): Obs'd: _____
 Corrid: 22/37

Custody Seals Intact: Yes No
Custody Seal No.: _____
Relinquished by: Doug Lavarway Company: APS Date/Time: 12/18/2018 Received by: _____ Received at Laboratory by: _____
Relinquished by: _____ Company: TAPPHX Date/Time: 12/15/2018

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: CCR

Doug Lavarway

CCR

112114
TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarway 928-587-0319
Analysis Turnaround Time: TAT if different from Below _____
Site: Cholla
Project Name: CCR
P O #

Carrier: 12/17/2018
COC No: 1 of 1 COCs

Sampler: _____
For Lab Use Only:
Walk-in Client: _____
Lab Sampling: _____
Job / SDG No.: _____

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)		Perform MS / MSD (Y / N)		Carrier	Sample Specific Notes:	
						EPA 200.7 Rev 4.4 (B, Ca, Na, K, Mg)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)			SM 2320B (HCO3)
-1 FC-CCR-MW83-121518	12/15/2018	1150 G	W	W	2	N	X	X	X	X	X	
-2 FC-CCR-MW84-121518	12/15/2018	1104 G	W	W	2	N	X	X	X	X	X	
-3 FC-CCR-MW85-121518	12/15/2018	1005 G	W	W	2	N	X	X	X	X	X	
-4 FC-CCR-MW86-121518	12/15/2018	851 G	W	W	2	N	X	X	X	X	X	
-5 FC-CCR-FD01-121518	12/15/2018	851 G	W	W	2	N	X	X	X	X	X	

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
Special Instructions/QC Requirements & Comments: _____

Special Instructions/QC Requirements & Comments: _____
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Active for _____ Months

Custody Seals Intact: Yes No
Cooler Temp. (°C): Obs'd: _____ Cor'd: 22/3.7 Therm ID No.: _____
 Relinquished by: Doug Lavarway Company: AOS Date/Time: 12/18/18
 Relinquished by: _____ Company: _____ Date/Time: 12/18/18
 Relinquished by: _____ Company: _____ Date/Time: 12/18/18

Received in Laboratory by: _____
 Received by: _____
 Received in Laboratory by: _____

Company: _____
 Company: _____
 Company: _____

Date/Time: 12/18/18 12:33

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115114-1

SDG Number: Cholla

Login Number: 115114

List Number: 1

Creator: Maycock, Lisa

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

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THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

TestAmerica Job ID: 550-115114-2

TestAmerica Sample Delivery Group: Cholla

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

1/25/2019 8:54:33 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike was acceptable.
D2	Sample required dilution due to high concentration of analyte.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Job ID: 550-115114-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-115114-2

Comments

No additional comments.

Receipt

The samples were received on 12/18/2018 12:33 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.2° C and 3.7° C.

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: FC-CCR-MW84-121518 (550-115114-2), FC-CCR-MW85-121518 (550-115114-3), FC-CCR-MW86-121518 (550-115114-4) and FC-CCR-FD01-121518 (550-115114-5). The samples contained high concentrations of Chloride and Sulfate which exceeded the instrument's maximum column capacity. Fluoride was not detected in the diluted samples. As such, elevated reporting limits (RLs) have been provided and these data have been qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method(s) 200.8 LL: The following samples were diluted due to the nature of the sample matrix: FC-CCR-MW83-121518 (550-115114-1), FC-CCR-MW84-121518 (550-115114-2), FC-CCR-MW85-121518 (550-115114-3), FC-CCR-MW86-121518 (550-115114-4) and FC-CCR-FD01-121518 (550-115114-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-115114-1	FC-CCR-MW83-121518	Water	12/15/18 11:50	12/18/18 12:33
550-115114-2	FC-CCR-MW84-121518	Water	12/15/18 11:04	12/18/18 12:33
550-115114-3	FC-CCR-MW85-121518	Water	12/15/18 10:05	12/18/18 12:33
550-115114-4	FC-CCR-MW86-121518	Water	12/15/18 08:51	12/18/18 12:33
550-115114-5	FC-CCR-FD01-121518	Water	12/15/18 08:51	12/18/18 12:33

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Client Sample ID: FC-CCR-MW83-121518

Lab Sample ID: 550-115114-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.8	D1	0.80	mg/L	2		300.0	Total/NA
Magnesium	270		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	21		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.022		0.0010	mg/L	5		200.8 LL	Total Recoverable
Cobalt	0.0040		0.0010	mg/L	5		200.8 LL	Total Recoverable
Molybdenum	0.010		0.0010	mg/L	5		200.8 LL	Total Recoverable

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	1800	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
SiO2, Silica	14		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.018		0.0010	mg/L	5		200.8 LL	Total Recoverable
Cobalt	0.011		0.0010	mg/L	5		200.8 LL	Total Recoverable
Lead	0.00067		0.00050	mg/L	5		200.8 LL	Total Recoverable
Molybdenum	0.0015		0.0010	mg/L	5		200.8 LL	Total Recoverable

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.25		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	770		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	19		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0013		0.0010	mg/L	5		200.8 LL	Total Recoverable
Barium	0.026		0.0010	mg/L	5		200.8 LL	Total Recoverable
Cobalt	0.0017		0.0010	mg/L	5		200.8 LL	Total Recoverable
Lead	0.00058		0.00050	mg/L	5		200.8 LL	Total Recoverable
Molybdenum	0.0058		0.0010	mg/L	5		200.8 LL	Total Recoverable
Selenium	0.12		0.0030	mg/L	5		200.8 LL	Total Recoverable

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.32		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1700	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
SiO2, Silica	20		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.019		0.0010	mg/L	5		200.8 LL	Total Recoverable
Cobalt	0.0092		0.0010	mg/L	5		200.8 LL	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-115114-2
 SDG: Cholla

Client Sample ID: FC-CCR-MW86-121518 (Continued)

Lab Sample ID: 550-115114-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00065		0.00050	mg/L	5		200.8 LL	Total Recoverable
Molybdenum	0.0041		0.0010	mg/L	5		200.8 LL	Total Recoverable
Thallium	0.00053		0.00050	mg/L	5		200.8 LL	Total Recoverable

Client Sample ID: FC-CCR-FD01-121518

Lab Sample ID: 550-115114-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.31		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	1700	D2	8.0	mg/L	4		200.7 Rev 4.4	Total/NA
SiO2, Silica	20		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.017		0.0010	mg/L	5		200.8 LL	Total Recoverable
Cobalt	0.0087		0.0010	mg/L	5		200.8 LL	Total Recoverable
Molybdenum	0.0039		0.0010	mg/L	5		200.8 LL	Total Recoverable
Thallium	0.00052		0.00050	mg/L	5		200.8 LL	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Client Sample ID: FC-CCR-MW83-121518

Lab Sample ID: 550-115114-1

Date Collected: 12/15/18 11:50

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.8	D1	0.80	mg/L			12/26/18 21:37	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		12/20/18 10:34	12/27/18 12:13	1
Magnesium	270		2.0	mg/L		12/20/18 10:34	12/27/18 12:13	1
SiO2, Silica	21		0.21	mg/L		12/20/18 10:34	12/29/18 02:26	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 18:56	5
Arsenic	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:56	5
Barium	0.022		0.0010	mg/L		01/18/19 09:43	01/20/19 18:56	5
Cadmium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 18:56	5
Chromium	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 18:56	5
Cobalt	0.0040		0.0010	mg/L		01/18/19 09:43	01/20/19 18:56	5
Lead	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 18:56	5
Molybdenum	0.010		0.0010	mg/L		01/18/19 09:43	01/20/19 18:56	5
Selenium	ND		0.0030	mg/L		01/18/19 09:43	01/20/19 18:56	5
Thallium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 18:56	5

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Date Collected: 12/15/18 11:04

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/21/18 22:26	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		12/20/18 10:34	12/27/18 13:38	1
Magnesium	1800	D2	8.0	mg/L		12/20/18 10:34	12/29/18 04:32	4
SiO2, Silica	14		0.21	mg/L		12/20/18 10:34	12/29/18 04:38	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 18:58	5
Arsenic	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:58	5
Barium	0.018		0.0010	mg/L		01/18/19 09:43	01/20/19 18:58	5
Cadmium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 18:58	5
Chromium	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 18:58	5
Cobalt	0.011		0.0010	mg/L		01/18/19 09:43	01/20/19 18:58	5
Lead	0.00067		0.00050	mg/L		01/18/19 09:43	01/20/19 18:58	5
Molybdenum	0.0015		0.0010	mg/L		01/18/19 09:43	01/20/19 18:58	5
Selenium	ND		0.0030	mg/L		01/18/19 09:43	01/20/19 18:58	5
Thallium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 18:58	5

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Date Collected: 12/15/18 10:05

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/21/18 23:02	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.25		0.20	mg/L		12/20/18 10:34	12/27/18 13:44	1
Magnesium	770		2.0	mg/L		12/20/18 10:34	12/27/18 13:44	1
SiO2, Silica	19		0.21	mg/L		12/20/18 10:34	12/29/18 04:53	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 19:00	5
Arsenic	0.0013		0.0010	mg/L		01/18/19 09:43	01/20/19 19:00	5
Barium	0.026		0.0010	mg/L		01/18/19 09:43	01/20/19 19:00	5
Cadmium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 19:00	5
Chromium	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 19:00	5
Cobalt	0.0017		0.0010	mg/L		01/18/19 09:43	01/20/19 19:00	5
Lead	0.00058		0.00050	mg/L		01/18/19 09:43	01/20/19 19:00	5
Molybdenum	0.0058		0.0010	mg/L		01/18/19 09:43	01/20/19 19:00	5
Selenium	0.12		0.0030	mg/L		01/18/19 09:43	01/20/19 19:00	5
Thallium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 19:00	5

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 00:16	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.32		0.20	mg/L		12/20/18 10:34	12/27/18 13:50	1
Magnesium	1700	D2	8.0	mg/L		12/20/18 10:34	12/29/18 04:59	4
SiO2, Silica	20		0.21	mg/L		12/20/18 10:34	12/29/18 05:04	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 19:02	5
Arsenic	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 19:02	5
Barium	0.019		0.0010	mg/L		01/18/19 09:43	01/20/19 19:02	5
Cadmium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 19:02	5
Chromium	ND		0.0025	mg/L		01/18/19 09:43	01/20/19 19:02	5
Cobalt	0.0092		0.0010	mg/L		01/18/19 09:43	01/20/19 19:02	5
Lead	0.00065		0.00050	mg/L		01/18/19 09:43	01/20/19 19:02	5
Molybdenum	0.0041		0.0010	mg/L		01/18/19 09:43	01/20/19 19:02	5
Selenium	ND		0.0030	mg/L		01/18/19 09:43	01/20/19 19:02	5
Thallium	0.00053		0.00050	mg/L		01/18/19 09:43	01/20/19 19:02	5

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Client Sample ID: FC-CCR-FD01-121518

Lab Sample ID: 550-115114-5

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/22/18 00:53	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.31		0.20	mg/L		12/20/18 10:34	12/27/18 13:56	1
Magnesium	1700	D2	8.0	mg/L		12/20/18 10:34	12/29/18 05:10	4
SiO ₂ , Silica	20		0.21	mg/L		12/20/18 10:34	12/29/18 05:16	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0025	mg/L		01/18/19 11:24	01/20/19 19:05	5
Arsenic	ND		0.0010	mg/L		01/18/19 11:24	01/20/19 19:05	5
Barium	0.017		0.0010	mg/L		01/18/19 11:24	01/20/19 19:05	5
Cadmium	ND		0.00050	mg/L		01/18/19 11:24	01/20/19 19:05	5
Chromium	ND		0.0025	mg/L		01/18/19 11:24	01/20/19 19:05	5
Cobalt	0.0087		0.0010	mg/L		01/18/19 11:24	01/20/19 19:05	5
Lead	ND		0.00050	mg/L		01/18/19 11:24	01/20/19 19:05	5
Molybdenum	0.0039		0.0010	mg/L		01/18/19 11:24	01/20/19 19:05	5
Selenium	ND		0.0030	mg/L		01/18/19 11:24	01/20/19 19:05	5
Thallium	0.00052		0.00050	mg/L		01/18/19 11:24	01/20/19 19:05	5

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-165329/2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			12/21/18 19:03	1

Lab Sample ID: LCS 550-165329/5
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.06		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-165329/6
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.06		mg/L		101	90 - 110	0	20

Lab Sample ID: 550-115113-B-1 MS ^2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.2	D1 D5	8.00	9.53	D1	mg/L		103	80 - 120

Lab Sample ID: 550-115113-B-1 MSD ^2
Matrix: Water
Analysis Batch: 165329

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.2	D1 D5	8.00	9.49	D1	mg/L		103	80 - 120	0	20

Lab Sample ID: MB 550-165473/1024
Matrix: Water
Analysis Batch: 165473

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			12/26/18 20:42	1

Lab Sample ID: LCS 550-165473/25
Matrix: Water
Analysis Batch: 165473

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	4.00	4.09		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-165473/26
Matrix: Water
Analysis Batch: 165473

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	4.00	4.10		mg/L		102	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Lab Sample ID: 550-115114-1 MS
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.8		8.00	9.94	D1	mg/L		101	80 - 120

Lab Sample ID: 550-115114-1 MSD
Matrix: Water
Analysis Batch: 165473

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Fluoride	1.8		8.00	10.0	D1	mg/L		102	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: 550-115114-1 MS
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.149		1.00	1.12		mg/L		97	70 - 130
Magnesium	274		21.0	285	M3	mg/L		56	70 - 130

Lab Sample ID: 550-115114-1 MS
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
SiO2, Silica	21.2		10.7	31.9		mg/L		100	70 - 130

Lab Sample ID: 550-115114-1 MSD
Matrix: Water
Analysis Batch: 165571

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Lithium	0.149		1.00	1.12		mg/L		97	70 - 130	0	20
Magnesium	274		21.0	281	M3	mg/L		33	70 - 130	2	20

Lab Sample ID: 550-115114-1 MSD
Matrix: Water
Analysis Batch: 165722

Client Sample ID: FC-CCR-MW83-121518
Prep Type: Total/NA
Prep Batch: 164986

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
SiO2, Silica	21.2		10.7	32.1		mg/L		101	70 - 130	0	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 440-523365/1-A
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 17:38	1
Arsenic	ND		0.00020	mg/L		01/18/19 09:43	01/20/19 17:38	1
Barium	ND		0.00020	mg/L		01/18/19 09:43	01/20/19 17:38	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 440-523365/1-A
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00010	mg/L		01/18/19 09:43	01/20/19 17:38	1
Chromium	ND		0.00050	mg/L		01/18/19 09:43	01/20/19 17:38	1
Cobalt	ND		0.00020	mg/L		01/18/19 09:43	01/20/19 17:38	1
Lead	ND		0.00010	mg/L		01/18/19 09:43	01/20/19 17:38	1
Molybdenum	ND		0.00020	mg/L		01/18/19 09:43	01/20/19 17:38	1
Selenium	ND		0.00060	mg/L		01/18/19 09:43	01/20/19 17:38	1
Thallium	ND		0.00010	mg/L		01/18/19 09:43	01/20/19 17:38	1

Lab Sample ID: LCS 440-523365/2-A
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.0800	0.0834		mg/L		104	85 - 115
Arsenic	0.0800	0.0782		mg/L		98	85 - 115
Barium	0.0800	0.0777		mg/L		97	85 - 115
Cadmium	0.0800	0.0792		mg/L		99	85 - 115
Chromium	0.0800	0.0774		mg/L		97	85 - 115
Cobalt	0.0800	0.0778		mg/L		97	85 - 115
Lead	0.0800	0.0780		mg/L		97	85 - 115
Molybdenum	0.0800	0.0791		mg/L		99	85 - 115
Selenium	0.0800	0.0772		mg/L		97	85 - 115
Thallium	0.0800	0.0772		mg/L		97	85 - 115

Lab Sample ID: LCSD 440-523365/3-A
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.0800	0.0884		mg/L		111	85 - 115	6	20
Arsenic	0.0800	0.0792		mg/L		99	85 - 115	1	20
Barium	0.0800	0.0793		mg/L		99	85 - 115	2	20
Cadmium	0.0800	0.0803		mg/L		100	85 - 115	1	20
Chromium	0.0800	0.0798		mg/L		100	85 - 115	3	20
Cobalt	0.0800	0.0796		mg/L		99	85 - 115	2	20
Lead	0.0800	0.0795		mg/L		99	85 - 115	2	20
Molybdenum	0.0800	0.0796		mg/L		99	85 - 115	1	20
Selenium	0.0800	0.0797		mg/L		100	85 - 115	3	20
Thallium	0.0800	0.0790		mg/L		99	85 - 115	2	20

Lab Sample ID: 550-114628-F-10-F MS ^10
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND		0.0800	0.0921		mg/L		115	70 - 130
Arsenic	ND		0.0800	0.0812		mg/L		100	70 - 130
Barium	0.0085		0.0800	0.0902		mg/L		102	70 - 130
Cadmium	0.0014		0.0800	0.0797		mg/L		98	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Method: 200.8 LL - Metals (ICP/MS) (Continued)

Lab Sample ID: 550-114628-F-10-F MS ^10
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD
Chromium	ND		0.0800	0.0776		mg/L		97	70 - 130	
Cobalt	0.014		0.0800	0.0904		mg/L		96	70 - 130	
Lead	ND		0.0800	0.0775		mg/L		96	70 - 130	
Molybdenum	0.042		0.0800	0.122		mg/L		99	70 - 130	
Selenium	ND		0.0800	0.0783		mg/L		98	70 - 130	
Thallium	ND		0.0800	0.0757		mg/L		95	70 - 130	

Lab Sample ID: 550-114628-F-10-G MSD ^10
Matrix: Water
Analysis Batch: 523766

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.		RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit	
Antimony	ND		0.0800	0.0912		mg/L		114	70 - 130	1	20	
Arsenic	ND		0.0800	0.0821		mg/L		101	70 - 130	1	20	
Barium	0.0085		0.0800	0.0911		mg/L		103	70 - 130	1	20	
Cadmium	0.0014		0.0800	0.0797		mg/L		98	70 - 130	0	20	
Chromium	ND		0.0800	0.0780		mg/L		98	70 - 130	1	20	
Cobalt	0.014		0.0800	0.0913		mg/L		97	70 - 130	1	20	
Lead	ND		0.0800	0.0778		mg/L		96	70 - 130	0	20	
Molybdenum	0.042		0.0800	0.123		mg/L		101	70 - 130	1	20	
Selenium	ND		0.0800	0.0777		mg/L		97	70 - 130	1	20	
Thallium	ND		0.0800	0.0757		mg/L		95	70 - 130	0	20	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

HPLC/IC

Analysis Batch: 165329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	300.0	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	300.0	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	300.0	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	300.0	
MB 550-165329/2	Method Blank	Total/NA	Water	300.0	
LCS 550-165329/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-165329/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-115113-B-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-115113-B-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 165473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	300.0	
MB 550-165473/1024	Method Blank	Total/NA	Water	300.0	
LCS 550-165473/25	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-165473/26	Lab Control Sample Dup	Total/NA	Water	300.0	
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	300.0	
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	300.0	

Metals

Prep Batch: 164986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	200.7	
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7	
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	200.7	
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7	
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7	
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	200.7	
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	200.7	

Analysis Batch: 165571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986

Analysis Batch: 165722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-2	FC-CCR-MW84-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-3	FC-CCR-MW85-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-4	FC-CCR-MW86-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7 Rev 4.4	164986

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 165722 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-5	FC-CCR-FD01-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MS	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986
550-115114-1 MSD	FC-CCR-MW83-121518	Total/NA	Water	200.7 Rev 4.4	164986

Prep Batch: 523365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total Recoverable	Water	200.2	
550-115114-2	FC-CCR-MW84-121518	Total Recoverable	Water	200.2	
550-115114-3	FC-CCR-MW85-121518	Total Recoverable	Water	200.2	
550-115114-4	FC-CCR-MW86-121518	Total Recoverable	Water	200.2	
550-115114-5	FC-CCR-FD01-121518	Total Recoverable	Water	200.2	
MB 440-523365/1-A	Method Blank	Total Recoverable	Water	200.2	
LCS 440-523365/2-A	Lab Control Sample	Total Recoverable	Water	200.2	
LCSD 440-523365/3-A	Lab Control Sample Dup	Total Recoverable	Water	200.2	
550-114628-F-10-F MS ^10	Matrix Spike	Total Recoverable	Water	200.2	
550-114628-F-10-G MSD ^10	Matrix Spike Duplicate	Total Recoverable	Water	200.2	

Analysis Batch: 523766

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-115114-1	FC-CCR-MW83-121518	Total Recoverable	Water	200.8 LL	523365
550-115114-2	FC-CCR-MW84-121518	Total Recoverable	Water	200.8 LL	523365
550-115114-3	FC-CCR-MW85-121518	Total Recoverable	Water	200.8 LL	523365
550-115114-4	FC-CCR-MW86-121518	Total Recoverable	Water	200.8 LL	523365
550-115114-5	FC-CCR-FD01-121518	Total Recoverable	Water	200.8 LL	523365
MB 440-523365/1-A	Method Blank	Total Recoverable	Water	200.8 LL	523365
LCS 440-523365/2-A	Lab Control Sample	Total Recoverable	Water	200.8 LL	523365
LCSD 440-523365/3-A	Lab Control Sample Dup	Total Recoverable	Water	200.8 LL	523365
550-114628-F-10-F MS ^10	Matrix Spike	Total Recoverable	Water	200.8 LL	523365
550-114628-F-10-G MSD ^10	Matrix Spike Duplicate	Total Recoverable	Water	200.8 LL	523365

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Client Sample ID: FC-CCR-MW83-121518

Lab Sample ID: 550-115114-1

Date Collected: 12/15/18 11:50

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165473	12/26/18 21:37	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 12:13	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 02:26	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		5	523766	01/20/19 18:56	MQP	TAL IRV

Client Sample ID: FC-CCR-MW84-121518

Lab Sample ID: 550-115114-2

Date Collected: 12/15/18 11:04

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/21/18 22:26	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:38	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:32	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:38	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		5	523766	01/20/19 18:58	MQP	TAL IRV

Client Sample ID: FC-CCR-MW85-121518

Lab Sample ID: 550-115114-3

Date Collected: 12/15/18 10:05

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/21/18 23:02	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:44	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 04:53	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		5	523766	01/20/19 19:00	MQP	TAL IRV

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 00:16	NEL	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Client Sample ID: FC-CCR-MW86-121518

Lab Sample ID: 550-115114-4

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:50	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 04:59	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 05:04	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		5	523766	01/20/19 19:02	MQP	TAL IRV

Client Sample ID: FC-CCR-FD01-121518

Lab Sample ID: 550-115114-5

Date Collected: 12/15/18 08:51

Matrix: Water

Date Received: 12/18/18 12:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	165329	12/22/18 00:53	NEL	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165571	12/27/18 13:56	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	165722	12/29/18 05:10	SRA	TAL PHX
Total/NA	Prep	200.7			164986	12/20/18 10:34	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	165722	12/29/18 05:16	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 11:24	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		5	523766	01/20/19 19:05	MQP	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Laboratory: TestAmerica Phoenix

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-19

Laboratory: TestAmerica Irvine

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0671	10-14-19

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-115114-2
SDG: Cholla

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
200.8 LL	Metals (ICP/MS)	EPA	TAL IRV
200.2	Preparation, Total Recoverable Metals	EPA	TAL IRV
200.7	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

115 114



Regulatory Program: CCR

CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarnway	Doug Lavarnway	Carrier:	12/17/2018	COC No:	1 of 1 COCs
Analysis Turnaround Time	928-587-0319	Lab Contact:			Sampler:	
TAT if different from Below		EPA 200.7 (Li, Mg, SiO2)			For Lab Use Only:	
		200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)			Walk-in Client:	
		EPA 300.0 (F)			Lab Sampling:	
					Job / SDG No.:	
					Sample Specific Notes:	

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	EPA 200.7 (Li, Mg, SiO2)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)
-1 FC-CCR-MW83-121518	12/15/2018	1150 G	W	W	2	N	X	X	X	X
-2 FC-CCR-MW84-121518	12/15/2018	1104 G	W	W	2	N	X	X	X	X
-3 FC-CCR-MW85-121518	12/15/2018	1005 G	W	W	2	N	X	X	X	X
-4 FC-CCR-MW86-121518	12/15/2018	851 G	W	W	2	N	X	X	X	X
-5 FC-CCR-FD01-121518	12/15/2018	851 G	W	W	2	N	X	X	X	X



Preservation Used: 1=Ice, 2=HCI, 3=H2SO4, 4=HNO3, 5=NaOH, 6= Other

Possible Hazard Identification:
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments: Method 200.8 with collision cell.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Cooler Temp. (°C): Obs'd: _____

Therm ID No.: _____

Relinquished by: *Dee Lavarnway* Company: *APS* Date/Time: *12/18/2018* Received by: *[Signature]* Company: *TAPPHX* Date/Time: *12/18/2018*

Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Company: _____ Date/Time: _____

CCO

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Regulatory Program: **CCR**

112114

12/17/2018

Client Contact: **Doug Lavarway** 928-587-0319 Analysis Turnaround Time: **12/17/2018**

4801 Cholla Lake Road Joseph City, Az 86032 Phone: (928) 587-0319 FAX: (xxx) xxx-xxxx Project Name: CCR Site: Cholla P O #

Lab Contact: **Doug Lavarway** Carrier: **12/17/2018**

COG No: 1 of 1 COCs
 Sampler: _____
 For Lab Use Only: Walk-in Client: _____
 Lab Sampling: _____
 Job / SDG No.: _____

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)		Perform MS / MSD (Y / N)		Carrier	Sample Specific Notes:	
						EPA 200.7 Rev 4.4 (B, Ca, Na, K, Mg)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)			SM 2320B (HCO3)
-1 FC-CCR-MW83-121518	12/15/2018	1150 G	W	W	2	N	X	X	X	X	X	
-2 FC-CCR-MW84-121518	12/15/2018	1104 G	W	W	2	N	X	X	X	X	X	
-3 FC-CCR-MW85-121518	12/15/2018	1005 G	W	W	2	N	X	X	X	X	X	
-4 FC-CCR-MW86-121518	12/15/2018	851 G	W	W	2	N	X	X	X	X	X	
-5 FC-CCR-FD01-121518	12/15/2018	851 G	W	W	2	N	X	X	X	X	X	

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other _____
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab Active for _____ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Custody Seals Intact: Yes No
 Relinquished by: **Doug Lavarway** Company: **POS** Date/Time: **12/18/2018**
 Relinquished by: _____ Company: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____
 Received in Laboratory by: _____
 Cooler Temp. (°C): Obs'd: _____ Cor'd: **22/3.7** Therm ID No.: _____

Received by: _____ Company: _____ Date/Time: _____
 Received in Laboratory by: _____
 Confirmed by: _____ Date/Time: **12/18/18 12:30**

Chain of Custody Record



Client Information (Sub Contract Lab)		Lab PM Baker, Ken	Camera Tracking No(s) 550-23340.1
Client Contact Shipping/Receiving		E-Mail ken.baker@testamericalab.com	Page Page 1 of 1
Company TestAmerica Laboratories, Inc		State of Origin Arizona	Job # 550-115114-2
Address 17461 Denan Ave, Suite 100, City Irving State, Zip CA, 92614-5817 Phone 949-261-1022(Tel) 949-260-3297(Fax) Email		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - H ₂ SO ₄ F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - Di Water K - EDTA L - EDA Other: M - Hexamine N - None O - AsNaO ₂ P - Na ₂ O ₄ Q - Na ₂ SO ₃ R - Na ₂ SO ₃ S - H ₂ SO ₄ T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Due Date Requested: 1/21/2019		Analysis Requested	
TAT Requested (days):		Total Number of Containers	
PO #	Field Filtered Sample (Yes or No)	200.8_CWA_LL/200.2_200.8_Metals	
WO #	Preservation Code		
Project # 55009651	Sample Date	Sample Time	Sample Type (C=comp, G=grab)
SSOW#	Sample Date	Sample Time	Matrix (W=water, S=solid, O=organic, M=metal)
Arizona Public Service	Sample Date	Sample Time	Matrix
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Matrix
FC-CCR-MW83-121518 (550-115114-1)	12/15/18	11:50 Arizona	Water
FC-CCR-MW83-121518 (550-115114-1MS)	12/15/18	11:50 Arizona	MS
FC-CCR-MW83-121518 (550-115114-1MSD)	12/15/18	11:50 Arizona	MSD
FC-CCR-MW84-121518 (550-115114-2)	12/15/18	11:04 Arizona	Water
FC-CCR-MW85-121518 (550-115114-3)	12/15/18	10:05 Arizona	Water
FC-CCR-MW86-121518 (550-115114-4)	12/15/18	08:51 Arizona	Water
FC-CCR-FD01-121518 (550-115114-5)	12/15/18	Arizona	Water
Special Instructions/Note: AZ Sample! Do not dilute if at all possible! AZ Sample! Do not dilute if at all possible! AZ Sample! Do not dilute if at all possible! AZ Sample! Do not dilute if at all possible! AZ Sample! Do not dilute if at all possible! AZ Sample! Do not dilute if at all possible! AZ Sample! Do not dilute if at all possible!			
Possible Hazard Identification			
Unconfirmed Deliverable Requested, I, II, III, IV, Other (specify) Primary Deliverable Rank, 2			
Empty Kit Relinquished by			
Relinquished by <i>[Signature]</i>		Date 12/18/18	
Relinquished by		Date/Time	
Relinquished by		Date/Time	
Custody Seals Intact: A Yes Δ No		Custody Seal No.:	
Received by <i>[Signature]</i>		Date/Time 11/5/19	
Received by <i>[Signature]</i>		Date/Time 11/5/19	
Received by <i>[Signature]</i>		Date/Time 11/5/19	
Cooler Temperature(s) Card Other Remarks 170/17.2 IR-901		Company Company Company	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115114-2

SDG Number: Cholla

Login Number: 115114

List Number: 1

Creator: Maycock, Lisa

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115114-2

SDG Number: Cholla

Login Number: 115114

List Number: 2

Creator: Ornelas, Olga

List Source: TestAmerica Irvine

List Creation: 01/15/19 05:27 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-115114-2

SDG Number: Cholla

Login Number: 115114

List Number: 3

Creator: Escalante, Maria I

List Source: TestAmerica Irvine

List Creation: 01/18/19 03:37 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX F

2018 DATA VALIDATION REPORT





2018 DATA VALIDATION REPORT

CCR Rule Compliance Groundwater Monitoring Data
Four Corners Power Plant, Arizona Public Service
Farmington, New Mexico

Prepared by:

Wood Environment & Infrastructure Solutions, Inc.

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January 31, 2019

Project No. 1420162024.4.3

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Table 1	Field Samples Submitted to Analytical Laboratories
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APPENDICES

Appendix A	Data Assessment Checklists by Sample Delivery Group
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ACRONYMS & ABBREVIATIONS

%	percent
APS	Arizona Public Service Company
BTV(s)	background threshold value(s)
CCR	coal combustion residuals
CLP	Contract Laboratory Program
COC	chain of custody
EPA	United States Environmental Protection Agency
GPS(s)	Groundwater Protection Standard(s)
ID	identification
LCS	laboratory control sample
LCSD	laboratory control sample
MCL	maximum contaminant level
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
QC	quality control
RL	reporting limit
RPD	relative percent difference
SAP	sampling and analysis plan
SDG	sample delivery group
SM	Standard Method
TDS	total dissolved solids
Wood	Wood Environment & Infrastructure Solutions, Inc.

1.0 INTRODUCTION

Arizona Public Service (APS) collected groundwater Detection and Assessment Monitoring samples to support Coal Combustion Residuals (CCR) Rule Compliance during the 2018 calendar year (the reporting period) at the Four Corners Power Plant, located near Farmington, New Mexico. This report presents the standard methods used to validate reporting period data and documents the results of the data validation process in summary tables and checklists generated as the samples were collected throughout the year.

2.0 DATA VALIDATION METHODOLOGY

Wood Environment & Infrastructure Solutions, Inc. (Wood) performed a United States Environmental Protection Agency (EPA) Stage 2A validation on samples collected by APS during the 2018 calendar year. This is equivalent to a Level I data evaluation as defined in the project sampling and analysis plan (SAP). The Stage 2A validation includes review of the quality control (QC) results in laboratory analytical reports and does not include review or validation of the raw analytical data. Data validation activities have been performed in general accordance with:

- APS, 2018. Sampling and Analysis Plan, Coal Combustion Residual (CCR) Groundwater Monitoring, Four Corners Power Plant, Arizona Public Service, Farmington, New Mexico, (originally prepared by AECOM, Inc. in December 2015 and updated by APS in January 2018).
- EPA, 2004. SW 846 Test Methods for Evaluating Solid Wastes, Update IIIB.
- EPA, 2017. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Superfund Data Review, EPA 540-R-2017-001.

The CLP guidelines were written specifically for the CLP, and have been modified for the purposes of data reviews conducted during the reporting period where they differ from method-specific QC requirements.

During each groundwater monitoring round conducted during the reporting period, the laboratory's certified analytical report and supporting documentation were reviewed to assess the following:

- Data package and electronic data deliverable completeness;
- Chain of custody (COC) compliance;
- Holding time compliance;
- Presence or absence of laboratory contamination as demonstrated by laboratory blanks;
- Accuracy and bias as demonstrated by recovery of laboratory control sample (LCS) and matrix spike (MS) samples;
- Analytical precision as relative percent difference (RPD) of analyte concentration between laboratory duplicates, LCS/LCS duplicates (LCSDs), or MSs/MS duplicates (MSDs);
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices.

Appendix A presents data assessment checklists generated for each sample delivery group submitted to the analytical laboratory during the reporting period. The laboratory performing the analyses as well as the methods of analysis are presented in the individual checklists. Table 1 presents a comprehensive listing of reporting period samples and Table 2 summarizes field duplicate detections at concentrations greater than analytical reporting limits.

In general, it is important to recognize that no analytical data are guaranteed to be correct, even if all QC audits are passed. Strict QC serves to increase confidence in data, but any reported value may potentially contain error.

3.0 EXPLANATION OF DATA QUALITY INDICATORS

Summary explanations of the specific data quality indicators reviewed during data validation are presented below.

3.1 Laboratory Control Sample Recoveries

LCSs are aliquots of analyte free matrices that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same analytical procedures as the samples it accompanies. LCS recovery is an indication of a laboratory's ability to successfully perform an analytical method in an interference free matrix.

3.2 Matrix Spike Recoveries

MSs and MSDs are prepared by adding known amounts of the analytes of interest for an analytical method, or a representative subset of those analytes, to an aliquot of sample. The spiked sample is then processed through the same extraction, concentration, cleanup, and analytical procedures as the unspiked samples in an analytical batch.

MS recovery and precision are an indication of a laboratory's ability to successfully recover an analyte in the matrix of a specific sample or closely related sample matrices. It is important not to apply MS results for any specific sample to other samples without understanding how the sample matrices are related.

3.3 Blank Concentrations

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results.

Laboratory blanks are processed by the laboratory using exactly the same procedures as the field samples. Target analytes should not be found in laboratory blanks.

When target analytes are detected in blanks, analyte concentrations in associated samples less than five times the concentration detected in the blank will be U qualified as being not detected.

3.4 Laboratory Duplicates

Laboratory duplicate analysis verifies acceptable method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection.

4.0 DEFINITIONS OF DATA VALIDATION QUALIFIERS

The following qualifiers may be added to the data during data validation:

- J** The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- R** The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- U** The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- UJ** The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

5.0 CHAIN OF CUSTODY AND SAMPLE RECEIPT CONDITION DOCUMENTATION

Unless otherwise noted in the Data Assessment Checklists included in Appendix A, the samples were received at the laboratories under proper COC, intact, properly preserved, and at temperatures less than the SAP-specified maximum of 6 degrees Celsius.

6.0 SPECIFIC DATA VALIDATION FINDINGS

Results for groundwater monitoring samples collected in 2018 may be considered usable with the limitations and exceptions summarized in Table 3. The following sections identify requirements used in data assessment.

6.1 Metals By EPA Methods 200.7, 200.8, and 245.1

6.1.1 Holding Times

Samples must be analyzed for metals within the SAP-specified holding time of 28 days for mercury and 180 days for additional metals.

6.1.2 Laboratory Blanks

Target analytes must not be detected in the laboratory blanks associated with the analysis of site samples.

6.1.3 Laboratory Control Sample Accuracy and Precision

LCS and LCSD recoveries must be within the laboratory-specified 85 to 115 percent (%) limits and RPDs between the LCS and LCSD results must be less than the laboratory-specified maximum of 20%.

6.1.4 Matrix Spikes/Matrix Spike Duplicates

Laboratories performed MS and MSD analysis on the project samples specified in the Data Assessment Checklists included in Appendix A. MS/MSD recoveries must be within laboratory-specified limits of 70 to 130% and RPDs between MS and MSD results must be less than the laboratory-specified maximum of 20%.

6.1.5 Analytical Sensitivity

RLs for antimony, arsenic, barium, beryllium, cadmium, chromium, selenium, thallium, lead and mercury must be sufficiently low to meet the National Primary Drinking Water Regulation Maximum Contamination Limits (MCLs).

Boron, calcium, cobalt, lithium, magnesium, molybdenum, potassium, and sodium are not EPA-regulated analytes in groundwater and it is not possible to evaluate the RLs for these analytes against the National Primary Drinking Water Regulation MCLs.

Pending development of applicable Background Threshold Values (BTVs) and/or Groundwater Protection Standards (GPSs) for the CCR groundwater monitoring program at Four Corners Power Plant, analytical sensitivity must also be evaluated for these site-specific comparison criteria.

6.2 Anions by EPA Method 300.0

6.2.1 Holding Times

Samples must be analyzed for anions within the SAP-specified holding time of 28 days.

6.2.2 Laboratory Blanks

Fluoride, chloride, and sulfate must not be detected in the laboratory blanks associated with the analysis of these samples.

6.2.3 Laboratory Control Samples

LCS and LCSD recoveries must be within the laboratory-specified limits of 90 to 110% and RPDs between the LCS and LCSD results must be less than the laboratory-specified maximum values.

6.2.4 Matrix Spikes/Matrix Spike Duplicates

Laboratories performed MS and MSD analysis on the project samples specified in the Data Assessment Checklists included in Appendix A. Recoveries must be within the laboratory-specified limits of 80 to 120%, and RPDs between MS and MSD results must be less than the laboratory-specified limit of 20%.

6.2.5 Laboratory Duplicates

Laboratories performed duplicate analysis on the project samples specified in the Data Assessment Checklists included in Appendix A. The RPDs between duplicate results must be less than the laboratory-specified 20% limit.

6.2.6 Analytical Sensitivity

Fluoride RLs must be sufficiently low to meet the 4 mg/L MCL. Chloride and sulfate are not EPA-regulated analytes in groundwater and it is not possible to evaluate the RLs for these analytes against the Primary Drinking Water Regulation MCLs.

There are applicable CCR Groundwater Monitoring Program Background Threshold Values (BTVs) for fluoride, chloride, and sulfate for the site. Analytical sensitivity must also be evaluated for these site-specific comparison criteria.

6.3 Total Dissolved Solids by SM 2540C

6.3.1 Holding Times

All samples must be analyzed for TDS within the SAP-specified holding time of 7 days.

6.3.2 Laboratory Blanks

TDS must not be detected in the laboratory blanks at concentrations above the reporting limit.

6.3.3 Laboratory Control Sample Accuracy and Precision

LCS and LCSD recoveries must be within the laboratory-specified limits of 90 to 110% and RPDs between the LCS and LCSD results must be less than the laboratory-specified maximum of 10%.

6.3.4 Laboratory Duplicates

Laboratories performed duplicate analysis for TDS on the project samples specified in the Data Assessment Checklists included in Appendix A. RPDs between primary sample and laboratory duplicate results must be less than the laboratory-specified 10% limit.

6.4 Alkalinity by SM 2320B

6.4.1 Holding Times

All samples must be analyzed for alkalinity within the SAP-specified holding time of 14 days.

6.4.2 Laboratory Blanks

Alkalinity must not be detected in the laboratory blanks at concentrations above the reporting limit.

6.4.3 Laboratory Control Sample Accuracy

LCS and LCSD recoveries must be within the laboratory-specified limits of 90 to 110% and RPDs between the LCS and LCSD results must be less than the laboratory-specified maximum of 20%.

6.4.4 Laboratory Duplicates

Laboratories performed duplicate analysis for alkalinity on the project samples specified in the Data Assessment Checklists included in Appendix A. RPDs between primary sample and laboratory duplicate results must be less than the laboratory-specified 20% limit.

6.5 pH by SM 4500B

6.5.1 Holding Times

All samples must be analyzed for pH within 15 minutes of sample collection.

6.5.2 Laboratory Control Sample Accuracy

LCS recoveries must be within the laboratory-specified limits of 98.5 to 101.5%.

6.5.3 Laboratory Duplicates

Laboratories performed duplicate analysis for pH on the project samples specified in the Data Assessment Checklists included in Appendix A. RPDs between primary sample and laboratory duplicate results must be less than the laboratory-specified 5% limit.

6.6 Radium by EPA Methods 903.0 and 904.0

6.6.1 Holding Time

All samples must be analyzed for radium within the EPA-recommended holding time of 6 months.

6.6.2 Laboratory Blanks

Radium must not be detected in the laboratory blanks at concentrations above the reporting limit.

6.6.3 Laboratory Control Sample Accuracy

LCS and LCSD recoveries must be within laboratory-specified limits.

6.6.4 Carrier Accuracy

Carrier recoveries must be within the laboratory-specified 40 to 110% limits.

6.6.5 Analytical Sensitivity

Total radium RLs must be sufficiently low to meet the MCL of 5 picocuries per liter. Pending development of applicable CCR Groundwater Monitoring Program BTVs and/or GPSs for the site, analytical sensitivity must also be evaluated for these site-specific comparison criteria.

7.0 FIELD DUPLICATES

APS collected field duplicate samples of the specified field original samples as specified in Table 1. Target analyte detections are summarized in Table 2. Precision values must be less than the SAP-specified maximum of 20%, or the differences between the detected concentrations must be less than the RLs.

8.0 SUMMARY AND CONCLUSIONS

Data are usable with the addition of qualifiers as presented in Table 3.

9.0 REFERENCES

APS, 2018. Sampling and Analysis Plan CCR Groundwater Monitoring Four Corners Power Plant Arizona Public Service, Farmington, New Mexico. Originally prepared by AECOM in December 2015 and updated by APS in January 2018.

EPA, 2017. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Superfund Data Review, EPA 540-R-2017-001.

EPA, 2004. SW 846 Test Methods for Evaluating Solid Wastes, Update IIIB.

10.0 LIMITATIONS

This report was prepared exclusively for Arizona Public Service by Wood Environment & Infrastructure Solutions, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in Wood services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This data validation report is intended to be used by Arizona Public Service for the Four Corners Power Plant site only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

wood.

TABLES



TABLE 1
FIELD SAMPLES SUBMITTED TO ANALYTICAL LABORATORIES
Coal Combustion Residuals Rule Groundwater Monitoring Program
2018 Detection and Assessment Monitoring

Sampling Program	CCR Unit	Collection Date	Analytical Laboratory	Field Sample ID	Laboratory Sample ID	Notes
Assessment	URS	3/16/2018	TA - Phoenix	FC-CCR-MW66-31618	550-99692-1	
Assessment	URS	3/16/2018	TA - Phoenix	FC-CCR-MW67-31618	550-99692-2	
Assessment	URS	3/16/2018	TA - Phoenix	FC-CCR-MW68-31618	550-99692-3	
Assessment	URS	3/16/2018	TA - Phoenix	FC-CCR-MW69-31618	550-99692-4	
Assessment	URS	3/16/2018	TA - Phoenix	FC-CCR-MW70-31618	550-99692-5	
Assessment	URS/CWTP	3/16/2018	TA - Phoenix	FC-CCR-MW71-31618	550-99692-6	
Assessment	URS/CWTP	3/16/2018	TA - Phoenix	FC-CCR-MW72-31618	550-99692-7	
Assessment	URS/CWTP	3/16/2018	TA - Phoenix	FC-CCR-MW73-31618	550-99692-8	
Assessment	URS	3/16/2018	TA - Phoenix	FC-CCR-FD01-31618	550-99692-9	Field duplicate of sample FC-CCR-MW66-31618
Assessment	Multiunit	3/17/2018	TA - Phoenix	FC-CCR-MW49A-31718	550-99693-1	
Assessment	Multiunit	3/17/2018	TA - Phoenix	FC-CCR-MW61-31718	550-99693-2	
Assessment	Multiunit	3/17/2018	TA - Phoenix	FC-CCR-MW74-31718	550-99693-3	
Assessment	Multiunit	3/17/2018	TA - Phoenix	FC-CCR-MW75-31718	550-99693-4	
Assessment	Multiunit	3/17/2018	TA - Phoenix	FC-CCR-MW7-31718	550-99693-5	
Assessment	Multiunit	3/17/2018	TA - Phoenix	FC-CCR-FD02-31718	550-99693-6	Field duplicate of sample FC-CCR-MW61-31718
Detection	CWTP	4/6/2018	TA - Phoenix	FC-CCR-MW62-4618	550-100875-1	
Detection	CWTP	4/6/2018	TA - Phoenix	FC-CCR-MW63-4618	550-100875-2	
Assessment	URS	5/31/2018	TA - Phoenix	FC-CCR-MW-66-53118	550-103741-1	
Assessment	URS	6/2/2018	TA - Phoenix	FC-CCR-MW-67-6218	550-103741-2	
Assessment	URS	6/2/2018	TA - Phoenix	FC-CCR-MW-68-6218	550-103741-3	
Assessment	URS	6/2/2018	TA - Phoenix	FC-CCR-MW-69-6218	550-103741-4	
Assessment	URS	6/2/2018	TA - Phoenix	FC-CCR-FD02-6218	550-103741-5	Field duplicate of sample FC-CCR-MW-69-6218
Assessment	URS	5/31/2018	TA - Phoenix	FC-CCR-MW-70-53118	550-103741-6	
Assessment	URS/CWTP	6/2/2018	TA - Phoenix	FC-CCR-MW-71-6218	550-103741-7	
Assessment	URS/CWTP	6/2/2018	TA - Phoenix	FC-CCR-MW-72-6218	550-103741-8	
Assessment	URS/CWTP	6/2/2018	TA - Phoenix	FC-CCR-MW-73-6218	550-103741-9	
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-MW-7-6118	550-103742-1	
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-MW-8-6118	550-103742-2	
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-MW-49A-6118	550-103742-3	
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-MW-61-6118	550-103742-4	
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-FD01-6118	550-103742-5	Field duplicate of sample FC-CCR-MW-61-6118
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-MW-74-6118	550-103742-6	
Assessment	Multiunit	6/1/2018	TA - Phoenix	FC-CCR-MW-75-6118	550-103742-7	
Detection	CWTP	6/3/2018	TA - Phoenix	FC-CCR-MW-62-6318	550-103738-1	
Detection	CWTP	6/3/2018	TA - Phoenix	FC-CCR-MW-63-6318	550-103738-2	

TABLE 1
FIELD SAMPLES SUBMITTED TO ANALYTICAL LABORATORIES
Coal Combustion Residuals Rule Groundwater Monitoring Program
2018 Detection and Assessment Monitoring

Sampling Program	CCR Unit	Collection Date	Analytical Laboratory	Field Sample ID	Laboratory Sample ID	Notes
Detection	CWTP	6/3/2018	TA - Phoenix	FC-CCR-MW-64-6318	550-103738-3	
Detection	CWTP	6/3/2018	TA - Phoenix	FC-CCR-MW-65-6318	550-103738-4	
Assessment	URS	11/2/2018	TA - Phoenix	FC-CCR-MW66-11218	550-113007-1	
Assessment	URS	11/3/2018	TA - Phoenix	FC-CCR-MW67-11318	550-113007-2	
Assessment	URS	11/3/2018	TA - Phoenix	FC-CCR-MW68-11318	550-113007-3	MS/MSD
Assessment	URS	11/3/2018	TA - Phoenix	FC-CCR-MW69-11318	550-113007-4	
Assessment	URS	11/2/2018	TA - Phoenix	FC-CCR-MW70-11218	550-113007-5	
Detection	CWTP	11/2/2018	TA - Phoenix	FC-CCR-MW62-11218	550-113007-6	
Detection	CWTP	11/2/2018	TA - Phoenix	FC-CCR-MW63-112818	550-113007-7	
Detection	CWTP	11/2/2018	TA - Phoenix	FC-CCR-MW64-11218	550-113007-8	
Detection	CWTP	11/2/2018	TA - Phoenix	FC-CCR-MW65-11218	550-113007-9	
Assessment	URS/CWTP	11/3/2018	TA - Phoenix	FC-CCR-MW71-11318	550-113007-10	
Assessment	URS/CWTP	11/3/2018	TA - Phoenix	FC-CCR-MW72-11318	550-113007-11	Field Duplicate of Sample FC-CCR-MW71-11318
Assessment	URS/CWTP	11/3/2018	TA - Phoenix	FC-CCR-MW73-11318	550-113007-12	Field Duplicate of Sample FC-CCR-MW72-11318
Assessment	URS	11/3/2018	TA - Phoenix	FC-CCR-FD01-11318	550-113007-13	
Assessment	URS	11/3/2018	TA - Phoenix	FC-CCR-FD02-11318	550-113007-14	
Assessment	Multiunit	11/4/2018	TA - Phoenix	FC-CCR-MW7-11418	550-113026-1	
Assessment	Multiunit	11/4/2018	TA - Phoenix	FC-CCR-MW8-11418	550-113026-2	
Assessment	Multiunit	11/3/2018	TA - Phoenix	FC-CCR-MW61-11318	550-113026-3	
Assessment	Multiunit	11/3/2018	TA - Phoenix	FC-CCR-MW75-11318	550-113026-4	MS/MSD
Assessment	Multiunit	11/4/2018	TA - Phoenix	FC-CCR-MW49A-11418	550-113026-5	

Notes:

ID = identification

TA = TestAmerica

TABLE 2A
FIELD DUPLICATE DETECTIONS (Conventional Analyses)
Coal Combustion Residuals Rule Groundwater Monitoring Program
2018 Detection and Assessment Monitoring

Method	Analyte	RL	Primary Sample Result	Field Duplicate Result	RPD	Notes
FC-CCR-MW66-31618 and FC-CCR-FD01-31618						
EPA 300.0	Fluoride	6.0 mg/L	41	38	8%	
EPA 200.7 Rev 4.4	Lithium	0.20 mg/L	0.38	0.39	3%	
EPA 200.8 LL	Arsenic	0.0020 mg/L	0.0050	0.0067	29%	± RL
EPA 200.8 LL	Barium	0.0020 mg/L	0.020	0.021	5%	
EPA 200.8 LL	Cobalt	0.0020 mg/L	0.0085	0.0088	3%	
EPA 200.8 LL	Molybdenum	0.0020 mg/L	0.022	0.022	0%	
EPA 200.8 LL	Thallium	0.00040 mg/L	0.00054	0.00048	12%	
FC-CCR-MW61-31718 and FC-CCR-FD02-31718						
EPA 300.0	Fluoride	1.6 mg/L	1.6	1.6 U	NC	± RL
EPA 200.7 Rev 4.4	Lithium	0.20 mg/L	0.38	0.39	3%	
EPA 200.8 LL	Barium	0.0020 mg/L	0.014	0.014	0%	
EPA 200.8 LL	Cadmium	0.00040 mg/L	0.0011	0.0010	10%	
EPA 200.8 LL	Cobalt	0.0020 mg/L	0.016	0.016	0%	
EPA 200.8 LL	Molybdenum	0.0020 mg/L	0.079	0.079	0%	
FC-CCR-MW-61-6118 and FC-CCR-FD01-6118						
EPA 300.0	Chloride	4.0 mg/L	330	330	0%	
EPA 300.0	Fluoride	0.80 mg/L	1.30	1.30	0%	
EPA 300.0	Sulfate	400 mg/L	3500	3500	0%	
EPA 200.7 Rev 4.4	Boron	0.050 mg/L	38	39	3%	
EPA 200.7 Rev 4.4	Clacium	2.0 mg/L	470.00	480	2%	
EPA 200.7 Rev 4.4	Magnesium	2.0 mg/L	120	120	0%	
EPA 200.7 Rev 4.4	Potassium	0.50 mg/L	19	20	5%	
EPA 200.7 Rev 4.4	Sodium	0.50 mg/L	980	980	0%	
SM 2320B	Alkalinity as CaCO3	6.0 mg/L	91	91	0%	
SM 2320B	Bicarbonate Alkalinity as CaCO3	6.0 mg/L	91	89	2%	
SM 2540C	TDS	100 mg/L	5600	5400	4%	
SM 4500 H+ B	pH	1.7 SU	8.50	8.50	0%	
EPA 200.7 Rev 4.4	Lithium	0.20 mg/L	0.36	0.36	0%	
EPA 200.8 LL	Barium	0.010 mg/L	0.014	0.014	0%	
EPA 200.8 LL	Cobalt	0.010 mg/L	0.017	0.017	0%	
EPA 200.8 LL	Molybdenum	0.010 mg/L	0.085	0.082	4%	
FC-CCR-MW69-6218 and FC-CCR-FD02-6218						
EPA 300.0	Chloride	400.0 mg/L	1400	1300	7%	
EPA 300.0	Fluoride	0.8 mg/L	21	21	0%	
EPA 300.0	Sulfate	400.0 mg/L	12000	12000	0%	
EPA 200.7 Rev 4.4	Boron	0.1 mg/L	120	130	8%	
EPA 200.7 Rev 4.4	Clacium	2.0 mg/L	430	430	0%	
EPA 200.7 Rev 4.4	Magnesium	8.0 mg/L	2600	2500	4%	
EPA 200.7 Rev 4.4	Potassium	0.5 mg/L	38	38	0%	
EPA 200.7 Rev 4.4	Sodium	0.5 mg/L	680	680	0%	
SM 2320B	Alkalinity as Caco3	6.0 mg/L	360	350	3%	
SM 2320B	Bicarbonate Alkalinity as Caco3	6.0 mg/L	360	350	3%	
SM 2540C	TDS	100.0 mg/L	18000	18000	0%	
SM 4500 H+ B	pH	1.7 SU	7.3	7.3	0%	
EPA 200.7 Rev 4.4	Lithium	0.20 mg/L	0.49	0.49	0%	

TABLE 2A
FIELD DUPLICATE DETECTIONS (Conventional Analyses)
Coal Combustion Residuals Rule Groundwater Monitoring Program
2018 Detection and Assessment Monitoring

Method	Analyte	RL	Primary Sample Result	Field Duplicate Result	RPD	Notes
EPA 200.8 LL	Barium	0.01 mg/L	0.016	0.014	13%	
EPA 200.8 LL	Molybdenum	0.01 mg/L	0.016	0.015	6%	
EPA 200.8 LL	Selenium	0.01 mg/L	0.014	0.013	7%	
Sample FC-CCR-MW71-11318 and FC-CCR-FD01-11318						
EPA 300.0	Chloride	400 mg/L	520	520	0%	
EPA 300.0	Sulfate	400 mg/L	11000	11000	0%	
EPA 200.7 Rev 4.4	Boron	0.050 mg/L	0.56	0.54	4%	
EPA 200.7 Rev 4.4	Calcium	2.0 mg/L	470	450	4%	
SM 2540C	TDS	100 mg/L	16000	16000	0%	
SM 4500 H+ B	pH	1.7 SU	7.0	7.2	3%	
EPA 200.7 Rev 4.4	Lithium	0.20 mg/L	0.35	0.34	3%	
EPA 200.8 LL	Arsenic	0.0050 mg/L	0.0046	0.0068	39%	± RL
EPA 200.8 LL	Barium	0.0050 mg/L	0.0098	0.0095	3%	
EPA 200.8 LL	Molybdenum	0.0050 mg/L	0.00079	0.00065	19%	
EPA 200.8 LL	Selenium	0.0050 mg/L	0.27	0.31	14%	
EPA 200.8 LL	Thallium	0.0010 mg/L	0.00031	0.00030	3%	
Sample FC-CCR-MW72-11318 and FC-CCR-FD02-11318						
EPA 300.0	Chloride	10 mg/L	450	450	0%	
EPA 300.0	Sulfate	400 mg/L	11000	11000	0%	
EPA 200.7 Rev 4.4	Boron	0.050 mg/L	0.22	0.21	5%	
EPA 200.7 Rev 4.4	Calcium	2.0 mg/L	470	460	2%	
SM 2540C	TDS	100 mg/L	16000	16000	0%	
SM 4500 H+ B	pH	1.7 SU	7.0	7.1	1%	
EPA 200.7 Rev 4.4	Lithium	0.20 mg/L	0.37	0.37	0%	
EPA 200.8 LL	Arsenic	0.0050 mg/L	0.0031	0.0026	18%	
EPA 200.8 LL	Barium	0.0050 mg/L	0.0075	0.0075	0%	
EPA 200.8 LL	Cobalt	0.0050 mg/L	0.002	0.002	0%	
EPA 200.8 LL	Molybdenum	0.0050 mg/L	0.00078	0.00078	0%	
EPA 200.8 LL	Selenium	0.0050 mg/L	0.13	0.15	14%	
EPA 200.8 LL	Thallium	0.0010 mg/L	0.00088	0.00087	1%	

Notes:

mg/L = milligrams per liter

RL = reporting limit

RPD = relative percent difference

± RL = The difference between analyte concentrations is less than the RL, indicating acceptable analytical precision.

Methods:

EPA 300.0 = Ions

EPA 200.7 Rev 4.4 = Metals

EPA 200.8 LL = Metals

TABLE 2B
FIELD DUPLICATE DETECTIONS (Radiological Analyses)
Coal Combustion Residuals Rule Groundwater Monitoring Program
2018 Detection and Assessment Monitoring

Analyte	Primary Sample Result and Uncertainty		Field Duplicate Result and Uncertainty		RPD	DER	Notes
FC-CCR-MW66-31618 and FC-CCR-FD01-31618							
Radium 226	1.5	U	1.4	±0.1	NC	0.9	DER in limits
Radium 228	1.5	U	2.6	±0.1	NC	2.4	UJ/J-FD
Total Radium	1.5	U	4.0	±0.1	NC	4.3	UJ/J-FD
FC-CCR-MW61-31718 and FC-CCR-FD02-31718							
No target analyte detections							
FC-CCR-MW69-6218 and FC-CCR-FD02-6218							
Radium 226	1.3	± 0.2	0.9	±0.2	36%	1.4	DER in limits
Radium 228	3.3	± 0.4	2.2	±0.3	40%	2.2	J-FD
Total Radium	4.6	± 0.4	3.1	±0.4	39%	2.7	J-FD
FC-CCR-MW61-61118 and FC-CCR-FD01-61118							
No target analyte detections							
Sample FC-CCR-MW71-11318 and FC-CCR-FD01-11318							
Radium 226	1.2	± 0.2	1.8	±0.2	40%	2.1	J-FD
Radium 228	0.7	U	0.7	U	NC	N/A	N/A
Total Radium	1.2	± 0.4	1.8	±0.2	40%	1.3	DER in limits
Sample FC-CCR-MW72-11318 and FC-CCR-FD02-11318							
Radium 226	0.7	± 0.2	0.5	±0.2	33%	0.7	DER in limits
Radium 228	1.0	± 0.3	1.5	±0.3	40%	1.2	DER in limits
Total Radium	1.7	± 0.4	2.0	±0.4	16%	0.5	

Notes:

DER = duplicate error ratio
 NC = not calculable
 RPD = relative percent difference
 Units are picocuries per liter (pCi/L)

Qualifiers:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
 U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
 UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Reason Codes:

DER in limits = 95% confidence of acceptable precision
 FD = Imprecision between primary and field duplicate results.

TABLE 3
QUALIFIERS ADDED DURING DATA VALIDATION
Coal Combustion Residuals Rule Groundwater Monitoring Program
2018 Detection and Assessment Monitoring

Sample IDs	Methods	SDG	Analytes	Concentrations		Qualifiers and Reason Codes
FC-CCR-FD01-3161818	Gamma Ray HPGE	550-99692-3	Radium 228	2.6	pCi/L	J FD
FC-CCR-FD01-31618	Gamma Ray HPGE	550-99692-3	Total Radium	4.0	pCi/L	J FD
FC-CCR-FD01-6118	SM 4500 H+ B	550-103742	pH	8.5	SU	J HT
FC-CCR-FD02-6218	Gamma Ray HPGE	550-103741	Radium 228	2.2	pCi/L	J FD
FC-CCR-FD02-6218	Gamma Ray HPGE	550-103741	Total Radium	3.1	pCi/L	J FD
FC-CCR-FD02-6218	SM 4500 H+ B	550-103741	pH	7.3	SU	J HT
FC-CCR-MW-49A-6118	SM 4500 H+ B	550-103742	pH	7.4	SU	J HT
FC-CCR-MW-61-6118	SM 4500 H+ B	550-103742	pH	8.5	SU	J HT
FC-CCR-MW-66-31618	Gamma Ray HPGE	550-99692-3	Radium 228	1.5	pCi/L	UJ FD
FC-CCR-MW-66-31618	Gamma Ray HPGE	550-99692-3	Total Radium	1.5	pCi/L	UJ FD
FC-CCR-MW-66-53118	SM 4500 H+ B	550-103741	pH	7.2	SU	J HT
FC-CCR-MW-67-6218	SM 4500 H+ B	550-103741	pH	7.1	SU	J HT
FC-CCR-MW-68-6218	SM 4500 H+ B	550-103741	pH	6.9	SU	J HT
FC-CCR-MW-69-6218	Gamma Ray HPGE	550-103741-2	Radium 228	3.3	pCi/L	J FD
FC-CCR-MW-69-6218	Gamma Ray HPGE	550-103741-2	Total Radium	4.6	pCi/L	J FD
FC-CCR-MW-69-6218	SM 4500 H+ B	550-103741	pH	7.3	SU	J HT
FC-CCR-MW-70-53118	SM 4500 H+ B	550-103741	pH	6.9	SU	J HT
FC-CCR-MW-71-6218	SM 4500 H+ B	550-103741	pH	7.1	SU	J HT
FC-CCR-MW-72-6218	SM 4500 H+ B	550-103741	pH	7.0	SU	J HT
FC-CCR-MW-73-6218	SM 4500 H+ B	550-103741	pH	6.9	SU	J HT
FC-CCR-MW-74-6118	SM 4500 H+ B	550-103742	pH	7.7	SU	J HT
FC-CCR-MW-75-6118	SM 4500 H+ B	550-103742	pH	8.2	SU	J HT
FC-CCR-MW-7-6118	SM 4500 H+ B	550-103742	pH	7.4	SU	J HT
FC-CCR-MW-8-6118	SM 4500 H+ B	550-103742	pH	7.3	SU	J HT
FC-CCR-MW66-11218	SM 4500 H+ B	550-113007	pH	7.30	SU	J HT
FC-CCR-MW66-11218	EPA 200.7 Rev 4.4	550-113007	Selenium	0.0020	mg/L	J HM
FC-CCR-MW67-11318	SM 4500 H+ B	550-113007	pH	7.40	SU	J HT
FC-CCR-MW68-11318	SM 4500 H+ B	550-113007	pH	7.20	SU	J HT
FC-CCR-MW69-11318	SM 4500 H+ B	550-113007	pH	7.30	SU	J HT
FC-CCR-MW70-11218	SM 4500 H+ B	550-113007	pH	7.00	SU	J HT
FC-CCR-MW71-11318	SM 4500 H+ B	550-113007	pH	6.80	SU	J HT
FC-CCR-MW71-11318	Gamma Ray HPGE	550-113007	Radium 226	1.2	pCi/L	J FD
FC-CCR-MW72-11318	SM 4500 H+ B	550-113007	pH	7.10	SU	J HT
FC-CCR-MW73-11318	SM 4500 H+ B	550-113007	pH	7.80	SU	J HT
FC-CCR-FD01-11318	SM 4500 H+ B	550-113007	pH	7.50	SU	J HT
FC-CCR-FD01-11318	Gamma Ray HPGE	550-113007	Radium 226	1.8	pCi/L	J FD
FC-CCR-FD02-11318	SM 4500 H+ B	550-113007	pH	7.00	SU	J HT
FC-CCR-MW7-11418	SM 4500 H+ B	550-113026	pH	7.40	SU	J HT
FC-CCR-MW8-11418	SM 4500 H+ B	550-113026	pH	7.30	SU	J HT
FC-CCR-MW61-11318	SM 4500 H+ B	550-113026	pH	8.60	SU	J HT
FC-CCR-MW75-11318	SM 4500 H+ B	550-113026	pH	8.30	SU	J HT
FC-CCR-MW49A-11418	SM 4500 H+ B	550-113026	pH	7.40	SU	J HT

**TABLE 3
 QUALIFIERS ADDED DURING DATA VALIDATION
 Coal Combustion Residuals Rule Groundwater Monitoring Program
 2018 Detection and Assessment Monitoring**

Sample IDs	Methods	SDG	Analytes	Concentrations	Qualifiers and Reason Codes
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Notes:

ID = identification pCi/L = picoCuries/litre
 SDG = sample delivery group SU = standard units of pH

Methods:

SM 4500 H+ B = pH
 Gamm Ray HPGE = radiochemical analysis
 EPA 200.7 Rev 4.4 = select metals

Qualifier Definitions:

J = The analyte was positively identified; the associated numerical value is approximate.

Reason Codes:

HM = High matrix spike recovery. Potential high analytical bias.
 HT = Samples were analyzed outside of specified holding time.
 FD = High field duplicate RPD. Potential sampling and/or analytical imprecision.

APPENDIX A

DATA ASSESSMENT CHECKLISTS BY SAMPLE DELIVERY GROUP



**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J99693-1	Date:	4/13/2018
Validator's Name:	Nathalie Perry-Freer	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification
FC-CCR-MW49A-31718	3/17/2018	550-99693-1
FC-CCR-MW61-31718	3/17/2018	550-99693-2
FC-CCR-MW74-31718	3/17/2018	550-99693-3
FC-CCR-MW75-31718	3/17/2018	550-99693-4
FC-CCR-MW7-31718	3/17/2018	550-99693-5
FC-CCR-FD02-31718	3/17/2018	550-99693-6

Analytical Methods:

Analyte	Analyte Group	EPA Method
Beryllium, Lithium	Metals (ICP)	200.7
Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Lead Molybdenum, Selenium Thallium	Metals (ICP/MS)	200.8
Mercury	Mercury (CVAA)	245.1
Fluoride	Anions, Ion Chromotography	300.0

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

Y N

COC signed and complete?

Y N

Sample login matches COC?

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times
the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
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If No:

Analyte	Recovery/Bias	Affected samples
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MS performed on a project-specific sample?	Y	N	N/A
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If Yes:

FC-CCR-MW49A-31718

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
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If No:

Analyte	Recovery/Bias
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Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW61-31718	FC-CCR-FD02-31718

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
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If No:

Analyte	RPD
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Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
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If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	----------	-----

If No:

Sample	Analyte	Result	BTW
FC-CCR-MW7-31718	Fluoride	ND w/ RL of 4.0 mg/L	2.1 mg/L

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP) or 200.8 LL (ICP/MS)

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte	Concentration
------------------	---------------

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW49A-31718

Are recoveries within laboratory-specified limits?	Y	N	N/A
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If No:

Analyte	Recovery/Bias	Effect
Selenium	(131% MS, 132% MSD)	None: Selenium ND

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW61-31718	FC-CCR-FD02-31718

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
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If No:

Analyte	RPD
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Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
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If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N//A
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If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Mercury by EPA method 245.1

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte	Concentration
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LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
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MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW49A-31718

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW61-31718	FC-CCR-FD02-31718

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J99692-1	Date:	4/13/2018
Reviewer's Name:	Nathalie Perry-Freer	Reviewed by:	Marie Bevier

Field Sample Identification	Collection Date	Laboratory Identification
FC-CCR-MW66-31618	3/16/2018	550-99692-1
FC-CCR-MW67-31618	3/16/2018	550-99692-2
FC-CCR-MW68-31618	3/16/2018	550-99692-3
FC-CCR-MW69-31618	3/16/2018	550-99692-4
FC-CCR-MW70-31618	3/16/2018	550-99692-5
FC-CCR-MW71-31618	3/16/2018	550-99692-6
FC-CCR-MW72-31618	3/16/2018	550-99692-7
FC-CCR-MW73-31618	3/16/2018	550-99692-8
FC-CCR-FD01-31618	3/16/2018	550-99692-9

Analytical Methods:

Analyte	Analyte Group	EPA Method
Beryllium, Lithium	Metals (ICP)	200.7
Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Lead Molybdenum, Selenium Thallium	Metals (ICP/MS)	200.8
Mercury	Mercury (CVAA)	245.1
Fluoride	Anions, Ion Chromotography	300.0

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

Y N

COC signed and complete?

Y N

Sample login matches COC?

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times
the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?	Y	N	N/A
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If Yes:

FC-CCR-MW66-31618

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
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If No:

Analyte Recovery/Bias

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample Field Duplicate
FC-CCR-MW66-31618 FC-CCR-FD01-31618

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
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If No:

Analyte RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	----------	---	-----

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP) or 200.8 LL (ICP/MS)

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Detected Analyte

Concentration

Samples with analyte concentrations less than 5
times the blank detection

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	-----

If No:

Analyte

Recovery/Bias

Affected samples

MS performed on a project-specific sample?	Y	N	N/A
--	---	---	-----

If Yes:

FC-CCR-MW66-31618

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	-----

If No:

Analyte

Recovery/Bias

Effect

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	---	-----

If Yes:

Parent Sample

Field Duplicate

FC-CCR-MW66-31618

FC-CCR-FD01-31618

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	-----

If No:

Analyte

RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	-----

If No:

Sample

Analyte

Result

MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	-----

If No:

Sample

Analyte

Result

BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Mercury by EPA method 245.1

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times
the blank detection

If Yes:
Detected Analyte Concentration

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	-----

If No:
Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?	Y	N	N/A
--	---	---	-----

If Yes:
FC-CCR-MW66-31618

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	-----

If No:
Analyte Recovery/Bias

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	---	-----

If Yes:
Parent Sample Field Duplicate
FC-CCR-MW66-31618 FC-CCR-FD01-31618

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	-----

If No:
Analyte RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	-----

If No:
Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	-----

If No:
Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:		Date:	4/16/2018
Validator's Name:	Nathalie Perry-Freer	Reviewed by:	Marie Bevier

Sample Summary:	Field Sample Identification	Collection Date	Laboratory Identification
	FC-CCR-MW62-4618	4/6/2018	550-100875-1
	FC-CCR-MW63-4618	4/6/2018	550-100875-2

Analytical Methods:	Analyte	Analyte Group	EPA Method
	Boron, Calcium	Metals (ICP)	200.7

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

Y N

COC signed and complete?

Y N

Sample login matches COC?

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP)

QC Criteria:

Samples analyzed within 180 days of sampling?

Y N N/A

Target analytes detected in the blank?

Y **N** N/A

If Yes:

Detected Analyte

Concentration

Samples with analyte concentrations less than 5 times the blank detection

LCS Recoveries within laboratory-specified limits?

Y N N/A

If No:

Analyte

Recovery/Bias

Affected samples

MS performed on a project-specific sample?

Y N N/A

If Yes:

FC-CCR-MW62-4618

Are recoveries within laboratory-specified limits?

Y **N** N/A

If No:

Analyte

Recovery/Bias

Effect

Calcium

(-44% MS, -44% MSD)

None: Spike < 4x native sample detection

Field duplicate(s) collected?

Y **N** N/A

If Yes:

Parent Sample

Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?

Y N **N/A**

If No:

Analyte

RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?

Y N **N/A**

If No:

Sample

Analyte

Result

MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?

Y N **N/A**

If No:

Sample

Analyte

Result

BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J103738-1	Date:	6/25/2018
Validator's Name:	Nathalie Perry-Freer	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification
FC-CCR-MW-62-6318	6/3/2018	550-103738-1
FC-CCR-MW-63-6318	6/3/2018	550-103738-2
FC-CCR-MW-64-6318	6/3/2018	550-103738-3
FC-CCR-MW-65-6318	6/3/2018	550-103738-4

Analytical Methods:

Analyte	Analyte Group	EPA Method/Standard Method (SM)
Boron, Calcium, Magnesium, Potassium, Sodium	Metals (ICP)	200.7
Chloride, Fluoride, Sulfate	Anions, Ion Chromotography	300.0
Alkalinity	General Chemistry Parameters	2320
Total Dissolved Solids	General Chemistry Parameters	2540
pH	General Chemistry Parameters	4500

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

COC signed and complete?

Y N

Sample login matches COC?

Y N

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP)

QC Criteria:

Samples analyzed within 180 days of sampling?

Y N N/A

Target analytes detected in the blank?

Y **N** N/A

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte Concentration

LCS Recoveries within laboratory-specified limits?

Y N N/A

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?

Y N N/A

If Yes:

FC-CCR-MW-62-6318

Are recoveries within laboratory-specified limits?

Y **N** N/A

If No:

Analyte	Recovery/Bias	Effect
Calcium	49%/27%	None: 4x spike < native sample detection
Magnesium	61%/44%	None: 4x spike < native sample detection
Sodium	59%/60%	None: 4x spike < native sample detection

Field duplicate(s) collected?

Y **N** N/A

If Yes:

Parent Sample Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?

Y N **N/A**

If No:

Analyte RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?

Y N **N/A**

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?

Y N **N/A**

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	---	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
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MS performed on a project-specific sample?	Y	N	N/A
--	---	---	-----

If Yes:

FC-CCR-MW-62-6318

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	---	---	-----

If No:

Analyte	Recovery/Bias	
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Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate	
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Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	-----

If No:

Analyte	RPD	
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Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
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If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Total Dissolved Solids by SM 2540C

QC Criteria:

Samples analyzed within 7 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
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Lab duplicate performed on a project-specific sample?	Y	N	N/A
---	----------	---	-----

If Yes:

FC-CCR-MW-62-6318

Duplicate precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
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Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
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Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Alkalinity by SM 2320B

QC Criteria:

Samples analyzed within 14 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
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Lab duplicate performed on a project-specific sample?	Y	N	N/A
---	----------	---	-----

If Yes:

FC-CCR-MW-62-6318

Duplicate precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
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Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
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Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:

Analyte	RPD
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Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: pH by SM 4500

QC Criteria:

Samples analyzed within 15 minutes of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits? **Y** N N/A

If No:
Analyte Recovery/Bias Affected samples

Lab duplicate performed on a project-specific sample? **Y** N N/A

If Yes:
FC-CCR-MW-62-6318

Duplicate precision within laboratory-specified limits? **Y** N N/A

If No:
Analyte Recovery/Bias

Field duplicate(s) collected? Y **N** N/A

If Yes:
Parent Sample Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N **N/A**

If No:
Analyte RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N **N/A**

If No:
Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N **N/A**

If No:
Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J103742	Date:	7/5/2018
Validator's Name:	Nathalie Perry-Freer	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification
FC-CCR-MW-7-6118	6/1/2018	550-103742-1
FC-CCR-MW-8-6118	6/1/2018	550-103742-2
FC-CCR-MW-49A-6118	6/1/2018	550-103742-3
FC-CCR-MW-61-6118	6/1/2018	550-103742-4
FC-CCR-FD01-6118	6/1/2018	550-103742-5
FC-CCR-MW-74-6118	6/1/2018	550-103742-6
FC-CCR-MW-75-6118	6/1/2018	550-103742-7

Analytical Methods:

Analyte	Analyte Group	EPA Method
Radium-226	Radiochemical	903.0
Radium-228	Radiochemical	904.0
Boron, Calcium, Magnesium, Potassium, Sodium, Lithium	Metals (ICP)	200.7
Arsenic, Barium, Cadmium, Cobalt, Lead, Molybdenum, Selenium, Thallium	Metals (ICP/MS)	200.8
Total Dissolved Solids	General Chemistry Parameters	2540
Alkalinity	General Chemistry Parameters	2320
pH	General Chemistry Parameters	4500
Chloride, Fluoride, Sulfate	Anions, Ion Chromatography	300.0

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate

concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures ≤ 6°C or within 8 hours of sampling?

Y

N

COC signed and complete?

Y

N

Sample login matches COC?

Y

N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times
the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
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MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW-7-6118

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW-61-6118	FC-CCR-FD01-6118

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Radiochemical analyses by EPA Methods 903.0 and 904.0

QC Criteria:

Samples analyzed within 180 days of sampling? **Y** N N/A

Target analytes detected in the blank? Y N **N/A**

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte Concentration

Barium carrier levels within laboratory specified limits? Y N **N/A**

Yttrium carrier levels within laboratory specified limits? Y N **N/A**

LCS Recoveries within laboratory-specified limits? Y N **N/A**

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample? Y N **N/A**

If Yes:

Are recoveries within laboratory-specified limits? Y N **N/A**

If No:

Analyte Recovery/Bias Effect

Field duplicate(s) collected? **Y** N N/A

If Yes:

Parent Sample Field Duplicate
FC-CCR-MW-61-6118 FC-CCR-FD01-6118

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? **Y** N **N/A**

If No:

Analyte RPD

Target analytes were not detected in either sample.

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? **Y** N N/A

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N **N/A**

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP)

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte	Concentration
------------------	---------------

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW-7-6118

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	----------	-----

If No:

Analyte	Recovery/Bias	Effect
Boron	64% MS	None: 4x spike < native sample detection
Calcium	19%/32%	None: 4x spike < native sample detection
Magnesium	26%/35%	None: 4x spike < native sample detection
Sodium	-263%/-119%	None: 4x spike < native sample detection

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
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FC-CCR-MW-61-6118	FC-CCR-FD01-6118
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Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	------------

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Alkalinity by SM 2320B

QC Criteria:

Samples analyzed within 14 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
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Lab duplicate performed on a project-specific sample?	Y	N	N/A
---	----------	---	-----

If Yes:

FC-CCR-MW-7-6118

Duplicate precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	----------	---	-----

If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW-61-6118	FC-CCR-FD01-6118

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	------------

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: pH by SM 4500

QC Criteria:

Samples analyzed within 15 minutes of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:	Samples with analyte concentrations less than 5 times the blank detection		
Detected Analyte	Concentration		

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:	Recovery/Bias	Affected samples
Analyte		

Lab duplicate performed on a project-specific sample?	Y	N	N/A
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If Yes:

FC-CCR-MW-7-6118

FC-CCR-FD01-6118

Duplicate precision within laboratory-specified limits?	Y	N	N/A
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If No:

Analyte	Recovery/Bias
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Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample

Field Duplicate

FC-CCR-MW-61-6118

FC-CCR-FD01-6118

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	------------

If No:

Analyte	RPD
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Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J103741-1	Date:	6/26/2018
Validator's Name:	Nathalie Perry-Freer	Reviewed by:	Marie Bevier

Field Sample Identification	Collection Date	Laboratory Identification
FC-CCR-MW-66-53118	5/31/2018	550-103741-1
FC-CCR-MW-67-6218	6/2/2018	550-103741-2
FC-CCR-MW-68-6218	6/2/2018	550-103741-3
FC-CCR-MW-69-6218	6/2/2018	550-103741-4
FC-CCR-FD02-6218	6/2/2018	550-103741-5
FC-CCR-MW-70-53118	5/31/2018	550-103741-6
FC-CCR-MW-71-6218	6/2/2018	550-103741-7
FC-CCR-MW-72-6218	6/2/2018	550-103741-8
FC-CCR-MW-73-6218	6/2/2018	550-103741-9

Analytical Methods:

Analyte	Analyte Group	EPA Method/Standard Method (SM)
Boron, Calcium, Magnesium, Potassium, Sodium	Metals (ICP)	200.7
Arsenic, Barium, Cadmium, Cobalt, Lead, Molybdenum, Selenium, Thallium	Metals (ICP/MS)	200.8
Total Dissolved Solids	General Chemistry Parameters	2540
Alkalinity	General Chemistry Parameters	2320
pH	General Chemistry Parameters	4500
Mercury	Mercury (CVAA)	245.1
Chloride, Fluoride, Sulfate	Anions, Ion Chromatography	300.0
²²⁶ Ra, ²²⁸ Ra, Total Ra	Radiochemistry	Gamma Ray HPGE

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures ≤ 6°C or within 8 hours of sampling?

Y N

COC signed and complete?

Y N

Sample login matches COC?

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW-66-53118

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	----------	---	-----

If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW-69-6218	FC-CCR-FD02-6218

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP)/200.8 LL (ICP/MS)

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Detected Analyte	Concentration
------------------	---------------

Samples with analyte concentrations less than 5 times the blank detection

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW-66-53118

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	----------	-----

If No:

Analyte	Recovery/Bias	Effect
Calcium	-40%/-59%	None: 4x spike < native sample detection
Boron	-916%/-30%	None: 4x spike < native sample detection
Magnesium	-730%/-127%	None: 4x spike < native sample detection
Sodium	-21%/-40%	None: 4x spike < native sample detection

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	----------	---	-----

If Yes:

Parent Sample	Field Duplicate
---------------	-----------------

FC-CCR-MW-69-6218 FC-CCR-FD02-6218

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Mercury by EPA method 245.1

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW-66-53118

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	Recovery/Bias	
---------	---------------	--

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	----------	---	-----

If Yes:

Parent Sample	Field Duplicate	
FC-CCR-MW-69-6218	FC-CCR-FD02-6218	

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	RPD	
---------	-----	--

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
--------	---------	--------	-----

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Total Dissolved Solids by SM 2540C

QC Criteria:

Samples analyzed within 7 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte Recovery/Bias Affected samples

Lab duplicate performed on a project-specific sample?	Y	N	N/A
---	----------	---	-----

If Yes:

FC-CCR-MW-66-53118

Duplicate precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte Recovery/Bias

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	----------	---	-----

If Yes:

Parent Sample Field Duplicate
FC-CCR-MW-69-6218 FC-CCR-FD02-6218

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Alkalinity by SM 2320B

QC Criteria:

Samples analyzed within 14 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

Lab duplicate performed on a project-specific sample?	Y	N	N/A
---	----------	---	-----

If Yes:

FC-CCR-MW-66-53118

Duplicate precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW-69-6218	FC-CCR-FD02-6218

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	----------	---	-----

If No:

Analyte	RPD
---------	-----

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: pH by SM 4500

QC Criteria:

Samples analyzed within 15 minutes of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

Samples with analyte concentrations less than 5 times the blank detection

If Yes:
Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits? **Y** N N/A

If No:

Analyte Recovery/Bias Affected samples

Lab duplicate performed on a project-specific sample? **Y** N N/A

If Yes:

FC-CCR-MW-66-53118

FC-CCR-FD02-6218

Duplicate precision within laboratory-specified limits? **Y** N N/A

If No:

Analyte Recovery/Bias

Field duplicate(s) collected? **Y** N N/A

If Yes:

Parent Sample Field Duplicate

FC-CCR-MW-69-6218 FC-CCR-FD02-6218

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? **Y** N N/A

If No:

Analyte RPD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N **N/A**

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? **Y** N N/A

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Radiochemical analyses by EPA Methods 903.0 and 904.0

QC Criteria:

Samples analyzed within 180 days of sampling? **Y** N N/A

Target analytes detected in the blank? Y N **N/A**

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte Concentration

Barium carrier levels within laboratory specified limits? Y N **N/A**

Yttrium carrier levels within laboratory specified limits? Y N **N/A**

LCS Recoveries within laboratory-specified limits? Y N **N/A**

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample? Y N **N/A**

If Yes:

Are recoveries within laboratory-specified limits? Y N **N/A**

If No:

Analyte Recovery/Bias Effect

Field duplicate(s) collected? **Y** N N/A

If Yes:

Parent Sample Field Duplicate
FC-CCR-MW-69-6218 FC-CCR-FD02-6218

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y **N** N/A

If No:

Analyte RPD
²²⁶Ra, ²²⁸Ra, Total Ra 36%, 40%, 39%

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? **Y** N N/A

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N **N/A**

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J113007-1	Date:	12/21/2018
Validator's Name:	Caprielle Larsen	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification	Note
FC-CCR-MW66-11218	11/2/2018	550-113007-1	MS/MSD
FC-CCR-MW67-11318	11/3/2018	550-113007-2	
FC-CCR-MW68-11318	11/3/2018	550-113007-3	
FC-CCR-MW69-11318	11/3/2018	550-113007-4	
FC-CCR-MW70-11218	11/2/2018	550-113007-5	
FC-CCR-MW62-11218	11/2/2018	550-113007-6	
FC-CCR-MW63-112818	11/2/2018	550-113007-7	
FC-CCR-MW64-11218	11/2/2018	550-113007-8	
FC-CCR-MW65-11218	11/2/2018	550-113007-9	
FC-CCR-MW71-11318	11/3/2018	550-113007-10	
FC-CCR-MW72-11318	11/3/2018	550-113007-11	
FC-CCR-MW73-11318	11/3/2018	550-113007-12	
FC-CCR-FD01-11318	11/3/2018	550-113007-13	Field Duplicate of Sample FC-CCR-MW71-11318
FC-CCR-FD02-11318	11/3/2018	550-113007-14	Field Duplicate of Sample FC-CCR-MW72-11318

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Analytical Methods:

Analyte	Analyte Group	EPA Method / Standard Method (SM)
226Ra, 228Ra, Total Ra	Radiochemistry	Gamma Ray HPGE
Boron, Calcium	Metals (ICP)	200.7 REV 4.4
Chloride, Fluoride, Sulfate	Anions, Ion Chromotography	300.0
Total Dissolved Solids	General Chemistry Parameters	2540 C
pH	General Chemistry Parameters	4500 H+ B

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

Y

N

COC signed and complete?

Y

N

Sample login matches COC?

Y

N

Correct ID (COC)

Discrepancy (Lab)

Explain Discrepancy

FC-CCR-MW63-11218

FC-CCR-MW63-112818

Laboratory mis-typed sample ID.

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Method 200.7 Rev 4.4 (ICP)

QC Criteria:

Samples analyzed within 180 days of sampling? Y N N/A

Target analytes detected in the blank? Y N N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection	
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LCS Recoveries within laboratory-specified limits? Y N N/A

Analyte	Recovery/Bias	Affected samples	
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MS performed on a project-specific sample? Y N N/A

If Yes:

FC-CCR-MW66-11218

Are recoveries within laboratory-specified limits? Y N N/A

If No:

Analyte	Recovery/Bias	Effect	
Calcium	-45%, 15%	None: 4x spike < native sample detection	
Boron	-514%, 282%	None: 4x spike < native sample detection	

Field duplicate(s) collected? Y N N/A

If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW71-11318	FC-CCR-FD01-11318
FC-CCR-MW72-11318	FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N N/A

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code	
			Parent	Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N N/A

If No:

Sample	Analyte	Result	MCL
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?

Y

N

N/A

If No:

Sample

Analyte

Result

BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling? **Y** N N/A

Target analytes detected in the blank? Y **N** N/A

If Yes:

Detected Analyte Concentration Samples with analyte concentrations less than 5 times the blank detection

LCS/LCSD recovery and precision within laboratory-specified limits? **Y** N N/A

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample? **Y** N N/A

If Yes:

FC-CCR-MW66-11218

MS/MSD recovery and precision within laboratory-specified limits? **Y** N N/A

If No:

Analyte Recovery/Bias

Field duplicate(s) collected? **Y** N N/A

If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW71-11318	FC-CCR-FD01-11318
FC-CCR-MW72-11318	FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? **Y** N N/A

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code	
			Parent	Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? **Y** N N/A

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N **N/A**

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Total Dissolved Solids by SM 2540C

QC Criteria:

Samples analyzed within 7 days of sampling? Y N N/A

Target analytes detected in the blank? Y N N/A

If Yes:

Detected Analyte Concentration Samples with analyte concentrations less than 5 times the blank detection

LCS/LCSD recovery and precision within laboratory-specified limits? Y N N/A

If No:

Analyte Recovery/Bias Affected samples

Lab duplicate performed on a project-specific sample? Y N N/A

If Yes:

FC-CCR-MW66-11218

Duplicate precision within laboratory-specified limits? Y N N/A

If No:

Analyte Recovery/Bias

Field duplicate(s) collected? Y N N/A

If Yes:

Parent Sample Field Duplicate

FC-CCR-MW71-11318 FC-CCR-FD01-11318

FC-CCR-MW72-11318 FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N N/A

If No:

Parent Sample Analyte RPD Flag-Reason Code Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N N/A

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N N/A

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: pH by SM 4500 H+ B

QC Criteria:

Samples analyzed within 15 minutes of sampling? Y N N/A

Samples were analyzed at the lab, at the time of receipt, and have been qualified J-HT.

Target analytes detected in the blank? Y N N/A

If Yes:

Detected Analyte

Concentration

Samples with analyte concentrations less than 5 times the blank detection

LCS/LCSD recovery and precision within laboratory-specified limits? Y N N/A

If No:

Analyte

Recovery/Bias

Affected samples

Lab duplicate performed on a project-specific sample? Y N N/A

If Yes:

FC-CCR-MW6611218

FC-CCR-MW72-11318

Duplicate precision within laboratory-specified limits? Y N N/A

If No:

Analyte

Recovery/Bias

Field duplicate(s) collected? Y N N/A

If Yes:

Parent Sample

Field Duplicate

FC-CCR-MW71-11318

FC-CCR-FD01-11318

FC-CCR-MW72-11318

FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N N/A

If No:

Parent Sample

Analyte

RPD

Flag-Reason Code

Parent

Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N N/A

If No:

Sample

Analyte

Result

MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N N/A

If No:

Sample

Analyte

Result

BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Radiochemical analyses by Gamma Ray HPGE

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection
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Barium carrier levels within laboratory specified limits?	Y	N	N/A
---	---	---	-----

Yttrium carrier levels within laboratory specified limits?	Y	N	N/A
--	---	---	-----

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample?	Y	N	N/A
--	---	---	-----

If Yes:

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	-----

If No:

Analyte	Recovery/Bias	Effect
---------	---------------	--------

Field duplicate(s) collected?	Y	N	N/A
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If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW71-11318	FC-CCR-FD01-11318
FC-CCR-MW72-11318	FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	-----

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code	
FC-CCR-MW71-11318	Radium 226	40%	Parent	Duplicate
			J-FD	J-FD

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
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If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	-----

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J113007-2	Date:	12/21/2018
Validator's Name:	Caprielle Larsen	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification	Note
FC-CCR-MW66-11218	11/2/2018	550-113007-1	MS/MSD
FC-CCR-MW67-11318	11/3/2018	550-113007-2	
FC-CCR-MW68-11318	11/3/2018	550-113007-3	
FC-CCR-MW69-11318	11/3/2018	550-113007-4	
FC-CCR-MW70-11218	11/2/2018	550-113007-5	
FC-CCR-MW71-11318	11/3/2018	550-113007-10	
FC-CCR-MW72-11318	11/3/2018	550-113007-11	
FC-CCR-MW73-11318	11/3/2018	550-113007-12	
FC-CCR-FD01-11318	11/3/2018	550-113007-13	Field Duplicate of Sample FC-CCR-MW71-11318
FC-CCR-FD02-11318	11/3/2018	550-113007-14	Field Duplicate of Sample FC-CCR-MW72-11318

Analytical Methods:

Analyte	Analyte Group	EPA Method / Standard Method (SM)
Arsenic, Barium, Cobalt, Molybdenum, Selenium, Thallium, Lithium	Metals (ICP-MS)	200.8 Low Level
Lithium	Metals (ICP)	200.7 Rev 4.4
Fluoride	Anions, Ion Chromotography	300.0

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures ≤ 6°C or within 8 hours of sampling?

Y N

COC signed and complete?

Y N

Sample login matches COC?

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP), 200.8 (ICP-MS)

QC Criteria:

Samples analyzed within 180 days of sampling? Y N N/A

Target analytes detected in the blank? Y N N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection
------------------	---------------	---

LCS Recoveries within laboratory-specified limits? Y N N/A

Analyte	Recovery/Bias	Affected samples
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MS performed on a project-specific sample? Y N N/A

If Yes:

FC-CCR-MW66-11218

Are recoveries within laboratory-specified limits? Y N N/A

If No:

Analyte	Recovery/Bias	Effect	Flag - Reason Code
Selenium	137%, 137%	Potential High Analytical Bias	J-HM

Field duplicate(s) collected? Y N N/A

If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW71-11318	FC-CCR-FD01-11318
FC-CCR-MW72-11318	FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N N/A

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code
			Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N N/A

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N N/A

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling? Y N N/A

Target analytes detected in the blank? Y N N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection
------------------	---------------	---

LCS/LCSD recovery and precision within laboratory-specified limits? Y N N/A

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

MS performed on a project-specific sample? Y N N/A

If Yes:

FC-CCR-MW66-11218

MS/MSD recovery and precision within laboratory-specified limits? Y N N/A

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected? Y N N/A

If Yes:

Parent Sample	Field Duplicate
FC-CCR-MW71-11318	FC-CCR-FD01-11318
FC-CCR-MW72-11318	FC-CCR-FD02-11318

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N N/A

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code
			Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N N/A

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N N/A

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J113007-3	Date:	12/21/2018
Validator's Name:	Caprielle Larsen	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification	Note
FC-CCR-MW71-11318	11/3/2018	550-113007-10	
FC-CCR-MW72-11318	11/3/2018	550-113007-11	

Analytical Methods:

Analyte	Analyte Group	EPA Method / Standard Method (SM)
Fluoride	Anions, Ion Chromatography	300.0

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

COC signed and complete?

Sample login matches COC?

Y	N
Y	N
Y	N

Correct ID (COC) Discrepancy (Lab) Explain Discrepancy

FC-CCR-MW63-11218 FC-CCR-MW63-112818 Laboratory mis-typed sample ID.

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:
Detected Analyte Concentration Samples with analyte concentrations less than 5 times
the blank detection

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:
Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:
FC-CCR-MW66-11218
FC-CCR-MW72-11318 FC-CCR-FD02-11318

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:
Analyte Recovery/Bias

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	----------	---	-----

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:
Parent Sample Analyte RPD Flag-Reason Code
Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:
Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:
Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J113026-1	Date:	12/21/2018
Validator's Name:	Caprielle Larsen	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification	Note
FC-CCR-MW7-11418	11/4/2018	550-113026-1	MS/MSD
FC-CCR-MW8-11418	11/4/2018	550-113026-2	
FC-CCR-MW61-11318	11/3/2018	550-113026-3	
FC-CCR-MW75-11318	11/3/2018	550-113026-4	MS/MSD
FC-CCR-MW49A-11418	11/4/2018	550-113026-5	

Analytical Methods:

Analyte	Analyte Group	EPA Method / Standard Method (SM)
Boron, Calcium	Metals (ICP)	200.7 REV 4.4
Chloride, Fluoride, Sulfate	Anions, Ion Chromotography	300.0
Total Dissolved Solids	General Chemistry Parameters	2540 C
pH	General Chemistry Parameters	4500 H+ B

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

Y N

COC signed and complete?

Y N

Sample login matches COC?

Y N

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP)

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection
------------------	---------------	---

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
Analyte	Recovery/Bias	Affected samples	

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW7-11418
FC-CCR-MW75-11318

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	----------	-----

If No:

Sample	Analyte	Recovery/Bias	Effect
FC-CCR-MW7-11418	Boron	61% MSD	None: 4x spike < native sample detection
FC-CCR-MW7-11418	Calcium	40% MSD	None: 4x spike < native sample detection
FC-CCR-MW75-11318	Boron	-578%, -623%	None: 4x spike < native sample detection
FC-CCR-MW75-11318	Calcium	-172%, -115%	None: 4x spike < native sample detection

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	----------	-----

If Yes:

Parent Sample	Field Duplicate
---------------	-----------------

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code
			Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
--------	---------	--------	-----

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
--------	---------	--------	-----

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:
Detected Analyte Concentration Samples with analyte concentrations less than 5 times
the blank detection

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:
Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW7-11418
FC-CCR-MW75-11318

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:
Analyte Recovery/Bias

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	----------	-----

If Yes:
Parent Sample Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:
Parent Sample Analyte RPD Flag-Reason Code
Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:
Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:
Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Total Dissolved Solids by SM 2540C

QC Criteria:

Samples analyzed within 7 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection
------------------	---------------	---

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias	Affected samples
---------	---------------	------------------

Lab duplicate performed on a project-specific sample?	Y	N	N/A
---	----------	---	-----

If Yes:

FC-CCR-MW75-11318

Duplicate precision within laboratory-specified limits?	Y	N	N/A
---	----------	---	-----

If No:

Analyte	Recovery/Bias
---------	---------------

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	----------	-----

If Yes:

Parent Sample	Field Duplicate
---------------	-----------------

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code
			Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
--------	---------	--------	-----

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: pH by SM 4500 H+ B

QC Criteria:

Samples analyzed within 15 minutes of sampling? Y **N** N/A

Samples were analyzed at the lab, at the time of receipt, and have been qualified J-HT.

Target analytes detected in the blank? Y N **N/A**

If Yes:

Detected Analyte

Concentration

Samples with analyte concentrations less than 5 times the blank detection

LCS/LCSD recovery and precision within laboratory-specified limits? **Y** N N/A

If No:

Analyte

Recovery/Bias

Affected samples

Lab duplicate performed on a project-specific sample? **Y** N N/A

If Yes:

FC-CCR-MW75-11318

Duplicate precision within laboratory-specified limits? **Y** N N/A

If No:

Analyte

Recovery/Bias

Field duplicate(s) collected? Y **N** N/A

If Yes:

Parent Sample

Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL? Y N **N/A**

If No:

Parent Sample

Analyte

RPD

Flag-Reason Code

Parent

Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs? Y N **N/A**

If No:

Sample

Analyte

Result

MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels? Y N **N/A**

If No:

Sample

Analyte

Result

BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J113026-2	Date:	12/21/2018
Validator's Name:	Caprielle Larsen	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification	Note
FC-CCR-MW7-11418	11/4/2018	550-113026-1	MS/MSD
FC-CCR-MW8-11418	11/4/2018	550-113026-2	
FC-CCR-MW61-11318	11/3/2018	550-113026-3	
FC-CCR-MW75-11318	11/3/2018	550-113026-4	MS/MSD
FC-CCR-MW49A-11418	11/4/2018	550-113026-5	

Analytical Methods:

Analyte	Analyte Group	EPA Method / Standard Method (SM)
Arsenic, Barium, Cobalt, Molybdenum, Selenium,	Metals (ICP-MS)	200.8 Low Level
Lithium	Metals (ICP)	200.7 Rev 4.4
Fluoride	Anions, Ion Chromatography	300.0

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures ≤ 6°C or within 8 hours of sampling?

Y	N
Y	N
Y	N

COC signed and complete?

Sample login matches COC?

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Metals by EPA Methods 200.7 Rev 4.4 (ICP), 200.8 (ICP-MS)

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Detected Analyte	Concentration	Samples with analyte concentrations less than 5 times the blank detection
Barium	0.000556	None

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
Analyte	Recovery/Bias	Affected samples	

MS performed on a project-specific sample?	Y	N	N/A
--	----------	---	-----

If Yes:

FC-CCR-MW7-11418			
FC-CCR-MW75-11318			
Are recoveries within laboratory-specified limits?	Y	N	N/A

If No:

Sample	Analyte	Recovery/Bias	Effect
FC-CCR-MW75-11318	Lithium	926%, 931%	None: 4x spike < native sample detection

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	----------	-----

If Yes:

Parent Sample	Field Duplicate
---------------	-----------------

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:

Parent Sample	Analyte	RPD	Flag-Reason Code
			Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	MCL
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Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample	Analyte	Result	BTV
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**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Anions by EPA Method 300.0

QC Criteria:

Samples analyzed within 28 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte Concentration

LCS/LCSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	---	---	-----

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?	Y	N	N/A
--	---	---	-----

If Yes:

FC-CCR-MW7-11418

FC-CCR-MW75-11318

MS/MSD recovery and precision within laboratory-specified limits?	Y	N	N/A
---	---	---	-----

If No:

Analyte Recovery/Bias

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	---	-----

If Yes:

Parent Sample Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	-----

If No:

Flag-Reason Code

Parent Sample Analyte RPD Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	---	---	-----

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	-----

If No:

Sample Analyte Result BTV

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Laboratory Name:	TestAmerica Phoenix		
Sample Delivery Group:	J113026-3	Date:	12/21/2018
Validator's Name:	Caprielle Larsen	Reviewed by:	Marie Bevier

Sample Summary:

Field Sample Identification	Collection Date	Laboratory Identification	Note
FC-CCR-MW7-11418	11/4/2018	550-113026-1	
FC-CCR-MW8-11418	11/4/2018	550-113026-2	
FC-CCR-MW61-11318	11/3/2018	550-113026-3	
FC-CCR-MW75-11318	11/3/2018	550-113026-4	MS/MSD
FC-CCR-MW49A-11418	11/4/2018	550-113026-5	

Analytical Methods:

Analyte	Analyte Group	EPA Method / Standard Method (SM)
Radium 226, Radium 228, Total Radium	Radiochemistry	Gamma Ray HPGE

Qualifier Definitions:

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Receipt Condition:

Samples received at temperatures $\leq 6^{\circ}\text{C}$ or within 8 hours of sampling?

Y	N
Y	N
Y	N

COC signed and complete?

Sample login matches COC?

**Arizona Public Service Company
CCR Groundwater Monitoring Data
Data Assessment Checklist**

Method Reference: Radiochemical analyses by Gamma Ray HPGE

QC Criteria:

Samples analyzed within 180 days of sampling?	Y	N	N/A
Target analytes detected in the blank?	Y	N	N/A

If Yes:

Samples with analyte concentrations less than 5 times the blank detection

Detected Analyte Concentration

Barium carrier levels within laboratory specified limits?	Y	N	N/A
---	---	---	------------

Yttrium carrier levels within laboratory specified limits?	Y	N	N/A
--	---	---	------------

LCS Recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	------------

If No:

Analyte Recovery/Bias Affected samples

MS performed on a project-specific sample?	Y	N	N/A
--	---	---	------------

If Yes:

Are recoveries within laboratory-specified limits?	Y	N	N/A
--	---	---	------------

If No:

Analyte Recovery/Bias Effect

Field duplicate(s) collected?	Y	N	N/A
-------------------------------	---	----------	-----

If Yes:

Parent Sample Field Duplicate

Is relative percent difference (%RPD) within SAP-specified 20% limit, or difference between values less than RL?	Y	N	N/A
--	---	---	------------

If No:

Parent Sample Analyte RPD

Flag-Reason Code
Parent Duplicate

Are all RLs for ND samples sufficiently low to meet EPA primary drinking water MCLs?	Y	N	N/A
--	----------	---	-----

If No:

Sample Analyte Result MCL

Are all RLs for ND samples sufficiently low to meet unit-specific background threshold levels?	Y	N	N/A
--	---	---	------------

If No:

Sample Analyte Result BTV

APPENDIX G

**WOOD TECHNICAL MEMORANDUM DOCUMENTING THE STATISTICAL ANALYSIS
OF INITIAL DETECTION MONITORING APPENDIX III CONSTITUENT DATA**



Technical Memorandum



To: Michele Robertson, RG
Pamela Norris
From: Natalie Chrisman Lazarr, PE
Carla Landrum, PhD
Tel: (602) 733-6087
Fax: (602) 733-6100
Date: January 12, 2018
Revised: August 20, 2018

Project: 14-2016-2024

**Subject: STATISTICAL ANALYSIS OF INITIAL DETECTION MONITORING
APPENDIX III CONSTITUENT DATA
Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico**

1.0 INTRODUCTION

This Technical Memorandum (Memo) summarizes the methods and findings of a statistical analysis of Detection Monitoring Appendix III constituent data collected during eight initial rounds of sampling conducted by Arizona Public Service (APS) at the Four Corners Power Plant (FCPP). The methods and findings detailed herein were developed in accordance with Coal Combustion Residuals (CCR) groundwater monitoring requirements set forth in 40 Code of Federal Regulation Section 257.93 and the published Statistical Data Analysis Work Plan (SDAWP) for the site (Amec Foster Wheeler, 2017).

This Memo summarizes the subject analysis for CCR units where sampling was not precluded due to dry conditions (i.e., at the Dry Fly Ash Disposal Area). The CRR units evaluated herein are the Upper Retention Sump (URS), the Combined Waste Treatment Pond (CWTP) and Multiunit 1 (which consists of the Lined Ash Impoundment and the Lined Decant Water Pond).

2.0 DATA INPUTS

There are seven constituents of concern (COCs) listed in Appendix III for Detection Monitoring Assessment: boron, calcium, chloride, fluoride, pH, sulfate and total dissolved solids (TDS). Sampled data for each constituent were provided by APS in Excel format including analytical results, data qualifiers, well identifiers (IDs), and sampling dates. Field pH and laboratory pH data were included in the provided file; the former data were used for statistical analysis. Non-detect sample results were flagged for statistical analysis using the “U” qualifier in the APS-provided spreadsheet. Non-detect values were substituted using their respective reporting limit for ProUCL software upload. All samples flagged as duplicates were excluded from the analysis. For samples identified with the same sample date, well ID and constituent but were not flagged as duplicates, the maximum concentration value was retained for the analysis. The minimum requirement of eight samples collected from each monitoring well was met for each constituent.

The sampling dates for the data used in the analysis documented herein range between November 2015 and October 2017. The sampling frequency fluctuated over this duration from approximately semiannually to monthly or bimonthly.

3.0 METHODS

Exploratory data analysis (EDA) is a data diagnostic step that generates qualitative and quantitative information necessary to select a defensible statistical method for determining if there is a statistically significant increase (SSI) in constituent concentrations over background levels. EDA Detection Monitoring Assessment methods are captured in Figure 1, including evaluation of spatial heterogeneity, trend detection, data distribution assessment, and outlier detection. Sample number, sampling frequency and non-detect frequency were the primary considerations defining the scope of EDA methods listed. The final EDA step is selection of an adequate statistical method for determining if an SSI over background has occurred.

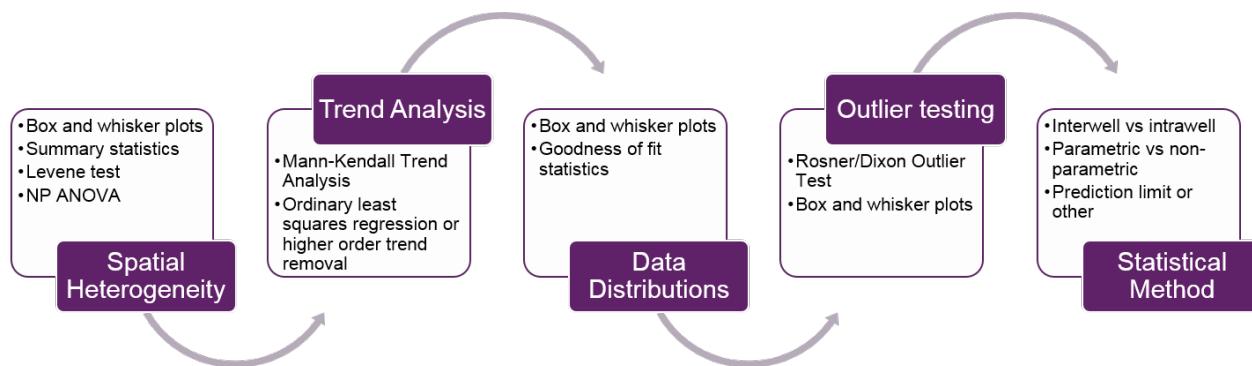


Figure 1. Detection monitoring EDA and statistical method workflow procedures. Each box represent as separate step in the EDA workflow process. The items listed in each box identifies the statistical method(s) applied for each step. Both quantitative and qualitative methods are listed.

The site SDAWP proposes using the prediction limit method with possible resampling to confirm if there is an SSI over background. Figure 2 (next page) generalizes the decision process for selecting an appropriate prediction limit method.

A resampling strategy is appropriate to reduce the overall false positive occurrence (falsely identifying an SSI) while maintaining adequate statistical power. Resampling strategies depend on several criteria, such as the size of the background dataset, sampling frequency, and number of active monitoring wells, among other considerations. For example, for a 1 of 2 resampling strategy, if an initial exceedance is declared during the analysis documented herein, the collection of a second statistically independent sample is necessary and subsequently compared to the relevant background prediction limit. If both the results for the initial sample and resample are in exceedance of the background prediction limit, then an SSI is declared. If only one of the two samples are in exceedance, then a SSI is not declared. Resampling strategies are established prior to performing statistical compliance testing. The overall defensibility of a resampling strategy decreases when the sample data are statistically dependent (i.e., sampled so close in time that they are correlated), which is usually the case when sampling at a frequency higher than quarterly. The value of a resampling strategy generally decreases when the observed concentrations in downgradient wells are distinctly higher than concentrations observed in background wells (e.g.,

all samples are order(s) of magnitude higher); in this case, background might be inadequate or a release from the evaluated unit has occurred.

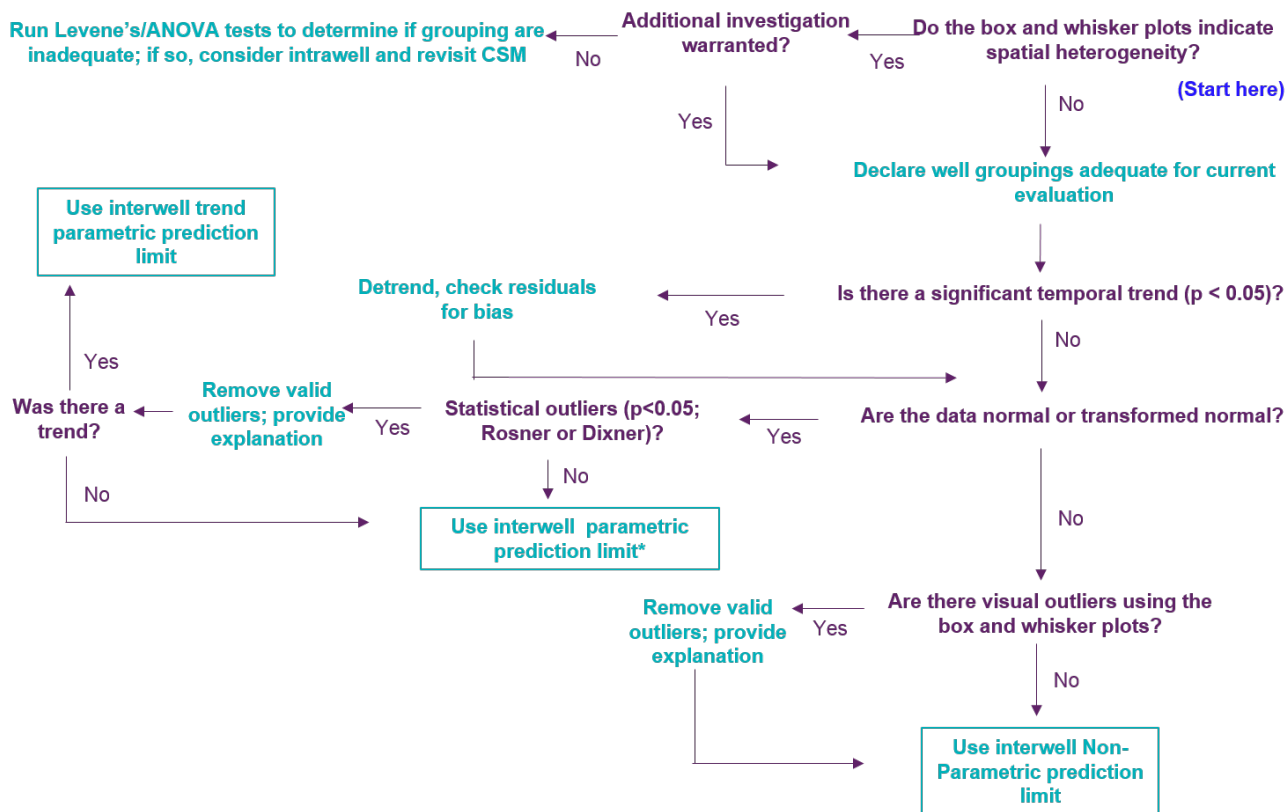


Figure 2. Generalized decision matrix for EDA and statistical prediction limit method selection. Matrix does not include resampling strategies. Any background constituent with a non-detect frequency 50%<ND<100% was automatically qualified for non-parametric prediction limit. Background constituents with a non-detect frequency <50% were processed using the Kaplan-Meier method or regression order statistic. The Double Quantification rule is used for 100% background non-detect frequency.

The EDA procedures, including trend and outlier detection, are applicable to data collected from both upgradient and downgradient wells. Prediction limit calculations with resampling are only applicable to background designated samples. Sample concentrations in downgradient wells were compared to the corresponding background prediction limit to assess whether an SSI is indicated.

4.0 EDA RESULTS

The results of the Detection Monitoring Assessment EDA by CCR Unit follow. Reference to the FCPP conceptual site model (CSM) is necessary to support interpretation of results and is not within the scope of this analysis.

URS (Pictured Cliffs Sandstone). Appendix A includes box and whisker plots for the three background wells completed in the Pictured Cliffs Sandstone (MW-71, MW-72 and MW-73) for all seven COCs. The box and whisker plots provide evidence of spatial heterogeneity, meaning the wells are sampling unique statistical populations, for boron, sulfate, chloride and TDS. At this point in time, ongoing analysis is necessary to conclude if the observed spatial heterogeneity is

intrinsic to the Pictured Cliffs Sandstone groundwater system at the FCPP. For this data evaluation, the data from these three wells are assumed spatially representative of in situ spatial variability within in the Pictured Cliffs Sandstone groundwater system and are grouped to generate prediction limits for this lithologic unit.

Table 1 includes a ProUCL printout of summary statistics for the URS monitoring well network, consisting of sample observations from five distinct downgradient wells (MW-66, MW-67, MW-68, MW-69 and MW-70) and sample observations from three grouped background monitoring wells (MW-71, MW-72 and MW-73). Statistical parameters of interest include mean, variance, non-detect frequency and sample number.

Appendix B includes graphical results from Mann-Kendall trend analysis tests for the grouped background monitoring wells. No statistically significant trends ($p < 0.05$) were detected except for pH and the trend is visibly trending downward over time. Considering no statistically significant trends are observed for the remaining COCs in the background dataset and the observed pH trend is generally weak, it is assumed the trend is due to temporal variations inherent to the groundwater system until proven otherwise. Multiple statistically significant trends were observed in the downgradient wells and are summarized in the informal Practitioner's Notes included as part of this Memo. Trend detection is sensitive to the sample number, detection and collection frequency. Trend behaviors and their significance can change as additional data are sampled over time.

Table 2 is a ProUCL printout of goodness-of-fit calculations for the grouped background dataset. Table 3 includes a ProUCL printout of the statistical outlier evaluation relevant to normally distributed background constituents; no significant ($p < 0.05$) outliers are listed. Box and whisker plots (Appendix C) were used to assess for outliers in cases where the data distributions were not normal. Potential outliers are visible (as dots below or above the box and whisker diagrams) in the box and whisker plots for boron and these samples were collected from MW-73. Ongoing analysis is necessary to determine if these samples are representative of the spatial variability of boron concentrations within the Pictured Cliffs Sandstone. However, for this evaluation, the boron observations in MW-73 are considered adequate until proven otherwise.

Based on the URS EDA results, a non-parametric prediction limit with resampling was calculated for boron, sulfate and TDS. Parametric prediction limits with resampling were calculated for calcium and chloride. A trend parametric prediction limit with resampling was calculated for pH (upper and lower prediction limit). Fluoride qualified for the Double Quantification Rule (DQR). The DQR states that a confirmed exceedance is declared if downgradient wells exhibit quantifiable measurements at or above the reporting limit in two consecutive samples and resample events (U.S. EPA, 2009, page 6-11).

Calculations for the Pictured Cliffs Sandstone prediction limits and associated k values are included in the attached Practitioner's Notes. Table 4 lists wells and constituents that are in initial exceedance of their respective prediction limit at the URS. Boron, chloride and fluoride exhibit concentrations orders of magnitude above their respective prediction limits and/or reporting limits (per the DQR). The results from this evaluation suggest there is enough evidence to declare an SSI over background for boron, chloride and fluoride concentrations at the URS without the need

for resampling. Calcium and pH exhibit initial exceedances and resampling is advocated for these constituents (although not necessary based on the SSI declaration for boron, chloride and fluoride). Sulfate and TDS did not exhibit exceedances.

CWTP (Pictured Cliffs Sandstone). Appendices A and B and Tables 2 and 3 include EDA findings for the grouped Pictured Cliffs Sandstone background wells (MW-71, MW-72 and MW-73) for all seven COCs.

Table 5 includes a ProUCL printout of summary statistics for the CWTP monitoring well network, consisting of sample observations from four distinct downgradient wells (MW-62, MW-63, MW-64 and MW-65) and sample observations from three grouped background monitoring wells (MW-71, MW-72 and MW-73). Statistical parameters of interest include mean, variance, non-detect frequency and sample number.

Appendix D includes box and whisker plots for the CWTP downgradient and grouped background sample data. Box and whisker plots for chloride, TDS and sulfate suggest spatial heterogeneity between downgradient and background wells for the CWTP. Ongoing analysis is necessary to determine if the background well designations are representative of groundwater conditions beneath the CWTP. However, for this evaluation, the background designations are assumed adequate until proven otherwise.

Calculations for the Pictured Cliff Sandstone prediction limits and associated k values are included in the attached Practitioner's Notes. Table 6 lists wells and constituents that are in initial exceedance of their respective prediction limit at the CWTP. Boron, calcium and pH exhibit initial exceedances and resampling is advocated for these constituents; resampling is explained in the Conclusion section of this Memo. Chloride, sulfate and TDS did not exhibit exceedances.

As discussed previously for the URS, the prediction limit method is not applicable for fluoride due to its 100% non-detection frequency in background wells (MW-71, MW-72 and MW-73). According to the U.S. EPA's Unified Guidance (2009), the DQR is applicable in this instance. The DQR states that if the background dataset exhibits 100% non-detectable concentrations, then two consecutive detectable concentrations (i.e., at or above the reporting limit) in the downgradient wells provides sufficient evidence to declare an exceedance. However, the downgradient CWTP wells may exhibit a high frequency of detectable concentrations because the laboratory reporting limits are generally lower for fluoride data collected from these wells relative to background wells. As depicted in Appendix D, the reporting limit for the background wells varied but the maximum value was 2.0 mg/L in almost 50% of occurrences. This implies that the true background sample concentration has the potential to fall between zero and 2 mg/L in a large portion of the background data set. The detectable concentrations in the downgradient CWTP wells range from 1.2 mg/L to 2.7 mg/L which is no more than (+/-) 1 mg/L around the maximum background reporting limit (but still well below the Maximum Contaminant Level for fluoride [4 mg/L]). This suggests that the laboratory performance parameters may produce bias in declaring an SSI over background per the DQR. These findings suggest there is reasonable uncertainty in the sample data that prevent any definitive declaration of an exceedance in fluoride concentrations at the CWTP solely based on the frequency of detectable concentrations at this time. Recommendations

are made in Section 6.0 that establish proposed criteria that allow for a definitive declaration using the DQR method.

Multiunit 1 (Weathered Lewis Shale/Alluvium). Appendix E includes box and whisker plots for the three background wells completed in the Lewis Shale/Alluvium (MW-49a and MW-74) for all seven COCs. The box and whisker plots suggest spatial heterogeneity for several constituents, particularly TDS and sulfate. At this point in time, ongoing analysis is necessary to conclude if the observed spatial heterogeneity is intrinsic to the Weathered Lewis Shale/Alluvium groundwater system at the FCPP. However, for this data evaluation, the data from these two wells are assumed spatially representative of in situ spatial variability within in the Weathered Lewis Shale/Alluvium groundwater system and are grouped to generate prediction limits for this lithologic unit.

Table 7 includes a ProUCL printout of summary statistics for the Multiunit 1 monitoring well network, consisting of sample observations from four distinct downgradient wells (MW-7, MW-8, MW-61, and MW-75) and sample observations from the two grouped background monitoring wells (MW-49a and MW-74). Statistical parameters of interest include mean, variance, non-detect frequency and sample number.

Appendix F includes graphical results from Mann-Kendall trend analysis tests for the grouped background monitoring wells. No statistically significant trends ($p < 0.05$) were detected except for fluoride. Fluoride exhibits a 56% non-detect frequency which is attributed to data collected from MW-49A. The statistically significant trend is believed to be an artifact of the non-detect frequency and not representative of the intrinsic temporal variability in the Weathered Lewis Shale/Alluvium groundwater system. On this basis, the trend is dismissed for this statistical evaluation. Multiple statistically significant trends were observed in the downgradient well data and are summarized in the attached Practitioner's Notes. Trend detection is sensitive to the sample number, detection and collection frequency. Trend behaviors and their significance can change as additional data are sampled over time.

Table 8 is a ProUCL printout of goodness-of-fit calculations for the grouped background dataset. Table 9 includes a ProUCL printout of the statistical outlier evaluation relevant to normally distributed background constituents; significant ($p < 0.05$) outliers are listed for boron, chloride and pH and were not included in the analysis (also listed in the Practitioner's Notes). Box and whisker plots (Appendix G) were used to assess outliers in cases where the data distributions were not normal. Potential outliers are visible (as dots below or above the box and whisker diagrams) in the box and whisker plots for fluoride. For this evaluation, the potential outliers for fluoride were not excluded because these values were within range of the maximum non-detect value. The box and whisker plots in Appendix G suggest spatial heterogeneity exists between downgradient and background well designations for this CCR unit, particularly for TDS and sulfate. Ongoing analysis is necessary to determine if the background well designations are representative of groundwater conditions beneath Multiunit 1. However, for this evaluation, the background designations are assumed adequate until proven otherwise.

For the Weathered Lewis Shale/Alluvium, a non-parametric prediction limit with resampling was calculated for fluoride and sulfate. Parametric prediction limits with resampling were calculated for boron, calcium, pH, TDS and chloride. Calculations for the Weathered Lewis Shale/Alluvium

prediction limits and associated k values are included in the attached Practitioner's Notes. Table 10 lists wells and constituents that are in initial exceedance of their respective prediction limit at Multiunit 1. The results from this evaluation suggest there is enough evidence to declare an SSI over background for boron without the need for resampling. Calcium, chloride and fluoride exhibit initial exceedances and resampling is advocated for these constituents (although not necessary based on the SSI declaration for boron). Sulfate, TDS and pH did not exhibit exceedances. Notably, the initial exceedance for fluoride is attributed to the detection limit for the laboratory analysis and is not reflective of in situ variability of groundwater conditions.

5.0 UPDATES TO BACKGROUND

Results from this evaluation indicate a strong statistical dependence between sample observations. This means the sampling program is collecting redundant information over very short periods of time. Statistical dependence violates the sample independence assumption of the statistical methods listed in the 40 Code of Federal Regulation Section 257.93. A lower frequency sampling program is advised (quarterly or semi-annually) to reduce sample dependence in both background and downgradient sample data.

Ongoing analysis is necessary to better understand and explain in situ spatial and temporal variations in groundwater constituent concentrations at the FCPP. The results from this evaluation suggest spatial heterogeneity exists between background wells within their respective lithologies, in addition to upgradient and downgradient wells within their respective lithologies. Results from this work need CSM integration to help explain suspected spatial heterogeneity as it might relate to site geochemistry, hydrogeology, and management operations. Additional data evaluations are likely necessary to support ongoing decision making and complete any apparent CSM information gaps. The background well groupings and designations are valid if they sample groundwater representative of the spatial and temporal variation inherent to unimpacted groundwater beneath the respective CCR units.

Statistical method selection and background threshold values should be updated after adjustments are made to the monitoring program's sampling frequency. Background threshold values and statistical method selection should be updated if, after further investigation, background well groupings and designations prove inadequate.

6.0 CONCLUSIONS

This Memo summarizes methods, findings and recommendations of statistical analysis for Detection Monitoring Appendix III constituent data collected from the eight initial rounds of monitoring. The results from this evaluation suggest:

- There is enough evidence to declare an SSI over background for one or more Appendix III constituents at the URS CCR Unit.
- Boron, calcium and pH data exhibit initial exceedances at the CWTP CCR unit and resampling is advocated for these constituents. A 1 of 2 resampling strategy is in place for calcium and pH for this unit. A 1 of 2 resampling strategy means that one more statistically independent samples should be collected following the declaration of an initial

exceedance. It is critical that enough time pass before the second sample is collected to ensure the sample is statistically independent from the initial exceedance. If the second sample is in exceedance of the prediction limit, then an SSI is declared because both the initial and second sample are in exceedance. If the second sample is not in exceedance, an SSI is not declared and Detection Monitoring should continue. Based on the results from this evaluation, the second sample should not be collected at a frequency higher than quarterly. A 1 of 3 resampling strategy is in place for boron for the CWTP CCR unit. Boron requires a 1 of 3 resampling strategy to maintain a low false positive rate while maintaining adequate statistical power for the non-parametric prediction limit. The same general resampling criteria apply except a third statistically independent sample must be collected and all three samples, the initial exceedance, second sample and third sample, must be in exceedance to declare an SSI for boron at the CWTP CCR unit. If the second sample is not in exceedance, then the third sample is not necessary and Detection Monitoring should continue.

- Background fluoride concentrations are the basis for use of the DQR statistical method for assessment of this constituent in the CWTP CCR unit. However, due to variability in the magnitude of the reporting limit for associated data, the laboratory analysis introduces uncertainty in determining if there is an SSI over background in downgradient well fluoride concentrations using the DQR. To decrease the risk of falsely declaring an exceedance at the CWTP CCR unit for fluoride using the DQR statistical method, every effort should be made to maintain a single reporting limit for the groundwater monitoring network throughout the duration of the groundwater monitoring program (background and downgradient wells). Based on a review of collected data, it is recommended that the target reporting limit should be 0.8 mg/L for fluoride at the CWTP CCR unit. The target reporting limit is less than the detectable downgradient fluoride concentrations and analytically achievable in the background well data set based on previous results.

Maintenance of the target reporting limit for fluoride will be enforced starting in 2018. An SSI over background will be declared if two consecutive detectable concentrations are present at or above the target reporting limit of 0.8 mg/L in downgradient wells. If an SSI is not declared, then the detection monitoring program will continue in accordance with the CCR Rule. The DQR will no longer apply if detectable fluoride concentrations become apparent in the background wells.

- There is enough evidence to declare an SSI over background for one or more Appendix III constituents at the Multiunit 1 CCR Unit.

Statistical method selection and background threshold values should be updated after adjustments are made to the monitoring program's sampling frequency. Background threshold values and statistical method selection should be updated if, after further investigation, background well groupings and designations prove inadequate.

7.0 REFERENCES

Amec Foster Wheeler (AMECFW), Environment and Infrastructure, Inc., 2017. Statistical Data Analysis Work Plan. Coal Combustion Residual Rule Groundwater Monitoring System Compliance. Four Corners Power Plant, Fruitland, New Mexico.

U.S. Environmental Protection Agency (U.S. EPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance. EPA 530/R-09-007. Environmental Protection Agency Office of Resource Conservation and Recovery.

ERRATA

An omission to the Technical Memo dated January 12, 2018 which documented the methods and results of a Detection Monitoring statistical evaluation of Appendix III constituents was discovered on August 13, 2018. The omission was corrected by the following updates made on August 16, 2018:

- *Updates to Section 2.0 include clarification regarding the sampling period and frequency. Updates also include data formatting clarification for software upload.*
- *Updates to Section 4.0 include a discussion of fluoride laboratory reporting limits that produce reasonable uncertainty in using the DQR to assess if fluoride concentrations beneath the CWTP exhibit an SSI over background concentrations. This uncertainty, with respect to the DQR, is not specifically addressed in the US EPA's Unified Guidance (U.S. EPA, 2009) nor the CCR Federal Rule.*
- *Finally, Section 6.0 includes an update recommending that the laboratory analysis maintain a single fluoride reporting limit for samples collected in background and downgradient CWTP wells over time. This recommendation is to rectify aforesaid uncertainty surrounding the use of the U.S. EPA's recommended DQR statistical method for collected site data.*

ATTACHMENTS (ELECTRONIC FILES PROVIDED ON CD)

Appendix A – Box and Whisker Plots for Background Wells in Pictured Cliffs Sandstone
Appendix B – Mann-Kendall Trend Tests for Background Wells in Pictured Cliffs Sandstone
Appendix C – Box and Whisker Plots for URS Wells in Pictured Cliffs Sandstone
Appendix D – Box and Whisker Plots for CWTP Wells in Pictured Cliffs Sandstone
Appendix E – Box and Whisker Plots for Background Wells in Lewis Shale/Alluvium
Appendix F – Mann-Kendall Trend Tests for Background Wells in Lewis Shale/Alluvium
Appendix G – Box and Whisker Plots for Multiunit 1 Wells in Lewis Shale/Alluvium
Practitioner’s Notes (2 Excel Spreadsheets)



TABLES

**TABLE 1
PRO UCL OUTPUT FOR GENERAL STATISTICS - URS IN PICTURED CLIFFS SANDSTONE**

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.11/4/2018 7:59:27 PM										
User Selected Options											
From File	AllWells_URS_Bckgrd_PctClfSand_12092016.xls										
Full Precision	OFF										
From File: AllWells_URS_Bckgrd_PctClfSand_12092016.xls											
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Boron (mw-66)	16	0	16	0	0.00%	N/A	N/A	125.2	494.4	22.24	0.178
Boron (mw-67)	16	0	16	0	0.00%	N/A	N/A	124.4	744.4	27.28	0.219
Boron (mw-68)	16	0	16	0	0.00%	N/A	N/A	120.8	141.2	11.88	0.0984
Boron (mw-69)	16	0	16	0	0.00%	N/A	N/A	123.1	423.4	20.58	0.167
Boron (mw-70)	16	0	16	0	0.00%	N/A	N/A	94.06	11	3.316	0.0353
Boron (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	0.712	0.349	0.591	0.83
Calcium (mw-66)	16	0	16	0	0.00%	N/A	N/A	468.8	425	20.62	0.044
Calcium (mw-67)	16	0	16	0	0.00%	N/A	N/A	490	2320	48.17	0.0983
Calcium (mw-68)	16	0	16	0	0.00%	N/A	N/A	465.6	466.3	21.59	0.0464
Calcium (mw-69)	16	0	16	0	0.00%	N/A	N/A	474.4	612.9	24.76	0.0522
Calcium (mw-70)	16	0	16	0	0.00%	N/A	N/A	498.8	585	24.19	0.0485
Calcium (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	465	1235	35.15	0.0756
Chloride (mw-66)	16	0	16	0	0.00%	N/A	N/A	1567	87690	296.1	0.189
Chloride (mw-67)	16	0	16	0	0.00%	N/A	N/A	1743	123623	351.6	0.202
Chloride (mw-68)	16	0	16	0	0.00%	N/A	N/A	1456	19958	141.3	0.097
Chloride (mw-69)	16	0	16	0	0.00%	N/A	N/A	1425	26000	161.2	0.113
Chloride (mw-70)	16	0	16	0	0.00%	N/A	N/A	1125	8667	93.09	0.0828
Chloride (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	508.6	8974	94.73	0.186
Fluoride (mw-66)	16	0	16	0	0.00%	N/A	N/A	21.81	18.16	4.262	0.195
Fluoride (mw-67)	16	0	16	0	0.00%	N/A	N/A	21.25	7.267	2.696	0.127
Fluoride (mw-68)	16	0	16	0	0.00%	N/A	N/A	9.131	2.261	1.504	0.165
Fluoride (mw-69)	16	0	16	0	0.00%	N/A	N/A	15.3	11.31	3.363	0.22
Fluoride (mw-70)	16	0	14	2	12.50%	0.4	0.4	1.812	0.917	0.958	0.529
Fluoride (mw71_72_73)	41	1	0	41	100.00%	0.05	2	N/A	N/A	N/A	N/A
Sulfate (mw-66)	16	0	16	0	0.00%	N/A	N/A	10031	4539625	2131	0.212
Sulfate (mw-67)	16	0	16	0	0.00%	N/A	N/A	9963	5873167	2423	0.243
Sulfate (mw-68)	16	0	16	0	0.00%	N/A	N/A	9506	1275292	1129	0.119
Sulfate (mw-69)	16	0	16	0	0.00%	N/A	N/A	10394	4615292	2148	0.207
Sulfate (mw-70)	16	0	16	0	0.00%	N/A	N/A	6869	2167625	1472	0.214
Sulfate (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	9045	7974518	2824	0.312
TDS (mw-66)	16	0	16	0	0.00%	N/A	N/A	16250	7133333	2671	0.164
TDS (mw-67)	16	0	16	0	0.00%	N/A	N/A	17125	11183333	3344	0.195
TDS (mw-68)	16	0	16	0	0.00%	N/A	N/A	16125	2250000	1500	0.093
TDS (mw-69)	16	0	16	0	0.00%	N/A	N/A	16750	7266667	2696	0.161
TDS (mw-70)	16	0	16	0	0.00%	N/A	N/A	11563	262500	512.3	0.0443
TDS (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	14529	11719164	3423	0.236
pH (mw-66)	16	0	16	0	0.00%	N/A	N/A	7.196	0.11	0.332	0.0461
pH (mw-67)	16	0	16	0	0.00%	N/A	N/A	6.856	0.0427	0.207	0.0302
pH (mw-68)	16	0	16	0	0.00%	N/A	N/A	6.731	0.141	0.375	0.0557
pH (mw-69)	16	0	16	0	0.00%	N/A	N/A	7.209	0.0552	0.235	0.0326
pH (mw-70)	16	0	16	0	0.00%	N/A	N/A	6.779	0.14	0.374	0.0552
pH (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	6.732	0.0822	0.287	0.0426

**TABLE 1
PRO UCL OUTPUT FOR GENERAL STATISTICS - URS IN PICTURED CLIFFS SANDSTONE**

General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Boron (mw-66)	16	0	86	150	125.2	130	494.4	22.24	14.83	-0.911	0.178
Boron (mw-67)	16	0	75	160	124.4	125	744.4	27.28	37.06	-0.253	0.219
Boron (mw-68)	16	0	93	140	120.8	120	141.2	11.88	14.83	-0.947	0.0984
Boron (mw-69)	16	0	80	150	123.1	125	423.4	20.58	14.83	-0.56	0.167
Boron (mw-70)	16	0	89	100	94.06	94	11	3.316	4.448	0.276	0.0353
Boron (mw71_72_73)	42	0	0.16	2	0.712	0.55	0.349	0.591	0.467	1.074	0.83
Calcium (mw-66)	16	0	440	510	468.8	470	425	20.62	14.83	0.713	0.044
Calcium (mw-67)	16	0	330	550	490	495	2320	48.17	22.24	-2.549	0.0983
Calcium (mw-68)	16	0	430	510	465.6	460	466.3	21.59	14.83	0.879	0.0464
Calcium (mw-69)	16	0	430	530	474.4	470	612.9	24.76	14.83	0.808	0.0522
Calcium (mw-70)	16	0	450	550	498.8	495	585	24.19	22.24	0.425	0.0485
Calcium (mw71_72_73)	42	0	400	570	465	460	1235	35.15	29.65	0.605	0.0756
Chloride (mw-66)	16	0	870	2000	1567	1700	87690	296.1	148.3	-1.243	0.189
Chloride (mw-67)	16	0	990	2300	1743	1750	123623	351.6	370.6	-0.405	0.202
Chloride (mw-68)	16	0	1200	1800	1456	1450	19958	141.3	74.13	0.585	0.097
Chloride (mw-69)	16	0	1000	1600	1425	1400	26000	161.2	148.3	-1.227	0.113
Chloride (mw-70)	16	0	1000	1400	1125	1100	8667	93.09	0	1.7	0.0828
Chloride (mw71_72_73)	42	0	290	750	508.6	505	8974	94.73	88.95	-0.025	0.186
Fluoride (mw-66)	16	0	12	26	21.81	24	18.16	4.262	2.965	-0.85	0.195
Fluoride (mw-67)	16	0	16	25	21.25	22	7.267	2.696	1.483	-0.887	0.127
Fluoride (mw-68)	16	0	6.4	11	9.131	9.65	2.261	1.504	1.779	-0.504	0.165
Fluoride (mw-69)	16	0	9	20	15.3	16	11.31	3.363	2.965	-0.52	0.22
Fluoride (mw-70)	14	0	0.66	3.2	2.014	2.2	0.779	0.882	0.964	-0.428	0.438
Fluoride (mw71_72_73)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sulfate (mw-66)	16	0	6500	13000	10031	11000	4539625	2131	1483	-0.437	0.212
Sulfate (mw-67)	16	0	6600	14000	9963	9900	5873167	2423	3113	0.106	0.243
Sulfate (mw-68)	16	0	7700	11000	9506	9900	1275292	1129	1186	-0.352	0.119
Sulfate (mw-69)	16	0	6600	13000	10394	11000	4615292	2148	2372	-0.445	0.207
Sulfate (mw-70)	16	0	5900	12000	6869	6450	2167625	1472	444.8	3.203	0.214
Sulfate (mw71_72_73)	42	0	610	14000	9045	9950	7974518	2824	1557	-0.913	0.312
TDS (mw-66)	16	0	11000	19000	16250	17000	7133333	2671	2965	-0.93	0.164
TDS (mw-67)	16	0	11000	22000	17125	17000	11183333	3344	3706	-0.271	0.195
TDS (mw-68)	16	0	12000	18000	16125	16000	2250000	1500	1483	-1.46	0.093
TDS (mw-69)	16	0	10000	20000	16750	18000	7266667	2696	1483	-1.307	0.161
TDS (mw-70)	16	0	11000	12000	11563	12000	262500	512.3	0	-0.279	0.0443
TDS (mw71_72_73)	42	0	6100	21000	14529	15000	11719164	3423	2965	-0.762	0.236
pH (mw-66)	16	0	6.9	8.27	7.196	7.135	0.11	0.332	0.215	2.474	0.0461
pH (mw-67)	16	0	6.2	7.07	6.856	6.86	0.0427	0.207	0.126	-2.18	0.0302
pH (mw-68)	16	0	5.85	7.75	6.731	6.67	0.141	0.375	0.141	0.606	0.0557
pH (mw-69)	16	0	6.52	7.63	7.209	7.235	0.0552	0.235	0.163	-1.379	0.0326
pH (mw-70)	16	0	6.47	7.88	6.779	6.665	0.14	0.374	0.208	2.114	0.0552
pH (mw71_72_73)	42	0	6.17	7.73	6.732	6.7	0.0822	0.287	0.17	1.69	0.0426

**TABLE 1
PRO UCL OUTPUT FOR GENERAL STATISTICS - URS IN PICTURED CLIFFS SANDSTONE**

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Boron (mw-66)	16	0	88	100	115	130	140	140	145.5	150	150
Boron (mw-67)	16	0	88	100	107.5	125	150	150	160	160	160
Boron (mw-68)	16	0	105	120	120	120	130	130	130	132.5	138.5
Boron (mw-69)	16	0	94.5	110	117.5	125	132.5	140	150	150	150
Boron (mw-70)	16	0	90.5	91	91	94	96.25	97	98.5	99.25	99.85
Boron (mw71_72_73)	42	0	0.22	0.23	0.233	0.55	0.698	1.6	1.69	1.795	1.959
Calcium (mw-66)	16	0	445	450	457.5	470	480	480	495	510	510
Calcium (mw-67)	16	0	470	480	487.5	495	510	510	530	542.5	548.5
Calcium (mw-68)	16	0	450	450	450	460	472.5	480	495	510	510
Calcium (mw-69)	16	0	455	460	460	470	482.5	490	505	522.5	528.5
Calcium (mw-70)	16	0	480	480	487.5	495	510	510	530	542.5	548.5
Calcium (mw71_72_73)	42	0	421	442	450	460	480	490	509	519.5	557.7
Chloride (mw-66)	16	0	1150	1400	1475	1700	1700	1700	1800	1850	1970
Chloride (mw-67)	16	0	1350	1500	1500	1750	2000	2000	2150	2225	2285
Chloride (mw-68)	16	0	1300	1400	1400	1450	1500	1500	1600	1650	1770
Chloride (mw-69)	16	0	1250	1400	1400	1400	1525	1600	1600	1600	1600
Chloride (mw-70)	16	0	1050	1100	1100	1100	1125	1200	1200	1250	1370
Chloride (mw71_72_73)	42	0	430	450	450	505	570	578	608	658	717.2
Fluoride (mw-66)	16	0	17.5	18	18	24	25	25	26	26	26
Fluoride (mw-67)	16	0	17	19	20.5	22	23	23	24	24.25	24.85
Fluoride (mw-68)	16	0	6.9	8	8.225	9.65	10	10	11	11	11
Fluoride (mw-69)	16	0	10.4	13	13	16	17.25	18	19	20	20
Fluoride (mw-70)	16	0	0.53	0.69	0.878	2.1	2.6	2.6	2.95	3.05	3.17
Fluoride (mw71_72_73)	41	1	0.4	0.4	0.4	0.8	2	2	2	2	2
Sulfate (mw-66)	16	0	7150	7600	7900	11000	12000	12000	12000	12250	12850
Sulfate (mw-67)	16	0	6950	7500	7800	9900	12000	12000	13000	13250	13850
Sulfate (mw-68)	16	0	7950	8100	8400	9900	10000	10000	11000	11000	11000
Sulfate (mw-69)	16	0	7350	8500	8650	11000	12000	12000	13000	13000	13000
Sulfate (mw-70)	16	0	6000	6200	6200	6450	6800	6800	7600	9150	11430
Sulfate (mw71_72_73)	42	0	4680	6740	7625	9950	11000	11000	11000	12950	13590
TDS (mw-66)	16	0	12000	15000	15000	17000	18250	19000	19000	19000	19000
TDS (mw-67)	16	0	12500	15000	15750	17000	20250	21000	21000	21250	21850
TDS (mw-68)	16	0	14500	16000	16000	16000	17000	17000	17500	18000	18000
TDS (mw-69)	16	0	13000	16000	16000	18000	18250	19000	19000	19250	19850
TDS (mw-70)	16	0	11000	11000	11000	12000	12000	12000	12000	12000	12000
TDS (mw71_72_73)	42	0	9270	11200	12250	15000	17000	17000	17000	18900	20590
pH (mw-66)	16	0	6.935	6.98	6.995	7.135	7.278	7.3	7.43	7.7	8.156
pH (mw-67)	16	0	6.745	6.78	6.81	6.86	6.995	7.01	7.055	7.07	7.07
pH (mw-68)	16	0	6.575	6.6	6.6	6.67	6.833	6.84	6.975	7.27	7.654
pH (mw-69)	16	0	7.09	7.1	7.1	7.235	7.305	7.32	7.42	7.503	7.605
pH (mw-70)	16	0	6.5	6.54	6.548	6.665	6.84	6.87	7.19	7.505	7.805
pH (mw71_72_73)	42	0	6.473	6.582	6.613	6.7	6.83	6.856	6.927	7.038	7.722

TABLE 2
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.112/21/2017 11:54:10 AM
From File	BackgroundPctClfSand_12092016_a.xls
Full Precision	OFF
Confidence Coefficient	0.95
 Boron	
Raw Statistics	
Number of Valid Observations	42
Number of Distinct Observations	23
Minimum	0.16
Maximum	2
Mean of Raw Data	0.712
Standard Deviation of Raw Data	0.591
Khat	1.733
Theta hat	0.411
Kstar	1.625
Theta star	0.438
Mean of Log Transformed Data	-0.656
Standard Deviation of Log Transformed Data	0.795
Normal GOF Test Results	
Correlation Coefficient R	0.88
Shapiro Wilk Test Statistic	0.722
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	1.5124E-8
Lilliefors Test Statistic	0.276
Lilliefors Critical (0.05) Value	0.135
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.931
A-D Test Statistic	2.518
A-D Critical (0.05) Value	0.763
K-S Test Statistic	0.187
K-S Critical(0.05) Value	0.139
Data not Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.943
Shapiro Wilk Test Statistic	0.819
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	6.7102E-5
Lilliefors Test Statistic	0.189
Lilliefors Critical (0.05) Value	0.135
Data not Lognormal at (0.05) Significance Level	
Non-parametric GOF Test Results	
Data do not follow a discernible distribution at (0.05) Level of Significance	

TABLE 2
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

Calcium

Raw Statistics

Number of Valid Observations	42
Number of Distinct Observations	15
Minimum	400
Maximum	570
Mean of Raw Data	465
Standard Deviation of Raw Data	35.15
Khat	183
Theta hat	2.541
Kstar	169.9
Theta star	2.736
Mean of Log Transformed Data	6.139
Standard Deviation of Log Transformed Data	0.0746

Normal GOF Test Results

Correlation Coefficient R	0.979
Shapiro Wilk Test Statistic	0.928
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.26
Lilliefors Test Statistic	0.12
Lilliefors Critical (0.05) Value	0.135

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.984
A-D Test Statistic	0.474
A-D Critical (0.05) Value	0.747
K-S Test Statistic	0.124
K-S Critical(0.05) Value	0.136

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.513
Lilliefors Test Statistic	0.129
Lilliefors Critical (0.05) Value	0.135

Data appear Approximate_Lognormal at (0.05) Significance Level

TABLE 2
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

Chloride

Raw Statistics

Number of Valid Observations	42
Number of Distinct Observations	24
Minimum	290
Maximum	750
Mean of Raw Data	508.6
Standard Deviation of Raw Data	94.73
Khat	27.95
Theta hat	18.19
Kstar	25.97
Theta star	19.58
Mean of Log Transformed Data	6.214
Standard Deviation of Log Transformed Data	0.196

Normal GOF Test Results

Correlation Coefficient R	0.98
Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.305
Lilliefors Test Statistic	0.125
Lilliefors Critical (0.05) Value	0.135

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.978
A-D Test Statistic	0.86
A-D Critical (0.05) Value	0.747
K-S Test Statistic	0.118
K-S Critical(0.05) Value	0.136

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.967
Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.0413
Lilliefors Test Statistic	0.131
Lilliefors Critical (0.05) Value	0.135

Data appear Approximate_Lognormal at (0.05) Significance Level

Fluoride

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	42	1	41	0	41	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Fluoride was not processed!

TABLE 2
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

Sulfate

Raw Statistics

Number of Valid Observations	42
Number of Distinct Observations	25
Minimum	610
Maximum	14000
Mean of Raw Data	9045
Standard Deviation of Raw Data	2824
Khat	5.973
Theta hat	1514
Kstar	5.563
Theta star	1626
Mean of Log Transformed Data	9.024
Standard Deviation of Log Transformed Data	0.521

Normal GOF Test Results

Correlation Coefficient R	0.958
Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.0071
Lilliefors Test Statistic	0.167
Lilliefors Critical (0.05) Value	0.135

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.902
A-D Test Statistic	2.603
A-D Critical (0.05) Value	0.751
K-S Test Statistic	0.203
K-S Critical(0.05) Value	0.137

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.803
Shapiro Wilk Test Statistic	0.659
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	7.980E-11
Lilliefors Test Statistic	0.213
Lilliefors Critical (0.05) Value	0.135

Data not Lognormal at (0.05) Significance Level

Non-parametric GOF Test Results

Data do not follow a discernible distribution at (0.05) Level of Significance

TABLE 2
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

TDS

Raw Statistics

Number of Valid Observations	42
Number of Distinct Observations	16
Minimum	6100
Maximum	21000
Mean of Raw Data	14529
Standard Deviation of Raw Data	3423
Khat	15.05
Theta hat	965.3
Kstar	13.99
Theta star	1038
Mean of Log Transformed Data	9.55
Standard Deviation of Log Transformed Data	0.279

Normal GOF Test Results

Correlation Coefficient R	0.957
Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.00345
Lilliefors Test Statistic	0.221
Lilliefors Critical (0.05) Value	0.135

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.929
A-D Test Statistic	2.196
A-D Critical (0.05) Value	0.748
K-S Test Statistic	0.25
K-S Critical(0.05) Value	0.136

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.919
Shapiro Wilk Test Statistic	0.816
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	1.2137E-5
Lilliefors Test Statistic	0.26
Lilliefors Critical (0.05) Value	0.135

Data not Lognormal at (0.05) Significance Level

Non-parametric GOF Test Results

Data do not follow a discernible distribution at (0.05) Level of Significance

TABLE 2
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

pH

Raw Statistics

Number of Valid Observations	42
Number of Distinct Observations	42
Minimum	-0.686
Maximum	0.745
Mean of Raw Data	-1.810E-5
Standard Deviation of Raw Data	0.26

Data contains values <= 0
Data not gamma or lognormal

Normal GOF Test Results

Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical (0.05) Value	0.942
Approximate Shapiro Wilk P Value	0.00611
Lilliefors Test Statistic	0.128
Lilliefors Critical (0.05) Value	0.135

Data appear Approximate Normal at (0.05) Significance Level

TABLE 3
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

Outlier Tests for Selected Uncensored Variables								
User Selected Options								
Date/Time of Computation ProUCL 5.112/21/2017 12:19:53 PM								
From File BackgroundPctClfSand_12092016_a.xls								
Full Precision OFF								
Rosner's Outlier Test for Calcium								
Mean			465					
Standard Deviation			35.15					
Number of data			42					
Number of suspected outliers			1					
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)	
1	465	34.73	570	19	3.024	3.06	3.4	
For 5% Significance Level, there is no Potential Outlier								
For 1% Significance Level, there is no Potential Outlier								
Rosner's Outlier Test for Chloride								
Mean			508.6					
Standard Deviation			94.73					
Number of data			42					
Number of suspected outliers			1					
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)	
1	508.6	93.59	750	3	2.58	3.06	3.4	
For 5% Significance Level, there is no Potential Outlier								
For 1% Significance Level, there is no Potential Outlier								
Rosner's Outlier Test for pH								
Mean			-1.810E-5					
Standard Deviation			0.26					
Number of data			42					
Number of suspected outliers			1					
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)	
1	-1.810E-5	0.257	0.745	2	2.898	3.06	3.4	
For 5% Significance Level, there is no Potential Outlier								
For 1% Significance Level, there is no Potential Outlier								

TABLE 3
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - PICTURED CLIFFS SANDSTONE DATA

Rosner's Outlier Test for TDS							
		Mean	14529				
		Standard Deviation	3423				
		Number of data	42				
		Number of suspected outliers	1				
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	14529	3382	6100	36	2.492	3.06	3.4
For 5% Significance Level, there is no Potential Outlier							
For 1% Significance Level, there is no Potential Outlier							
Rosner's Outlier Test for Sulfate							
		Mean	9045				
		Standard Deviation	2824				
		Number of data	42				
		Number of suspected outliers	1				
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	9045	2790	610	24	3.023	3.06	3.4
For 5% Significance Level, there is no Potential Outlier							
For 1% Significance Level, there is no Potential Outlier							

**TABLE 4
LIST OF INITIAL EXCEEDANCES FOR THE URS**

Boron (upper prediction limit = 1.9 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-66	11/5/2015	87
MW-66	4/27/2016	86
MW-66	6/5/2016	89
MW-66	8/20/2016	100
MW-66	9/12/2016	120
MW-66	10/19/2016	130
MW-66	2/1/2017	130
MW-66	4/16/2017	141
MW-66	5/1/2017	140
MW-66	5/29/2017	130
MW-66	6/21/2017	130
MW-66	7/21/2017	140
MW-66	8/9/2017	140
MW-66	8/16/2017	150
MW-66	9/9/2017	140
MW-66	10/13/2017	150
MW-67	11/4/2015	75
MW-67	4/27/2016	86
MW-67	6/6/2016	90
MW-67	8/20/2016	100
MW-67	9/13/2016	110
MW-67	10/20/2016	120
MW-67	2/1/2017	120
MW-67	4/17/2017	130
MW-67	5/2/2017	130
MW-67	5/29/2017	120
MW-67	6/21/2017	130
MW-67	7/21/2017	150
MW-67	8/9/2017	160
MW-67	8/16/2017	160
MW-67	9/10/2017	150
MW-67	10/13/2017	160
MW-68	11/6/2015	93
MW-68	4/26/2016	110
MW-68	6/5/2016	100
MW-68	8/20/2016	120
MW-68	9/13/2016	120
MW-68	10/20/2016	120
MW-68	2/1/2017	120
MW-68	4/17/2017	130
MW-68	5/2/2017	130
MW-68	5/29/2017	120
MW-68	6/21/2017	120
MW-68	7/21/2017	130
MW-68	8/9/2017	120
MW-68	8/16/2017	130
MW-68	9/10/2017	130
MW-68	10/13/2017	140

Boron (upper prediction limit = 1.9 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-69	11/4/2015	80
MW-69	4/26/2016	95
MW-69	6/6/2016	94
MW-69	8/20/2016	110
MW-69	9/13/2016	120
MW-69	10/20/2016	120
MW-69	2/1/2017	130
MW-69	4/17/2017	130
MW-69	5/2/2017	130
MW-69	5/29/2017	120
MW-69	6/21/2017	120
MW-69	7/21/2017	150
MW-69	8/9/2017	140
MW-69	8/16/2017	130
MW-69	9/10/2017	150
MW-69	10/13/2017	150
MW-70	11/9/2015	95
MW-70	4/27/2016	91
MW-70	6/5/2016	89
MW-70	8/20/2016	91
MW-70	9/12/2016	96
MW-70	10/19/2016	91
MW-70	2/1/2017	90
MW-70	4/16/2017	94
MW-70	5/1/2017	95
MW-70	5/29/2017	93
MW-70	6/21/2017	92
MW-70	7/21/2017	100
MW-70	8/9/2017	98
MW-70	8/16/2017	94
MW-70	9/9/2017	99
MW-70	10/13/2017	97

**TABLE 4
LIST OF INITIAL EXCEEDANCES FOR THE URS**

Calcium (upper prediction limit = 540 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-70	9/12/2016	550

Sulfate (upper prediction limit = 13,000 ppm)		
Well ID	Sample Date	Sample Value (ppm)
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Chloride (upper prediction limit = 710 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-69	6/21/2017	1400
MW-69	7/21/2017	1600
MW-69	8/9/2017	1600
MW-69	8/16/2017	1500
MW-69	9/10/2017	1600
MW-69	10/13/2017	1600
MW-70	11/9/2015	1200
MW-70	4/27/2016	1000
MW-70	6/5/2016	1200
MW-70	8/20/2016	1100
MW-70	9/12/2016	1100
MW-70	10/19/2016	1100
MW-70	2/1/2017	1100
MW-70	4/16/2017	1100
MW-70	5/1/2017	1400
MW-70	5/29/2017	1100
MW-70	6/21/2017	1000
MW-70	7/21/2017	1100
MW-70	8/9/2017	1100
MW-70	8/16/2017	1100
MW-70	9/9/2017	1100
MW-70	10/13/2017	1200

TDS (upper prediction limit = 20,000 ppm)		
Well ID	Sample Date	Sample Value (ppm)
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pH (time regression upper and lower prediction limit)		
Well ID	Sample Date	Sample Value (ppm)
MW-66	8/20/2016	8.27
MW-70	8/20/2016	7.88
MW-68	9/13/2016	5.85

**TABLE 4
LIST OF INITIAL EXCEEDANCES FOR THE URS**

Fluoride (upper prediction limit = quantified measurements [above RL] in two consecutive samples [not resamples])		
Well ID	Sample Date	Sample Value (ppm)
MW-66	11/5/2015	18
MW-66	4/27/2016	18
MW-66	6/5/2016	20
MW-66	8/20/2016	20
MW-66	9/12/2016	12
MW-66	10/19/2016	17
MW-66	2/1/2017	18
MW-66	4/16/2017	25
MW-66	5/1/2017	24
MW-66	5/29/2017	25
MW-66	6/21/2017	24
MW-66	7/21/2017	25
MW-66	8/9/2017	26
MW-66	8/16/2017	25
MW-66	9/9/2017	26
MW-66	10/13/2017	26
MW-67	11/4/2015	18
MW-67	4/27/2016	19
MW-67	6/6/2016	24
MW-67	8/20/2016	23
MW-67	9/13/2016	23
MW-67	10/20/2016	16
MW-67	2/1/2017	16
MW-67	4/17/2017	22
MW-67	5/2/2017	22
MW-67	5/29/2017	21
MW-67	6/21/2017	21
MW-67	7/21/2017	22
MW-67	8/9/2017	22
MW-67	8/16/2017	22
MW-67	9/10/2017	24
MW-67	10/13/2017	25
MW-68	11/6/2015	7
MW-68	4/26/2016	8
MW-68	6/5/2016	10
MW-68	8/20/2016	8.6
MW-68	9/13/2016	9.7
MW-68	10/20/2016	6.8
MW-68	2/1/2017	6.4
MW-68	4/17/2017	10
MW-68	5/2/2017	10
MW-68	5/29/2017	8.3
MW-68	6/21/2017	8.7
MW-68	7/21/2017	9.6
MW-68	8/9/2017	11
MW-68	8/16/2017	11
MW-68	9/10/2017	11
MW-68	10/13/2017	10

Fluoride (upper prediction limit = quantified measurements [above RL] in two consecutive samples [not resamples])		
Well ID	Sample Date	Sample Value (ppm)
MW-69	11/4/2015	9.8
MW-69	4/26/2016	13
MW-69	6/6/2016	13
MW-69	8/20/2016	16
MW-69	9/13/2016	16
MW-69	10/20/2016	9
MW-69	2/1/2017	11
MW-69	4/17/2017	17
MW-69	5/2/2017	18
MW-69	5/29/2017	16
MW-69	6/21/2017	14
MW-69	7/21/2017	18
MW-69	8/9/2017	17
MW-69	8/16/2017	17
MW-69	9/10/2017	20
MW-69	10/13/2017	20
MW-70	11/9/2015	2.6
MW-70	4/27/2016	2.3
MW-70	6/5/2016	2.1
MW-70	4/16/2017	0.94
MW-70	5/1/2017	1.6
MW-70	5/29/2017	2.6
MW-70	6/21/2017	2.9
MW-70	7/21/2017	2.1
MW-70	8/9/2017	3
MW-70	8/16/2017	3.2
MW-70	9/9/2017	2.5
MW-70	10/13/2017	1

TABLE 5
PRO UCL OUTPUT FOR GENERAL STATISTICS - CWTP IN PICTURED CLIFFS SANDSTONE

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.11/5/2018 9:13:57 AM										
User Selected Options											
From File	AllWells_CWTP_Bckgrd_PctClfSand_12092016.xls										
Full Precision	OFF										
From File: AllWells_CWTP_Bckgrd_PctClfSand_12092016.xls											
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Boron (mw-62)	16	0	16	0	0.00%	N/A	N/A	2.106	0.03	0.173	0.0822
Boron (mw-63)	15	0	15	0	0.00%	N/A	N/A	1.673	0.055	0.234	0.14
Boron (mw-64)	16	0	16	0	0.00%	N/A	N/A	0.607	0.00164	0.0405	0.0667
Boron (mw-65)	16	0	16	0	0.00%	N/A	N/A	0.804	0.00447	0.0668	0.0831
Boron (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	0.712	0.349	0.591	0.83
Calcium (mw-62)	16	0	16	0	0.00%	N/A	N/A	533.8	998.3	31.6	0.0592
Calcium (mw-63)	15	0	15	0	0.00%	N/A	N/A	517.3	1464	38.26	0.074
Calcium (mw-64)	16	0	16	0	0.00%	N/A	N/A	87.38	8.383	2.895	0.0331
Calcium (mw-65)	16	0	16	0	0.00%	N/A	N/A	110.8	302.3	17.39	0.157
Calcium (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	465	1235	35.15	0.0756
Chloride (mw-62)	16	0	16	0	0.00%	N/A	N/A	122.4	209.7	14.48	0.118
Chloride (mw-63)	15	0	15	0	0.00%	N/A	N/A	97.87	58.55	7.652	0.0782
Chloride (mw-64)	16	0	16	0	0.00%	N/A	N/A	50.75	7.133	2.671	0.0526
Chloride (mw-65)	16	0	16	0	0.00%	N/A	N/A	56.19	48.43	6.959	0.124
Chloride (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	508.6	8974	94.73	0.186
Fluoride (mw-62)	16	0	16	0	0.00%	N/A	N/A	1.431	0.0196	0.14	0.0979
Fluoride (mw-63)	15	0	15	0	0.00%	N/A	N/A	1.92	0.0474	0.218	0.113
Fluoride (mw-64)	16	0	16	0	0.00%	N/A	N/A	1.447	0.00382	0.0618	0.0427
Fluoride (mw-65)	16	0	16	0	0.00%	N/A	N/A	1.9	0.0133	0.115	0.0608
Fluoride (mw71_72_73)	41	1	0	41	100.00%	0.05	2	N/A	N/A	N/A	N/A
Sulfate (mw-62)	16	0	16	0	0.00%	N/A	N/A	3381	26958	164.2	0.0486
Sulfate (mw-63)	15	0	15	0	0.00%	N/A	N/A	2707	26381	162.4	0.06
Sulfate (mw-64)	16	0	16	0	0.00%	N/A	N/A	383.1	17316	131.6	0.343
Sulfate (mw-65)	16	0	16	0	0.00%	N/A	N/A	497.5	10793	103.9	0.209
Sulfate (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	9045	7974518	2824	0.312
TDS (mw-62)	16	0	16	0	0.00%	N/A	N/A	5544	814625	902.6	0.163
TDS (mw-63)	15	0	15	0	0.00%	N/A	N/A	4413	29810	172.7	0.0391
TDS (mw-64)	16	0	16	0	0.00%	N/A	N/A	797.5	726.7	26.96	0.0338
TDS (mw-65)	16	0	16	0	0.00%	N/A	N/A	1096	26413	162.5	0.148
TDS (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	14529	11719164	3423	0.236
pH (mw-62)	16	0	16	0	0.00%	N/A	N/A	6.621	0.0581	0.241	0.0364
pH (mw-63)	15	0	15	0	0.00%	N/A	N/A	6.781	0.0178	0.133	0.0196
pH (mw-64)	16	0	16	0	0.00%	N/A	N/A	7.468	0.0146	0.121	0.0162
pH (mw-65)	16	0	16	0	0.00%	N/A	N/A	7.286	0.095	0.308	0.0423
pH (mw71_72_73)	42	0	42	0	0.00%	N/A	N/A	6.732	0.0822	0.287	0.0426

TABLE 5
PRO UCL OUTPUT FOR GENERAL STATISTICS - CWTP IN PICTURED CLIFFS SANDSTONE

General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Boron (mw-62)	16	0	1.9	2.5	2.106	2.1	0.03	0.173	0.148	0.596	0.0822
Boron (mw-63)	15	0	1.3	2	1.673	1.7	0.055	0.234	0.297	-0.129	0.14
Boron (mw-64)	16	0	0.55	0.67	0.607	0.61	0.00164	0.0405	0.0445	0.0525	0.0667
Boron (mw-65)	16	0	0.75	0.98	0.804	0.78	0.00447	0.0668	0.0371	1.638	0.0831
Boron (mw71_72_73)	42	0	0.16	2	0.712	0.55	0.349	0.591	0.467	1.074	0.83
Calcium (mw-62)	16	0	480	590	533.8	525	998.3	31.6	22.24	0.533	0.0592
Calcium (mw-63)	15	0	420	580	517.3	520	1464	38.26	29.65	-0.983	0.074
Calcium (mw-64)	16	0	82	93	87.38	87.5	8.383	2.895	2.965	-0.0889	0.0331
Calcium (mw-65)	16	0	92	160	110.8	110	302.3	17.39	14.83	1.841	0.157
Calcium (mw71_72_73)	42	0	400	570	465	460	1235	35.15	29.65	0.605	0.0756
Chloride (mw-62)	16	0	99	150	122.4	120	209.7	14.48	14.83	0.69	0.118
Chloride (mw-63)	15	0	77	110	97.87	98	58.55	7.652	2.965	-1.101	0.0782
Chloride (mw-64)	16	0	44	53	50.75	52	7.133	2.671	1.483	-1.542	0.0526
Chloride (mw-65)	16	0	51	77	56.19	53.5	48.43	6.959	2.224	2.306	0.124
Chloride (mw71_72_73)	42	0	290	750	508.6	505	8974	94.73	88.95	-0.025	0.186
Fluoride (mw-62)	16	0	1.2	1.6	1.431	1.5	0.0196	0.14	0.148	-0.64	0.0979
Fluoride (mw-63)	15	0	1.5	2.4	1.92	1.9	0.0474	0.218	0.148	0.0402	0.113
Fluoride (mw-64)	16	0	1.3	1.5	1.447	1.475	0.00382	0.0618	0.0371	-0.834	0.0427
Fluoride (mw-65)	16	0	1.7	2	1.9	1.95	0.0133	0.115	0.0741	-0.594	0.0608
Fluoride (mw71_72_73)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sulfate (mw-62)	16	0	3200	3800	3381	3300	26958	164.2	74.13	1.374	0.0486
Sulfate (mw-63)	15	0	2300	2900	2707	2700	26381	162.4	148.3	-1.046	0.06
Sulfate (mw-64)	16	0	320	870	383.1	350	17316	131.6	29.65	3.821	0.343
Sulfate (mw-65)	16	0	400	790	497.5	465	10793	103.9	37.06	2.2	0.209
Sulfate (mw71_72_73)	42	0	610	14000	9045	9950	7974518	2824	1557	-0.913	0.312
TDS (mw-62)	16	0	2400	6700	5544	5650	814625	902.6	370.6	-3.019	0.163
TDS (mw-63)	15	0	4100	4700	4413	4400	29810	172.7	148.3	0.148	0.0391
TDS (mw-64)	16	0	770	890	797.5	790	726.7	26.96	14.83	2.94	0.0338
TDS (mw-65)	16	0	960	1500	1096	1000	26413	162.5	51.89	1.638	0.148
TDS (mw71_72_73)	42	0	6100	21000	14529	15000	11719164	3423	2965	-0.762	0.236
pH (mw-62)	16	0	6.36	7.4	6.621	6.6	0.0581	0.241	0.148	2.361	0.0364
pH (mw-63)	15	0	6.53	7.03	6.781	6.8	0.0178	0.133	0.119	-0.315	0.0196
pH (mw-64)	16	0	7.29	7.68	7.468	7.485	0.0146	0.121	0.126	0.0404	0.0162
pH (mw-65)	16	0	6.96	8.27	7.286	7.225	0.095	0.308	0.193	2.329	0.0423
pH (mw71_72_73)	42	0	6.17	7.73	6.732	6.7	0.0822	0.287	0.17	1.69	0.0426

TABLE 5
PRO UCL OUTPUT FOR GENERAL STATISTICS - CWTP IN PICTURED CLIFFS SANDSTONE

Percentiles using all Detects (Ds) and Non-Detects (NDs)											
Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Boron (mw-62)	16	0	1.9	1.9	1.975	2.1	2.2	2.2	2.3	2.35	2.47
Boron (mw-63)	15	0	1.4	1.4	1.45	1.7	1.85	1.9	1.96	2	2
Boron (mw-64)	16	0	0.55	0.58	0.58	0.61	0.64	0.64	0.66	0.67	0.67
Boron (mw-65)	16	0	0.75	0.76	0.76	0.78	0.83	0.83	0.89	0.935	0.971
Boron (mw71_72_73)	42	0	0.22	0.23	0.233	0.55	0.698	1.6	1.69	1.795	1.959
Calcium (mw-62)	16	0	505	510	517.5	525	547.5	570	580	590	590
Calcium (mw-63)	15	0	482	500	500	520	535	542	556	566	577.2
Calcium (mw-64)	16	0	84	85	85.75	87.5	89.25	90	90	90.75	92.55
Calcium (mw-65)	16	0	95.5	100	100	110	110	110	130	145	157
Calcium (mw71_72_73)	42	0	421	442	450	460	480	490	509	519.5	557.7
Chloride (mw-62)	16	0	110	110	110	120	130	130	145	150	150
Chloride (mw-63)	15	0	92	96.6	97	98	100	100	106	110	110
Chloride (mw-64)	16	0	47	49	50.5	52	52.25	53	53	53	53
Chloride (mw-65)	16	0	52	52	52.75	53.5	55.75	58	64	70.25	75.65
Chloride (mw71_72_73)	42	0	430	450	450	505	570	578	608	658	717.2
Fluoride (mw-62)	16	0	1.2	1.3	1.375	1.5	1.5	1.5	1.6	1.6	1.6
Fluoride (mw-63)	15	0	1.64	1.78	1.85	1.9	2	2.02	2.1	2.19	2.358
Fluoride (mw-64)	16	0	1.4	1.4	1.4	1.475	1.5	1.5	1.5	1.5	1.5
Fluoride (mw-65)	16	0	1.75	1.8	1.8	1.95	2	2	2	2	2
Fluoride (mw71_72_73)	41	1	0.4	0.4	0.4	0.8	2	2	2	2	2
Sulfate (mw-62)	16	0	3250	3300	3300	3300	3425	3500	3600	3650	3770
Sulfate (mw-63)	15	0	2540	2600	2650	2700	2800	2820	2900	2900	2900
Sulfate (mw-64)	16	0	325	330	337.5	350	372.5	380	385	510	798
Sulfate (mw-65)	16	0	425	450	450	465	500	500	605	730	778
Sulfate (mw71_72_73)	42	0	4680	6740	7625	9950	11000	11000	11000	12950	13590
TDS (mw-62)	16	0	5400	5400	5475	5650	5900	5900	6050	6250	6610
TDS (mw-63)	15	0	4240	4300	4300	4400	4500	4520	4660	4700	4700
TDS (mw-64)	16	0	780	780	787.5	790	800	800	810	830	878
TDS (mw-65)	16	0	985	1000	1000	1000	1100	1100	1350	1425	1485
TDS (mw71_72_73)	42	0	9270	11200	12250	15000	17000	17000	17000	18900	20590
pH (mw-62)	16	0	6.41	6.46	6.49	6.6	6.683	6.69	6.75	6.928	7.306
pH (mw-63)	15	0	6.604	6.686	6.695	6.8	6.865	6.872	6.904	6.953	7.015
pH (mw-64)	16	0	7.3	7.36	7.375	7.485	7.533	7.54	7.625	7.65	7.674
pH (mw-65)	16	0	7.05	7.08	7.095	7.225	7.353	7.36	7.51	7.708	8.158
pH (mw71_72_73)	42	0	6.473	6.582	6.613	6.7	6.83	6.856	6.927	7.038	7.722

**TABLE 6
LIST OF INITIAL EXCEEDANCES FOR THE CWTP**

Boron (upper prediction limit = 1.9 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-62	11/9/2015	2.1
MW-62	4/27/2016	2
MW-62	6/5/2016	2
MW-62	8/20/2016	2.3
MW-62	9/12/2016	2.5
MW-62	10/19/2016	2.2
MW-62	2/1/2017	2.1
MW-62	7/21/2017	2.1
MW-62	8/9/2017	2.2
MW-62	8/16/2017	2.1
MW-62	9/9/2017	2.3
MW-62	10/13/2017	2.2
MW-63	9/12/2016	2
MW-63	9/9/2017	2

TDS (upper prediction limit = 20,000 ppm)		
Well ID	Sample Date	Sample Value (ppm)
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Calcium (upper prediction limit = 540 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-62	9/12/2016	590
MW-62	5/29/2017	570
MW-62	8/16/2017	590
MW-62	9/9/2017	570
MW-63	9/12/2016	560
MW-63	5/28/2017	550
MW-63	8/16/2017	580

pH (time regression upper and lower prediction limit)		
Well ID	Sample Date	Sample Value (ppm)
MW-65	8/20/2016	8.27
MW-64	7/21/2017	7.61

Chloride (upper prediction limit = 710 ppm)		
Well ID	Sample Date	Sample Value (ppm)
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Sulfate (upper prediction limit = 13,000 ppm)		
Well ID	Sample Date	Sample Value (ppm)
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Fluoride (upper prediction limit = quantified measurements [above RL] in two consecutive samples [not resamples])		
Well ID	Sample Date	Sample Value (ppm)
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TABLE 7
PRO UCL OUTPUT FOR GENERAL STATISTICS - MULTIUNIT 1 IN WEATHERED LEWIS SHALE/ALLUVIUM

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.11/7/2018 12:17:53 AM										
User Selected Options											
From File	AllWells_MultiUnit1_Bckgrd_LewisShale_01042018.xls										
Full Precision	OFF										
From File: AllWells_MultiUnit1_Bckgrd_LewisShale_01042018.xls											
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Boron (bckgrd_mw-49a_mw_74)	25	0	25	0	0.00%	N/A	N/A	2.396	1.05	1.025	0.428
Boron (mw-61)	16	0	16	0	0.00%	N/A	N/A	38.56	2.129	1.459	0.0378
Boron (mw-7)	16	0	16	0	0.00%	N/A	N/A	8.688	1.5	1.225	0.141
Boron (mw-75)	9	0	9	0	0.00%	N/A	N/A	24.56	0.278	0.527	0.0215
Boron (mw-8)	8	0	8	0	0.00%	N/A	N/A	18.13	2.411	1.553	0.0857
Calcium (bckgrd_mw-49a_mw_74)	25	0	25	0	0.00%	N/A	N/A	407.6	519	22.78	0.0559
Calcium (mw-61)	16	0	16	0	0.00%	N/A	N/A	484.4	692.9	26.32	0.0543
Calcium (mw-7)	16	0	16	0	0.00%	N/A	N/A	413.8	478.3	21.87	0.0529
Calcium (mw-75)	9	0	9	0	0.00%	N/A	N/A	451.1	586.1	24.21	0.0537
Calcium (mw-8)	8	0	8	0	0.00%	N/A	N/A	455	857.1	29.28	0.0643
Chloride (bckgrd_mw-49a_mw_74)	25	0	25	0	0.00%	N/A	N/A	502.4	14227	119.3	0.237
Chloride (mw-61)	16	0	16	0	0.00%	N/A	N/A	331.9	7576	87.04	0.262
Chloride (mw-7)	16	0	15	1	6.25%	400	400	483.3	20368	142.7	0.295
Chloride (mw-75)	9	0	9	0	0.00%	N/A	N/A	296.7	75	8.66	0.0292
Chloride (mw-8)	8	0	8	0	0.00%	N/A	N/A	1019	8470	92.03	0.0903
Fluoride (bckgrd_mw-49a_mw_74)	25	0	11	14	56.00%	0.4	5	1.395	0.424	0.651	0.467
Fluoride (mw-61)	16	0	16	0	0.00%	N/A	N/A	1.216	0.00991	0.0995	0.0819
Fluoride (mw-7)	16	0	2	14	87.50%	0.4	2	0.36	5.0000E-4	0.0224	0.0621
Fluoride (mw-75)	9	0	0	9	100.00%	2	2	N/A	N/A	N/A	N/A
Fluoride (mw-8)	8	0	3	5	62.50%	2	5	0.693	0.00429	0.0655	0.0945
Sulfate (bckgrd_mw-49a_mw_74)	25	0	25	0	0.00%	N/A	N/A	14668	22988100	4795	0.327
Sulfate (mw-61)	16	0	16	0	0.00%	N/A	N/A	3613	54500	233.5	0.0646
Sulfate (mw-7)	16	0	16	0	0.00%	N/A	N/A	6625	268667	518.3	0.0782
Sulfate (mw-75)	9	0	9	0	0.00%	N/A	N/A	4489	91111	301.8	0.0672
Sulfate (mw-8)	8	0	8	0	0.00%	N/A	N/A	10125	10459286	3234	0.319
TDS (bckgrd_mw-49a_mw_74)	25	0	25	0	0.00%	N/A	N/A	20800	44416667	6665	0.32
TDS (mw-61)	16	0	16	0	0.00%	N/A	N/A	5556	18625	136.5	0.0246
TDS (mw-7)	16	0	16	0	0.00%	N/A	N/A	10150	185333	430.5	0.0424
TDS (mw-75)	9	0	9	0	0.00%	N/A	N/A	6478	29444	171.6	0.0265
TDS (mw-8)	8	0	8	0	0.00%	N/A	N/A	14750	500000	707.1	0.0479
pH (bckgrd_mw-49a_mw_74)	25	0	25	0	0.00%	N/A	N/A	7.222	0.17	0.412	0.057
pH (mw-61)	16	0	16	0	0.00%	N/A	N/A	8.584	0.0385	0.196	0.0229
pH (mw-7)	16	0	16	0	0.00%	N/A	N/A	7.002	0.0468	0.216	0.0309
pH (mw-75)	9	0	9	0	0.00%	N/A	N/A	8.257	0.0168	0.13	0.0157
pH (mw-8)	8	0	8	0	0.00%	N/A	N/A	6.819	0.0431	0.208	0.0304

TABLE 7
PRO UCL OUTPUT FOR GENERAL STATISTICS - MULTIUNIT 1 IN WEATHERED LEWIS SHALE/ALLUVIUM

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximurr	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Boron (bckgrd_mw-49a_mw_74)	25	0	1.3	6	2.396	2.2	1.05	1.025	0.741	2.164	0.428
Boron (mw-61)	16	0	35	41	38.56	39	2.129	1.459	1.483	-0.729	0.0378
Boron (mw-7)	16	0	7.2	11	8.688	8.3	1.5	1.225	1.334	0.425	0.141
Boron (mw-75)	9	0	24	25	24.56	25	0.278	0.527	0	-0.271	0.0215
Boron (mw-8)	8	0	16	20	18.13	18	2.411	1.553	1.483	0.0334	0.0857
Calcium (bckgrd_mw-49a_mw_74)	25	0	360	440	407.6	410	519	22.78	29.65	-0.276	0.0559
Calcium (mw-61)	16	0	420	520	484.4	485	692.9	26.32	22.24	-0.722	0.0543
Calcium (mw-7)	16	0	380	460	413.8	410	478.3	21.87	29.65	0.367	0.0529
Calcium (mw-75)	9	0	410	490	451.1	460	586.1	24.21	14.83	-0.234	0.0537
Calcium (mw-8)	8	0	420	500	455	450	857.1	29.28	37.06	0.342	0.0643
Chloride (bckgrd_mw-49a_mw_74)	25	0	340	1000	502.4	490	14227	119.3	74.13	3.094	0.237
Chloride (mw-61)	16	0	280	650	331.9	310	7576	87.04	14.83	3.682	0.262
Chloride (mw-7)	15	0	320	880	492	430	21931	148.1	59.3	1.626	0.301
Chloride (mw-75)	9	0	280	310	296.7	300	75	8.66	0	-0.66	0.0292
Chloride (mw-8)	8	0	880	1100	1019	1040	8470	92.03	88.95	-0.406	0.0903
Fluoride (bckgrd_mw-49a_mw_74)	11	0	0.65	2.1	1.714	1.9	0.198	0.445	0.148	-1.809	0.26
Fluoride (mw-61)	16	0	0.95	1.4	1.216	1.2	0.00991	0.0995	0	-0.9	0.0819
Fluoride (mw-7)	2	0	0.35	0.41	0.38	0.38	0.0018	0.0424	0.0445	N/A	0.112
Fluoride (mw-75)	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fluoride (mw-8)	3	0	0.61	0.77	0.693	0.7	0.00643	0.0802	0.104	-0.371	0.116
Sulfate (bckgrd_mw-49a_mw_74)	25	0	7100	22000	14668	16000	22988100	4795	4448	-0.411	0.327
Sulfate (mw-61)	16	0	3400	4400	3613	3550	54500	233.5	74.13	2.774	0.0646
Sulfate (mw-7)	16	0	5900	7500	6625	6500	268667	518.3	593	0.359	0.0782
Sulfate (mw-75)	9	0	4100	5200	4489	4400	91111	301.8	148.3	1.714	0.0672
Sulfate (mw-8)	8	0	8400	18000	10125	8850	10459286	3234	518.9	2.655	0.319
TDS (bckgrd_mw-49a_mw_74)	25	0	12000	30000	20800	22000	44416667	6665	8895	-0.187	0.32
TDS (mw-61)	16	0	5300	5800	5556	5600	18625	136.5	148.3	-0.15	0.0246
TDS (mw-7)	16	0	9700	11000	10150	10000	185333	430.5	0	1.584	0.0424
TDS (mw-75)	9	0	6100	6700	6478	6500	29444	171.6	148.3	-1.279	0.0265
TDS (mw-8)	8	0	13000	15000	14750	15000	500000	707.1	0	-2.828	0.0479
pH (bckgrd_mw-49a_mw_74)	25	0	6.21	8.5	7.222	7.16	0.17	0.412	0.311	0.716	0.057
pH (mw-61)	16	0	8.17	9.01	8.584	8.58	0.0385	0.196	0.111	-0.00842	0.0229
pH (mw-7)	16	0	6.48	7.46	7.002	6.99	0.0468	0.216	0.133	-0.226	0.0309
pH (mw-75)	9	0	8.05	8.49	8.257	8.24	0.0168	0.13	0.148	0.269	0.0157
pH (mw-8)	8	0	6.48	7.17	6.819	6.78	0.0431	0.208	0.119	0.226	0.0304

TABLE 7
PRO UCL OUTPUT FOR GENERAL STATISTICS - MULTIUNIT 1 IN WEATHERED LEWIS SHALE/ALLUVIUM

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Boron (bckgrd_mw-49a_mw_74)	25	0	1.6	1.6	1.7	2.2	2.7	2.74	3.28	4.2	5.616
Boron (mw-61)	16	0	37	38	38	39	39.25	40	40	40.25	40.85
Boron (mw-7)	16	0	7.4	7.6	7.6	8.3	10	10	10	10.25	10.85
Boron (mw-75)	9	0	24	24	24	25	25	25	25	25	25
Boron (mw-8)	8	0	16.7	17	17	18	19.25	19.6	20	20	20
Calcium (bckgrd_mw-49a_mw_74)	25	0	380	390	390	410	420	422	440	440	440
Calcium (mw-61)	16	0	460	470	470	485	502.5	510	515	520	520
Calcium (mw-7)	16	0	390	390	397.5	410	430	430	435	445	457
Calcium (mw-75)	9	0	426	430	430	460	460	464	474	482	488.4
Calcium (mw-8)	8	0	427	430	430	450	480	480	486	493	498.6
Chloride (bckgrd_mw-49a_mw_74)	25	0	414	420	430	490	530	532	556	584	901.6
Chloride (mw-61)	16	0	300	300	300	310	320	320	350	440	608
Chloride (mw-7)	16	0	370	400	415	430	532.5	540	660	775	859
Chloride (mw-75)	9	0	288	290	290	300	300	300	302	306	309.2
Chloride (mw-8)	8	0	908	940	957.5	1040	1100	1100	1100	1100	1100
Fluoride (bckgrd_mw-49a_mw_74)	25	0	0.71	1.5	1.8	2	2.1	4	4	4	4.76
Fluoride (mw-61)	16	0	1.15	1.2	1.2	1.2	1.3	1.3	1.3	1.325	1.385
Fluoride (mw-7)	16	0	0.4	0.4	0.4	0.8	0.8	0.8	0.8	1.1	1.82
Fluoride (mw-75)	9	0	2	2	2	2	2	2	2	2	2
Fluoride (mw-8)	8	0	0.673	0.724	0.753	2	2	2	2.9	3.95	4.79
Sulfate (bckgrd_mw-49a_mw_74)	25	0	7740	8340	10000	16000	18000	19000	19600	20000	21520
Sulfate (mw-61)	16	0	3450	3500	3500	3550	3700	3700	3700	3875	4295
Sulfate (mw-7)	16	0	6000	6200	6275	6500	7100	7100	7350	7425	7485
Sulfate (mw-75)	9	0	4260	4360	4400	4400	4500	4540	4720	4960	5152
Sulfate (mw-8)	8	0	8540	8600	8600	8850	9775	9880	12400	15200	17440
TDS (bckgrd_mw-49a_mw_74)	25	0	12000	12000	13000	22000	27000	28000	29000	29000	29760
TDS (mw-61)	16	0	5400	5400	5475	5600	5625	5700	5700	5725	5785
TDS (mw-7)	16	0	9850	10000	10000	10000	10000	10000	11000	11000	11000
TDS (mw-75)	9	0	6340	6400	6400	6500	6600	6600	6620	6660	6692
TDS (mw-8)	8	0	14400	15000	15000	15000	15000	15000	15000	15000	15000
pH (bckgrd_mw-49a_mw_74)	25	0	6.896	6.984	6.99	7.16	7.46	7.502	7.56	7.672	8.308
pH (mw-61)	16	0	8.36	8.46	8.52	8.58	8.653	8.66	8.79	8.86	8.98
pH (mw-7)	16	0	6.84	6.88	6.91	6.99	7.075	7.18	7.225	7.303	7.429
pH (mw-75)	9	0	8.122	8.174	8.2	8.24	8.35	8.35	8.378	8.434	8.479
pH (mw-8)	8	0	6.634	6.724	6.745	6.78	6.9	6.956	7.065	7.118	7.16

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.11/7/2018 12:36:43 AM
From File	BackgroundLewisShale_DATEORDERED__01062018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Boron	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	17
Minimum	1.3
Maximum	6
Mean of Raw Data	2.396
Standard Deviation of Raw Data	1.025
Khat	7.66
Theta hat	0.313
Kstar	6.768
Theta star	0.354
Mean of Log Transformed Data	0.807
Standard Deviation of Log Transformed Data	0.353
Normal GOF Test Results	
Correlation Coefficient R	0.88
Shapiro Wilk Test Statistic	0.79
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	8.5799E-5
Lilliefors Test Statistic	0.183
Lilliefors Critical (0.05) Value	0.173
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.939
A-D Test Statistic	0.747
A-D Critical (0.05) Value	0.746
K-S Test Statistic	0.144
K-S Critical(0.05) Value	0.175
Data appear Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.964
Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.117
Lilliefors Test Statistic	0.121
Lilliefors Critical (0.05) Value	0.173
Data appear Lognormal at (0.05) Significance Level	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Ln_Boron	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	17
Minimum	0.262
Maximum	1.792
Mean of Raw Data	0.807
Standard Deviation of Raw Data	0.353
Khat	5.703
Theta hat	0.142
Kstar	5.045
Theta star	0.16
Mean of Log Transformed Data	-0.305
Standard Deviation of Log Transformed Data	0.44
Normal GOF Test Results	
Correlation Coefficient R	0.964
Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.117
Lilliefors Test Statistic	0.121
Lilliefors Critical (0.05) Value	0.173
Data appear Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.991
A-D Test Statistic	0.24
A-D Critical (0.05) Value	0.747
K-S Test Statistic	0.106
K-S Critical(0.05) Value	0.175
Data appear Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.989
Shapiro Wilk Test Statistic	0.981
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.903
Lilliefors Test Statistic	0.105
Lilliefors Critical (0.05) Value	0.173
Data appear Lognormal at (0.05) Significance Level	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Calcium	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	9
Minimum	360
Maximum	440
Mean of Raw Data	407.6
Standard Deviation of Raw Data	22.78
Khat	329.4
Theta hat	1.237
Kstar	289.9
Theta star	1.406
Mean of Log Transformed Data	6.009
Standard Deviation of Log Transformed Data	0.0564
Normal GOF Test Results	
Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.16
Lilliefors Test Statistic	0.147
Lilliefors Critical (0.05) Value	0.173
Data appear Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.972
A-D Test Statistic	0.585
A-D Critical (0.05) Value	0.742
K-S Test Statistic	0.154
K-S Critical(0.05) Value	0.174
Data appear Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.141
Lilliefors Test Statistic	0.152
Lilliefors Critical (0.05) Value	0.173
Data appear Lognormal at (0.05) Significance Level	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Ln_Calcium	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	9
Minimum	5.886
Maximum	6.087
Mean of Raw Data	6.009
Standard Deviation of Raw Data	0.0564
Khat	11780
Theta hat	5.1006E-4
Kstar	10367
Theta star	5.7962E-4
Mean of Log Transformed Data	1.793
Standard Deviation of Log Transformed Data	0.00941
Normal GOF Test Results	
Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.141
Lilliefors Test Statistic	0.152
Lilliefors Critical (0.05) Value	0.173
Data appear Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.972
A-D Test Statistic	0.844
A-D Critical (0.05) Value	0.742
K-S Test Statistic	0.184
K-S Critical(0.05) Value	0.174
Data not Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.137
Lilliefors Test Statistic	0.154
Lilliefors Critical (0.05) Value	0.173
Data appear Lognormal at (0.05) Significance Level	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Chloride	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	14
Minimum	340
Maximum	1000
Mean of Raw Data	502.4
Standard Deviation of Raw Data	119.3
Khat	24.55
Theta hat	20.47
Kstar	21.63
Theta star	23.23
Mean of Log Transformed Data	6.199
Standard Deviation of Log Transformed Data	0.195
Normal GOF Test Results	
Correlation Coefficient R	0.807
Shapiro Wilk Test Statistic	0.686
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	1.2219E-6
Lilliefors Test Statistic	0.235
Lilliefors Critical (0.05) Value	0.173
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.84
A-D Test Statistic	1.346
A-D Critical (0.05) Value	0.743
K-S Test Statistic	0.189
K-S Critical(0.05) Value	0.174
Data not Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.896
Shapiro Wilk Test Statistic	0.834
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	6.4181E-4
Lilliefors Test Statistic	0.174
Lilliefors Critical (0.05) Value	0.173
Data not Lognormal at (0.05) Significance Level	
Non-parametric GOF Test Results	
Data do not follow a discernible distribution at (0.05) Level of Significance	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Ln_Chloride	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	14
Minimum	5.829
Maximum	6.908
Mean of Raw Data	6.199
Standard Deviation of Raw Data	0.195
Khat	1084
Theta hat	0.00572
Kstar	954.3
Theta star	0.0065
Mean of Log Transformed Data	1.824
Standard Deviation of Log Transformed Data	0.0308
Normal GOF Test Results	
Correlation Coefficient R	0.896
Shapiro Wilk Test Statistic	0.834
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	6.4181E-4
Lilliefors Test Statistic	0.174
Lilliefors Critical (0.05) Value	0.173
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.903
A-D Test Statistic	1.025
A-D Critical (0.05) Value	0.742
K-S Test Statistic	0.165
K-S Critical(0.05) Value	0.174
Data follow Appr. Gamma Distribution at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.907
Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.00157
Lilliefors Test Statistic	0.167
Lilliefors Critical (0.05) Value	0.173
Data appear Approximate_Lognormal at (0.05) Significance Level	

**TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA**

Fluoride							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	25	0	25	11	14	56.00%	
	Number	Minimum	Maximum	Mean	Median	SD	
Statistics (Non-Detects Only)	14	0.4	5	2.614	2	1.526	
Statistics (Non-Detects Only)	11	0.65	2.1	1.714	1.9	0.445	
Statistics (All: NDs treated as DL value)	25	0.4	5	2.218	2	1.246	
Statistics (All: NDs treated as DL/2 value)	25	0.2	2.5	1.486	1.9	0.664	
Statistics (Normal ROS Imputed Data)	25	0.65	2.1	1.502	1.569	0.427	
Statistics (Gamma ROS Imputed Data)	25	0.65	2.1	1.53	1.561	0.389	
Statistics (Lognormal ROS Imputed Data)	25	0.65	2.1	1.469	1.471	0.435	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	11.02	8.072	0.156	0.493	0.354	0.718	
Statistics (NDs = DL)	2.905	2.583	0.763	0.615	0.671	1.091	
Statistics (NDs = DL/2)	3.107	2.761	0.478	0.227	0.704	3.107	
Statistics (Gamma ROS Estimates)	14.04	12.38	0.109	0.389	0.286	0.736	
Statistics (Lognormal ROS Estimates)	--	--	--	0.337	0.326	0.968	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal ROS			
Correlation Coefficient R	0.857	0.929	0.933	0.971			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.746	0.85	Data Not Normal				
Shapiro-Wilk (NDs = DL)	0.859	0.918	Data Not Normal				
Shapiro-Wilk (NDs = DL/2)	0.862	0.918	Data Not Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.93	0.918	Data Appear Normal				
Lilliefors (Detects Only)	0.304	0.251	Data Not Normal				
Lilliefors (NDs = DL)	0.298	0.173	Data Not Normal				
Lilliefors (NDs = DL/2)	0.254	0.173	Data Not Normal				
Lilliefors (Normal ROS Estimates)	0.144	0.173	Data Appear Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma ROS			
Correlation Coefficient R	0.796	0.937	0.852	0.951			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	1.559	0.729					
Kolmogorov-Smirnov (Detects Only)	0.332	0.255	Data Not Gamma Distributed				
Anderson-Darling (NDs = DL)	1.371	0.752					
Kolmogorov-Smirnov (NDs = DL)	0.218	0.176	Data Not Gamma Distributed				
Anderson-Darling (NDs = DL/2)	2.066	0.751					
Kolmogorov-Smirnov (NDs = DL/2)	0.264	0.176	Data Not Gamma Distributed				
Anderson-Darling (Gamma ROS Estimates)	0.661	0.744					
Kolmogorov-Smirnov (Gamma ROS Est.)	0.144	0.174	Data Appear Gamma Distributed				

**TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA**

Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.805	0.929	0.867	0.963		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.666	0.85	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.861	0.918	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.751	0.918	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.918	0.918	Data Not Lognormal			
Lilliefors (Detects Only)	0.333	0.251	Data Not Lognormal			
Lilliefors (NDs = DL)	0.244	0.173	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.256	0.173	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.145	0.173	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Ln_Fluoride						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	25	0	25	11	14	56.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	-0.916	1.609	0.711	0.693	0.844
Statistics (Non-Detects Only)	11	-0.431	0.742	0.493	0.642	0.354
Statistics (All: NDs treated as DL value)	25	-0.916	1.609	0.615	0.693	0.671
Statistics (All: NDs treated as DL/2 value)	25	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Imputed Data)	25	-0.431	0.742	0.337	0.386	0.326
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.805	0.929	0.884	0.963		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.666	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.861	0.918	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.772	0.918	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.918	0.918	Data Not Normal			
Lilliefors (Detects Only)	0.333	0.251	Data Not Normal			
Lilliefors (NDs = DL)	0.244	0.173	Data Not Normal			
Lilliefors (NDs = DL/2)	0.238	0.173	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.145	0.173	Data Appear Normal			

**TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA**

Gamma GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A
	Test value Crit. (0.05)		Conclusion with Alpha(0.05)	
Anderson-Darling (Detects Only)	N/A	N/A		
Kolmogorov-Smirnov (Detects Only)	N/A	N/A		
Anderson-Darling (NDs = DL)	N/A	N/A		
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A		
Anderson-Darling (NDs = DL/2)	N/A	N/A		
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A		
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A		
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A		
Note: Substitution methods such as DL or DL/2 are not recommended.				
Sulfate				
Raw Statistics				
Number of Valid Observations	25			
Number of Distinct Observations	16			
Minimum	7100			
Maximum	22000			
Mean of Raw Data	14668			
Standard Deviation of Raw Data	4795			
Khat	8.28			
Theta hat	1772			
Kstar	7.313			
Theta star	2006			
Mean of Log Transformed Data	9.532			
Standard Deviation of Log Transformed Data	0.375			
Normal GOF Test Results				
Correlation Coefficient R	0.951			
Shapiro Wilk Test Statistic	0.887			
Shapiro Wilk Critical (0.05) Value	0.918			
Approximate Shapiro Wilk P Value	0.00923			
Lilliefors Test Statistic	0.196			
Lilliefors Critical (0.05) Value	0.173			
Data not Normal at (0.05) Significance Level				
Gamma GOF Test Results				
Correlation Coefficient R	0.922			
A-D Test Statistic	1.46			
A-D Critical (0.05) Value	0.746			
K-S Test Statistic	0.205			
K-S Critical(0.05) Value	0.175			
Data not Gamma Distributed at (0.05) Significance Level				

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Lognormal GOF Test Results	
Correlation Coefficient R	0.929
Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.00121
Lilliefors Test Statistic	0.214
Lilliefors Critical (0.05) Value	0.173
Data not Lognormal at (0.05) Significance Level	
Non-parametric GOF Test Results	
Data do not follow a discernible distribution at (0.05) Level of Significance	
Ln_Sulfate	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	16
Minimum	8.868
Maximum	9.999
Mean of Raw Data	9.532
Standard Deviation of Raw Data	0.375
Khat	660.8
Theta hat	0.0144
Kstar	581.5
Theta star	0.0164
Mean of Log Transformed Data	2.254
Standard Deviation of Log Transformed Data	0.0399
Normal GOF Test Results	
Correlation Coefficient R	0.929
Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.00121
Lilliefors Test Statistic	0.214
Lilliefors Critical (0.05) Value	0.173
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.924
A-D Test Statistic	1.663
A-D Critical (0.05) Value	0.742
K-S Test Statistic	0.22
K-S Critical(0.05) Value	0.174
Data not Gamma Distributed at (0.05) Significance Level	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Lognormal GOF Test Results

Correlation Coefficient R	0.927
Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	9.6163E-4
Lilliefors Test Statistic	0.218
Lilliefors Critical (0.05) Value	0.173

Data not Lognormal at (0.05) Significance Level

Non-parametric GOF Test Results

Data do not follow a discernible distribution at (0.05) Level of Significance

TDS

Raw Statistics

Number of Valid Observations	25
Number of Distinct Observations	13
Minimum	12000
Maximum	30000
Mean of Raw Data	20800
Standard Deviation of Raw Data	6665
Khat	9.163
Theta hat	2270
Kstar	8.09
Theta star	2571
Mean of Log Transformed Data	9.887
Standard Deviation of Log Transformed Data	0.351

Normal GOF Test Results

Correlation Coefficient R	0.947
Shapiro Wilk Test Statistic	0.872
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	0.00422
Lilliefors Test Statistic	0.171
Lilliefors Critical (0.05) Value	0.173

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.929
A-D Test Statistic	1.346
A-D Critical (0.05) Value	0.745
K-S Test Statistic	0.211
K-S Critical(0.05) Value	0.175

Data not Gamma Distributed at (0.05) Significance Level

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Lognormal GOF Test Results	
Correlation Coefficient R	0.931
Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	9.4424E-4
Lilliefors Test Statistic	0.225
Lilliefors Critical (0.05) Value	0.173
Data not Lognormal at (0.05) Significance Level	
Ln_TDS	
Raw Statistics	
Number of Valid Observations	25
Number of Distinct Observations	13
Minimum	9.393
Maximum	10.31
Mean of Raw Data	9.887
Standard Deviation of Raw Data	0.351
Khat	820.6
Theta hat	0.012
Kstar	722.1
Theta star	0.0137
Mean of Log Transformed Data	2.291
Standard Deviation of Log Transformed Data	0.0357
Normal GOF Test Results	
Correlation Coefficient R	0.931
Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	9.4424E-4
Lilliefors Test Statistic	0.225
Lilliefors Critical (0.05) Value	0.173
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.926
A-D Test Statistic	1.519
A-D Critical (0.05) Value	0.742
K-S Test Statistic	0.231
K-S Critical(0.05) Value	0.174
Data not Gamma Distributed at (0.05) Significance Level	

TABLE 8
PRO UCL OUTPUT FOR GOODNESS-OF-FIT TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM DATA

Lognormal GOF Test Results	
Correlation Coefficient R	0.929
Shapiro Wilk Test Statistic	0.838
Shapiro Wilk Critical (0.05) Value	0.918
Approximate Shapiro Wilk P Value	7.8800E-4
Lilliefors Test Statistic	0.23
Lilliefors Critical (0.05) Value	0.173
Data not Lognormal at (0.05) Significance Level	
Non-parametric GOF Test Results	
Data do not follow a discernible distribution at (0.05) Level of Significance	

TABLE 9
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM

Outlier Tests for Selected Uncensored Variables								
User Selected Options								
Date/Time of Computation ProUCL 5.11/7/2018 12:40:18 AM								
From File BackgroundLewisShale_DATEORDERED__01062018.xls								
Full Precision OFF								
Rosner's Outlier Test for Boron								
Mean			2.396					
Standard Deviation			1.025					
Number of data			25					
Number of suspected outliers			1					
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)	
1	2.396	1.004	6	1	3.589	2.82	3.14	
For 5% Significance Level, there is 1 Potential Outlier								
Potential outliers is: 6								
For 1% Significance Level, there is 1 Potential Outlier								
Potential outliers is: 6								
Rosner's Outlier Test for Ln_B								
Mean			0.807					
Standard Deviation			0.353					
Number of data			25					
Number of suspected outliers			1					
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)	
1	0.807	0.346	1.792	1	2.848	2.82	3.14	
For 5% Significance Level, there is 1 Potential Outlier								
Potential outliers is: 1.792								
For 1% Significance Level, there is no Potential Outlier								

TABLE 9
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM

Rosner's Outlier Test for Calcium

Mean 407.6
Standard Deviation 22.78
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	407.6	22.32	360	10	2.132	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Ln_Ca

Mean 6.009
Standard Deviation 0.0564
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	6.009	0.0553	5.886	10	2.218	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Chloride

Mean 502.4
Standard Deviation 119.3
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	502.4	116.9	1000	9	4.258	2.82	3.14

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 1000

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 1000

TABLE 9
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM

Rosner's Outlier Test for Ln_Chloride

Mean 6.199
Standard Deviation 0.195
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	6.199	0.191	6.908	9	3.708	2.82	3.14

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 6.908

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 6.908

Rosner's Outlier Test for Fluoride

Mean 2.218
Standard Deviation 1.246
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	2.218	1.221	5	1	2.279	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Ln_F

Mean 0.615
Standard Deviation 0.671
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	0.615	0.657	-0.916	6	2.329	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

TABLE 9
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM

Rosner's Outlier Test for Sulfate

Mean 14668
Standard Deviation 4795
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	14668	4698	7100	11	1.611	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Ln_Sulfate

Mean 9.532
Standard Deviation 0.375
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	9.532	0.368	8.868	11	1.806	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for TDS

Mean 20800
Standard Deviation 6665
Number of data 25
Number of suspected outliers 1

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	20800	6530	30000	2	1.409	2.82	3.14

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

TABLE 9
PRO UCL OUTPUT FOR OUTLIER TEST RESULTS - WEATHERED LEWIS SHALE/ALLUVIUM

Rosner's Outlier Test for Ln_TDS							
	Mean		9.887				
	Standard Deviation		0.351				
	Number of data		25				
	Number of suspected outliers		1				
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	9.887	0.343	9.393	8	1.44	2.82	3.14
For 5% Significance Level, there is no Potential Outlier							
For 1% Significance Level, there is no Potential Outlier							
Rosner's Outlier Test for pH							
	Mean		7.222				
	Standard Deviation		0.412				
	Number of data		25				
	Number of suspected outliers		1				
#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	7.222	0.404	8.5	24	3.165	2.82	3.14
For 5% Significance Level, there is 1 Potential Outlier							
Potential outliers is: 8.5							
For 1% Significance Level, there is 1 Potential Outlier							
Potential outliers is: 8.5							

TABLE 10
LIST OF INITIAL EXCEEDANCES FOR MULTIUNIT 1

Boron (upper prediction limit = 3.95 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-61	11/6/2015	35
MW-61	4/26/2016	39
MW-61	6/6/2016	38
MW-61	8/21/2016	38
MW-61	9/13/2016	40
MW-61	10/20/2016	37
MW-61	2/2/2017	37
MW-61	4/18/2017	39
MW-61	5/3/2017	39
MW-61	5/30/2017	40
MW-61	6/22/2017	38
MW-61	7/22/2017	39
MW-61	8/10/2017	40
MW-61	8/17/2017	39
MW-61	9/10/2017	41
MW-61	10/12/2017	38
MW-7	11/7/2015	9.4
MW-7	4/26/2016	10
MW-7	6/6/2016	10
MW-7	8/21/2016	11
MW-7	9/13/2016	10
MW-7	10/20/2016	10
MW-7	2/2/2017	9
MW-7	4/18/2017	8.6
MW-7	5/3/2017	8
MW-7	5/30/2017	7.3
MW-7	6/22/2017	7.6
MW-7	7/22/2017	7.6
MW-7	8/10/2017	7.8
MW-7	8/17/2017	7.5
MW-7	9/10/2017	8
MW-7	10/12/2017	7.2
MW-75	4/18/2017	24
MW-75	5/3/2017	25
MW-75	5/30/2017	24
MW-75	6/22/2017	25
MW-75	7/22/2017	25
MW-75	8/10/2017	25
MW-75	8/17/2017	25
MW-75	9/10/2017	24
MW-75	10/12/2017	24
MW-8	12/1/2015	17
MW-8	4/26/2016	20
MW-8	6/7/2016	20
MW-8	8/21/2016	19
MW-8	9/13/2016	19
MW-8	4/18/2017	17
MW-8	5/3/2017	17
MW-8	5/30/2017	16

Calcium (upper prediction limit = 454.1 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-7	8/17/2017	460
MW-75	5/3/2017	460
MW-75	7/22/2017	460
MW-75	8/10/2017	460
MW-75	8/17/2017	490
MW-75	9/10/2017	470
MW-8	12/1/2015	500
MW-8	4/26/2016	480
MW-8	8/21/2016	460
MW-8	9/13/2016	480

TABLE 10
LIST OF INITIAL EXCEEDANCES FOR MULTIUNIT 1

Chloride (upper prediction limit = 604.7ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-7	4/26/2016	740
MW-7	6/6/2016	880
MW-8	12/1/2015	880
MW-8	4/26/2016	920
MW-8	6/7/2016	1100
MW-8	8/21/2016	980
MW-8	9/13/2016	970
MW-8	4/18/2017	1100
MW-8	5/3/2017	1100
MW-8	5/30/2017	1100

pH (upper prediction limit = 7.88 SU; lower prediction limit = 6.52 SU)		
Well ID	Sample Date	Sample Value (SU)
---	---	---

Fluoride (upper prediction limit = 2.1 ppm)		
Well ID	Sample Date	Sample Value (ppm)
MW-8	12/1/2015	5

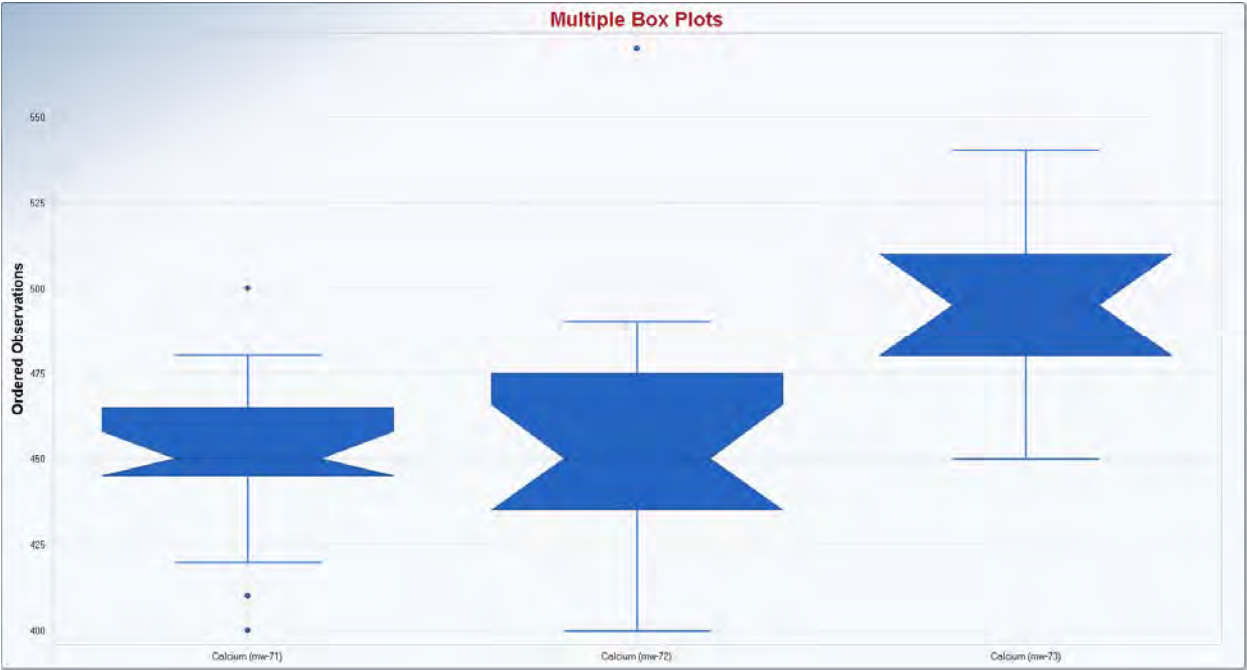
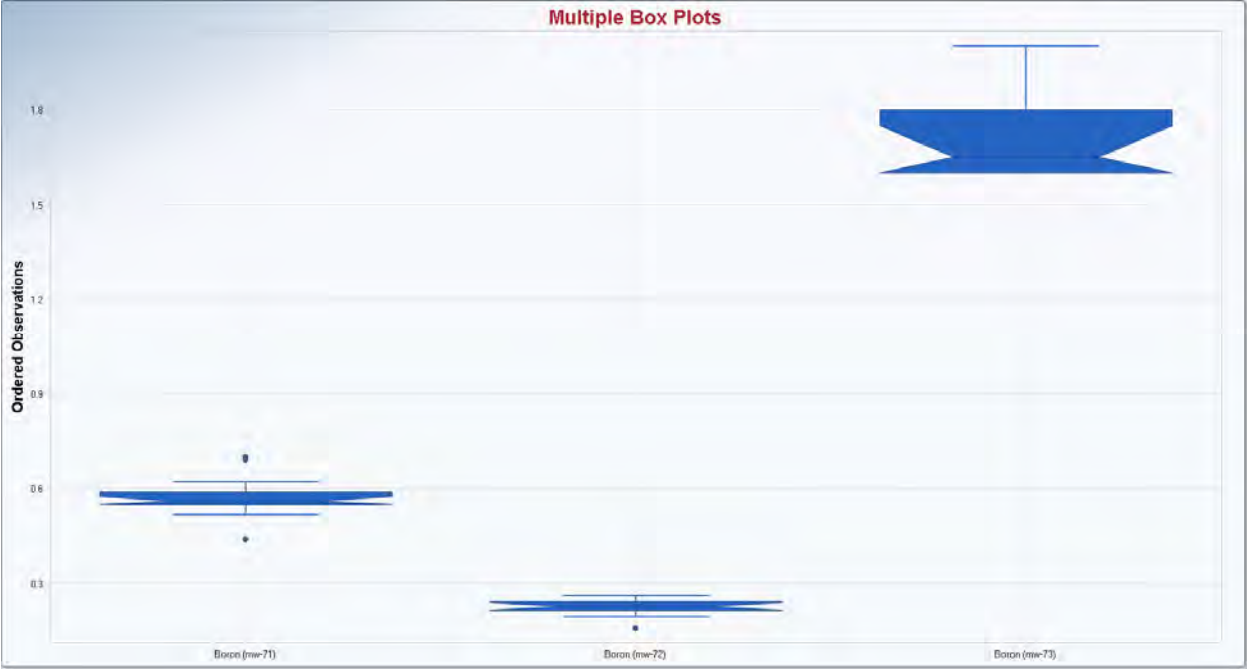
TDS (upper prediction limit = 34,396.6 ppm)		
Well ID	Sample Date	Sample Value (ppm)
---	---	---

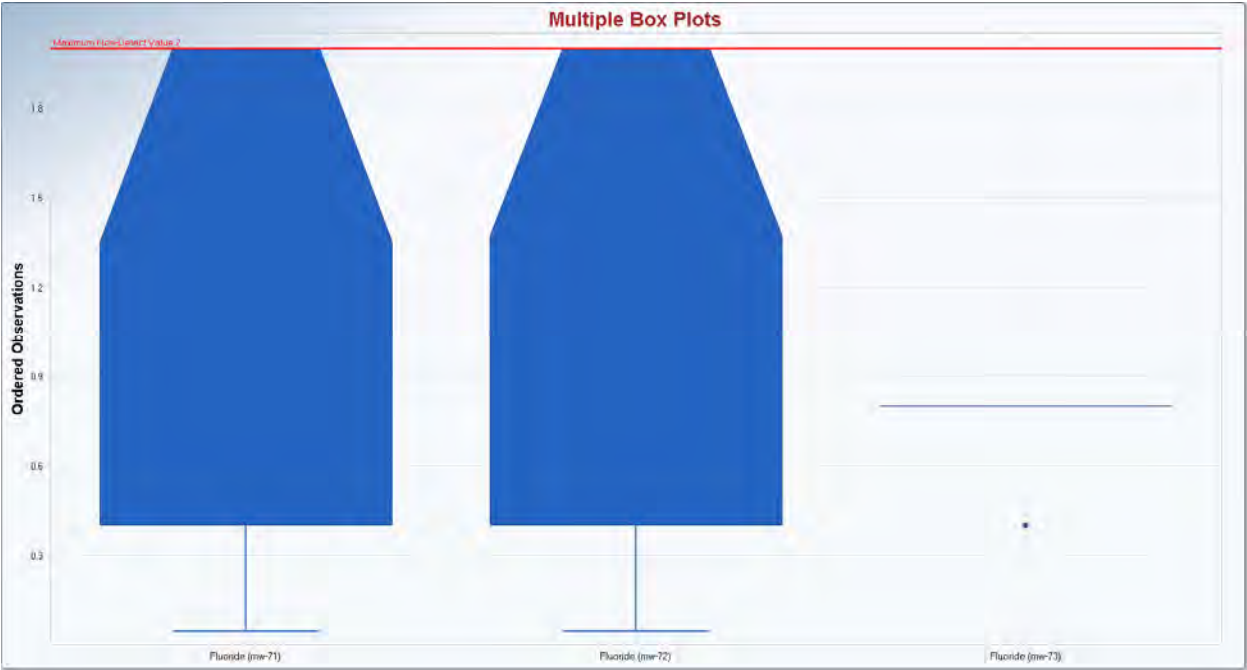
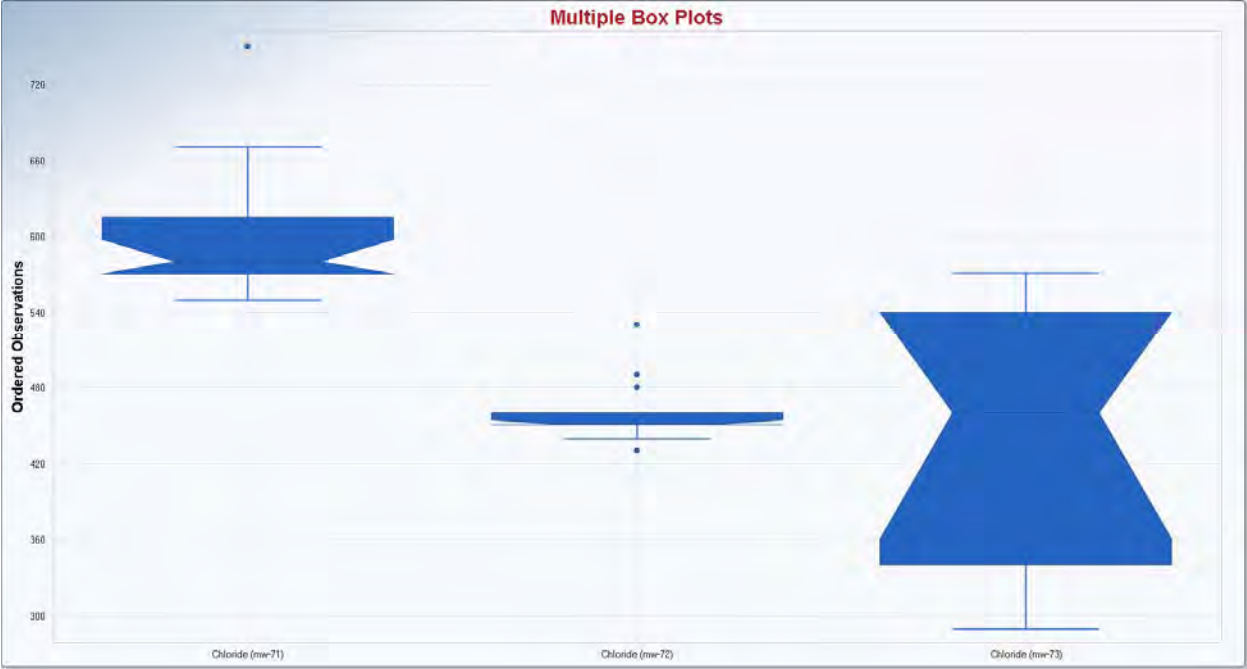
Sulfate (upper prediction limit = 22,000 ppm)		
Well ID	Sample Date	Sample Value (ppm)
---	---	---

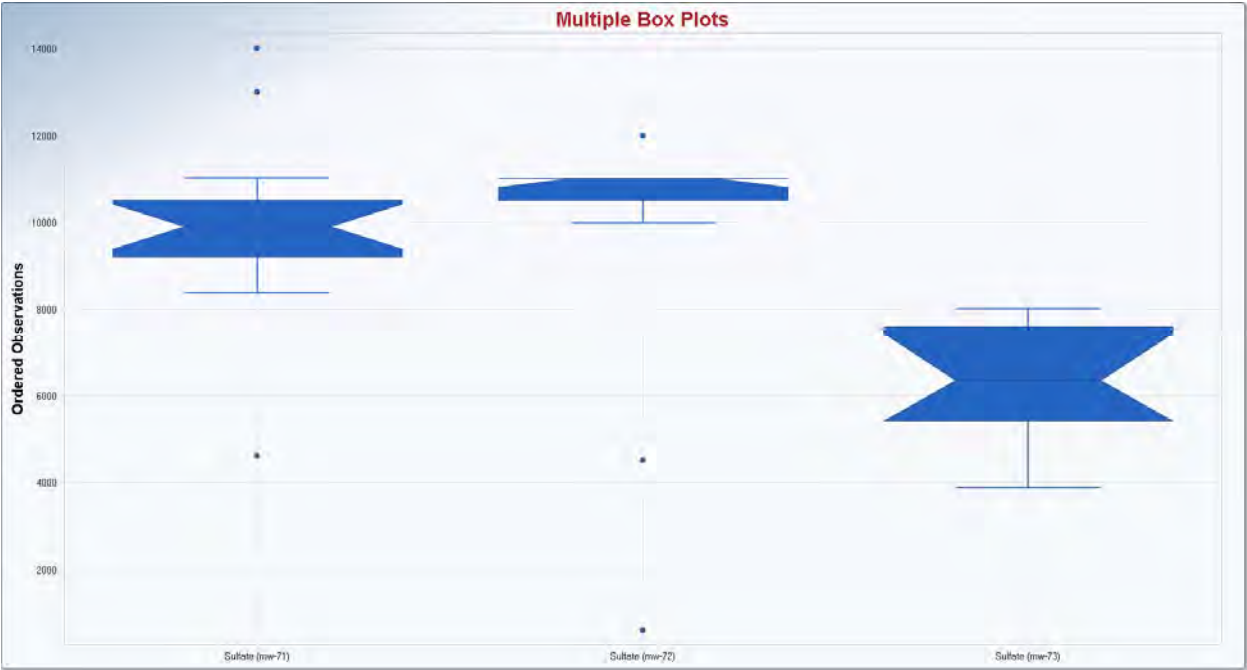
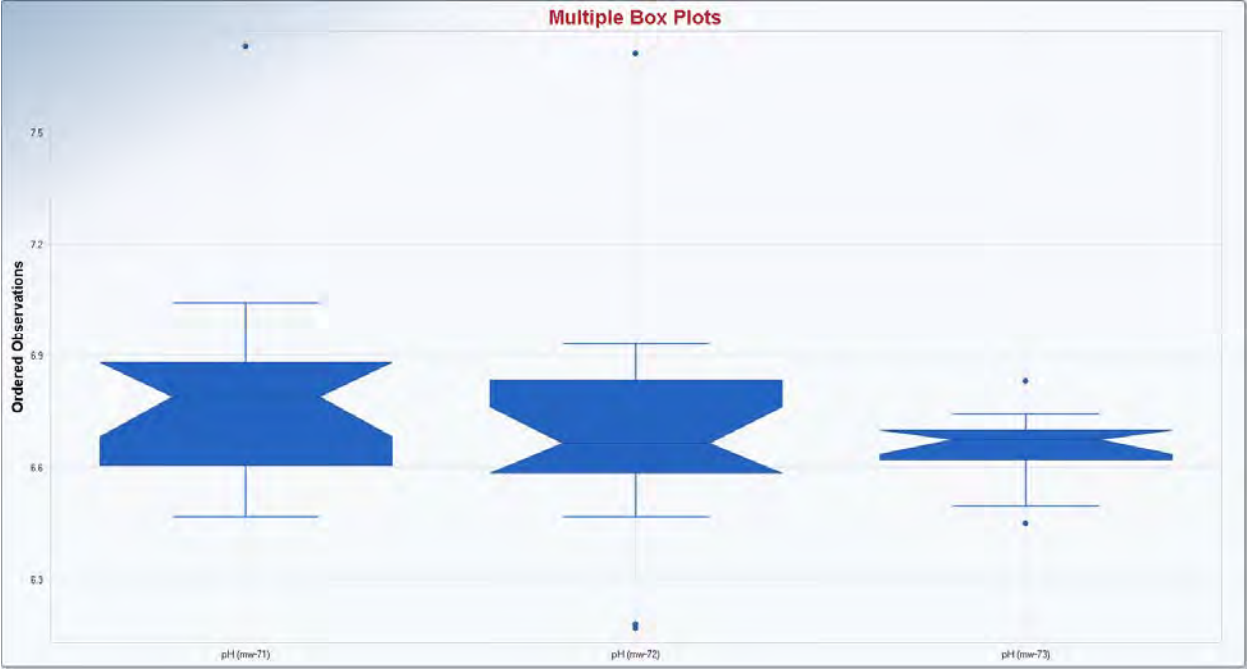


APPENDIX A

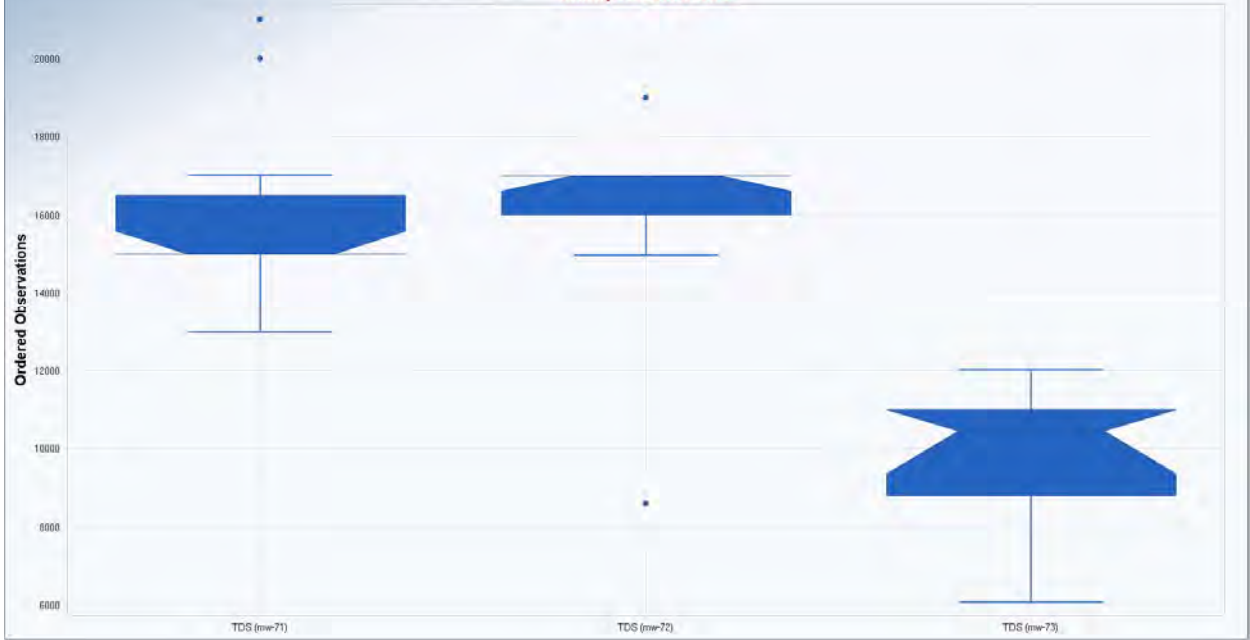
BOX AND WHISKER PLOTS FOR BACKGROUND WELLS IN PICTURED CLIFFS SANDSTONE







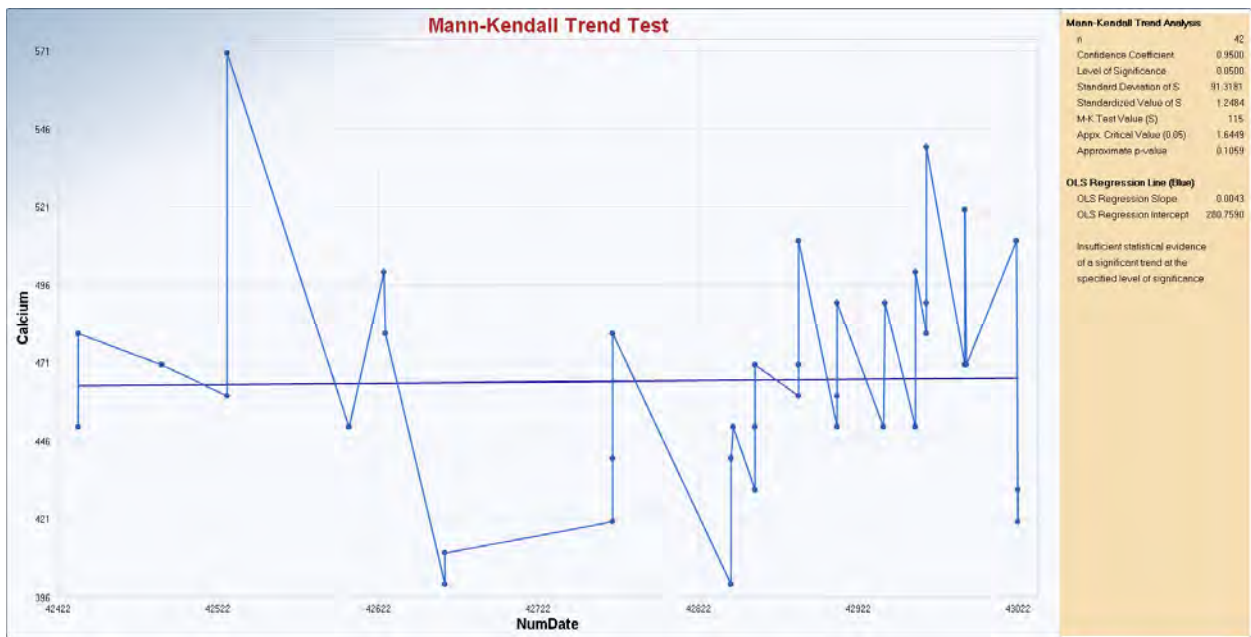
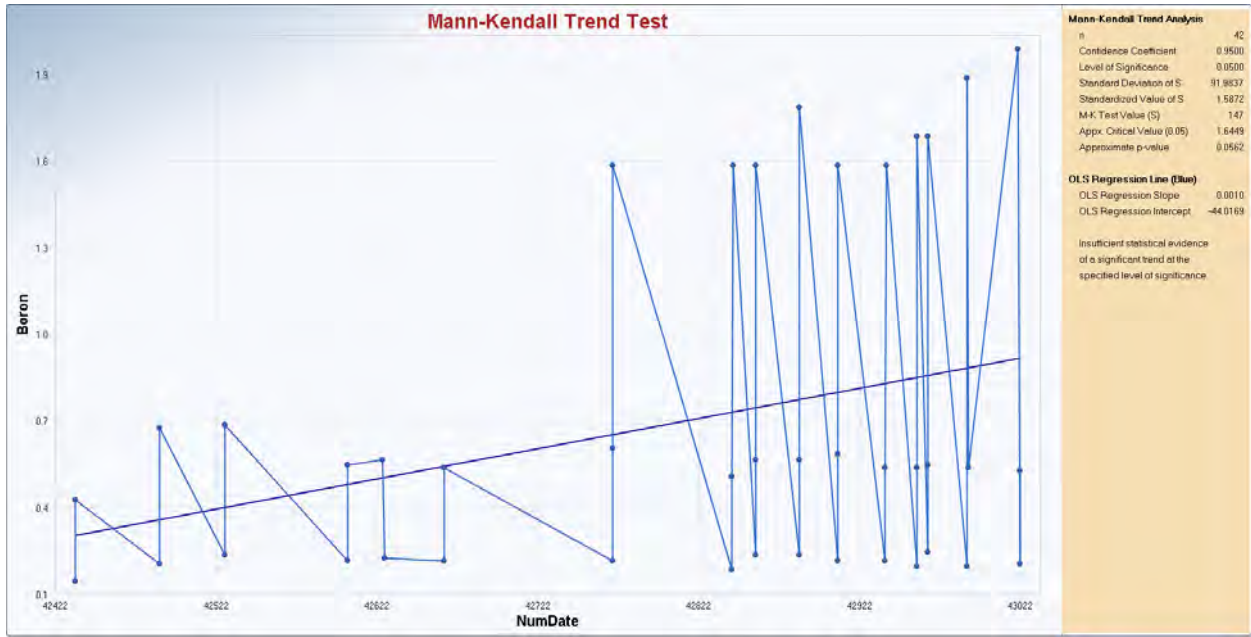
Multiple Box Plots

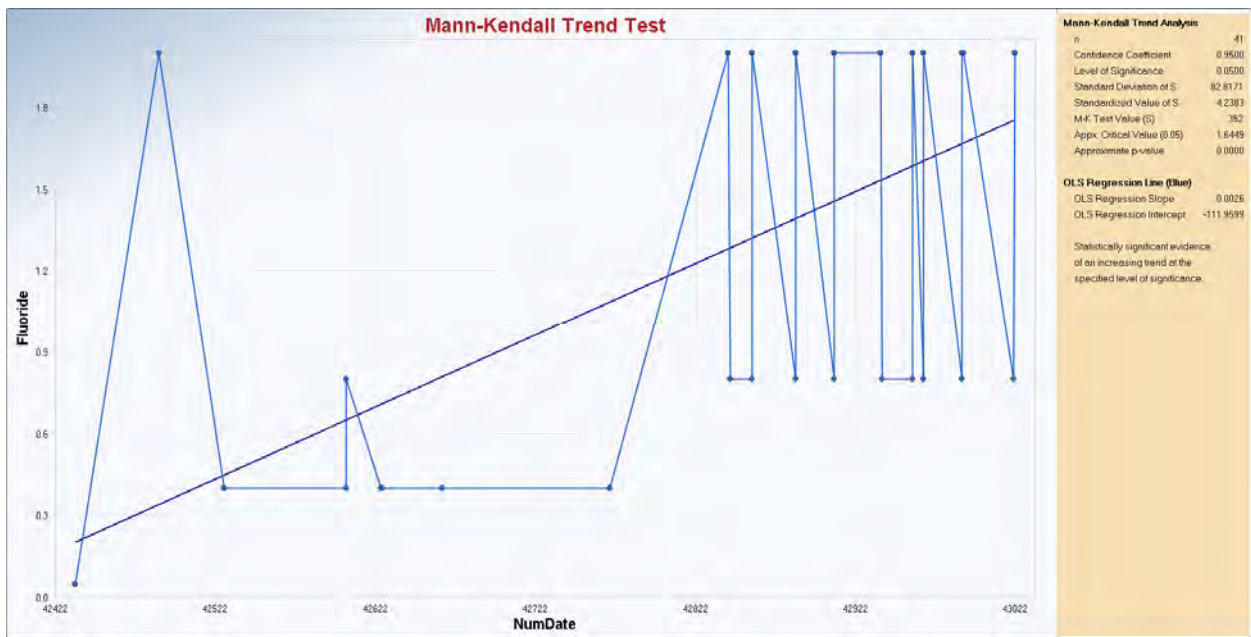
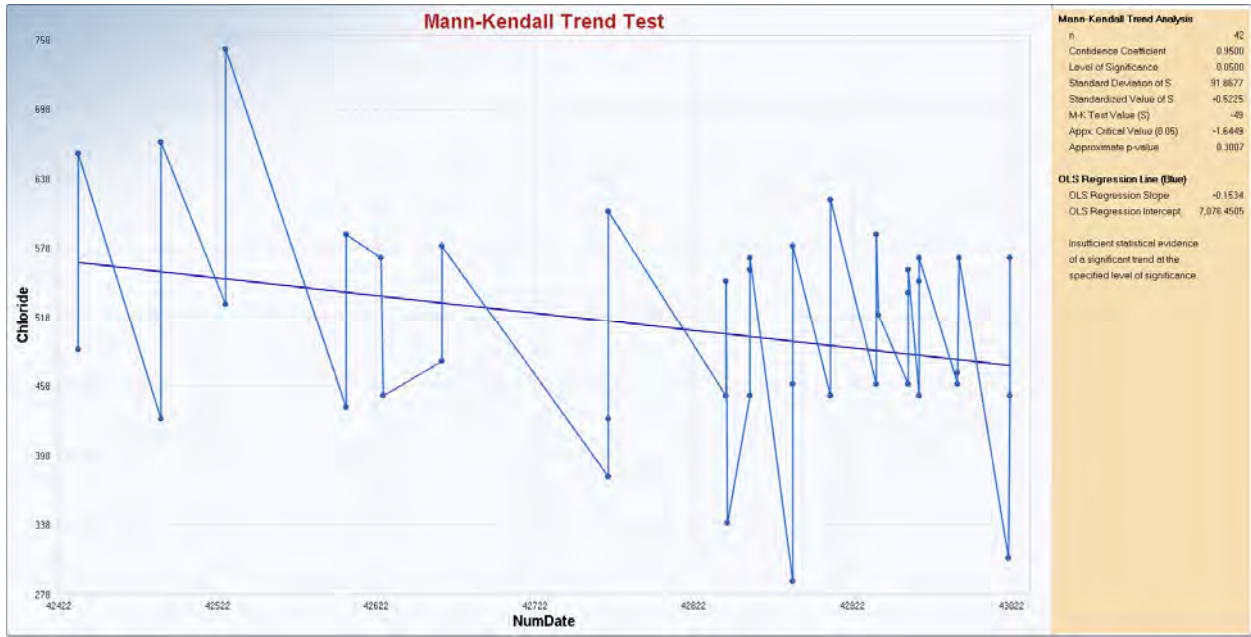


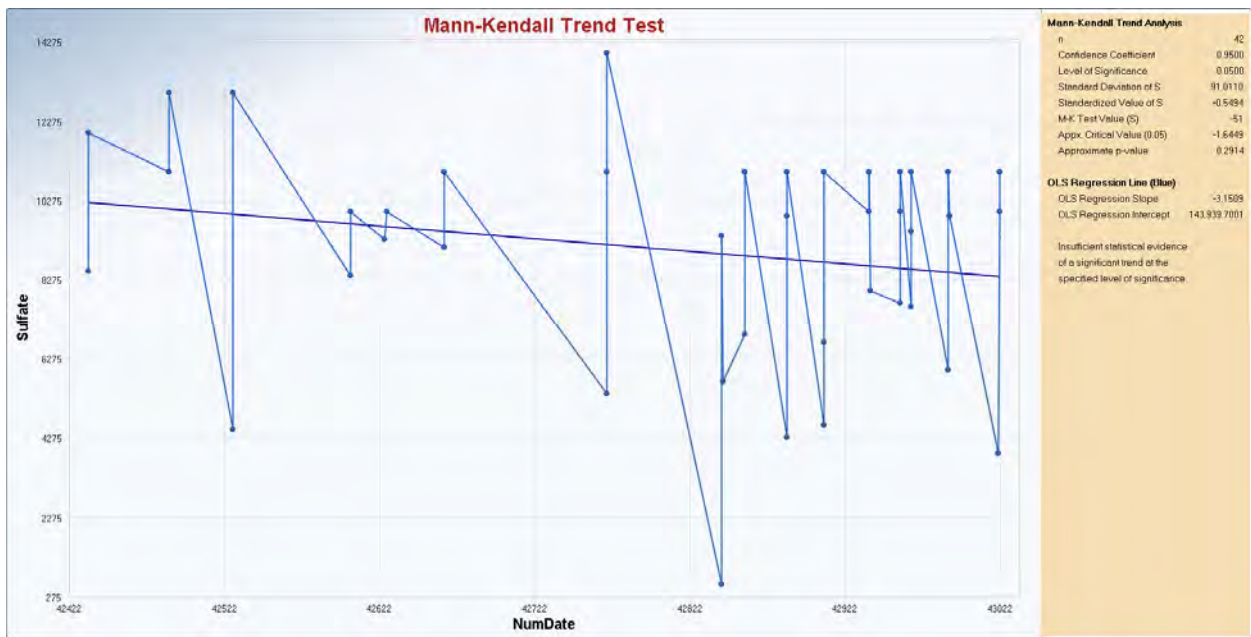
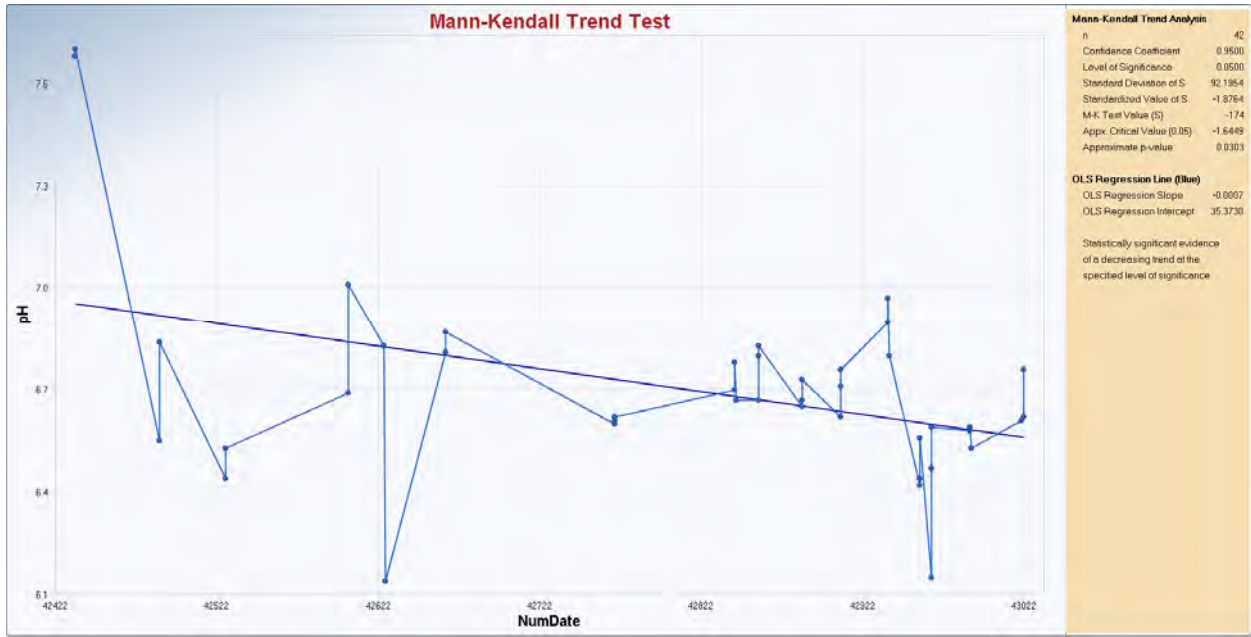


APPENDIX B

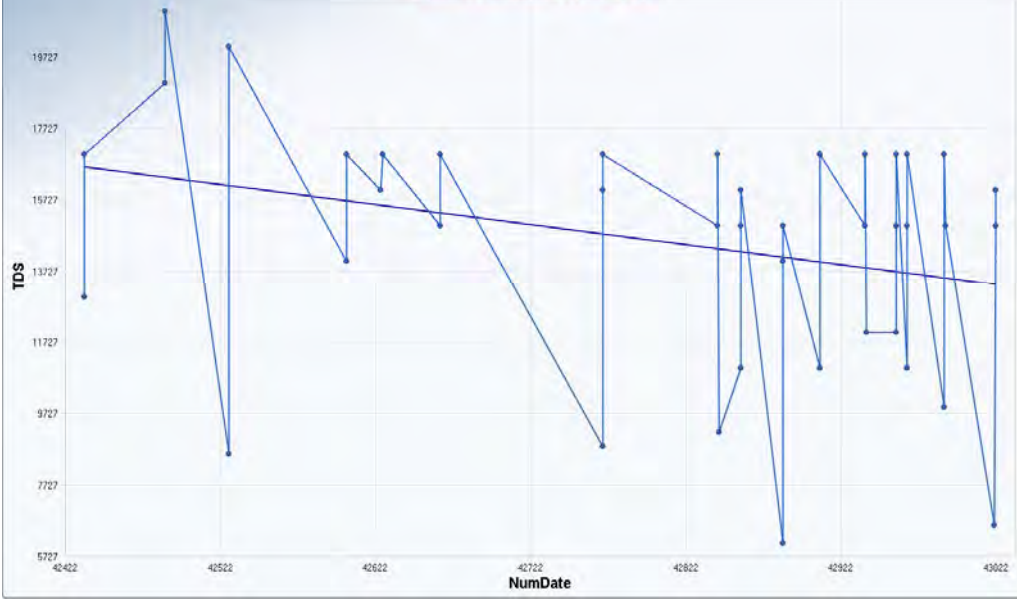
MANN-KENDALL TREND TESTS FOR BACKGROUND WELLS IN PICTURED CLIFFS SANDSTONE







Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	42
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	90.5261
Standardized Value of S	-1.4029
M-K Test Value (Z)	-128
Approx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0803

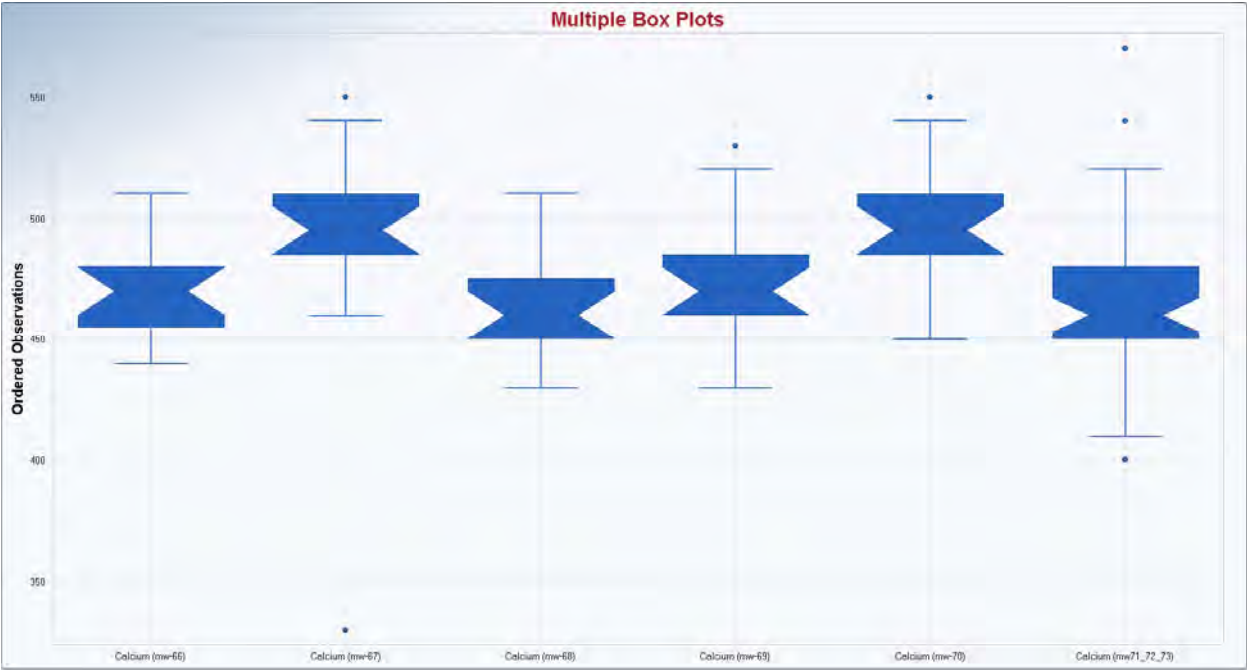
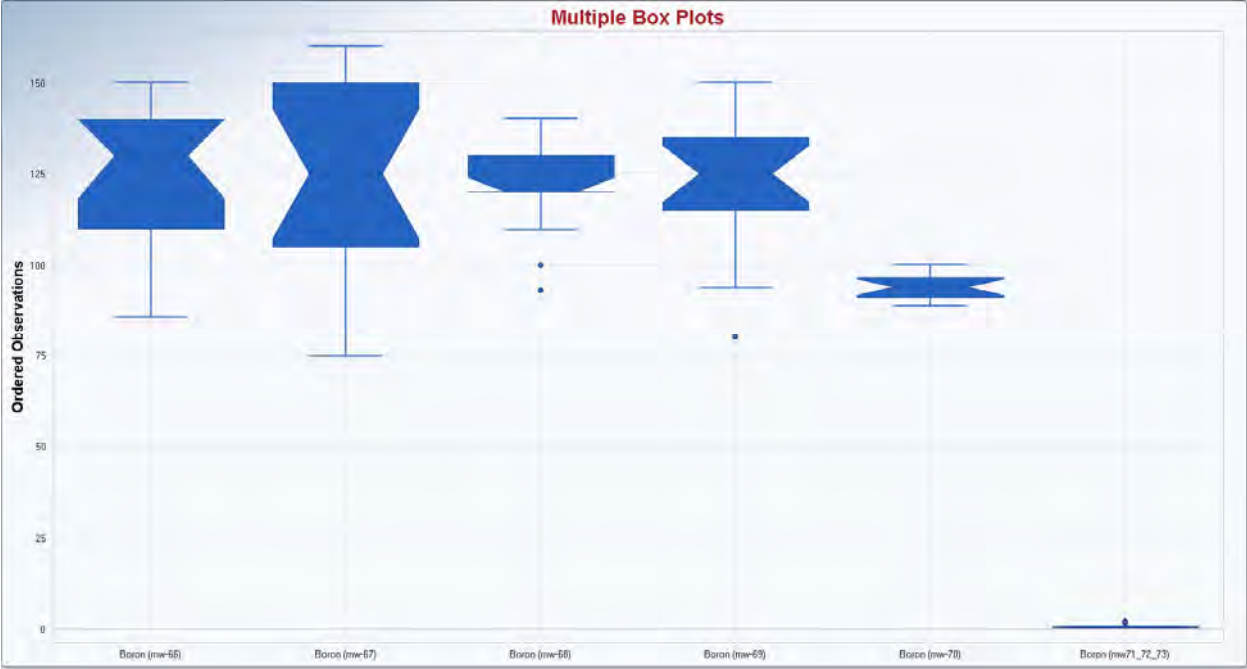
OLS Regression Line (Blue)	
OLS Regression Slope	-5.6198
OLS Regression Intercept	255,117.7209

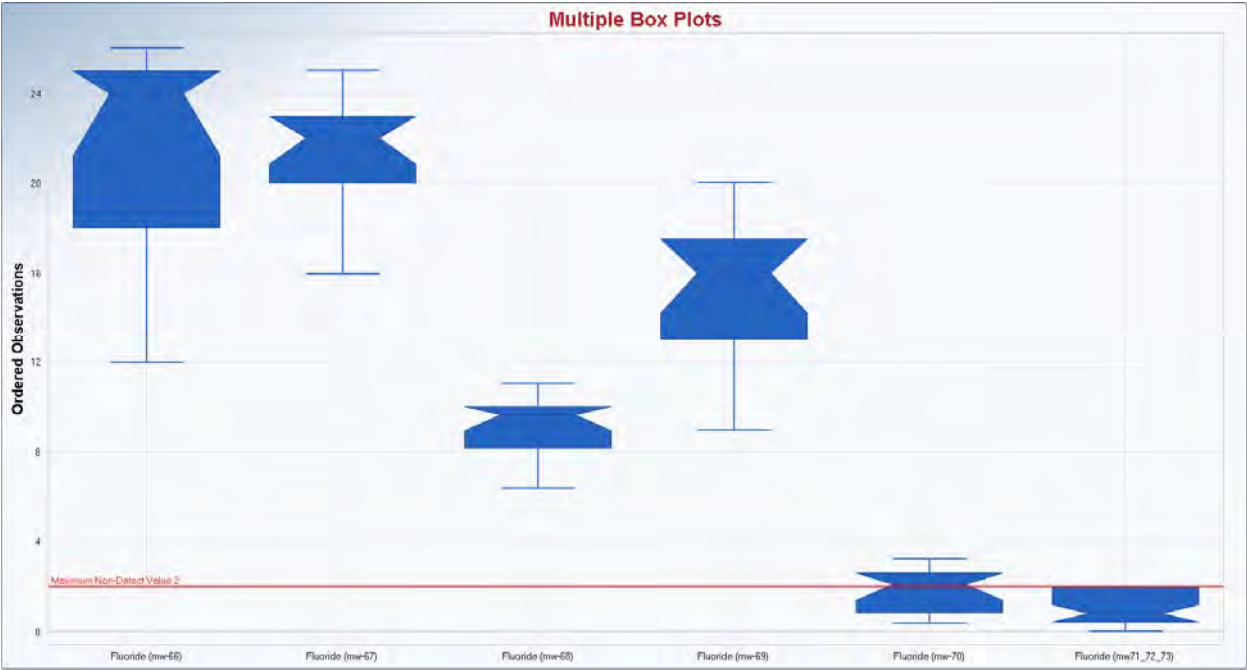
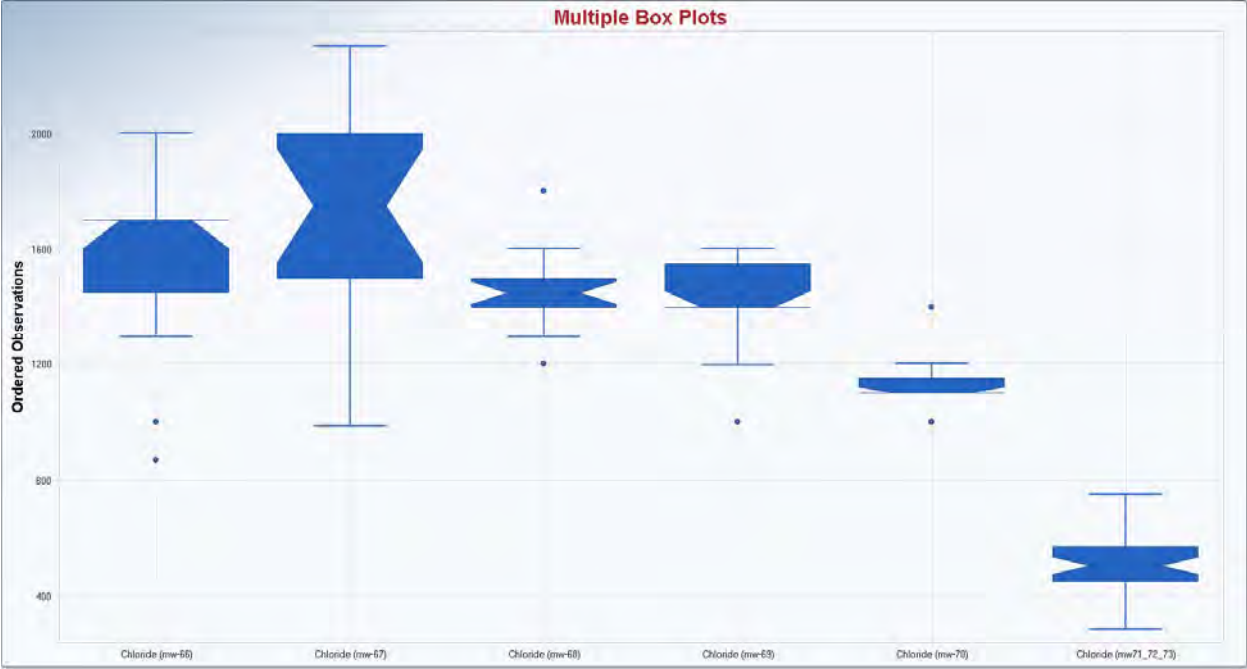
Insufficient statistical evidence of a significant trend at the specified level of significance.

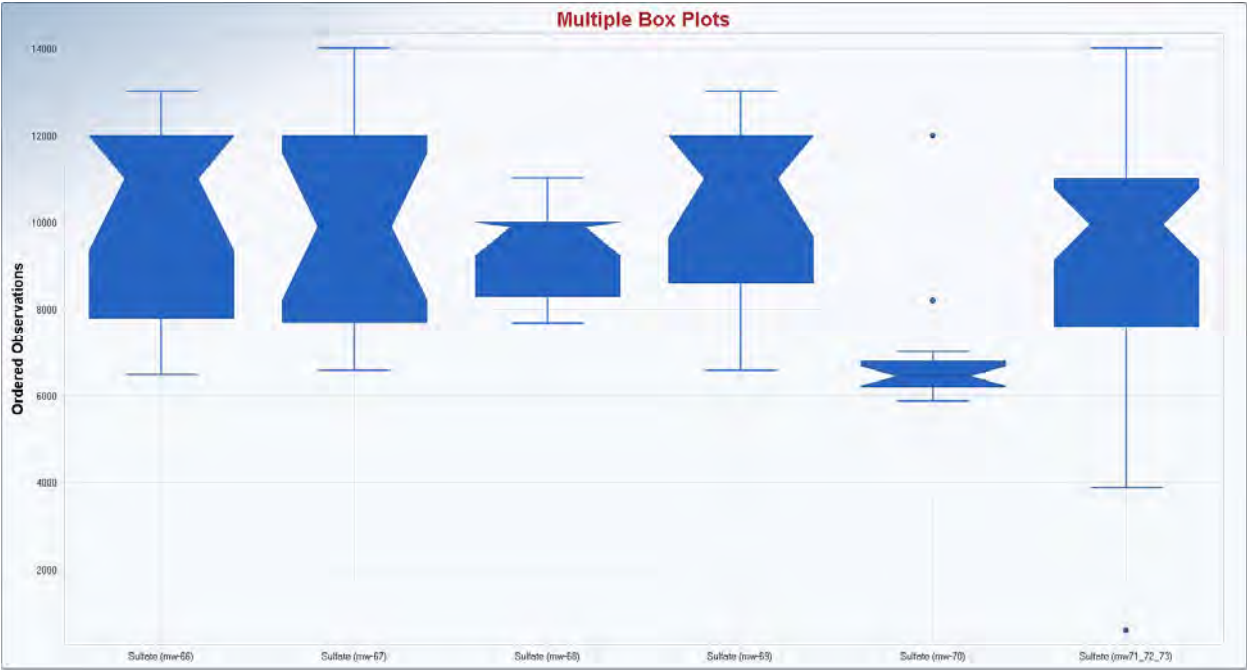
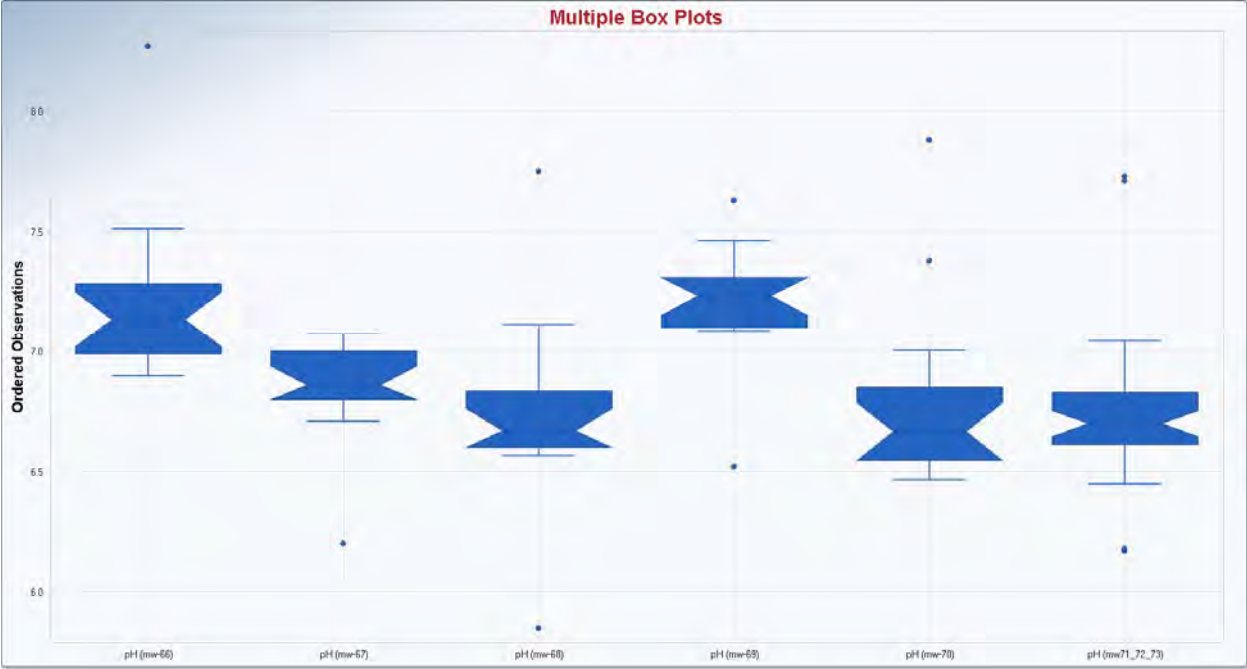


APPENDIX C

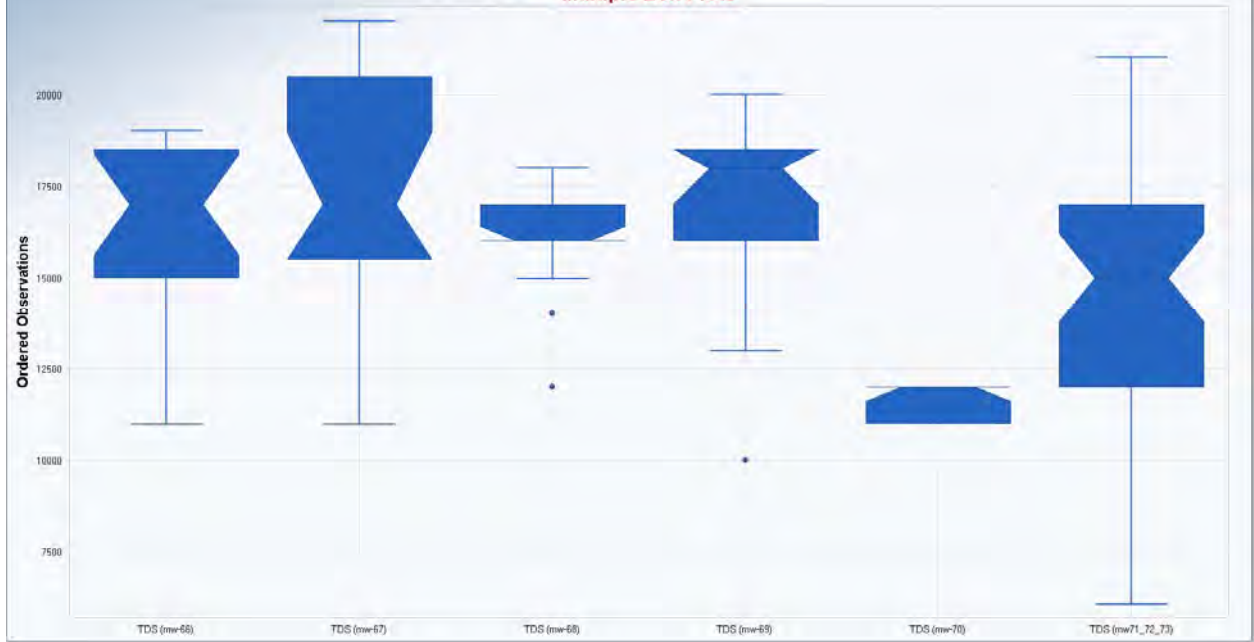
BOX AND WHISKER PLOTS FOR URS WELLS IN PICTURED CLIFFS SANDSTONE







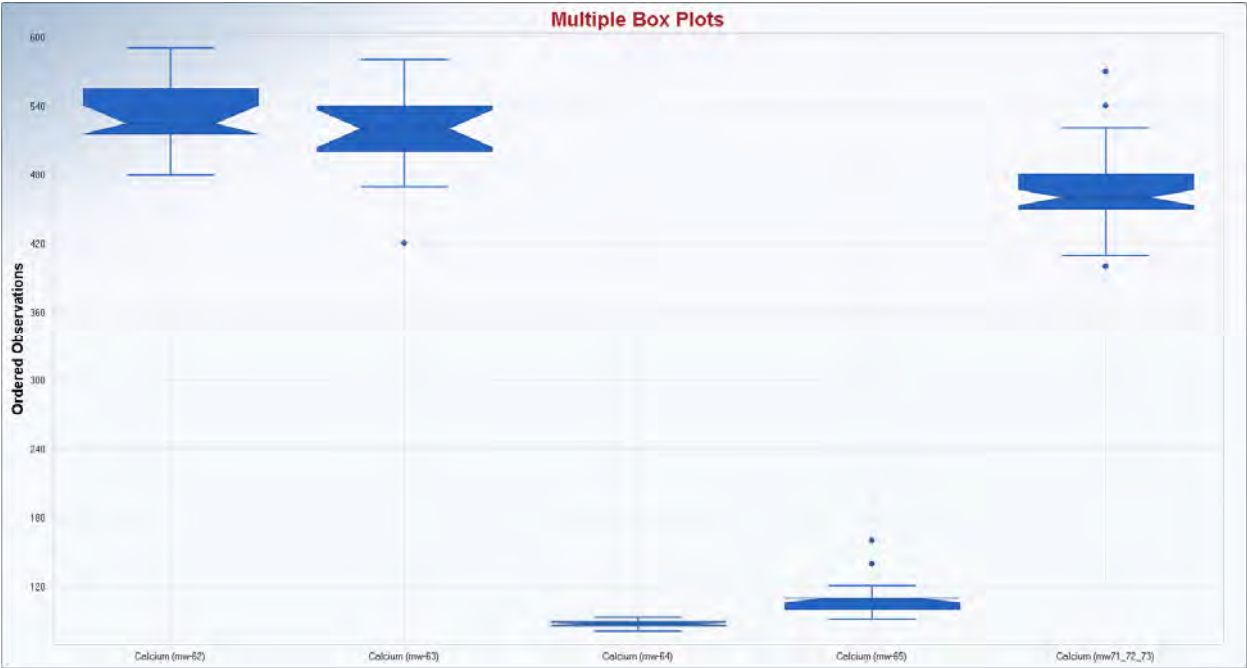
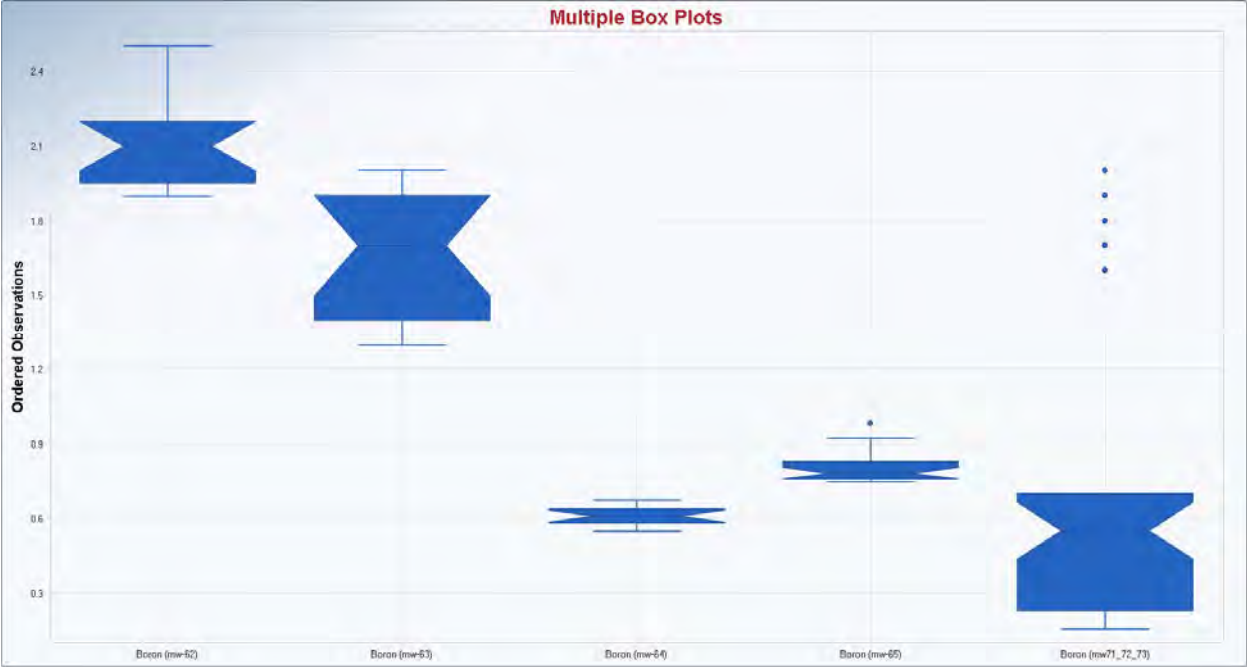
Multiple Box Plots

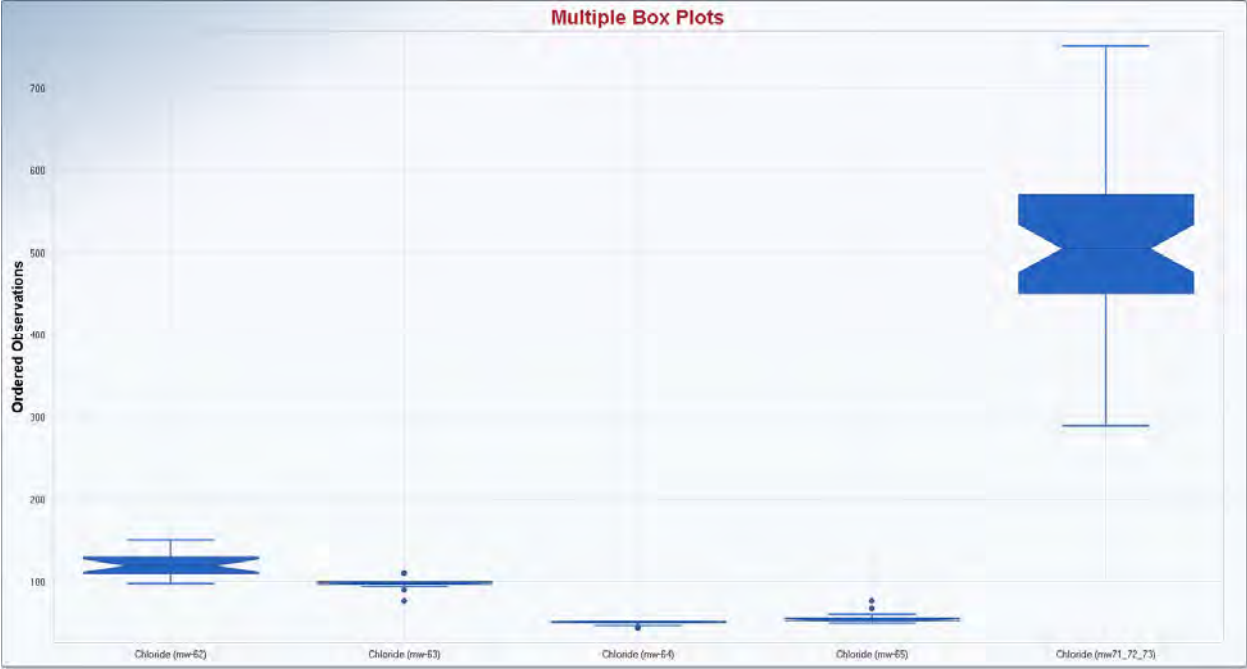


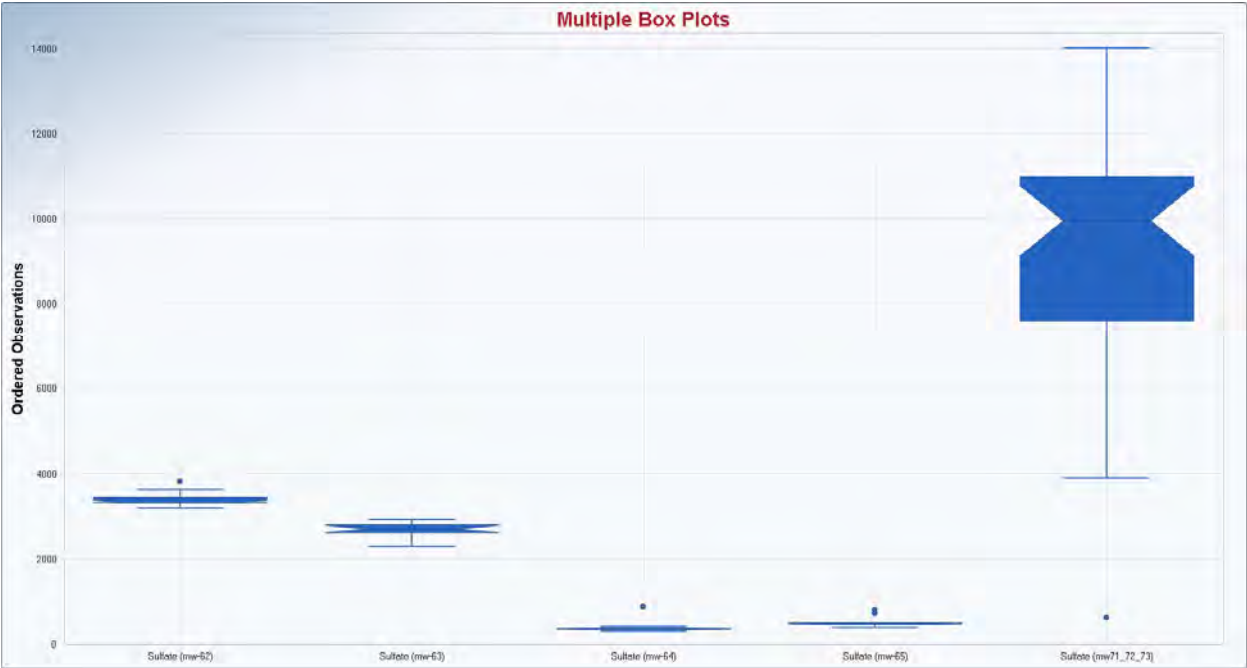


APPENDIX D

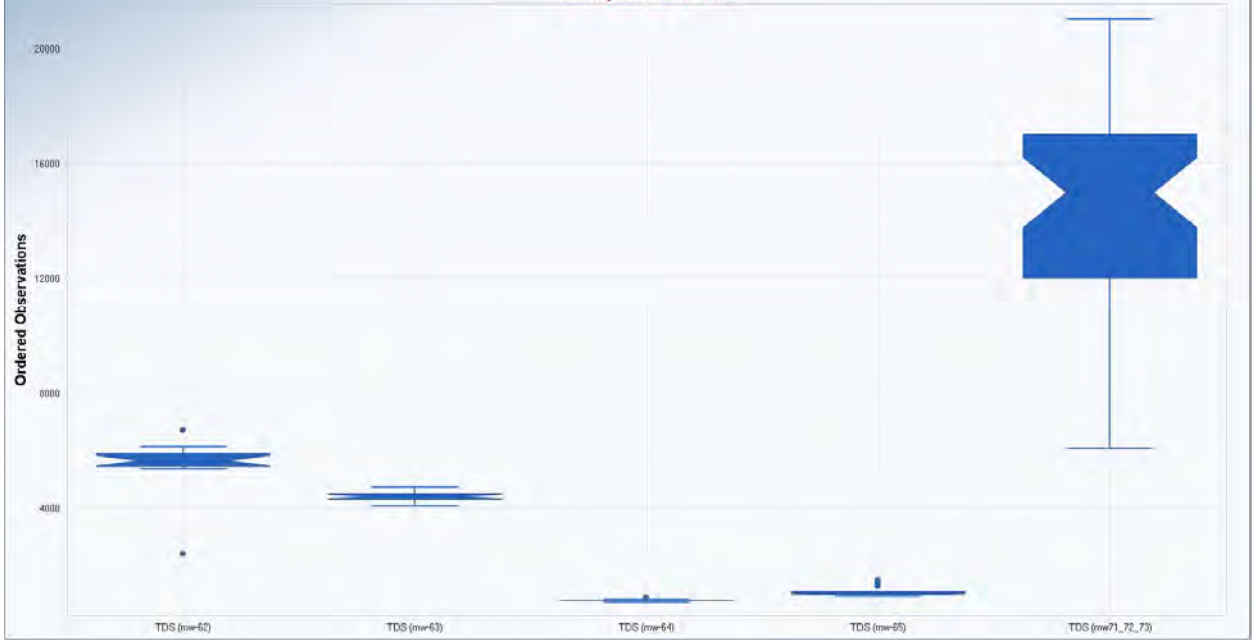
BOX AND WHISKER PLOTS FOR CWTP WELLS IN PICTURED CLIFFS SANDSTONE







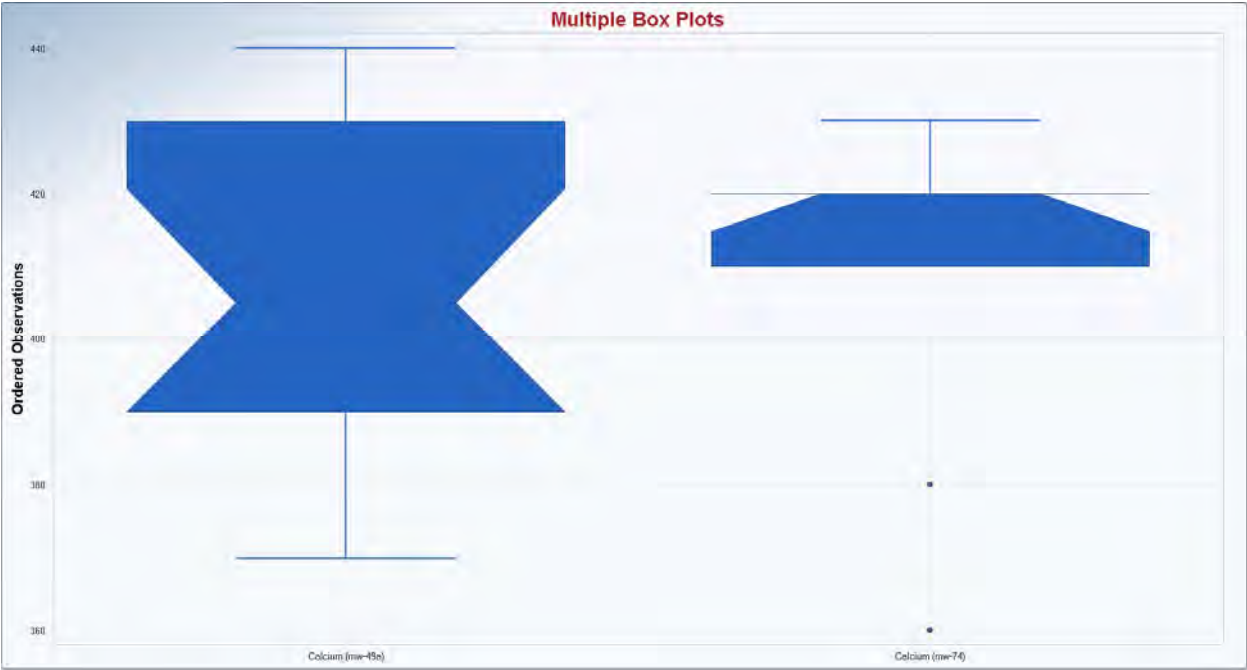
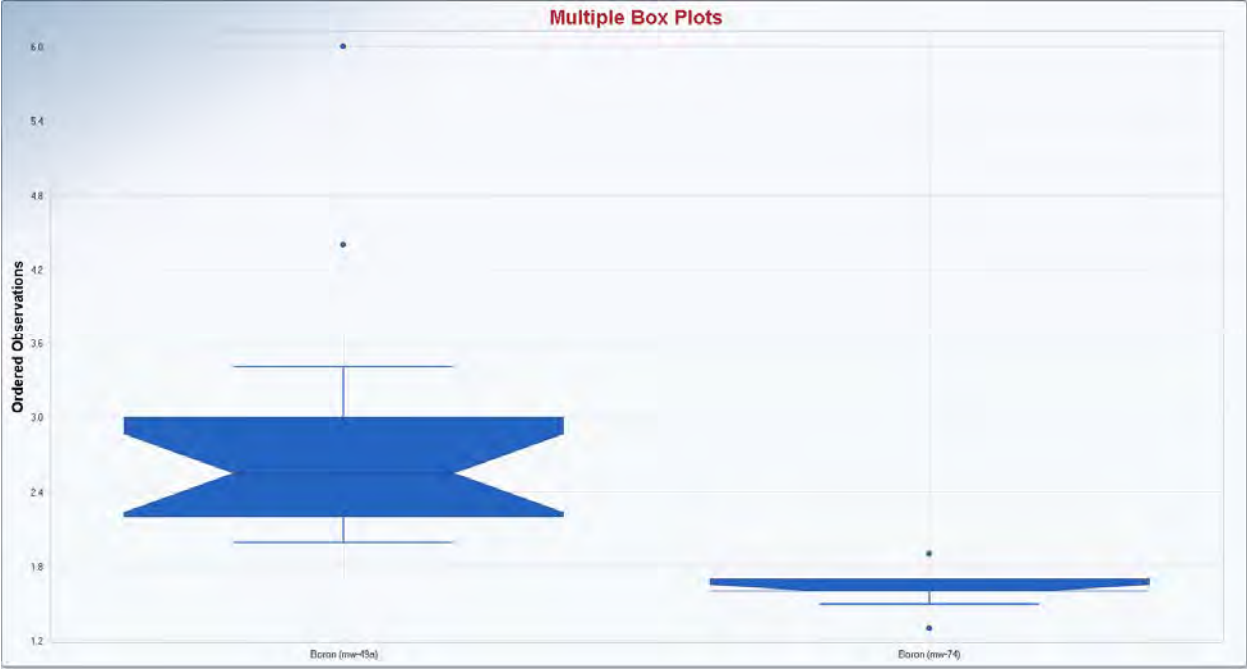
Multiple Box Plots

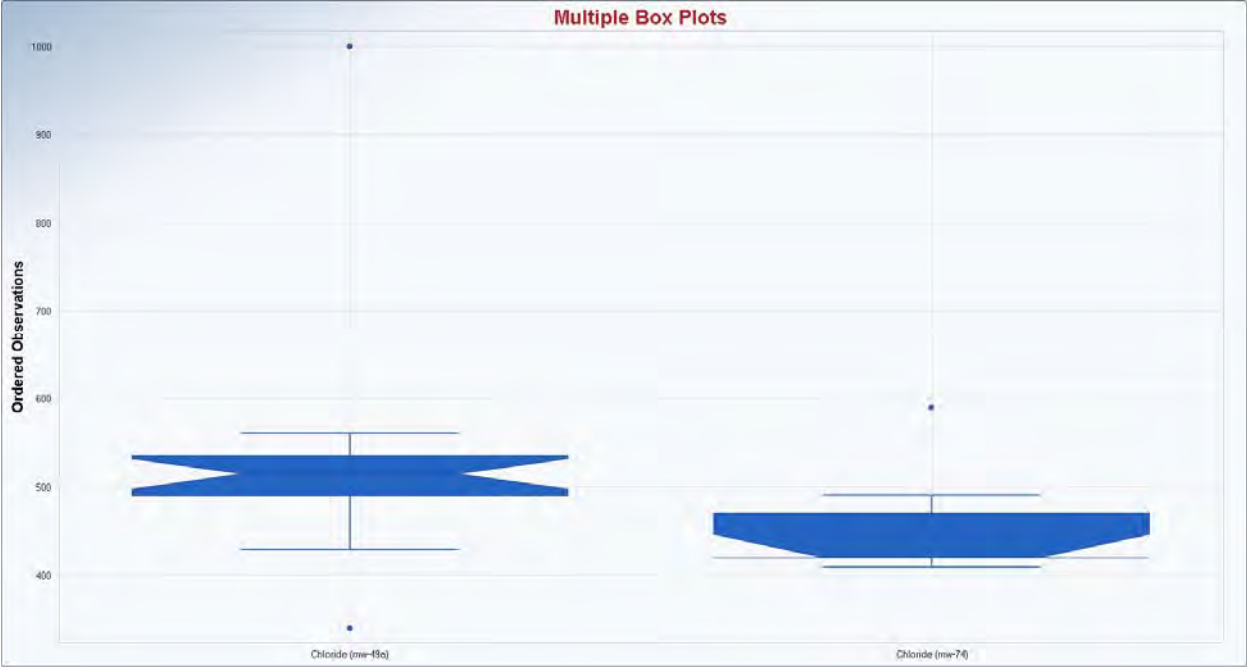


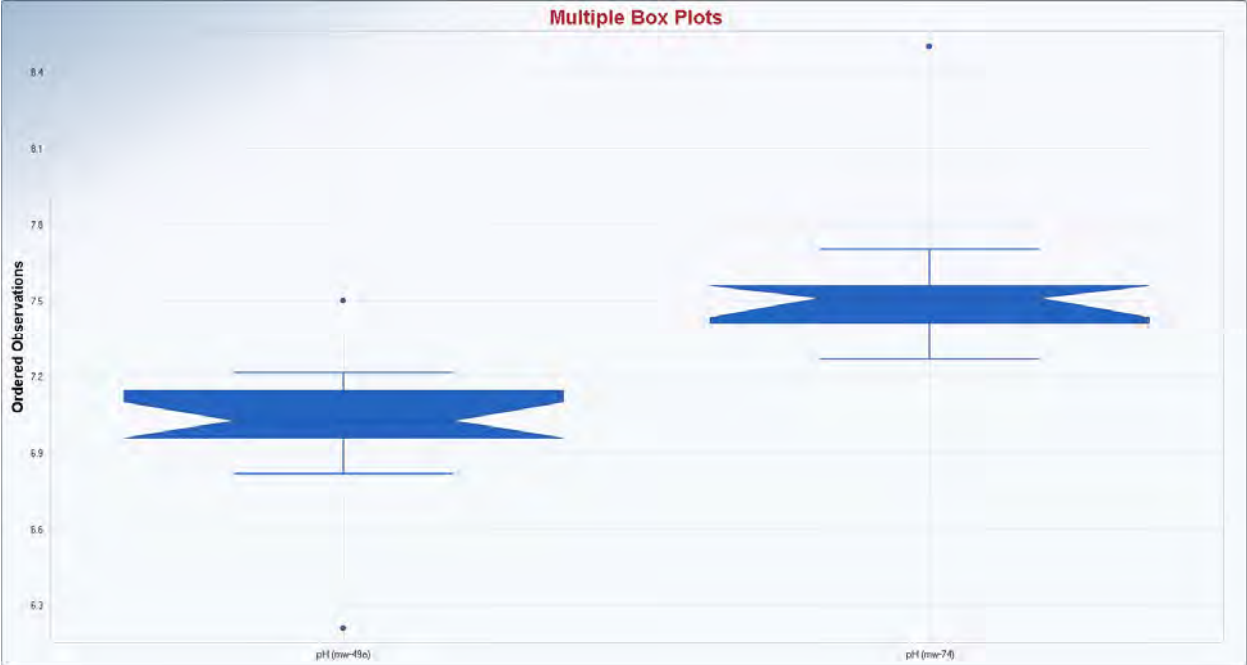


APPENDIX E

BOX AND WHISKER PLOTS FOR BACKGROUND WELLS IN LEWIS SHALE/ALLUVIUM







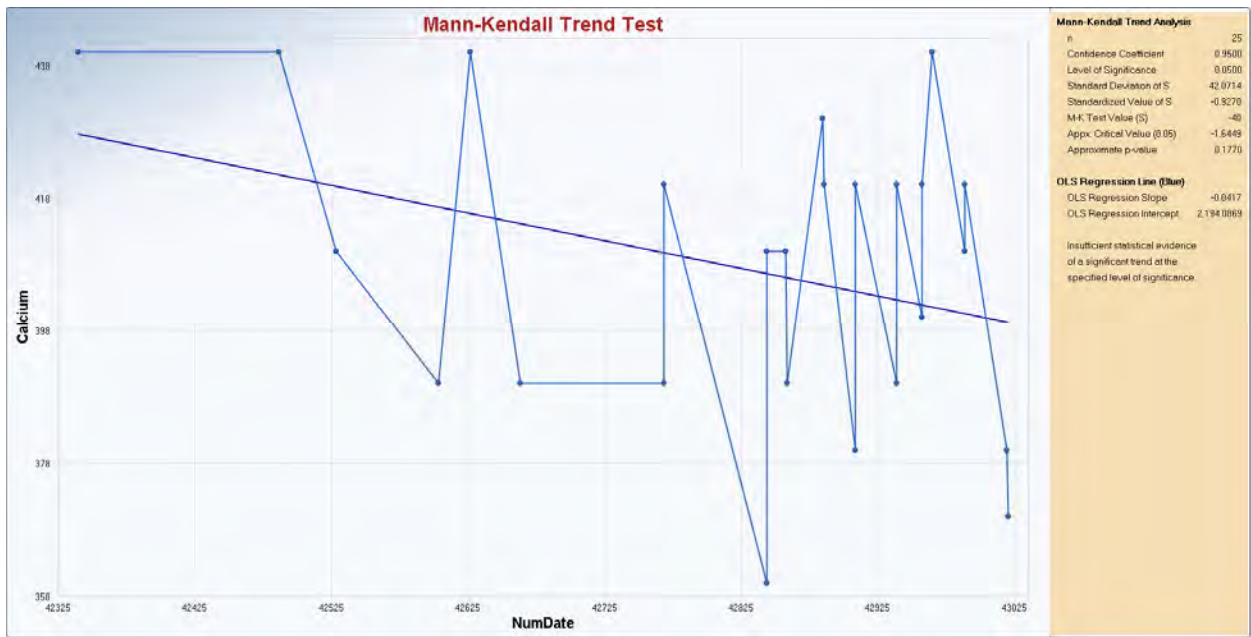
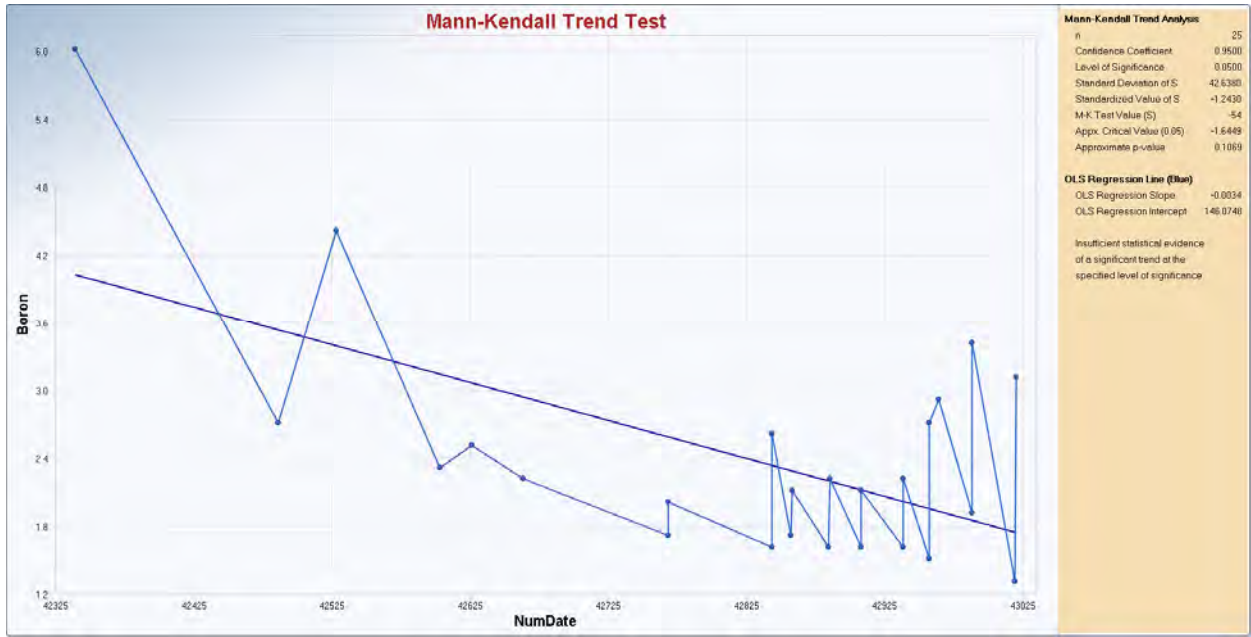
Multiple Box Plots

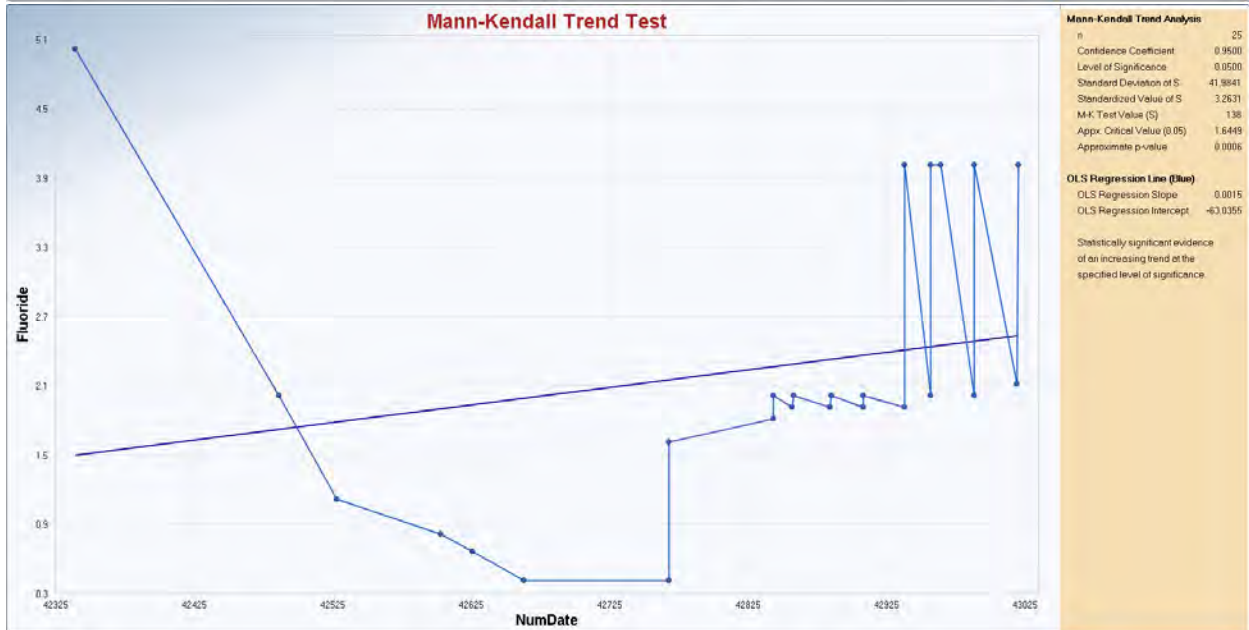
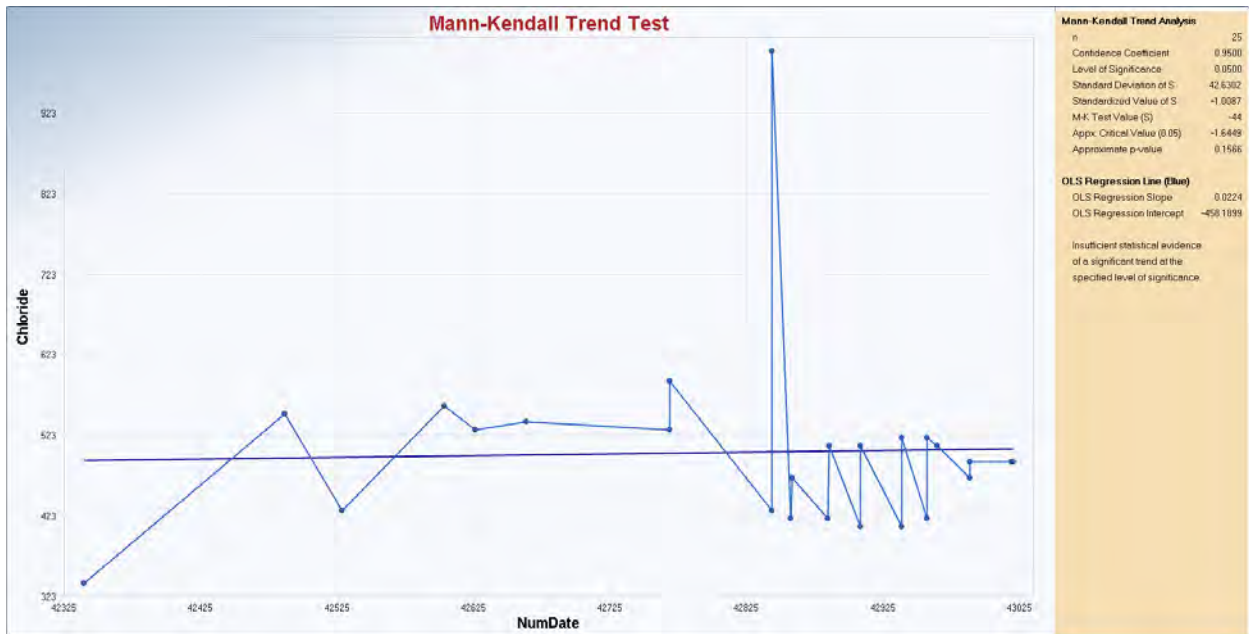


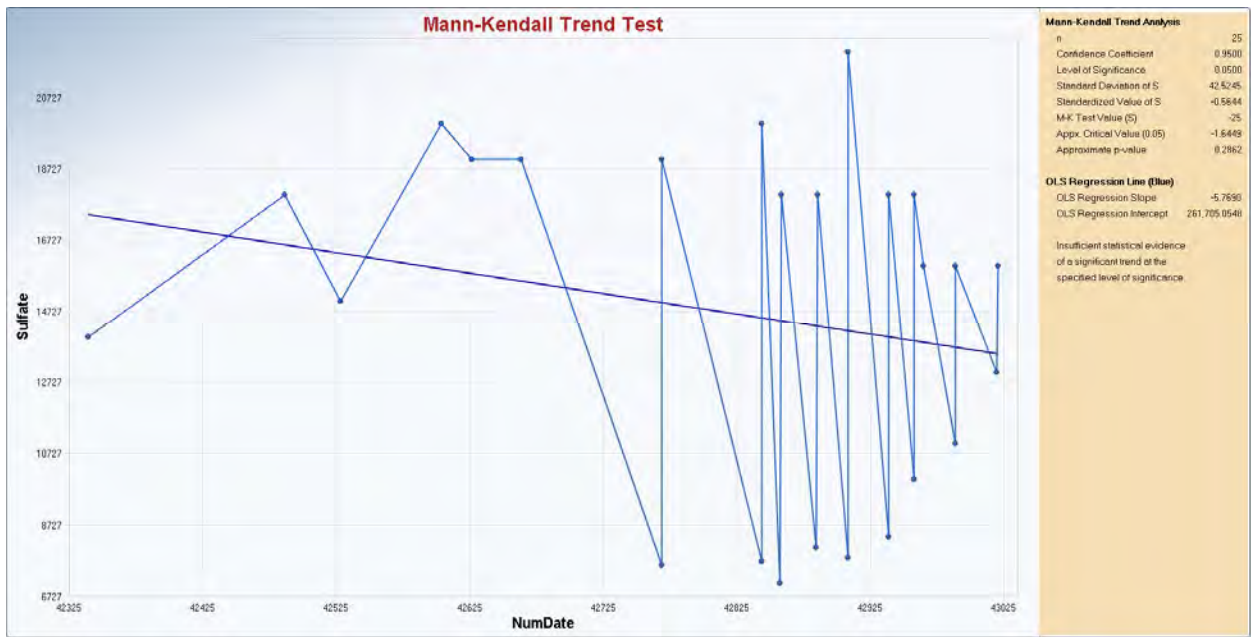
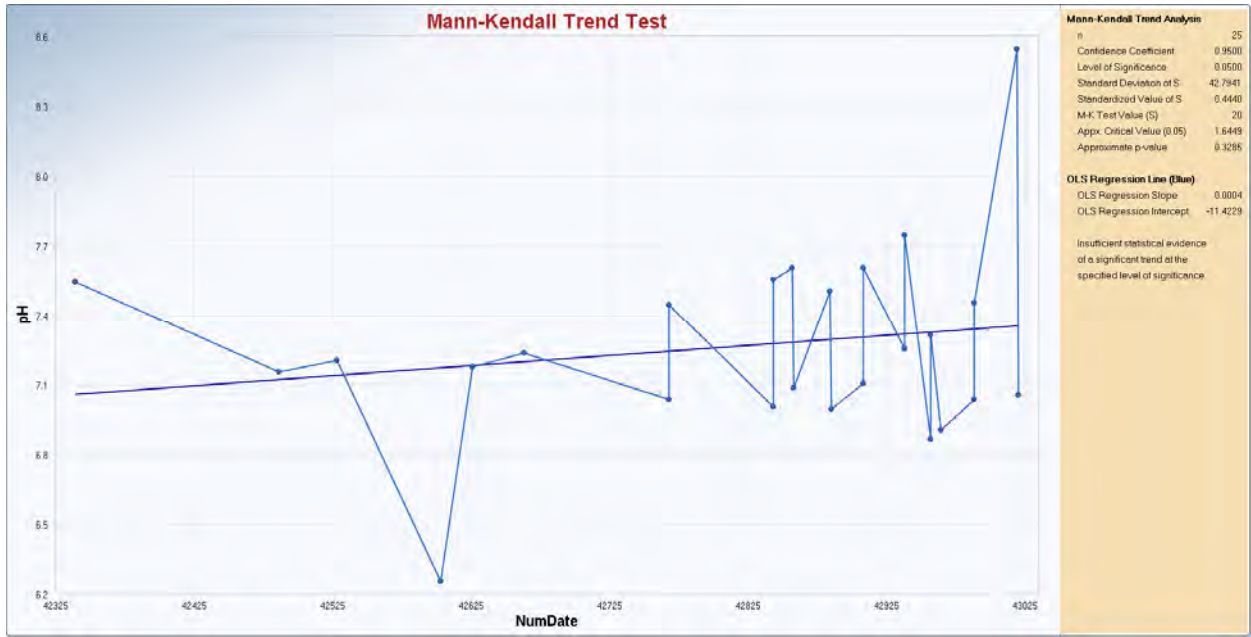


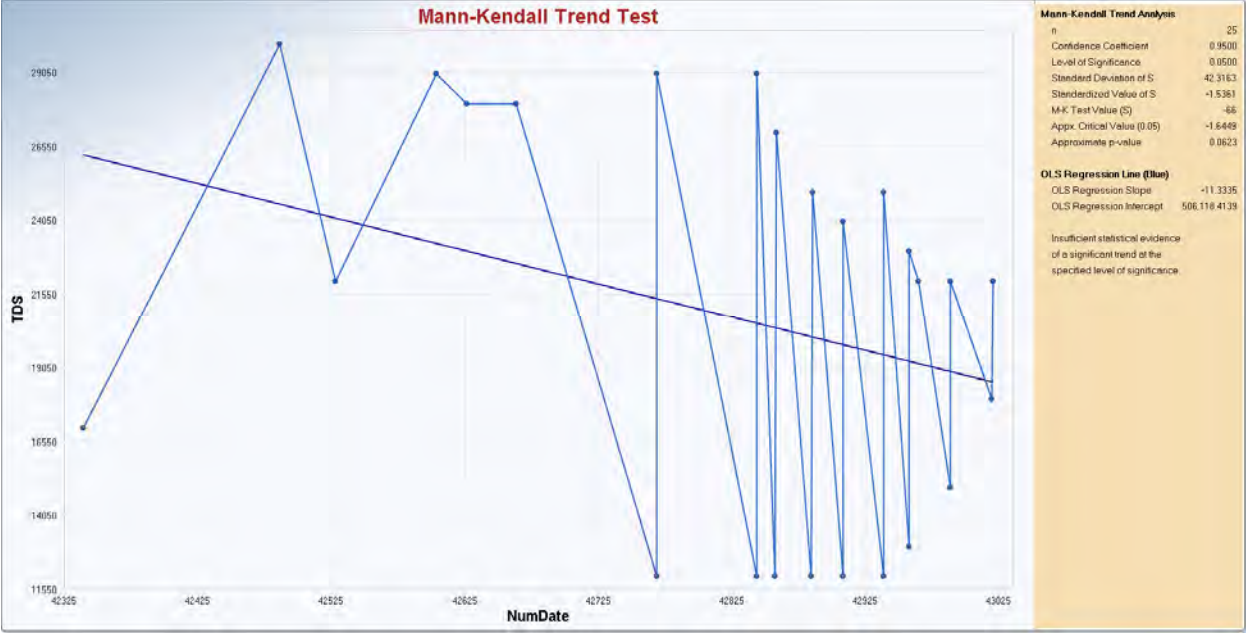
APPENDIX F

MANN-KENDALL TREND TESTS FOR BACKGROUND WELLS IN LEWIS SHALE/ALLUVIUM





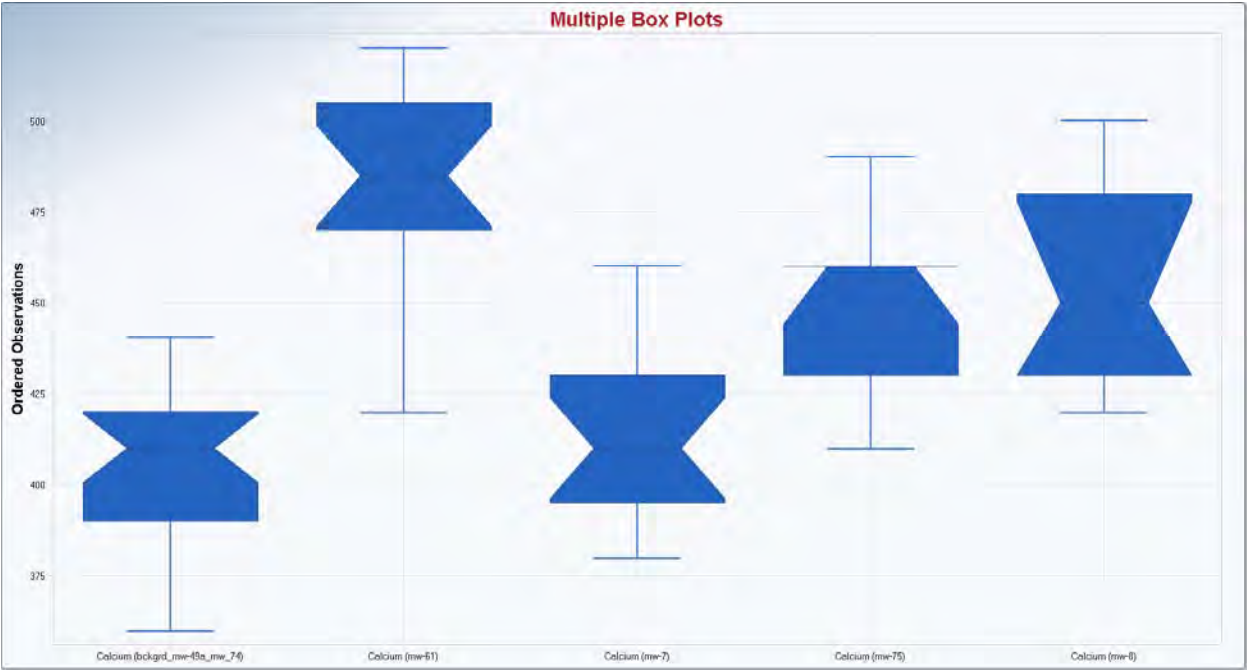
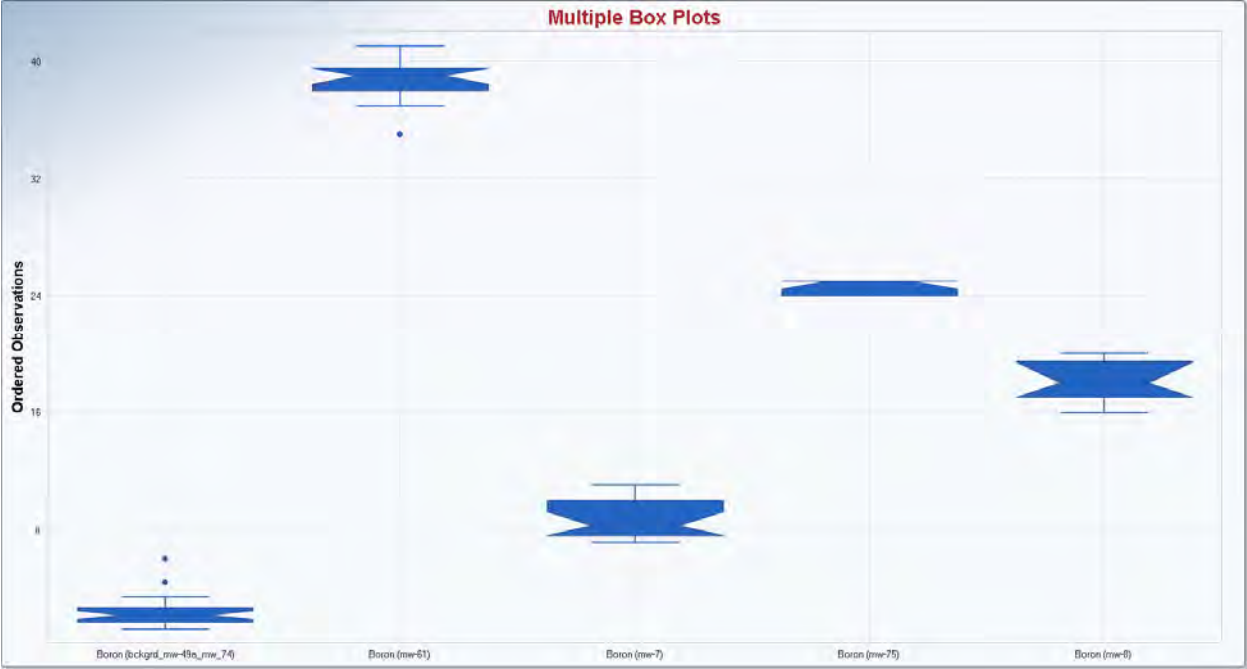


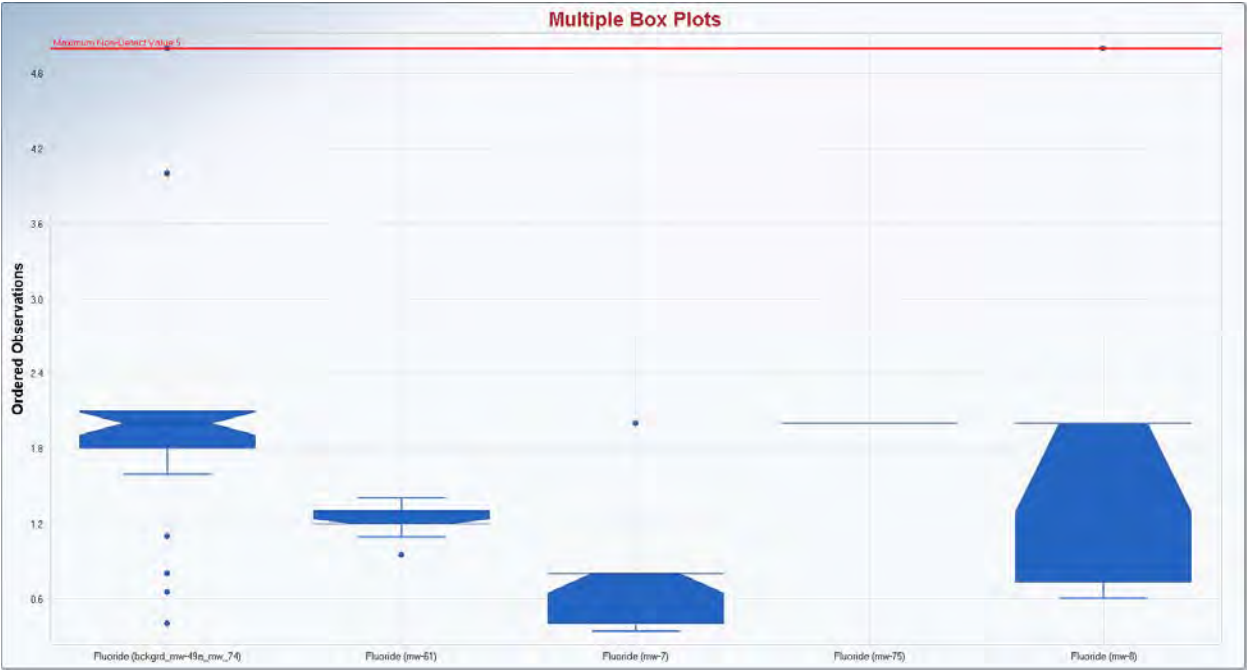
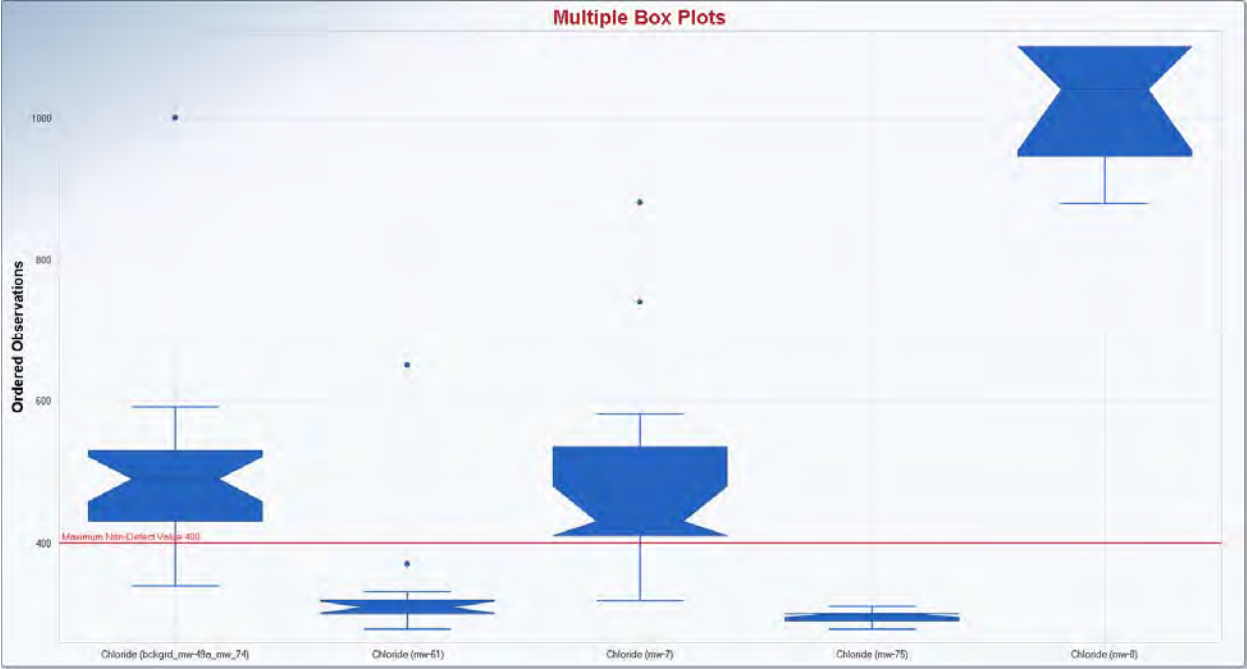


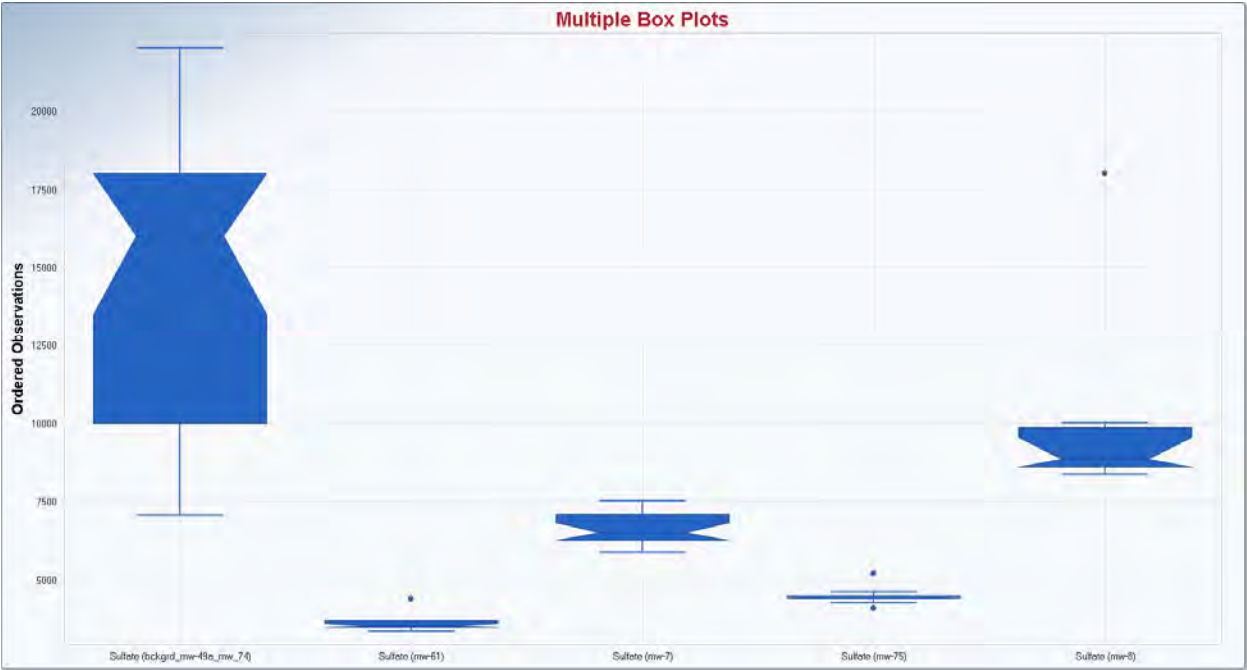
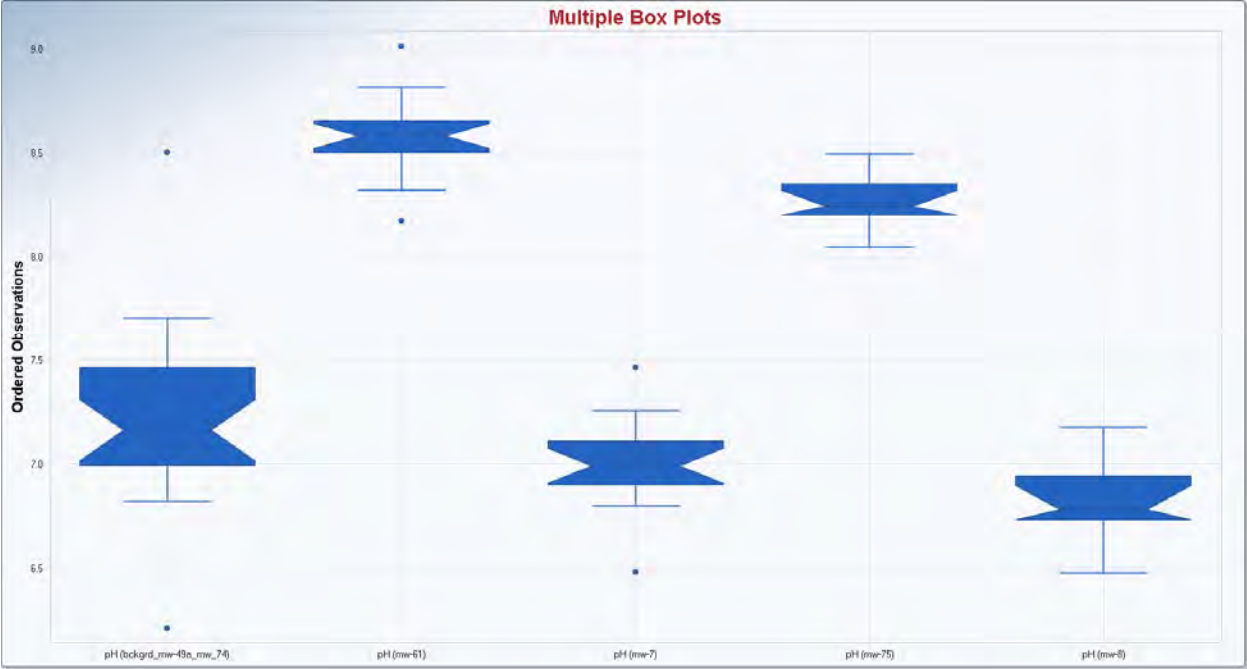


APPENDIX G

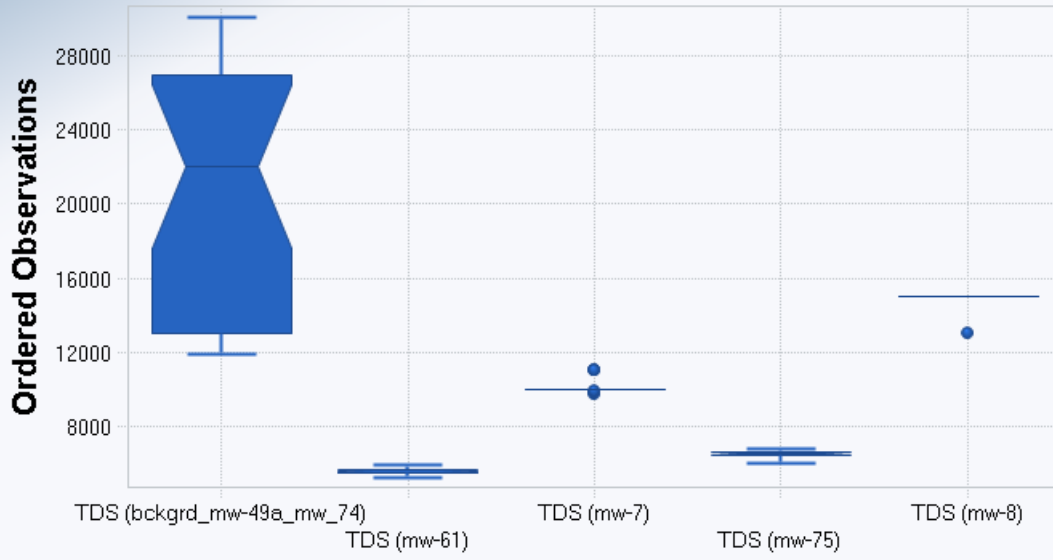
BOX AND WHISKER PLOTS FOR MULTIUNIT 1 WELLS IN LEWIS SHALE/ALLUVIUM







Multiple Box Plots





**PRACTITIONER'S NOTES
(2 EXCEL SPREADSHEETS)**

LEWIS SHALE/ALLUVIUM

Practitioner's Notes
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Prediction Limits with Retesting on Grouped Background Wells - Lewis Shale/Alluvium

	MW49A & MW74						
	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
Trend testing (including NDs)							
Trend significant (p<0.05) ^{1,2} ?	---	---	---	Increasing; p<0.001	---	---	---
OLS detrending successful (p<0.05) ² ?	---	---	---	Yes; residuals not homoscedastic	---	---	---
ND frequency (%)	0	0	0	56	0	0	0
Sample number	25	25	25	25	25	25	25
Goodness of fit testing (including NDs)							
Normal	---	x	---	---	x	---	x
Ln transform normal	x (transformed)	---	---	---	---	---	---
50%<NDs<100% (Non-parametric) or double quant rule (NDs=100%)	---	---	---	x	---	---	---
Non-normal or no discernable distribution (non-parametric)	---	---	x	---	---	x	---
ND frequency (%)	0	0	0	56	0	0	0
Sample number	25	25	25	25	25	25	25
Outlier testing (excluding NDs)							
Potential Outlier(s)	1.792 ³	---	1000 ⁴	Multiple values ⁴	8.5 ³	---	---
Interpreted as outlier?	Yes	---	Yes	No	Yes	---	---
Outlier removed?	Yes	---	Yes	No	Yes	---	---
Proposed Statistical Method (UPL/LPL with resampling)							
Did GOF change after removing outlier(s) in background well?	No	---	Yes, Normal at p<0.05	---	No	---	---
Suitable PL test based on GOF statistics	Parametric (ln transformed data)	Parametric	Parametric	Non-Parametric	Parametric	Non-Parametric	Parametric
Background Mean	0.776	407.6	481.7	---	7.17	---	20800
Background SD	0.293	22.78	60.27	---	0.321	---	6665
k-multiplier* (Table 19-1; page D-38 Unified Guidance)	2.04	2.04	2.04	---	2.04	---	2.04
95% UPL ⁵ (backtransformed where appropriate)	3.950017463	454.0712	604.6508	---	7.82484	---	34396.6
95% LPL ⁵	---	---	---	---	6.51516	---	---
Non-parametric UPL ⁶	---	---	---	2.1	---	22,000	---
Non-parametric LPL ⁶	---	---	---	---	---	---	---
Notes:							

^{1,2}Too many NDs and not enough low frequency samples to conclude if trend is representative of groundwater conditions.

³Normal distribution. Rosner's/Dixon's outlier test (p<0.05) identifies potential outlier(s). Box and whisker plots support this identification.

⁴Non-normal distribution. Box and whisker plots identify potential outlier(s).

⁵Retesting criteria: scheme = 1 of 2 retesting, SWFPR < 0.10; "good" statistical power, per declared by the Unified Guidance

⁶Nonparametric 1 of 3 retesting criteria; maximum ordered sample value; "good" statistical power, per declared by the * w=number of compliance wells (4 for Lewis Shale); n=size of background sample (25 in this case)

Table 10. List of Initial Exceedances for the Lewis Shale/Alluvium CCR Unit

Boron (upper prediction limit = 3.95 ppm)

Well ID	Sample Date	Sample Value (ppm)
MW-61	11/6/2015	35
MW-61	4/26/2016	39
MW-61	6/6/2016	38
MW-61	8/21/2016	38
MW-61	9/13/2016	40
MW-61	10/20/2016	37
MW-61	2/2/2017	37
MW-61	4/18/2017	39
MW-61	5/3/2017	39
MW-61	5/30/2017	40
MW-61	6/22/2017	38
MW-61	7/22/2017	39
MW-61	8/10/2017	40
MW-61	8/17/2017	39
MW-61	9/10/2017	41
MW-61	10/12/2017	38

MW-7	11/7/2015	9.4
MW-7	4/26/2016	10
MW-7	6/6/2016	10
MW-7	8/21/2016	11
MW-7	9/13/2016	10
MW-7	10/20/2016	10
MW-7	2/2/2017	9
MW-7	4/18/2017	8.6
MW-7	5/3/2017	8
MW-7	5/30/2017	7.3
MW-7	6/22/2017	7.6
MW-7	7/22/2017	7.6
MW-7	8/10/2017	7.8
MW-7	8/17/2017	7.5
MW-7	9/10/2017	8
MW-7	10/12/2017	7.2

MW-75	4/18/2017	24
MW-75	5/3/2017	25
MW-75	5/30/2017	24
MW-75	6/22/2017	25
MW-75	7/22/2017	25
MW-75	8/10/2017	25
MW-75	8/17/2017	25
MW-75	9/10/2017	24
MW-75	10/12/2017	24

MW-8	12/1/2015	17
MW-8	4/26/2016	20
MW-8	6/7/2016	20
MW-8	8/21/2016	19
MW-8	9/13/2016	19
MW-8	4/18/2017	17
MW-8	5/3/2017	17
MW-8	5/30/2017	16

Calcium (upper prediction limit = 454.1 ppm)

Well ID	Sample Date	Sample Value (ppm)
MW-7	8/17/2017	460
MW-75	5/3/2017	460
MW-75	7/22/2017	460
MW-75	8/10/2017	460
MW-75	8/17/2017	490
MW-75	9/10/2017	470
MW-8	12/1/2015	500
MW-8	4/26/2016	480
MW-8	8/21/2016	460
MW-8	9/13/2016	480

Chloride (upper prediction limit = 604.7ppm)

Well ID	Sample Date	Sample Value (ppm)
MW-7	4/26/2016	740
MW-7	6/6/2016	880
MW-8	12/1/2015	880
MW-8	4/26/2016	920
MW-8	6/7/2016	1100
MW-8	8/21/2016	980
MW-8	9/13/2016	970
MW-8	4/18/2017	1100
MW-8	5/3/2017	1100
MW-8	5/30/2017	1100

Fluoride (upper prediction limit = 2.1 ppm)

Well ID	Sample Date	Sample Value (ppm)
MW-8	12/1/2015	5

Sulfate (upper prediction limit = 22,000 ppm)

Well ID	Sample Date	Sample Value (ppm)
---	---	---

TDS (upper prediction limit = 34,396.6 ppm)

Well ID	Sample Date	Sample Value (ppm)
---	---	---

pH (upper prediction limit = 7.88; lower prediction limit = 6.52 S.U.)

Well ID	Sample Date	Sample Value (ppm)
---	---	---

Practitioner's Notes
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Downgradient Well EDA - Lewis Shale/Alluvium

	MW61							MW7							MW75							MW8						
	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
Trend testing																												
Trend significant (p<0.05)	Increasing; p<0.05							Decreasin g; p<0.001							Increasing; p<0.001							Increasing; p<0.01						
Detrending successful (p<0.05)?	Yes							Yes							Yes							Yes						
*Seasonal trends not tested due to low sample number	---																											
Goodness of fit testing (including NDs)																												
Normal	x (detrnd)							x (detrnd)							x (detrnd)							x (detrnd)						
Ln transform normal	---																											
Non-normal or no discernable distribution	x							x							x							x (detrnd)						
ND frequency (%)	0							0							0							0						
Sample number	16							16							16							8						
Outlier testing (excluding NDs)																												
Potential Outlier(s)	-58.93							-1.49							5200							6100						
Interpreted as outlier?	Yes ¹							Yes ¹							Yes ²							Yes ²						
Notes:																												

¹Too many NDs and not enough low frequency samples to conclude if trend is representative of groundwater conditions.

²Normal distribution. Dixon outlier test (p<0.05) identifies potential outlier(s). Box and whisker plots support this identification.

³Non-normal distribution. Box and whisker plots identify potential outlier(s).

Non-Parametric significance level

Nonparametric legend:

alpha_c = target per constituent false positive rate
 c = number of monitoring constituents
 alpha = target SWFPR = 0.10
 w = number of compliance wells (4 for lewis shale)
 ne = number of statistical evaluations per year (assumed 4)
 w* = w x ne = lookup entry for appendix table

alpha_c 0.014938795 Equation 19.16 in Unified Guidance
 w* 16 quarterly sampling?
 n 25

Parametric 1 of 2 retesting confidence

Probability of false positive for 1 of 2 resampling (equation [19.5] Unified Guidance)
 0.061285
 where:
 4 wells x 7 tests = 28 = r

Corresponding confidence level
 0.938715

Non-Parametric 1 of 2 PL = Xn Significance Level Interpolation Table 19-19						
w1	w*	w2	n1	n*	n2	
15	16	20	25	25	25	
kw,n:						
k15,25		0.0389				
k20,25		0.0503				
interpolated k multiplier		0.0446				
Does 1 of 2 achieved significance level		No				

Non-Parametric 1 of 3 PL = Xn Significance Level Interpolation Table 19-20						
w1	w*	w2	n1	n*	n2	
15	16	20	25	25	25	
kw,n:						
k15,25		0.0044				
k20,25		0.0059				
interpolated k multiplier		0.00515				
Does 1 of 3 achieved significance level		Yes				

PICTURED CLIFF SANDSTONE

Practitioner's Notes

Prediction Limits with Retesting on Grouped Background Wells - Sandstone

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	MW 71, MW 72 AND MW73						
	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
Trend testing (including NDs)							
Trend significant (p<0.05)?	---	---	---	Increasing ¹ ; p < 0.001	Decreasing; p<0.05	---	---
OLS detrending successful (p<0.05)?	---	---	---	NA	Yes; residuals appear homoscedastic	---	---
ND frequency (%)	0	0	0	100	0	0	0
Sample number	42	42	42	41	42	42	42
Goodness of fit testing (including NDs)							
Normal		x	x		x (detrend)		
Ln transform normal							
50%<NDs<100% (Non-parametric) or double quant rule (NDs=100%)				x			
Non-normal or no discernable distribution (non-parametric)	x					x	x
ND frequency (%)	0	0	0	100	0	0	0
Sample number	42	42	42	41	42	42	42
Outlier testing (excluding NDs)							
Potential Outlier(s)	Multiple values ⁴	---	---	---	---	---	---
Interpreted as outlier?	No; more statistically independent samples needed to confirm	---	---	---	---	---	---
Outlier removed?	No	---	---	---	---	---	---
Proposed Statistical Method (UPL/LPL with resampling)							
Did GOF change after removing outlier(s) in background well?	---	---	---	---	---	---	---
Suitable PL test based on GOF statistics	Non-Parametric	Parametric	Parametric	Non-parametric	Trend	Non-Parametric	Non-Parametric
Background Mean	---	465	508.6	---		---	---
Background SD	---	35.15	94.73	---		---	---
k-multiplier (interpolated)	---	2.123	2.123	---	See excel worksheet calculations	---	---
95% UPL ⁵	---	539.62345	709.71179	---		---	---
95% LPL ⁵	---	---	---	---		---	---
Non-parametric UPL ⁶	1.9	---	---	DQ Rule	---	13,000	20,000
Non-parametric LPL ⁶	---	---	---	---	---	---	---

Notes:

¹Too many NDs to conclude if trend is representative of groundwater conditions.

²Normal distribution. Rosner's outlier test (p<0.05) identifies potential outlier(s). Box and whisker plots support this identification.

⁴Non-normal distribution. Box and whisker plots identify potential outlier(s).

⁵Retesting criteria: scheme = 1 of 2 retesting, SWFPR < 0.10; "good" statistical power, per declared by the Unified Guidance

⁶Nonparametric 1 of 3 retesting criteria; second-maximum ordered sample value; "good" statistical power, per declared by the Unified Guidance

one-tailed t value (95% confidence, df = 40) 1.68 Table 16-1 in Unified Guidance
 Standard error 0.5559 includes k interpolated value
 n 421
 Mean of sampling dates (numeric format) 42011
 SD of sampling dates 179.7

Copied equation from Cameron's Stat SOP

$$UPL = \bar{x}_g + t_{1-\alpha, n-2} \cdot s_x \cdot \sqrt{1 + \frac{1}{n} + \frac{(t_g - \bar{t})^2}{(n-1)s_t^2}} \quad (6)$$

where:
 \bar{x}_g = regression-line estimate of the mean concentration at time t_g
 $t_{1-\alpha, n-2}$ = one-tailed t-value at a confidence of $1-\alpha$ and $n-2$ degrees of freedom
 s_x = standard error of the regression line
 n = number of samples in the background dataset
 t_g = date the groundwater sample being compared to the UPL was collected
 \bar{t} = mean of the sampling dates in the background dataset
 s_t = standard deviation of the sampling dates in the background dataset

Sample Date	NumDate	UPL	UPL	Year - OLS df Estimate
3/5/2016 0:00	42434	7.95271	5.968729	42
3/5/2016 0:00	42434	7.95271	5.968729	42
4/26/2016 0:00	42486	7.912091	5.949909	42
4/26/2016 0:00	42486	7.912091	5.949909	42
6/6/2016 0:00	42527	7.876972	5.933328	42
6/6/2016 0:00	42527	7.876972	5.933328	42
8/21/2016 0:00	42603	7.818927	5.899073	42
8/21/2016 0:00	42603	7.818927	5.899073	42
9/12/2016 0:00	42625	7.802948	5.889052	42
9/12/2016 0:00	42625	7.802948	5.889052	42
10/20/2016 0:00	42663	7.775569	5.870431	42
10/20/2016 0:00	42663	7.775569	5.870431	42
2/2/2017 0:00	42768	7.704609	5.813391	42
2/2/2017 0:00	42768	7.704609	5.813391	42
2/2/2017 0:00	42768	7.704609	5.813391	42
4/17/2017 0:00	42842	7.6583	5.7677	42
4/17/2017 0:00	42842	7.6583	5.7677	42
4/18/2017 0:00	42843	7.658322	5.767678	42
5/2/2017 0:00	42857	7.649702	5.758298	42
5/2/2017 0:00	42857	7.649702	5.758298	42
5/2/2017 0:00	42857	7.649702	5.758298	42
5/29/2017 0:00	42884	7.63482	5.74118	42
5/29/2017 0:00	42884	7.63482	5.74118	42
6/22/2017 0:00	42908	7.62239	5.724761	42
6/22/2017 0:00	42908	7.62239	5.724761	42
7/21/2017 0:00	42937	7.605482	5.704518	42
7/21/2017 0:00	42937	7.605482	5.704518	42
7/22/2017 0:00	42938	7.60557	5.70443	42
8/10/2017 0:00	42957	7.595366	5.690634	42
8/10/2017 0:00	42957	7.595366	5.690634	42
8/10/2017 0:00	42957	7.595366	5.690634	42
8/17/2017 0:00	42964	7.592089	5.685911	42
8/17/2017 0:00	42964	7.592089	5.685911	42
9/10/2017 0:00	42988	7.579823	5.668177	42
9/10/2017 0:00	42988	7.579823	5.668177	42
9/11/2017 0:00	42989	7.579945	5.668055	42
10/12/2017 0:00	43020	7.56507	5.64949	42
10/13/2017 0:00	43021	7.564213	5.643787	42
10/13/2017 0:00	43021	7.564213	5.643787	42

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options
 Calc/Time of Calculation: PHC/CL 5.1152038 9:07:50 AM
 From File Background:PHC/CL 1200018.xls
 Full Precision: OFF

Display Limits: True
 Confidence Limit for Interval: 0.95
 Display Regression Diagnostics: True
 Display Regression Tables: True
 Title For Y's in X's: Classical Regression
 Confidence Level for Regression Line: 0.95
 Display Confidence Band: True
 Display Prediction Band: True

Dependent Variable (Y-Data): pH
 Number Regressor (X-Values): 42
 Independent Variable (X-Data): NumDate
 Number Regressor (X-Values): 42

Regression Estimates and Inference Tests
 Parameter Estimates Std. Error T-Statistic P-Value
 Intercept 32.85 9.582 3.291 0.00209
 NumDate -0.1015 -4 2.331054 -0.017 0.0120

OLS ANOVA Tests
 Source of Variation MS DFP MS P-Value F-Value P-Value
 Regression 0.463 1 0.463 6.847 0.0125
 Error 2.877 40 0.0719
 Total 3.34 41
 R Square: 0.146
 Adjusted R Square: 0.123
 Sign(F(1)) = Sign: 0.208

Obs	X-Vector	Y-Vector	Yhat	Residuals	Res/Scale	SqDiff	St Err
1	6.81	6.962	-0.152	-0.368	0.032104	0.261846	
2	1.71	6.962	0.146	0.708	0.032104		
3	6.7	6.931	-0.231	-0.86	0.032381		
4	7.73	6.931	0.769	2.81	0.62401		
5	6.58	6.906	-0.236	-1.24	0.16076		
6	6.7	6.906	-0.206	-0.766	0.042426		
7	6.83	6.859	-0.022	-0.100	0.003641		
8	6.87	6.859	0.0168	0.0462	0.001211		
9	6.47	6.846	-0.376	-1.61	0.141376		
10	6.86	6.845	0.0146	0.0003	0.000025		
11	6.58	6.823	-0.263	-0.979	0.032104		
12	6.88	6.823	-0.143	-0.532	0.020449		
13	6.39	6.759	-0.169	-0.624	0.025811		
14	6.7	6.759	-0.056	-0.216	0.003641		
15	6.72	6.759	-0.0386	-0.144	0.001521		
16	6.36	6.713	0.0466	0.174	0.003209		
17	7.04	6.713	0.027	1.218	0.168626		
18	6.18	6.713	-0.533	-1.966	0.240489		
19	6.5	6.704	-0.204	-0.762	0.044916		
20	6.65	6.704	-0.0542	-0.202	0.003916		
21	6.86	6.704	0.156	0.581	0.032326		
22	6.17	6.688	-0.516	-1.98	0.248224		
23	6.62	6.688	-0.0678	-0.253	0.004644		
24	6.74	6.688	0.0222	0.195	0.001704		
25	6.61	6.673	-0.0631	-0.235	0.003555		
26	6.79	6.673	0.117	0.436	0.013865		
27	6.84	6.673	0.167	0.622	0.027889		
28	6.9	6.656	0.246	0.912	0.048025		
29	6.93	6.655	0.275	1.024	0.079525		
30	6.62	6.655	-0.0348	-0.13	0.001225		
31	6.56	6.643	-0.082	-0.31	0.009869		
32	6.63	6.643	-0.0132	-0.0464	0.000169		
33	7	6.643	0.367	1.35	0.127469		
34	6.64	6.639	0.00103	0.00086	1E-06		
35	6.64	6.639	0.00103	0.00086	1E-06		
36	6.83	6.639	0.191	0.712	0.020481		
37	6.45	6.624	-0.174	-0.65	0.020076		
38	6.65	6.624	0.0257	0.0957	0.000676		
39	6.65	6.624	0.0263	0.098	0.000676		
40	6.78	6.605	0.165	0.601	0.024426		
41	6.47	6.604	-0.134	-0.5	0.017556		
42	6.73	6.604	0.126	0.469	0.015876		

Summary Tables for Prediction and Confidence Limits

Obs	X-Vector	Y-Vector	Yhat	sYhat	95%CL	95%CU	UPL	UPL	Residuals
1	6.81	6.962	0.0071	0.285	0.766	1.159	6.386	7.539	-0.152
2	1.71	6.962	0.0071	0.285	0.766	1.159	6.386	7.539	0.708
3	6.7	6.931	0.0083	0.282	0.756	1.105	6.361	7.5	-0.231
4	7.73	6.931	0.0083	0.282	0.756	1.105	6.361	7.5	2.81
5	6.58	6.906	0.0078	0.279	0.748	1.063	6.341	7.47	-0.326
6	6.7	6.906	0.0078	0.279	0.748	1.063	6.341	7.47	-0.206
7	6.83	6.859	0.0057	0.276	0.73	1.068	6.302	7.416	-0.022
8	6.87	6.859	0.0057	0.276	0.73	1.068	6.302	7.416	0.0462
9	6.47	6.846	0.0069	0.275	0.729	1.067	6.29	7.401	-0.376
10	6.86	6.845	0.0069	0.275	0.729	1.067	6.29	7.401	0.0146
11	6.58	6.823	0.0059	0.274	0.714	1.051	6.27	7.375	-0.263
12	6.88	6.823	0.0059	0.274	0.714	1.051	6.27	7.375	0.0146
13	6.39	6.759	0.0046	0.272	0.672	1.045	6.21	7.307	-0.169
14	6.7	6.759	0.0046	0.272	0.672	1.045	6.21	7.307	-0.056
15	6.72	6.759	0.0046	0.272	0.672	1.045	6.21	7.307	-0.0386
16	6.36	6.713	0.0042	0.271	0.628	1.036	6.165	7.262	0.0466
17	7.04	6.713	0.0042	0.271	0.628	1.036	6.165	7.262	0.027
18	6.18	6.713	0.0042	0.271	0.628	1.036	6.165	7.262	-0.533
19	6.5	6.704	0.0048	0.272	0.616	1.051	6.155	7.253	-0.204
20	6.65	6.704	0.0048	0.272	0.616	1.051	6.155	7.253	-0.0542
21	6.86	6.704	0.0048	0.272	0.616	1.051	6.155	7.253	0.156
22	6.17	6.688	0.0048	0.272	0.616	1.051	6.155	7.253	-0.516
23	6.62	6.688	0.0048	0.272	0.616	1.051	6.155	7.253	0.0222
24	6.74	6.688	0.0048	0.272	0.616	1.051	6.155	7.253	0.0957
25	6.61	6.673	0.0047	0.272	0.616	1.051	6.155	7.253	-0.0631
26	6.79	6.673	0.0047	0.272	0.616	1.051	6.155	7.253	0.117
27	6.84	6.673	0.0047	0.272	0.616	1.051	6.155	7.253	0.167
28	6.9	6.656	0.0058	0.273	0.633	1.076	6.104	7.207	0.246
29	6.93	6.655	0.0058	0.273	0.633	1.076	6.104	7.207	0.275
30	6.62	6.655	0.0058	0.273	0.633	1.076	6.104	7.207	-0.0348
31	6.56	6.643	0.0058	0.274	0.635	1.072	6.09	7.196	-0.082
32	6.63	6.643	0.0058	0.274	0.635	1.072	6.09	7.196	-0.0132
33	7	6.643	0.0058	0.274	0.635	1.072	6.09	7.196	0.367
34	6.64	6.639	0.0047	0.274	0.629	1.049	6.086	7.182	0.00086
35	6.64	6.639	0.0047	0.274	0.629	1.049	6.086	7.182	0.00086
36	6.83	6.624	0.0088	0.275	0.606	1.042	6.07	7.179	0.0957
37	6.83	6.624	0.0088	0.275	0.606	1.042	6.07	7.179	0.0957
38	6.45	6.605	0.0064	0.276	0.616	1.042	6.069	7.179	-0.174
39	6.65	6.604	0.0064	0.276	0.616	1.042	6.069	7.179	0.0257
40	6.65	6.604	0.0064	0.276	0.616	1.042	6.069	7.179	0.0257
41	6.78	6.605	0.0064	0.276	0.616	1.042	6.069	7.179	0.165
42	6.47	6.604	0.0064	0.276	0.616	1.042	6.069	7.179	-0.134

Parametric PL k multiplier interpolation

Legend

k=PL multiplier
w=number of compliance wells: 5 [URS] and 4 [CWTP] = 9
n=size of background sample (46 in this case)
fw=fractional term
fn=fractional term

*Assuming background wells are adequately representing groundwater spatial and temporal variability within the Pictured Cliff Sandstone; otherwise calculate for each CCR Unit separately

See table 19-1 in Unified Guidance - page D-38 (5 COCs, quarterly)

Parametric 1 of 2 resampling interwell k interpolation*						
w1	w*	w2	n1	n*	n2	
8	9	12	45	46	50	
kw,n:						
k8,45		2.1				
k12,45		2.2				
k8,50		2.09				
k12,50		2.19				
fw		0.25				
fn		0.2				
interpolated k multiplier		2.123				

Probability of false positive for 1 of 2 resampling ([19.5] Unified Guidance)
0.040877763

9 wells x 7 tests = 63 = r

Corresponding confidence level
0.959122237

Non-Parametric significance level

Nonparametric legend:

alpha_c = target per constituent false positive rate
c = number of monitoring constituents
alpha = target SWFPR = 0.10
w = number of compliance wells
ne = number of statistical evaluations per year
w* = w x ne = lookup entry for appendix table

alpha_c 0.014939 Equation 19.16 in Unified Guidance
w* 36 quarterly sampling
n 46

Non-Parametric 1 of 2 PL = Xn Significance Level Interpolation Table 19-19						
w1	w*	w2	n1	n*	n2	
35	36	40	40	46	50	
kw,n:						
k35,40		0.0368				
k40,40		0.0416				
k35,50		0.0247				
k40,50		0.0278				
fw		0.2				
fn		0.6				
interpolated k multiplier		0.030296				
Does 1 of 2 achieved significance level < alpha_c? No						

Non-Parametric 1 of 3 PL = Xn-1 Significance Level Interpolation Table 19-20						
w1	w*	w2	n1	n*	n2	
35	36	40	40	46	50	
kw,n:						
k35,40		0.0109				
k40,40		0.01243				
k35,50		0.00585				
k40,50		0.00667				
fw		0.2				
fn		0.6				
interpolated k multiplier		0.008091				
Does 1 of 3 achieved significance level < alpha_c? Yes						

Practitioner's Notes
 12/12/2017
 INFORMAL AND INTERNAL WORK PRODUCT - DO NOT CITE OR COPY

Downgradient Well Comparison & Exceedance Assessment Worksheet - SANDSTONE BACKGROUND

	MW56							MW67							MW58							MW69							MW70							MW62							MW63							MW64							MW65																																																																					
	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS																																																															
Trend testing																																																																																																																														
Trend significant (p<0.05) ¹	Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001							Increasing: p<0.0001																																																														
Detrending successful (p<0.05) ²	Yes							Yes							Yes							Yes							Yes							Yes							Yes							Yes							Yes							Yes																																																														
*Seasonal trends not tested due to high frequency sampling and relatively low sample count																																																																																																																														
Goodness of fit testing (including NDs)																																																																																																																														
Normal	x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)							x (detrend)																																																							
Ln transform normal	---							---							---							---							---							---							---							---							---							---							---							---							---																																									
Non-normal or no discernable distribution	---							---							---							---							---							---							---							---							---							---							---							---							---							---							---																											
ND frequency (%)	0							0							0							0							0							0							0							0							0							0							0							0							0																																									
Sample number	16							16							16							16							16							16							16							16							16							16							16							16							16							16																																		
Outlier testing (excluding NDs)																																																																																																																														
Potential Outlier(s)	---							---							---							---							---							---							---							---							---							---							---							---							---							---							---							---																				
Interpreted as outlier?	---							---							---							---							---							---							---							---							---							---							---							---							---							---							---							---							---							---						

¹Interpreted as "gross outlier" in box and whisker plots
²Too many NDs to conclude if trend is representative of groundwater conditions.
³Normal distribution. Dixon's outlier test (p<0.05) identifies potential outlier(s). Box and whisker plots support this identification.
⁴Non-normal distribution. Box and whisker plots identify potential outlier(s).

APPENDIX H

**WOOD TECHNICAL MEMORANDA DOCUMENTING ADDITIONAL EVALUATION OF
APPENDIX III CONSTITUENT DATA COLLECTED FROM THE CWTP IN APRIL AND
JUNE 2018**



Technical Memorandum

To: Michele Robertson, RG
Pamela Norris
From: Natalie Chrisman Lazarr, PE
Carla Landrum, PhD
Tel: 602-733-6087
Fax: 602-733-6100
Date: April 25, 2018

File No: 1420162024
cc: File

**Subject: CWTP DETECTION MONITORING – EVALUATION OF APRIL 2018 RESAMPLING DATA
Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico**

1.0 INTRODUCTION

This Technical Memorandum (Tech Memo) documents an evaluation of Combined Waste Treatment Pond (CWTP) resampling data collected in April 2018 pursuant to the findings of a statistical analysis of initial Detection Monitoring constituent data supporting Coal Combustion Residuals (CCR) Rule compliance at the Arizona Public Service (APS) Four Corners Power Plant (FCPP). The referenced statistical analysis included calculation of background threshold values (BTVs) using upper prediction limits for Appendix III constituents and was documented in a Tech Memo prepared by Amec Foster Wheeler dated January 8, 2018.

Based on the results of initial exceedances of BTVs calculated for boron, calcium, and pH in groundwater collected downgradient of the CWTP during the initial eight rounds of monitoring, Amec Foster Wheeler advocated resampling strategies for these constituents. Resampling a monitoring well where an exceedance occurs can either verify the initial evidence of a release from a CCR unit or not, while avoiding unnecessary declarations based on false positives. Two resampling strategies are in place for the CWTP. Specifically, a 1 of 2 resampling strategy is in place for pH and calcium and a 1 of 3 resampling strategy is in place for boron. For a 1 of n resampling strategy, where n represents the number of resamples, the initial exceedance and all corresponding statistically independent resamples must exceed the BTV to declare a statistically significant increase (SSI) over background; if the resample(s) fail to exceed the BTV, there is not enough evidence to declare an SSI and detection monitoring continues.

2.0 EVALUATION

Table 1 presents the results of the April 2018 CWTP resampling event for boron, calcium and pH and summarizes both the calculated BTVs and the most recent exceedance identified during the initial eight rounds of detection monitoring. As indicated in Table 1, there is insufficient evidence to declare an SSI for calcium or pH at this time since resample concentrations were less than corresponding BTVs. For boron, there is insufficient evidence to declare an SSI over background in monitoring well MW-63 because the April 2018 resample concentration was less than the corresponding BTV; however, the 1 of 3 resampling strategy remains in effect for monitoring well MW-62 because the April 2018 resample concentration exceeded the BTV.



3.0 RECOMMENDATIONS

The third and final resample for boron in MW-62 should occur no sooner than within approximately 3 months from the April 2018 resampling event to help ensure that the third and final resample event is statistically independent from the second. This resampling event could occur concurrent with a full round of detection monitoring of the CWTP as part of the semiannual detection monitoring program.

4.0 REFERENCES

Amec Foster Wheeler Environment and Infrastructure, Inc. (now known as Wood Environment and Infrastructure Solutions, Inc.), 2018. Statistical Analysis of Initial Detection Monitoring Appendix III Constituent Data. Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico. Technical Memorandum dated January 12, 2018.

**TABLE 1
CWTP DETECTION MONITORING RESAMPLING ANALYSIS - APRIL 2018**

Parameter	Parameter Value by Downgradient Monitoring Well					
	MW-62		MW-63		MW-64	MW-65
	Boron (ppm)	Calcium (ppm)	Boron (ppm)	Calcium (ppm)	pH (SU)	pH (SU)
<i>Not to Exceed BTV</i>	1.9	540	1.9	540	5.7 - 7.6	5.7 - 7.6
<i>Resampling Strategy in Effect</i>	1 of 3	1 of 2	1 of 3	1 of 2	1 of 2	1 of 2
Most Recent Initial Exceedance Concentration During Initial Detection Monitoring (Date of Exceedance)	2.2 (10/13/17)	570 (9/9/17)	2.0 (9/9/17)	580 (8/16/17)	7.61 (7/21/17)	8.27 (8/20/16)
Resample Concentration (Sample Date)	2.1 (4/6/18)	520 (4/6/18)	1.3 (4/6/18)	530 (4/6/18)	7.5 (4/6/18)	7.2 (4/6/18)
SSI Over Background Status as of April 2018	To Be Determined ¹	Insufficient Evidence to Declare ²	Insufficient Evidence to Declare ²	Insufficient Evidence to Declare ²	Insufficient Evidence to Declare ²	Insufficient Evidence to Declare ²
Path Forward	Continue 1 of 3 Resampling Strategy	Continue Detection Monitoring	Continue Detection Monitoring	Continue Detection Monitoring	Continue Detection Monitoring	Continue Detection Monitoring

Notes:

BTV = Background Threshold Value

ppm = parts per million

SSI = statistically significant increase

SU = standard units

¹ A 1 of 3 resampling strategy is in effect and one more statistically independent samples is necessary make a declaration.

² There is insufficient evidence to declare a statistically significant increase over background because the resample concentration is less than the respective BTV.

Technical Memorandum

To: Michele Robertson, RG
 Pamela Norris
From: Natalie Chrisman Lazarr, PE
 Carla Landrum, PhD
Date: October 15, 2018
File No: 1420162024.4.4
cc: File

**Subject: CCR GROUNDWATER DETECTION MONITORING
 EVALUATION OF JUNE 2018 DATA COLLECTED FROM THE CWTP
 Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico**

1.0 INTRODUCTION

This Technical Memorandum (Tech Memo) documents an evaluation of detection monitoring data collected in June 2018 from the Combined Waste Treatment Pond (CWTP) located at the Arizona Public Service (APS) Four Corners Power Plant (FCPP) in Fruitland, New Mexico. The evaluation consists of comparing CWTP compliance (i.e., downgradient) sample data to Appendix III background threshold values (BTVs) using the prediction limit statistical method declared in the *Statistical Analysis of Initial Detection Monitoring Appendix III Constituent Data* Technical Memorandum (2018 Tech Memo) (Amec Foster Wheeler Environment and Infrastructure, Inc. [Amec Foster Wheeler], 2018). This Tech Memo as well as the 2018 Tech Memo were prepared pursuant to the Coal Combustion Residuals (CCR) Rule and the *Statistical Data Analysis Work Plan* (Wood, 2018a) developed for the site.

2.0 EVALUATION

Table 1 presents the concentrations of Appendix III constituents in samples collected from CWTP compliance monitoring wells MW-62, MW-63, MW-64 and MW-65 on June 3, 2018. APS recognizes this sampling event as the first detection monitoring event of 2018 at the CWTP as well as the final resampling event for a 1 of 3 resampling strategy for boron at MW-62 based on an initial exceedance identified in the 2018 Tech Memo. Applicable BTVs are presented in Table 1 for comparison.

2.1 Updates to Background Threshold Values

With the exception of fluoride and pH, the BTVs presented in Table 1 reflect those previously declared in the 2018 Tech Memo for the CWTP. A discussion of updates to BTVs by constituent follows.

Fluoride. The Double Quantification Rule (DQR) is the applicable method for evaluating if there is a statistically significant increase (SSI) above background in CWTP compliance well (i.e. downgradient) fluoride concentrations since fluoride was not detected in background wells throughout the initial detection monitoring period (November 2015 to October 2017). The DQR states that two consecutive detectable sample concentrations in a downgradient well provides sufficient evidence to declare an SSI above a background that exhibits 100% non-detectable concentrations. However, as noted in the 2018 Tech Memo, the reporting limit values were inconsistent between background and compliance wells during the initial detection monitoring period. For a majority of sampling events, the maximum reporting limit for background well fluoride analyses (i.e., 2 milligrams per liter [mg/L]) exceeded the reportable concentrations



in downgradient CWTP wells. In these instances, achieving a lower reporting limit in compliance wells relative to background (i.e. 2 mg/L) subjectively increased the detection frequency in compliance wells and, therefore, introduced uncertainty in declaring an SSI above background using the DQR. To manage this uncertainty, recommendations were made in the 2018 Tech Memo to maintain a fluoride reporting limit for samples collected in both background and CWTP compliance wells of no more than 0.8 mg/L, effective in 2018 and thereafter. On this basis, the fluoride BTV in Table 1 reflects the 0.8 mg/L threshold, not the maximum background reporting limit equal to 2 mg/L, and the DQR remains in effect.

pH. For the initial detection monitoring period, there was a statistically significant ($p < 0.05$) temporal trend in grouped background pH sample data associated with the CWTP (i.e., data collected from monitoring wells MW-71, MW-72 and MW-73). The temporal trend means the pH values change as a function of time and warrant an iterative calculation of pH prediction limits around this trend for each sampling event. The p value for Mann-Kendal trend was 0.03 for the 42 background samples collected during the initial detection monitoring period (Figure 1). Integrating the June 2018 pH data into the BTV Mann-Kendal trend analysis results in a statistically insignificant ($p < 0.05$) temporal trend. In this case, the p value increases to 0.09 with a sample number equal to 45 (Figure 2). In the absence of a temporal trend, the BTV resorts to a prediction limit calculation for a stationary data set (i.e., the data contain no temporal trends). On this basis, the upper and lower pH BTVs in Table 1 were updated to a simple parametric prediction limit calculation for a stationary and normally distributed sample dataset. The updated pH parametric prediction limits maintain a 1 of 2 resampling strategy.

2.2 Exceedance Assessment

As indicated in Table 1, there is insufficient evidence at this time to declare an initial exceedance for boron, calcium, chloride, sulfate, or total dissolved solids based on June 2018 data because sample concentrations are less than their respective BTVs.

For boron, a 1 of 3 resampling strategy was implemented for MW-62 based on review of an initial exceedance declared in the 2018 Tech Memo. Table 1 presents the results of associated resampling data for this constituent as well as previous resampling data for comparison (Wood, 2018b). Since the June 2018 resampling concentration was 1.8 mg/L (which is less than the BTV), the initial exceedance was not confirmed. For an exceedance to be confirmed using a 1 of 3 resampling strategy, all three samples must exceed the BTV.

For fluoride, this constituent was detected in all downgradient wells at a concentration that exceeded the reporting limit used to establish that the constituent was not present in background wells (i.e., 0.8 mg/L). On this basis, there is sufficient evidence to declare initial exceedances at all downgradient wells for fluoride. Since the DQR is in effect for this constituent, a second consecutive sample from one or more of the downgradient wells must indicate a reportable concentration above 0.8 mg/L to declare an SSI over background.

For pH, there is sufficient evidence to declare an initial exceedance over background in monitoring wells MW-64 and MW-65 because the June 2018 pH values are higher than the corresponding upper BTV. The initial exceedance in pH triggers a 1 of 2 resampling strategy for this constituent. Resampling a monitoring well where an exceedance occurs can either verify the initial evidence of a release from a CCR unit or not, while avoiding unnecessary declarations based on false positives. In this case, a second statistically independent sample from monitoring wells MW-64 and MW-65 must exceed the pH upper BTV to declare

a statistically significant increase (SSI) over background; if the resample(s) fail to exceed the BTV, there is not enough evidence to declare an SSI and detection monitoring continues.

3.0 RECOMMENDATIONS

The second resample for pH in MW-64 and MW-65 should occur no sooner than within approximately 3 months from the June 2018 sampling event but before the next scheduled statistical evaluation for the Detection Monitoring Program at the APS FCPP. The next detection monitoring event is scheduled for December 2018 and evaluation of resampling results will be conducted thereafter with the associated detection monitoring data assessment.

To ensure that a false positive SSI for fluoride is not declared in accordance with the DQR, Wood recommends that the reporting limit for this constituent in compliance and background monitoring well data be enforced at a maximum value of 0.8 mg/L for the duration of groundwater monitoring at the CWTP.

The p values for the Mann-Kendal pH trend test prior to incorporating the June 2018 data and after are very close to 0.05, which is the stated significance level for the test. It is possible for the trend to revert to significant with future sample data. Therefore, trend testing should occur iteratively after every sampling event to determine if there is change in trend significance for pH; if the trend reverts to significant the prediction limit calculation should honor the trend. Trend detection is, in part, sensitive to the sampling frequency. The sampling frequency was highly irregular during the initial detection monitoring period. A more consistent sampling frequency (i.e. semiannual) will likely improve the consistency in trend detection.

4.0 REFERENCES

Amec Foster Wheeler Environment and Infrastructure, Inc. (Amec Foster Wheeler; now known as Wood Environment and Infrastructure Solutions, Inc. [Wood]), 2018a. *Statistical Analysis of Initial Detection Monitoring Appendix III Constituent Data*. Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico. Technical Memorandum dated January 12, 2018 and revised August 20, 2018.

Wood, 2018a. *Statistical Data Analysis Work Plan*. Coal Combustion Residual Rule Groundwater Monitoring System Compliance. Four Corners Power Plant, Fruitland, New Mexico. Report prepared for Arizona Public Service. Updated October 15, 2018.

Wood, 2018b. CWTP Detection Monitoring – Evaluation of April 2018 Resampling Data. Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico. Technical Memorandum dated April 25, 2018.

wood.

TABLES



Table 1
Detection Monitoring Data Collected from the CWTP in June 2018

Well	Sample Date	Boron ¹ (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride ² (mg/L)	Sulfate (mg/L)	TDS (mg/L)	pH ³ (S.U.)
MW-62	10/13/2017	2.2	---	---	---	---	---	---
	4/6/2018	2.1	---	---	---	---	---	---
	6/3/2018	1.8	490	120	1.6	3500	5900	6.59
MW-63	6/3/2018	1.4	510	90	1.7	2600	4500	6.76
MW-64	6/3/2018	0.48	85	50	1.4	390	800	7.54
MW-65	6/3/2018	0.62	98	52	1.9	480	1000	7.22
<i>Not to Exceed Upper BTV</i>		<i>1.9</i>	<i>540</i>	<i>710</i>	<i>0.8</i>	<i>13,000</i>	<i>20,000</i>	<i>7.04</i>
<i>Not to Exceed Lower BTV</i>		---	---	---	---	---	---	6.33

Notes:

BTV = Background Threshold Value
mg/L = milligrams per liter
S.U. = standard units
TDS = total dissolved solids

2.2 Concentration exceeds applicable BTV

- ¹ A 1 of 3 resampling strategy was implemented after initial review of Appendix III constituent data (Amec Foster Wheeler, 2018). The October 2107 and April 2018 concentrations exceeded the BTV (Wood, 2018) but the June 2018 concentration was less than the BTV. On this basis, there is insufficient evidence to declare a statistically significant increase over background as all three sample results must exceed the BTV to declare an exceedance.
- ² Fluoride was not detected (with a reporting limit of 0.8 mg/L) in background well samples (i.e., MW-71, MW-72, and MW-73) collected in June 2018. Since the Double Quantification Rule (DQR) is in effect and the reporting limits for both the background and downgradient wells were consistent, the detected concentrations in downgradient wells represent an initial exceedance for fluoride that must be confirmed by a consecutive exceedance during the next monitoring round to declare a statistically significant increase over background.
- ³ Grouped background sample data (MW-71, MW-72 and MW-73) supported a statistically significant ($p < 0.05$) decreasing temporal trend in pH prior to June 2018, meaning pH values change over time. Trend testing subsequent to incorporating the June 2018 sampling data indicate the trend is no longer statistically significant ($p < 0.05$). Therefore, the upper and lower BTVs reflect a traditional parametric prediction limit calculation with a 1 of 2 resampling strategy. Elevated pH values at MW-64 and MW-65 represent an initial exceedance.

FIGURES



Figure 1. Mann-Kendal trend test results for the initial detection monitoring sample period for grouped wells MW-71, MW-72 and MW-73. The x-axis reflects the sample date in numeric format. The y-axis represents pH (SU).

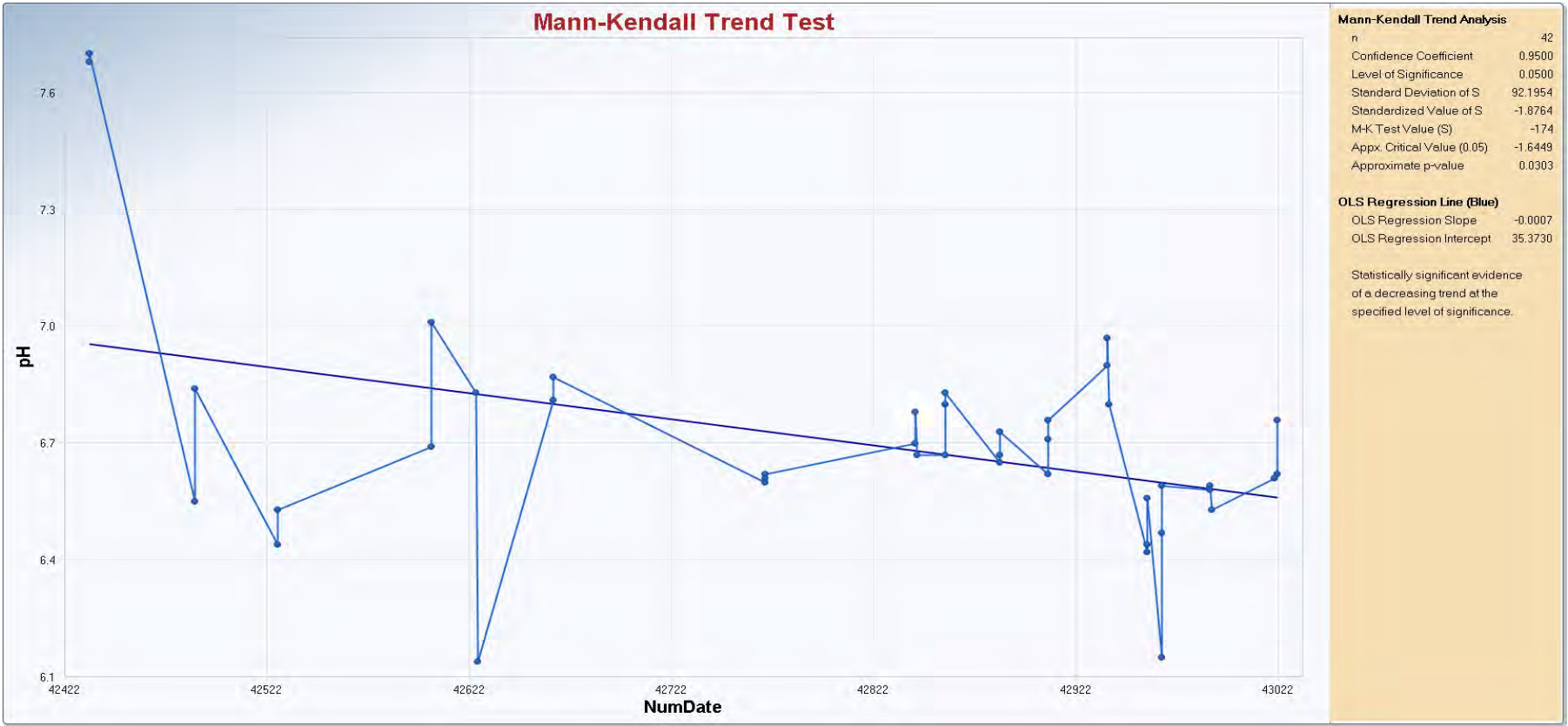
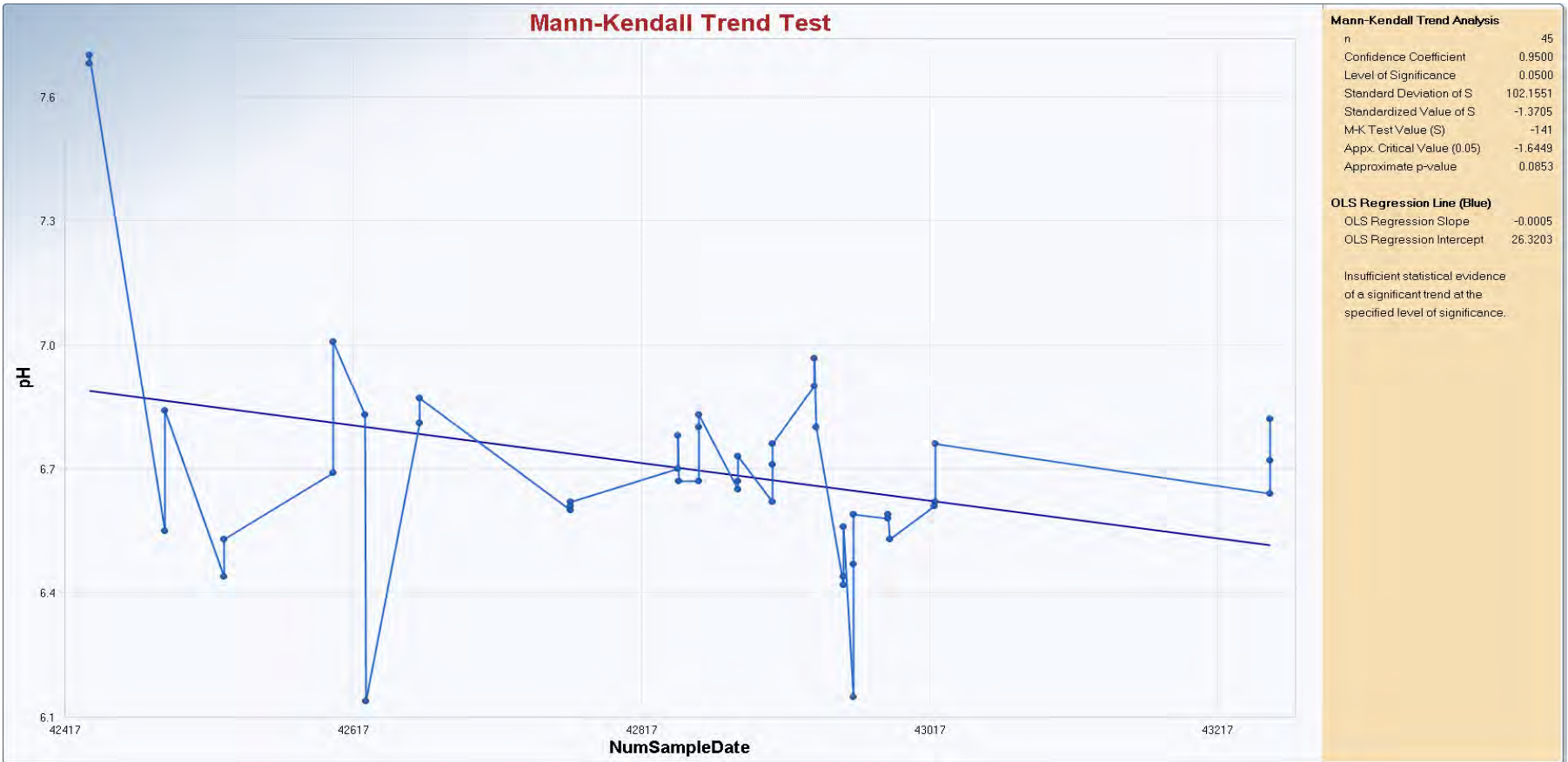


Figure 2. Mann-Kendal trend test results including the June 2018 sample event and the initial detection monitoring sample period for grouped wells MW-71, MW-72 and MW-73. The x-axis reflects the sample date in numeric format. The y-axis represents pH (SU).



APPENDIX I

**WOOD TECHNICAL MEMORANDUM DOCUMENTING THE STATISTICAL ANALYSIS
OF INITIAL ASSESSMENT MONITORING APPENDIX IV CONSTITUENT DATA
COLLECTED FROM MULTIUNIT 1**



Technical Memorandum

To: Michele Robertson, RG
Pamela Norris
File No: 1420162024.4.4

From: Natalie Chrisman Lazarr, PE
Carla Landrum, PhD
cc: File

Date: October 15, 2018

**Subject: CCR GROUNDWATER ASSESSMENT MONITORING
STATISTICAL ANALYSIS AND RESULTS FOR MULTIUNIT 1
Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico**

1.0 INTRODUCTION

This Technical Memorandum (Tech Memo) documents the initial statistical evaluation of assessment monitoring (i.e., Appendix IV constituent) groundwater data at Multiunit 1 located at the Arizona Public Service (APS) Four Corners Power Plant (FCPP) in Fruitland, New Mexico. The statistical methods and analysis include the determination of groundwater protection standards (GWPSs) for Appendix IV constituents using statistically-driven background threshold values (BTVs), the applicable U.S. Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) promulgated under the Safe Drinking Water Act, or alternative risk-based GWPSs established in the statute, whichever is higher (40 Code of Federal Regulations [CFR] Section [§] 257.95(h)). The statistical method selection process for evaluating assessment monitoring data was selected pursuant to the Coal Combustion Residuals (CCR) Rule (40 CFR § 257.93(f)(3)) and the analysis approach documented in the FCPP Statistical Data Analysis Work Plan (Wood, 2018).

The following sections detail data inputs, statistical evaluations, results and recommendations for the subject analysis.

2.0 DATA INPUTS

2.1 Appendix IV Constituent Data

The Multiunit 1 CCR groundwater monitoring well network consists of two background monitoring wells (MW-49A and MW-74) and four compliance (i.e., downgradient), monitoring wells (MW-7, MW-8, MW-61, and MW-75) with usable data for the subject statistical analysis¹. Collected data from the two background monitoring wells were pooled for evaluation purposes.

The period of evaluation for Multiunit 1 Appendix IV constituent statistical analysis ranges from November 2015 through June 2018 and includes site data collected during a minimum of eight initial rounds of detection monitoring (for both Appendix III and IV constituents) and two rounds of assessment monitoring (for

¹ Monitoring wells MW-12R (now abandoned), MW-12R1 (a replacement well for MW-12R), MW-43, MW-50A and MW-51 are background monitoring wells associated with Multiunit 1 that are either routinely dry or have limited saturated thickness for sampling. Monitoring wells MW-40R and MW-76 are Multiunit 1 downgradient monitoring wells that are also either routinely dry or have limited saturated thickness for sampling.



Appendix IV constituents). The duration of collected data is shorter (i.e. February 2017 through June 2018) for MW-74, which was installed in January 2017.

Due principally to the addition of wells to the monitoring program in 2016 and the CCR Rule requirement that a minimum of eight initial rounds of data be collected from the site prior to October 17, 2017, the frequency of sample collection prior to this date is short and variable (e.g. biweekly to quarterly sampling). Assessment monitoring was performed on a quarterly basis and the first round of assessment monitoring at Multiunit 1 was conducted in March 2018; all Appendix IV constituents were evaluated in collected samples during this monitoring event. During the second round of assessment monitoring conducted in June 2018, only detected Appendix IV constituents from the first round of assessment monitoring were evaluated in collected samples as prescribed by the CCR Rule. Based on these frequencies of sample collection for Appendix IV constituents and the inconsistent presence of water at monitoring program wells, the minimum sample numbers used in the statistical evaluation of available data were 8 and 26 for compliance monitoring wells and pooled background monitoring wells, respectively

Appendix A contains the contents of the ProUCL data upload tables for the subject analysis. The Appendix IV analytes are listed by name as column headers in the ProUCL data upload table. Each analyte has a corresponding data column (indicated with a "D_" prefix) that indicates if the analyte was detected or not at a concentration that exceeds the analytical reporting limit, where detectable concentrations are symbolized by a "1" and non-detectable concentrations are symbolized by a "0". The non-detectable concentration corresponds the analyte's reporting limit value for the corresponding sample date. Duplicates were retracted using a random selection process. Combined radium and fluoride data exhibit unique sampling dates and/or duplicate records; therefore, these analytes were segregated into separate worksheets for duplicate retraction and software upload.

2.2 MCLs and Alternative Risk-Based GWPSs

As presented in the Introduction of this Tech Memo, the CCR Rule stipulates that GWPSs used in evaluation of assessment monitoring data are established by comparing the applicable U.S. EPA MCL or an alternative risk-based GWPS to a statistically-driven BTV calculated from background well data. The highest value is selected as the GWPS for each constituent. Table 1 lists the MCLs and alternative risk-based GWPSs used in this analysis.

3.0 STATISTICAL METHODS

Assessment monitoring data evaluation implements a single-sample population testing approach, where downgradient samples are compared to a pre-defined standard, in this case the GWPS. Detection monitoring data evaluation differs in that it is a two-sample population (or more) testing approach, where there is no GWPS to compare to for compliance assessment. As such, the statistical methods and testing approaches differ between detection monitoring and assessment monitoring.

To establish BTVs for each Appendix IV constituent, background well data underwent exploratory data analysis (EDA) to select an appropriate statistical test for calculating the BTVs (see Section 3.1). In accordance with the Unified Guidance (U.S. EPA, 2009) and CCR Rule (40 C.F.R. § 257.93(f)(3)), the Statistical Data Analysis Work Plan (Wood, 2018) identifies the upper tolerance limit (UTL) method as the prescribed approach for establishing BTVs. This method encompasses a variety of statistical tests to establish BTVs in instances where a promulgated U.S. EPA MCL or alternative risk-based GWPS exists. The purpose of selecting the UTL method is its ability to serve as a single-sample statistical comparison. The statistical hypothesis structure for a single-sample comparison is reversible, such that the same fixed background level can be used for assessment

monitoring and later for corrective action comparison testing, if necessary. The UTL tests are applicable for analytes that exhibit non-detectable frequencies of less than 100%. The U.S. EPA's Unified Guidance (2009) and the Statistical Data Analysis Work Plan (Wood, 2018) promote the use of the Double Quantification Rule (DQR) to calculate the UTL in cases where the background non-detection frequency is equal to 100%. Where applicable, the DQR uses the maximum reporting limit (RL) as the BTV.

To compare compliance data for each Appendix IV constituent to the corresponding established GWPS, derivation of compliance threshold limits are appropriate for assessment monitoring. On this basis, a threshold limit was established for each Appendix IV constituent in each compliance well using the confidence interval statistical method. This method encompasses a variety of statistical tests (U.S. EPA, 2009). For assessment monitoring, the lower confidence limit (LCL) for each analyte is compared to its respective GWPS to assess if the lower limit exceeds the GWPS and, if so, declares a statistically significant increase (SSI) in constituent concentrations above the GWPS. Much like the UTL, the confidence interval method's use is reversible. For assessment monitoring, the lower confidence limit is compared to the GWPS to determine if there is a potential release from the CCR unit whereas the upper confidence limit is compared to the GWPS for corrective action analysis to assess if corrective action is successful. Each compliance well analyte underwent EDA (see Section 3.2) to ensure that the compliance well had no sample outliers and to assess for statistically-significant ($p < 0.05$) increasing or decreasing temporal trends in the sample data. The EDA process also identified which statistical distribution the sample data best fit to select an appropriate statistical comparison (e.g. parametric versus non-parametric) to the GWPS (Wood, 2018).

The following section describe these statistical methods in more detail.

3.1 EDA Workflow Procedures

EDA is a data diagnostic step that generates qualitative and quantitative information necessary to select a defensible statistical method for determining if there is a SSI over the GWPS. Figure 1 generalizes the EDA workflow, including assessment of spatial heterogeneity, trend detection, data distribution assessment, and outlier detection. Sample number, monitoring well network configuration, sampling frequency and non-detect frequency determine which EDA methods are most useful. The final EDA step is selecting an adequate and appropriate statistical method.

There are a number of different types of tolerance limit and confidence interval quantification methods to select from, depending on the statistical distribution, the presence of a temporal trend, the type of statistical

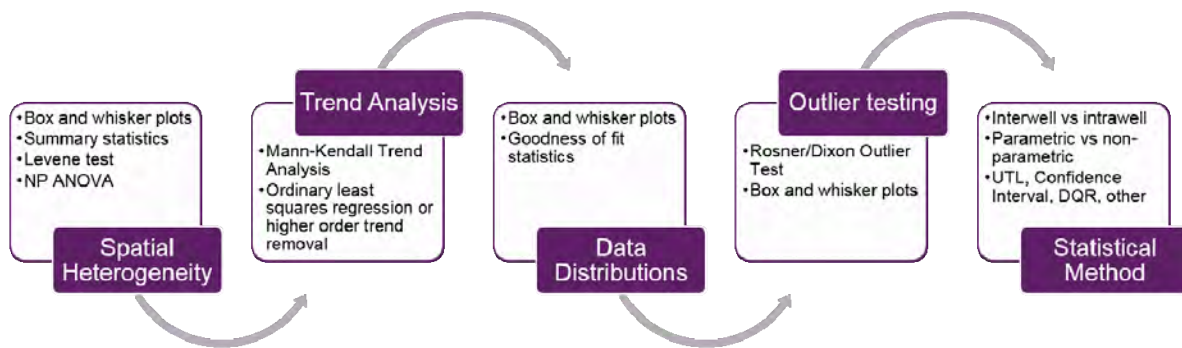


Figure 1. Assessment monitoring EDA and statistical method workflow procedures. Each box represent as separate step in the EDA workflow process. The items listed in each box identifies the statistical method(s) applied for each step. Both quantitative and qualitative methods are listed.

comparison (e.g. interwell or intrawell) and the quantity of non-detect values in the background sample data. The following subsections describe these methods and criteria for their selection.

Appendix B summarizes the results of the EDA of Multiunit 1 Appendix IV groundwater data.

3.2 Establishing Background Threshold Values

The EDA results for the subject analysis suggest that three UTL statistical tests are appropriate for collected Multiunit 1 background groundwater data: the parametric interwell upper tolerance limit, non-parametric interwell upper tolerance limit and the Double Quantification Rule. Each statistical test is described below. This work assumes that background well locations are adequate and thereby declare interwell comparisons appropriate.

3.2.1 Parametric Interwell Upper Tolerance Limit (P-UTL)

An interwell UTL represents an upper boundary, or threshold concentration value, that contains a pre-specified proportion, or coverage, of the underlying statistical population. For example, this coverage can range from 95% to 99% of all possible sample measurements in the underlying background statistical population, depending on the data characteristics. To be meaningful, testing with the UTL assumes that this coverage is similar for any statistically similar population (e.g. downgradient compliance wells), thereby underscoring the importance of a representative background well. Declaring a tolerance coefficient is necessary to establish confidence that the background sample dataset contains the pre-specified coverage (U.S. EPA, 2009). Oftentimes a tolerance coefficient of at least 95% is used, which corresponds to a significance level (α) equal to 5% (U.S. EPA, 2009). Table 17-3 within the Unified Guidance (U.S. EPA, 2009) combines the coverage and confidence to calculate the UTL.

A parametric interwell upper tolerance limit (P-UTL) was calculated if the background sample data generally met the following criteria, which are tested using procedures declared in the Statistical Data Analysis Work Plan (Wood, 2018):

1. Temporal stationarity (no trend in concentration through time)
2. Normal or transformed normal data distribution
3. Spatial heterogeneity is minimal
4. Sample outliers have been removed
5. Sample data are statistically independent and identically distributed

The P-UTLs were calculated using a 99% coverage with a 95% confidence. Although the Unified Guidance (U.S. EPA, 2009) recommends at least 95% coverage, the 99% coverage is justifiable for the following reasons:

- 1) The sampling frequency for the November 2015 to June 2018 sampling period is higher than quarterly in some cases, suggesting the background sample data might not be derived from independent samples and might underrepresent long-term temporal variations in groundwater constituent concentrations. A larger coverage can help compensate for underrepresented temporal variation. A more conservative coverage (i.e. only 95%) is suggested once a longer history of samples exists and the background sampling frequency becomes more consistent (e.g., semiannual).
- 2) Spatial heterogeneity is suspected at Multiunit 1. Spatial heterogeneity introduces uncertainty in the sample data in that one sample location might have naturally occurring elevated concentrations of a

constituent relative to other sample locations. This uncertainty can increase the chance of a declaring a false positive SSI. By increasing the UTL coverage it is possible to reduce the chance of declaring a false positive SSI due to spatial heterogeneity. This analysis assumes that the background well designations are adequate such that the other extreme does not occur (i.e., that the spatial heterogeneity causes background analyte concentrations to be elevated and result in a false negative SSI downgradient of the site).

The UTL coverage assumes the background sample data set is adequate and representative of intrinsic spatial and temporal variability in groundwater constituent concentrations beneath Multiunit 1. Factors that can violate this assumption include: 1) background wells completed in a different water-bearing unit than compliance wells (i.e., spatial heterogeneity), 2) background wells that have not been sampled during times of extreme potentiometric level (drought and snow-melt), and 3) structurally-compromised wells that do not produce representative groundwater samples. Reference to the conceptual site model and professional judgement/interpretation are necessary to confirm the adequacy of background well designations.

Table 1 lists background analytes and wells that qualify for the P-UTL method.

3.2.2 Non-Parametric Interwell Upper Tolerance Limit (NP-UTL)

A non-parametric interwell tolerance limit (NP-UTL) was calculated if the upgradient sample data generally met the following diagnostic criteria:

1. Temporal stationarity
2. No discernable data distribution
3. Spatial heterogeneity is minimal
4. Sample outliers have been removed
5. Statistical independence

Criterion Number 2, where a parametric distribution is not discernable from the sample data, primarily drives the NP-UTL selection. A NP-UTL uses the first or second highest-ranked background concentration value to establish the UTL, depending on the number of data points. "Ranked" means the grouped background concentration values are ordered in decreasing order and assigned a rank based on this order, where a rank equal to one represents the maximum concentration value. Table 17-4 in the Unified Guidance (U.S. EPA, 2009) provides minimum coverage levels for the first and second ordered sample values with 95% confidence for different background sample numbers. Table 17-4 illustrates that the sample number controls the coverage for the NP-UTL and higher sample numbers are necessary to achieve a higher coverage. Overall, the non-parametric tolerance limit is less powerful in comparison to its parametric counterparts (but more appropriate when parametric assumptions are not met).

The NP-UTL uses the maximum ranked value in the background well, which can constitute a reporting limit value if the reporting limit is higher than detectable concentrations. It is preferable that the maximum reporting limit in compliance wells not exceed the maximum reporting limit in the background well.

Table 1 lists background analytes and wells that qualify for the NP-UTL method.

3.2.3 Double Quantification Rule

The DQR is appropriate when the analyte exhibits 100% non-detectable concentrations in the background data set. The DQR states that, for any given compliance well analyte, two consecutive detectable concentrations that are above the maximum reporting limit are sufficient evidence to declare an SSI.

It should be noted that implications exist when there are inconsistencies in reporting limit values over time and between monitoring wells. For example, when the downgradient wells reflect a higher maximum reporting limit in comparison to the background well, applying the DQR leads to uncertainty in identifying a real SSI (i.e., the statistical test results in a false negative SSI). In other cases, it is possible to have lower reporting limit values in downgradient wells, resulting in a higher detection frequencies, which can trigger a false positive SSI. For these reasons, it is recommended that the laboratory establish achievable and consistent analytical reporting limit values among all wells throughout the duration of the monitoring program.

Table 1 lists background analytes and wells that qualify for the DQR.

3.3 Establishing Compliance Well Comparison Limits

Confidence intervals are a recommended approach for comparing compliance well (i.e., downgradient) data to a GWPS during assessment monitoring or corrective action (U.S. EPA, 2009). The confidence interval method estimates the range of concentration values (e.g. the upper and lower limits) in which the true central tendency (e.g. mean, median for this work) is expected to occur with a certain probability. The confidence interval accounts for both the level of statistical variation in the data and the desired confidence level. For this statistical analysis, the lower confidence limit is of interest and reflects the lowest concentration beyond which we do not expect the true mean of the downgradient sample data to reside.

Below is the formal null hypothesis statement for the confidence limit:

Ho: The true central tendency of the sample concentrations at the compliance point (e.g. downgradient well) is no greater than the predetermined GWPS.

This is the assumed condition unless, through a statistical test, the actual data demonstrates otherwise. The null hypothesis is rejected when the lower confidence limit (LCL) of the compliance sample dataset resides above the GWPS, resulting in sufficient evidence to declare an SSI.

Statistical power is the ability for the statistical test to detect a true increase above the GWPS. The statistical power can be negligible when the sample size is small, the sample variability is high and/or the confidence level is set too high (U.S. EPA, 2009). Statistical confidence should not be confused with the statistical power. The *statistical confidence* (1- α) indicates how often the confidence limit will contain the statistical parameter of interest (i.e., mean or median). The *statistical power* indicates how often a test will correctly identify an exceedance, using the statistical parameter of interest, above the GWPS. Because the statistical power typically decreases with higher confidence levels, the Unified Guidance (U.S. EPA, 2009) recommends first establishing an acceptable level of statistical power and then computing the associated confidence level. The Unified Guidance (U.S. EPA, 2009) suggests that the compliance test have at least 80% statistical power to detect a compliance well central tendency that is two times above the GWPS. This recommendation primarily accommodates parametric statistical tests, meaning when parametric method assumptions are not met, the parametric methods' power and confidence are not meaningful. In these cases, non-parametric methods are appropriate and their confidence limits generally exhibit somewhat less statistical power than their parametric counterparts.

The EDA results for the subject analysis suggest that three LCL statistical tests are appropriate for groundwater data collected downgradient of Multiunit 1: the parametric lower confidence limit, non-parametric lower confidence limit and the parametric lower confidence limit with a temporal trend. Each statistical test is described below.

3.3.1 Parametric Lower Confidence Limits (P-LCL)

For parametric data distributions, the mean (i.e., central tendency), standard deviation, and one-tailed Student's t value are necessary to calculate the parametric lower confidence limit (P-LCL) according to Equation 21.1 in the Unified Guidance (U.S. EPA, 2009). The confidence level ($1-\alpha$) is necessary to establish the Student's t value. The objective is to select the α that achieves high statistical power with an acceptable level of confidence. Table 22-2 in Appendix D of the Unified Guidance (U.S. EPA, 2009) allows for the selection of α based on the compliance well's sample number and the above statistical power criterion (i.e., at least 80%). The selected α for the P-LCL test is the maximum value that achieves at least 80% statistical power for the set sample number (n) and the minimum RCRA standard requirement of $\alpha = 0.01$ (U.S. EPA, 2009).

Table 2 summarizes compliance well analytes that quality for the P-LCL test.

3.3.2 Non-Parametric Lower Confidence Limits (NP-LCL)

For the non-parametric cases, the median represents the central tendency. The Unified Guidance (U.S. EPA, 2009) does not provide formal guidance for calculating the statistical power for a non-parametric statistical test using environmental data. As such, the non-parametric confidence limit calculations will achieve a minimum confidence level of 95%.

The non-parametric LCL (NP-LCL) test uses the sample number and the 95% confidence level ($1-\alpha$) to establish the LCL. The compliance well with a sample count (n) is first ordered from smallest to largest sample concentration then assigned a numeric rank, where 1 is the lowest concentration and (n) is the highest concentration. Table 21-11 in Appendix D of the Unified Guidance (U.S. EPA, 2009) provides achievable confidence levels for ranked values for small sample sizes ($n < 20$). The rank value that achieves the 95% confidence level or higher serves as the lower non-parametric confidence limit.

Table 2 summarizes compliance well analytes that quality for the NP-LCL test.

3.3.3 Calculating the Trend-Dependent Lower Confidence Limit (P-LCLT)

The confidence interval tests are sensitive to temporal trends, which inflate the standard deviation. If the temporal Mann-Kendall trend was significant ($p < 0.05$), and the data exhibit a parametric distribution, the 95% lower confidence interval was calculated around the temporal trend (P-LCLT). If a trend was significant ($p < 0.05$) but the data distribution was non-parametric, then a NP-LCL was calculated. The P-LCLT was calculated in ProUCL 5.1 using equation 10-12 in the ProUCL 5.1.1 Technical Guidance (U.S. EPA, 2015). By proxy, the coefficient of variation was calculated to assess the statistical power of this parametric test. The Unified Guidance (Section 7.4.1) suggests that if the coefficient of variation is less than or equal to 0.5, the lower limit confidence exhibits adequate statistical power.

Table 2 summarizes compliance well analytes that quality for the P-LCLT test if the statistically significant ($p < 0.05$) temporal trend is increasing or decreasing.

4.0 RESULTS

Table 1 summarizes the GWPS selection for each Appendix IV constituent. The GWPS constitutes either the statistically calculated BTV, the U.S. EPA's promulgated MCL, or the risk-based alternative GWPS identified for constituents without MCLs, whichever value is higher.

Table 2 summarizes: 1) which compliance wells exhibit SSIs above their respective GWPS for Appendix IV constituents, 2) which compliance wells exhibit statistically significant temporal trends and 3) the type of LCL test applied.

This statistical analysis indicates there is sufficient evidence to declare an SSI for cobalt in monitoring wells MW-61 and MW-75, which show LCLs equal to 0.016 mg/L and 0.043 mg/L, respectively. The GWPS for cobalt is equal to 0.01 mg/L, which corresponds to the NP-UTL BTV (Table 1). Monitoring wells MW-61 and MW-75 also exhibit statistically significant ($p < 0.05$) increasing temporal trends for cobalt.

This statistical analysis also indicates there is sufficient evidence to declare an SSI for molybdenum in monitoring well MW-75, which shows an LCL equal to 0.15 mg/L. The GWPS for molybdenum is 0.1 mg/L which corresponds to the risk-based alternative GWPS identified for this constituent (Table 1).

This statistical analysis indicates there is insufficient evidence to declare SSIs above their respective GWPSs for the remaining Appendix IV analytes (i.e., excluding cobalt and molybdenum). Statistically significant ($p < 0.05$) increasing trends are present for MW-7 (arsenic and selenium), MW-61 (fluoride) and MW-75 (selenium). Statistically significant ($p < 0.05$) decreasing trends are present for monitoring wells MW-7 and MW-8 for barium and molybdenum.

This analysis suggests spatial heterogeneity is present within the grouped background wells (MW-49a and MW-74) for arsenic, combined radium, lithium and selenium. Specifically, MW-74 exhibits elevated concentrations for selenium relative to all Multiunit 1 monitoring wells. The elevated background selenium concentrations present a possibility for declaring a false negative SSI in downgradient wells using the interwell statistical comparison method. Reference to the conceptual site model and professional judgement/interpretation are necessary to confirm adequacy and representativeness of background well designations for Multiunit 1.

Statistically significant ($p < 0.05$) trends were detected in the background dataset for barium (decreasing), molybdenum (decreasing) and combined radium (decreasing).

5.0 RECOMMENDATIONS

This statistical analysis results in the following recommendations for the Multiunit 1 assessment monitoring statistical analysis:

- There is sufficient evidence to declare an SSI above the GWPS for cobalt in wells MW-61 and MW-75 and molybdenum in well MW-75. Therefore, proper notification in the facility's operation record should be made and, within 90 days of the date of this Tech Memo, APS should either begin corrective action assessment or demonstrate that the SSI is due to an alternative source.

- A lower sampling frequency is necessary to avoid temporal autocorrelation in the groundwater monitoring data; a quarterly or semiannual frequency should be used until future data evaluations can establish a more objective, data-driven sampling frequency.
- The laboratory should achieve reporting limits below the U.S. EPA's promulgated MCLs and maintain a constant reporting limit for each analyte over time for all monitoring wells – background and compliance. This recommendation will improve the certainty of detection of temporal trends in the groundwater sample data while also decreasing the probability for declaring false negative/false positive SSIs when applying statistical tests, especially the DQR.
- Intrawell statistical comparisons should be considered for analytes that exhibit spatial heterogeneity. Reference to the conceptual site model and professional judgement/interpretation are necessary to confirm adequacy and representativeness of background well designations for Multiunit 1.

6.0 REFERENCES

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wood.

TABLES



Table 1
GWPS Selection for the FCPP Multiunit 1
Appendix IV Statistical Comparison

Grouped Background Wells	Constituent	US EPA MCL	Alternative Risk-Based GWPS	Background Threshold Value (Calculation Method ^{1,2})	Units	GWPS Selection ³
MW-49A & MW-74	Antimony	0.006	---	0.01 (NP-UTL)	mg/L	BTV
MW-49A & MW-74	Arsenic	0.01	---	0.0086 (P-UTL)	mg/L	US EPA MCL
MW-49A & MW-74	Barium	2	---	0.042 (NP-UTL)	mg/L	US EPA MCL
MW-49A & MW-74	Beryllium	0.004	---	0.001 (NP-UTL)	mg/L	US EPA MCL
MW-49A & MW-74	Cadmium	0.005	---	0.002 (NP-UTL)	mg/L	US EPA MCL
MW-49A & MW-74	Chromium	0.1	---	0.02 (NP-UTL)	mg/L	US EPA MCL
MW-49A & MW-74	Cobalt	---	0.006	0.01 (NP-UTL)	mg/L	BTV
MW-49A & MW-74	Fluoride	4	---	5 (NP-UTL)	mg/L	BTV
MW-49A & MW-74	Lead	---	0.015	0.01 (DQR)	mg/L	Alternative Risk-Based GWPS
MW-49A & MW-74	Lithium	---	0.04	1.8 (NP-UTL)	mg/L	BTV
MW-49A & MW-74	Mercury	0.002	---	0.0002 (NP-UTL)	mg/L	BTV/US EPA MCL
MW-49A & MW-74	Molybdenum	---	0.1	0.12 (P-UTL)*	mg/L	Alternative Risk-Based GWPS
MW-49A & MW-74	Selenium	0.05	---	0.092 (NP-UTL)	mg/L	BTV
MW-49A & MW-74	Thallium	0.002	---	0.017 (NP-UTL)	mg/L	BTV
MW-49A & MW-74	Combined Radium	5	---	4.43 (P-UTL)*	pCi/L	US EPA MCL

Notes:

BTV = Background Threshold Value

GWPS = Groundwater Protection Standard

US EPA MCL = United States Environmental Protection Agency Maximum Contaminant Level under the Safe Drinking Water Act

¹ Double Quantification Rule (DQR), Parametric Upper Tolerance Limit (P-UTL), Non-Parametric Upper Tolerance Limit (NP-UTL)

² The DQR BTV represents the maximum reporting limit value

³ The GWPS selection represents the highest value between the US EPA MCL, the Alternative Risk-Based GWPS and the BTV

* Inadequate temporal detrending in the background data defaults to using US EPA MCL or Alternative Risk-Based GWPS, as applicable

Table 2
 Statistical Results Summary - FCPP MultiUnit 1 CCR Unit
 Appendix IV Statistical Comparison

Appendix IV Constituent	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Combined Radium
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L
GWPS	0.01	0.01	2	0.004	0.005	0.1	0.01	5	0.015	1.8	0.002	0.1	0.092	0.017	5
MW-7	NP-LCL (0.004)	P-LCLT (0.0012)	P-LCLT (0.013)	NP-LCL (0.001)	NP-LCL (0.0004)	NP-LCL (0.004)	NP-LCL (0.002)	NP-LCL (0.8)	NP-LCL (0.002)	P-LCL (0.72)	NP-LCL (0.0002)	NP-LCL (0.01)	P-LCLT (0.0098)	P-LCL (0.000063)	P-LCL (0.50)
MW-8	NP-LCL (0.0025)	NP-LCL (0.001)	NP-LCL (0.017)	NP-LCL (0.001)	P-LCL (0.000056)	NP-LCL (0.0025)	P-LCL (0.000035)	NP-LCL (2.0)	NP-LCL (0.0014)	NP-LCL (1.2)	NP-LCL (0.0002)	P-LCLT (0.0049)	NP-LCL (0.01)	NP-LCL (0.0005)	P-LCL (0.41)
MW-61	NP-LCL (0.004)	NP-LCL (0.002)	NP-LCL (0.014)	NP-LCL (0.001)	P-LCL (0.00082)	NP-LCL (0.004)	P-LCLT (0.016)	P-LCLT (2.0)	P-LCL (0.00076)	P-LCL (0.34)	NP-LCL (0.0002)	P-LCL (0.069)	NP-LCL (0.0002)	P-LCL (0.0015)	P-LCL (0.00)
MW-75	NP-LCL (0.004)	NP-LCL (0.004)	NP-LCL (0.02)	NP-LCL (0.001)	P-LCL (0.0017)	NP-LCL (0.004)	P-LCLT (0.043)	NP-LCL (2.0)	NP-LCL (0.005)	P-LCL (0.39)	NP-LCL (0.0002)	P-LCL (0.15)	P-LCLT (0.0040)	NP-LCL (0.001)	P-LCL (0.24)

Legend

Method (LCL)	There is insufficient evidence to declare an SSI over the GWPS
Method (LCL)	Statistically significant increasing trend (p<0.05)
Method (LCL)	Statistically significant decreasing trend (p<0.05)
Method (LCL)	There is sufficient evidence to declare an SSI over the GWPS

NP-LCL	Non-Parametric Lower Confidence Limit
P-LCLT	Parametric Lower Confidence Limit with a Trend
P-LCL	Parametric Lower Confidence Limit
LCL	Lower Confidence Limit

APPENDIX A
PROUCL INPUT FILES



Table A-1
Fluoride - All Wells

Well	Sample Date	Fluoride	D_Fluoride
Background	12/1/2015	5	0
Background	6/7/2016	0.86	1
Background	8/21/2016	0.08	0
Background	9/13/2016	0.4	0
Background	10/20/2016	0.4	0
Background	2/2/2017	0.4	0
Background	2/2/2017	1.7	1
Background	4/18/2017	2	0
Background	4/18/2017	1.6	1
Background	5/2/2017	1.9	1
Background	5/3/2017	0.79	1
Background	5/29/2017	1.9	1
Background	5/30/2017	2	0
Background	6/22/2017	1.9	1
Background	6/22/2017	2	0
Background	7/22/2017	4	0
Background	7/22/2017	1.9	1
Background	8/10/2017	4	0
Background	8/10/2017	2	1
Background	8/17/2017	4	0
Background	9/10/2017	4	0
Background	9/10/2017	2	1
Background	10/11/2017	2.1	1
Background	10/12/2017	4	0
Background	3/17/2018	3.2	1
Background	3/17/2018	4	0
Background	6/1/2018	0.8	0
Background	6/1/2018	2.1	1
MW-61	11/6/2015	1.2	1
MW-61	4/26/2016	1.3	1
MW-61	6/6/2016	1.3	1
MW-61	8/21/2016	0.91	1
MW-61	9/13/2016	1.1	1
MW-61	10/20/2016	1.1	1
MW-61	2/2/2017	1.1	1
MW-61	4/18/2017	1.1	1
MW-61	5/3/2017	1.2	1
MW-61	5/30/2017	1.2	1
MW-61	6/22/2017	1.3	1
MW-61	7/22/2017	1.3	1
MW-61	8/10/2017	1.2	1
MW-61	8/17/2017	1.4	1
MW-61	9/10/2017	1.2	1
MW-61	10/12/2017	1.2	1
MW-61	3/17/2018	1.6	1
MW-61	6/1/2018	1.3	1

Table A-1
Fluoride - All Wells

Well	Sample Date	Fluoride	D_Fluoride
MW-7	11/7/2015	0.35	1
MW-7	4/26/2016	2	0
MW-7	6/6/2016	0.4	1
MW-7	8/21/2016	0.4	0
MW-7	9/13/2016	0.4	0
MW-7	10/20/2016	0.4	0
MW-7	2/2/2017	0.4	0
MW-7	4/18/2017	0.8	0
MW-7	5/3/2017	0.35	1
MW-7	5/30/2017	0.8	0
MW-7	6/22/2017	0.8	0
MW-7	7/22/2017	0.8	0
MW-7	8/10/2017	0.8	0
MW-7	8/17/2017	0.8	0
MW-7	9/10/2017	0.8	0
MW-7	10/12/2017	0.8	0
MW-7	3/17/2018	4	0
MW-7	6/1/2018	0.8	0
MW-75	4/18/2017	2	0
MW-75	5/3/2017	1.4	1
MW-75	5/30/2017	2	0
MW-75	6/22/2017	2	0
MW-75	7/22/2017	2	0
MW-75	8/10/2017	2	0
MW-75	8/17/2017	2	0
MW-75	9/10/2017	2	0
MW-75	10/12/2017	2	0
MW-75	3/17/2018	1.7	1
MW-75	6/1/2018	1.2	1
MW-8	12/1/2015	5	0
MW-8	4/26/2016	2	0
MW-8	6/7/2016	0.68	1
MW-8	8/21/2016	0.4	0
MW-8	9/13/2016	0.4	0
MW-8	4/18/2017	0.8	0
MW-8	5/3/2017	1.1	1
MW-8	5/30/2017	2	0
MW-8	6/1/2018	0.91	1

Table A-2
Fluoride - Background Wells Only

Well	Sample Date	Fluoride	D_Fluoride
MW-49A	12/1/2015	5	0
MW-49A	6/7/2016	0.86	1
MW-49A	8/21/2016	0.08	0
MW-49A	9/13/2016	0.4	0
MW-49A	10/20/2016	0.4	0
MW-49A	2/2/2017	0.4	0
MW-49A	4/18/2017	2	0
MW-49A	5/3/2017	0.79	1
MW-49A	5/30/2017	2	0
MW-49A	6/22/2017	2	0
MW-49A	7/22/2017	4	0
MW-49A	8/10/2017	4	0
MW-49A	8/17/2017	4	0
MW-49A	9/10/2017	4	0
MW-49A	10/12/2017	4	0
MW-49A	3/17/2018	4	0
MW-49A	6/1/2018	0.8	0
MW-74	2/2/2017	1.7	1
MW-74	4/18/2017	1.6	1
MW-74	5/2/2017	1.9	1
MW-74	5/29/2017	1.9	1
MW-74	6/22/2017	1.9	1
MW-74	7/22/2017	1.9	1
MW-74	8/10/2017	2	1
MW-74	9/10/2017	2	1
MW-74	10/11/2017	2.1	1
MW-74	3/17/2018	3.2	1
MW-74	6/1/2018	2.1	1

Table A-3
Radium - All Wells

Well	Sample Date	Combined_Radium	D_CombinedRadium	NumDate
Background	12/1/2015	1.87	1	42339.00
Background	4/26/2016	2.3	1	42486.00
Background	6/7/2016	2.4	1	42528.00
Background	8/21/2016	3.5	1	42603.00
Background	9/13/2016	1.3	1	42626.00
Background	10/20/2016	2.1	1	42663.00
Background	2/2/2017	3.4	1	42768.00
Background	2/2/2017	1.6	1	42768.00
Background	4/17/2017	0.7	1	42842.00
Background	4/18/2017	2	1	42843.00
Background	5/2/2017	1.5	1	42857.00
Background	5/3/2017	1.9	1	42858.00
Background	5/29/2017	1.1	1	42884.61
Background	5/30/2017	2.1	1	42885.00
Background	6/22/2017	0.6	0	42908.42
Background	6/22/2017	2.7	1	42908.60
Background	7/22/2017	2.6	1	42938.00
Background	7/22/2017	0.7	0	42938.00
Background	8/10/2017	1.7	1	42957.00
Background	8/10/2017	0.9	1	42957.00
Background	8/17/2017	2	1	42964.00
Background	9/10/2017	2.3	1	42988.00
Background	9/10/2017	1.7	1	42988.00
Background	10/11/2017	0.6	0	43019.00
Background	10/12/2017	2.5	1	43020.00
Background	3/17/2018	0.9	0	43176.45
Background	3/17/2018	0.8	0	43176.58
Background	6/1/2018	1.5	1	43252.00
Background	6/1/2018	0.7	0	43252.00
MW-61	11/6/2015	1.29	1	42314.00
MW-61	4/26/2016	1.9	1	42486.00
MW-61	6/6/2016	0.8	0	42527.00
MW-61	8/21/2016	1.4	1	42603.00
MW-61	9/13/2016	1.3	1	42626.00
MW-61	10/20/2016	0.7	1	42663.00
MW-61	2/2/2017	2.2	1	42768.00
MW-61	4/18/2017	0.6	0	42843.00
MW-61	5/3/2017	0.7	1	42858.00
MW-61	5/30/2017	0.6	0	42885.00
MW-61	6/22/2017	0.6	0	42908.50
MW-61	7/22/2017	0.5	1	42938.00
MW-61	8/10/2017	0.7	0	42957.00
MW-61	8/17/2017	0.7	0	42964.00
MW-61	9/10/2017	0.7	1	42988.00
MW-61	10/12/2017	2	1	43020.00
MW-61	3/17/2018	0.9	0	43176.49

Table A-3
Radium - All Wells

Well	Sample Date	Combined_Radium	D_CombinedRadium	NumDate
MW-61	6/1/2018	0.7	0	43252.00
MW-7	11/7/2015	1.8	1	42315.00
MW-7	4/26/2016	1.9	1	42486.00
MW-7	6/6/2016	3.3	1	42527.00
MW-7	8/21/2016	0.7	1	42603.00
MW-7	9/13/2016	3.3	1	42626.00
MW-7	10/20/2016	1	1	42663.00
MW-7	2/2/2017	1.9	1	42768.00
MW-7	4/18/2017	1.5	1	42843.00
MW-7	5/3/2017	0.6	0	42858.00
MW-7	5/30/2017	0.6	0	42885.00
MW-7	6/22/2017	1.2	1	42908.00
MW-7	7/22/2017	1.9	1	42938.00
MW-7	8/10/2017	1.2	1	42957.00
MW-7	8/17/2017	1.2	1	42964.00
MW-7	9/10/2017	1.3	1	42988.00
MW-7	10/12/2017	2.6	1	43020.00
MW-7	3/17/2018	0.9	0	43176.00
MW-7	6/1/2018	1.3	1	43252.00
MW-75	4/17/2017	1.6	1	42842.00
MW-75	5/3/2017	0.4	1	42858.00
MW-75	5/30/2017	0.9	1	42885.37
MW-75	6/22/2017	0.6	0	42908.53
MW-75	7/22/2017	0.7	0	42938.00
MW-75	8/10/2017	1	1	42957.00
MW-75	8/17/2017	0.7	0	42964.00
MW-75	9/10/2017	0.8	1	42988.00
MW-75	10/12/2017	0.8	1	43020.00
MW-75	3/17/2018	0.8	0	43176.52
MW-75	6/1/2018	1.4	1	43252.00
MW-8	12/1/2015	4.66	1	42339.00
MW-8	4/26/2016	1.4	1	42486.00
MW-8	6/7/2016	1.3	1	42528.00
MW-8	8/21/2016	1.3	1	42603.00
MW-8	9/13/2016	1.2	1	42626.00
MW-8	4/18/2017	1	1	42843.00
MW-8	5/3/2017	1.9	1	42858.00
MW-8	5/30/2017	1.2	1	42885.00
MW-8	6/1/2018	0.7	0	43252.00

Table A-4
Radium - Background Wells Only

Well	Sample Date	Combined_Radium	D_CombinedRadium
MW-49A	12/1/2015	1.87	1
MW-49A	4/26/2016	2.3	1
MW-49A	6/7/2016	2.4	1
MW-49A	8/21/2016	3.5	1
MW-49A	9/13/2016	1.3	1
MW-49A	10/20/2016	2.1	1
MW-49A	2/2/2017	3.4	1
MW-49A	4/18/2017	2	1
MW-49A	5/3/2017	1.9	1
MW-49A	5/30/2017	2.1	1
MW-49A	6/22/2017	2.7	1
MW-49A	7/22/2017	2.6	1
MW-49A	8/10/2017	1.7	1
MW-49A	8/17/2017	2	1
MW-49A	9/10/2017	2.3	1
MW-49A	10/12/2017	2.5	1
MW-49A	3/17/2018	0.8	0
MW-49A	6/1/2018	1.5	1
MW-74	2/2/2017	1.6	1
MW-74	4/17/2017	0.7	1
MW-74	5/2/2017	1.5	1
MW-74	5/29/2017	1.1	1
MW-74	6/22/2017	0.6	0
MW-74	7/22/2017	0.7	0
MW-74	8/10/2017	0.9	1
MW-74	9/10/2017	1.7	1
MW-74	10/11/2017	0.6	0
MW-74	3/17/2018	0.9	0
MW-74	6/1/2018	0.7	0

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Lead	D_Lead	Lithium
Background	12/1/2015	0.00033	1	0.0016	1	0.042	1	0.00075	1	0.00018	1	0.0035	1	0.0022	1	0.01	0	0.75
Background	6/7/2016	0.00035	1	0.0013	1	0.028	1	0.001	0	0.00012	1	0.00091	1	0.0019	1	0.0005	0	0.9
Background	8/21/2016	0.00035	1	0.0011	1	0.022	1	0.001	0	0.0003	1	0.00079	1	0.003	1	0.0005	0	1.8
Background	9/13/2016	0.0025	0	0.004	0	0.029	1	0.001	0	0.002	0	0.01	0	0.004	0	0.002	0	1.2
Background	10/20/2016	0.005	0	0.002	0	0.022	1	0.001	0	0.001	0	0.005	0	0.0036	1	0.0001	0	1.2
Background	2/2/2017	0.001	0	0.00092	1	0.02	1	0.001	0	0.00031	1	0.00079	1	0.004	1	0.0005	0	1.4
Background	2/2/2017	0.002	0	0.0035	1	0.036	1	0.001	0	0.0002	0	0.0026	1	0.001	0	0.0005	0	0.39
Background	4/18/2017	0.004	0	0.002	0	0.022	1	0.001	0	0.0004	0	0.002	0	0.0045	1	0.002	0	1.3
Background	4/18/2017	0.004	0	0.0029	1	0.018	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.4
Background	5/2/2017	0.002	0	0.0028	1	0.018	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.001	0	0.38
Background	5/3/2017	0.001	0	0.00088	1	0.022	1	0.001	0	0.00023	1	0.00065	1	0.0037	1	0.0005	0	1.1
Background	5/29/2017	0.00048	1	0.0045	1	0.022	1	0.001	0	0.00028	1	0.005	0	0.00064	1	0.005	0	0.37
Background	5/30/2017	0.001	0	0.0011	1	0.022	1	0.001	0	0.00024	1	0.00069	1	0.0036	1	0.0005	0	1.1
Background	6/22/2017	0.004	0	0.0032	1	0.02	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.38
Background	6/22/2017	0.001	0	0.0011	1	0.021	1	0.001	0	0.00024	1	0.00088	1	0.0039	1	0.0005	0	1.1
Background	7/22/2017	0.01	0	0.01	0	0.021	1	0.001	0	0.001	0	0.02	0	0.01	0	0.005	0	1.1
Background	7/22/2017	0.004	0	0.0028	1	0.018	1	0.001	0	0.0004	0	0.002	0	0.001	0	0.002	0	0.41
Background	8/10/2017	0.01	0	0.002	0	0.02	1	0.001	0	0.001	0	0.004	0	0.0029	1	0.005	0	1.1
Background	8/10/2017	0.01	0	0.0022	1	0.019	1	0.001	0	0.001	0	0.004	0	0.002	0	0.005	0	0.43
Background	8/17/2017	0.004	0	0.002	0	0.02	1	0.001	0	0.0004	0	0.004	0	0.0029	1	0.002	0	1.1
Background	9/10/2017	0.004	0	0.002	0	0.02	1	0.001	0	0.0004	0	0.004	0	0.0026	1	0.002	0	0.9
Background	9/10/2017	0.004	0	0.0043	1	0.023	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.48
Background	10/11/2017	0.01	0	0.005	0	0.023	1	0.001	1	0.001	0	0.01	0	0.005	0	0.005	0	0.48
Background	10/12/2017	0.004	0	0.005	0	0.019	1	0.001	0	0.0004	0	0.01	0	0.005	0	0.005	0	0.92
Background	3/17/2018	0.004	0	0.0034	1	0.02	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.47
Background	3/17/2018	0.004	0	0.002	0	0.021	1	0.001	0	0.0004	0	0.004	0	0.0023	1	0.002	0	1.1
Background	6/1/2018			0.01	0	0.022	1			0.002	0			0.01	0	0.01	0	1.1
Background	6/1/2018			0.01	0	0.019	1			0.002	0			0.01	0	0.01	0	0.49
MW-61	11/6/2015	0.00029	1	0.00056	1	0.016	1	0.00016	1	0.001	1	0.00075	1	0.011	1	0.00082	1	0.36
MW-61	4/26/2016	0.0025	0	0.0005	0	0.014	1	0.001	0	0.00082	1	0.0005	0	0.01	1	0.00078	1	0.4
MW-61	6/6/2016	0.00023	1	0.0005	0	0.015	1	0.001	0	0.00094	1	0.0005	0	0.012	1	0.0008	1	0.39
MW-61	8/21/2016	0.00023	1	0.00058	1			0.001	0	0.00091	1	0.00052	1	0.013	1	0.001	1	0.44
MW-61	9/13/2016	0.0025	0	0.001	0	0.014	1	0.001	0	0.00094	1	0.0025	0	0.013	1	0.00089	1	0.37
MW-61	10/20/2016	0.0005	0	0.00042	1	0.014	1	0.001	0	0.00094	1	0.0005	0	0.012	1	0.00092	1	0.39
MW-61	2/2/2017	0.001	0	0.0005	1	0.013	1	0.001	0	0.0011	1	0.0005	0	0.013	1	0.00079	1	0.36
MW-61	4/18/2017	0.004	0	0.002	0	0.014	1	0.001	0	0.00093	1	0.002	0	0.014	1	0.002	0	0.37
MW-61	5/3/2017	0.001	0	0.0005	0	0.014	1	0.001	0	0.00094	1	0.00062	1	0.014	1	0.00082	1	0.38
MW-61	5/30/2017	0.001	0	0.0005	0	0.014	1	0.001	0	0.00092	1	0.0005	0	0.015	1	0.00089	1	0.36
MW-61	6/22/2017	0.001	0	0.00063	1	0.014	1	0.001	0	0.00098	1	0.00052	1	0.015	1	0.00086	1	0.37
MW-61	7/22/2017	0.004	0	0.002	0	0.013	1	0.001	0	0.00082	1	0.002	0	0.013	1	0.002	0	0.38
MW-61	8/10/2017	0.001	0	0.0005	0	0.014	1	0.001	0	0.00092	1	0.001	0	0.015	1	0.00083	1	0.4
MW-61	8/17/2017	0.004	0	0.002	0	0.014	1	0.001	0	0.00092	1	0.004	0	0.015	1	0.002	0	0.41
MW-61	9/10/2017	0.004	0	0.002	0	0.013	1	0.001	0	0.00087	1	0.004	0	0.014	1	0.002	0	0.37
MW-61	10/12/2017	0.004	0	0.005	0	0.013	1	0.001	0	0.00097	1	0.01	0	0.016	1	0.005	0	0.35
MW-61	3/17/2018	0.004	0	0.002	0	0.014	1	0.001	0	0.0011	1	0.004	0	0.016	1	0.002	0	0.38
MW-61	6/1/2018			0.01	0	0.014	1			0.002	0			0.017	1	0.01	0	0.36

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Lead	D_Lead	Lithium
MW-7	11/7/2015	0.00027	1	0.0006	1	0.017	1	0.00015	1	0.00014	1	0.00041	1	0.0028	1	0.00045	1	0.75
MW-7	4/26/2016	0.0025	0	0.00065	1	0.014	1	0.001	0	0.0001	0	0.0005	0	0.0015	1	0.0005	0	1
MW-7	6/6/2016	0.00031	1	0.00075	1	0.017	1	0.001	0	0.0001	0	0.0005	0	0.002	1	0.00082	1	0.94
MW-7	8/21/2016	0.00016	1	0.00055	1	0.017	1	0.001	0	0.0001	0	0.0005	0	0.0015	1	0.0005	0	1.2
MW-7	9/13/2016	0.0025	0	0.001	0	0.017	1	0.001	0	0.0014	1	0.0025	0	0.002	1	0.0005	0	0.9
MW-7	10/20/2016	0.0005	0	0.00033	1	0.015	1	0.001	0	0.0001	1	0.0005	0	0.00083	1	0.0001	0	0.93
MW-7	2/2/2017	0.001	1	0.0005	0	0.016	1	0.001	0	0.0001	0	0.00093	1	0.00065	1	0.0005	0	0.92
MW-7	4/18/2017	0.001	0	0.00072	1	0.016	1	0.001	0	0.0001	0	0.0023	1	0.0005	0	0.0005	0	0.85
MW-7	5/3/2017	0.001	0	0.0005	0	0.015	1	0.001	0	0.0001	0	0.0024	1	0.0005	0	0.0005	0	0.9
MW-7	5/30/2017	0.001	0	0.0005	1	0.015	1	0.001	0	0.0001	0	0.0025	1	0.0005	0	0.0005	0	0.79
MW-7	6/22/2017	0.001	0	0.00067	1	0.015	1	0.001	0	0.0001	0	0.0018	1	0.0005	0	0.0005	0	0.86
MW-7	7/22/2017	0.004	0	0.002	0	0.014	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.89
MW-7	8/10/2017	0.01	0	0.00066	1	0.016	1	0.001	0	0.001	0	0.0017	1	0.0005	0	0.005	0	0.9
MW-7	8/17/2017	0.004	0	0.002	0	0.015	1	0.001	0	0.0004	0	0.0047	1	0.002	0	0.002	0	0.96
MW-7	9/10/2017	0.004	0	0.0021	1	0.014	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.83
MW-7	10/12/2017	0.001	0	0.00079	1	0.013	1	0.001	0	0.0001	0	0.001	0	0.0005	0	0.0005	0	0.81
MW-7	3/17/2018	0.004	0	0.002	0	0.014	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.92
MW-7	6/1/2018			0.01	0	0.017	1			0.002	0			0.01	0	0.01	0	0.83
MW-75	4/18/2017	0.004	1	0.004	0	0.02	1	0.001	0	0.0022	1	0.002	0	0.043	1	0.0031	1	0.43
MW-75	5/3/2017	0.001	0	0.001	0	0.018	1	0.001	0	0.0019	1	0.001	0	0.042	1	0.0031	1	0.43
MW-75	5/30/2017	0.001	0	0.0005	0	0.017	1	0.001	0	0.0019	1	0.0005	0	0.039	1	0.0028	1	0.43
MW-75	6/22/2017	0.004	0	0.002	0	0.02	1	0.001	0	0.0024	1	0.002	0	0.048	1	0.0041	1	0.43
MW-75	7/22/2017	0.004	0	0.002	0	0.018	1	0.001	0	0.002	1	0.002	0	0.043	1	0.003	1	0.44
MW-75	8/10/2017	0.01	0	0.002	0	0.019	1	0.001	0	0.0023	1	0.004	0	0.046	1	0.005	0	0.45
MW-75	8/17/2017	0.004	0	0.002	0	0.018	1	0.001	0	0.002	1	0.004	0	0.045	1	0.0032	1	0.48
MW-75	9/10/2017	0.004	0	0.002	0	0.018	1	0.001	0	0.002	1	0.004	0	0.044	1	0.0032	1	0.42
MW-75	10/12/2017	0.01	0	0.005	0	0.02	1	0.001	0	0.0023	1	0.01	0	0.049	1	0.005	0	0.41
MW-75	3/17/2018	0.004	0	0.002	0	0.018	1	0.001	0	0.002	1	0.004	0	0.044	1	0.003	1	0.43
MW-75	6/1/2018			0.01	0	0.02	1			0.0024	1			0.048	1	0.01	0	0.4
MW-8	12/1/2015	0.0014	1	0.0091	1	0.15	1	0.002	1	0.00096	1	0.02	1	0.019	1	0.033	1	1.1
MW-8	4/26/2016	0.005	0	0.001	0	0.014	1	0.001	0	0.00025	1	0.001	0	0.0018	1	0.001	0	1.2
MW-8	6/7/2016	0.00054	1	0.00058	1	0.038	1	0.001	0	0.0002	1	0.0016	1	0.0023	1	0.0014	1	1.1
MW-8	8/21/2016	0.00048	1	0.0005	0	0.014	1	0.001	0	0.00022	1	0.00082	1	0.00093	1	0.0005	0	1.5
MW-8	9/13/2016	0.0025	0	0.001	0	0.013	1	0.001	0	0.00074	1	0.0025	0	0.0013	1	0.0005	0	1.1
MW-8	4/18/2017	0.001	0	0.00053	1	0.017	1	0.001	0	0.00018	1	0.00075	1	0.00053	1	0.0005	1	1.1
MW-8	5/3/2017	0.001	0	0.0005	0	0.012	1	0.001	0	0.00011	1	0.0006	1	0.0005	0	0.0005	0	1.2
MW-8	5/30/2017	0.001	0	0.0007	1	0.013	1	0.001	0	0.00013	1	0.00077	1	0.0005	0	0.0005	0	1.1
MW-8	6/1/2018			0.01	0	0.011	1			0.002	0			0.01	0	0.01	0	1.2

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Selenium	D_Selenium	Thallium	D_Thallium
Background	12/1/2015	1	0.0001	1	0.096	1	0.0021	1	0.0014	1
Background	6/7/2016	1	0.0002	0	0.069	1	0.0018	1	0.0012	1
Background	8/21/2016	1	0.0002	0	0.028	1	0.0018	1	0.0015	1
Background	9/13/2016	1	0.0002	0	0.027	1	0.012	0		
Background	10/20/2016	1	0.0002	0	0.036	1	0.006	0	0.002	1
Background	2/2/2017	1	0.0002	0	0.042	1	0.0018	1	0.0015	1
Background	2/2/2017	1	0.0002	0	0.075	1	0.089	1	0.0001	0
Background	4/18/2017	1	0.0002	0	0.028	1	0.002	0	0.017	1
Background	4/18/2017	1	0.0002	0	0.013	1	0.069	1	0.0004	0
Background	5/2/2017	1	0.0002	0	0.019	1	0.067	1	0.0002	0
Background	5/3/2017	1	0.0002	0	0.025	1	0.0018	1	0.0014	1
Background	5/29/2017	1	0.0002	0	0.028	1	0.062	1	0.00035	1
Background	5/30/2017	1	0.0002	0	0.028	1	0.0017	1	0.0015	1
Background	6/22/2017	1	0.0002	0	0.02	1	0.06	1	0.0004	0
Background	6/22/2017	1	0.0002	0	0.025	1	0.0017	1	0.0014	1
Background	7/22/2017	1	0.0002	0	0.025	1	0.01	0	0.0013	1
Background	7/22/2017	1	0.0002	0	0.016	1	0.071	1	0.0004	0
Background	8/10/2017	1	0.0002	0	0.029	1	0.002	0	0.0014	1
Background	8/10/2017	1	0.0002	0	0.018	1	0.06	1	0.001	0
Background	8/17/2017	1	0.0002	0	0.037	1	0.002	0	0.0014	1
Background	9/10/2017	1	0.0002	0	0.034	1	0.002	0	0.0013	1
Background	9/10/2017	1	0.0002	0	0.024	1	0.092	1	0.0004	0
Background	10/11/2017	1	0.0002	0	0.023	1	0.081	1	0.001	0
Background	10/12/2017	1	0.0002	0	0.032	1	0.002	0	0.0013	1
Background	3/17/2018	1	0.0002	0	0.016	1	0.085	1	0.0004	0
Background	3/17/2018	1	0.0002	0	0.021	1	0.002	0	0.0015	1
Background	6/1/2018	1			0.018	1	0.01	0	0.002	0
Background	6/1/2018	1			0.015	1	0.089	1	0.002	0
MW-61	11/6/2015	1	0.0002	0	0.076	1	0.0016	1	0.00018	1
MW-61	4/26/2016	1	0.0002	0	0.076	1	0.00088	1	0.00013	1
MW-61	6/6/2016	1	0.0002	0	0.077	1	0.00096	1	0.00014	1
MW-61	8/21/2016	1	0.0002	0	0.083	1	0.00091	1	0.00016	1
MW-61	9/13/2016	1	0.0002	0	0.069	1	0.003	0	0.0005	0
MW-61	10/20/2016	1	0.0002	0	0.08	1	0.00076	1	0.00014	1
MW-61	2/2/2017	1	0.0002	0	0.072	1	0.0007	1	0.00015	1
MW-61	4/18/2017	1	0.0002	0	0.078	1	0.002	0	0.0004	0
MW-61	5/3/2017	1	0.0002	0	0.075	1	0.00067	1	0.00015	1
MW-61	5/30/2017	1	0.0002	0	0.079	1	0.0005	0	0.00016	1
MW-61	6/22/2017	1	0.0002	0	0.079	1	0.00076	1	0.00016	1
MW-61	7/22/2017	1	0.0002	0	0.07	1	0.002	0	0.0004	0
MW-61	8/10/2017	1	0.0002	0	0.079	1	0.00066	1	0.00011	1
MW-61	8/17/2017	1	0.0002	0	0.078	1	0.002	0	0.0004	0
MW-61	9/10/2017	1	0.0002	0	0.073	1	0.002	0	0.0004	0
MW-61	10/12/2017	1	0.0002	0	0.07	1	0.002	0	0.001	0
MW-61	3/17/2018	1	0.0002	0	0.079	1	0.002	0	0.0004	0
MW-61	6/1/2018	1			0.085	1	0.01	0	0.002	0

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Selenium	D_Selenium	Thallium	D_Thallium
MW-7	11/7/2015	1	0.0002	0	0.0055	1	0.0038	1	0.000093	1
MW-7	4/26/2016	1	0.0002	0	0.0039	1	0.0028	1	0.0001	0
MW-7	6/6/2016	1	0.0002	0	0.0046	1	0.0026	1	0.00022	1
MW-7	8/21/2016	1	0.0002	0	0.033	1	0.011	1	0.00016	1
MW-7	9/13/2016	1	0.0002	0	0.041	1	0.0064	1	0.00053	1
MW-7	10/20/2016	1	0.0002	0	0.016	1	0.0049	1	0.00015	1
MW-7	2/2/2017	1	0.0002	0	0.0048	1	0.0063	1	0.00017	1
MW-7	4/18/2017	1	0.0002	0	0.0039	1	0.008	1	0.00011	1
MW-7	5/3/2017	1	0.0002	0	0.0035	1	0.011	1	0.0001	1
MW-7	5/30/2017	1	0.0002	0	0.0041	1	0.0098	1	0.00015	1
MW-7	6/22/2017	1	0.0002	0	0.0037	1	0.014	1	0.00015	1
MW-7	7/22/2017	1	0.0002	0	0.0031	1	0.011	1	0.0004	0
MW-7	8/10/2017	1	0.0002	0	0.005	0	0.015	1	0.001	0
MW-7	8/17/2017	1	0.0002	0	0.0022	1	0.013	1	0.0004	0
MW-7	9/10/2017	1	0.0002	0	0.0035	1	0.013	1	0.0004	0
MW-7	10/12/2017	1	0.0002	0	0.0031	1	0.015	1	0.0001	1
MW-7	3/17/2018	1	0.0002	0	0.0043	1	0.0047	1	0.0004	0
MW-7	6/1/2018	1			0.01	0	0.01	0	0.002	0
MW-75	4/18/2017	1	0.0002	0	0.17	1	0.0021	1	0.0004	0
MW-75	5/3/2017	1	0.00028	1	0.17	1	0.0022	1	0.00018	1
MW-75	5/30/2017	1	0.0002	0	0.16	1	0.0025	1	0.00017	1
MW-75	6/22/2017	1	0.0002	0	0.18	1	0.0022	1	0.0004	0
MW-75	7/22/2017	1	0.0002	0	0.16	1	0.0026	1	0.0004	0
MW-75	8/10/2017	1	0.0002	0	0.18	1	0.0025	1	0.001	0
MW-75	8/17/2017	1	0.0002	0	0.17	1	0.0021	1	0.0004	0
MW-75	9/10/2017	1	0.0002	0	0.16	1	0.0023	1	0.0004	0
MW-75	10/12/2017	1	0.0002	0	0.18	1	0.005	0	0.001	0
MW-75	3/17/2018	1	0.0002	0	0.16	1	0.0023	1	0.0004	0
MW-75	6/1/2018	1			0.17	1	0.01	0	0.002	0
MW-8	12/1/2015	1	0.0002	0	0.033	1	0.013	1	0.01	0
MW-8	4/26/2016	1	0.0002	0	0.018	1	0.0015	1	0.0002	0
MW-8	6/7/2016	1	0.0002	0	0.018	1	0.0013	1	0.00014	1
MW-8	8/21/2016	1	0.0002	0	0.049	1	0.0016	1	0.0001	0
MW-8	9/13/2016	1	0.0002	0	0.044	1	0.003	0	0.0005	0
MW-8	4/18/2017	1	0.0002	0	0.014	1	0.00084	1	0.0001	0
MW-8	5/3/2017	1	0.0002	0	0.014	1	0.0015	1	0.0001	0
MW-8	5/30/2017	1	0.0002	0	0.016	1	0.0016	1	0.0001	0
MW-8	6/1/2018	1			0.011	1	0.01	0	0.002	0

Table A-6
All Constituents Except Fluoride and Radium - Background Wells Only

Well	Sample Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Lead	D_Lead	Lithium
MW-49A	12/1/2015	0.00033	1	0.0016	1	0.042	1	0.00075	1	0.00018	1	0.0035	1	0.0022	1	0.01	0	0.75
MW-49A	6/7/2016	0.00035	1	0.0013	1	0.028	1	0.001	0	0.00012	1	0.00091	1	0.0019	1	0.0005	0	0.9
MW-49A	8/21/2016	0.00035	1	0.0011	1	0.022	1	0.001	0	0.0003	1	0.00079	1	0.003	1	0.0005	0	1.8
MW-49A	9/13/2016	0.0025	0	0.004	0	0.029	1	0.001	0	0.002	0	0.01	0	0.004	0	0.002	0	1.2
MW-49A	10/20/2016	0.005	0	0.002	0	0.022	1	0.001	0	0.001	0	0.005	0	0.0036	1	0.0001	0	1.2
MW-49A	2/2/2017	0.001	0	0.00092	1	0.02	1	0.001	0	0.00031	1	0.00079	1	0.004	1	0.0005	0	1.4
MW-49A	4/18/2017	0.004	0	0.002	0	0.022	1	0.001	0	0.0004	0	0.002	0	0.0045	1	0.002	0	1.3
MW-49A	5/3/2017	0.001	0	0.00088	1	0.022	1	0.001	0	0.00023	1	0.00065	1	0.0037	1	0.0005	0	1.1
MW-49A	5/30/2017	0.001	0	0.0011	1	0.022	1	0.001	0	0.00024	1	0.00069	1	0.0036	1	0.0005	0	1.1
MW-49A	6/22/2017	0.001	0	0.0011	1	0.021	1	0.001	0	0.00024	1	0.00088	1	0.0039	1	0.0005	0	1.1
MW-49A	7/22/2017	0.01	0	0.01	0	0.021	1	0.001	0	0.001	0	0.02	0	0.01	0	0.005	0	1.1
MW-49A	8/10/2017	0.01	0	0.002	0	0.02	1	0.001	0	0.001	0	0.004	0	0.0029	1	0.005	0	1.1
MW-49A	8/17/2017	0.004	0	0.002	0	0.02	1	0.001	0	0.0004	0	0.004	0	0.0029	1	0.002	0	1.1
MW-49A	9/10/2017	0.004	0	0.002	0	0.02	1	0.001	0	0.0004	0	0.004	0	0.0026	1	0.002	0	0.9
MW-49A	10/12/2017	0.004	0	0.005	0	0.019	1	0.001	0	0.0004	0	0.01	0	0.005	0	0.005	0	0.92
MW-49A	3/17/2018	0.004	0	0.002	0	0.021	1	0.001	0	0.0004	0	0.004	0	0.0023	1	0.002	0	1.1
MW-49A	6/1/2018			0.01	0	0.022	1			0.002	0			0.01	0	0.01	0	1.1
MW-74	2/2/2017	0.002	0	0.0035	1	0.036	1	0.001	0	0.0002	0	0.0026	1	0.001	0	0.0005	0	0.39
MW-74	4/18/2017	0.004	0	0.0029	1	0.018	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.4
MW-74	5/2/2017	0.002	0	0.0028	1	0.018	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.001	0	0.38
MW-74	5/29/2017	0.00048	1	0.0045	1	0.022	1	0.001	0	0.00028	1	0.005	0	0.00064	1	0.005	0	0.37
MW-74	6/22/2017	0.004	0	0.0032	1	0.02	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.38
MW-74	7/22/2017	0.004	0	0.0028	1	0.018	1	0.001	0	0.0004	0	0.002	0	0.001	0	0.002	0	0.41
MW-74	8/10/2017	0.01	0	0.0022	1	0.019	1	0.001	0	0.001	0	0.004	0	0.002	0	0.005	0	0.43
MW-74	9/10/2017	0.004	0	0.0043	1	0.023	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.48
MW-74	10/11/2017	0.01	0	0.005	0	0.023	1	0.001	1	0.001	0	0.01	0	0.005	0	0.005	0	0.48
MW-74	3/17/2018	0.004	0	0.0034	1	0.02	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.47
MW-74	6/1/2018			0.01	0	0.019	1			0.002	0			0.01	0	0.01	0	0.49

Table A-6
All Constituents Except Fluoride and Radium - Background Wells Only

Well	Sample Date	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Selenium	D_Selenium	Thallium	D_Thallium
MW-49A	12/1/2015	1	0.0001	1	0.096	1	0.0021	1	0.0014	1
MW-49A	6/7/2016	1	0.0002	0	0.069	1	0.0018	1	0.0012	1
MW-49A	8/21/2016	1	0.0002	0	0.028	1	0.0018	1	0.0015	1
MW-49A	9/13/2016	1	0.0002	0	0.027	1	0.012	0		
MW-49A	10/20/2016	1	0.0002	0	0.036	1	0.006	0	0.002	1
MW-49A	2/2/2017	1	0.0002	0	0.042	1	0.0018	1	0.0015	1
MW-49A	4/18/2017	1	0.0002	0	0.028	1	0.002	0	0.017	1
MW-49A	5/3/2017	1	0.0002	0	0.025	1	0.0018	1	0.0014	1
MW-49A	5/30/2017	1	0.0002	0	0.028	1	0.0017	1	0.0015	1
MW-49A	6/22/2017	1	0.0002	0	0.025	1	0.0017	1	0.0014	1
MW-49A	7/22/2017	1	0.0002	0	0.025	1	0.01	0	0.0013	1
MW-49A	8/10/2017	1	0.0002	0	0.029	1	0.002	0	0.0014	1
MW-49A	8/17/2017	1	0.0002	0	0.037	1	0.002	0	0.0014	1
MW-49A	9/10/2017	1	0.0002	0	0.034	1	0.002	0	0.0013	1
MW-49A	10/12/2017	1	0.0002	0	0.032	1	0.002	0	0.0013	1
MW-49A	3/17/2018	1	0.0002	0	0.021	1	0.002	0	0.0015	1
MW-49A	6/1/2018	1			0.018	1	0.01	0	0.002	0
MW-74	2/2/2017	1	0.0002	0	0.075	1	0.089	1	0.0001	0
MW-74	4/18/2017	1	0.0002	0	0.013	1	0.069	1	0.0004	0
MW-74	5/2/2017	1	0.0002	0	0.019	1	0.067	1	0.0002	0
MW-74	5/29/2017	1	0.0002	0	0.028	1	0.062	1	0.00035	1
MW-74	6/22/2017	1	0.0002	0	0.02	1	0.06	1	0.0004	0
MW-74	7/22/2017	1	0.0002	0	0.016	1	0.071	1	0.0004	0
MW-74	8/10/2017	1	0.0002	0	0.018	1	0.06	1	0.001	0
MW-74	9/10/2017	1	0.0002	0	0.024	1	0.092	1	0.0004	0
MW-74	10/11/2017	1	0.0002	0	0.023	1	0.081	1	0.001	0
MW-74	3/17/2018	1	0.0002	0	0.016	1	0.085	1	0.0004	0
MW-74	6/1/2018	1			0.015	1	0.089	1	0.002	0

APPENDIX B

PROUCL OUTPUT FILES



TABLE B-1
MULTIUNIT ProUCL GENERAL STATISTICS*

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.110/9/2018 4:54:52 PM										
User Selected Options											
From File	Table1_AppendixA_Multiunit_AppendixIV_ProUCLUpload_Sept2018.xls										
Full Precision	OFF										
From File: Table1_AppendixA_Multiunit_AppendixIV_ProUCLUpload_Sept2018.xls											
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Antimony (background)	26	2	4	22	84.62%	0.001	0.01	3.7750E-4	3.5688E-9	5.9739E-5	0.158
Antimony (mw-61)	17	1	3	14	82.35%	5.0000E-4	0.004	2.5000E-4	8.000E-10	2.8284E-5	0.113
Antimony (mw-7)	17	1	4	13	76.47%	5.0000E-4	0.01	3.2200E-4	5.4696E-8	2.3387E-4	0.726
Antimony (mw-75)	10	1	1	9	90.00%	0.001	0.01	0.00138	9.8438E-7	9.9216E-4	0.722
Antimony (mw-8)	8	1	3	5	62.50%	0.001	0.005	6.5833E-4	1.1076E-7	3.3281E-4	0.506
Arsenic (background)	28	0	16	12	42.86%	0.002	0.01	0.00201	1.3232E-6	0.00115	0.572
Arsenic (mw-61)	18	0	5	13	72.22%	5.0000E-4	0.01	4.7900E-4	6.0890E-9	7.8032E-5	0.163
Arsenic (mw-7)	18	0	11	7	38.89%	5.0000E-4	0.01	6.6314E-4	1.5309E-7	3.9126E-4	0.59
Arsenic (mw-75)	11	0	0	11	100.00%	5.0000E-4	0.01	N/A	N/A	N/A	N/A
Arsenic (mw-8)	9	0	4	5	55.56%	5.0000E-4	0.01	0.00163	7.9781E-6	0.00282	1.734
Barium (background)	28	0	28	0	0.00%	N/A	N/A	0.0225	2.8851E-5	0.00537	0.239
Barium (mw-61)	17	1	17	0	0.00%	N/A	N/A	0.0139	5.5882E-7	7.4755E-4	0.0536
Barium (mw-7)	18	0	18	0	0.00%	N/A	N/A	0.0154	1.6634E-6	0.00129	0.0838
Barium (mw-75)	11	0	11	0	0.00%	N/A	N/A	0.0187	1.2182E-6	0.0011	0.0589
Barium (mw-8)	9	0	9	0	0.00%	N/A	N/A	0.0313	0.00205	0.0453	1.445
Beryllium (background)	26	2	2	24	92.31%	0.001	0.001	7.5962E-4	2.3114E-9	4.8077E-5	0.0633
Beryllium (mw-61)	17	1	1	16	94.12%	0.001	0.001	1.6000E-4	0	0	N/A
Beryllium (mw-7)	17	1	1	16	94.12%	0.001	0.001	1.5000E-4	0	0	N/A
Beryllium (mw-75)	10	1	0	10	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (mw-8)	8	1	1	7	87.50%	0.001	0.001	0.00113	1.0938E-7	3.3072E-4	0.294
Cadmium (background)	28	0	8	20	71.43%	2.0000E-4	0.002	2.2000E-4	4.2200E-9	6.4962E-5	0.295
Cadmium (mw-61)	18	0	17	1	5.56%	0.002	0.002	9.4235E-4	5.4768E-9	7.4006E-5	0.0785
Cadmium (mw-7)	18	0	3	15	83.33%	1.0000E-4	0.002	1.7989E-4	9.3166E-8	3.0523E-4	1.697
Cadmium (mw-75)	11	0	11	0	0.00%	N/A	N/A	0.00213	3.8182E-8	1.9540E-4	0.0919
Cadmium (mw-8)	9	0	8	1	11.11%	0.002	0.002	3.4875E-4	8.8561E-8	2.9759E-4	0.853
Chromium (background)	26	2	8	18	69.23%	0.001	0.02	0.00113	7.0632E-7	8.4043E-4	0.741
Chromium (mw-61)	17	1	4	13	76.47%	5.0000E-4	0.01	5.4556E-4	6.5580E-9	8.0982E-5	0.148
Chromium (mw-7)	17	1	8	9	52.94%	5.0000E-4	0.004	0.00135	1.3551E-6	0.00116	0.861
Chromium (mw-75)	10	1	0	10	100.00%	5.0000E-4	0.01	N/A	N/A	N/A	N/A

TABLE B-1
MULTIUNIT ProUCL GENERAL STATISTICS*

Chromium (mw-8)	8	1	6	2	25.00%	0.001	0.0025	0.00327	4.0084E-5	0.00633	1.937
Cobalt (background)	28	0	14	14	50.00%	0.001	0.01	0.00218	1.7627E-6	0.00133	0.61
Cobalt (mw-61)	18	0	18	0	0.00%	N/A	N/A	0.0138	3.3595E-6	0.00183	0.133
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Cobalt (mw-7)	18	0	7	11	61.11%	5.0000E-4	0.01	0.00102	4.8515E-7	6.9653E-4	0.686
Cobalt (mw-75)	11	0	11	0	0.00%	N/A	N/A	0.0446	8.8545E-6	0.00298	0.0667
Cobalt (mw-8)	9	0	6	3	33.33%	5.0000E-4	0.01	0.00311	3.1951E-5	0.00565	1.818
Lead (background)	28	0	0	28	100.00%	1.0000E-4	0.01	N/A	N/A	N/A	N/A
Lead (mw-61)	18	0	11	7	38.89%	0.002	0.01	8.5455E-4	3.9702E-9	6.3010E-5	0.0737
Lead (mw-7)	18	0	2	16	88.89%	1.0000E-4	0.01	3.2042E-4	5.0762E-8	2.2530E-4	0.703
Lead (mw-75)	11	0	8	3	27.27%	0.005	0.01	0.00319	1.3359E-7	3.6550E-4	0.115
Lead (mw-8)	9	0	3	6	66.67%	5.0000E-4	0.01	0.00423	1.0359E-4	0.0102	2.409
Lithium (background)	28	0	28	0	0.00%	N/A	N/A	0.852	0.155	0.393	0.462
Lithium (mw-61)	18	0	18	0	0.00%	N/A	N/A	0.38	4.9412E-4	0.0222	0.0585
Lithium (mw-7)	18	0	18	0	0.00%	N/A	N/A	0.899	0.00962	0.0981	0.109
Lithium (mw-75)	11	0	11	0	0.00%	N/A	N/A	0.432	4.3636E-4	0.0209	0.0484
Lithium (mw-8)	9	0	9	0	0.00%	N/A	N/A	1.178	0.0169	0.13	0.111
Mercury (background)	26	2	1	25	96.15%	2.0000E-4	2.0000E-4	1.0000E-4	0	0	N/A
Mercury (mw-61)	17	1	0	17	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-7)	17	1	0	17	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-75)	10	1	1	9	90.00%	2.0000E-4	2.0000E-4	2.0800E-4	5.760E-10	2.4000E-5	0.115
Mercury (mw-8)	8	1	0	8	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (background)	28	0	28	0	0.00%	N/A	N/A	0.031	3.6322E-4	0.0191	0.615
Molybdenum (mw-61)	18	0	18	0	0.00%	N/A	N/A	0.0766	1.9556E-5	0.00442	0.0578
Molybdenum (mw-7)	18	0	16	2	11.11%	0.005	0.01	0.00821	1.1361E-4	0.0107	1.298
Molybdenum (mw-75)	11	0	11	0	0.00%	N/A	N/A	0.169	6.9091E-5	0.00831	0.0492
Molybdenum (mw-8)	9	0	9	0	0.00%	N/A	N/A	0.0241	2.0136E-4	0.0142	0.589
Selenium (background)	28	0	18	10	35.71%	0.002	0.012	0.0306	0.00133	0.0365	1.195
Selenium (mw-61)	18	0	9	9	50.00%	5.0000E-4	0.01	8.4000E-4	8.0780E-8	2.8422E-4	0.338
Selenium (mw-7)	18	0	17	1	5.56%	0.01	0.01	0.00877	1.7496E-5	0.00418	0.477
Selenium (mw-75)	11	0	9	2	18.18%	0.005	0.01	0.00231	2.9877E-8	1.7285E-4	0.0748
Selenium (mw-8)	9	0	7	2	22.22%	0.003	0.01	0.00268	1.3375E-5	0.00366	1.365
Thallium (background)	27	1	16	11	40.74%	1.0000E-4	0.002	0.00151	9.6213E-6	0.0031	2.059
Thallium (mw-61)	18	0	10	8	44.44%	4.0000E-4	0.002	1.4800E-4	3.360E-10	1.8330E-5	0.124
Thallium (mw-7)	18	0	11	7	38.89%	1.0000E-4	0.002	1.6063E-4	1.0489E-8	1.0241E-4	0.638
Thallium (mw-75)	11	0	2	9	81.82%	4.0000E-4	0.002	1.7500E-4	2.500E-11	5.0000E-6	0.0286
Thallium (mw-8)	9	0	1	8	88.89%	1.0000E-4	0.01	1.0800E-4	2.560E-10	1.6000E-5	0.148
Fluoride (background)	28	0	13	15	53.57%	0.08	5	1.31	0.827	0.909	0.694

TABLE B-1
MULTIUNIT ProUCL GENERAL STATISTICS*

Fluoride (mw-61)	18	0	18	0	0.00%	N/A	N/A	1.223	0.0215	0.146	0.12
Fluoride (mw-7)	18	0	3	15	83.33%	0.4	4	0.357	3.0612E-4	0.0175	0.049
Fluoride (mw-75)	11	0	3	8	72.73%	2	2	1.433	0.0422	0.205	0.143
Fluoride (mw-8)	9	0	3	6	66.67%	0.4	5	0.664	0.0728	0.27	0.406
Combined_Radium (background)	29	0	23	6	20.69%	0.6	0.9	1.7	0.682	0.826	0.486
Combined_Radium (mw-61)	18	0	10	8	44.44%	0.6	0.9	0.934	0.329	0.574	0.615
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Combined_Radium (mw-7)	18	0	15	3	16.67%	0.6	0.9	1.552	0.657	0.811	0.522
Combined_Radium (mw-75)	11	0	7	4	36.36%	0.6	0.8	0.773	0.167	0.409	0.53
Combined_Radium (mw-8)	9	0	8	1	11.11%	0.7	0.7	1.629	1.24	1.113	0.684
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Antimony (background)	4	2	3.3000E-4	4.8000E-4	3.7750E-4	3.5000E-4	4.7583E-9	6.8981E-5	1.4826E-5	1.885	0.183
Antimony (mw-61)	3	1	2.3000E-4	2.9000E-4	2.5000E-4	2.3000E-4	1.2000E-9	3.4641E-5	0	1.732	0.139
Antimony (mw-7)	4	1	1.6000E-4	0.001	4.3500E-4	2.9000E-4	1.4590E-7	3.8197E-4	1.1119E-4	1.832	0.878
Antimony (mw-75)	1	1	0.004	0.004	0.004	0.004	N/A	N/A	0	N/A	N/A
Antimony (mw-8)	3	1	4.8000E-4	0.0014	8.0667E-4	5.4000E-4	2.6493E-7	5.1472E-4	8.8955E-5	1.706	0.638
Arsenic (background)	16	0	8.8000E-4	0.0045	0.00235	0.0025	1.5241E-6	0.00123	0.00163	0.302	0.525
Arsenic (mw-61)	5	0	4.2000E-4	6.3000E-4	5.3800E-4	5.6000E-4	6.5200E-9	8.0747E-5	8.8955E-5	-0.66	0.15
Arsenic (mw-7)	11	0	3.3000E-4	0.0021	7.5636E-4	6.6000E-4	2.1505E-7	4.6373E-4	1.3343E-4	2.839	0.613
Arsenic (mw-75)	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic (mw-8)	4	0	5.3000E-4	0.0091	0.00273	6.4000E-4	1.8053E-5	0.00425	1.2602E-4	1.998	1.558
Barium (background)	28	0	0.018	0.042	0.0225	0.021	2.8851E-5	0.00537	0.00148	2.546	0.239
Barium (mw-61)	17	1	0.013	0.016	0.0139	0.014	5.5882E-7	7.4755E-4	0	1.116	0.0536
Barium (mw-7)	18	0	0.013	0.017	0.0154	0.015	1.6634E-6	0.00129	0.00148	-0.0941	0.0838
Barium (mw-75)	11	0	0.017	0.02	0.0187	0.018	1.2182E-6	0.0011	0.00148	0.108	0.0589
Barium (mw-8)	9	0	0.011	0.15	0.0313	0.014	0.00205	0.0453	0.00297	2.824	1.445
Beryllium (background)	2	2	7.5000E-4	0.001	8.7500E-4	8.7500E-4	3.1250E-8	1.7678E-4	1.8532E-4	N/A	0.202
Beryllium (mw-61)	1	1	1.6000E-4	1.6000E-4	1.6000E-4	1.6000E-4	N/A	N/A	0	N/A	N/A
Beryllium (mw-7)	1	1	1.5000E-4	1.5000E-4	1.5000E-4	1.5000E-4	N/A	N/A	0	N/A	N/A
Beryllium (mw-75)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (mw-8)	1	1	0.002	0.002	0.002	0.002	N/A	N/A	0	N/A	N/A
Cadmium (background)	8	0	1.2000E-4	3.1000E-4	2.3750E-4	2.4000E-4	4.0214E-9	6.3415E-5	7.4129E-5	-0.83	0.267
Cadmium (mw-61)	17	0	8.2000E-4	0.0011	9.4235E-4	9.4000E-4	5.8191E-9	7.6283E-5	4.4477E-5	0.637	0.0809
Cadmium (mw-7)	3	0	1.0000E-4	0.0014	5.4667E-4	1.4000E-4	5.4653E-7	7.3928E-4	5.9303E-5	1.726	1.352
Cadmium (mw-75)	11	0	0.0019	0.0024	0.00213	0.002	3.8182E-8	1.9540E-4	1.4826E-4	0.32	0.0919

TABLE B-1
MULTIUNIT ProUCL GENERAL STATISTICS*

Cadmium (mw-8)	8	0	1.1000E-4	9.6000E-4	3.4875E-4	2.1000E-4	1.0121E-7	3.1814E-4	8.8955E-5	1.497	0.912
Chromium (background)	8	2	6.5000E-4	0.0035	0.00135	8.3500E-4	1.1646E-6	0.00108	1.6308E-4	1.62	0.799
Chromium (mw-61)	4	1	5.2000E-4	7.5000E-4	6.0250E-4	5.7000E-4	1.1892E-8	1.0905E-4	7.4129E-5	1.075	0.181
Chromium (mw-7)	8	1	4.1000E-4	0.0047	0.00209	0.00205	1.6464E-6	0.00128	5.9303E-4	1.029	0.613
Chromium (mw-75)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (mw-8)	6	1	6.0000E-4	0.02	0.00409	7.9500E-4	6.0876E-5	0.0078	1.7791E-4	2.438	1.908
Cobalt (background)	14	0	6.4000E-4	0.0045	0.00298	0.00295	1.0273E-6	0.00101	0.00104	-0.756	0.34
Cobalt (mw-61)	18	0	0.01	0.017	0.0138	0.014	3.3595E-6	0.00183	0.00148	-0.277	0.133
Cobalt (mw-7)	7	0	6.5000E-4	0.0028	0.00161	0.0015	5.4575E-7	7.3875E-4	7.4129E-4	0.248	0.458
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Cobalt (mw-75)	11	0	0.039	0.049	0.0446	0.044	8.8545E-6	0.00298	0.00297	-0.208	0.0667
Cobalt (mw-8)	6	0	5.3000E-4	0.019	0.00431	0.00155	5.2182E-5	0.00722	0.00102	2.408	1.676
Lead (background)	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead (mw-61)	11	0	7.8000E-4	0.001	8.5455E-4	8.3000E-4	4.3673E-9	6.6085E-5	5.9303E-5	1.061	0.0773
Lead (mw-7)	2	0	4.5000E-4	8.2000E-4	6.3500E-4	6.3500E-4	6.8450E-8	2.6163E-4	2.7428E-4	N/A	0.412
Lead (mw-75)	8	0	0.0028	0.0041	0.00319	0.0031	1.5268E-7	3.9074E-4	1.4826E-4	2.194	0.123
Lead (mw-8)	3	0	5.0000E-4	0.033	0.0116	0.0014	3.4260E-4	0.0185	0.00133	1.727	1.591
Lithium (background)	28	0	0.37	1.8	0.852	0.91	0.155	0.393	0.504	0.285	0.462
Lithium (mw-61)	18	0	0.35	0.44	0.38	0.375	4.9412E-4	0.0222	0.0222	1.193	0.0585
Lithium (mw-7)	18	0	0.75	1.2	0.899	0.9	0.00962	0.0981	0.0667	1.582	0.109
Lithium (mw-75)	11	0	0.4	0.48	0.432	0.43	4.3636E-4	0.0209	0.0148	0.994	0.0484
Lithium (mw-8)	9	0	1.1	1.5	1.178	1.1	0.0169	0.13	0	2.269	0.111
Mercury (background)	1	2	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	N/A	N/A	0	N/A	N/A
Mercury (mw-61)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (mw-7)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (mw-75)	1	1	2.8000E-4	2.8000E-4	2.8000E-4	2.8000E-4	N/A	N/A	0	N/A	N/A
Mercury (mw-8)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (background)	28	0	0.013	0.096	0.031	0.026	3.6322E-4	0.0191	0.00964	2.251	0.615
Molybdenum (mw-61)	18	0	0.069	0.085	0.0766	0.0775	1.9556E-5	0.00442	0.00297	-0.125	0.0578
Molybdenum (mw-7)	16	0	0.0022	0.041	0.00876	0.004	1.3333E-4	0.0115	0.00104	2.3	1.318
Molybdenum (mw-75)	11	0	0.16	0.18	0.169	0.17	6.9091E-5	0.00831	0.0148	0.19	0.0492
Molybdenum (mw-8)	9	0	0.011	0.049	0.0241	0.018	2.0136E-4	0.0142	0.00593	1.05	0.589
Selenium (background)	18	0	0.0017	0.092	0.0465	0.061	0.00144	0.0379	0.0415	-0.289	0.815
Selenium (mw-61)	9	0	6.6000E-4	0.0016	8.7778E-4	7.6000E-4	8.4919E-8	2.9141E-4	1.4826E-4	2.267	0.332
Selenium (mw-7)	17	0	0.0026	0.015	0.00896	0.0098	1.8650E-5	0.00432	0.00519	-0.0716	0.482
Selenium (mw-75)	9	0	0.0021	0.0026	0.00231	0.0023	3.3611E-8	1.8333E-4	2.9652E-4	0.418	0.0793
Selenium (mw-8)	7	0	8.4000E-4	0.013	0.00305	0.0015	1.9327E-5	0.0044	1.4826E-4	2.625	1.442
Thallium (background)	16	1	3.5000E-4	0.017	0.00234	0.0014	1.5385E-5	0.00392	1.4826E-4	3.953	1.676

TABLE B-1
MULTIUNIT ProUCL GENERAL STATISTICS*

Thallium (mw-61)	10	0	1.1000E-4	1.8000E-4	1.4800E-4	1.5000E-4	3.733E-10	1.9322E-5	1.4826E-5	-0.457	0.131
Thallium (mw-7)	11	0	9.3000E-5	5.3000E-4	1.7573E-4	1.5000E-4	1.5237E-8	1.2344E-4	5.9303E-5	2.78	0.702
Thallium (mw-75)	2	0	1.7000E-4	1.8000E-4	1.7500E-4	1.7500E-4	5.000E-11	7.0711E-6	7.4129E-6	N/A	0.0404
Thallium (mw-8)	1	0	1.4000E-4	1.4000E-4	1.4000E-4	1.4000E-4	N/A	N/A	0	N/A	N/A
Fluoride (background)	13	0	0.79	3.2	1.842	1.9	0.349	0.591	0.297	0.198	0.321
Fluoride (mw-61)	18	0	0.91	1.6	1.223	1.2	0.0215	0.146	0.148	0.494	0.12
Fluoride (mw-7)	3	0	0.35	0.4	0.367	0.35	8.3333E-4	0.0289	0	1.732	0.0787
Fluoride (mw-75)	3	0	1.2	1.7	1.433	1.4	0.0633	0.252	0.297	0.586	0.176
Fluoride (mw-8)	3	0	0.68	1.1	0.897	0.91	0.0442	0.21	0.282	-0.284	0.235
Combined_Radium (background)	23	0	0.7	3.5	1.986	2	0.488	0.698	0.593	0.353	0.352
Combined_Radium (mw-61)	10	0	0.5	2.2	1.269	1.295	0.376	0.613	0.882	0.268	0.483
Combined_Radium (mw-7)	15	0	0.7	3.3	1.74	1.5	0.617	0.785	0.593	1.03	0.451
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Combined_Radium (mw-75)	7	0	0.4	1.6	0.986	0.9	0.161	0.402	0.148	0.318	0.408
Combined_Radium (mw-8)	8	0	1	4.66	1.745	1.3	1.455	1.206	0.148	2.585	0.691

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.19/19/2018 9:22:16 AM
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Arsenic-background	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	28
Number Values Reported (n)	28
Minimum	8.8000E-4
Maximum	0.01
Mean	0.00334
Geometric Mean	0.00262
Median	0.0025
Standard Deviation	0.00264
Coefficient of Variation	0.79
Mann-Kendall Test	
M-K Test Value (S)	129
Critical Value (0.05)	1.645
Standard Deviation of S	50.24
Standardized Value of S	2.548
Approximate p-value	0.00542
Statistically significant evidence of an increasing trend at the specified level of significance.	
Arsenic-mw-61	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	18
Number Values Reported (n)	18
Minimum	4.2000E-4
Maximum	0.01
Mean	0.00173
Geometric Mean	0.00104
Median	6.0500E-4
Standard Deviation	0.00236
Coefficient of Variation	1.362
Mann-Kendall Test	
M-K Test Value (S)	74
Tabulated p-value	0.002
Standard Deviation of S	25.53
Standardized Value of S	2.859
Approximate p-value	0.00213
Statistically significant evidence of an increasing	

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

trend at the specified level of significance.									
Arsenic-mw-7									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	3.3000E-4								
Maximum	0.01								
Mean	0.00146								
Geometric Mean	9.3180E-4								
Median	6.9500E-4								
Standard Deviation	0.00222								
Coefficient of Variation	1.515								
Mann-Kendall Test									
M-K Test Value (S)	67								
Tabulated p-value	0.002								
Standard Deviation of S	26.26								
Standardized Value of S	2.513								
Approximate p-value	0.00598								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Arsenic-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00295								
Geometric Mean	0.00222								
Median	0.002								
Standard Deviation	0.00265								
Coefficient of Variation	0.897								
Mann-Kendall Test									
M-K Test Value (S)	20								
Tabulated p-value	0.06								
Standard Deviation of S	11.69								
Standardized Value of S	1.625								
Approximate p-value	0.0521								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Arsenic-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00266								
Geometric Mean	0.00119								
Median	7.0000E-4								
Standard Deviation	0.00392								
Coefficient of Variation	1.475								
Mann-Kendall Test									
M-K Test Value (S)	-4								
Tabulated p-value	0.381								
Standard Deviation of S	9.487								
Standardized Value of S	-0.316								
Approximate p-value	0.376								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/19/2018 9:30:17 AM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Barium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	28								
Number Values Reported (n)	28								
Minimum	0.018								
Maximum	0.042								
Mean	0.0225								
Geometric Mean	0.022								
Median	0.021								
Standard Deviation	0.00537								
Coefficient of Variation	0.239								
Mann-Kendall Test									
M-K Test Value (S)	-110								
Critical Value (0.05)	-1.645								
Standard Deviation of S	49.77								
Standardized Value of S	-2.19								
Approximate p-value	0.0143								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Barium-mw-61									
General Statistics									
Number or Reported Events Not Used	0								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	0.013								
Maximum	0.016								
Mean	0.0139								
Geometric Mean	0.0139								
Median	0.014								
Standard Deviation	7.4755E-4								
Coefficient of Variation	0.0536								
Mann-Kendall Test									
M-K Test Value (S)	-41								
Tabulated p-value	0.054								
Standard Deviation of S	20.39								
Standardized Value of S	-1.962								
Approximate p-value	0.0249								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Barium-mw-7									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.013								
Maximum	0.017								
Mean	0.0154								
Geometric Mean	0.0153								
Median	0.015								
Standard Deviation	0.00129								
Coefficient of Variation	0.0838								
Mann-Kendall Test									
M-K Test Value (S)	-58								
Tabulated p-value	0.013								
Standard Deviation of S	25.52								
Standardized Value of S	-2.233								
Approximate p-value	0.0128								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Barium-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.017								
Maximum	0.02								
Mean	0.0187								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Geometric Mean	0.0187								
Median	0.018								
Standard Deviation	0.0011								
Coefficient of Variation	0.0589								
Mann-Kendall Test									
M-K Test Value (S)	5								
Tabulated p-value	0.381								
Standard Deviation of S	11.82								
Standardized Value of S	0.338								
Approximate p-value	0.368								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Barium-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								
Minimum	0.011								
Maximum	0.15								
Mean	0.0313								
Geometric Mean	0.0196								
Median	0.014								
Standard Deviation	0.0453								
Coefficient of Variation	1.445								
Mann-Kendall Test									
M-K Test Value (S)	-24								
Tabulated p-value	0.006								
Standard Deviation of S	9.487								
Standardized Value of S	-2.424								
Approximate p-value	0.00767								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/19/2018 9:36:13 AM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Cadmium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	28								
Number Values Reported (n)	28								
Minimum	1.2000E-4								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Maximum	0.002								
Mean	6.1786E-4								
Geometric Mean	4.5402E-4								
Median	4.0000E-4								
Standard Deviation	5.6011E-4								
Coefficient of Variation	0.907								
Mann-Kendall Test									
M-K Test Value (S)	144								
Critical Value (0.05)	1.645								
Standard Deviation of S	49.14								
Standardized Value of S	2.91								
Approximate p-value	0.00181								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cadmium-mw-61									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	8.2000E-4								
Maximum	0.002								
Mean	0.001								
Geometric Mean	9.7979E-4								
Median	9.4000E-4								
Standard Deviation	2.6004E-4								
Coefficient of Variation	0.26								
Mann-Kendall Test									
M-K Test Value (S)	16								
Tabulated p-value	0.275								
Standard Deviation of S	26.13								
Standardized Value of S	0.574								
Approximate p-value	0.283								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-mw-7									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	1.0000E-4								
Maximum	0.002								
Mean	3.9667E-4								
Geometric Mean	2.1549E-4								
Median	1.0000E-4								
Standard Deviation	5.3618E-4								
Coefficient of Variation	1.352								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test								
M-K Test Value (S)	44							
Tabulated p-value	0.048							
Standard Deviation of S	23.73							
Standardized Value of S	1.812							
Approximate p-value	0.035							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Cadmium-mw-75								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	11							
Number Values Reported (n)	11							
Minimum	0.0019							
Maximum	0.0024							
Mean	0.00213							
Geometric Mean	0.00212							
Median	0.002							
Standard Deviation	1.9540E-4							
Coefficient of Variation	0.0919							
Mann-Kendall Test								
M-K Test Value (S)	14							
Tabulated p-value	0.141							
Standard Deviation of S	12.38							
Standardized Value of S	1.05							
Approximate p-value	0.147							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Cadmium-mw-8								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	9							
Number Values Reported (n)	9							
Minimum	1.1000E-4							
Maximum	0.002							
Mean	5.3222E-4							
Geometric Mean	3.2480E-4							
Median	2.2000E-4							
Standard Deviation	6.2572E-4							
Coefficient of Variation	1.176							
Mann-Kendall Test								
M-K Test Value (S)	-10							
Tabulated p-value	0.179							
Standard Deviation of S	9.592							
Standardized Value of S	-0.938							
Approximate p-value	0.174							

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Insufficient evidence to identify a significant trend at the specified level of significance.									
		Mann-Kendall Trend Test Analysis							
User Selected Options									
Date/Time of Computation		ProUCL 5.19/24/2018 2:43:01 PM							
From File		MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Chromium-background									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		26							
Number Values Reported (n)		28							
Number Values Missing		2							
Number Values Used		26							
Minimum		6.5000E-4							
Maximum		0.02							
Mean		0.00415							
Geometric Mean		0.00275							
Median		0.00375							
Standard Deviation		0.00426							
Coefficient of Variation		1.029							
Mann-Kendall Test									
M-K Test Value (S)		89							
Critical Value (0.05)		1.645							
Standard Deviation of S		44.72							
Standardized Value of S		1.968							
Approximate p-value		0.0245							
Statistically significant evidence of an increasing trend at the specified level of significance.									
Chromium-mw-61									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		17							
Number Values Reported (n)		18							
Number Values Missing		1							
Number Values Used		17							
Minimum		5.0000E-4							
Maximum		0.01							
Mean		0.00202							
Geometric Mean		0.00121							
Median		7.5000E-4							
Standard Deviation		0.00245							
Coefficient of Variation		1.212							
Mann-Kendall Test									

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	67								
Tabulated p-value	0.003								
Standard Deviation of S	23.81								
Standardized Value of S	2.772								
Approximate p-value	0.00279								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Chromium-mw-7									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	4.1000E-4								
Maximum	0.0047								
Mean	0.0019								
Geometric Mean	0.00142								
Median	0.0018								
Standard Deviation	0.00136								
Coefficient of Variation	0.718								
Mann-Kendall Test									
M-K Test Value (S)	70								
Tabulated p-value	0.002								
Standard Deviation of S	24.06								
Standardized Value of S	2.868								
Approximate p-value	0.00206								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Chromium-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	10								
Number Values Reported (n)	11								
Number Values Missing	1								
Number Values Used	10								
Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00335								
Geometric Mean	0.00252								
Median	0.003								
Standard Deviation	0.00269								
Coefficient of Variation	0.802								
Mann-Kendall Test									
M-K Test Value (S)	28								
Tabulated p-value	0.005								
Standard Deviation of S	10.61								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Standardized Value of S	2.544								
Approximate p-value	0.00548								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Chromium-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	8								
Number Values Reported (n)	9								
Number Values Missing	1								
Number Values Used	8								
Minimum	6.0000E-4								
Maximum	0.02								
Mean	0.00351								
Geometric Mean	0.00148								
Median	9.1000E-4								
Standard Deviation	0.00669								
Coefficient of Variation	1.91								
Mann-Kendall Test									
M-K Test Value (S)	-16								
Tabulated p-value	0.031								
Standard Deviation of S	8.083								
Standardized Value of S	-1.856								
Approximate p-value	0.0317								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/23/2018 5:26:18 PM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Cobalt-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	28								
Number Values Reported (n)	28								
Minimum	6.4000E-4								
Maximum	0.01								
Mean	0.00353								
Geometric Mean	0.00283								
Median	0.0029								
Standard Deviation	0.00257								
Coefficient of Variation	0.729								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test								
M-K Test Value (S)	62							
Critical Value (0.05)	1.645							
Standard Deviation of S	50.34							
Standardized Value of S	1.212							
Approximate p-value	0.113							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Cobalt-mw-61								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	0.01							
Maximum	0.017							
Mean	0.0138							
Geometric Mean	0.0137							
Median	0.014							
Standard Deviation	0.00183							
Coefficient of Variation	0.133							
Mann-Kendall Test								
M-K Test Value (S)	114							
Tabulated p-value	0							
Standard Deviation of S	25.96							
Standardized Value of S	4.353							
Approximate p-value	6.7267E-6							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Cobalt-mw-7								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	5.0000E-4							
Maximum	0.01							
Mean	0.00179							
Geometric Mean	0.00122							
Median	0.0015							
Standard Deviation	0.00218							
Coefficient of Variation	1.218							
Mann-Kendall Test								
M-K Test Value (S)	-10							
Tabulated p-value	0.354							
Standard Deviation of S	25.29							
Standardized Value of S	-0.356							
Approximate p-value	0.361							

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Insufficient evidence to identify a significant trend at the specified level of significance.									
Cobalt-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.039								
Maximum	0.049								
Mean	0.0446								
Geometric Mean	0.0445								
Median	0.044								
Standard Deviation	0.00298								
Coefficient of Variation	0.0667								
Mann-Kendall Test									
M-K Test Value (S)	22								
Tabulated p-value	0.043								
Standard Deviation of S	12.73								
Standardized Value of S	1.65								
Approximate p-value	0.0495								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cobalt-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								
Minimum	5.0000E-4								
Maximum	0.019								
Mean	0.0041								
Geometric Mean	0.00171								
Median	0.0013								
Standard Deviation	0.00634								
Coefficient of Variation	1.549								
Mann-Kendall Test									
M-K Test Value (S)	-17								
Tabulated p-value	0.06								
Standard Deviation of S	9.539								
Standardized Value of S	-1.677								
Approximate p-value	0.0467								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/23/2018 5:36:59 PM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Full Precision	OFF							
Confidence Coefficient	0.95							
Level of Significance	0.05							
Lead-background								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	28							
Number Values Reported (n)	28							
Minimum	1.0000E-4							
Maximum	0.01							
Mean	0.00302							
Geometric Mean	0.00179							
Median	0.002							
Standard Deviation	0.00296							
Coefficient of Variation	0.981							
Mann-Kendall Test								
M-K Test Value (S)	144							
Critical Value (0.05)	1.645							
Standard Deviation of S	48.59							
Standardized Value of S	2.943							
Approximate p-value	0.00162							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Lead-mw-61								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	7.8000E-4							
Maximum	0.01							
Mean	0.00191							
Geometric Mean	0.00137							
Median	9.0500E-4							
Standard Deviation	0.00227							
Coefficient of Variation	1.186							
Mann-Kendall Test								
M-K Test Value (S)	83							
Tabulated p-value	0.001							
Standard Deviation of S	26.04							
Standardized Value of S	3.148							
Approximate p-value	8.2079E-4							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Lead-mw-7								
General Statistics								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	1.0000E-4								
Maximum	0.01								
Mean	0.0016								
Geometric Mean	8.5341E-4								
Median	5.0000E-4								
Standard Deviation	0.0024								
Coefficient of Variation	1.496								
Mann-Kendall Test									
M-K Test Value (S)	71								
Tabulated p-value	0.003								
Standard Deviation of S	24.42								
Standardized Value of S	2.867								
Approximate p-value	0.00208								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Lead-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.0028								
Maximum	0.01								
Mean	0.00414								
Geometric Mean	0.00382								
Median	0.0032								
Standard Deviation	0.0021								
Coefficient of Variation	0.508								
Mann-Kendall Test									
M-K Test Value (S)	19								
Tabulated p-value	0.082								
Standard Deviation of S	12.69								
Standardized Value of S	1.419								
Approximate p-value	0.078								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lead-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								
Minimum	5.0000E-4								
Maximum	0.033								
Mean	0.00532								
Geometric Mean	0.00135								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Median	5.0000E-4								
Standard Deviation	0.0108								
Coefficient of Variation	2.035								
Mann-Kendall Test									
M-K Test Value (S)	-10								
Tabulated p-value	0.179								
Standard Deviation of S	8.679								
Standardized Value of S	-1.037								
Approximate p-value	0.15								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/23/2018 5:31:39 PM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Lithium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	28								
Number Values Reported (n)	28								
Minimum	0.37								
Maximum	1.8								
Mean	0.852								
Geometric Mean	0.759								
Median	0.91								
Standard Deviation	0.393								
Coefficient of Variation	0.462								
Mann-Kendall Test									
M-K Test Value (S)	-46								
Critical Value (0.05)	-1.645								
Standard Deviation of S	49.93								
Standardized Value of S	-0.901								
Approximate p-value	0.184								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-mw-61									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.35								
Maximum	0.44								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Mean	0.38								
Geometric Mean	0.379								
Median	0.375								
Standard Deviation	0.0222								
Coefficient of Variation	0.0585								
Mann-Kendall Test									
M-K Test Value (S)	-22								
Tabulated p-value	0.205								
Standard Deviation of S	25.96								
Standardized Value of S	-0.809								
Approximate p-value	0.209								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-mw-7									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.75								
Maximum	1.2								
Mean	0.899								
Geometric Mean	0.894								
Median	0.9								
Standard Deviation	0.0981								
Coefficient of Variation	0.109								
Mann-Kendall Test									
M-K Test Value (S)	-40								
Tabulated p-value	0.066								
Standard Deviation of S	26.29								
Standardized Value of S	-1.483								
Approximate p-value	0.069								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.4								
Maximum	0.48								
Mean	0.432								
Geometric Mean	0.431								
Median	0.43								
Standard Deviation	0.0209								
Coefficient of Variation	0.0484								
Mann-Kendall Test									

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	-11								
Tabulated p-value	0.223								
Standard Deviation of S	12.18								
Standardized Value of S	-0.821								
Approximate p-value	0.206								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								
Minimum	1.1								
Maximum	1.5								
Mean	1.178								
Geometric Mean	1.172								
Median	1.1								
Standard Deviation	0.13								
Coefficient of Variation	0.111								
Mann-Kendall Test									
M-K Test Value (S)	3								
Tabulated p-value	0.46								
Standard Deviation of S	8.466								
Standardized Value of S	0.236								
Approximate p-value	0.407								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/23/2018 5:38:51 PM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Molybdenum-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	28								
Number Values Reported (n)	28								
Minimum	0.013								
Maximum	0.096								
Mean	0.031								
Geometric Mean	0.0273								
Median	0.026								
Standard Deviation	0.0191								
Coefficient of Variation	0.615								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test								
M-K Test Value (S)	-145							
Critical Value (0.05)	-1.645							
Standard Deviation of S	50.47							
Standardized Value of S	-2.853							
Approximate p-value	0.00217							
Statistically significant evidence of a decreasing trend at the specified level of significance.								
Molybdenum-mw-61								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	0.069							
Maximum	0.085							
Mean	0.0766							
Geometric Mean	0.0764							
Median	0.0775							
Standard Deviation	0.00442							
Coefficient of Variation	0.0578							
Mann-Kendall Test								
M-K Test Value (S)	14							
Tabulated p-value	0.3							
Standard Deviation of S	26.18							
Standardized Value of S	0.497							
Approximate p-value	0.31							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Molybdenum-mw-7								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	0.0022							
Maximum	0.041							
Mean	0.00862							
Geometric Mean	0.00564							
Median	0.0042							
Standard Deviation	0.0109							
Coefficient of Variation	1.263							
Mann-Kendall Test								
M-K Test Value (S)	-48							
Tabulated p-value	0.034							
Standard Deviation of S	26.34							
Standardized Value of S	-1.784							
Approximate p-value	0.0372							

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Statistically significant evidence of a decreasing trend at the specified level of significance.							
Molybdenum-mw-75							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	11						
Number Values Reported (n)	11						
Minimum	0.16						
Maximum	0.18						
Mean	0.169						
Geometric Mean	0.169						
Median	0.17						
Standard Deviation	0.00831						
Coefficient of Variation	0.0492						
Mann-Kendall Test							
M-K Test Value (S)	-2						
Tabulated p-value	0.44						
Standard Deviation of S	12						
Standardized Value of S	-0.0833						
Approximate p-value	0.467						
Insufficient evidence to identify a significant trend at the specified level of significance.							
Molybdenum-mw-8							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	9						
Number Values Reported (n)	9						
Minimum	0.011						
Maximum	0.049						
Mean	0.0241						
Geometric Mean	0.021						
Median	0.018						
Standard Deviation	0.0142						
Coefficient of Variation	0.589						
Mann-Kendall Test							
M-K Test Value (S)	-18						
Tabulated p-value	0.038						
Standard Deviation of S	9.487						
Standardized Value of S	-1.792						
Approximate p-value	0.0366						
Statistically significant evidence of a decreasing trend at the specified level of significance.							
Mann-Kendall Trend Test Analysis							
User Selected Options							
Date/Time of Computation	ProUCL 5.19/18/2018 10:01:48 PM						

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

From File	MultiUnit_COMBINEDRADIUM_AssessmentMont_Sept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Combined_Radium-background	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	29
Number Values Reported (n)	29
Minimum	0.6
Maximum	3.5
Mean	1.723
Geometric Mean	1.523
Median	1.7
Standard Deviation	0.812
Coefficient of Variation	0.471
Mann-Kendall Test	
M-K Test Value (S)	-108
Critical Value (0.05)	-1.645
Standard Deviation of S	53.21
Standardized Value of S	-2.011
Approximate p-value	0.0222
Statistically significant evidence of a decreasing trend at the specified level of significance.	
Combined_Radium-mw-61	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	18
Number Values Reported (n)	18
Minimum	0.5
Maximum	2.2
Mean	1.016
Geometric Mean	0.909
Median	0.7
Standard Deviation	0.537
Coefficient of Variation	0.528
Mann-Kendall Test	
M-K Test Value (S)	-31
Tabulated p-value	0.13
Standard Deviation of S	25.79
Standardized Value of S	-1.163
Approximate p-value	0.122
Insufficient evidence to identify a significant trend at the specified level of significance.	
Combined_Radium-mw-7	

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.6								
Maximum	3.3								
Mean	1.567								
Geometric Mean	1.384								
Median	1.3								
Standard Deviation	0.819								
Coefficient of Variation	0.523								
Mann-Kendall Test									
M-K Test Value (S)	-20								
Tabulated p-value	0.227								
Standard Deviation of S	26.2								
Standardized Value of S	-0.725								
Approximate p-value	0.234								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Combined_Radium-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.4								
Maximum	1.6								
Mean	0.882								
Geometric Mean	0.826								
Median	0.8								
Standard Deviation	0.346								
Coefficient of Variation	0.392								
Mann-Kendall Test									
M-K Test Value (S)	11								
Tabulated p-value	0.223								
Standard Deviation of S	12.66								
Standardized Value of S	0.79								
Approximate p-value	0.215								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Combined_Radium-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	8								
Number Values Reported (n)	9								
Number Values Missing	1								
Number Values Used	8								
Minimum	0.7								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Maximum	1.9								
Mean	1.25								
Geometric Mean	1.208								
Median	1.25								
Standard Deviation	0.342								
Coefficient of Variation	0.274								
Mann-Kendall Test									
M-K Test Value (S)	-14								
Tabulated p-value	0.054								
Standard Deviation of S	7.958								
Standardized Value of S	-1.634								
Approximate p-value	0.0512								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/23/2018 8:08:42 PM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Selenium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	28								
Number Values Reported (n)	28								
Minimum	0.0017								
Maximum	0.092								
Mean	0.0317								
Geometric Mean	0.01								
Median	0.008								
Standard Deviation	0.0364								
Coefficient of Variation	1.147								
Mann-Kendall Test									
M-K Test Value (S)	75								
Critical Value (0.05)	1.645								
Standard Deviation of S	50.21								
Standardized Value of S	1.474								
Approximate p-value	0.0703								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-mw-61									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Reported (n)	18							
Minimum	5.0000E-4							
Maximum	0.01							
Mean	0.00186							
Geometric Mean	0.00135							
Median	0.00128							
Standard Deviation	0.00215							
Coefficient of Variation	1.161							
Mann-Kendall Test								
M-K Test Value (S)	27							
Tabulated p-value	0.165							
Standard Deviation of S	25.84							
Standardized Value of S	1.006							
Approximate p-value	0.157							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Selenium-mw-7								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	0.0026							
Maximum	0.015							
Mean	0.00902							
Geometric Mean	0.0079							
Median	0.0099							
Standard Deviation	0.0042							
Coefficient of Variation	0.465							
Mann-Kendall Test								
M-K Test Value (S)	74							
Tabulated p-value	0.002							
Standard Deviation of S	26.29							
Standardized Value of S	2.776							
Approximate p-value	0.00275							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Selenium-mw-75								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	11							
Number Values Reported (n)	11							
Minimum	0.0021							
Maximum	0.01							
Mean	0.00325							
Geometric Mean	0.00283							
Median	0.0023							
Standard Deviation	0.00238							

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Coefficient of Variation	0.732								
Mann-Kendall Test									
M-K Test Value (S)	23								
Tabulated p-value	0.043								
Standard Deviation of S	12.69								
Standardized Value of S	1.734								
Approximate p-value	0.0415								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Selenium-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								
Minimum	8.4000E-4								
Maximum	0.013								
Mean	0.00382								
Geometric Mean	0.00238								
Median	0.0016								
Standard Deviation	0.00446								
Coefficient of Variation	1.168								
Mann-Kendall Test									
M-K Test Value (S)	2								
Tabulated p-value	0.46								
Standard Deviation of S	9.487								
Standardized Value of S	0.105								
Approximate p-value	0.458								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/23/2018 8:18:52 PM								
From File	MultiUnit_NOFLUORIDEorRADIUMAssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Thallium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	27								
Number Values Reported (n)	28								
Number Values Missing	1								
Number Values Used	27								
Minimum	1.0000E-4								
Maximum	0.017								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Mean	0.00169						
Geometric Mean	9.8686E-4						
Median	0.0013						
Standard Deviation	0.00311						
Coefficient of Variation	1.836						
Mann-Kendall Test							
M-K Test Value (S)	12						
Critical Value (0.05)	1.645						
Standard Deviation of S	47.44						
Standardized Value of S	0.232						
Approximate p-value	0.408						
Insufficient evidence to identify a significant trend at the specified level of significance.							
Thallium-mw-61							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	18						
Number Values Reported (n)	18						
Minimum	1.1000E-4						
Maximum	0.002						
Mean	3.8778E-4						
Geometric Mean	2.6702E-4						
Median	1.7000E-4						
Standard Deviation	4.5798E-4						
Coefficient of Variation	1.181						
Mann-Kendall Test							
M-K Test Value (S)	64						
Tabulated p-value	0.007						
Standard Deviation of S	25.97						
Standardized Value of S	2.425						
Approximate p-value	0.00764						
Statistically significant evidence of an increasing trend at the specified level of significance.							
Thallium-mw-7							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	18						
Number Values Reported (n)	18						
Minimum	9.3000E-5						
Maximum	0.002						
Mean	3.6850E-4						
Geometric Mean	2.3710E-4						
Median	1.6500E-4						
Standard Deviation	4.6639E-4						
Coefficient of Variation	1.266						
Mann-Kendall Test							

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	53								
Tabulated p-value	0.024								
Standard Deviation of S	26.1								
Standardized Value of S	1.993								
Approximate p-value	0.0232								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Thallium-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	1.7000E-4								
Maximum	0.002								
Mean	6.1364E-4								
Geometric Mean	4.7059E-4								
Median	4.0000E-4								
Standard Deviation	5.3659E-4								
Coefficient of Variation	0.874								
Mann-Kendall Test									
M-K Test Value (S)	25								
Tabulated p-value	0.03								
Standard Deviation of S	11.65								
Standardized Value of S	2.061								
Approximate p-value	0.0197								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Thallium-mw-8									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	9								
Minimum	1.0000E-4								
Maximum	0.01								
Mean	0.00147								
Geometric Mean	3.1198E-4								
Median	1.4000E-4								
Standard Deviation	0.00326								
Coefficient of Variation	2.214								
Mann-Kendall Test									
M-K Test Value (S)	-10								
Tabulated p-value	0.179								
Standard Deviation of S	9.129								
Standardized Value of S	-0.986								
Approximate p-value	0.162								
Insufficient evidence to identify a significant									

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

trend at the specified level of significance.									
		Mann-Kendall Trend Test Analysis							
User Selected Options									
Date/Time of Computation		ProUCL 5.110/9/2018 6:03:49 PM							
From File		Table2_AppendixA_Multiunit_FLUORIDEProUCLUpload_Sept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Fluoride-background									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		28							
Number Values Reported (n)		28							
Minimum		0.08							
Maximum		5							
Mean		2.18							
Geometric Mean		1.633							
Median		2							
Standard Deviation		1.353							
Coefficient of Variation		0.621							
Mann-Kendall Test									
M-K Test Value (S)		167							
Critical Value (0.05)		1.645							
Standard Deviation of S		50.04							
Standardized Value of S		3.318							
Approximate p-value		4.5402E-4							
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-61									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		18							
Number Values Reported (n)		18							
Minimum		0.91							
Maximum		1.6							
Mean		1.223							
Geometric Mean		1.215							
Median		1.2							
Standard Deviation		0.146							
Coefficient of Variation		0.12							
Mann-Kendall Test									
M-K Test Value (S)		52							
Tabulated p-value		0.024							
Standard Deviation of S		25.36							
Standardized Value of S		2.011							
Approximate p-value		0.0222							

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-7									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.35								
Maximum	4								
Mean	0.883								
Geometric Mean	0.693								
Median	0.8								
Standard Deviation	0.866								
Coefficient of Variation	0.981								
Mann-Kendall Test									
M-K Test Value (S)	62								
Tabulated p-value	0.009								
Standard Deviation of S	24.23								
Standardized Value of S	2.517								
Approximate p-value	0.00592								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-75									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	1.2								
Maximum	2								
Mean	1.845								
Geometric Mean	1.821								
Median	2								
Standard Deviation	0.288								
Coefficient of Variation	0.156								
Mann-Kendall Test									
M-K Test Value (S)	-11								
Tabulated p-value	0.223								
Standard Deviation of S	9.983								
Standardized Value of S	-1.002								
Approximate p-value	0.158								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-mw-8									
General Statistics									
Number or Reported Events Not Used	0								

TABLE B-2
MULTIUNIT ProUCL MANN-KENDALL TREND ANALYSIS*

Number of Generated Events	9							
Number Values Reported (n)	9							
Minimum	0.4							
Maximum	5							
Mean	1.477							
Geometric Mean	1.064							
Median	0.91							
Standard Deviation	1.451							
Coefficient of Variation	0.982							
Mann-Kendall Test								
M-K Test Value (S)	-2							
Tabulated p-value	0.46							
Standard Deviation of S	9.487							
Standardized Value of S	-0.105							
Approximate p-value	0.458							
Insufficient evidence to identify a significant trend at the specified level of significance.								

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects						
User Selected Options						
Date/Time of Computation	ProUCL 5.110/9/2018 5:05:46 PM					
From File	Table1_AppendixA_Multiunit_AppendixIV_ProUCLUpload_Sept2018.xls					
Full Precision	OFF					
Confidence Coefficient	0.95					
Antimony (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	2	26	4	22	84.62%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	22	0.001	0.01	0.00434	0.004	0.003
Statistics (Non-Detects Only)	4	3.3000E-4	4.8000E-4	3.7750E-4	3.5000E-4	6.8981E-5
Statistics (All: NDs treated as DL value)	26	3.3000E-4	0.01	0.00373	0.004	0.00311
Statistics (All: NDs treated as DL/2 value)	26	3.3000E-4	0.005	0.00189	0.002	0.00152
Statistics (Normal ROS Imputed Data)	26	2.6840E-4	4.8660E-4	3.7750E-4	3.7283E-4	5.6173E-5
Statistics (Gamma ROS Imputed Data)	26	3.3000E-4	0.01	0.00852	0.01	0.00354
Statistics (Lognormal ROS Imputed Data)	26	2.8420E-4	4.9015E-4	3.7679E-4	3.6893E-4	5.3522E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	44.09	11.19	8.5628E-6	-7.893	0.17	-0.0215
Statistics (NDs = DL)	1.303	1.178	0.00286	-6.021	1.065	-0.177
Statistics (NDs = DL/2)	1.62	1.459	0.00117	-6.608	0.886	-0.134
Statistics (Gamma ROS Estimates)	1.593	1.435	0.00535	-5.111	1.211	-0.237
Statistics (Lognormal ROS Estimates)	--	--	--	-7.893	0.14	-0.0177
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.854	0.907	0.897	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.744	0.748	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.81	0.92	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.791	0.92	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.977	0.92	Data Appear Normal			
Lilliefors (Detects Only)	0.405	0.375	Data Not Normal			
Lilliefors (NDs = DL)	0.273	0.17	Data Not Normal			
Lilliefors (NDs = DL/2)	0.28	0.17	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.105	0.17	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.887	0.928	0.93	0.454		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.684	0.656				
Kolmogorov-Smirnov (Detects Only)	0.422	0.394	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.023	0.766				
Kolmogorov-Smirnov (NDs = DL)	0.223	0.175	Data Not Gamma Distributed			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	1.219	0.761				
Kolmogorov-Smirnov (NDs = DL/2)	0.207	0.174	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	7.887	0.761				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.527	0.174	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.865	0.947	0.949	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.765	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.882	0.92	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.882	0.92	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.978	0.92	Data Appear Lognormal			
Lilliefors (Detects Only)	0.397	0.375	Data Not Lognormal			
Lilliefors (NDs = DL)	0.258	0.17	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.248	0.17	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.106	0.17	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	5.0000E-4	0.004	0.00246	0.0025	0.00149
Statistics (Non-Detects Only)	3	2.3000E-4	2.9000E-4	2.5000E-4	2.3000E-4	3.4641E-5
Statistics (All: NDs treated as DL value)	17	2.3000E-4	0.004	0.00207	0.001	0.0016
Statistics (All: NDs treated as DL/2 value)	17	2.3000E-4	0.002	0.00106	5.0000E-4	7.7333E-4
Statistics (Normal ROS Imputed Data)	17	2.0252E-4	2.9748E-4	2.5000E-4	2.5000E-4	2.9022E-5
Statistics (Gamma ROS Imputed Data)	17	2.3000E-4	0.01	0.00828	0.01	0.00383
Statistics (Lognormal ROS Imputed Data)	17	2.0683E-4	2.9851E-4	2.4996E-4	2.4848E-4	2.8201E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.336	1.14	0.00155	-6.597	1.058	-0.16
Statistics (NDs = DL/2)	1.723	1.458	6.1446E-4	-7.168	0.866	-0.121
Statistics (Gamma ROS Estimates)	1.219	1.043	0.00679	-5.257	1.453	-0.276
Statistics (Lognormal ROS Estimates)	--	--	--	-8.3	0.112	-0.0135
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.866	0.907	0.895	0.983		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.75	0.767	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.795	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.773	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.953	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL)	0.279	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.294	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.157	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.847	0.859	0.454		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	1.045	0.759				
Kolmogorov-Smirnov (NDs = DL)	0.223	0.214	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.323	0.753				
Kolmogorov-Smirnov (NDs = DL/2)	0.258	0.212	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.97	0.761				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.521	0.214	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.866	0.933	0.926	0.983		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.75	0.767	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.849	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.831	0.892	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.953	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.198	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.221	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.157	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	4	13	76.47%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.01	0.00281	0.0025	0.00257
Statistics (Non-Detects Only)	4	1.6000E-4	0.001	4.3500E-4	2.9000E-4	3.8197E-4
Statistics (All: NDs treated as DL value)	17	1.6000E-4	0.01	0.00225	0.001	0.00246
Statistics (All: NDs treated as DL/2 value)	17	1.6000E-4	0.005	0.00118	5.0000E-4	0.0012
Statistics (Normal ROS Imputed Data)	17	-3.709E-5	0.001	3.3473E-4	2.8358E-4	2.4442E-4
Statistics (Gamma ROS Imputed Data)	17	1.6000E-4	0.01	0.00775	0.01	0.00419
Statistics (Lognormal ROS Imputed Data)	17	1.2526E-4	0.001	3.1555E-4	2.7000E-4	2.0457E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.186	0.713	1.9902E-4	-7.986	0.773	-0.0968
Statistics (NDs = DL)	1.069	0.92	0.0021	-6.633	1.127	-0.17
Statistics (NDs = DL/2)	1.341	1.143	8.7695E-4	-7.163	0.945	-0.132

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	1.061	0.913	0.0073	-5.401	1.516	-0.281		
Statistics (Lognormal ROS Estimates)	--	--	--	-8.198	0.507	-0.0619		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.875	0.852	0.851	0.956				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.779	0.748	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.741	0.892	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.74	0.892	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.927	0.892	Data Appear Normal					
Lilliefors (Detects Only)	0.378	0.375	Data Not Normal					
Lilliefors (NDs = DL)	0.282	0.207	Data Not Normal					
Lilliefors (NDs = DL/2)	0.242	0.207	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.158	0.207	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.973	0.958	0.955	0.506				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.445	0.66						
Kolmogorov-Smirnov (Detects Only)	0.345	0.398	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.612	0.765						
Kolmogorov-Smirnov (NDs = DL)	0.243	0.215	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL/2)	0.648	0.759						
Kolmogorov-Smirnov (NDs = DL/2)	0.242	0.214	Detected Data appear Approximate Gamma					
Anderson-Darling (Gamma ROS Estimates)	4.092	0.765						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.489	0.215	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.95	0.973	0.974	0.974				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.917	0.748	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.944	0.892	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.946	0.892	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.958	0.892	Data Appear Lognormal					
Lilliefors (Detects Only)	0.298	0.375	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.185	0.207	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.208	0.207	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.13	0.207	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Antimony (mw-75)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	11	1	10	1	9	90.00%		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Requested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, EPC2, EPC3, EPC4, EPC5, EPC6, EPC7, EPC8, EPC9, EPC10, EPC11, EPC12, EPC13, EPC14, EPC15, EPC16, EPC17, EPC18, EPC19, EPC20, EPC21, EPC22, EPC23, EPC24, EPC25, EPC26, EPC27, EPC28, EPC29, EPC30, EPC31, EPC32, EPC33, EPC34, EPC35, EPC36, EPC37, EPC38, EPC39, EPC40, EPC41, EPC42, EPC43, EPC44, EPC45, EPC46, EPC47, EPC48, EPC49, EPC50, EPC51, EPC52, EPC53, EPC54, EPC55, EPC56, EPC57, EPC58, EPC59, EPC60, EPC61, EPC62, EPC63, EPC64, EPC65, EPC66, EPC67, EPC68, EPC69, EPC70, EPC71, EPC72, EPC73, EPC74, EPC75, EPC76, EPC77, EPC78, EPC79, EPC80, EPC81, EPC82, EPC83, EPC84, EPC85, EPC86, EPC87, EPC88, EPC89, EPC90, EPC91, EPC92, EPC93, EPC94, EPC95, EPC96, EPC97, EPC98, EPC99, EPC100).						
The data set for variable Antimony (mw-75) was not processed!						
Antimony (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	1	8	3	5	62.50%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	0.001	0.005	0.0021	0.001	0.00175
Statistics (Non-Detects Only)	3	4.8000E-4	0.0014	8.0667E-4	5.4000E-4	5.1472E-4
Statistics (All: NDs treated as DL value)	8	4.8000E-4	0.005	0.00162	0.001	0.00151
Statistics (All: NDs treated as DL/2 value)	8	4.8000E-4	0.0025	9.5875E-4	5.2000E-4	7.2613E-4
Statistics (Normal ROS Imputed Data)	8	2.5563E-4	0.0014	6.6812E-4	6.0245E-4	3.3636E-4
Statistics (Gamma ROS Imputed Data)	8	4.8000E-4	0.01	0.00655	0.01	0.00477
Statistics (Lognormal ROS Imputed Data)	8	3.7742E-4	0.0014	6.5507E-4	5.6900E-4	3.1659E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdev	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.872	1.253	8.6288E-4	-6.719	0.772	-0.115
Statistics (NDs = DL/2)	2.629	1.726	3.6469E-4	-7.152	0.642	-0.0898
Statistics (Gamma ROS Estimates)	1.015	0.718	0.00645	-5.595	1.402	-0.251
Statistics (Lognormal ROS Estimates)	--	--	--	-7.406	0.385	-0.052
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.894	0.851	0.851	0.909		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.799	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.74	0.818	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.729	0.818	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.855	0.818	Data Appear Normal			
Lilliefors (Detects Only)	0.364	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.307	0.283	Data Not Normal			
Lilliefors (NDs = DL/2)	0.343	0.283	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.267	0.283	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.961	0.949	0.646		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.535	0.725				
Kolmogorov-Smirnov (NDs = DL)	0.263	0.298	Data Appear Gamma Distributed			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	0.994	0.722				
Kolmogorov-Smirnov (NDs = DL/2)	0.362	0.297	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.346	0.735				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.408	0.301	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.912	0.959	0.882	0.914		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.831	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.922	0.818	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.768	0.818	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.862	0.818	Data Appear Lognormal			
Lilliefors (Detects Only)	0.349	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.222	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.344	0.283	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.267	0.283	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	16	12	42.86%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	0.002	0.01	0.00467	0.003	0.00342
Statistics (Non-Detects Only)	16	8.8000E-4	0.0045	0.00235	0.0025	0.00123
Statistics (All: NDs treated as DL value)	28	8.8000E-4	0.01	0.00334	0.0025	0.00264
Statistics (All: NDs treated as DL/2 value)	28	8.8000E-4	0.005	0.00234	0.0021	0.00143
Statistics (Normal ROS Imputed Data)	28	2.6717E-4	0.0045	0.00204	0.00182	0.00109
Statistics (Gamma ROS Imputed Data)	28	8.8000E-4	0.01	0.00563	0.0039	0.00396
Statistics (Lognormal ROS Imputed Data)	28	7.6140E-4	0.0045	0.00195	0.00161	0.00106
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.564	2.937	6.5935E-4	-6.2	0.578	-0.0932
Statistics (NDs = DL)	2.212	1.999	0.00151	-5.944	0.691	-0.116
Statistics (NDs = DL/2)	2.868	2.584	8.1699E-4	-6.241	0.624	-0.0999
Statistics (Gamma ROS Estimates)	1.632	1.481	0.00345	-5.517	0.912	-0.165
Statistics (Lognormal ROS Estimates)	--	--	--	-6.347	0.513	-0.0808
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.96	0.875	0.934	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.902	0.887	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.76	0.924	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.851	0.924	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.942	0.924	Data Appear Normal			
Lilliefors (Detects Only)	0.177	0.213	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL)	0.191	0.164	Data Not Normal			
Lilliefors (NDs = DL/2)	0.201	0.164	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.122	0.164	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.96	0.95	0.959	0.816		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.688	0.743				
Kolmogorov-Smirnov (Detects Only)	0.197	0.216	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.788	0.757				
Kolmogorov-Smirnov (NDs = DL)	0.145	0.167	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	1.285	0.754				
Kolmogorov-Smirnov (NDs = DL/2)	0.216	0.167	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.042	0.761				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.285	0.168	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.957	0.979	0.946	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.893	0.887	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.945	0.924	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.87	0.924	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.947	0.924	Data Appear Lognormal			
Lilliefors (Detects Only)	0.211	0.213	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.117	0.164	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.213	0.164	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.122	0.164	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	5	13	72.22%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.01	0.00219	0.002	0.00266
Statistics (Non-Detects Only)	5	4.2000E-4	6.3000E-4	5.3800E-4	5.6000E-4	8.0747E-5
Statistics (All: NDs treated as DL value)	18	4.2000E-4	0.01	0.00173	6.0500E-4	0.00236
Statistics (All: NDs treated as DL/2 value)	18	2.5000E-4	0.005	9.4111E-4	5.7000E-4	0.00115
Statistics (Normal ROS Imputed Data)	18	3.2987E-4	6.3000E-4	4.7180E-4	4.7090E-4	7.9819E-5
Statistics (Gamma ROS Imputed Data)	18	4.2000E-4	0.01	0.00737	0.01	0.00436
Statistics (Lognormal ROS Imputed Data)	18	3.5521E-4	6.3000E-4	4.7380E-4	4.6756E-4	7.4716E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	52.53	21.14	1.0242E-5	-7.537	0.157	-0.0208
Statistics (NDs = DL)	1.123	0.973	0.00154	-6.865	0.931	-0.136
Statistics (NDs = DL/2)	1.401	1.205	6.7155E-4	-7.366	0.834	-0.113

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	1.119	0.969	0.00659	-5.42	1.353	-0.25		
Statistics (Lognormal ROS Estimates)	--	--	--	-7.666	0.155	-0.0203		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.983	0.746	0.754	0.987				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.968	0.762	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.578	0.897	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.591	0.897	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.972	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.207	0.343	Data Appear Normal					
Lilliefors (NDs = DL)	0.344	0.202	Data Not Normal					
Lilliefors (NDs = DL/2)	0.368	0.202	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.171	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.972	0.922	0.908	0.555				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.257	0.678						
Kolmogorov-Smirnov (Detects Only)	0.232	0.357	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	1.739	0.764						
Kolmogorov-Smirnov (NDs = DL)	0.275	0.209	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.123	0.758						
Kolmogorov-Smirnov (NDs = DL/2)	0.25	0.208	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	4.094	0.764						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.465	0.209	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.972	0.904	0.944	0.987				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.947	0.762	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.814	0.897	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.889	0.897	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.97	0.897	Data Appear Lognormal					
Lilliefors (Detects Only)	0.224	0.343	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.262	0.202	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.18	0.202	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.171	0.202	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Arsenic (mw-7)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	11	7	38.89%		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	5.0000E-4	0.01	0.00257	0.002	0.00335
Statistics (Non-Detects Only)	11	3.3000E-4	0.0021	7.5636E-4	6.6000E-4	4.6373E-4
Statistics (All: NDs treated as DL value)	18	3.3000E-4	0.01	0.00146	6.9500E-4	0.00222
Statistics (All: NDs treated as DL/2 value)	18	2.5000E-4	0.005	9.6222E-4	6.6500E-4	0.00109
Statistics (Normal ROS Imputed Data)	18	-6.282E-6	0.0021	6.3937E-4	6.1649E-4	4.2709E-4
Statistics (Gamma ROS Imputed Data)	18	3.3000E-4	0.01	0.00435	7.7000E-4	0.00465
Statistics (Lognormal ROS Imputed Data)	18	2.9486E-4	0.0021	6.6120E-4	5.9645E-4	3.8871E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	4.76	3.523	1.5889E-4	-7.296	0.446	-0.0611
Statistics (NDs = DL)	1.25	1.079	0.00117	-6.978	0.814	-0.117
Statistics (NDs = DL/2)	1.806	1.542	5.3275E-4	-7.248	0.706	-0.0974
Statistics (Gamma ROS Estimates)	0.739	0.653	0.00589	-6.249	1.392	-0.223
Statistics (Lognormal ROS Estimates)	--	--	--	-7.424	0.429	-0.0577
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.761	0.66	0.72	0.844		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.616	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.465	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.547	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.747	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.38	0.251	Data Not Normal			
Lilliefors (NDs = DL)	0.331	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.375	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.251	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma ROS		
Correlation Coefficient R	0.841	0.841	0.865	0.778		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.13	0.732				
Kolmogorov-Smirnov (Detects Only)	0.311	0.256	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.903	0.761				
Kolmogorov-Smirnov (NDs = DL)	0.289	0.208	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.322	0.754				
Kolmogorov-Smirnov (NDs = DL/2)	0.27	0.207	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.384	0.779				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.322	0.212	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.891	0.904	0.94	0.926		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.832	0.85	Data Not Lognormal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.831	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.897	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.881	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.275	0.251	Data Not Lognormal			
Lilliefors (NDs = DL)	0.247	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.204	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.201	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	0	11	0	11	100.00%
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!						
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!						
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Arsenic (mw-75) was not processed!						
Arsenic (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	4	5	55.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	5.0000E-4	0.01	0.0026	0.001	0.00414
Statistics (Non-Detects Only)	4	5.3000E-4	0.0091	0.00273	6.4000E-4	0.00425
Statistics (All: NDs treated as DL value)	9	5.0000E-4	0.01	0.00266	7.0000E-4	0.00392
Statistics (All: NDs treated as DL/2 value)	9	2.5000E-4	0.0091	0.00193	5.3000E-4	0.00308
Statistics (Normal ROS Imputed Data)	9	-0.00752	0.0091	-6.242E-4	4.6743E-4	0.0047
Statistics (Gamma ROS Imputed Data)	9	5.3000E-4	0.01	0.00677	0.01	0.00463
Statistics (Lognormal ROS Imputed Data)	9	4.0099E-5	0.0091	0.00135	5.3000E-4	0.00292
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	0.721	0.347	0.00379	-6.74	1.365	-0.203
Statistics (NDs = DL)	0.748	0.573	0.00355	-6.731	1.209	-0.18
Statistics (NDs = DL/2)	0.696	0.538	0.00278	-7.116	1.26	-0.177
Statistics (Gamma ROS Estimates)	1.03	0.761	0.00657	-5.554	1.402	-0.252
Statistics (Lognormal ROS Estimates)	--	--	--	-7.846	1.538	-0.196
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.795	0.77	0.771	0.936		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.645	0.748	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.59	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.609	0.829	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.899	0.829	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Detects Only)	0.433	0.375	Data Not Normal		
Lilliefors (NDs = DL)	0.442	0.274	Data Not Normal		
Lilliefors (NDs = DL/2)	0.434	0.274	Data Not Normal		
Lilliefors (Normal ROS Estimates)	0.278	0.274	Data Not Normal		
Gamma GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Gamma RO	
Correlation Coefficient R	0.975	0.909	0.958	0.627	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Anderson-Darling (Detects Only)	0.835	0.672			
Kolmogorov-Smirnov (Detects Only)	0.449	0.406	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL)	1.551	0.752			
Kolmogorov-Smirnov (NDs = DL)	0.403	0.289	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL/2)	1.308	0.756			
Kolmogorov-Smirnov (NDs = DL/2)	0.396	0.29	Data Not Gamma Distributed		
Anderson-Darling (Gamma ROS Estimates)	1.734	0.743			
Kolmogorov-Smirnov (Gamma ROS Est.)	0.406	0.287	Data Not Gamma Distributed		
Lognormal GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Log ROS	
Correlation Coefficient R	0.833	0.85	0.89	0.947	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Shapiro-Wilk (Detects Only)	0.705	0.748	Data Not Lognormal		
Shapiro-Wilk (NDs = DL)	0.711	0.829	Data Not Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.79	0.829	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.917	0.829	Data Appear Lognormal		
Lilliefors (Detects Only)	0.4	0.375	Data Not Lognormal		
Lilliefors (NDs = DL)	0.336	0.274	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.325	0.274	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.241	0.274	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Barium (background)					
Raw Statistics					
Number of Valid Observations	28				
Number of Distinct Observations	10				
Minimum	0.018				
Maximum	0.042				
Mean of Raw Data	0.0225				
Standard Deviation of Raw Data	0.00537				
Khat	23.79				
Theta hat	9.4424E-4				
Kstar	21.27				
Theta star	0.00106				
Mean of Log Transformed Data	-3.817				
Standard Deviation of Log Transformed Data	0.197				
Normal GOF Test Results					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.812						
Shapiro Wilk Test Statistic	0.675						
Shapiro Wilk Critical (0.05) Value	0.924						
Approximate Shapiro Wilk P Value	2.3062E-7						
Lilliefors Test Statistic	0.32						
Lilliefors Critical (0.05) Value	0.164						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.856						
A-D Test Statistic	2.616						
A-D Critical (0.05) Value	0.744						
K-S Test Statistic	0.299						
K-S Critical(0.05) Value	0.165						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.87						
Shapiro Wilk Test Statistic	0.766						
Shapiro Wilk Critical (0.05) Value	0.924						
Approximate Shapiro Wilk P Value	1.1183E-5						
Lilliefors Test Statistic	0.285						
Lilliefors Critical (0.05) Value	0.164						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Barium (mw-61)							
Raw Statistics							
Number of Valid Observations	17						
Number of Missing Observations	1						
Number of Distinct Observations	4						
Minimum	0.013						
Maximum	0.016						
Mean of Raw Data	0.0139						
Standard Deviation of Raw Data	7.4755E-4						
Khat	380.8						
Theta hat	3.6606E-5						
Kstar	313.7						
Theta star	4.4444E-5						
Mean of Log Transformed Data	-4.274						
Standard Deviation of Log Transformed Data	0.0525						
Normal GOF Test Results							
Correlation Coefficient R	0.859						
Shapiro Wilk Test Statistic	0.755						
Shapiro Wilk Critical (0.05) Value	0.892						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Approximate Shapiro Wilk P Value	2.7875E-4						
Lilliefors Test Statistic	0.351						
Lilliefors Critical (0.05) Value	0.207						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.866						
A-D Test Statistic	1.993						
A-D Critical (0.05) Value	0.736						
K-S Test Statistic	0.343						
K-S Critical(0.05) Value	0.208						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.866						
Shapiro Wilk Test Statistic	0.765						
Shapiro Wilk Critical (0.05) Value	0.892						
Approximate Shapiro Wilk P Value	3.9910E-4						
Lilliefors Test Statistic	0.34						
Lilliefors Critical (0.05) Value	0.207						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Barium (mw-7)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	5						
Minimum	0.013						
Maximum	0.017						
Mean of Raw Data	0.0154						
Standard Deviation of Raw Data	0.00129						
Khat	149.3						
Theta hat	1.0309E-4						
Kstar	124.4						
Theta star	1.2368E-4						
Mean of Log Transformed Data	-4.177						
Standard Deviation of Log Transformed Data	0.0845						
Normal GOF Test Results							
Correlation Coefficient R	0.955						
Shapiro Wilk Test Statistic	0.896						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0592						
Lilliefors Test Statistic	0.174						
Lilliefors Critical (0.05) Value	0.202						
Data appear Approximate Normal at (0.05) Significance Level							

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results							
Correlation Coefficient R	0.949						
A-D Test Statistic	0.762						
A-D Critical (0.05) Value	0.737						
K-S Test Statistic	0.175						
K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.955						
Shapiro Wilk Test Statistic	0.898						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0645						
Lilliefors Test Statistic	0.166						
Lilliefors Critical (0.05) Value	0.202						
Data appear Lognormal at (0.05) Significance Level							
Barium (mw-75)							
Raw Statistics							
Number of Valid Observations	11						
Number of Distinct Observations	4						
Minimum	0.017						
Maximum	0.02						
Mean of Raw Data	0.0187						
Standard Deviation of Raw Data	0.0011						
Khat	317.2						
Theta hat	5.9044E-5						
Kstar	230.7						
Theta star	8.1164E-5						
Mean of Log Transformed Data	-3.979						
Standard Deviation of Log Transformed Data	0.0589						
Normal GOF Test Results							
Correlation Coefficient R	0.912						
Shapiro Wilk Test Statistic	0.815						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.0227						
Lilliefors Test Statistic	0.29						
Lilliefors Critical (0.05) Value	0.251						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.909						
A-D Test Statistic	1.053						
A-D Critical (0.05) Value	0.726						
K-S Test Statistic	0.298						
K-S Critical(0.05) Value	0.254						
Data not Gamma Distributed at (0.05) Significance Level							

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results							
Correlation Coefficient R	0.914						
Shapiro Wilk Test Statistic	0.819						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.0252						
Lilliefors Test Statistic	0.286						
Lilliefors Critical (0.05) Value	0.251						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Barium (mw-8)							
Raw Statistics							
Number of Valid Observations	9						
Number of Distinct Observations	7						
Minimum	0.011						
Maximum	0.15						
Mean of Raw Data	0.0313						
Standard Deviation of Raw Data	0.0453						
Khat	1.203						
Theta hat	0.026						
Kstar	0.876						
Theta star	0.0358						
Mean of Log Transformed Data	-3.933						
Standard Deviation of Log Transformed Data	0.847						
Normal GOF Test Results							
Correlation Coefficient R	0.692						
Shapiro Wilk Test Statistic	0.507						
Shapiro Wilk Critical (0.05) Value	0.829						
Approximate Shapiro Wilk P Value	1.0333E-5						
Lilliefors Test Statistic	0.402						
Lilliefors Critical (0.05) Value	0.274						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.884						
A-D Test Statistic	1.68						
A-D Critical (0.05) Value	0.74						
K-S Test Statistic	0.392						
K-S Critical(0.05) Value	0.286						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.813						
Shapiro Wilk Test Statistic	0.678						
Shapiro Wilk Critical (0.05) Value	0.829						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Approximate Shapiro Wilk P Value	6.9924E-4					
Lilliefors Test Statistic	0.344					
Lilliefors Critical (0.05) Value	0.274					
Data not Lognormal at (0.05) Significance Level						
Non-parametric GOF Test Results						
Data do not follow a discernible distribution at (0.05) Level of Significance						
Beryllium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	2	26	2	24	92.31%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	24	0.001	0.001	0.001	0.001	6.645E-19
Statistics (Non-Detects Only)	2	7.5000E-4	0.001	8.7500E-4	8.7500E-4	1.7678E-4
Statistics (All: NDs treated as DL value)	26	7.5000E-4	0.001	9.9038E-4	0.001	4.9029E-5
Statistics (All: NDs treated as DL/2 value)	26	5.0000E-4	0.001	5.2885E-4	5.0000E-4	1.0786E-4
Statistics (Normal ROS Imputed Data)	26	5.4692E-4	0.001	7.5684E-4	7.5285E-4	1.0784E-4
Statistics (Gamma ROS Imputed Data)	26	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	26	5.9370E-4	0.001	7.6157E-4	7.5246E-4	9.5565E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdev	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	356.6	315.5	2.7773E-6	-6.919	0.0564	-0.00815
Statistics (NDs = DL/2)	36.31	32.14	1.4566E-5	-7.559	0.155	-0.0205
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-7.188	0.124	-0.0173
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	1	0.417	0.526	0.999		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.202	0.92	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.302	0.92	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.996	0.92	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.539	0.17	Data Not Normal			
Lilliefors (NDs = DL/2)	0.529	0.17	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0427	0.17	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma ROS		
Correlation Coefficient R	N/A	0.411	0.576	0.414		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	9.567	0.742				
Kolmogorov-Smirnov (NDs = DL)	0.541	0.171	Data Not Gamma Distributed			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	8.633	0.743				
Kolmogorov-Smirnov (NDs = DL/2)	0.533	0.171	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.742				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.171				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.417	0.532	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.202	0.92	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.307	0.92	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.996	0.92	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.539	0.17	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.531	0.17	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0427	0.17	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Beryllium (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Requested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Beryllium (mw-61) was not processed!						
Beryllium (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Requested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Beryllium (mw-7) was not processed!						
Beryllium (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	0	10	100.00%
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

The data set for variable Beryllium (mw-75) was not processed!						
Beryllium (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	1	8	1	7	87.50%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Beryllium (mw-8) was not processed!						
Cadmium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	8	20	71.43%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	20	2.0000E-4	0.002	7.7000E-4	4.0000E-4	5.9921E-4
Statistics (Non-Detects Only)	8	1.2000E-4	3.1000E-4	2.3750E-4	2.4000E-4	6.3415E-5
Statistics (All: NDs treated as DL value)	28	1.2000E-4	0.002	6.1786E-4	4.0000E-4	5.6011E-4
Statistics (All: NDs treated as DL/2 value)	28	1.0000E-4	0.001	3.4286E-4	2.1500E-4	2.6232E-4
Statistics (Normal ROS Imputed Data)	28	1.1796E-4	3.2283E-4	2.2053E-4	2.2478E-4	5.9373E-5
Statistics (Gamma ROS Imputed Data)	28	1.2000E-4	0.01	0.0072	0.01	0.00449
Statistics (Lognormal ROS Imputed Data)	28	1.2000E-4	3.4424E-4	2.1903E-4	2.1508E-4	6.0894E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	13.22	8.346	1.7966E-5	-8.384	0.313	-0.0373
Statistics (NDs = DL)	1.771	1.605	3.4885E-4	-7.697	0.762	-0.099
Statistics (NDs = DL/2)	2.487	2.245	1.3784E-4	-8.192	0.633	-0.0772
Statistics (Gamma ROS Estimates)	0.79	0.729	0.00913	-5.685	1.746	-0.307
Statistics (Lognormal ROS Estimates)	--	--	--	-8.465	0.287	-0.0339
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.965	0.845	0.849	0.99		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.929	0.818	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.709	0.924	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.717	0.924	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.965	0.924	Data Appear Normal			
Lilliefors (Detects Only)	0.203	0.283	Data Appear Normal			
Lilliefors (NDs = DL)	0.366	0.164	Data Not Normal			
Lilliefors (NDs = DL/2)	0.264	0.164	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.074	0.164	Data Appear Normal			
Gamma GOF Test Results						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.934	0.935	0.931	0.514		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.436	0.715				
Kolmogorov-Smirnov (Detects Only)	0.24	0.294	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.882	0.76				
Kolmogorov-Smirnov (NDs = DL)	0.324	0.168	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.886	0.756				
Kolmogorov-Smirnov (NDs = DL/2)	0.23	0.167	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	6.293	0.783				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.465	0.172	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.927	0.953	0.946	0.99		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.866	0.818	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.9	0.924	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.886	0.924	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.968	0.924	Data Appear Lognormal			
Lilliefors (Detects Only)	0.258	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.28	0.164	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.196	0.164	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.1	0.164	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.002	0.002	0.002	0.002	N/A
Statistics (Non-Detects Only)	17	8.2000E-4	0.0011	9.4235E-4	9.4000E-4	7.6283E-5
Statistics (All: NDs treated as DL value)	18	8.2000E-4	0.002	0.001	9.4000E-4	2.6004E-4
Statistics (All: NDs treated as DL/2 value)	18	8.2000E-4	0.0011	9.4556E-4	9.4000E-4	7.5243E-5
Statistics (Normal ROS Imputed Data)	18	8.2000E-4	0.0011	9.4235E-4	9.4000E-4	7.4006E-5
Statistics (Gamma ROS Imputed Data)	18	8.2000E-4	0.01	0.00145	9.4000E-4	0.00214
Statistics (Lognormal ROS Imputed Data)	18	8.2000E-4	0.0011	9.4220E-4	9.3976E-4	7.4009E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	165.7	136.5	5.6874E-6	-6.97	0.0798	-0.0114
Statistics (NDs = DL)	23.39	19.53	4.2807E-5	-6.928	0.194	-0.028
Statistics (NDs = DL/2)	169.8	141.6	5.5676E-6	-6.967	0.0788	-0.0113
Statistics (Gamma ROS Estimates)	1.818	1.552	7.9498E-4	-6.839	0.563	-0.0823
Statistics (Lognormal ROS Estimates)	--	--	--	-6.97	0.0774	-0.0111
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.947	0.688	0.957	0.942		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.899	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.505	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.917	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.891	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.218	0.207	Data Not Normal			
Lilliefors (NDs = DL)	0.335	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.196	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.222	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.952	0.738	0.961	0.676		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.712	0.736				
Kolmogorov-Smirnov (Detects Only)	0.208	0.208	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	2.669	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.308	0.203	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.613	0.737				
Kolmogorov-Smirnov (NDs = DL/2)	0.187	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	5.435	0.754				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.483	0.207	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.954	0.766	0.962	0.947		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.911	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.617	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.925	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.902	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.203	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.291	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.182	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.22	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	3	15	83.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	15	1.0000E-4	0.002	3.6667E-4	1.0000E-4	5.1501E-4
Statistics (Non-Detects Only)	3	1.0000E-4	0.0014	5.4667E-4	1.4000E-4	7.3928E-4
Statistics (All: NDs treated as DL value)	18	1.0000E-4	0.002	3.9667E-4	1.0000E-4	5.3618E-4
Statistics (All: NDs treated as DL/2 value)	18	5.0000E-5	0.0014	2.4389E-4	7.5000E-5	3.7191E-4

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Normal ROS Imputed Data)	18	-0.00351	0.0014	-0.00139	-0.00148	0.00121		
Statistics (Gamma ROS Imputed Data)	18	1.0000E-4	0.01	0.00842	0.01	0.00363		
Statistics (Lognormal ROS Imputed Data)	18	8.7899E-8	0.0014	9.7443E-5	4.9603E-6	3.2731E-4		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A		
Statistics (NDs = DL)	0.952	0.83	4.1686E-4	-8.443	1.041	-0.123		
Statistics (NDs = DL/2)	0.841	0.738	2.9012E-4	-9.02	1.1	-0.122		
Statistics (Gamma ROS Estimates)	1.302	1.122	0.00647	-5.207	1.471	-0.282		
Statistics (Lognormal ROS Estimates)	--	--	--	-12.04	2.394	-0.199		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.879	0.786	0.756	0.989				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.773	0.767	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.628	0.897	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.586	0.897	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.982	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.376	0.425	Data Appear Normal					
Lilliefors (NDs = DL)	0.331	0.202	Data Not Normal					
Lilliefors (NDs = DL/2)	0.38	0.202	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.0998	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	N/A	0.959	0.948	0.45				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	N/A	N/A						
Kolmogorov-Smirnov (Detects Only)	N/A	N/A						
Anderson-Darling (NDs = DL)	2.217	0.769						
Kolmogorov-Smirnov (NDs = DL)	0.322	0.21	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.919	0.774						
Kolmogorov-Smirnov (NDs = DL/2)	0.276	0.211	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	5.125	0.76						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.522	0.208	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.919	0.871	0.896	0.99				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.844	0.767	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.747	0.897	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.792	0.897	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.984	0.897	Data Appear Lognormal					
Lilliefors (Detects Only)	0.343	0.425	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.325	0.202	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.289	0.202	Data Not Lognormal					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Lognormal ROS Estimates)	0.0998	0.202	Data Appear Lognormal				
Note: Substitution methods such as DL or DL/2 are not recommended.							
Cadmium (mw-75)							
Raw Statistics							
Number of Valid Observations	11						
Number of Distinct Observations	5						
Minimum	0.0019						
Maximum	0.0024						
Mean of Raw Data	0.00213						
Standard Deviation of Raw Data	1.9540E-4						
Khat	131.9						
Theta hat	1.6123E-5						
Kstar	96.02						
Theta star	2.2155E-5						
Mean of Log Transformed Data	-6.157						
Standard Deviation of Log Transformed Data	0.0911						
Normal GOF Test Results							
Correlation Coefficient R	0.937						
Shapiro Wilk Test Statistic	0.852						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.0764						
Lilliefors Test Statistic	0.288						
Lilliefors Critical (0.05) Value	0.251						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.937						
A-D Test Statistic	0.782						
A-D Critical (0.05) Value	0.726						
K-S Test Statistic	0.295						
K-S Critical(0.05) Value	0.254						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.939						
Shapiro Wilk Test Statistic	0.855						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.0839						
Lilliefors Test Statistic	0.283						
Lilliefors Critical (0.05) Value	0.251						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Cadmium (mw-8)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	9	0	9	8	1	11.11%	

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	1	0.002	0.002	0.002	0.002	N/A		
Statistics (Non-Detects Only)	8	1.1000E-4	9.6000E-4	3.4875E-4	2.1000E-4	3.1814E-4		
Statistics (All: NDs treated as DL value)	9	1.1000E-4	0.002	5.3222E-4	2.2000E-4	6.2572E-4		
Statistics (All: NDs treated as DL/2 value)	9	1.1000E-4	0.001	4.2111E-4	2.2000E-4	3.6836E-4		
Statistics (Normal ROS Imputed Data)	9	1.1000E-4	9.6000E-4	3.4875E-4	2.2000E-4	2.9759E-4		
Statistics (Gamma ROS Imputed Data)	9	1.1000E-4	0.01	0.00142	2.2000E-4	0.00323		
Statistics (Lognormal ROS Imputed Data)	9	1.1000E-4	9.6000E-4	3.3875E-4	2.2000E-4	2.9910E-4		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	1.825	1.224	1.9112E-4	-8.26	0.78	-0.0944		
Statistics (NDs = DL)	1.15	0.841	4.6260E-4	-8.032	0.998	-0.124		
Statistics (NDs = DL/2)	1.632	1.162	2.5808E-4	-8.109	0.857	-0.106		
Statistics (Gamma ROS Estimates)	0.491	0.401	0.00289	-7.853	1.42	-0.181		
Statistics (Lognormal ROS Estimates)	--	--	--	-8.26	0.729	-0.0883		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.857	0.839	0.884	0.875				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.733	0.818	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.716	0.829	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.761	0.829	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.766	0.829	Data Not Normal					
Lilliefors (Detects Only)	0.372	0.283	Data Not Normal					
Lilliefors (NDs = DL)	0.341	0.274	Data Not Normal					
Lilliefors (NDs = DL/2)	0.346	0.274	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.297	0.274	Data Not Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.949	0.975	0.928	0.914				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.761	0.726						
Kolmogorov-Smirnov (Detects Only)	0.318	0.298	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	0.738	0.741						
Kolmogorov-Smirnov (NDs = DL)	0.319	0.286	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL/2)	0.801	0.733						
Kolmogorov-Smirnov (NDs = DL/2)	0.3	0.284	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	1.399	0.772						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.337	0.294	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.937	0.946	0.94	0.939				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.87	0.818	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.886	0.829	Data Appear Lognormal					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL/2)	0.86	0.829	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.878	0.829	Data Appear Lognormal			
Lilliefors (Detects Only)	0.268	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.27	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.252	0.274	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.278	0.274	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	2	26	8	18	69.23%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	18	0.001	0.02	0.00535	0.004	0.00458
Statistics (Non-Detects Only)	8	6.5000E-4	0.0035	0.00135	8.3500E-4	0.00108
Statistics (All: NDs treated as DL value)	26	6.5000E-4	0.02	0.00415	0.00375	0.00426
Statistics (All: NDs treated as DL/2 value)	26	5.0000E-4	0.01	0.00228	0.002	0.00207
Statistics (Normal ROS Imputed Data)	26	5.5041E-5	0.0035	0.00118	9.4584E-4	7.5893E-4
Statistics (Gamma ROS Imputed Data)	26	6.5000E-4	0.01	0.00734	0.01	0.00411
Statistics (Lognormal ROS Imputed Data)	26	4.8522E-4	0.0035	0.00111	8.9500E-4	6.7157E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.513	1.654	5.3761E-4	-6.819	0.641	-0.094
Statistics (NDs = DL)	1.361	1.23	0.00305	-5.896	0.933	-0.158
Statistics (NDs = DL/2)	1.858	1.67	0.00123	-6.376	0.753	-0.118
Statistics (Gamma ROS Estimates)	1.49	1.344	0.00493	-5.286	1.096	-0.207
Statistics (Lognormal ROS Estimates)	--	--	--	-6.923	0.462	-0.0667
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.823	0.841	0.845	0.942		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.68	0.818	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.723	0.92	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.73	0.92	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.898	0.92	Data Not Normal			
Lilliefors (Detects Only)	0.409	0.283	Data Not Normal			
Lilliefors (NDs = DL)	0.283	0.17	Data Not Normal			
Lilliefors (NDs = DL/2)	0.247	0.17	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.191	0.17	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.924	0.956	0.953	0.615		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.183	0.723				
Kolmogorov-Smirnov (Detects Only)	0.394	0.297	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	0.787	0.765				

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL)	0.171	0.175	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.941	0.759				
Kolmogorov-Smirnov (NDs = DL/2)	0.19	0.174	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	5.01	0.762				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.44	0.174	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.869	0.972	0.972	0.957		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.75	0.818	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.935	0.92	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.943	0.92	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.92	0.92	Data Not Lognormal			
Lilliefors (Detects Only)	0.363	0.283	Data Not Lognormal			
Lilliefors (NDs = DL)	0.156	0.17	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.183	0.17	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.19	0.17	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	4	13	76.47%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.01	0.00246	0.002	0.00267
Statistics (Non-Detects Only)	4	5.2000E-4	7.5000E-4	6.0250E-4	5.7000E-4	1.0905E-4
Statistics (All: NDs treated as DL value)	17	5.0000E-4	0.01	0.00202	7.5000E-4	0.00245
Statistics (All: NDs treated as DL/2 value)	17	2.5000E-4	0.005	0.00108	6.2000E-4	0.00119
Statistics (Normal ROS Imputed Data)	17	6.5341E-5	7.5000E-4	3.9819E-4	3.9774E-4	1.7217E-4
Statistics (Gamma ROS Imputed Data)	17	5.2000E-4	0.01	0.00779	0.01	0.00411
Statistics (Lognormal ROS Imputed Data)	17	2.5133E-4	7.5000E-4	4.4469E-4	4.2861E-4	1.2535E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	42.81	10.87	1.4074E-5	-7.426	0.175	-0.0235
Statistics (NDs = DL)	1.107	0.951	0.00183	-6.718	0.995	-0.148
Statistics (NDs = DL/2)	1.332	1.136	8.1278E-4	-7.248	0.914	-0.126
Statistics (Gamma ROS Estimates)	1.351	1.151	0.00577	-5.269	1.236	-0.235
Statistics (Lognormal ROS Estimates)	--	--	--	-7.754	0.276	-0.0356
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.931	0.81	0.825	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.857	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.671	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.697	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.987	0.892	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Detects Only)	0.275	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.267	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.242	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.148	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.952	0.957	0.954	0.535		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.432	0.656				
Kolmogorov-Smirnov (Detects Only)	0.313	0.394	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.347	0.764				
Kolmogorov-Smirnov (NDs = DL)	0.241	0.215	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.697	0.759				
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.214	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.234	0.759				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.486	0.214	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.936	0.917	0.961	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.863	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.828	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.913	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.987	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.281	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.22	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.168	0.207	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.148	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	8	9	52.94%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	9	5.0000E-4	0.004	0.00172	0.001	0.00148
Statistics (Non-Detects Only)	8	4.1000E-4	0.0047	0.00209	0.00205	0.00128
Statistics (All: NDs treated as DL value)	17	4.1000E-4	0.0047	0.0019	0.0018	0.00136
Statistics (All: NDs treated as DL/2 value)	17	2.5000E-4	0.0047	0.00144	0.00125	0.00118
Statistics (Normal ROS Imputed Data)	17	-8.595E-4	0.0047	0.0012	8.9944E-4	0.00131
Statistics (Gamma ROS Imputed Data)	17	4.1000E-4	0.01	0.00628	0.01	0.00416
Statistics (Lognormal ROS Imputed Data)	17	3.0967E-4	0.0047	0.00135	8.5939E-4	0.00113
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.686	1.762	7.7904E-4	-6.367	0.735	-0.115
Statistics (NDs = DL)	1.869	1.578	0.00101	-6.559	0.834	-0.127

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (NDs = DL/2)	1.45	1.233	9.9341E-4	-6.926	0.978	-0.141		
Statistics (Gamma ROS Estimates)	1.52	1.291	0.00413	-5.434	1.029	-0.189		
Statistics (Lognormal ROS Estimates)	--	--	--	-6.884	0.755	-0.11		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.945	0.95	0.929	0.954				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.913	0.818	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.889	0.892	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.866	0.892	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.924	0.892	Data Appear Normal					
Lilliefors (Detects Only)	0.25	0.283	Data Appear Normal					
Lilliefors (NDs = DL)	0.157	0.207	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.157	0.207	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.171	0.207	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.965	0.97	0.972	0.752				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.323	0.722						
Kolmogorov-Smirnov (Detects Only)	0.202	0.297	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.611	0.751						
Kolmogorov-Smirnov (NDs = DL)	0.185	0.212	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.594	0.757						
Kolmogorov-Smirnov (NDs = DL/2)	0.155	0.213	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	1.728	0.755						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.341	0.213	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.949	0.957	0.953	0.983				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.918	0.818	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.895	0.892	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.89	0.892	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.961	0.892	Data Appear Lognormal					
Lilliefors (Detects Only)	0.244	0.283	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.188	0.207	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.183	0.207	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.139	0.207	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Chromium (mw-75)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Raw Statistics	11	1	10	0	10	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Chromium (mw-75) was not processed!							
Chromium (mw-8)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	9	1	8	6	2	25.00%	
	Number	Minimum	Maximum	Mean	Median	SD	
Statistics (Non-Detects Only)	2	0.001	0.0025	0.00175	0.00175	0.00106	
Statistics (Non-Detects Only)	6	6.0000E-4	0.02	0.00409	7.9500E-4	0.0078	
Statistics (All: NDs treated as DL value)	8	6.0000E-4	0.02	0.00351	9.1000E-4	0.00669	
Statistics (All: NDs treated as DL/2 value)	8	5.0000E-4	0.02	0.00329	7.9500E-4	0.00676	
Statistics (Normal ROS Imputed Data)	8	6.0000E-4	0.02	0.00348	9.4519E-4	0.0067	
Statistics (Gamma ROS Imputed Data)	8	6.0000E-4	0.02	0.00557	0.00121	0.00714	
Statistics (Lognormal ROS Imputed Data)	8	6.0000E-4	0.02	0.00329	8.1114E-4	0.00676	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	0.595	0.408	0.00688	-6.54	1.329	-0.203	
Statistics (NDs = DL)	0.7	0.521	0.00501	-6.517	1.151	-0.177	
Statistics (NDs = DL/2)	0.631	0.478	0.00521	-6.691	1.183	-0.177	
Statistics (Gamma ROS Estimates)	0.699	0.52	0.00797	-6.056	1.437	-0.237	
Statistics (Lognormal ROS Estimates)	--	--	--	-6.658	1.146	-0.172	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	0.711	0.682	0.66	0.677			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.531	0.788	Data Not Normal				
Shapiro-Wilk (NDs = DL)	0.494	0.818	Data Not Normal				
Shapiro-Wilk (NDs = DL/2)	0.465	0.818	Data Not Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.488	0.818	Data Not Normal				
Lilliefors (Detects Only)	0.459	0.325	Data Not Normal				
Lilliefors (NDs = DL)	0.435	0.283	Data Not Normal				
Lilliefors (NDs = DL/2)	0.473	0.283	Data Not Normal				
Lilliefors (Normal ROS Estimates)	0.448	0.283	Data Not Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	0.938	0.909	0.899	0.969			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	1.243	0.73					
Kolmogorov-Smirnov (Detects Only)	0.401	0.347	Data Not Gamma Distributed				

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL)	1.372	0.749				
Kolmogorov-Smirnov (NDs = DL)	0.318	0.305	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.608	0.753				
Kolmogorov-Smirnov (NDs = DL/2)	0.403	0.306	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.853	0.749				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.294	0.305	Detected Data appear Approximate Gamn			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.82	0.858	0.828	0.778		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.692	0.788	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.753	0.818	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.709	0.818	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.632	0.818	Data Not Lognormal			
Lilliefors (Detects Only)	0.332	0.325	Data Not Lognormal			
Lilliefors (NDs = DL)	0.258	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.29	0.283	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.333	0.283	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	14	14	50.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	0.001	0.01	0.00407	0.002	0.00347
Statistics (Non-Detects Only)	14	6.4000E-4	0.0045	0.00298	0.00295	0.00101
Statistics (All: NDs treated as DL value)	28	6.4000E-4	0.01	0.00353	0.0029	0.00257
Statistics (All: NDs treated as DL/2 value)	28	5.0000E-4	0.005	0.00251	0.0025	0.00148
Statistics (Normal ROS Imputed Data)	28	3.1925E-4	0.0045	0.00228	0.00223	0.00115
Statistics (Gamma ROS Imputed Data)	28	6.4000E-4	0.01	0.00649	0.00725	0.00364
Statistics (Lognormal ROS Imputed Data)	28	6.4000E-4	0.0045	0.00228	0.0021	0.00109
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	6.137	4.869	4.8585E-4	-5.899	0.488	-0.0828
Statistics (NDs = DL)	2.416	2.181	0.00146	-5.868	0.681	-0.116
Statistics (NDs = DL/2)	2.356	2.127	0.00106	-6.215	0.752	-0.121
Statistics (Gamma ROS Estimates)	2.483	2.24	0.00261	-5.252	0.741	-0.141
Statistics (Lognormal ROS Estimates)	--	--	--	-6.206	0.525	-0.0845
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.974	0.886	0.973	0.993		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.955	0.874	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.781	0.924	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.924	0.924	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Normal ROS Estimates)	0.972	0.924	Data Appear Normal		
Lilliefors (Detects Only)	0.158	0.226	Data Appear Normal		
Lilliefors (NDs = DL)	0.213	0.164	Data Not Normal		
Lilliefors (NDs = DL/2)	0.168	0.164	Data Not Normal		
Lilliefors (Normal ROS Estimates)	0.0879	0.164	Data Appear Normal		
Gamma GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Gamma RO	
Correlation Coefficient R	0.932	0.948	0.95	0.798	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Anderson-Darling (Detects Only)	0.668	0.737			
Kolmogorov-Smirnov (Detects Only)	0.17	0.229	Detected Data Appear Gamma Distributed		
Anderson-Darling (NDs = DL)	0.698	0.756			
Kolmogorov-Smirnov (NDs = DL)	0.125	0.167	Data Appear Gamma Distributed		
Anderson-Darling (NDs = DL/2)	0.79	0.756			
Kolmogorov-Smirnov (NDs = DL/2)	0.161	0.167	Detected Data appear Approximate Gamma		
Anderson-Darling (Gamma ROS Estimates)	2.604	0.756			
Kolmogorov-Smirnov (Gamma ROS Est.)	0.326	0.167	Data Not Gamma Distributed		
Lognormal GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Log ROS	
Correlation Coefficient R	0.871	0.978	0.953	0.986	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Shapiro-Wilk (Detects Only)	0.78	0.874	Data Not Lognormal		
Shapiro-Wilk (NDs = DL)	0.953	0.924	Data Appear Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.888	0.924	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.961	0.924	Data Appear Lognormal		
Lilliefors (Detects Only)	0.189	0.226	Data Appear Lognormal		
Lilliefors (NDs = DL)	0.137	0.164	Data Appear Lognormal		
Lilliefors (NDs = DL/2)	0.158	0.164	Data Appear Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.113	0.164	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Cobalt (mw-61)					
Raw Statistics					
Number of Valid Observations	18				
Number of Distinct Observations	8				
Minimum	0.01				
Maximum	0.017				
Mean of Raw Data	0.0138				
Standard Deviation of Raw Data	0.00183				
Khat	57.43				
Theta hat	2.3991E-4				
Kstar	47.89				
Theta star	2.8767E-4				
Mean of Log Transformed Data	-4.293				
Standard Deviation of Log Transformed Data	0.138				

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results						
Correlation Coefficient R	0.986					
Shapiro Wilk Test Statistic	0.972					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.822					
Lilliefors Test Statistic	0.136					
Lilliefors Critical (0.05) Value	0.202					
Data appear Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.981					
A-D Test Statistic	0.332					
A-D Critical (0.05) Value	0.738					
K-S Test Statistic	0.146					
K-S Critical(0.05) Value	0.203					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.978					
Shapiro Wilk Test Statistic	0.957					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.543					
Lilliefors Test Statistic	0.141					
Lilliefors Critical (0.05) Value	0.202					
Data appear Lognormal at (0.05) Significance Level						
Cobalt (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	7	11	61.11%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	5.0000E-4	0.01	0.00191	5.0000E-4	0.00278
Statistics (Non-Detects Only)	7	6.5000E-4	0.0028	0.00161	0.0015	7.3875E-4
Statistics (All: NDs treated as DL value)	18	5.0000E-4	0.01	0.00179	0.0015	0.00218
Statistics (All: NDs treated as DL/2 value)	18	2.5000E-4	0.005	0.00121	0.001	0.0012
Statistics (Normal ROS Imputed Data)	18	-0.00127	0.0028	5.9088E-4	5.5888E-4	0.00108
Statistics (Gamma ROS Imputed Data)	18	6.5000E-4	0.01	0.00674	0.01	0.00423
Statistics (Lognormal ROS Imputed Data)	18	2.0966E-4	0.0028	9.4425E-4	6.8088E-4	7.2449E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	4.954	2.926	3.2525E-4	-6.535	0.516	-0.079
Statistics (NDs = DL)	1.432	1.23	0.00125	-6.712	0.84	-0.125
Statistics (NDs = DL/2)	1.337	1.152	9.0475E-4	-7.135	0.963	-0.135
Statistics (Gamma ROS Estimates)	1.552	1.33	0.00434	-5.356	1.015	-0.19
Statistics (Lognormal ROS Estimates)	--	--	--	-7.22	0.732	-0.101
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.976	0.722	0.87	0.994		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.951	0.803	Data Appear Normal	
Shapiro-Wilk (NDs = DL)	0.548	0.897	Data Not Normal	
Shapiro-Wilk (NDs = DL/2)	0.769	0.897	Data Not Normal	
Shapiro-Wilk (Normal ROS Estimates)	0.984	0.897	Data Appear Normal	
Lilliefors (Detects Only)	0.157	0.304	Data Appear Normal	
Lilliefors (NDs = DL)	0.351	0.202	Data Not Normal	
Lilliefors (NDs = DL/2)	0.236	0.202	Data Not Normal	
Lilliefors (Normal ROS Estimates)	0.0893	0.202	Data Appear Normal	
Gamma GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Gamma RO
Correlation Coefficient R	0.972	0.865	0.978	0.692
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Anderson-Darling (Detects Only)	0.313	0.71		
Kolmogorov-Smirnov (Detects Only)	0.212	0.313	Detected Data Appear Gamma Distributed	
Anderson-Darling (NDs = DL)	1.261	0.758		
Kolmogorov-Smirnov (NDs = DL)	0.229	0.208	Data Not Gamma Distributed	
Anderson-Darling (NDs = DL/2)	0.683	0.76		
Kolmogorov-Smirnov (NDs = DL/2)	0.205	0.208	Data Appear Gamma Distributed	
Anderson-Darling (Gamma ROS Estimates)	2.617	0.756		
Kolmogorov-Smirnov (Gamma ROS Est.)	0.396	0.207	Data Not Gamma Distributed	
Lognormal GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.965	0.92	0.952	0.989
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.928	0.803	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL)	0.845	0.897	Data Not Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.891	0.897	Data Not Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.971	0.897	Data Appear Lognormal	
Lilliefors (Detects Only)	0.24	0.304	Data Appear Lognormal	
Lilliefors (NDs = DL)	0.188	0.202	Data Appear Lognormal	
Lilliefors (NDs = DL/2)	0.219	0.202	Data Not Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.119	0.202	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Cobalt (mw-75)				
Raw Statistics				
Number of Valid Observations	11			
Number of Distinct Observations	8			
Minimum	0.039			
Maximum	0.049			
Mean of Raw Data	0.0446			
Standard Deviation of Raw Data	0.00298			
Khat	244.6			
Theta hat	1.8248E-4			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Kstar	178					
Theta star	2.5083E-4					
Mean of Log Transformed Data	-3.111					
Standard Deviation of Log Transformed Data	0.0673					
Normal GOF Test Results						
Correlation Coefficient R	0.98					
Shapiro Wilk Test Statistic	0.96					
Shapiro Wilk Critical (0.05) Value	0.85					
Approximate Shapiro Wilk P Value	0.773					
Lilliefors Test Statistic	0.144					
Lilliefors Critical (0.05) Value	0.251					
Data appear Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.979					
A-D Test Statistic	0.259					
A-D Critical (0.05) Value	0.726					
K-S Test Statistic	0.152					
K-S Critical(0.05) Value	0.254					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.978					
Shapiro Wilk Test Statistic	0.956					
Shapiro Wilk Critical (0.05) Value	0.85					
Approximate Shapiro Wilk P Value	0.717					
Lilliefors Test Statistic	0.139					
Lilliefors Critical (0.05) Value	0.251					
Data appear Lognormal at (0.05) Significance Level						
Cobalt (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	6	3	33.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	5.0000E-4	0.01	0.00367	5.0000E-4	0.00548
Statistics (Non-Detects Only)	6	5.3000E-4	0.019	0.00431	0.00155	0.00722
Statistics (All: NDs treated as DL value)	9	5.0000E-4	0.019	0.0041	0.0013	0.00634
Statistics (All: NDs treated as DL/2 value)	9	2.5000E-4	0.019	0.00348	0.0013	0.006
Statistics (Normal ROS Imputed Data)	9	-0.0119	0.019	5.6843E-4	9.3000E-4	0.00849
Statistics (Gamma ROS Imputed Data)	9	5.3000E-4	0.019	0.00621	0.0023	0.00638
Statistics (Lognormal ROS Imputed Data)	9	8.4233E-5	0.019	0.00298	9.3000E-4	0.00605
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	0.742	0.482	0.00581	-6.254	1.235	-0.197
Statistics (NDs = DL)	0.694	0.536	0.00591	-6.37	1.316	-0.207
Statistics (NDs = DL/2)	0.649	0.506	0.00537	-6.601	1.404	-0.213
Statistics (Gamma ROS Estimates)	0.935	0.697	0.00664	-5.705	1.278	-0.224
Statistics (Lognormal ROS Estimates)	--	--	--	-6.978	1.559	-0.223

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.745	0.795	0.75	0.905		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.58	0.788	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.645	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.588	0.829	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.849	0.829	Data Appear Normal			
Lilliefors (Detects Only)	0.443	0.325	Data Not Normal			
Lilliefors (NDs = DL)	0.389	0.274	Data Not Normal			
Lilliefors (NDs = DL/2)	0.356	0.274	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.308	0.274	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.941	0.973	0.953	0.952		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.796	0.721				
Kolmogorov-Smirnov (Detects Only)	0.367	0.344	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	0.849	0.756				
Kolmogorov-Smirnov (NDs = DL)	0.286	0.29	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.542	0.759				
Kolmogorov-Smirnov (NDs = DL/2)	0.232	0.291	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.565	0.746				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.243	0.288	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.926	0.939	0.978	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.876	0.788	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.867	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.951	0.829	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.963	0.829	Data Appear Lognormal			
Lilliefors (Detects Only)	0.276	0.325	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.189	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.132	0.274	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.17	0.274	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	0	28	100.00%
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!						
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Lead (background) was not processed!						
Lead (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	11	7	38.89%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.002	0.01	0.00357	0.002	0.00305
Statistics (Non-Detects Only)	11	7.8000E-4	0.001	8.5455E-4	8.3000E-4	6.6085E-5
Statistics (All: NDs treated as DL value)	18	7.8000E-4	0.01	0.00191	9.0500E-4	0.00227
Statistics (All: NDs treated as DL/2 value)	18	7.8000E-4	0.005	0.00122	9.0500E-4	0.00102
Statistics (Normal ROS Imputed Data)	18	7.8000E-4	0.001	8.5455E-4	8.5455E-4	5.7525E-5
Statistics (Gamma ROS Imputed Data)	18	7.8000E-4	0.01	0.00441	9.0500E-4	0.00459
Statistics (Lognormal ROS Imputed Data)	18	7.8000E-4	0.001	8.5407E-4	8.5231E-4	5.7283E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	191.2	139.1	4.4692E-6	-7.068	0.0752	-0.0106
Statistics (NDs = DL)	1.637	1.401	0.00117	-6.596	0.723	-0.11
Statistics (NDs = DL/2)	3.416	2.884	3.5617E-4	-6.865	0.469	-0.0683
Statistics (Gamma ROS Estimates)	0.857	0.751	0.00515	-6.11	1.237	-0.202
Statistics (Lognormal ROS Estimates)	--	--	--	-7.068	0.0656	-0.00928
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.954	0.717	0.639	0.967		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.911	0.85	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.537	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.435	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.937	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.19	0.251	Data Appear Normal			
Lilliefors (NDs = DL)	0.373	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.473	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.129	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.962	0.882	0.771	0.782		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.375	0.726				
Kolmogorov-Smirnov (Detects Only)	0.192	0.254	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	2.199	0.755				
Kolmogorov-Smirnov (NDs = DL)	0.293	0.207	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	3.72	0.744				

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL/2)	0.455	0.205	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.145	0.773				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.374	0.211	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.963	0.866	0.738	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.926	0.85	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.753	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.565	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.948	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.183	0.251	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.278	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.425	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.112	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	2	16	88.89%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	1.0000E-4	0.01	0.00173	5.0000E-4	0.00253
Statistics (Non-Detects Only)	2	4.5000E-4	8.2000E-4	6.3500E-4	6.3500E-4	2.6163E-4
Statistics (All: NDs treated as DL value)	18	1.0000E-4	0.01	0.0016	5.0000E-4	0.0024
Statistics (All: NDs treated as DL/2 value)	18	5.0000E-5	0.005	8.3722E-4	2.5000E-4	0.00119
Statistics (Normal ROS Imputed Data)	18	-9.161E-5	8.2000E-4	3.0861E-4	3.0449E-4	2.2612E-4
Statistics (Gamma ROS Imputed Data)	18	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	18	1.8696E-4	8.2000E-4	3.8209E-4	3.5541E-4	1.5148E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	0.924	0.807	0.00174	-7.066	1.076	-0.152
Statistics (NDs = DL/2)	0.97	0.846	8.6281E-4	-7.682	1.073	-0.14
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-7.936	0.367	-0.0462
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	1	0.737	0.751	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.567	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.587	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.987	0.897	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.323	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.334	0.202	Data Not Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Normal ROS Estimates)	0.0674	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.93	0.932	0.439		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	1.851	0.77				
Kolmogorov-Smirnov (NDs = DL)	0.326	0.21	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.494	0.768				
Kolmogorov-Smirnov (NDs = DL/2)	0.291	0.21	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.737				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.203				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.915	0.93	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.853	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.879	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.987	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.302	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.271	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0674	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	0	11	8	3	27.27%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.005	0.01	0.00667	0.005	0.00289
Statistics (Non-Detects Only)	8	0.0028	0.0041	0.00319	0.0031	3.9074E-4
Statistics (All: NDs treated as DL value)	11	0.0028	0.01	0.00414	0.0032	0.0021
Statistics (All: NDs treated as DL/2 value)	11	0.0025	0.005	0.00323	0.0031	7.2676E-4
Statistics (Normal ROS Imputed Data)	11	0.0028	0.0041	0.00319	0.0031	3.3589E-4
Statistics (Gamma ROS Imputed Data)	11	0.0028	0.01	0.00505	0.0032	0.0032
Statistics (Lognormal ROS Imputed Data)	11	0.0028	0.0041	0.00318	0.0031	3.3498E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	85.35	53.43	3.7347E-5	-5.754	0.113	-0.0196
Statistics (NDs = DL)	6.487	4.778	6.3764E-4	-5.567	0.379	-0.0681
Statistics (NDs = DL/2)	25.27	18.44	1.2769E-4	-5.756	0.202	-0.0351
Statistics (Gamma ROS Estimates)	3.454	2.572	0.00146	-5.441	0.545	-0.1
Statistics (Lognormal ROS Estimates)	--	--	--	-5.754	0.097	-0.0169

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.837	0.783	0.887	0.853		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.733	0.818	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.636	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.801	0.85	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.759	0.85	Data Not Normal			
Lilliefors (Detects Only)	0.362	0.283	Data Not Normal			
Lilliefors (NDs = DL)	0.308	0.251	Data Not Normal			
Lilliefors (NDs = DL/2)	0.333	0.251	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.303	0.251	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.858	0.867	0.917	0.865		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.923	0.715				
Kolmogorov-Smirnov (Detects Only)	0.346	0.294	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.307	0.731				
Kolmogorov-Smirnov (NDs = DL)	0.325	0.256	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.792	0.729				
Kolmogorov-Smirnov (NDs = DL/2)	0.309	0.255	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.856	0.733				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.362	0.257	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.862	0.859	0.923	0.874		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.776	0.818	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.751	0.85	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.862	0.85	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.796	0.85	Data Not Lognormal			
Lilliefors (Detects Only)	0.34	0.283	Data Not Lognormal			
Lilliefors (NDs = DL)	0.317	0.251	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.296	0.251	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.278	0.251	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	3	6	66.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	5.0000E-4	0.01	0.00217	5.0000E-4	0.00384

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Non-Detects Only)	3	5.0000E-4	0.033	0.0116	0.0014	0.0185		
Statistics (All: NDs treated as DL value)	9	5.0000E-4	0.033	0.00532	5.0000E-4	0.0108		
Statistics (All: NDs treated as DL/2 value)	9	2.5000E-4	0.033	0.0046	5.0000E-4	0.0108		
Statistics (Normal ROS Imputed Data)	9	-0.0549	0.033	-0.018	-0.0234	0.0261		
Statistics (Gamma ROS Imputed Data)	9	5.0000E-4	0.033	0.0105	0.01	0.00929		
Statistics (Lognormal ROS Imputed Data)	9	6.6962E-7	0.033	0.00389	3.4777E-5	0.0109		
	K hat	K Star	Theta hat	Log Mean	Log Stdev	Log CV		
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A		
Statistics (NDs = DL)	0.467	0.385	0.0114	-6.611	1.551	-0.235		
Statistics (NDs = DL/2)	0.391	0.334	0.0118	-7.073	1.708	-0.241		
Statistics (Gamma ROS Estimates)	1.199	0.874	0.00879	-5.024	1.259	-0.251		
Statistics (Lognormal ROS Estimates)	--	--	--	-9.585	3.258	-0.34		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.878	0.716	0.671	0.97				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.771	0.767	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.537	0.829	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.48	0.829	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.951	0.829	Data Appear Normal					
Lilliefors (Detects Only)	0.376	0.425	Data Appear Normal					
Lilliefors (NDs = DL)	0.419	0.274	Data Not Normal					
Lilliefors (NDs = DL/2)	0.395	0.274	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.199	0.274	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	N/A	0.962	0.943	0.883				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	N/A	N/A						
Kolmogorov-Smirnov (Detects Only)	N/A	N/A						
Anderson-Darling (NDs = DL)	1.515	0.777						
Kolmogorov-Smirnov (NDs = DL)	0.37	0.295	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.372	0.791						
Kolmogorov-Smirnov (NDs = DL/2)	0.343	0.298	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	1.138	0.74						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.377	0.286	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.96	0.846	0.881	0.977				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.921	0.767	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.714	0.829	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.775	0.829	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.961	0.829	Data Appear Lognormal					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Detects Only)	0.294	0.425	Data Appear Lognormal		
Lilliefors (NDs = DL)	0.294	0.274	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.288	0.274	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.199	0.274	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Lithium (background)					
Raw Statistics					
Number of Valid Observations	28				
Number of Distinct Observations	17				
Minimum	0.37				
Maximum	1.8				
Mean of Raw Data	0.852				
Standard Deviation of Raw Data	0.393				
Khat	4.487				
Theta hat	0.19				
Kstar	4.03				
Theta star	0.211				
Mean of Log Transformed Data	-0.276				
Standard Deviation of Log Transformed Data	0.505				
Normal GOF Test Results					
Correlation Coefficient R	0.943				
Shapiro Wilk Test Statistic	0.881				
Shapiro Wilk Critical (0.05) Value	0.924				
Approximate Shapiro Wilk P Value	0.00392				
Lilliefors Test Statistic	0.214				
Lilliefors Critical (0.05) Value	0.164				
Data not Normal at (0.05) Significance Level					
Gamma GOF Test Results					
Correlation Coefficient R	0.946				
A-D Test Statistic	1.703				
A-D Critical (0.05) Value	0.749				
K-S Test Statistic	0.229				
K-S Critical(0.05) Value	0.166				
Data not Gamma Distributed at (0.05) Significance Level					
Lognormal GOF Test Results					
Correlation Coefficient R	0.934				
Shapiro Wilk Test Statistic	0.856				
Shapiro Wilk Critical (0.05) Value	0.924				
Approximate Shapiro Wilk P Value	9.8286E-4				
Lilliefors Test Statistic	0.233				
Lilliefors Critical (0.05) Value	0.164				
Data not Lognormal at (0.05) Significance Level					
Non-parametric GOF Test Results					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Data do not follow a discernible distribution at (0.05) Level of Significance								
Lithium (mw-61)								
Raw Statistics								
Number of Valid Observations	18							
Number of Distinct Observations	8							
Minimum	0.35							
Maximum	0.44							
Mean of Raw Data	0.38							
Standard Deviation of Raw Data	0.0222							
Khat	321							
Theta hat	0.00118							
Kstar	267.5							
Theta star	0.00142							
Mean of Log Transformed Data	-0.969							
Standard Deviation of Log Transformed Data	0.0569							
Normal GOF Test Results								
Correlation Coefficient R	0.947							
Shapiro Wilk Test Statistic	0.905							
Shapiro Wilk Critical (0.05) Value	0.897							
Approximate Shapiro Wilk P Value	0.0689							
Lilliefors Test Statistic	0.174							
Lilliefors Critical (0.05) Value	0.202							
Data appear Normal at (0.05) Significance Level								
Gamma GOF Test Results								
Correlation Coefficient R	0.955							
A-D Test Statistic	0.543							
A-D Critical (0.05) Value	0.737							
K-S Test Statistic	0.176							
K-S Critical(0.05) Value	0.203							
Data appear Gamma Distributed at (0.05) Significance Level								
Lognormal GOF Test Results								
Correlation Coefficient R	0.957							
Shapiro Wilk Test Statistic	0.921							
Shapiro Wilk Critical (0.05) Value	0.897							
Approximate Shapiro Wilk P Value	0.134							
Lilliefors Test Statistic	0.17							
Lilliefors Critical (0.05) Value	0.202							
Data appear Lognormal at (0.05) Significance Level								
Lithium (mw-7)								
Raw Statistics								
Number of Valid Observations	18							
Number of Distinct Observations	14							
Minimum	0.75							
Maximum	1.2							

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Mean of Raw Data	0.899						
Standard Deviation of Raw Data	0.0981						
Khat	96.19						
Theta hat	0.00934						
Kstar	80.2						
Theta star	0.0112						
Mean of Log Transformed Data	-0.112						
Standard Deviation of Log Transformed Data	0.103						
Normal GOF Test Results							
Correlation Coefficient R	0.924						
Shapiro Wilk Test Statistic	0.876						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0175						
Lilliefors Test Statistic	0.171						
Lilliefors Critical (0.05) Value	0.202						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.937						
A-D Test Statistic	0.506						
A-D Critical (0.05) Value	0.737						
K-S Test Statistic	0.15						
K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.95						
Shapiro Wilk Test Statistic	0.922						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.12						
Lilliefors Test Statistic	0.148						
Lilliefors Critical (0.05) Value	0.202						
Data appear Lognormal at (0.05) Significance Level							
Lithium (mw-75)							
Raw Statistics							
Number of Valid Observations	11						
Number of Distinct Observations	7						
Minimum	0.4						
Maximum	0.48						
Mean of Raw Data	0.432						
Standard Deviation of Raw Data	0.0209						
Khat	480.9						
Theta hat	8.9787E-4						
Kstar	349.8						
Theta star	0.00123						
Mean of Log Transformed Data	-0.841						
Standard Deviation of Log Transformed Data	0.0476						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results							
Correlation Coefficient R	0.935						
Shapiro Wilk Test Statistic	0.898						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.11						
Lilliefors Test Statistic	0.262						
Lilliefors Critical (0.05) Value	0.251						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.942						
A-D Test Statistic	0.586						
A-D Critical (0.05) Value	0.726						
K-S Test Statistic	0.258						
K-S Critical(0.05) Value	0.254						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.942						
Shapiro Wilk Test Statistic	0.91						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.155						
Lilliefors Test Statistic	0.254						
Lilliefors Critical (0.05) Value	0.251						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Lithium (mw-8)							
Raw Statistics							
Number of Valid Observations	9						
Number of Distinct Observations	3						
Minimum	1.1						
Maximum	1.5						
Mean of Raw Data	1.178						
Standard Deviation of Raw Data	0.13						
Khat	103.2						
Theta hat	0.0114						
Kstar	68.86						
Theta star	0.0171						
Mean of Log Transformed Data	0.159						
Standard Deviation of Log Transformed Data	0.102						
Normal GOF Test Results							
Correlation Coefficient R	0.796						
Shapiro Wilk Test Statistic	0.652						
Shapiro Wilk Critical (0.05) Value	0.829						
Approximate Shapiro Wilk P Value	3.6530E-4						
Lilliefors Test Statistic	0.321						
Lilliefors Critical (0.05) Value	0.274						
Data not Normal at (0.05) Significance Level							

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results							
Correlation Coefficient R	0.819						
A-D Test Statistic	1.301						
A-D Critical (0.05) Value	0.72						
K-S Test Statistic	0.301						
K-S Critical(0.05) Value	0.279						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.812						
Shapiro Wilk Test Statistic	0.675						
Shapiro Wilk Critical (0.05) Value	0.829						
Approximate Shapiro Wilk P Value	6.8778E-4						
Lilliefors Test Statistic	0.297						
Lilliefors Critical (0.05) Value	0.274						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Mercury (background)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	28	2	26	1	25	96.15%	
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Instead to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Mercury (background) was not processed!							
Mercury (mw-61)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	0	17	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Mercury (mw-61) was not processed!							
Mercury (mw-7)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	0	17	100.00%	

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!						
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!						
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Mercury (mw-7) was not processed!						
Mercury (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	1	9	90.00%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!						
ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Mercury (mw-75) was not processed!						
Mercury (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	1	8	0	8	100.00%
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!						
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!						
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Mercury (mw-8) was not processed!						
Molybdenum (background)						
Raw Statistics						
Number of Valid Observations	28					
Number of Distinct Observations	21					
Minimum	0.013					
Maximum	0.096					
Mean of Raw Data	0.031					
Standard Deviation of Raw Data	0.0191					
Khat	4.121					
Theta hat	0.00751					
Kstar	3.704					
Theta star	0.00836					
Mean of Log Transformed Data	-3.601					
Standard Deviation of Log Transformed Data	0.475					
Normal GOF Test Results						
Correlation Coefficient R	0.844					
Shapiro Wilk Test Statistic	0.724					
Shapiro Wilk Critical (0.05) Value	0.924					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Approximate Shapiro Wilk P Value	1.7086E-6						
Lilliefors Test Statistic	0.255						
Lilliefors Critical (0.05) Value	0.164						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.926						
A-D Test Statistic	1.325						
A-D Critical (0.05) Value	0.75						
K-S Test Statistic	0.201						
K-S Critical(0.05) Value	0.166						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.957						
Shapiro Wilk Test Statistic	0.918						
Shapiro Wilk Critical (0.05) Value	0.924						
Approximate Shapiro Wilk P Value	0.0337						
Lilliefors Test Statistic	0.163						
Lilliefors Critical (0.05) Value	0.164						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Molybdenum (mw-61)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	12						
Minimum	0.069						
Maximum	0.085						
Mean of Raw Data	0.0766						
Standard Deviation of Raw Data	0.00442						
Khat	315						
Theta hat	2.4306E-4						
Kstar	262.5						
Theta star	2.9164E-4						
Mean of Log Transformed Data	-2.571						
Standard Deviation of Log Transformed Data	0.0581						
Normal GOF Test Results							
Correlation Coefficient R	0.98						
Shapiro Wilk Test Statistic	0.955						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.526						
Lilliefors Test Statistic	0.128						
Lilliefors Critical (0.05) Value	0.202						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.978						
A-D Test Statistic	0.426						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

A-D Critical (0.05) Value	0.737					
K-S Test Statistic	0.137					
K-S Critical(0.05) Value	0.203					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.978					
Shapiro Wilk Test Statistic	0.951					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.464					
Lilliefors Test Statistic	0.136					
Lilliefors Critical (0.05) Value	0.202					
Data appear Lognormal at (0.05) Significance Level						
Molybdenum (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	16	2	11.11%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.005	0.01	0.0075	0.0075	0.00354
Statistics (Non-Detects Only)	16	0.0022	0.041	0.00876	0.004	0.0115
Statistics (All: NDs treated as DL value)	18	0.0022	0.041	0.00862	0.0042	0.0109
Statistics (All: NDs treated as DL/2 value)	18	0.0022	0.041	0.00821	0.004	0.011
Statistics (Normal ROS Imputed Data)	18	0.0022	0.041	0.00845	0.0042	0.0109
Statistics (Gamma ROS Imputed Data)	18	0.0022	0.041	0.0089	0.0042	0.0109
Statistics (Lognormal ROS Imputed Data)	18	0.0022	0.041	0.00827	0.00414	0.0109
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.208	1.023	0.00726	-5.205	0.852	-0.164
Statistics (NDs = DL)	1.322	1.139	0.00652	-5.177	0.813	-0.157
Statistics (NDs = DL/2)	1.248	1.077	0.00657	-5.254	0.821	-0.156
Statistics (Gamma ROS Estimates)	1.341	1.155	0.00663	-5.139	0.823	-0.16
Statistics (Lognormal ROS Estimates)	--	--	--	-5.232	0.804	-0.154
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.739	0.746	0.723	0.73		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.558	0.887	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.57	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.537	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.547	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.424	0.213	Data Not Normal			
Lilliefors (NDs = DL)	0.391	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.431	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.411	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.908	0.912	0.896	0.926		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	2.561	0.76				
Kolmogorov-Smirnov (Detects Only)	0.376	0.22	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	2.425	0.76				
Kolmogorov-Smirnov (NDs = DL)	0.349	0.208	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.808	0.761				
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.208	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.04	0.76				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.308	0.208	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.856	0.882	0.86	0.84		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.737	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.782	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.745	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.714	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.312	0.213	Data Not Lognormal			
Lilliefors (NDs = DL)	0.29	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.308	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.331	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Molybdenum (mw-75)						
Raw Statistics						
Number of Valid Observations	11					
Number of Distinct Observations	3					
Minimum	0.16					
Maximum	0.18					
Mean of Raw Data	0.169					
Standard Deviation of Raw Data	0.00831					
Khat	456.9					
Theta hat	3.7008E-4					
Kstar	332.4					
Theta star	5.0876E-4					
Mean of Log Transformed Data	-1.778					
Standard Deviation of Log Transformed Data	0.049					
Normal GOF Test Results						
Correlation Coefficient R	0.921					
Shapiro Wilk Test Statistic	0.819					
Shapiro Wilk Critical (0.05) Value	0.85					
Approximate Shapiro Wilk P Value	0.0312					
Lilliefors Test Statistic	0.227					
Lilliefors Critical (0.05) Value	0.251					
Data appear Approximate Normal at (0.05) Significance Level						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results							
Correlation Coefficient R	0.918						
A-D Test Statistic	0.889						
A-D Critical (0.05) Value	0.726						
K-S Test Statistic	0.24						
K-S Critical(0.05) Value	0.254						
Data follow Appr. Gamma Distribution at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.921						
Shapiro Wilk Test Statistic	0.819						
Shapiro Wilk Critical (0.05) Value	0.85						
Approximate Shapiro Wilk P Value	0.0315						
Lilliefors Test Statistic	0.229						
Lilliefors Critical (0.05) Value	0.251						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Molybdenum (mw-8)							
Raw Statistics							
Number of Valid Observations	9						
Number of Distinct Observations	7						
Minimum	0.011						
Maximum	0.049						
Mean of Raw Data	0.0241						
Standard Deviation of Raw Data	0.0142						
Khat	3.781						
Theta hat	0.00638						
Kstar	2.595						
Theta star	0.00929						
Mean of Log Transformed Data	-3.863						
Standard Deviation of Log Transformed Data	0.541						
Normal GOF Test Results							
Correlation Coefficient R	0.905						
Shapiro Wilk Test Statistic	0.807						
Shapiro Wilk Critical (0.05) Value	0.829						
Approximate Shapiro Wilk P Value	0.0323						
Lilliefors Test Statistic	0.333						
Lilliefors Critical (0.05) Value	0.274						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.952						
A-D Test Statistic	0.702						
A-D Critical (0.05) Value	0.725						
K-S Test Statistic	0.309						
K-S Critical(0.05) Value	0.281						
Data follow Appr. Gamma Distribution at (0.05) Significance Level							

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results						
Correlation Coefficient R	0.944					
Shapiro Wilk Test Statistic	0.877					
Shapiro Wilk Critical (0.05) Value	0.829					
Approximate Shapiro Wilk P Value	0.193					
Lilliefors Test Statistic	0.279					
Lilliefors Critical (0.05) Value	0.274					
Data appear Approximate_Lognormal at (0.05) Significance Lev						
Selenium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	18	10	35.71%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.002	0.012	0.005	0.002	0.00414
Statistics (Non-Detects Only)	18	0.0017	0.092	0.0465	0.061	0.0379
Statistics (All: NDs treated as DL value)	28	0.0017	0.092	0.0317	0.008	0.0364
Statistics (All: NDs treated as DL/2 value)	28	0.001	0.092	0.0308	0.004	0.037
Statistics (Normal ROS Imputed Data)	28	-0.0226	0.092	0.0331	0.0181	0.0364
Statistics (Gamma ROS Imputed Data)	28	0.0017	0.092	0.0354	0.0175	0.0338
Statistics (Lognormal ROS Imputed Data)	28	6.7957E-4	0.092	0.0312	0.00469	0.0367
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	0.627	0.56	0.0742	-4.046	1.867	-0.461
Statistics (NDs = DL)	0.545	0.51	0.0582	-4.602	1.729	-0.376
Statistics (NDs = DL/2)	0.468	0.442	0.0658	-4.85	1.902	-0.392
Statistics (Gamma ROS Estimates)	0.782	0.722	0.0453	-4.101	1.491	-0.364
Statistics (Lognormal ROS Estimates)	--	--	--	-4.679	1.767	-0.378
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.9	0.87	0.859	0.939		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.784	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.734	0.924	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.717	0.924	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.864	0.924	Data Not Normal			
Lilliefors (Detects Only)	0.268	0.202	Data Not Normal			
Lilliefors (NDs = DL)	0.313	0.164	Data Not Normal			
Lilliefors (NDs = DL/2)	0.356	0.164	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.2	0.164	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.742	0.843	0.825	0.884		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	2.593	0.789				

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (Detects Only)	0.346	0.213	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	2.871	0.806				
Kolmogorov-Smirnov (NDs = DL)	0.282	0.174	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.933	0.817				
Kolmogorov-Smirnov (NDs = DL/2)	0.25	0.176	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.252	0.783				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.202	0.172	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.841	0.887	0.897	0.91		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.682	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.759	0.924	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.778	0.924	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.807	0.924	Data Not Lognormal			
Lilliefors (Detects Only)	0.357	0.202	Data Not Lognormal			
Lilliefors (NDs = DL)	0.281	0.164	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.251	0.164	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.247	0.164	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	9	9	50.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	9	5.0000E-4	0.01	0.00283	0.002	0.00276
Statistics (Non-Detects Only)	9	6.6000E-4	0.0016	8.7778E-4	7.6000E-4	2.9141E-4
Statistics (All: NDs treated as DL value)	18	5.0000E-4	0.01	0.00186	0.00128	0.00215
Statistics (All: NDs treated as DL/2 value)	18	2.5000E-4	0.005	0.00115	9.8000E-4	0.00101
Statistics (Normal ROS Imputed Data)	18	2.5390E-4	0.0016	8.1823E-4	7.9089E-4	2.8549E-4
Statistics (Gamma ROS Imputed Data)	18	6.6000E-4	0.01	0.00544	0.0058	0.0047
Statistics (Lognormal ROS Imputed Data)	18	4.5050E-4	0.0016	8.2700E-4	7.7936E-4	2.5309E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	13.35	8.975	6.5744E-5	-7.076	0.275	-0.0388
Statistics (NDs = DL)	1.706	1.459	0.00109	-6.61	0.733	-0.111
Statistics (NDs = DL/2)	2.836	2.4	4.0455E-4	-6.957	0.568	-0.0817
Statistics (Gamma ROS Estimates)	0.93	0.812	0.00585	-5.841	1.285	-0.22
Statistics (Lognormal ROS Estimates)	--	--	--	-7.136	0.279	-0.0391
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.838	0.713	0.693	0.949		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.722	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.537	0.897	Data Not Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL/2)	0.516	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.925	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.278	0.274	Data Not Normal			
Lilliefors (NDs = DL)	0.362	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.391	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.152	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.889	0.854	0.807	0.721		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.761	0.721				
Kolmogorov-Smirnov (Detects Only)	0.225	0.279	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	1.251	0.755				
Kolmogorov-Smirnov (NDs = DL)	0.25	0.207	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.846	0.747				
Kolmogorov-Smirnov (NDs = DL/2)	0.343	0.205	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.671	0.77				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.338	0.21	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.899	0.932	0.883	0.971		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.82	0.829	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.879	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.82	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.961	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.21	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.184	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.299	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.133	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	0.0026	0.015	0.00896	0.0098	0.00432
Statistics (All: NDs treated as DL value)	18	0.0026	0.015	0.00902	0.0099	0.0042
Statistics (All: NDs treated as DL/2 value)	18	0.0026	0.015	0.00874	0.0089	0.00429
Statistics (Normal ROS Imputed Data)	18	0.0026	0.015	0.0088	0.0089	0.00425
Statistics (Gamma ROS Imputed Data)	18	0.0026	0.015	0.00902	0.0099	0.0042
Statistics (Lognormal ROS Imputed Data)	18	0.0026	0.015	0.00875	0.0089	0.00428
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Non-Detects Only)	3.729	3.11	0.0024	-4.855	0.584	-0.12		
Statistics (NDs = DL)	3.93	3.312	0.00229	-4.841	0.57	-0.118		
Statistics (NDs = DL/2)	3.735	3.15	0.00234	-4.88	0.576	-0.118		
Statistics (Gamma ROS Estimates)	3.93	3.312	0.00229	-4.841	0.57	-0.118		
Statistics (Lognormal ROS Estimates)	--	--	--	-4.877	0.574	-0.118		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.972	0.976	0.97	0.973				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.922	0.892	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.931	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.919	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.926	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.152	0.207	Data Appear Normal					
Lilliefors (NDs = DL)	0.13	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.152	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.158	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.938	0.941	0.945	0.941				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.559	0.744						
Kolmogorov-Smirnov (Detects Only)	0.19	0.21	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.575	0.743						
Kolmogorov-Smirnov (NDs = DL)	0.187	0.205	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.542	0.743						
Kolmogorov-Smirnov (NDs = DL/2)	0.181	0.205	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.575	0.743						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.187	0.205	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.957	0.955	0.964	0.964				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.899	0.892	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.897	0.897	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.911	0.897	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.913	0.897	Data Appear Lognormal					
Lilliefors (Detects Only)	0.193	0.207	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.203	0.202	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.184	0.202	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.183	0.202	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Selenium (mw-75)								

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	0	11	9	2	18.18%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.005	0.01	0.0075	0.0075	0.00354
Statistics (Non-Detects Only)	9	0.0021	0.0026	0.00231	0.0023	1.8333E-4
Statistics (All: NDs treated as DL value)	11	0.0021	0.01	0.00325	0.0023	0.00238
Statistics (All: NDs treated as DL/2 value)	11	0.0021	0.005	0.00257	0.0023	8.2352E-4
Statistics (Normal ROS Imputed Data)	11	0.0021	0.0026	0.00231	0.0023	1.6398E-4
Statistics (Gamma ROS Imputed Data)	11	0.0021	0.01	0.00371	0.0023	0.00311
Statistics (Lognormal ROS Imputed Data)	11	0.0021	0.0026	0.00231	0.0023	1.6400E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	181.2	120.9	1.2753E-5	-6.073	0.0786	-0.0129
Statistics (NDs = DL)	3.698	2.75	8.8009E-4	-5.869	0.484	-0.0825
Statistics (NDs = DL/2)	15.69	11.47	1.6394E-4	-5.995	0.243	-0.0405
Statistics (Gamma ROS Estimates)	2.547	1.913	0.00146	-5.806	0.598	-0.103
Statistics (Lognormal ROS Estimates)	--	--	--	-6.073	0.0703	-0.0116
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.961	0.717	0.714	0.964		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.904	0.829	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.539	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.541	0.85	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.919	0.85	Data Appear Normal			
Lilliefors (Detects Only)	0.191	0.274	Data Appear Normal			
Lilliefors (NDs = DL)	0.426	0.251	Data Not Normal			
Lilliefors (NDs = DL/2)	0.396	0.251	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.227	0.251	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.962	0.838	0.773	0.839		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.435	0.72				
Kolmogorov-Smirnov (Detects Only)	0.197	0.279	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	2.02	0.733				
Kolmogorov-Smirnov (NDs = DL)	0.413	0.257	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.785	0.729				
Kolmogorov-Smirnov (NDs = DL/2)	0.359	0.255	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.43	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.443	0.258	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.964	0.789	0.776	0.965		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.908	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.638	0.85	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.631	0.85	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.919	0.85	Data Appear Lognormal			
Lilliefors (Detects Only)	0.183	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.386	0.251	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.339	0.251	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.227	0.251	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	7	2	22.22%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.003	0.01	0.0065	0.0065	0.00495
Statistics (Non-Detects Only)	7	8.4000E-4	0.013	0.00305	0.0015	0.0044
Statistics (All: NDs treated as DL value)	9	8.4000E-4	0.013	0.00382	0.0016	0.00446
Statistics (All: NDs treated as DL/2 value)	9	8.4000E-4	0.013	0.00309	0.0015	0.00391
Statistics (Normal ROS Imputed Data)	9	8.4000E-4	0.013	0.00287	0.0016	0.00382
Statistics (Gamma ROS Imputed Data)	9	8.4000E-4	0.013	0.00459	0.0016	0.00489
Statistics (Lognormal ROS Imputed Data)	9	8.4000E-4	0.013	0.00272	0.00156	0.00386
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.168	0.763	0.00261	-6.279	0.883	-0.141
Statistics (NDs = DL)	1.199	0.873	0.00318	-6.041	0.948	-0.157
Statistics (NDs = DL/2)	1.344	0.97	0.0023	-6.195	0.839	-0.135
Statistics (Gamma ROS Estimates)	1.091	0.802	0.00421	-5.907	1.063	-0.18
Statistics (Lognormal ROS Estimates)	--	--	--	-6.32	0.769	-0.122
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.692	0.814	0.742	0.68		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.509	0.803	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.666	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.576	0.829	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.495	0.829	Data Not Normal			
Lilliefors (Detects Only)	0.486	0.304	Data Not Normal			
Lilliefors (NDs = DL)	0.357	0.274	Data Not Normal			
Lilliefors (NDs = DL/2)	0.427	0.274	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.455	0.274	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.874	0.942	0.91	0.917		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.505	0.725				
Kolmogorov-Smirnov (Detects Only)	0.477	0.319	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.158	0.74				
Kolmogorov-Smirnov (NDs = DL)	0.361	0.286	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.428	0.737				
Kolmogorov-Smirnov (NDs = DL/2)	0.428	0.285	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.239	0.742				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.391	0.286	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.8	0.903	0.861	0.753		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.677	0.803	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.813	0.829	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.761	0.829	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.609	0.829	Data Not Lognormal			
Lilliefors (Detects Only)	0.429	0.304	Data Not Lognormal			
Lilliefors (NDs = DL)	0.329	0.274	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.392	0.274	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.45	0.274	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	1	27	16	11	40.74%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	1.0000E-4	0.002	7.5455E-4	4.0000E-4	6.7729E-4
Statistics (Non-Detects Only)	16	3.5000E-4	0.017	0.00234	0.0014	0.00392
Statistics (All: NDs treated as DL value)	27	1.0000E-4	0.017	0.00169	0.0013	0.00311
Statistics (All: NDs treated as DL/2 value)	27	5.0000E-5	0.017	0.00154	0.0013	0.00314
Statistics (Normal ROS Imputed Data)	27	-0.00528	0.017	3.0388E-4	0.0013	0.00405
Statistics (Gamma ROS Imputed Data)	27	3.5000E-4	0.017	0.00546	0.0015	0.00486
Statistics (Lognormal ROS Imputed Data)	27	2.5581E-4	0.017	0.0016	0.0013	0.00312
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.308	1.105	0.00179	-6.486	0.741	-0.114
Statistics (NDs = DL)	1.061	0.967	0.0016	-6.921	0.963	-0.139
Statistics (NDs = DL/2)	0.814	0.748	0.00189	-7.203	1.191	-0.165
Statistics (Gamma ROS Estimates)	1.118	1.019	0.00488	-5.72	1.097	-0.192
Statistics (Lognormal ROS Estimates)	--	--	--	-6.963	0.853	-0.122
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.55	0.564	0.563	0.807		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Detects Only)	0.336	0.887	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.352	0.923	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.35	0.923	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.684	0.923	Data Not Normal			
Lilliefors (Detects Only)	0.472	0.213	Data Not Normal			
Lilliefors (NDs = DL)	0.424	0.167	Data Not Normal			
Lilliefors (NDs = DL/2)	0.431	0.167	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.31	0.167	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.737	0.743	0.759	0.862		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	3.758	0.758				
Kolmogorov-Smirnov (Detects Only)	0.443	0.22	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	2.322	0.772				
Kolmogorov-Smirnov (NDs = DL)	0.272	0.173	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.997	0.781				
Kolmogorov-Smirnov (NDs = DL/2)	0.289	0.174	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.301	0.771				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.303	0.173	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.742	0.917	0.929	0.903		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.601	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.867	0.923	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.88	0.923	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.834	0.923	Data Not Lognormal			
Lilliefors (Detects Only)	0.384	0.213	Data Not Lognormal			
Lilliefors (NDs = DL)	0.21	0.167	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.228	0.167	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.221	0.167	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	10	8	44.44%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	4.0000E-4	0.002	6.8750E-4	4.0000E-4	5.6930E-4
Statistics (Non-Detects Only)	10	1.1000E-4	1.8000E-4	1.4800E-4	1.5000E-4	1.9322E-5
Statistics (All: NDs treated as DL value)	18	1.1000E-4	0.002	3.8778E-4	1.7000E-4	4.5798E-4
Statistics (All: NDs treated as DL/2 value)	18	1.1000E-4	0.001	2.3500E-4	1.7000E-4	2.0876E-4
Statistics (Normal ROS Imputed Data)	18	1.1000E-4	1.8000E-4	1.4800E-4	1.4800E-4	1.6259E-5
Statistics (Gamma ROS Imputed Data)	18	1.1000E-4	0.01	0.00453	1.7000E-4	0.00504
Statistics (Lognormal ROS Imputed Data)	18	1.1000E-4	1.8000E-4	1.4769E-4	1.4680E-4	1.6377E-5

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	61.84	43.35	2.3933E-6	-8.826	0.136	-0.0154
Statistics (NDs = DL)	1.485	1.274	2.6118E-4	-8.228	0.795	-0.0967
Statistics (NDs = DL/2)	2.929	2.478	8.0243E-5	-8.536	0.52	-0.0609
Statistics (Gamma ROS Estimates)	0.42	0.387	0.0108	-6.95	2.161	-0.311
Statistics (Lognormal ROS Estimates)	--	--	--	-8.826	0.114	-0.013
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.972	0.755	0.695	0.978		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.959	0.842	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.592	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.511	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.968	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.167	0.262	Data Appear Normal			
Lilliefors (NDs = DL)	0.323	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.4	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.167	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.967	0.911	0.825	0.673		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.335	0.724				
Kolmogorov-Smirnov (Detects Only)	0.159	0.266	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.533	0.757				
Kolmogorov-Smirnov (NDs = DL)	0.261	0.207	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.393	0.746				
Kolmogorov-Smirnov (NDs = DL/2)	0.361	0.205	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.008	0.817				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.355	0.217	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.96	0.919	0.851	0.972		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.937	0.842	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.846	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.744	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.957	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.164	0.262	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.246	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.319	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.167	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Thallium (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	11	7	38.89%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	1.0000E-4	0.002	6.7143E-4	4.0000E-4	6.4476E-4
Statistics (Non-Detects Only)	11	9.3000E-5	5.3000E-4	1.7573E-4	1.5000E-4	1.2344E-4
Statistics (All: NDs treated as DL value)	18	9.3000E-5	0.002	3.6850E-4	1.6500E-4	4.6639E-4
Statistics (All: NDs treated as DL/2 value)	18	5.0000E-5	0.001	2.3794E-4	1.6500E-4	2.2822E-4
Statistics (Normal ROS Imputed Data)	18	1.1296E-6	5.3000E-4	1.5708E-4	1.5000E-4	1.0794E-4
Statistics (Gamma ROS Imputed Data)	18	9.3000E-5	0.01	0.004	1.9500E-4	0.00493
Statistics (Lognormal ROS Imputed Data)	18	6.9824E-5	5.3000E-4	1.5784E-4	1.4509E-4	1.0060E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.812	2.833	4.6098E-5	-8.783	0.491	-0.0559
Statistics (NDs = DL)	1.275	1.099	2.8908E-4	-8.347	0.873	-0.105
Statistics (NDs = DL/2)	1.981	1.688	1.2010E-4	-8.617	0.701	-0.0814
Statistics (Gamma ROS Estimates)	0.402	0.372	0.00994	-7.159	2.129	-0.297
Statistics (Lognormal ROS Estimates)	--	--	--	-8.867	0.443	-0.0499
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.77	0.764	0.794	0.842		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.621	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.605	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.652	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.743	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.337	0.251	Data Not Normal			
Lilliefors (NDs = DL)	0.306	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.365	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.272	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.869	0.928	0.919	0.716		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.019	0.733				
Kolmogorov-Smirnov (Detects Only)	0.275	0.257	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.242	0.761				
Kolmogorov-Smirnov (NDs = DL)	0.233	0.208	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.236	0.753				
Kolmogorov-Smirnov (NDs = DL/2)	0.281	0.206	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.608	0.821				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.313	0.218	Data Not Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.9	0.941	0.951	0.931		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.825	0.85	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.881	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.917	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.888	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.234	0.251	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.204	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.224	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.169	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	0	11	2	9	81.82%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	9	4.0000E-4	0.002	7.1111E-4	4.0000E-4	5.4874E-4
Statistics (Non-Detects Only)	2	1.7000E-4	1.8000E-4	1.7500E-4	1.7500E-4	7.0711E-6
Statistics (All: NDs treated as DL value)	11	1.7000E-4	0.002	6.1364E-4	4.0000E-4	5.3659E-4
Statistics (All: NDs treated as DL/2 value)	11	1.7000E-4	0.001	3.2273E-4	2.0000E-4	2.5605E-4
Statistics (Normal ROS Imputed Data)	11	1.6261E-4	1.8739E-4	1.7500E-4	1.7500E-4	7.0867E-6
Statistics (Gamma ROS Imputed Data)	11	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	11	1.6297E-4	1.8777E-4	1.7506E-4	1.7493E-4	7.0916E-6
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	2.035	1.54	3.0157E-4	-7.662	0.731	-0.0955
Statistics (NDs = DL/2)	2.788	2.088	1.1576E-4	-8.229	0.582	-0.0708
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-8.651	0.0405	-0.00468
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.833	0.778	0.99		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.713	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.622	0.85	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.983	0.85	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.382	0.251	Data Not Normal			
Lilliefors (NDs = DL/2)	0.411	0.251	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.123	0.251	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.938	0.897	0.445		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.992	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.355	0.258	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.796	0.735				
Kolmogorov-Smirnov (NDs = DL/2)	0.43	0.257	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.726				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.254				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.929	0.832	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.869	0.85	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.698	0.85	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.983	0.85	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.315	0.251	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.417	0.251	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.123	0.251	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	1	8	88.89%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Requested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Thallium (mw-8) was not processed!						
Goodness-of-Fit Test Statistics for Data Sets with Non-Detects						
User Selected Options						
Date/Time of Computation	ProUCL 5.19/19/2018 12:03:55 AM					
From File	MultiUnit_FLUORIDE_AssessmentMont_Sept2018.xls					
Full Precision	OFF					
Confidence Coefficient	0.95					
Fluoride (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	28	0	28	13	15	53.57%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	15	0.08	5	2.472	2	1.742

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Non-Detects Only)	13	0.79	3.2	1.842	1.9	0.591		
Statistics (All: NDs treated as DL value)	28	0.08	5	2.18	2	1.353		
Statistics (All: NDs treated as DL/2 value)	28	0.04	3.2	1.518	1.9	0.802		
Statistics (Normal ROS Imputed Data)	28	0.336	3.2	1.46	1.586	0.662		
Statistics (Gamma ROS Imputed Data)	28	0.638	3.2	1.509	1.57	0.599		
Statistics (Lognormal ROS Imputed Data)	28	0.713	3.2	1.498	1.496	0.593		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	9.087	7.041	0.203	0.555	0.37	0.666		
Statistics (NDs = DL)	1.879	1.702	1.16	0.49	0.931	1.9		
Statistics (NDs = DL/2)	1.825	1.654	0.831	0.119	1.017	8.563		
Statistics (Gamma ROS Estimates)	6.495	5.823	0.232	0.332	0.412	1.241		
Statistics (Lognormal ROS Estimates)	--	--	--	0.328	0.401	1.22		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.908	0.955	0.941	0.968				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.849	0.866	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.902	0.924	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.883	0.924	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.94	0.924	Data Appear Normal					
Lilliefors (Detects Only)	0.254	0.234	Data Not Normal					
Lilliefors (NDs = DL)	0.238	0.164	Data Not Normal					
Lilliefors (NDs = DL/2)	0.255	0.164	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.139	0.164	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.904	0.934	0.856	0.969				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	1.209	0.734						
Kolmogorov-Smirnov (Detects Only)	0.273	0.237	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	1.109	0.759						
Kolmogorov-Smirnov (NDs = DL)	0.204	0.168	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	2.559	0.76						
Kolmogorov-Smirnov (NDs = DL/2)	0.284	0.168	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.795	0.748						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.141	0.166	Detected Data appear Approximate Gamma					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.884	0.912	0.851	0.969				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.8	0.866	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.84	0.924	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.735	0.924	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.931	0.924	Data Appear Lognormal					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Detects Only)	0.285	0.234	Data Not Lognormal		
Lilliefors (NDs = DL)	0.243	0.164	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.278	0.164	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.141	0.164	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Fluoride (mw-61)					
Raw Statistics					
Number of Valid Observations	18				
Number of Distinct Observations	6				
Minimum	0.91				
Maximum	1.6				
Mean of Raw Data	1.223				
Standard Deviation of Raw Data	0.146				
Khat	74.49				
Theta hat	0.0164				
Kstar	62.11				
Theta star	0.0197				
Mean of Log Transformed Data	0.194				
Standard Deviation of Log Transformed Data	0.119				
Normal GOF Test Results					
Correlation Coefficient R	0.945				
Shapiro Wilk Test Statistic	0.917				
Shapiro Wilk Critical (0.05) Value	0.897				
Approximate Shapiro Wilk P Value	0.0958				
Lilliefors Test Statistic	0.188				
Lilliefors Critical (0.05) Value	0.202				
Data appear Normal at (0.05) Significance Level					
Gamma GOF Test Results					
Correlation Coefficient R	0.952				
A-D Test Statistic	0.676				
A-D Critical (0.05) Value	0.738				
K-S Test Statistic	0.173				
K-S Critical(0.05) Value	0.203				
Data appear Gamma Distributed at (0.05) Significance Level					
Lognormal GOF Test Results					
Correlation Coefficient R	0.949				
Shapiro Wilk Test Statistic	0.924				
Shapiro Wilk Critical (0.05) Value	0.897				
Approximate Shapiro Wilk P Value	0.125				
Lilliefors Test Statistic	0.182				
Lilliefors Critical (0.05) Value	0.202				
Data appear Lognormal at (0.05) Significance Level					
Fluoride (mw-7)					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	3	15	83.33%		
	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	15	0.4	4	0.987	0.8	0.918		
Statistics (Non-Detects Only)	3	0.35	0.4	0.367	0.35	0.0289		
Statistics (All: NDs treated as DL value)	18	0.35	4	0.883	0.8	0.866		
Statistics (All: NDs treated as DL/2 value)	18	0.2	2	0.472	0.4	0.419		
Statistics (Normal ROS Imputed Data)	18	0.324	0.4	0.358	0.357	0.0196		
Statistics (Gamma ROS Imputed Data)	18	0.325	0.4	0.358	0.357	0.0193		
Statistics (Lognormal ROS Imputed Data)	18	0.326	0.4	0.358	0.357	0.0189		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A		
Statistics (NDs = DL)	2.208	1.877	0.4	-0.367	0.634	-1.725		
Statistics (NDs = DL/2)	2.725	2.308	0.173	-0.945	0.562	-0.595		
Statistics (Gamma ROS Estimates)	367.7	306.4	9.7251E-4	-1.03	0.0535	-0.052		
Statistics (Lognormal ROS Estimates)	--	--	--	-1.03	0.0523	-0.0508		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.866	0.724	0.7	0.984				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.75	0.767	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.55	0.897	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.518	0.897	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.97	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.385	0.425	Data Appear Normal					
Lilliefors (NDs = DL)	0.427	0.202	Data Not Normal					
Lilliefors (NDs = DL/2)	0.457	0.202	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.155	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	N/A	0.854	0.82	0.985				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	N/A	N/A						
Kolmogorov-Smirnov (Detects Only)	N/A	N/A						
Anderson-Darling (NDs = DL)	1.941	0.751						
Kolmogorov-Smirnov (NDs = DL)	0.356	0.206	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	2.449	0.748						
Kolmogorov-Smirnov (NDs = DL/2)	0.413	0.205	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.274	0.737						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.153	0.203	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.866	0.885	0.854	0.984				

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.75	0.767	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.792	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.747	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.97	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.299	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.369	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.155	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Fluoride (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	0	11	3	8	72.73%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	2	2	2	2	0
Statistics (Non-Detects Only)	3	1.2	1.7	1.433	1.4	0.252
Statistics (All: NDs treated as DL value)	11	1.2	2	1.845	2	0.288
Statistics (All: NDs treated as DL/2 value)	11	1	1.7	1.118	1	0.232
Statistics (Normal ROS Imputed Data)	11	0.981	1.886	1.433	1.4	0.274
Statistics (Gamma ROS Imputed Data)	11	1.001	1.908	1.437	1.4	0.275
Statistics (Lognormal ROS Imputed Data)	11	1.035	1.944	1.442	1.4	0.276
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	38	27.69	0.0486	0.6	0.178	0.298
Statistics (NDs = DL/2)	30.84	22.49	0.0363	0.0954	0.181	1.898
Statistics (Gamma ROS Estimates)	29.62	21.6	0.0485	0.345	0.194	0.563
Statistics (Lognormal ROS Estimates)	--	--	--	0.35	0.191	0.546
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.993	0.784	0.771	0.995		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.987	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.618	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.605	0.85	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.983	0.85	Data Appear Normal			
Lilliefors (Detects Only)	0.219	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.432	0.251	Data Not Normal			
Lilliefors (NDs = DL/2)	0.422	0.251	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.107	0.251	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.746	0.815	0.994		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	2.153	0.729				
Kolmogorov-Smirnov (NDs = DL)	0.438	0.255	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.107	0.729				
Kolmogorov-Smirnov (NDs = DL/2)	0.436	0.255	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.144	0.729				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.115	0.255	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.998	0.778	0.781	0.996		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.996	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.612	0.85	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.617	0.85	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.985	0.85	Data Appear Lognormal			
Lilliefors (Detects Only)	0.197	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.427	0.251	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.428	0.251	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.101	0.251	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Fluoride (mw-8)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	3	6	66.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.4	5	1.767	1.4	1.745
Statistics (Non-Detects Only)	3	0.68	1.1	0.897	0.91	0.21
Statistics (All: NDs treated as DL value)	9	0.4	5	1.477	0.91	1.451
Statistics (All: NDs treated as DL/2 value)	9	0.2	2.5	0.888	0.91	0.698
Statistics (Normal ROS Imputed Data)	9	0.218	1.1	0.627	0.622	0.275
Statistics (Gamma ROS Imputed Data)	9	0.281	1.1	0.643	0.628	0.256
Statistics (Lognormal ROS Imputed Data)	9	0.402	1.1	0.675	0.641	0.222
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.671	1.188	0.884	0.0617	0.823	13.33
Statistics (NDs = DL/2)	1.927	1.359	0.461	-0.4	0.835	-2.087
Statistics (Gamma ROS Estimates)	6.896	4.672	0.0933	-0.516	0.418	-0.81
Statistics (Lognormal ROS Estimates)	--	--	--	-0.439	0.317	-0.722
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.998	0.847	0.901	0.988		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.997	0.767	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.735	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.827	0.829	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.974	0.829	Data Appear Normal			
Lilliefors (Detects Only)	0.192	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.269	0.274	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.269	0.274	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.178	0.274	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.959	0.958	0.993		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.445	0.733				
Kolmogorov-Smirnov (NDs = DL)	0.205	0.283	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.389	0.73				
Kolmogorov-Smirnov (NDs = DL/2)	0.181	0.283	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.185	0.722				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.172	0.28	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.993	0.971	0.958	0.987		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.985	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.937	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.913	0.829	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.972	0.829	Data Appear Lognormal			
Lilliefors (Detects Only)	0.222	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.15	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.199	0.274	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.178	0.274	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Goodness-of-Fit Test Statistics for Data Sets with Non-Detects						
User Selected Options						
Date/Time of Computation	ProUCL 5.19/18/2018 10:06:49 PM					
From File	MultiUnit_COMBINEDRADIUM_AssessmentMont_Sept2018.xls					
Full Precision	OFF					
Confidence Coefficient	0.95					
Combined_Radium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	29	0	29	23	6	20.69%
	Number	Minimum	Maximum	Mean	Median	SD

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Non-Detects Only)	6	0.6	0.9	0.717	0.7	0.117		
Statistics (Non-Detects Only)	23	0.7	3.5	1.986	2	0.698		
Statistics (All: NDs treated as DL value)	29	0.6	3.5	1.723	1.7	0.812		
Statistics (All: NDs treated as DL/2 value)	29	0.3	3.5	1.649	1.7	0.913		
Statistics (Normal ROS Imputed Data)	29	0.169	3.5	1.659	1.7	0.901		
Statistics (Gamma ROS Imputed Data)	29	0.548	3.5	1.719	1.7	0.818		
Statistics (Lognormal ROS Imputed Data)	29	0.7	3.5	1.742	1.7	0.788		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	7.738	6.758	0.257	0.62	0.388	0.626		
Statistics (NDs = DL)	4.205	3.793	0.41	0.421	0.53	1.26		
Statistics (NDs = DL/2)	2.395	2.17	0.688	0.277	0.768	2.771		
Statistics (Gamma ROS Estimates)	4.075	3.676	0.422	0.414	0.541	1.307		
Statistics (Lognormal ROS Estimates)	--	--	--	0.446	0.49	1.096		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.988	0.978	0.979	0.986				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.975	0.914	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.944	0.926	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.944	0.926	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.96	0.926	Data Appear Normal					
Lilliefors (Detects Only)	0.0872	0.18	Data Appear Normal					
Lilliefors (NDs = DL)	0.12	0.161	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.112	0.161	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.0982	0.161	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.988	0.979	0.95	0.978				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.231	0.745						
Kolmogorov-Smirnov (Detects Only)	0.0929	0.182	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.607	0.75						
Kolmogorov-Smirnov (NDs = DL)	0.125	0.163	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.187	0.755						
Kolmogorov-Smirnov (NDs = DL/2)	0.185	0.164	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.62	0.75						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.133	0.163	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.976	0.969	0.931	0.971				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.955	0.914	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.922	0.926	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.852	0.926	Data Not Lognormal					

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Lognormal ROS Estimates)	0.924	0.926	Data Not Lognormal			
Lilliefors (Detects Only)	0.116	0.18	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.144	0.161	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.222	0.161	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.146	0.161	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Combined_Radium (mw-61)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	10	8	44.44%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.6	0.9	0.7	0.7	0.107
Statistics (Non-Detects Only)	10	0.5	2.2	1.269	1.295	0.613
Statistics (All: NDs treated as DL value)	18	0.5	2.2	1.016	0.7	0.537
Statistics (All: NDs treated as DL/2 value)	18	0.3	2.2	0.861	0.6	0.649
Statistics (Normal ROS Imputed Data)	18	-0.229	2.2	0.792	0.6	0.731
Statistics (Gamma ROS Imputed Data)	18	0.0401	2.2	0.844	0.6	0.673
Statistics (Lognormal ROS Imputed Data)	18	0.307	2.2	0.908	0.626	0.613
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	4.439	3.174	0.286	0.121	0.524	4.321
Statistics (NDs = DL)	4.649	3.911	0.219	-0.0954	0.466	-4.88
Statistics (NDs = DL/2)	2.126	1.808	0.405	-0.403	0.721	-1.786
Statistics (Gamma ROS Estimates)	1.296	1.117	0.651	-0.603	1.149	-1.905
Statistics (Lognormal ROS Estimates)	--	--	--	-0.293	0.631	-2.155
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.96	0.893	0.908	0.965		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.902	0.842	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.79	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.81	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.922	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.223	0.262	Data Appear Normal			
Lilliefors (NDs = DL)	0.278	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.264	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.217	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.957	0.948	0.963	0.964		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.498	0.729				
Kolmogorov-Smirnov (Detects Only)	0.235	0.268	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.353	0.743				
Kolmogorov-Smirnov (NDs = DL)	0.28	0.204	Data Not Gamma Distributed			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	1.007	0.752				
Kolmogorov-Smirnov (NDs = DL/2)	0.189	0.206	Detected Data appear Approximate Gamn			
Anderson-Darling (Gamma ROS Estimates)	0.468	0.76				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.146	0.208	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.959	0.934	0.948	0.963		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.902	0.842	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.861	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.877	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.911	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.219	0.262	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.268	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.156	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.207	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Combined_Radium (mw-7)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	15	3	16.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.6	0.9	0.7	0.6	0.173
Statistics (Non-Detects Only)	15	0.7	3.3	1.74	1.5	0.785
Statistics (All: NDs treated as DL value)	18	0.6	3.3	1.567	1.3	0.819
Statistics (All: NDs treated as DL/2 value)	18	0.3	3.3	1.508	1.3	0.891
Statistics (Normal ROS Imputed Data)	18	-0.27	3.3	1.451	1.3	0.978
Statistics (Gamma ROS Imputed Data)	18	0.176	3.3	1.506	1.3	0.895
Statistics (Lognormal ROS Imputed Data)	18	0.512	3.3	1.55	1.3	0.836
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	5.796	4.681	0.3	0.465	0.433	0.932
Statistics (NDs = DL)	4.194	3.532	0.374	0.325	0.515	1.584
Statistics (NDs = DL/2)	2.636	2.234	0.572	0.209	0.712	3.399
Statistics (Gamma ROS Estimates)	2.462	2.088	0.612	0.193	0.759	3.945
Statistics (Lognormal ROS Estimates)	--	--	--	0.302	0.546	1.808
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.938	0.945	0.965	0.977		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.875	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.885	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.922	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.952	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.219	0.22	Data Appear Normal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL)	0.183	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.163	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.156	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.967	0.976	0.974	0.973		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.464	0.738				
Kolmogorov-Smirnov (Detects Only)	0.168	0.222	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.338	0.743				
Kolmogorov-Smirnov (NDs = DL)	0.137	0.205	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.393	0.748				
Kolmogorov-Smirnov (NDs = DL/2)	0.164	0.205	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.372	0.749				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.172	0.206	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.977	0.984	0.959	0.984		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.952	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.956	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.912	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.958	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.147	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.113	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.207	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.135	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Combined_Radium (mw-75)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	0	11	7	4	36.36%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	0.6	0.8	0.7	0.7	0.0816
Statistics (Non-Detects Only)	7	0.4	1.6	0.986	0.9	0.402
Statistics (All: NDs treated as DL value)	11	0.4	1.6	0.882	0.8	0.346
Statistics (All: NDs treated as DL/2 value)	11	0.3	1.6	0.755	0.8	0.447
Statistics (Normal ROS Imputed Data)	11	0.154	1.6	0.738	0.8	0.468
Statistics (Gamma ROS Imputed Data)	11	0.244	1.6	0.756	0.8	0.448
Statistics (Lognormal ROS Imputed Data)	11	0.351	1.6	0.78	0.8	0.424
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	6.404	3.755	0.154	-0.0945	0.451	-4.776
Statistics (NDs = DL)	7.746	5.694	0.114	-0.192	0.38	-1.983
Statistics (NDs = DL/2)	3.241	2.418	0.233	-0.444	0.601	-1.354

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	3.144	2.347	0.24	-0.448	0.618	-1.381		
Statistics (Lognormal ROS Estimates)	--	--	--	-0.379	0.532	-1.405		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.971	0.94	0.942	0.966				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.947	0.803	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.893	0.85	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.873	0.85	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.924	0.85	Data Appear Normal					
Lilliefors (Detects Only)	0.2	0.304	Data Appear Normal					
Lilliefors (NDs = DL)	0.23	0.251	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.24	0.251	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.192	0.251	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.972	0.968	0.974	0.981				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.296	0.709						
Kolmogorov-Smirnov (Detects Only)	0.211	0.313	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.403	0.73						
Kolmogorov-Smirnov (NDs = DL)	0.194	0.256	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.561	0.733						
Kolmogorov-Smirnov (NDs = DL/2)	0.254	0.257	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.376	0.733						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.191	0.257	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.957	0.97	0.957	0.964				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.928	0.803	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.953	0.85	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.896	0.85	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.91	0.85	Data Appear Lognormal					
Lilliefors (Detects Only)	0.245	0.304	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.169	0.251	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.239	0.251	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.194	0.251	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Combined_Radium (mw-8)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	9	0	9	8	1	11.11%		

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.7	0.7	0.7	0.7	N/A
Statistics (Non-Detects Only)	8	1	4.66	1.745	1.3	1.206
Statistics (All: NDs treated as DL value)	9	0.7	4.66	1.629	1.3	1.181
Statistics (All: NDs treated as DL/2 value)	9	0.35	4.66	1.59	1.3	1.22
Statistics (Normal ROS Imputed Data)	9	-0.607	4.66	1.484	1.3	1.374
Statistics (Gamma ROS Imputed Data)	9	0.01	4.66	1.552	1.3	1.268
Statistics (Lognormal ROS Imputed Data)	9	0.535	4.66	1.611	1.3	1.198
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.978	2.57	0.439	0.426	0.485	1.139
Statistics (NDs = DL)	3.514	2.416	0.464	0.339	0.523	1.544
Statistics (NDs = DL/2)	2.632	1.829	0.604	0.262	0.669	2.555
Statistics (Gamma ROS Estimates)	1.007	0.745	1.542	-0.133	1.737	-13.05
Statistics (Lognormal ROS Estimates)	--	--	--	0.309	0.573	1.855
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.756	0.78	0.812	0.86		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.6	0.818	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.64	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.695	0.829	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.785	0.829	Data Not Normal			
Lilliefors (Detects Only)	0.363	0.283	Data Not Normal			
Lilliefors (NDs = DL)	0.355	0.274	Data Not Normal			
Lilliefors (NDs = DL/2)	0.34	0.274	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.302	0.274	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.862	0.879	0.903	0.929		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.198	0.719				
Kolmogorov-Smirnov (Detects Only)	0.35	0.295	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	0.956	0.726				
Kolmogorov-Smirnov (NDs = DL)	0.316	0.281	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.784	0.728				
Kolmogorov-Smirnov (NDs = DL/2)	0.275	0.282	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	1.201	0.743				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.363	0.287	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.846	0.904	0.913	0.918		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.739	0.818	Data Not Lognormal			

TABLE B-3
MULTIUNIT ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.847	0.829	Data Appear Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.875	0.829	Data Appear Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.879	0.829	Data Appear Lognormal		
Lilliefors (Detects Only)	0.323	0.283	Data Not Lognormal		
Lilliefors (NDs = DL)	0.28	0.274	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.237	0.274	Data Appear Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.259	0.274	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

User Selected Options		Outlier Tests for Selected Variables excluding nondetects					
Date/Time of Computation	ProUCL 5.110/9/2018 5:21:51 PM						
From File	Table1_AppendixA_Multiunit_AppendixIV_ProUCLUpload_Sept2018.xls						
Full Precision	OFF						
Dixon's Outlier Test for Antimony (background)							
Total N = 26							
Number NDs = 22							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00048 is a Potential Outlier (Upper T							
Test Statistic: 0.867							
For 10% significance level, 0.00048 is an outlier.							
For 5% significance level, 0.00048 is an outlier.							
For 1% significance level, 0.00048 is not an outlier.							
2. Data Value 0.00033 is a Potential Outlier (Lower T							
Test Statistic: 0.133							
For 10% significance level, 0.00033 is not an outlier.							
For 5% significance level, 0.00033 is not an outlier.							
For 1% significance level, 0.00033 is not an outlier.							
Dixon's Outlier Test for Antimony (mw-61)							
Total N = 17							
Number NDs = 14							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00029 is a Potential Outlier (Upper T							
Test Statistic: 1.000							
For 10% significance level, 0.00029 is an outlier.							
For 5% significance level, 0.00029 is an outlier.							
For 1% significance level, 0.00029 is an outlier.							
2. Data Value 0.00023 is a Potential Outlier (Lower T							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.000								
For 10% significance level, 0.00023 is not an outlier.								
For 5% significance level, 0.00023 is not an outlier.								
For 1% significance level, 0.00023 is not an outlier.								
Dixon's Outlier Test for Antimony (mw-7)								
Total N = 17								
Number NDs = 13								
Number Detects = 4								
10% critical value: 0.679								
5% critical value: 0.765								
1% critical value: 0.889								
Note: NDs excluded from Outlier Test								
1. Data Value 0.001 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.821								
For 10% significance level, 0.001 is an outlier.								
For 5% significance level, 0.001 is an outlier.								
For 1% significance level, 0.001 is not an outlier.								
2. Data Value 0.00016 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.131								
For 10% significance level, 0.00016 is not an outlier.								
For 5% significance level, 0.00016 is not an outlier.								
For 1% significance level, 0.00016 is not an outlier.								
No Outlier Test for Antimony (mw-75)								
Dixon's Outlier Test for Antimony (mw-8)								
Total N = 8								
Number NDs = 5								
Number Detects = 3								
10% critical value: 0.886								
5% critical value: 0.941								
1% critical value: 0.988								
Note: NDs excluded from Outlier Test								
1. Data Value 0.0014 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.935								
For 10% significance level, 0.0014 is an outlier.								
For 5% significance level, 0.0014 is not an outlier.								
For 1% significance level, 0.0014 is not an outlier.								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

2. Data Value 0.00048 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.065								
For 10% significance level, 0.00048 is not an outlier.								
For 5% significance level, 0.00048 is not an outlier.								
For 1% significance level, 0.00048 is not an outlier.								
Dixon's Outlier Test for Arsenic (background)								
Total N = 28								
Number NDs = 12								
Number Detects = 16								
10% critical value: 0.454								
5% critical value: 0.507								
1% critical value: 0.595								
Note: NDs excluded from Outlier Test								
1. Data Value 0.0045 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.294								
For 10% significance level, 0.0045 is not an outlier.								
For 5% significance level, 0.0045 is not an outlier.								
For 1% significance level, 0.0045 is not an outlier.								
2. Data Value 0.00088 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.084								
For 10% significance level, 0.00088 is not an outlier.								
For 5% significance level, 0.00088 is not an outlier.								
For 1% significance level, 0.00088 is not an outlier.								
Dixon's Outlier Test for Arsenic (mw-61)								
Total N = 18								
Number NDs = 13								
Number Detects = 5								
10% critical value: 0.557								
5% critical value: 0.642								
1% critical value: 0.78								
Note: NDs excluded from Outlier Test								
1. Data Value 0.00063 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.238								
For 10% significance level, 0.00063 is not an outlier.								
For 5% significance level, 0.00063 is not an outlier.								
For 1% significance level, 0.00063 is not an outlier.								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

2. Data Value 0.00042 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.381							
For 10% significance level, 0.00042 is not an outlier.							
For 5% significance level, 0.00042 is not an outlier.							
For 1% significance level, 0.00042 is not an outlier.							
Dixon's Outlier Test for Arsenic (mw-7)							
Total N = 18							
Number NDs = 7							
Number Detects = 11							
10% critical value: 0.517							
5% critical value: 0.576							
1% critical value: 0.679							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0021 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.844							
For 10% significance level, 0.0021 is an outlier.							
For 5% significance level, 0.0021 is an outlier.							
For 1% significance level, 0.0021 is an outlier.							
2. Data Value 0.00033 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.478							
For 10% significance level, 0.00033 is not an outlier.							
For 5% significance level, 0.00033 is not an outlier.							
For 1% significance level, 0.00033 is not an outlier.							
No Outlier Test for Arsenic (mw-75)							
Dixon's Outlier Test for Arsenic (mw-8)							
Total N = 9							
Number NDs = 5							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0091 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.980							
For 10% significance level, 0.0091 is an outlier.							
For 5% significance level, 0.0091 is an outlier.							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

For 1% significance level, 0.0091 is an outlier.							
2. Data Value 0.00053 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.006							
For 10% significance level, 0.00053 is not an outlier.							
For 5% significance level, 0.00053 is not an outlier.							
For 1% significance level, 0.00053 is not an outlier.							
Rosner's Outlier Test for 1 Outliers in Barium (background)							
Total N		28					
Number NDs		0					
Number Detects		28					
Mean of Detects		0.0225					
SD of Detects		0.00537					
Number of data		28					
Number of suspected outliers		1					
s not included in the following:							
			Potential	Obs.	Test	Critical	Critical
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)
1	0.0225	0.00527	0.042	1	3.704	2.88	3.2
For 5% Significance Level, there is 1 Potential Outlier							
Therefore, Observation 0.042 is a Potential Statistical Outlier							
For 1% Significance Level, there is 1 Potential Outlier							
Dixon's Outlier Test for Barium (mw-61)							
Total N = 17							
Number NDs = 0							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.016 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.667							
For 10% significance level, 0.016 is an outlier.							
For 5% significance level, 0.016 is an outlier.							
For 1% significance level, 0.016 is an outlier.							
2. Data Value 0.013 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.000							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

For 10% significance level, 0.013 is not an outlier.								
For 5% significance level, 0.013 is not an outlier.								
For 1% significance level, 0.013 is not an outlier.								
Dixon's Outlier Test for Barium (mw-7)								
Total N = 18								
Number NDs = 0								
Number Detects = 18								
10% critical value: 0.424								
5% critical value: 0.475								
1% critical value: 0.561								
Note: NDs excluded from Outlier Test								
1. Data Value 0.017 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.000								
For 10% significance level, 0.017 is not an outlier.								
For 5% significance level, 0.017 is not an outlier.								
For 1% significance level, 0.017 is not an outlier.								
2. Data Value 0.013 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.250								
For 10% significance level, 0.013 is not an outlier.								
For 5% significance level, 0.013 is not an outlier.								
For 1% significance level, 0.013 is not an outlier.								
Dixon's Outlier Test for Barium (mw-75)								
Total N = 11								
Number NDs = 0								
Number Detects = 11								
10% critical value: 0.517								
5% critical value: 0.576								
1% critical value: 0.679								
Note: NDs excluded from Outlier Test								
1. Data Value 0.02 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.000								
For 10% significance level, 0.02 is not an outlier.								
For 5% significance level, 0.02 is not an outlier.								
For 1% significance level, 0.02 is not an outlier.								
2. Data Value 0.017 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.333								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

For 10% significance level, 0.017 is not an outlier.							
For 5% significance level, 0.017 is not an outlier.							
For 1% significance level, 0.017 is not an outlier.							
Dixon's Outlier Test for Barium (mw-8)							
Total N = 9							
Number NDs = 0							
Number Detects = 9							
10% critical value: 0.441							
5% critical value: 0.512							
1% critical value: 0.635							
Note: NDs excluded from Outlier Test							
1. Data Value 0.15 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.812							
For 10% significance level, 0.15 is an outlier.							
For 5% significance level, 0.15 is an outlier.							
For 1% significance level, 0.15 is an outlier.							
2. Data Value 0.011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.037							
For 10% significance level, 0.011 is not an outlier.							
For 5% significance level, 0.011 is not an outlier.							
For 1% significance level, 0.011 is not an outlier.							
No Outlier Test for Beryllium (background)							
No Outlier Test for Beryllium (mw-61)							
No Outlier Test for Beryllium (mw-7)							
No Outlier Test for Beryllium (mw-75)							
No Outlier Test for Beryllium (mw-8)							
Dixon's Outlier Test for Cadmium (background)							
Total N = 28							
Number NDs = 20							
Number Detects = 8							
10% critical value: 0.479							
5% critical value: 0.554							
1% critical value: 0.683							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00031 is a Potential Outlier (Upper T							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.077							
For 10% significance level, 0.00031 is not an outlier.							
For 5% significance level, 0.00031 is not an outlier.							
For 1% significance level, 0.00031 is not an outlier.							
2. Data Value 0.00012 is a Potential Outlier (Lower T							
Test Statistic: 0.333							
For 10% significance level, 0.00012 is not an outlier.							
For 5% significance level, 0.00012 is not an outlier.							
For 1% significance level, 0.00012 is not an outlier.							
Dixon's Outlier Test for Cadmium (mw-61)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0011 is a Potential Outlier (Upper T							
Test Statistic: 0.435							
For 10% significance level, 0.0011 is not an outlier.							
For 5% significance level, 0.0011 is not an outlier.							
For 1% significance level, 0.0011 is not an outlier.							
2. Data Value 0.00082 is a Potential Outlier (Lower T							
Test Statistic: 0.278							
For 10% significance level, 0.00082 is not an outlier.							
For 5% significance level, 0.00082 is not an outlier.							
For 1% significance level, 0.00082 is not an outlier.							
Dixon's Outlier Test for Cadmium (mw-7)							
Total N = 18							
Number NDs = 15							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0014 is a Potential Outlier (Upper T							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.969							
For 10% significance level, 0.0014 is an outlier.							
For 5% significance level, 0.0014 is an outlier.							
For 1% significance level, 0.0014 is not an outlier.							
2. Data Value 0.0001 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.031							
For 10% significance level, 0.0001 is not an outlier.							
For 5% significance level, 0.0001 is not an outlier.							
For 1% significance level, 0.0001 is not an outlier.							
Dixon's Outlier Test for Cadmium (mw-75)							
Total N = 11							
Number NDs = 0							
Number Detects = 11							
10% critical value: 0.517							
5% critical value: 0.576							
1% critical value: 0.679							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0024 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.0024 is not an outlier.							
For 5% significance level, 0.0024 is not an outlier.							
For 1% significance level, 0.0024 is not an outlier.							
2. Data Value 0.0019 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.0019 is not an outlier.							
For 5% significance level, 0.0019 is not an outlier.							
For 1% significance level, 0.0019 is not an outlier.							
Dixon's Outlier Test for Cadmium (mw-8)							
Total N = 9							
Number NDs = 1							
Number Detects = 8							
10% critical value: 0.479							
5% critical value: 0.554							
1% critical value: 0.683							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00096 is a Potential Outlier (Upper Tail)							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.265							
For 10% significance level, 0.00096 is not an outlier.							
For 5% significance level, 0.00096 is not an outlier.							
For 1% significance level, 0.00096 is not an outlier.							
2. Data Value 0.00011 is a Potential Outlier (Lower T							
Test Statistic: 0.032							
For 10% significance level, 0.00011 is not an outlier.							
For 5% significance level, 0.00011 is not an outlier.							
For 1% significance level, 0.00011 is not an outlier.							
Dixon's Outlier Test for Chromium (background)							
Total N = 26							
Number NDs = 18							
Number Detects = 8							
10% critical value: 0.479							
5% critical value: 0.554							
1% critical value: 0.683							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0035 is a Potential Outlier (Upper T							
Test Statistic: 0.320							
For 10% significance level, 0.0035 is not an outlier.							
For 5% significance level, 0.0035 is not an outlier.							
For 1% significance level, 0.0035 is not an outlier.							
2. Data Value 0.00065 is a Potential Outlier (Lower T							
Test Statistic: 0.021							
For 10% significance level, 0.00065 is not an outlier.							
For 5% significance level, 0.00065 is not an outlier.							
For 1% significance level, 0.00065 is not an outlier.							
Dixon's Outlier Test for Chromium (mw-61)							
Total N = 17							
Number NDs = 13							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00075 is a Potential Outlier (Upper T							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.565							
For 10% significance level, 0.00075 is not an outlier.							
For 5% significance level, 0.00075 is not an outlier.							
For 1% significance level, 0.00075 is not an outlier.							
2. Data Value 0.00052 is a Potential Outlier (Lower T							
Test Statistic: 0.000							
For 10% significance level, 0.00052 is not an outlier.							
For 5% significance level, 0.00052 is not an outlier.							
For 1% significance level, 0.00052 is not an outlier.							
Dixon's Outlier Test for Chromium (mw-7)							
Total N = 17							
Number NDs = 9							
Number Detects = 8							
10% critical value: 0.479							
5% critical value: 0.554							
1% critical value: 0.683							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0047 is a Potential Outlier (Upper T							
Test Statistic: 0.584							
For 10% significance level, 0.0047 is an outlier.							
For 5% significance level, 0.0047 is an outlier.							
For 1% significance level, 0.0047 is not an outlier.							
2. Data Value 0.00041 is a Potential Outlier (Lower T							
Test Statistic: 0.249							
For 10% significance level, 0.00041 is not an outlier.							
For 5% significance level, 0.00041 is not an outlier.							
For 1% significance level, 0.00041 is not an outlier.							
No Outlier Test for Chromium (mw-75)							
Dixon's Outlier Test for Chromium (mw-8)							
Total N = 8							
Number NDs = 2							
Number Detects = 6							
10% critical value: 0.482							
5% critical value: 0.56							
1% critical value: 0.698							
Note: NDs excluded from Outlier Test							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

1. Data Value 0.02 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.948							
For 10% significance level, 0.02 is an outlier.							
For 5% significance level, 0.02 is an outlier.							
For 1% significance level, 0.02 is an outlier.							
2. Data Value 0.0006 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.008							
For 10% significance level, 0.0006 is not an outlier.							
For 5% significance level, 0.0006 is not an outlier.							
For 1% significance level, 0.0006 is not an outlier.							
Dixon's Outlier Test for Cobalt (background)							
Total N = 28							
Number NDs = 14							
Number Detects = 14							
10% critical value: 0.492							
5% critical value: 0.546							
1% critical value: 0.641							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0045 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.261							
For 10% significance level, 0.0045 is not an outlier.							
For 5% significance level, 0.0045 is not an outlier.							
For 1% significance level, 0.0045 is not an outlier.							
2. Data Value 0.00064 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.479							
For 10% significance level, 0.00064 is not an outlier.							
For 5% significance level, 0.00064 is not an outlier.							
For 1% significance level, 0.00064 is not an outlier.							
Dixon's Outlier Test for Cobalt (mw-61)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

1. Data Value 0.017 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.017 is not an outlier.							
For 5% significance level, 0.017 is not an outlier.							
For 1% significance level, 0.017 is not an outlier.							
2. Data Value 0.01 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.333							
For 10% significance level, 0.01 is not an outlier.							
For 5% significance level, 0.01 is not an outlier.							
For 1% significance level, 0.01 is not an outlier.							
Dixon's Outlier Test for Cobalt (mw-7)							
Total N = 18							
Number NDs = 11							
Number Detects = 7							
10% critical value: 0.434							
5% critical value: 0.507							
1% critical value: 0.637							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0028 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.372							
For 10% significance level, 0.0028 is not an outlier.							
For 5% significance level, 0.0028 is not an outlier.							
For 1% significance level, 0.0028 is not an outlier.							
2. Data Value 0.00065 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.084							
For 10% significance level, 0.00065 is not an outlier.							
For 5% significance level, 0.00065 is not an outlier.							
For 1% significance level, 0.00065 is not an outlier.							
Dixon's Outlier Test for Cobalt (mw-75)							
Total N = 11							
Number NDs = 0							
Number Detects = 11							
10% critical value: 0.517							
5% critical value: 0.576							
1% critical value: 0.679							
Note: NDs excluded from Outlier Test							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

1. Data Value 0.049 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.143							
For 10% significance level, 0.049 is not an outlier.							
For 5% significance level, 0.049 is not an outlier.							
For 1% significance level, 0.049 is not an outlier.							
2. Data Value 0.039 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.444							
For 10% significance level, 0.039 is not an outlier.							
For 5% significance level, 0.039 is not an outlier.							
For 1% significance level, 0.039 is not an outlier.							
Dixon's Outlier Test for Cobalt (mw-8)							
Total N = 9							
Number NDs = 3							
Number Detects = 6							
10% critical value: 0.482							
5% critical value: 0.56							
1% critical value: 0.698							
Note: NDs excluded from Outlier Test							
1. Data Value 0.019 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.904							
For 10% significance level, 0.019 is an outlier.							
For 5% significance level, 0.019 is an outlier.							
For 1% significance level, 0.019 is an outlier.							
2. Data Value 0.00053 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.022							
For 10% significance level, 0.00053 is not an outlier.							
For 5% significance level, 0.00053 is not an outlier.							
For 1% significance level, 0.00053 is not an outlier.							
No Outlier Test for Lead (background)							
Dixon's Outlier Test for Lead (mw-61)							
Total N = 18							
Number NDs = 7							
Number Detects = 11							
10% critical value: 0.517							
5% critical value: 0.576							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

1% critical value: 0.679								
Note: NDs excluded from Outlier Test								
1. Data Value 0.001 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.524								
For 10% significance level, 0.001 is an outlier.								
For 5% significance level, 0.001 is not an outlier.								
For 1% significance level, 0.001 is not an outlier.								
2. Data Value 0.00078 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.143								
For 10% significance level, 0.00078 is not an outlier.								
For 5% significance level, 0.00078 is not an outlier.								
For 1% significance level, 0.00078 is not an outlier.								
No Outlier Test for Lead (mw-7)								
Dixon's Outlier Test for Lead (mw-75)								
Total N = 11								
Number NDs = 3								
Number Detects = 8								
10% critical value: 0.479								
5% critical value: 0.554								
1% critical value: 0.683								
Note: NDs excluded from Outlier Test								
1. Data Value 0.0041 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.818								
For 10% significance level, 0.0041 is an outlier.								
For 5% significance level, 0.0041 is an outlier.								
For 1% significance level, 0.0041 is an outlier.								
2. Data Value 0.0028 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.500								
For 10% significance level, 0.0028 is an outlier.								
For 5% significance level, 0.0028 is not an outlier.								
For 1% significance level, 0.0028 is not an outlier.								
Dixon's Outlier Test for Lead (mw-8)								
Total N = 9								
Number NDs = 6								
Number Detects = 3								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.500							
For 10% significance level, 0.44 is an outlier.							
For 5% significance level, 0.44 is an outlier.							
For 1% significance level, 0.44 is not an outlier.							
2. Data Value 0.35 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.200							
For 10% significance level, 0.35 is not an outlier.							
For 5% significance level, 0.35 is not an outlier.							
For 1% significance level, 0.35 is not an outlier.							
Dixon's Outlier Test for Lithium (mw-7)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 1.2 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.615							
For 10% significance level, 1.2 is an outlier.							
For 5% significance level, 1.2 is an outlier.							
For 1% significance level, 1.2 is an outlier.							
2. Data Value 0.75 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.286							
For 10% significance level, 0.75 is not an outlier.							
For 5% significance level, 0.75 is not an outlier.							
For 1% significance level, 0.75 is not an outlier.							
Dixon's Outlier Test for Lithium (mw-75)							
Total N = 11							
Number NDs = 0							
Number Detects = 11							
10% critical value: 0.517							
5% critical value: 0.576							
1% critical value: 0.679							
Note: NDs excluded from Outlier Test							
1. Data Value 0.48 is a Potential Outlier (Upper Tail)							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Test Statistic: 0.571							
For 10% significance level, 0.48 is an outlier.							
For 5% significance level, 0.48 is not an outlier.							
For 1% significance level, 0.48 is not an outlier.							
2. Data Value 0.4 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.400							
For 10% significance level, 0.4 is not an outlier.							
For 5% significance level, 0.4 is not an outlier.							
For 1% significance level, 0.4 is not an outlier.							
Dixon's Outlier Test for Lithium (mw-8)							
Total N = 9							
Number NDs = 0							
Number Detects = 9							
10% critical value: 0.441							
5% critical value: 0.512							
1% critical value: 0.635							
Note: NDs excluded from Outlier Test							
1. Data Value 1.5 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.750							
For 10% significance level, 1.5 is an outlier.							
For 5% significance level, 1.5 is an outlier.							
For 1% significance level, 1.5 is an outlier.							
2. Data Value 1.1 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
For 10% significance level, 1.1 is not an outlier.							
For 5% significance level, 1.1 is not an outlier.							
For 1% significance level, 1.1 is not an outlier.							
No Outlier Test for Mercury (background)							
No Outlier Test for Mercury (mw-61)							
No Outlier Test for Mercury (mw-7)							
No Outlier Test for Mercury (mw-75)							
No Outlier Test for Mercury (mw-8)							
Rosner's Outlier Test for 1 Outliers in Molybdenum (background)							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

Total N		28						
Number NDs		0						
Number Detects		28						
Mean of Detects		0.031						
SD of Detects		0.0191						
Number of data		28						
Number of suspected outliers		1						
s not included in the following:								
			Potential	Obs.	Test	Critical	Critical	
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)	
1	0.031	0.0187	0.096	1	3.475	2.88	3.2	
For 5% Significance Level, there is 1 Potential Outlier								
Therefore, Observation 0.096 is a Potential Statistical Outlier								
For 1% Significance Level, there is 1 Potential Outlier								
Dixon's Outlier Test for Molybdenum (mw-61)								
Total N = 18								
Number NDs = 0								
Number Detects = 18								
10% critical value: 0.424								
5% critical value: 0.475								
1% critical value: 0.561								
Note: NDs excluded from Outlier Test								
1. Data Value 0.085 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.333								
For 10% significance level, 0.085 is not an outlier.								
For 5% significance level, 0.085 is not an outlier.								
For 1% significance level, 0.085 is not an outlier.								
2. Data Value 0.069 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.091								
For 10% significance level, 0.069 is not an outlier.								
For 5% significance level, 0.069 is not an outlier.								
For 1% significance level, 0.069 is not an outlier.								
Dixon's Outlier Test for Molybdenum (mw-7)								
Total N = 18								
Number NDs = 2								
Number Detects = 16								
10% critical value: 0.454								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

5% critical value: 0.507							
1% critical value: 0.595							
Note: NDs excluded from Outlier Test							
1. Data Value 0.041 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.660							
For 10% significance level, 0.041 is an outlier.							
For 5% significance level, 0.041 is an outlier.							
For 1% significance level, 0.041 is an outlier.							
2. Data Value 0.0022 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.065							
For 10% significance level, 0.0022 is not an outlier.							
For 5% significance level, 0.0022 is not an outlier.							
For 1% significance level, 0.0022 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-75)							
Total N = 11							
Number NDs = 0							
Number Detects = 11							
10% critical value: 0.517							
5% critical value: 0.576							
1% critical value: 0.679							
Note: NDs excluded from Outlier Test							
1. Data Value 0.18 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.18 is not an outlier.							
For 5% significance level, 0.18 is not an outlier.							
For 1% significance level, 0.18 is not an outlier.							
2. Data Value 0.16 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.16 is not an outlier.							
For 5% significance level, 0.16 is not an outlier.							
For 1% significance level, 0.16 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-8)							
Total N = 9							
Number NDs = 0							
Number Detects = 9							
10% critical value: 0.441							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

5% critical value: 0.512							
1% critical value: 0.635							
Note: NDs excluded from Outlier Test							
1. Data Value 0.049 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.143							
For 10% significance level, 0.049 is not an outlier.							
For 5% significance level, 0.049 is not an outlier.							
For 1% significance level, 0.049 is not an outlier.							
2. Data Value 0.011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.091							
For 10% significance level, 0.011 is not an outlier.							
For 5% significance level, 0.011 is not an outlier.							
For 1% significance level, 0.011 is not an outlier.							
Dixon's Outlier Test for Selenium (background)							
Total N = 28							
Number NDs = 10							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.092 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.033							
For 10% significance level, 0.092 is not an outlier.							
For 5% significance level, 0.092 is not an outlier.							
For 1% significance level, 0.092 is not an outlier.							
2. Data Value 0.0017 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.001							
For 10% significance level, 0.0017 is not an outlier.							
For 5% significance level, 0.0017 is not an outlier.							
For 1% significance level, 0.0017 is not an outlier.							
Dixon's Outlier Test for Selenium (mw-61)							
Total N = 18							
Number NDs = 9							
Number Detects = 9							
10% critical value: 0.441							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

5% critical value: 0.512								
1% critical value: 0.635								
Note: NDs excluded from Outlier Test								
1. Data Value 0.0016 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.688								
For 10% significance level, 0.0016 is an outlier.								
For 5% significance level, 0.0016 is an outlier.								
For 1% significance level, 0.0016 is an outlier.								
2. Data Value 0.00066 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.033								
For 10% significance level, 0.00066 is not an outlier.								
For 5% significance level, 0.00066 is not an outlier.								
For 1% significance level, 0.00066 is not an outlier.								
Dixon's Outlier Test for Selenium (mw-7)								
Total N = 18								
Number NDs = 1								
Number Detects = 17								
10% critical value: 0.438								
5% critical value: 0.49								
1% critical value: 0.577								
Note: NDs excluded from Outlier Test								
1. Data Value 0.015 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.089								
For 10% significance level, 0.015 is not an outlier.								
For 5% significance level, 0.015 is not an outlier.								
For 1% significance level, 0.015 is not an outlier.								
2. Data Value 0.0026 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.105								
For 10% significance level, 0.0026 is not an outlier.								
For 5% significance level, 0.0026 is not an outlier.								
For 1% significance level, 0.0026 is not an outlier.								
Dixon's Outlier Test for Selenium (mw-75)								
Total N = 11								
Number NDs = 2								
Number Detects = 9								
10% critical value: 0.441								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

5% critical value: 0.512							
1% critical value: 0.635							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0026 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.0026 is not an outlier.							
For 5% significance level, 0.0026 is not an outlier.							
For 1% significance level, 0.0026 is not an outlier.							
2. Data Value 0.0021 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.0021 is not an outlier.							
For 5% significance level, 0.0021 is not an outlier.							
For 1% significance level, 0.0021 is not an outlier.							
Dixon's Outlier Test for Selenium (mw-8)							
Total N = 9							
Number NDs = 2							
Number Detects = 7							
10% critical value: 0.434							
5% critical value: 0.507							
1% critical value: 0.637							
Note: NDs excluded from Outlier Test							
1. Data Value 0.013 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.938							
For 10% significance level, 0.013 is an outlier.							
For 5% significance level, 0.013 is an outlier.							
For 1% significance level, 0.013 is an outlier.							
2. Data Value 0.00084 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.038							
For 10% significance level, 0.00084 is not an outlier.							
For 5% significance level, 0.00084 is not an outlier.							
For 1% significance level, 0.00084 is not an outlier.							
Dixon's Outlier Test for Thallium (background)							
Total N = 27							
Number NDs = 11							
Number Detects = 16							
10% critical value: 0.454							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

5% critical value: 0.507							
1% critical value: 0.595							
Note: NDs excluded from Outlier Test							
1. Data Value 0.017 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.987							
For 10% significance level, 0.017 is an outlier.							
For 5% significance level, 0.017 is an outlier.							
For 1% significance level, 0.017 is an outlier.							
2. Data Value 0.00035 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.826							
For 10% significance level, 0.00035 is an outlier.							
For 5% significance level, 0.00035 is an outlier.							
For 1% significance level, 0.00035 is an outlier.							
Dixon's Outlier Test for Thallium (mw-61)							
Total N = 18							
Number NDs = 8							
Number Detects = 10							
10% critical value: 0.409							
5% critical value: 0.477							
1% critical value: 0.597							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00018 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.400							
For 10% significance level, 0.00018 is not an outlier.							
For 5% significance level, 0.00018 is not an outlier.							
For 1% significance level, 0.00018 is not an outlier.							
2. Data Value 0.00011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.400							
For 10% significance level, 0.00011 is not an outlier.							
For 5% significance level, 0.00011 is not an outlier.							
For 1% significance level, 0.00011 is not an outlier.							
Dixon's Outlier Test for Thallium (mw-7)							
Total N = 18							
Number NDs = 7							
Number Detects = 11							
10% critical value: 0.517							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

5% critical value: 0.576							
1% critical value: 0.679							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00053 is a Potential Outlier (Upper T							
Test Statistic: 0.837							
For 10% significance level, 0.00053 is an outlier.							
For 5% significance level, 0.00053 is an outlier.							
For 1% significance level, 0.00053 is an outlier.							
2. Data Value 9.3E-05 is a Potential Outlier (Lower T							
Test Statistic: 0.055							
For 10% significance level, 9.3E-05 is not an outlier.							
For 5% significance level, 9.3E-05 is not an outlier.							
For 1% significance level, 9.3E-05 is not an outlier.							
No Outlier Test for Thallium (mw-75)							
No Outlier Test for Thallium (mw-8)							
Outlier Tests for Selected Uncensored Variables							
User Selected Options							
Date/Time of Computation		ProUCL 5.19/19/2018 12:03:23 AM					
From File		MultiUnit_FLUORIDE_AssessmentMont_Sept2018.xls					
Full Precision		OFF					
Rosner's Outlier Test for Fluoride (background)							
Mean		2.18					
Standard Deviation		1.353					
Number of data		28					
Number of suspected outliers		1					
			Potential	Obs.	Test	Critical	Critical
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)
1	2.18	1.328	5	1	2.123	2.88	3.2
For 5% Significance Level, there is no Potential Outlier							
For 1% Significance Level, there is no Potential Outlier							
Dixon's Outlier Test for Fluoride (mw-61)							
Number of Observations = 18							
10% critical value: 0.424							
5% critical value: 0.475							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

1% critical value: 0.561								
1. Observation Value 1.6 is a Potential Outlier (Upper)								
Test Statistic: 0.600								
For 10% significance level, 1.6 is an outlier.								
For 5% significance level, 1.6 is an outlier.								
For 1% significance level, 1.6 is an outlier.								
2. Observation Value 0.91 is a Potential Outlier (Lower)								
Test Statistic: 0.487								
For 10% significance level, 0.91 is an outlier.								
For 5% significance level, 0.91 is an outlier.								
For 1% significance level, 0.91 is not an outlier.								
Dixon's Outlier Test for Fluoride (mw-7)								
Number of Observations = 18								
10% critical value: 0.424								
5% critical value: 0.475								
1% critical value: 0.561								
1. Observation Value 4 is a Potential Outlier (Upper)								
Test Statistic: 0.889								
For 10% significance level, 4 is an outlier.								
For 5% significance level, 4 is an outlier.								
For 1% significance level, 4 is an outlier.								
2. Observation Value 0.35 is a Potential Outlier (Lower)								
Test Statistic: 0.111								
For 10% significance level, 0.35 is not an outlier.								
For 5% significance level, 0.35 is not an outlier.								
For 1% significance level, 0.35 is not an outlier.								
Dixon's Outlier Test for Fluoride (mw-75)								
Number of Observations = 11								
10% critical value: 0.517								
5% critical value: 0.576								
1% critical value: 0.679								
1. Observation Value 2 is a Potential Outlier (Upper)								
Test Statistic: 0.000								

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

For 10% significance level, 2 is not an outlier.									
For 5% significance level, 2 is not an outlier.									
For 1% significance level, 2 is not an outlier.									
2. Observation Value 1.2 is a Potential Outlier (Lower)									
Test Statistic: 0.625									
For 10% significance level, 1.2 is an outlier.									
For 5% significance level, 1.2 is an outlier.									
For 1% significance level, 1.2 is not an outlier.									
Dixon's Outlier Test for Fluoride (mw-8)									
Number of Observations = 9									
10% critical value: 0.441									
5% critical value: 0.512									
1% critical value: 0.635									
1. Observation Value 5 is a Potential Outlier (Upper)									
Test Statistic: 0.652									
For 10% significance level, 5 is an outlier.									
For 5% significance level, 5 is an outlier.									
For 1% significance level, 5 is an outlier.									
2. Observation Value 0.4 is a Potential Outlier (Lower)									
Test Statistic: 0.000									
For 10% significance level, 0.4 is not an outlier.									
For 5% significance level, 0.4 is not an outlier.									
For 1% significance level, 0.4 is not an outlier.									
Outlier Tests for Selected Variables excluding nondetects									
User Selected Options									
Date/Time of Computation		ProUCL 5.19/18/2018 10:10:05 PM							
From File		MultiUnit_COMBINEDRADIUM_AssessmentMont_Sept2018.xls							
Full Precision		OFF							
Dixon's Outlier Test for Combined_Radium (background)									
Total N = 29									
Number NDs = 6									
Number Detects = 23									
10% critical value: 0.374									
5% critical value: 0.421									
1% critical value: 0.505									
Note: NDs excluded from Outlier Test									

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

1. Data Value 3.5 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.333							
For 10% significance level, 3.5 is not an outlier.							
For 5% significance level, 3.5 is not an outlier.							
For 1% significance level, 3.5 is not an outlier.							
2. Data Value 0.7 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.200							
For 10% significance level, 0.7 is not an outlier.							
For 5% significance level, 0.7 is not an outlier.							
For 1% significance level, 0.7 is not an outlier.							
Dixon's Outlier Test for Combined_Radium (mw-61)							
Total N = 18							
Number NDs = 8							
Number Detects = 10							
10% critical value: 0.409							
5% critical value: 0.477							
1% critical value: 0.597							
Note: NDs excluded from Outlier Test							
1. Data Value 2.2 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.133							
For 10% significance level, 2.2 is not an outlier.							
For 5% significance level, 2.2 is not an outlier.							
For 1% significance level, 2.2 is not an outlier.							
2. Data Value 0.5 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.133							
For 10% significance level, 0.5 is not an outlier.							
For 5% significance level, 0.5 is not an outlier.							
For 1% significance level, 0.5 is not an outlier.							
Dixon's Outlier Test for Combined_Radium (mw-7)							
Total N = 18							
Number NDs = 3							
Number Detects = 15							
10% critical value: 0.472							
5% critical value: 0.525							
1% critical value: 0.616							
Note: NDs excluded from Outlier Test							

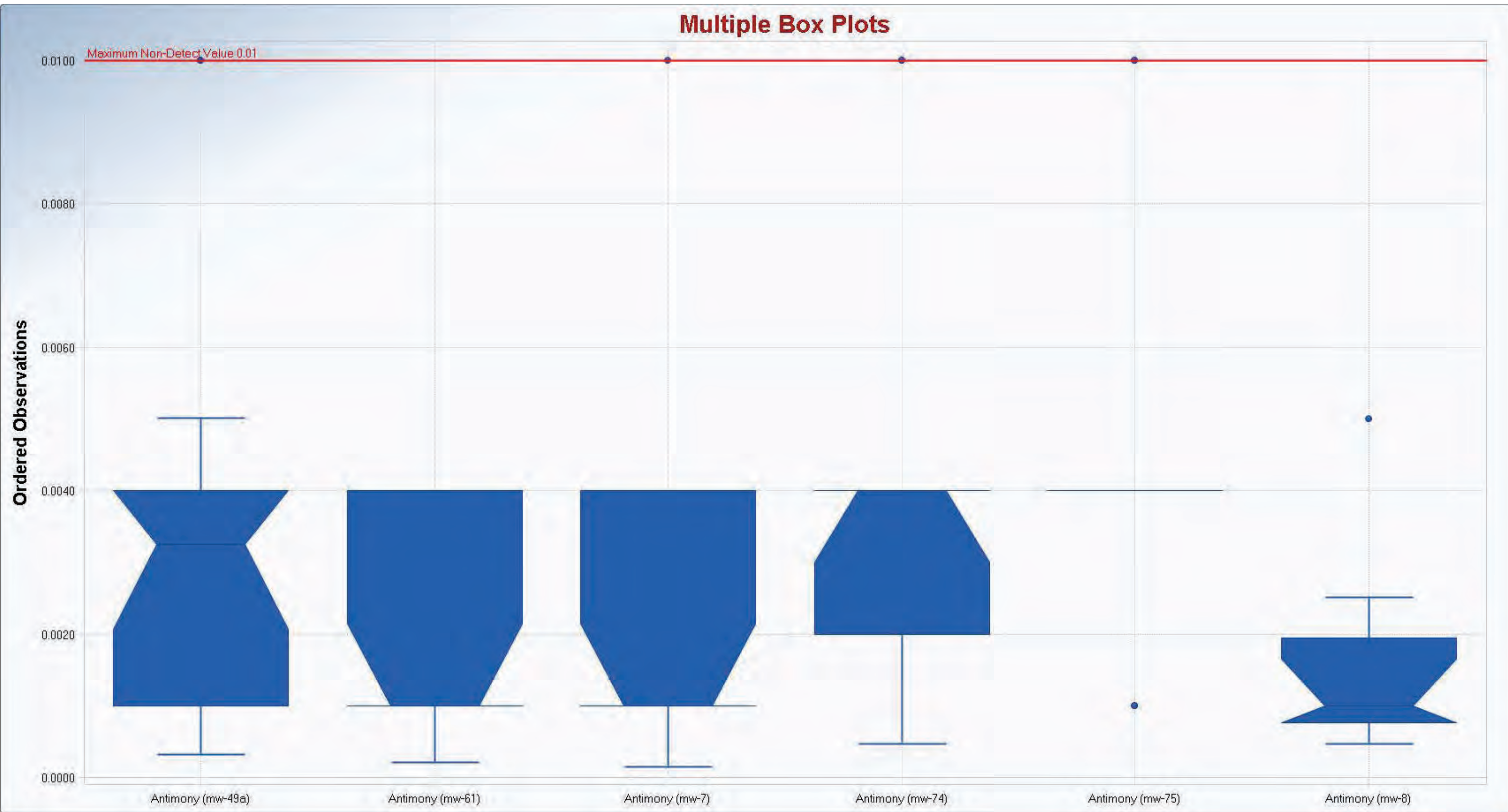
TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

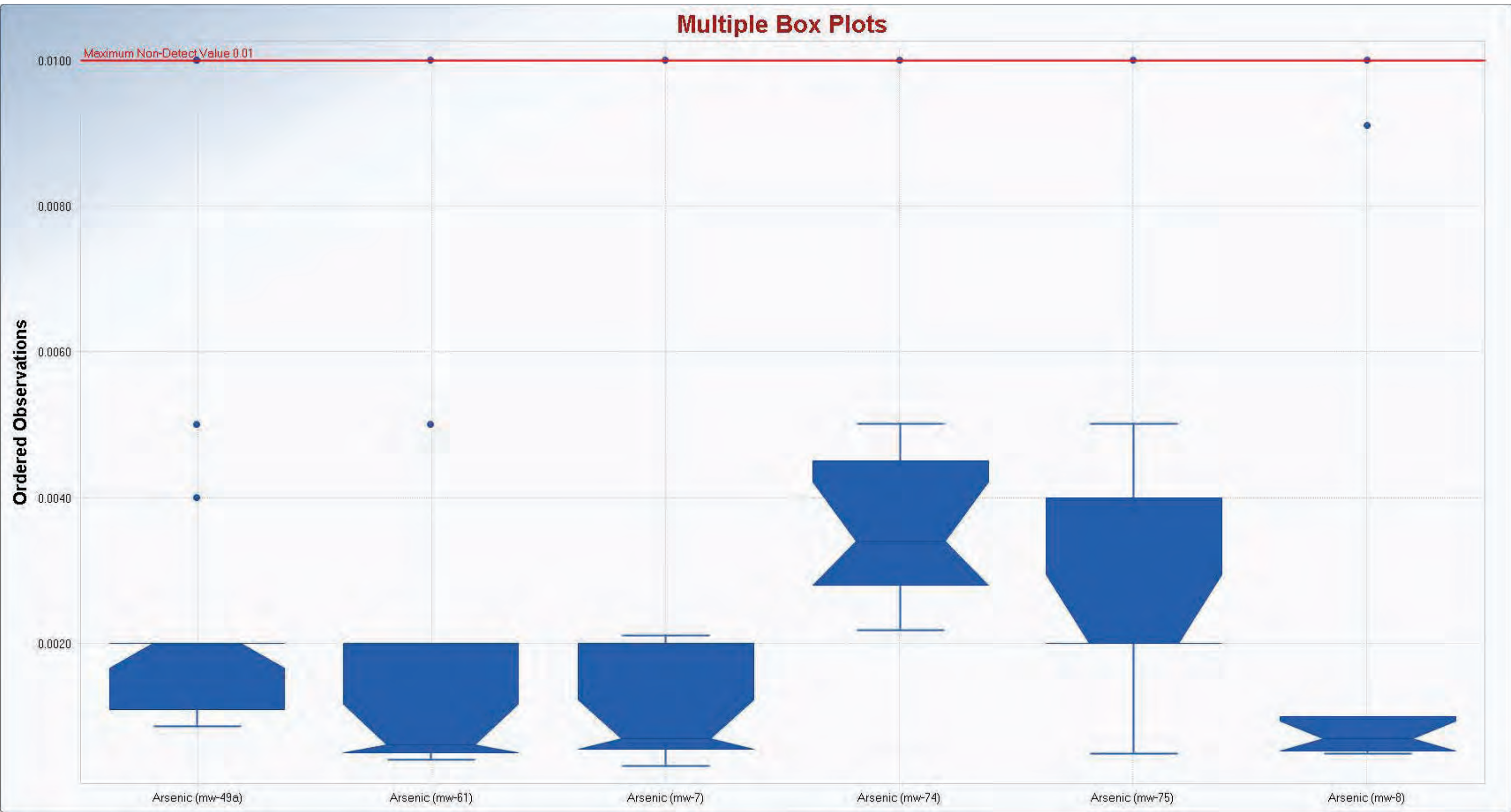
1. Data Value 3.3 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.333							
For 10% significance level, 3.3 is not an outlier.							
For 5% significance level, 3.3 is not an outlier.							
For 1% significance level, 3.3 is not an outlier.							
2. Data Value 0.7 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.263							
For 10% significance level, 0.7 is not an outlier.							
For 5% significance level, 0.7 is not an outlier.							
For 1% significance level, 0.7 is not an outlier.							
Dixon's Outlier Test for Combined_Radium (mw-75)							
Total N = 11							
Number NDs = 4							
Number Detects = 7							
10% critical value: 0.434							
5% critical value: 0.507							
1% critical value: 0.637							
Note: NDs excluded from Outlier Test							
1. Data Value 1.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.167							
For 10% significance level, 1.6 is not an outlier.							
For 5% significance level, 1.6 is not an outlier.							
For 1% significance level, 1.6 is not an outlier.							
2. Data Value 0.4 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.333							
For 10% significance level, 0.4 is not an outlier.							
For 5% significance level, 0.4 is not an outlier.							
For 1% significance level, 0.4 is not an outlier.							
Dixon's Outlier Test for Combined_Radium (mw-8)							
Total N = 9							
Number NDs = 1							
Number Detects = 8							
10% critical value: 0.479							
5% critical value: 0.554							
1% critical value: 0.683							
Note: NDs excluded from Outlier Test							

TABLE B-4
MULTIUNIT ProUCL OUTLIER TESTING*

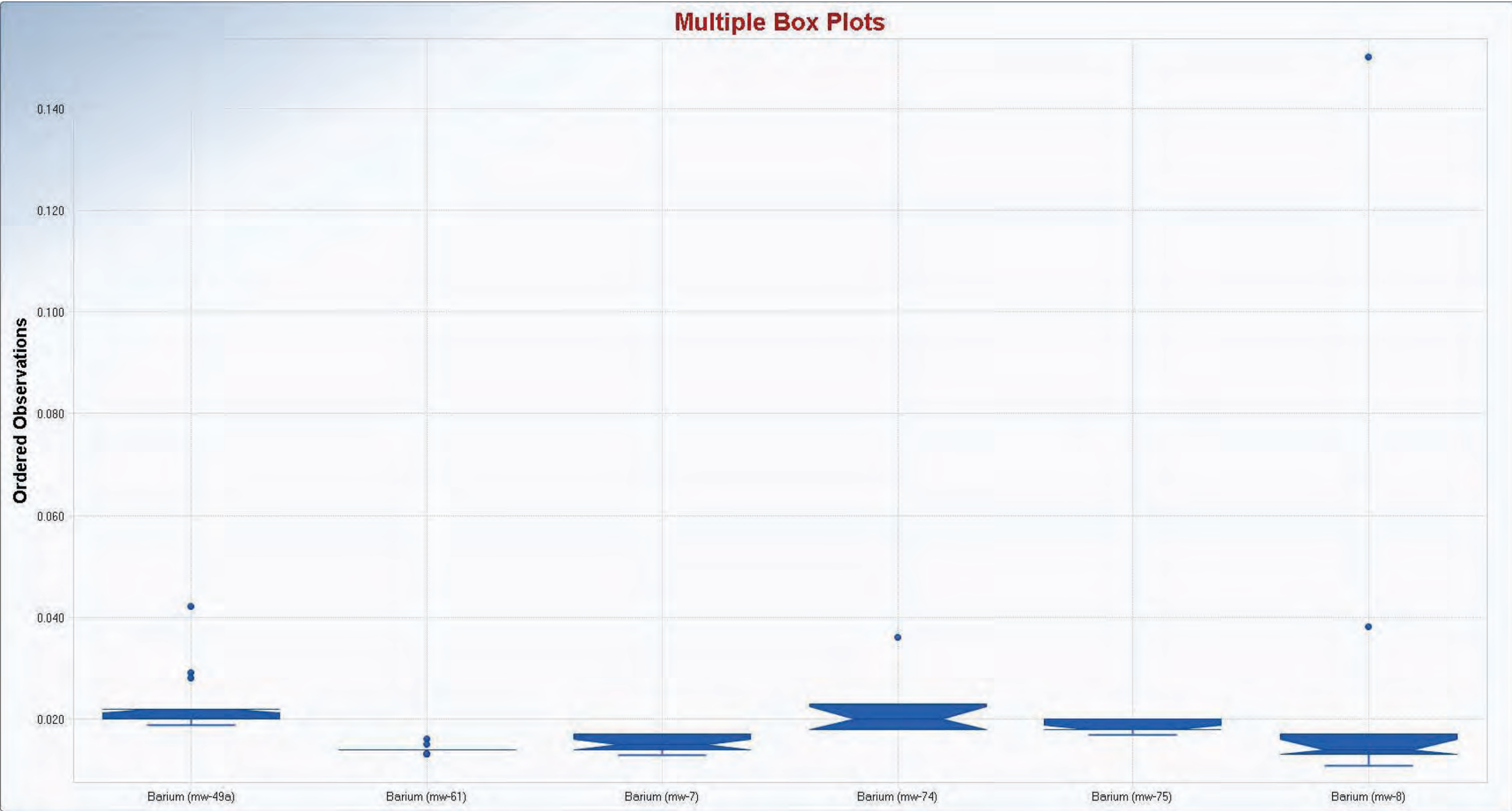
1. Data Value 4.66 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.798							
For 10% significance level, 4.66 is an outlier.							
For 5% significance level, 4.66 is an outlier.							
For 1% significance level, 4.66 is an outlier.							
2. Data Value 1 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.222							
For 10% significance level, 1 is not an outlier.							
For 5% significance level, 1 is not an outlier.							
For 1% significance level, 1 is not an outlier.							

Multiple Box Plots

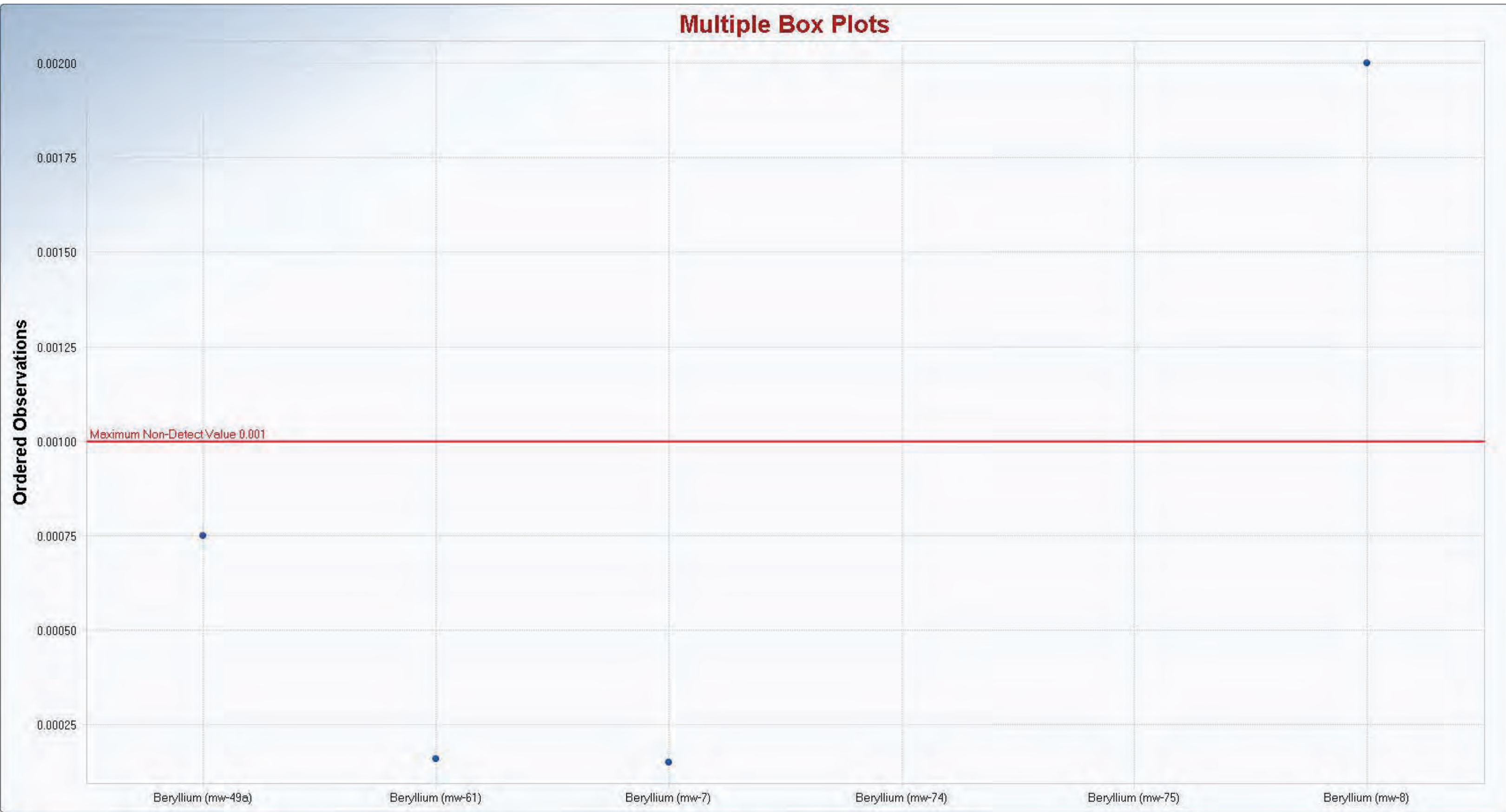




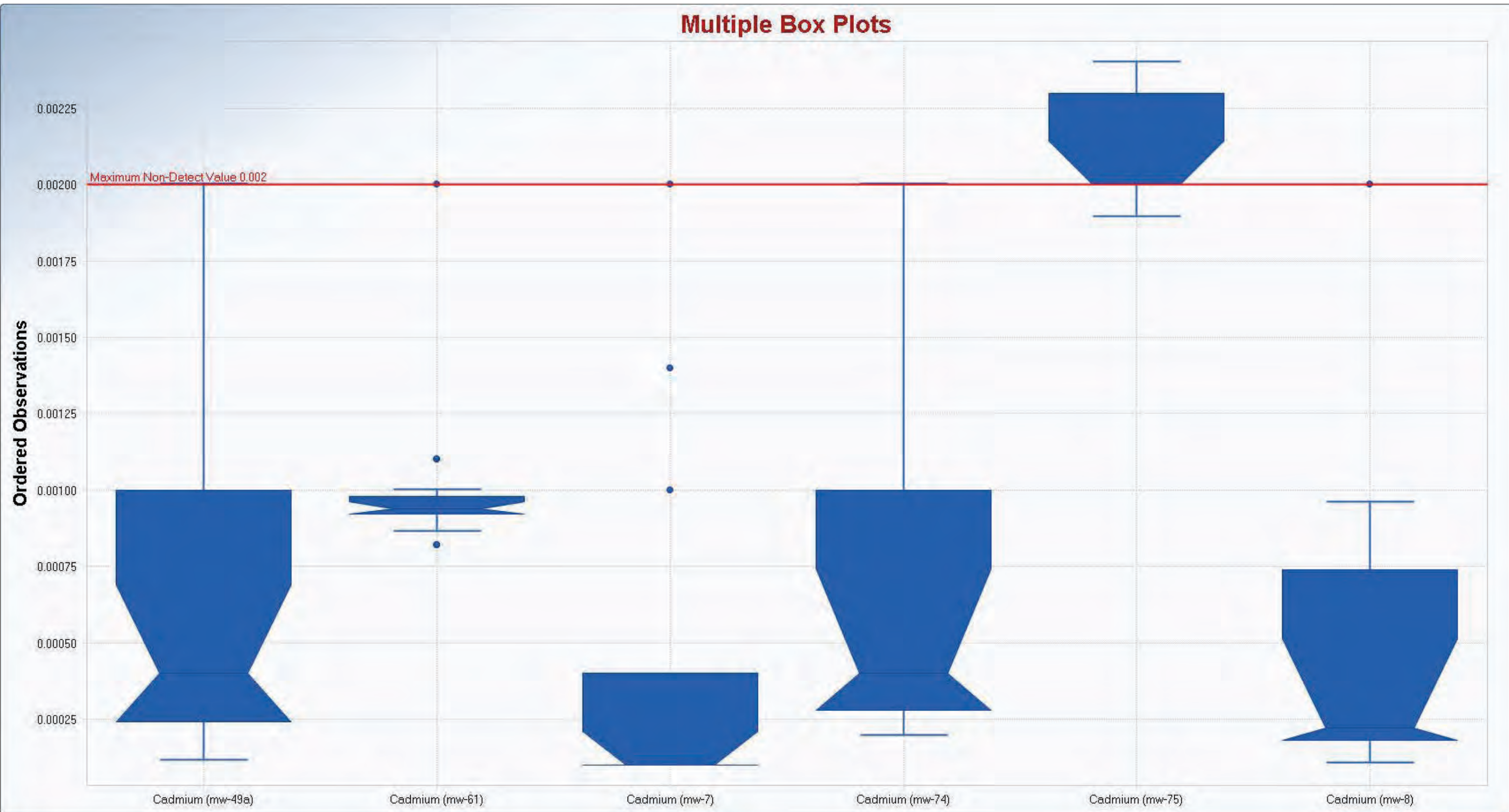
Multiple Box Plots



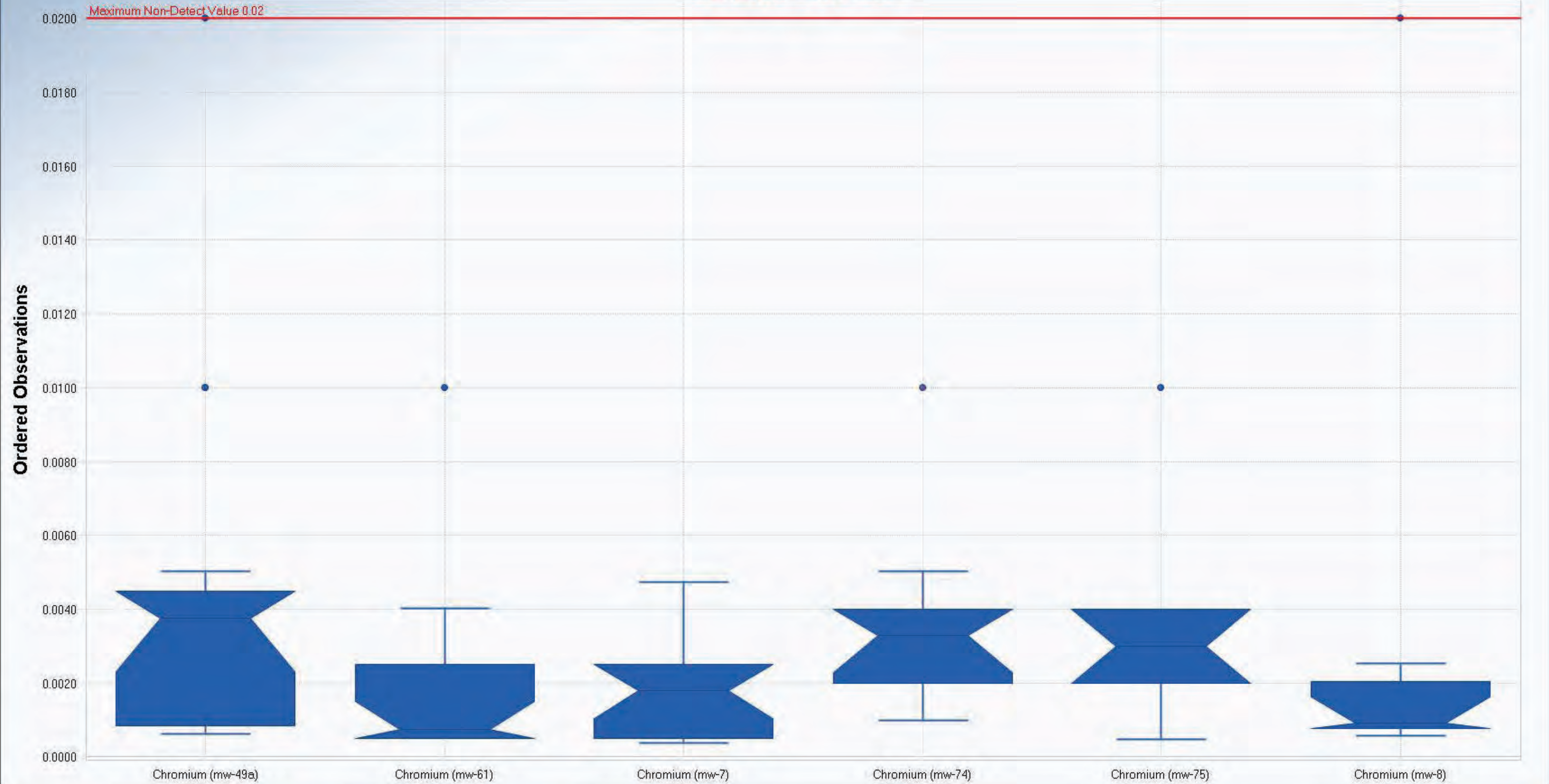
Multiple Box Plots



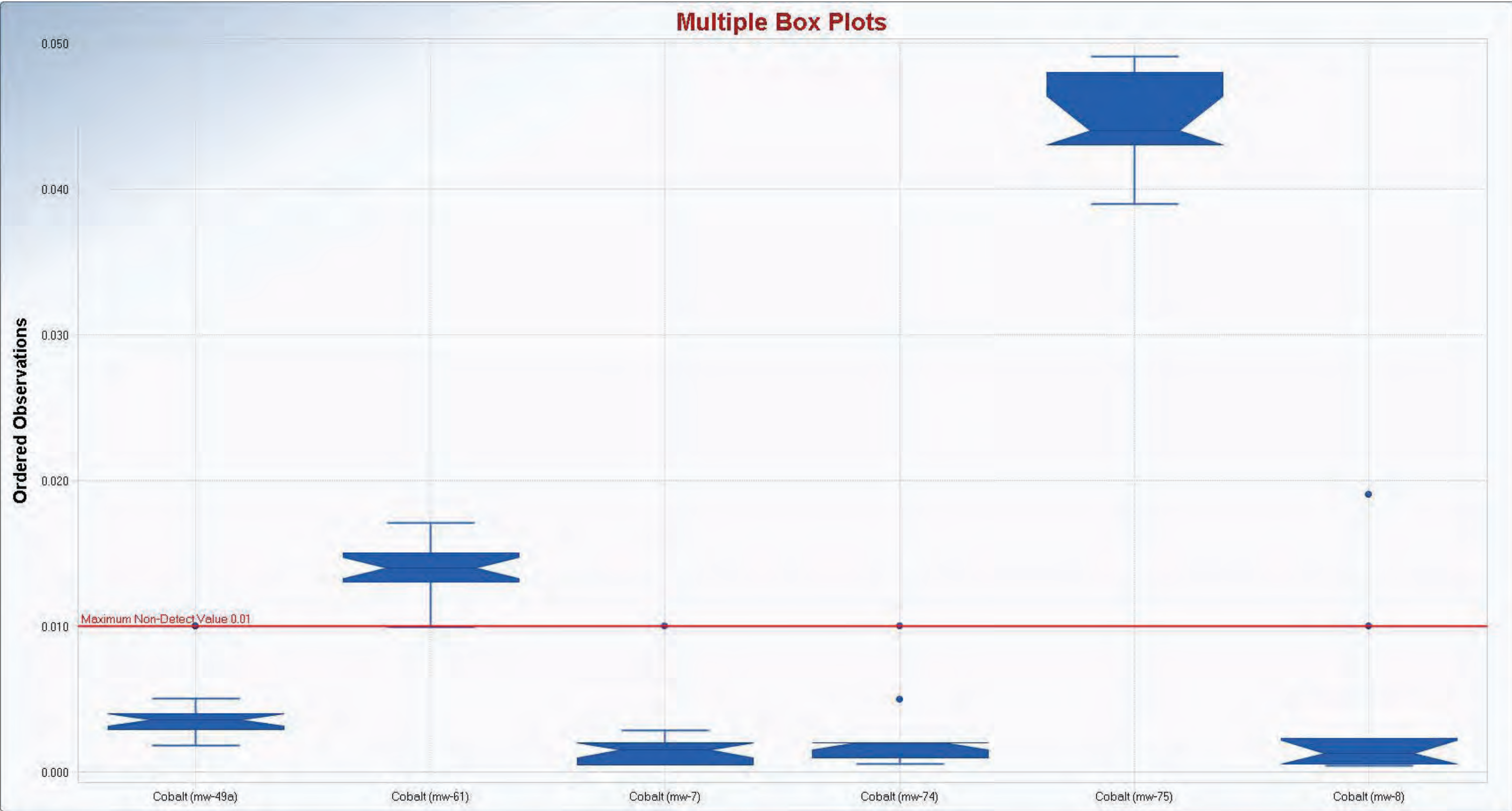
Multiple Box Plots



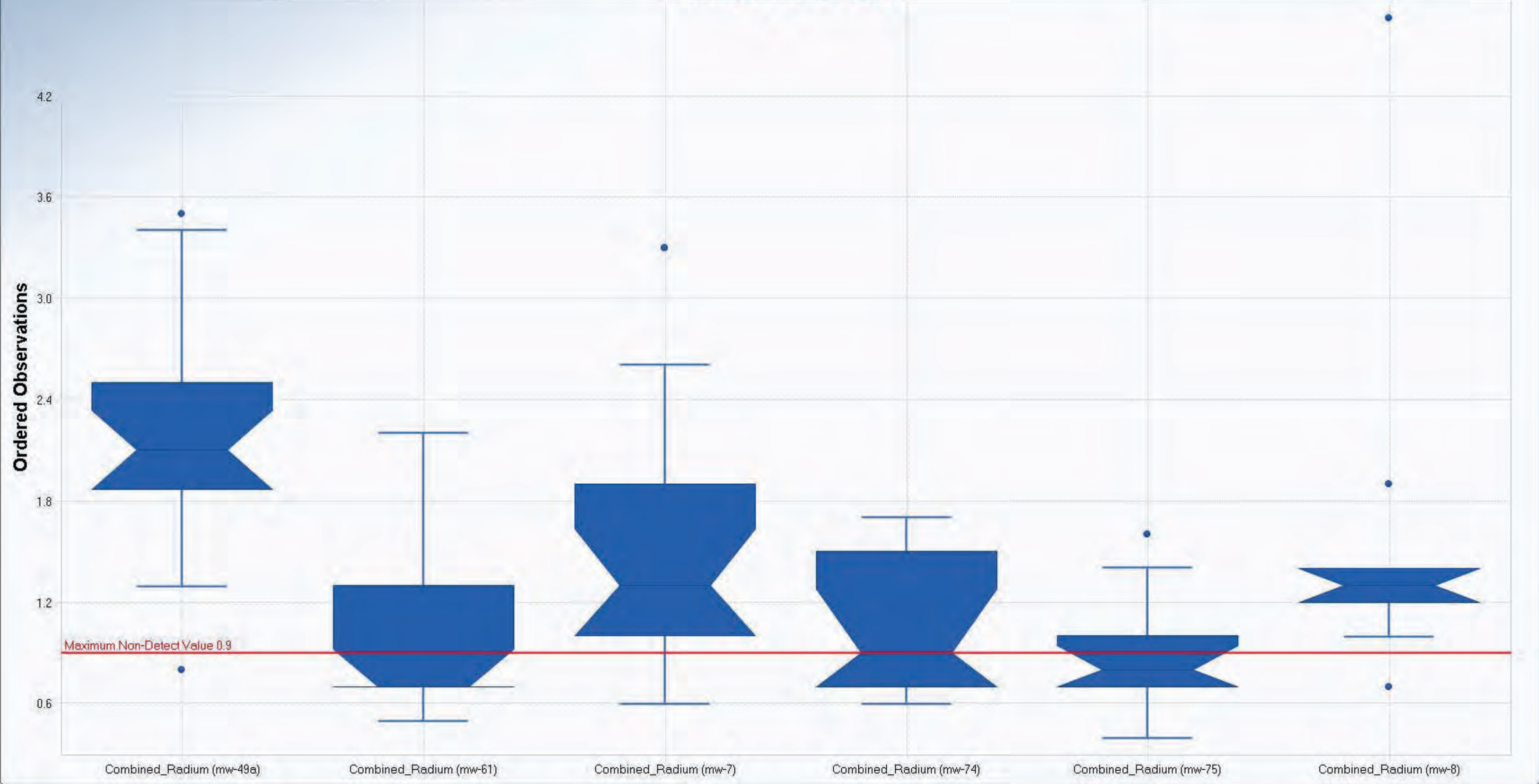
Multiple Box Plots



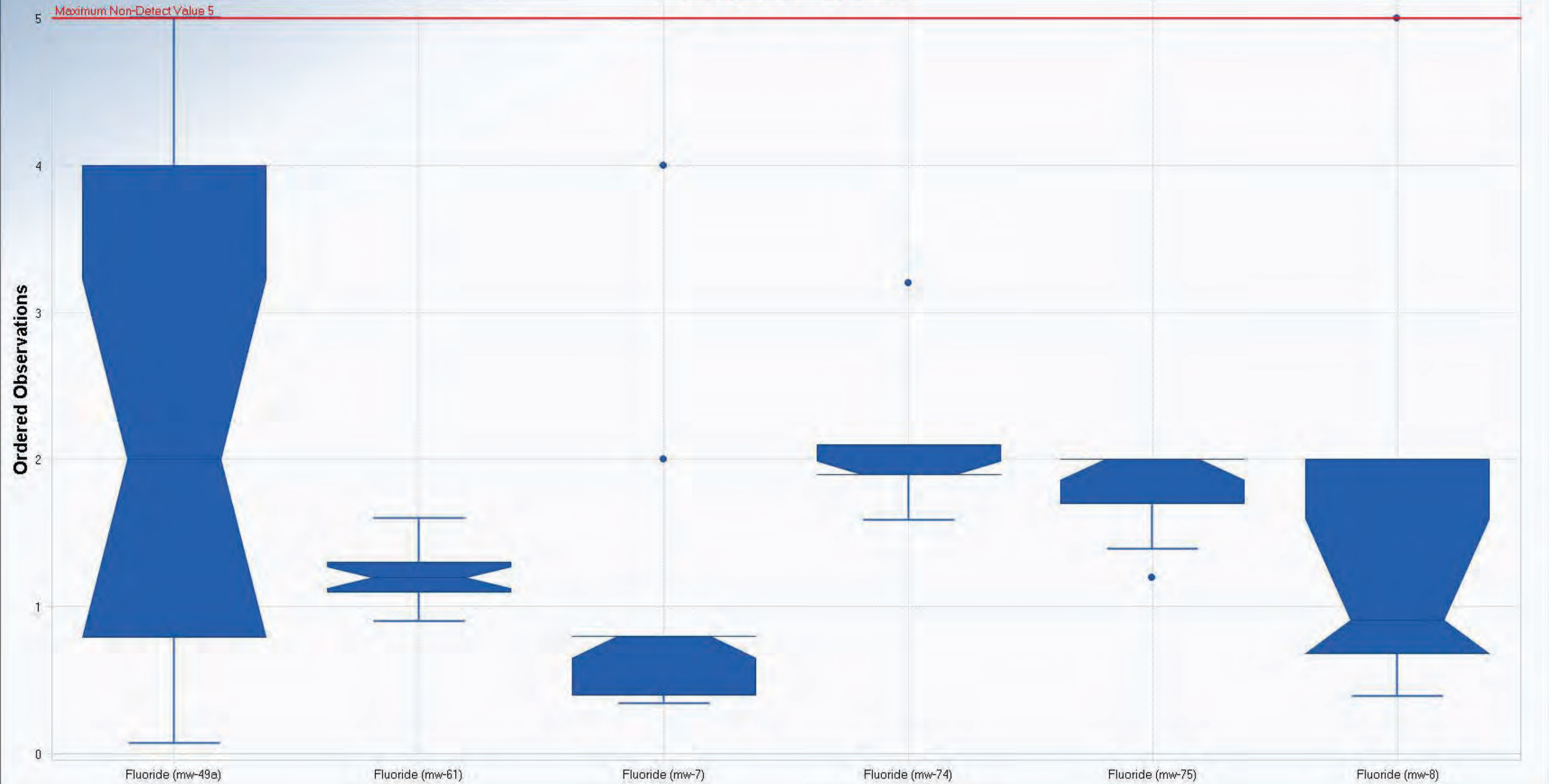
Multiple Box Plots



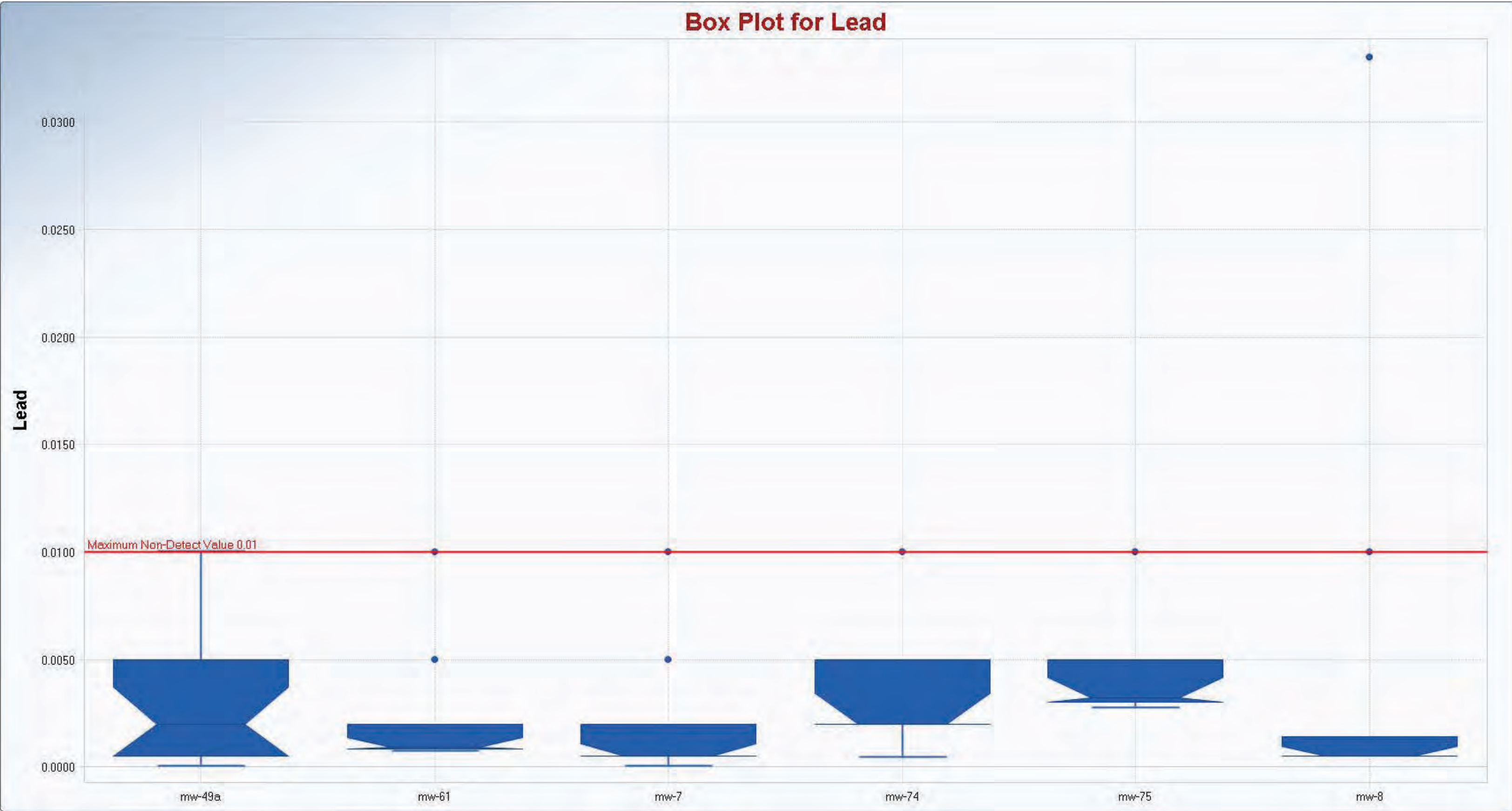
Multiple Box Plots

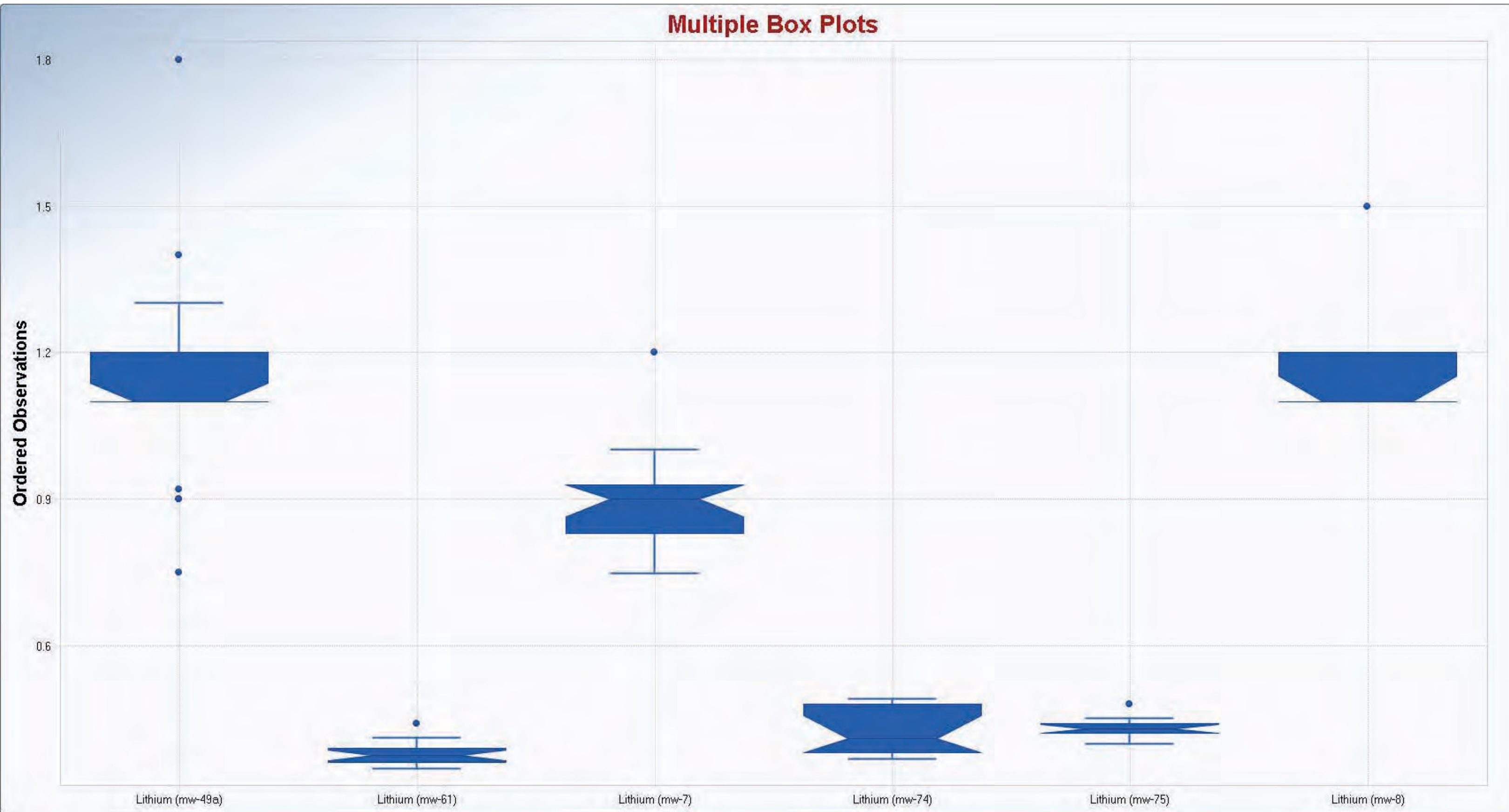


Multiple Box Plots

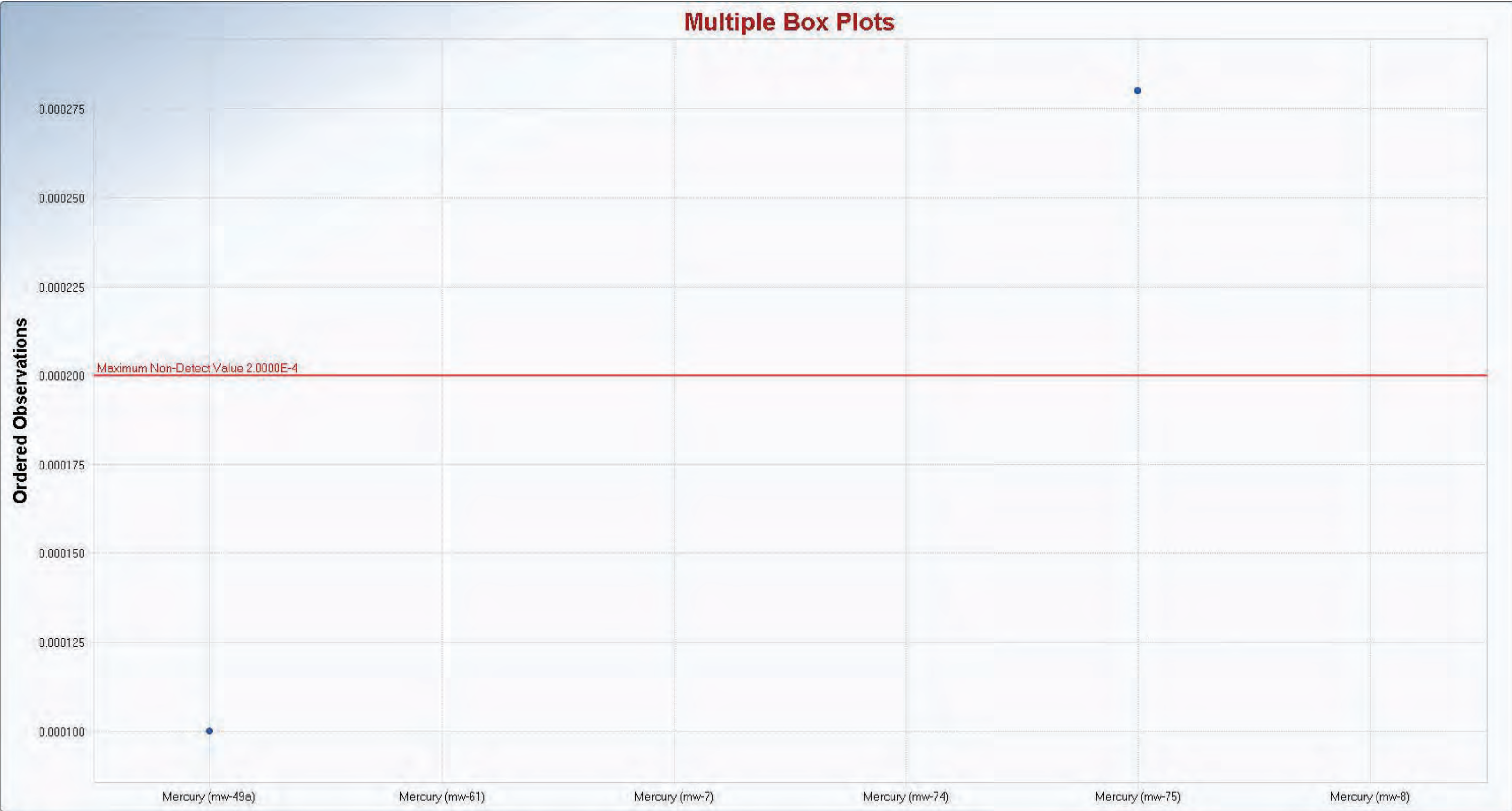


Box Plot for Lead

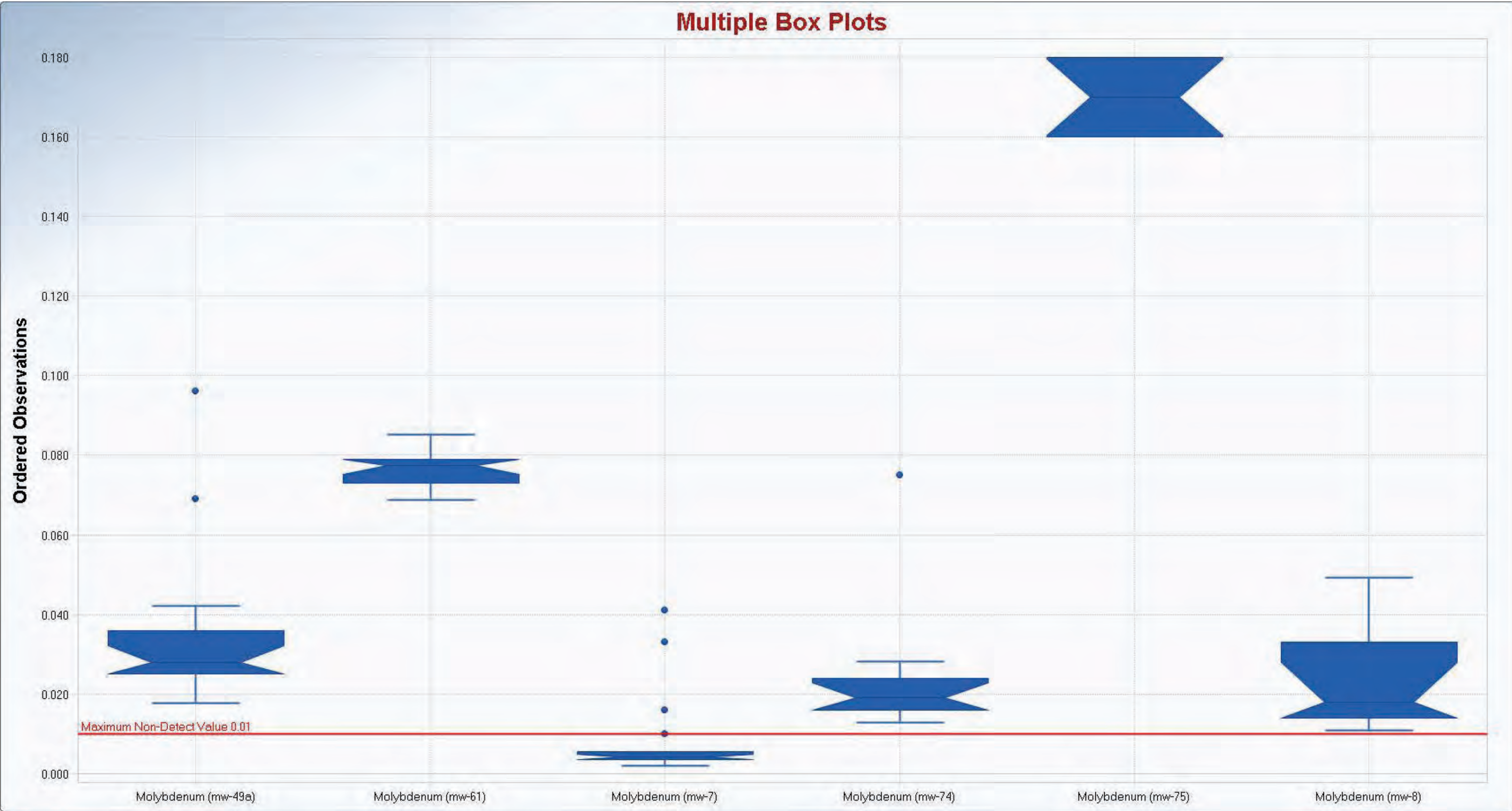




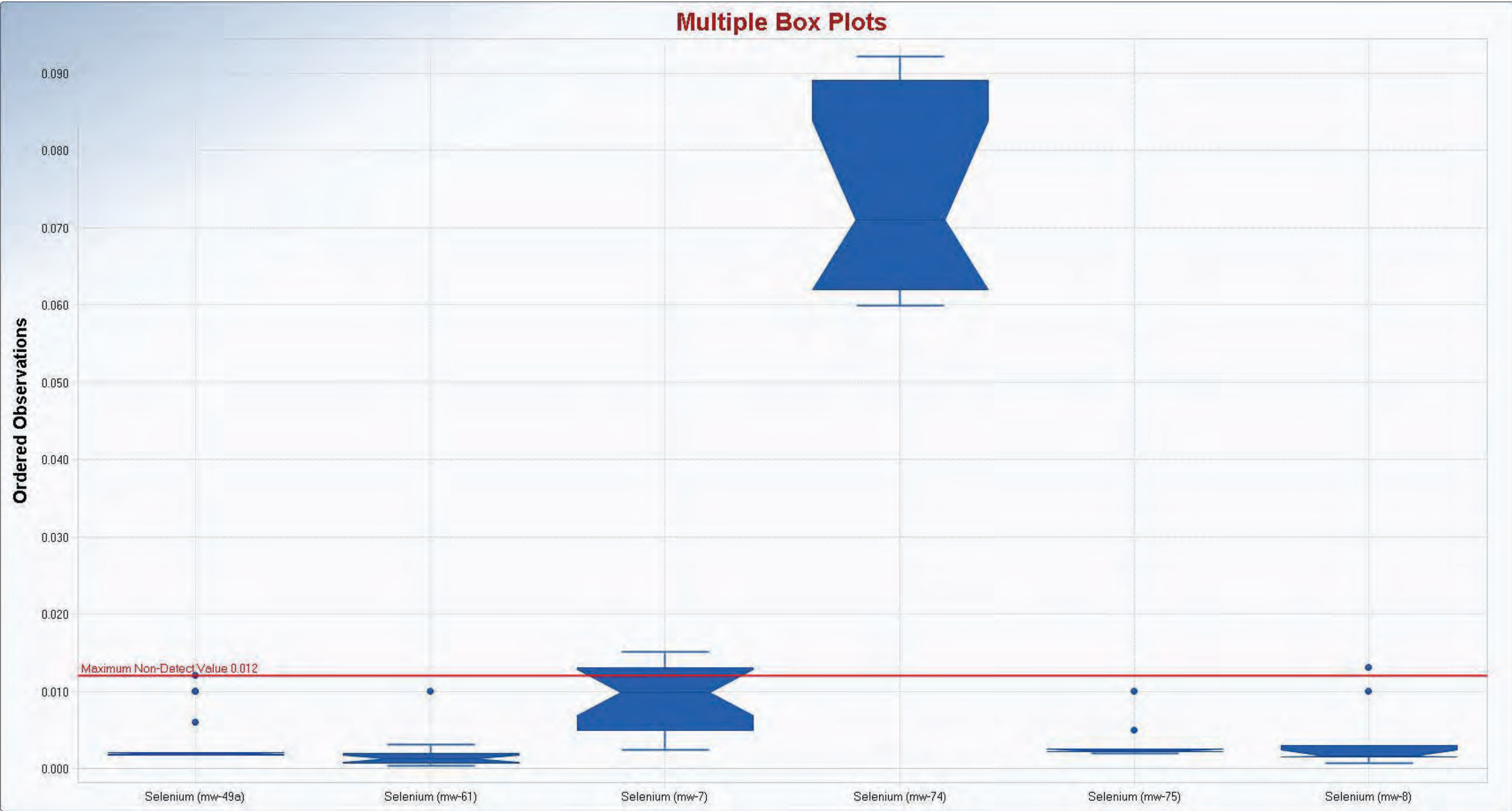
Multiple Box Plots



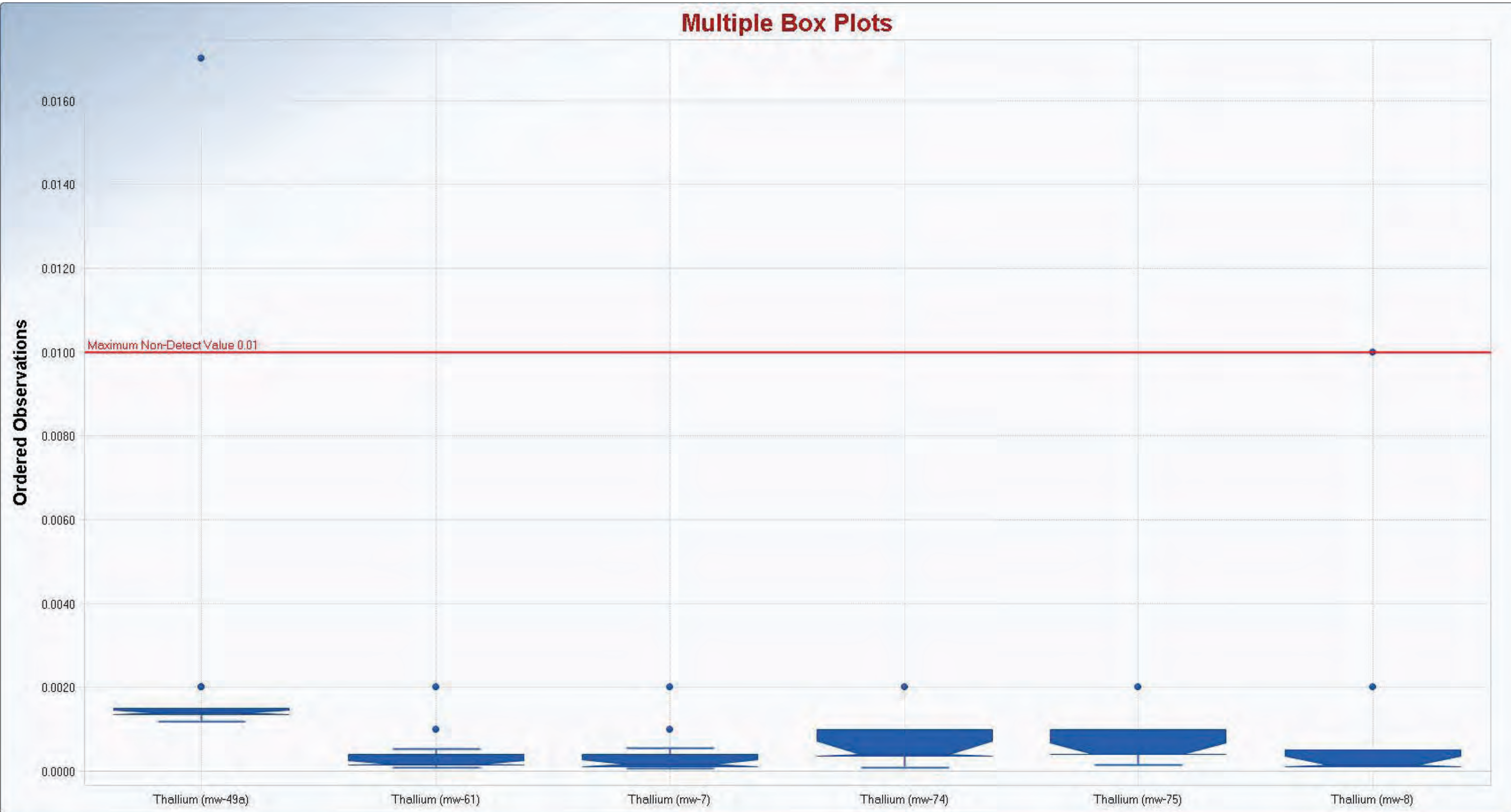
Multiple Box Plots



Multiple Box Plots



Multiple Box Plots



APPENDIX J

**WOOD TECHNICAL MEMORANDUM DOCUMENTING THE STATISTICAL ANALYSIS
OF INITIAL ASSESSMENT MONITORING APPENDIX IV CONSTITUENT DATA
COLLECTED FROM THE URS**



Technical Memorandum

To: Michele Robertson, RG
Pamela Norris
File No: 1420162024.4.4

From: Natalie Chrisman Lazarr, PE
Carla Landrum, PhD
cc: File

Date: October 15, 2018

**Subject: CCR GROUNDWATER ASSESSMENT MONITORING
STATISTICAL ANALYSIS AND RESULTS FOR THE UPPER RETENTION SUMP
Arizona Public Service Four Corners Power Plant – Fruitland, New Mexico**

1.0 INTRODUCTION

This Technical Memorandum (Tech Memo) documents the initial statistical evaluation of assessment monitoring (i.e., Appendix IV constituent) groundwater data at the Upper Retention Sump (URS) located at the Arizona Public Service (APS) Four Corners Power Plant (FCPP) in Fruitland, New Mexico. The statistical methods and analysis include the determination of groundwater protection standards (GWPSs) for Appendix IV constituents using statistically-driven background threshold values (BTVs), the applicable U.S. Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) promulgated under the Safe Drinking Water Act, or alternative risk-based GWPSs established in the statute, whichever is higher (40 Code of Federal Regulations [CFR] Section [§] 257.95(h)). The statistical method selection process for evaluating assessment monitoring data was selected pursuant to the Coal Combustion Residuals (CCR) Rule (40 CFR § 257.93(f)(3)) and the analysis approach documented in the FCPP Statistical Data Analysis Work Plan (Wood, 2018).

The following sections detail data inputs, statistical evaluations, results and recommendations for the subject analysis.

2.0 DATA INPUTS

2.1 Appendix IV Constituent Data

The URS groundwater monitoring well network consists of three background monitoring wells (MW-71, MW-72 and MW-73) and five compliance (i.e., downgradient), monitoring wells (MW-66, MW-67, MW-68, MW-69 and MW-70) with usable data for statistical analysis.

The period of evaluation for the URS Appendix IV constituent statistical analysis ranges from November 2015 through June 2018 and includes site data collected during a minimum of eight initial rounds of detection monitoring (for both Appendix III and IV constituents) and two rounds of assessment monitoring (for Appendix IV constituents). The duration is shorter (i.e. February 2017 through June 2018) for MW-73, which was installed in January 2017.

Due principally to the addition of wells to the monitoring program in 2016 and the CCR Rule requirement that a minimum of eight initial rounds of data be collected from the site prior to October 17, 2017, the frequency of sample collection prior to this date is short and variable (e.g. biweekly to quarterly sampling).



Assessment monitoring was performed on a quarterly basis and the first round of assessment monitoring at the URS was conducted in March 2018; all Appendix IV constituents were evaluated in collected samples during this monitoring event. During the second round of assessment monitoring conducted in June 2018, only detected Appendix IV constituents from the first round of assessment monitoring were evaluated in collected samples as prescribed by the CCR Rule. Based on these frequencies of sample collection for Appendix IV constituents, the minimum sample numbers used in the statistical evaluation of available data were 16 and 24 for compliance monitoring wells and pooled background monitoring wells, respectively

Appendix A contains the contents of the ProUCL data upload tables for the subject analysis. The Appendix IV analytes are listed by name as column headers in the ProUCL data upload table. Each analyte has a corresponding data column (indicated with a "D_" prefix) that indicates if the analyte was detected or not at a concentration that exceeds the analytical reporting limit, where detectable concentrations are symbolized by a "1" and non-detectable concentrations are symbolized by a "0". The non-detectable concentration corresponds the analyte's reporting limit value for the corresponding sample date. Duplicates were retracted using a random selection process. Combined radium and fluoride data exhibit unique sampling dates and/or duplicate records; therefore, these analytes were segregated into separate worksheets for duplicate retraction and software upload.

2.2 MCLs and Alternative Risk-Based GWPSs

As presented in the Introduction of this Tech Memo, the CCR Rule stipulates that GWPSs used in evaluation of assessment monitoring data are established by comparing the applicable U.S. EPA MCL or an alternative risk-based GWPS to a statistically-driven BTV calculated from background well data. The highest value is selected as the GWPS for each constituent. Table 1 lists the MCLs and alternative risk-based GWPSs used in this analysis.

3.0 STATISTICAL METHODS

Assessment monitoring data evaluation implements a single-sample population testing approach, where downgradient samples are compared to a pre-defined standard, in this case the GWPS. The detection monitoring data evaluation differs in that it is a two-sample population (or more) testing approach, where there is no GWPS to compare for compliance assessment. As such, the statistical methods and testing approaches differ between detection monitoring and assessment monitoring.

To establish BTVs for each Appendix IV constituent, background well data underwent exploratory data analysis (EDA) to select an appropriate statistical test for calculating the BTVs (see Section 3.1). In accordance with the Unified Guidance (U.S. EPA, 2009) and CCR Rule (40 C.F.R. § 257.93(f)(3)), the Statistical Data Analysis Work Plan (Wood, 2018) identifies the upper tolerance limit (UTL) method as the prescribed approach for establishing BTVs. This method encompasses a variety of statistical tests to establish BTVs in instances where a promulgated U.S. EPA MCL or alternative risk-based GWPS exists. The purpose of selecting the UTL method is its ability to serve as a single-sample statistical comparison. The statistical hypothesis structure for a single-sample comparison is reversible, such that the same fixed background level can be used for assessment monitoring and later for corrective action comparison testing, if necessary. The UTL tests are applicable for analytes that exhibit non-detectable frequencies of less than 100%. The U.S. EPA's Unified Guidance (2009) and the Statistical Data Analysis Work Plan (Wood, 2018) promotes the use of the Double Quantification Rule (DQR) to calculate the UTL in cases where the background non-detection frequency is equal to 100%. Where applicable, the DQR uses the maximum reporting limit (RL) as the BTV.

After establishing a GWPS it is appropriate to compare compliance data for each Appendix IV constituent to the corresponding GWPS. To perform this comparison, a threshold limit was established for each Appendix IV constituent in each compliance well using the confidence interval statistical method. This method encompasses a variety of statistical tests (U.S. EPA, 2009). For assessment monitoring, the lower confidence limit (LCL) for each Appendix IV constituent is compared to its respective GWPS to assess if the lower limit exceeds the GWPS and, if so, declares a statistically significant increase (SSI) in constituent concentrations above the GWPS. Much like the UTL, the confidence interval method's use is reversible. For assessment monitoring, the lower confidence limit is compared to the GWPS to determine if there is a potential release from the CCR unit whereas for the upper confidence limit is compared to the GWPS for corrective action analysis to assess if corrective action is successful. Each compliance well analyte underwent EDA (see Section 3.2) to ensure that the compliance well had no sample outliers and to assess for statistically-significant ($p < 0.05$) increasing or decreasing temporal trends in the sample data. The EDA process also identified which statistical distribution the sample data best fit to select an appropriate statistical comparison (e.g. parametric versus non-parametric) to the GWPS (Wood, 2018).

The following section describe these statistical methods in more detail.

3.1 EDA Workflow Procedures

EDA is a data diagnostic step that generates qualitative and quantitative information necessary to select a defensible statistical method for determining if there is a SSI over the GWPS. Figure 1 generalizes the EDA workflow, including assessment of spatial heterogeneity, trend detection, data distribution assessment, and outlier detection. Sample number, monitoring well network configuration, sampling frequency and non-detect frequency determine which EDA methods are most useful. The final EDA step is selecting an adequate and appropriate statistical method. Notably, the EDA workflow procedure is standard between detection monitoring and assessment monitoring.

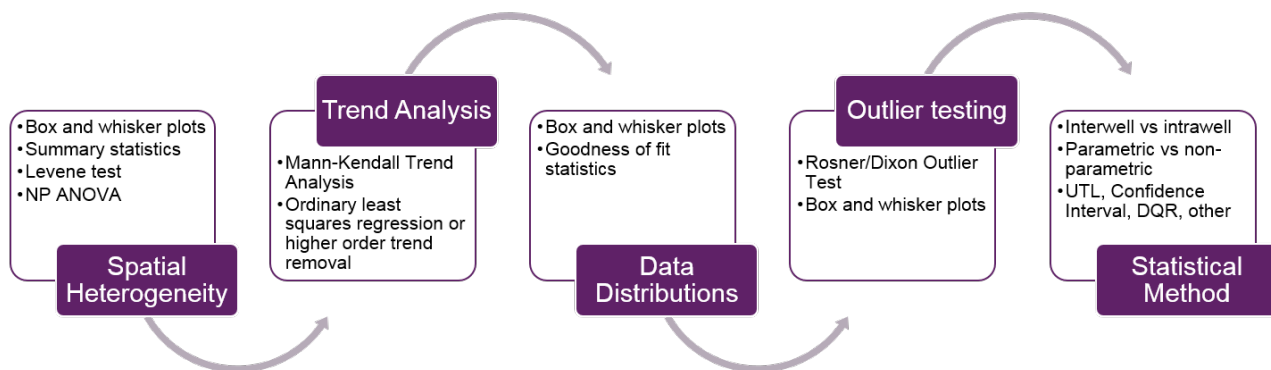


Figure 1. Assessment monitoring EDA and statistical method workflow procedures. Each box represent as separate step in the EDA workflow process. The items listed in each box identifies the statistical method(s) applied for each step. Both quantitative and qualitative methods are listed.

There are a number of different types of tolerance limit and confidence interval quantification methods to select from, depending on the statistical distribution, the presence of a temporal trend, the type of statistical comparison (e.g. interwell or intrawell) and the quantity of non-detect values in the background sample data. The following subsections describe these methods and criteria for their selection.

Appendix B summarizes the results of the EDA of URS Appendix IV groundwater data.

3.2 Establishing Background Threshold Values

The EDA results for the subject analysis suggest that three UTL statistical tests are appropriate for collected URS background groundwater data: the parametric interwell upper tolerance limit, non-parametric interwell upper tolerance limit and the Double Quantification Rule. This work assumes that background well locations are adequate and thereby declare interwell comparisons appropriate. Each statistical test is described below.

3.2.1 Parametric Interwell Upper Tolerance Limit (P-UTL)

An interwell UTL represents an upper boundary, or threshold concentration value, that contains a pre-specified proportion, or coverage, of the underlying statistical population. For example, this coverage can range from 95% to 99% of all possible sample measurements in the underlying background statistical population, depending on the data characteristics. To be meaningful, testing with the UTL assumes that this coverage is similar for any statistically similar population (e.g. downgradient compliance wells), thereby underscoring the importance of a representative background well. Declaring a tolerance coefficient is necessary to establish confidence that the background sample dataset contains the pre-specified coverage (U.S. EPA, 2009). Oftentimes a tolerance coefficient of at least 95% is used, which corresponds to a significance level (α) equal to 5% (U.S. EPA, 2009). Table 17-3 within the Unified Guidance (U.S. EPA, 2009) combines the coverage and confidence to calculate the UTL.

A parametric interwell upper tolerance limit (P-UTL) was calculated if the background sample data generally met the following criteria, which are tested using procedures declared in the Statistical Data Analysis Work Plan (Wood, 2018):

1. Temporal stationarity (no trend in concentration through time)
2. Normal or transformed normal data distribution
3. Spatial heterogeneity is minimal
4. Sample outliers have been removed
5. Sample data are statistically independent and identically distributed

The P-UTLs were calculated using a 99% coverage with a 95% confidence. Although the Unified Guidance (U.S. EPA, 2009) recommends at least a 95% coverage, the 99% coverage is justifiable for the following reasons:

- 1) The sampling frequency for the November 2015 to June 2018 sampling period is higher than quarterly in some cases, suggesting the background sample data might not be independent samples and might underrepresent long-term temporal variations in groundwater constituent concentrations. A larger coverage can help compensate for underrepresented temporal variation. A more conservative coverage (i.e. only 95%) is suggested once a longer history of samples exists and the background sampling frequency becomes more consistent (e.g., semiannual).
- 2) Spatial heterogeneity is suspected at the URS. Spatial heterogeneity introduces uncertainty in the sample data in that one sample location might have naturally occurring elevated concentrations of a constituent relative to other sample locations. This uncertainty can increase the chance of a declaring a false positive SSI. By increasing the UTL coverage it is possible to reduce the chance of declaring a false positive SSI due to spatial heterogeneity. This analysis assumes that the background well designations are adequate such that the other extreme does not occur (i.e., that

the spatial heterogeneity causes background analyte concentrations to be elevated and result in a false negative SSI downgradient of the site).

The UTL coverage assumes the background sample data set is adequate and representative of intrinsic spatial and temporal variability in groundwater constituent concentrations beneath the URS. Factors that can violate this assumption include: 1) background wells completed in a different water-bearing unit than compliance wells (i.e., spatial heterogeneity), 2) background wells that have not been sampled during times of extreme potentiometric level (drought and snow-melt), and 3) structurally-compromised wells that do not produce representative groundwater samples. Reference to the conceptual site model and professional judgement/interpretation are necessary to confirm the adequacy of background well designations.

Table 1 lists background analytes and wells that qualify for the P-UTL method.

3.2.2 Non-Parametric Interwell Upper Tolerance Limit (NP-UTL)

A non-parametric interwell tolerance limit (NP-UTL) was calculated if the upgradient sample data generally met the following diagnostic criteria:

1. Temporal stationarity
2. No discernable data distribution
3. Spatial heterogeneity is minimal
4. Sample outliers have been removed
5. Statistical independence

Criterion Number 2, where a parametric distribution is not discernable from the sample data, primarily drives the NP-UTL selection. A NP-UTL uses the first or second highest-ranked background concentration value to establish the UTL, depending on the number of data points. "Ranked" means the grouped background concentration values are ordered in decreasing order and assigned a rank based on this order, where a rank equal to one represents the maximum concentration value. Table 17-4 in the Unified Guidance (U.S. EPA, 2009) provides minimum coverage levels for the first and second ordered sample values with 95% confidence for different background sample numbers. Table 17-4 illustrates that the sample number controls the coverage for the NP-UTL and higher sample numbers are necessary to achieve a higher coverage. Overall, the non-parametric tolerance limit is less powerful in comparison to its parametric counterparts (but more appropriate when parametric assumptions are not met).

The NP-UTL uses the maximum ranked value in the background well, which can constitute a reporting limit value if the reporting limit is higher than detectable concentrations. It is preferable that the maximum reporting limit in compliance wells not exceed the maximum reporting limit in the background well.

Table 1 lists background analytes and wells that qualify for the NP-UTL method.

3.2.3 Double Quantification Rule

The DQR is appropriate when the analyte exhibits 100% non-detectable concentrations in the background data set. The DQR states that, for any given compliance well analyte, two consecutive detectable concentrations that are above the maximum reporting limit are sufficient evidence to declare an SSI.

It should be noted that implications exist when there are inconsistencies in reporting limit values over time and between monitoring wells. For example, when the downgradient wells reflect a higher maximum reporting limit in comparison to the background well, applying the DQR leads to uncertainty in identifying a real SSI (i.e., the statistical test results in a false negative SSI). In other cases, it is possible to have lower reporting limit values in downgradient wells, resulting in a higher detection frequencies, which can trigger a false positive SSI. For these reasons, it is recommended that the laboratory establish achievable and consistent analytical reporting limit values among all wells throughout the duration of the monitoring program.

Table 1 lists background analytes and wells that qualify for the DQR.

3.3 Establishing Compliance Well Comparison Limits

Confidence intervals are a recommended approach for comparing compliance well (i.e., downgradient) data to a GWPS during assessment monitoring or corrective action (U.S. EPA, 2009). The confidence interval method estimates the range of concentration values (e.g. the upper and lower limits) in which the true central tendency (e.g. mean, median for this work) is expected to occur with a certain probability. The confidence interval accounts for both the level of statistical variation in the data and the desired confidence level. For this statistical analysis, the lower confidence limit is of interest and reflects the lowest concentration beyond which we do not expect the true mean of the downgradient sample data to reside.

Below is the formal null hypothesis statement for the confidence limit:

Ho: The true central tendency of the sample concentrations at the compliance point (e.g. downgradient well) is no greater than the predetermined GWPS.

This is the assumed condition unless, through a statistical test, the actual data demonstrates otherwise. The null hypothesis is rejected when the lower confidence limit (LCL) of the compliance sample dataset resides above the GWPS, resulting in sufficient evidence to declare an SSI.

Statistical power is the ability for the statistical test to detect a true increase above the GWPS. The statistical power can be negligible when the sample size is small, the sample variability is high and/or the confidence level is set too high (U.S. EPA, 2009). Statistical confidence should not be confused with the statistical power. The *statistical confidence* (1- α) indicates how often the confidence limit will contain the statistical parameter of interest (i.e., mean or median). The *statistical power* indicates how often a test will correctly identify an exceedance, using the statistical parameter of interest, above the GWPS. Because the statistical power typically decreases with higher confidence levels, the Unified Guidance (U.S. EPA, 2009) recommends first establishing an acceptable level of statistical power and then computing the associated confidence level. The Unified Guidance (U.S. EPA, 2009) suggests that the compliance test have at least 80% statistical power to detect a compliance well central tendency that is two times above the GWPS. This recommendation primarily accommodates parametric statistical tests, meaning when parametric method assumptions are not met, the parametric methods' power and confidence are not meaningful. In these cases, non-parametric methods are appropriate and their confidence limits generally exhibit somewhat less statistical power than their parametric counterparts.

The EDA results for the subject analysis suggest that three LCL statistical tests are appropriate for groundwater data collected downgradient of the URS: the parametric lower confidence limit, non-parametric lower confidence limit and the parametric lower confidence limit with a temporal trend. Each statistical test is described below.

3.3.1 Parametric Lower Confidence Limits (P-LCL)

For parametric data distributions, the mean (i.e., central tendency), standard deviation, and one-tailed Student's t value are necessary to calculate the parametric lower confidence limit (P-LCL) according to Equation 21.1 in the Unified Guidance (U.S. EPA, 2009). The confidence level ($1-\alpha$) is necessary to establish the Student's t value. The objective is to select the α that achieves high statistical power with an acceptable level of confidence. Table 22-2 in Appendix D of the Unified Guidance (U.S. EPA, 2009) allows for the selection of α based on the compliance well's sample number and the above statistical power criterion (i.e., at least 80%). The selected α for the P-LCL test is the maximum value that achieves at least 80% statistical power for the set sample number (n) and the minimum RCRA standard requirement of $\alpha = 0.01$ (U.S. EPA, 2009).

Table 2 summarizes compliance well analytes that quality for the P-LCL test.

3.3.2 Non-Parametric Lower Confidence Limits (NP-LCL)

For the non-parametric cases, the median represents the central tendency. The Unified Guidance (U.S. EPA, 2009) does not provide formal guidance for calculating the statistical power for a non-parametric statistical test using environmental data. As such, the non-parametric confidence limit calculations will achieve a minimum confidence level of 95%.

The non-parametric LCL (NP-LCL) test uses the sample number and the 95% confidence level ($1-\alpha$) to establish the LCL. The compliance well with a sample count (n) is first ordered from smallest to largest sample concentration then assigned a numeric rank, where 1 is the lowest concentration and (n) is the highest concentration. Table 21-11 in Appendix D of the Unified Guidance (U.S. EPA, 2009) provides achievable confidence levels for ranked values for small sample sizes ($n < 20$). The rank value that achieves the 95% confidence level or higher serves as the lower non-parametric confidence limit.

Table 2 summarizes compliance well analytes that quality for the NP-LCL test.

3.3.3 Calculating the Trend-Dependent Lower Confidence Limit (P-LCLT)

The confidence interval tests are sensitive to temporal trends, which inflate the standard deviation. If the temporal Mann-Kendall trend was significant ($p < 0.05$), and the data exhibit a parametric distribution, the 95% lower confidence interval was calculated around the temporal trend (P-LCLT). If a trend was significant ($p < 0.05$) but the data distribution was non-parametric, then a NP-LCL was calculated. The P-LCLT was calculated in ProUCL 5.1 using equation 10-12 in the ProUCL 5.1.1 Technical Guidance (U.S. EPA, 2015). By proxy, the coefficient of variation was calculated to assess the statistical power of this parametric test. The Unified Guidance (Section 7.4.1) suggests that if the coefficient of variation is less than or equal to 0.5, the lower limit confidence exhibits adequate statistical power.

Table 2 summarizes compliance well analytes that quality for the P-LCLT test if the statistically significant ($p < 0.05$) temporal trend is increasing or decreasing.

4.0 RESULTS

Table 1 summarizes the GWPS selection for each Appendix IV constituent. The GWPS constitutes either the statistically calculated BTV, the U.S. EPA's promulgated MCL, or the risk-based alternative GWPS identified for constituents without MCLs, whichever value is higher.

Table 2 summarizes: 1) which compliance wells exhibit SSIs above their respective GWPS for Appendix IV constituents, 2) which compliance wells exhibit statistically significant temporal trends and 3) the type of LCL test applied.

This statistical analysis indicates there is sufficient evidence to declare an SSI for fluoride in following wells: MW-66, MW-67, MW-68 and MW-69. Fluoride concentrations in MW-66, MW-67, and MW-69 exhibit concentrations that are at least one order of magnitude above the fluoride GWPS, which is equal to 4 mg/L. Data collected from each of these wells also exhibit statistically significant ($p < 0.05$) increasing trends for fluoride. This statistical analysis indicates there is insufficient evidence to declare SSIs above their respective GWPS for the remaining Appendix IV analytes (i.e., excluding fluoride).

Several compliance monitoring wells exhibit statistically significant ($p < 0.05$) temporal trends. Most notable are the statistically significant ($p < 0.05$) increasing trends present in more than one compliance well for arsenic, cobalt, lithium and thallium. Statistically significant ($p < 0.05$) trends were detected in the background dataset for cobalt (increasing), molybdenum (increasing), selenium (decreasing) and thallium (increasing). Most of these constituents exhibit relatively high non-detect frequencies with fluctuating reporting limit values over time. The fluctuation in reporting limit values creates subjective uncertainty regarding the true presence of temporal trends in background groundwater conditions.

This analysis suggests spatial heterogeneity is present for the grouped background wells (MW-71, MW-72 and MW-73) for multiple Appendix IV constituents, including arsenic, barium, cobalt, lead, lithium, molybdenum and selenium. Reference to the conceptual site model and professional judgement/interpretation are necessary to confirm adequacy and representativeness of background well designations for the URS.

5.0 RECOMMENDATIONS

This statistical analysis results in the following recommendations for the URS assessment monitoring statistical analysis:

- There is sufficient evidence to declare an SSI above the GWPS for fluoride in wells MW-66, MW-67, MW-68 and MW-69. Therefore, proper notification in the facility's operation record should be made and, within 90 days of the date of this Tech Memo, APS should either begin corrective action monitoring or demonstrate that the SSI is due to an alternative source.
- A lower sampling frequency is necessary to avoid temporal autocorrelation in the groundwater monitoring data; a quarterly or semiannual frequency should be used until future data evaluations can establish a more objective, data-driven sampling frequency.
- The laboratory should achieve reporting limits below the U.S. EPA's promulgated MCLs and maintain a constant reporting limit for each analyte over time for all monitoring wells – background and compliance. This recommendation will improve the certainty of detection of temporal trends

in the groundwater sample data while also decreasing the probability for declaring a false negative or false positive SSIs when applying statistical tests, especially the DQR.

- Intrawell statistical comparisons should be considered for analytes that exhibit spatial heterogeneity. Reference to the conceptual site model and professional judgement/interpretation are necessary to confirm adequacy and representativeness of background well designations for URS.

6.0 REFERENCES

United States Environmental Protection Agency (U.S. EPA), 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance*. EPA 530/R-09-007. Environmental Protection Agency Office of Resource Conservation and Recovery.

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Wood Environment & Infrastructure Solutions, Inc., 2018. *Statistical Data Analysis Work Plan*. Coal Combustion Residual Rule Groundwater Monitoring System Compliance, Four Corners Power Plant, Fruitland, New Mexico. Prepared for Arizona Public Service. October, 2018.

wood.

TABLES



Table 1
GWPS Selection for the FCPP URS
Appendix IV Statistical Comparison

Grouped Background Wells	Constituent	US EPA MCL	Alternative Risk-Based GWPS	Background Threshold Value (Calculation Method ^{1,2})	Units	GWPS Selection ³
MW-71, MW-72, MW-73	Antimony	0.006	---	0.01 (NP-UTL)	mg/L	BTV
MW-71, MW-72, MW-73	Arsenic	0.01	---	0.013 (P-UTL)	mg/L	BTV
MW-71, MW-72, MW-73	Barium	2	---	0.051 (NP-UTL)	mg/L	US EPA MCL
MW-71, MW-72, MW-73	Beryllium	0.004	---	0.001 (DQR)	mg/L	US EPA MCL
MW-71, MW-72, MW-73	Cadmium	0.005	---	0.001 (NP-UTL)	mg/L	US EPA MCL
MW-71, MW-72, MW-73	Chromium	0.1	---	0.01 (NP-UTL)	mg/L	US EPA MCL
MW-71, MW-72, MW-73	Cobalt	---	0.006	0.016 (P-UTL)	mg/L	BTV
MW-71, MW-72, MW-73	Fluoride	4	---	4 (NP-UTL)	mg/L	BTV/US EPA MCL
MW-71, MW-72, MW-73	Lead	---	0.015	0.005 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
MW-71, MW-72, MW-73	Lithium	---	0.04	0.8 (NP-UTL)	mg/L	BTV
MW-71, MW-72, MW-73	Mercury	0.002	---	0.0002 (DQR)	mg/L	US EPA MCL
MW-71, MW-72, MW-73	Molybdenum	---	0.1	0.011 (P-UTL)	mg/L	Alternative Risk-Based GWPS
MW-71, MW-72, MW-73	Selenium	0.05	---	0.45 (P-UTL)	mg/L	BTV
MW-71, MW-72, MW-73	Thallium	0.002	---	0.0014 (P-UTL)	mg/L	US EPA MCL
MW-71, MW-72, MW-73	Combined Radium	5	---	5.4 (P-UTL)	pCi/L	BTV

Notes:

BTV = Background Threshold Value

GWPS = Groundwater Protection Standard

US EPA MCL = United States Environmental Protection Agency Maximum Contaminant Level under the Safe Drinking Water Act

¹ Double Quantification Rule (DQR), Parametric Upper Tolerance Limit (P-UTL), Non-Parametric Upper Tolerance Limit (NP-UTL)

² The DQR BTV represents the maximum reporting limit value

³ The GWPS selection represents the highest value between the US EPA MCL, the Alternative Risk-Based GWPS and the BTV

Table 2
 Statistical Results Summary - FCPP URS CCR Unit
 Appendix IV Statistical Comparison

Appendix IV Constituent	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Combined Radium
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L
GWPS	0.01	0.013	2	0.004	0.005	0.1	0.016	4	0.015	0.8	0.002	0.1	0.45	0.002	5.4
MW-66	NP-LCL (0.004)	P-LCLT (0.0024)	NP-LCL (0.021)	NP-LCL (0.001)	NP-LCL (0.0005)	NP-LCL (0.004)	P-LCLT (0.0072)	NP-LCL (26)	NP-LCL (0.002)	NP-LCL (0.36)	NP-LCL (0.0002)	NP-LCL (0.023)	NP-LCL (0.0022)	P-LCL (0.0004)	P-LCL (2.0)
MW-67	NP-LCL (0.004)	P-LCL (0.0021)	P-LCL (0.019)	NP-LCL (0.001)	NP-LCL (0.0005)	NP-LCL (0.004)	P-LCL (0.0048)	P-LCLT (22)	NP-LCL (0.002)	P-LCLT (0.47)	NP-LCL (0.0002)	P-LCLT (0.034)	P-LCLT (0.0016)	P-LCLT (0.0007)	P-LCL (2.1)
MW-68	NP-LCL (0.004)	P-LCLT (0.0081)	NP-LCL (0.0093)	NP-LCL (0.001)	NP-LCL (0.00046)	NP-LCL (0.004)	P-LCL (0.0026)	P-LCLT (11)	NP-LCL (0.002)	P-LCLT (0.34)	NP-LCL (0.0002)	P-LCLT (0.0043)	P-LCLT (0.29)	P-LCLT (0.0007)	P-LCL (1.5)
MW-69	NP-LCL (0.004)	P-LCLT (0.0072)	P-LCL (0.015)	NP-LCL (0.001)	NP-LCL (0.0005)	NP-LCL (0.004)	P-LCLT (0.0053)	P-LCLT (20)	NP-LCL (0.005)	P-LCLT (0.46)	NP-LCL (0.0002)	P-LCL (0.015)	P-LCL (0.013)	NP-LCL (0.00047)	P-LCLT (4.4)
MW-70	NP-LCL (0.01)	P-LCL (0.0043)	P-LCL (0.010)	NP-LCL (0.001)	NP-LCL (0.0005)	NP-LCL (0.004)	P-LCLT (0.0054)	P-LCL (1.5)	NP-LCL (0.005)	NP-LCL (0.34)	NP-LCL (0.0002)	P-LCL (0.0050)	P-LCL (0.18)	NP-LCL (0.00057)	P-LCL (1.6)

Legend

Method (LCL)	There is insufficient evidence to declare an SSI over the GWPS
Method (LCL)	Statistically significant increasing trend (p<0.05)
Method (LCL)	Statistically significant decreasing trend (p<0.05)
Method (LCL)	There is sufficient evidence to declare an SSI over the GWPS

NP-LCL	Non-Parametric Lower Confidence Limit
P-LCLT	Parametric Lower Confidence Limit with a Trend
P-LCL	Parametric Lower Confidence Limit
LCL	Lower Confidence Limit

APPENDIX A
PROUCL INPUT FILES



Table A-1
Fluoride - All Wells

Well	Sample Date	Fluoride	D_Fluoride	NumDate
MW-66	11/5/2015	18	1	42313.00
MW-66	4/27/2016	18	1	42487.00
MW-66	6/5/2016	20	1	42526.00
MW-66	8/20/2016	19	1	42602.00
MW-66	9/12/2016	17	1	42625.00
MW-66	10/19/2016	19	1	42662.00
MW-66	2/1/2017	19	1	42767.00
MW-66	4/16/2017	23	1	42841.00
MW-66	5/1/2017	24	1	42856.00
MW-66	5/29/2017	25	1	42884.00
MW-66	6/21/2017	24	1	42907.41
MW-66	7/21/2017	25	1	42937.00
MW-66	8/9/2017	26	1	42956.00
MW-66	8/16/2017	25	1	42963.00
MW-66	9/9/2017	26	1	42987.00
MW-66	10/13/2017	26	1	43021.00
MW-66	3/16/2018	41	1	43175.00
MW-66	5/31/2018	25	1	43251.00
MW-67	11/4/2015	18	1	42312.00
MW-67	4/27/2016	19	1	42487.00
MW-67	6/6/2016	24	1	42527.00
MW-67	8/20/2016	20	1	42602.00
MW-67	9/13/2016	17	1	42626.00
MW-67	10/20/2016	15	1	42663.00
MW-67	2/1/2017	16	1	42767.00
MW-67	4/17/2017	21	1	42842.00
MW-67	5/2/2017	37	1	42857.00
MW-67	5/29/2017	21	1	42884.00
MW-67	6/21/2017	21	1	42907.56
MW-67	7/21/2017	22	1	42937.00
MW-67	8/9/2017	22	1	42956.00
MW-67	8/16/2017	22	1	42963.00
MW-67	9/10/2017	24	1	42988.00
MW-67	10/13/2017	25	1	43021.00
MW-67	3/16/2018	31	1	43175.00
MW-67	6/2/2018	25	1	43253.00
MW-68	11/6/2015	7	1	42314.00
MW-68	4/26/2016	8	1	42486.00
MW-68	6/5/2016	10	1	42526.00
MW-68	8/20/2016	7.5	1	42602.00
MW-68	9/13/2016	5.7	1	42626.00
MW-68	10/20/2016	5.5	1	42663.00
MW-68	2/1/2017	6.8	1	42767.00
MW-68	4/17/2017	9.7	1	42842.00
MW-68	5/2/2017	10	1	42857.00
MW-68	5/29/2017	8.3	1	42884.00

Table A-1
Fluoride - All Wells

Well	Sample Date	Fluoride	D_Fluoride	NumDate
MW-68	6/21/2017	8.7	1	42907.59
MW-68	7/21/2017	9.6	1	42937.00
MW-68	8/9/2017	11	1	42956.00
MW-68	8/16/2017	11	1	42963.00
MW-68	9/10/2017	11	1	42988.00
MW-68	10/13/2017	10	1	43021.00
MW-68	3/16/2018	14	1	43175.00
MW-68	6/2/2018	12	1	43253.00
MW-69	11/4/2015	9.8	1	42312.00
MW-69	4/26/2016	13	1	42486.00
MW-69	6/5/2016	13	1	42526.00
MW-69	8/20/2016	13	1	42602.00
MW-69	9/13/2016	11	1	42626.00
MW-69	10/20/2016	9.6	1	42663.00
MW-69	2/1/2017	12	1	42767.00
MW-69	4/17/2017	17	1	42842.00
MW-69	5/2/2017	18	1	42857.00
MW-69	5/29/2017	16	1	42884.00
MW-69	6/21/2017	14	1	42907.53
MW-69	7/21/2017	18	1	42937.00
MW-69	8/9/2017	17	1	42956.00
MW-69	8/16/2017	17	1	42963.00
MW-69	9/10/2017	20	1	42988.00
MW-69	10/13/2017	20	1	43021.00
MW-69	3/16/2018	29	1	43175.00
MW-69	6/2/2018	21	1	43253.00
MW-70	11/9/2015	2.6	1	42317.00
MW-70	4/27/2016	2.3	1	42487.00
MW-70	6/5/2016	2.1	1	42526.00
MW-70	8/20/2016	0.8	0	42602.00
MW-70	9/12/2016	0.4	0	42625.00
MW-70	10/19/2016	0.4	0	42662.00
MW-70	2/1/2017	0.4	0	42767.00
MW-70	4/16/2017	0.85	1	42841.00
MW-70	5/1/2017	1.7	1	42856.00
MW-70	5/29/2017	2.6	1	42884.00
MW-70	6/21/2017	2.9	1	42907.50
MW-70	7/21/2017	2.1	1	42937.00
MW-70	8/9/2017	3	1	42956.00
MW-70	8/16/2017	3.2	1	42963.00
MW-70	9/9/2017	2.5	1	42987.00
MW-70	10/13/2017	1	1	43021.00
MW-70	3/16/2018	2.2	1	43175.00
MW-70	5/31/2018	1.8	1	43251.00
MW-71	4/26/2016	2	0	42486.00
MW-71	6/6/2016	0.4	0	42527.00

Table A-1
Fluoride - All Wells

Well	Sample Date	Fluoride	D_Fluoride	NumDate
MW-71	8/21/2016	0.8	0	42603.00
MW-71	9/12/2016	0.4	0	42625.00
MW-71	10/20/2016	0.4	0	42663.00
MW-71	2/2/2017	0.4	0	42768.00
MW-71	4/17/2017	2	0	42842.00
MW-71	5/2/2017	0.44	1	42857.00
MW-71	5/29/2017	2	0	42884.48
MW-71	6/22/2017	2	0	42908.36
MW-71	7/21/2017	2	0	42937.00
MW-71	8/10/2017	2	0	42957.00
MW-71	8/17/2017	2	0	42964.00
MW-71	9/11/2017	2	0	42989.00
MW-71	10/13/2017	2	0	43021.00
MW-71	3/16/2018	4	0	43175.00
MW-71	6/2/2018	0.8	0	43253.00
MW-72	4/26/2016	2	0	42486.00
MW-72	6/6/2016	0.4	0	42527.00
MW-72	8/21/2016	0.8	0	42603.00
MW-72	9/13/2016	0.4	0	42626.00
MW-72	10/20/2016	0.4	0	42663.00
MW-72	2/2/2017	0.4	0	42768.00
MW-72	4/17/2017	2	0	42842.00
MW-72	5/2/2017	0.32	1	42857.00
MW-72	5/29/2017	2	0	42884.46
MW-72	6/22/2017	2	0	42908.33
MW-72	7/21/2017	2	0	42937.00
MW-72	8/10/2017	2	0	42957.00
MW-72	8/17/2017	2	0	42964.00
MW-72	9/10/2017	2	0	42988.00
MW-72	10/13/2017	2	0	43021.00
MW-72	3/16/2018	4	0	43175.61
MW-72	6/2/2018	0.8	0	43253.00
MW-73	2/2/2017	0.4	0	42768.00
MW-73	4/18/2017	0.8	0	42843.00
MW-73	5/2/2017	0.2	1	42857.00
MW-73	5/29/2017	0.8	0	42884.59
MW-73	6/22/2017	0.8	0	42908.39
MW-73	7/22/2017	2	0	42938.00
MW-73	8/10/2017	0.8	0	42957.00
MW-73	8/17/2017	0.8	0	42964.00
MW-73	9/10/2017	0.8	0	42988.00
MW-73	10/12/2017	0.8	0	43020.00
MW-73	3/16/2018	4	0	43175.00
MW-73	6/2/2018	0.8	0	43253.00

Table A-2
Fluoride - Background Wells Only

Well	Sample Date	Fluoride	D_Fluoride
MW-71	4/26/2016	2	0
MW-71	6/6/2016	0.4	0
MW-71	8/21/2016	0.8	0
MW-71	9/12/2016	0.4	0
MW-71	10/20/2016	0.4	0
MW-71	2/2/2017	0.4	0
MW-71	4/17/2017	2	0
MW-71	5/2/2017	0.44	1
MW-71	5/29/2017	2	0
MW-71	6/22/2017	2	0
MW-71	7/21/2017	2	0
MW-71	8/10/2017	2	0
MW-71	8/17/2017	2	0
MW-71	9/11/2017	2	0
MW-71	10/13/2017	2	0
MW-71	3/16/2018	4	0
MW-71	6/2/2018	0.8	0
MW-72	4/26/2016	2	0
MW-72	6/6/2016	0.4	0
MW-72	8/21/2016	0.8	0
MW-72	9/13/2016	0.4	0
MW-72	10/20/2016	0.4	0
MW-72	2/2/2017	0.4	0
MW-72	4/17/2017	2	0
MW-72	5/2/2017	0.32	1
MW-72	5/29/2017	2	0
MW-72	6/22/2017	2	0
MW-72	7/21/2017	2	0
MW-72	8/10/2017	2	0
MW-72	8/17/2017	2	0
MW-72	9/10/2017	2	0
MW-72	10/13/2017	2	0
MW-72	3/16/2018	4	0
MW-72	6/2/2018	0.8	0
MW-73	2/2/2017	0.4	0
MW-73	4/18/2017	0.8	0
MW-73	5/2/2017	0.2	1
MW-73	5/29/2017	0.8	0
MW-73	6/22/2017	0.8	0
MW-73	7/22/2017	2	0
MW-73	8/10/2017	0.8	0
MW-73	8/17/2017	0.8	0
MW-73	9/10/2017	0.8	0
MW-73	10/12/2017	0.8	0
MW-73	3/16/2018	4	0
MW-73	6/2/2018	0.8	0

Table A-3
Radium - All Wells

Well	Sample Date	Combined_Radium	D_CombinedRadium	Date
MW-66	11/5/2015	1.78	1	42313.00
MW-66	4/27/2016	0.6	1	42487.00
MW-66	6/5/2016	1.7	1	42526.00
MW-66	8/20/2016	0.4	1	42602.00
MW-66	9/12/2016	2.9	1	42625.00
MW-66	10/19/2016	3	1	42662.00
MW-66	2/1/2017	4	1	42767.00
MW-66	4/16/2017	3.8	1	42841.00
MW-66	5/1/2017	2.9	1	42856.00
MW-66	5/29/2017	2.8	1	42884.00
MW-66	6/21/2017	3.7	1	42907.41
MW-66	7/21/2017	1.2	1	42937.00
MW-66	8/9/2017	3.2	1	42956.00
MW-66	8/16/2017	2.5	1	42963.00
MW-66	9/9/2017	2.5	1	42987.00
MW-66	10/13/2017	5.1	1	43021.00
MW-66	3/16/2018	1.5	0	43175.00
MW-66	5/31/2018	2.1	1	43251.00
MW-67	11/4/2015	2.67	1	42312.00
MW-67	4/27/2016	2.1	1	42487.00
MW-67	6/6/2016	2	1	42527.00
MW-67	8/20/2016	3	1	42602.00
MW-67	9/13/2016	2.1	1	42626.00
MW-67	10/20/2016	4.1	1	42663.00
MW-67	2/1/2017	3	1	42767.00
MW-67	4/17/2017	3.2	1	42842.00
MW-67	5/2/2017	3.3	1	42857.00
MW-67	5/29/2017	2.2	1	42884.00
MW-67	6/21/2017	4.2	1	42907.56
MW-67	7/21/2017	2	0	42937.00
MW-67	8/9/2017	1.4	1	42956.00
MW-67	8/16/2017	2.6	1	42963.00
MW-67	9/10/2017	3.1	1	42988.00
MW-67	10/13/2017	2.7	1	43021.00
MW-67	3/16/2018	0.9	1	43175.00
MW-67	6/2/2018	1.5	1	43253.00
MW-68	11/6/2015	1.35	1	42314.00
MW-68	4/26/2016	1.5	1	42486.00
MW-68	6/5/2016	2.9	1	42526.00
MW-68	8/20/2016	1.9	1	42602.00
MW-68	9/13/2016	3.8	1	42626.00
MW-68	10/20/2016	1.4	1	42663.00
MW-68	2/1/2017	2.1	1	42767.00
MW-68	4/17/2017	2.2	1	42842.00
MW-68	5/2/2017	1.2	1	42857.00
MW-68	5/29/2017	0.6	0	42884.00

Table A-3
Radium - All Wells

Well	Sample Date	Combined_Radium	D_CombinedRadium	Date
MW-68	6/21/2017	2.2	1	42907.59
MW-68	7/21/2017	0.9	1	42937.00
MW-68	8/9/2017	3.3	1	42956.00
MW-68	8/16/2017	2.2	1	42963.00
MW-68	9/10/2017	2.9	1	42988.00
MW-68	10/13/2017	2.9	1	43021.00
MW-68	3/16/2018	1	1	43175.00
MW-68	6/2/2018	0.6	1	43253.00
MW-69	11/4/2015	3.17	1	42312.00
MW-69	4/26/2016	3.1	1	42486.00
MW-69	6/5/2016	3.2	1	42526.00
MW-69	8/20/2016	3.9	1	42602.00
MW-69	9/13/2016	5.4	1	42626.00
MW-69	10/20/2016	5.5	1	42663.00
MW-69	2/1/2017	5.4	1	42767.00
MW-69	4/17/2017	4.9	1	42842.00
MW-69	5/2/2017	5	1	42857.00
MW-69	5/29/2017	3.6	1	42884.00
MW-69	6/21/2017	4.3	1	42907.53
MW-69	7/21/2017	3.4	1	42937.00
MW-69	8/9/2017	5.1	1	42956.00
MW-69	8/16/2017	3.6	1	42963.00
MW-69	9/10/2017	5.9	1	42988.00
MW-69	10/13/2017	6.7	1	43021.00
MW-69	3/16/2018	5.4	1	43175.00
MW-69	6/2/2018	4.6	1	43253.00
MW-70	11/9/2015	1.63	1	42317.00
MW-70	4/27/2016	1	1	42487.00
MW-70	6/5/2016	1.9	1	42526.00
MW-70	8/20/2016	1.5	1	42602.00
MW-70	9/12/2016	2.6	1	42625.00
MW-70	10/19/2016	1.6	1	42662.00
MW-70	2/1/2017	3.3	1	42767.00
MW-70	4/16/2017	2.1	1	42841.00
MW-70	5/1/2017	2.4	1	42856.00
MW-70	5/29/2017	1.3	1	42884.00
MW-70	6/21/2017	2.5	1	42907.50
MW-70	7/21/2017	0.7	0	42937.00
MW-70	8/9/2017	1.6	1	42956.00
MW-70	8/16/2017	1.8	1	42963.00
MW-70	9/9/2017	2	1	42987.00
MW-70	10/13/2017	0.6	0	43021.00
MW-70	3/16/2018	2.6	1	43175.00
MW-70	5/31/2018	2.8	1	43251.00
MW-71	4/26/2016	2.2	1	42486.00
MW-71	6/6/2016	3.2	1	42527.00

Table A-3
Radium - All Wells

Well	Sample Date	Combined_Radium	D_CombinedRadium	Date
MW-71	8/21/2016	1.1	1	42603.00
MW-71	9/12/2016	2.1	1	42625.00
MW-71	10/20/2016	0.4	1	42663.00
MW-71	2/2/2017	1.9	1	42768.00
MW-71	4/17/2017	1.2	1	42842.00
MW-71	5/2/2017	0.7	1	42857.00
MW-71	5/29/2017	0.6	0	42884.48
MW-71	6/22/2017	2.7	1	42908.36
MW-71	7/21/2017	0.5	0	42937.00
MW-71	8/10/2017	0.7	0	42957.00
MW-71	8/17/2017	2	1	42964.00
MW-71	9/11/2017	0.7	0	42989.00
MW-71	10/13/2017	1.6	1	43021.00
MW-71	3/16/2018	0.8	1	43175.00
MW-71	6/2/2018	1.9	1	43253.00
MW-72	4/26/2016	0.8	0	42486.00
MW-72	6/6/2016	1.3	1	42527.00
MW-72	8/21/2016	3.2	1	42603.00
MW-72	9/13/2016	3.9	1	42626.00
MW-72	10/20/2016	4.2	1	42663.00
MW-72	2/2/2017	4.8	1	42768.00
MW-72	4/17/2017	3.5	1	42842.00
MW-72	5/2/2017	3.8	1	42857.00
MW-72	5/29/2017	2.2	1	42884.46
MW-72	6/22/2017	3	1	42908.33
MW-72	7/21/2017	1.7	1	42937.00
MW-72	8/10/2017	2.8	1	42957.00
MW-72	8/17/2017	2.1	1	42964.00
MW-72	9/10/2017	2.3	1	42988.00
MW-72	10/13/2017	3.1	1	43021.00
MW-72	3/16/2018	1.9	1	43175.61
MW-72	6/2/2018	2.8	1	43253.00
MW-73	2/2/2017	3.2	1	42768.00
MW-73	4/17/2017	1.8	1	42842.00
MW-73	5/2/2017	2.3	1	42857.00
MW-73	5/29/2017	0.6	0	42884.59
MW-73	6/22/2017	3.1	1	42908.39
MW-73	7/22/2017	2	1	42938.00
MW-73	8/10/2017	1.5	1	42957.00
MW-73	8/17/2017	1.5	1	42964.00
MW-73	9/10/2017	2.5	1	42988.00
MW-73	10/12/2017	0.9	1	43020.00
MW-73	3/16/2018	2.6	1	43175.00
MW-73	6/2/2018	2.8	1	43253.00

Table A-4
Radium - Background Wells Only

Well	Sample Date	Combined_Radium	D_CombinedRadium
MW-71	4/26/2016	2.2	1
MW-71	6/6/2016	3.2	1
MW-71	8/21/2016	1.1	1
MW-71	9/12/2016	2.1	1
MW-71	10/20/2016	0.4	1
MW-71	2/2/2017	1.9	1
MW-71	4/17/2017	1.2	1
MW-71	5/2/2017	0.7	1
MW-71	5/29/2017	0.6	0
MW-71	6/22/2017	2.7	1
MW-71	7/21/2017	0.5	0
MW-71	8/10/2017	0.7	0
MW-71	8/17/2017	2	1
MW-71	9/11/2017	0.7	0
MW-71	10/13/2017	1.6	1
MW-71	3/16/2018	0.8	1
MW-71	6/2/2018	1.9	1
MW-72	4/26/2016	0.8	0
MW-72	6/6/2016	1.3	1
MW-72	8/21/2016	3.2	1
MW-72	9/13/2016	3.9	1
MW-72	10/20/2016	4.2	1
MW-72	2/2/2017	4.8	1
MW-72	4/17/2017	3.5	1
MW-72	5/2/2017	3.8	1
MW-72	5/29/2017	2.2	1
MW-72	6/22/2017	3	1
MW-72	7/21/2017	1.7	1
MW-72	8/10/2017	2.8	1
MW-72	8/17/2017	2.1	1
MW-72	9/10/2017	2.3	1
MW-72	10/13/2017	3.1	1
MW-72	3/16/2018	1.9	1
MW-72	6/2/2018	2.8	1
MW-73	2/2/2017	3.2	1
MW-73	4/17/2017	1.8	1
MW-73	5/2/2017	2.3	1
MW-73	5/29/2017	0.6	0
MW-73	6/22/2017	3.1	1
MW-73	7/22/2017	2	1
MW-73	8/10/2017	1.5	1
MW-73	8/17/2017	1.5	1
MW-73	9/10/2017	2.5	1
MW-73	10/12/2017	0.9	1
MW-73	3/16/2018	2.6	1
MW-73	6/2/2018	2.8	1

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Num_Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Ln_As	D_Ln_As	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt
Background	4/26/2016	42486.00	0.0025	0	0.0064	1	-5.05146	1	0.019	1	0.001	0	0.00015	1	0.0005	0	0.0049	1
Background	4/26/2016	42486.00	0.0025	0	0.0038	1	-5.57275	1	0.034	1	0.001	0	0.0001	0	0.0028	1	0.0087	1
Background	6/6/2016	42527.00	0.00012	1	0.0069	1	-4.97623	1	0.02	1	0.001	0	0.00015	1	0.0005	0	0.0041	1
Background	6/6/2016	42527.00	0.00027	1	0.0084	1	-4.77952	1	0.051	1	0.001	0	0.0002	0	0.0006	1	0.0029	1
Background	8/21/2016	42603.00	0.00024	1	0.0076	1	-4.87961	1	0.013	1	0.001	0	0.0002	0	0.001	0	0.001	0
Background	8/21/2016	42603.00	0.00022	1	0.0066	1	-5.02069	1	0.014	1	0.001	0	0.0002	0	0.001	0	0.001	0
Background	9/12/2016	42625.00	0.0025	0	0.001	0	-6.90776	0	0.013	1	0.001	0	0.0005	0	0.0025	0	0.0012	1
Background	9/13/2016	42626.00	0.0025	0	0.001	0	-6.90776	0	0.019	1			0.0005	0	0.0025	0	0.0073	1
Background	10/20/2016	42663.00	0.0005	0	0.00031	1	-8.07894	1	0.009	1	0.001	0	0.0001	0	0.0005	0	0.0002	0
Background	10/20/2016	42663.00	0.0005	0	0.00023	1	-8.37743	1	0.009	1	0.001	0	0.0001	0	0.0005	0	0.0024	1
Background	2/2/2017	42768.00	0.001	0	0.0094	1	-4.66705	1	0.012	1	0.001	0	0.00011	1	0.0005	0	0.0012	1
Background	2/2/2017	42768.00	0.002	0	0.0027	1	-5.9145	1	0.0084	1	0.001	0	0.0002	0	0.001	0	0.0025	1
Background	2/2/2017	42768.00	0.001	0	0.0015	1	-6.50229	1	0.043	1	0.001	0	0.00017	1	0.001	1	0.0073	1
Background	4/17/2017	42842.00	0.004	0	0.0063	1	-5.06721	1	0.01	1	0.001	0	0.0004	0	0.002	0	0.002	0
Background	4/17/2017	42842.00	0.004	0	0.0028	1	-5.87814	1	0.0096	1	0.001	0	0.0004	0	0.002	0	0.0024	1
Background	4/18/2017	42843.00	0.004	0	0.004	0	-5.52146	0	0.027	1	0.001	0	0.0004	0	0.002	0	0.0058	1
Background	5/2/2017	42857.00	0.001	0	0.0072	1	-4.93367	1	0.0087	1	0.001	0	0.0001	0	0.001	0	0.001	0
Background	5/2/2017	42857.00	0.001	0	0.003	1	-5.80914	1	0.0079	1	0.001	0	0.0001	0	0.001	0	0.0024	1
Background	5/2/2017	42857.00	0.002	0	0.001	0	-6.90776	0	0.026	1	0.001	0	0.00021	1	0.001	0	0.0067	1
Background	5/29/2017	42884.46	0.01	0	0.003	1	-5.80914	1	0.0093	1	0.001	0	0.001	0	0.005	0	0.0026	1
Background	5/29/2017	42884.48	0.01	0	0.007	1	-4.96185	1	0.01	1	0.001	0	0.001	0	0.005	0	0.005	0
Background	5/29/2017	42884.59	0.01	0	0.005	0	-5.29832	0	0.028	1	0.001	0	0.0003	1	0.005	0	0.0034	1
Background	6/22/2017	42908.33	0.004	0	0.0026	1	-5.95224	1	0.0073	1								
Background	6/22/2017	42908.36	0.004	0	0.0063	1	-5.06721	1	0.012	1	0.001	0	0.0004	0	0.002	0	0.002	0
Background	6/22/2017	42908.39	0.004	0	0.002	0	-6.21461	0	0.029	1	0.001	0	0.0004	0	0.002	0	0.0066	1
Background	7/21/2017	42937.00	0.004	0	0.0053	1	-5.24005	1	0.0086	1	0.001	0	0.0004	0	0.002	0	0.001	0
Background	7/21/2017	42937.00	0.004	0	0.0026	1	-5.95224	1	0.0073	1	0.001	0	0.0004	0	0.002	0	0.0024	1
Background	7/22/2017	42938.00	0.004	0	0.002	0	-6.21461	0	0.025	1	0.001	0	0.0004	0	0.002	0	0.0067	1
Background	8/10/2017	42957.00	0.01	0	0.0048	1	-5.33914	1	0.0092	1	0.001	0	0.001	0	0.004	0	0.002	0
Background	8/10/2017	42957.00	0.01	0	0.004	1	-5.52146	1	0.0075	1	0.001	0	0.0001	0	0.001	0	0.0023	1
Background	8/10/2017	42957.00	0.01	0	0.002	0	-6.21461	0	0.024	1	0.001	0	0.001	0	0.0041	1	0.0065	1
Background	8/17/2017	42964.00	0.004	0	0.006	1	-5.116	1	0.0093	1	0.001	0	0.0004	0	0.004	0	0.002	0
Background	8/17/2017	42964.00	0.004	0	0.002	0	-6.21461	0	0.0077	1	0.001	0	0.0004	0	0.004	0	0.0025	1
Background	8/17/2017	42964.00	0.004	0	0.002	0	-6.21461	0	0.024	1	0.001	0	0.0004	0	0.004	0	0.0066	1
Background	9/10/2017	42988.00	0.004	0	0.0029	1	-5.84304	1	0.0086	1	0.001	0	0.0004	0	0.004	0	0.0023	1
Background	9/10/2017	42988.00	0.004	0	0.002	1	-6.21461	1	0.023	1	0.001	0	0.0004	0	0.004	0	0.0048	1
Background	9/11/2017	42989.00	0.004	0	0.0048	1	-5.33914	1	0.0089	1	0.001	0	0.0004	0	0.004	0	0.002	0
Background	10/12/2017	43020.00	0.01	0	0.005	0	-5.29832	0	0.024	1	0.001	0	0.001	0	0.01	0	0.005	0
Background	10/13/2017	43021.00	0.01	0	0.005	0	-5.29832	0	0.012	1	0.001	0	0.001	0	0.01	0	0.005	0
Background	10/13/2017	43021.00	0.01	0	0.0052	1	-5.2591	1	0.011	1	0.001	0	0.001	0	0.01	0	0.005	0
Background	3/16/2018	43175.00	0.004	0	0.01	1	-4.60517	1	0.011	1	0.001	0	0.0004	0	0.004	0	0.002	0
Background	3/16/2018	43175.00	0.004	0	0.0034	1	-5.68398	1	0.02	1	0.001	0	0.0004	0	0.004	0	0.0057	1
Background	3/16/2018	43175.61	0.004	0	0.0067	1	-5.00565	1	0.0082	1	0.001	0	0.0004	0	0.004	0	0.0025	1
Background	6/2/2018	43253.00			0.012	1	-4.42285	1	0.01	0							0.01	0
Background	6/2/2018	43253.00			0.01	0	-4.60517	0	0.01	0							0.01	0
Background	6/2/2018	43253.00			0.01	0	-4.60517	0	0.023	1							0.01	0

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Num_Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Ln_As	D_Ln_As	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt
MW-66	11/5/2015	42313.00	0.002	0	0.0034	1	-5.68398	1	0.016	1	0.001	0	0.000062	1	0.001	1	0.0051	1
MW-66	4/27/2016	42487.00	0.0025	0	0.0013	1	-6.64539	1	0.0013	1	0.001	0	0.0001	0	0.0031	1	0.0076	1
MW-66	6/5/2016	42526.00	0.0001	0	0.00067	1	-7.30823	1	0.016	1	0.001	0	0.0001	0	0.00074	1	0.0078	1
MW-66	8/20/2016	42602.00	0.00013	1	0.0013	1	-6.64539	1	0.021	1	0.001	0	0.0001	0	0.0012	1	0.008	1
MW-66	9/12/2016	42625.00	0.0025	0	0.001	0	-6.90776	0	0.011	1	0.001	0	0.0005	0	0.0025	0	0.0029	1
MW-66	10/19/2016	42662.00	0.0005	0	0.001	1	-6.90776	1	0.022	1	0.001	0	0.0001	0			0.0057	1
MW-66	2/1/2017	42767.00	0.001	0	0.0014	1	-6.57128	1	0.021	1	0.001	0	0.0001	0	0.0031	1	0.0064	1
MW-66	4/16/2017	42841.00	0.004	0	0.002	0	-6.21461	0	0.02	1	0.001	0	0.0004	0	0.002	0	0.0071	1
MW-66	5/1/2017	42856.00	0.001	0	0.0018	1	-6.31997	1	0.02	1	0.001	0	0.0001	0	0.001	0	0.0073	1
MW-66	5/29/2017	42884.00	0.01	0	0.005	0	-5.29832	0	0.022	1	0.001	0	0.001	0	0.005	0	0.0077	1
MW-66	6/21/2017	42907.41	0.001	0	0.0028	1	-5.87814	1	0.022	1	0.001	0	0.0001	0	0.00088	1	0.0074	1
MW-66	7/21/2017	42937.00	0.004	0	0.002	0	-6.21461	0	0.02	1	0.001	0	0.0004	0	0.002	0	0.0065	1
MW-66	8/9/2017	42956.00	0.01	0	0.002	0	-6.21461	0	0.019	1	0.001	0	0.001	0	0.004	0	0.0072	1
MW-66	8/16/2017	42963.00	0.004	0	0.002	1	-6.21461	1	0.02	1	0.001	0	0.0004	0	0.004	0	0.0078	1
MW-66	9/9/2017	42987.00	0.004	0	0.002	0	-6.21461	0	0.019	1	0.001	0	0.0004	0	0.004	0	0.0069	1
MW-66	10/13/2017	43021.00	0.001	0	0.0021	1	-6.16582	1	0.021	1	0.001	0	0.0001	0	0.001	0	0.0075	1
MW-66	3/16/2018	43175.00	0.004	0	0.005	1	-5.29832	1	0.02	1	0.001	0	0.0004	0	0.004	0	0.0085	1
MW-66	5/31/2018	43251.00			0.01	0	-4.60517	0	0.02	1							0.01	1
MW-67	11/4/2015	42312.00	0.00019	1	0.00099	1	-6.91781	1	0.017	1	0.00017	1	0.00018	1	0.00078	1	0.0078	1
MW-67	4/27/2016	42487.00	0.0025	0	0.0029	1	-5.84304	1	0.017	1	0.001	0	0.0001	0	0.00069	1	0.0027	1
MW-67	6/6/2016	42527.00	0.00014	1	0.003	1	-5.80914	1	0.018	1	0.001	0	0.0001	0	0.0005	0	0.0025	1
MW-67	8/20/2016	42602.00	0.00029	1	0.004	1	-5.52146	1	0.022	1	0.001	0	0.0002	0	0.0016	1	0.0064	1
MW-67	9/13/2016	42626.00	0.0025	0	0.0023	1	-6.07485	1	0.021	1	0.001	0	0.0005	0	0.0025	0	0.0057	1
MW-67	10/20/2016	42663.00	0.0005	0	0.0014	1	-6.57128	1	0.022	1	0.001	0	0.0001	0	0.0005	0	0.005	1
MW-67	2/1/2017	42767.00	0.001	0	0.0033	1	-5.71383	1	0.019	1	0.001	0	0.00015	1	0.00058	1	0.0058	1
MW-67	4/17/2017	42842.00	0.004	0	0.002	1	-6.21461	1	0.02	1	0.001	0	0.0004	0	0.002	0	0.0062	1
MW-67	5/2/2017	42857.00	0.001	0	0.0027	1	-5.9145	1	0.019	1	0.001	0	0.00015	1	0.001	0	0.0065	1
MW-67	5/29/2017	42884.00	0.01	0	0.0033	1	-5.71383	1	0.022	1	0.001	0	0.001	0	0.005	0	0.006	1
MW-67	6/21/2017	42907.56	0.004	0	0.002	1	-6.21461	1	0.02	1	0.001	0	0.0004	0	0.002	0	0.0049	1
MW-67	7/21/2017	42937.00	0.004	0	0.0027	1	-5.9145	1	0.02	1	0.001	0	0.0004	0	0.002	0	0.0053	1
MW-67	8/9/2017	42956.00	0.01	0	0.0023	1	-6.07485	1	0.02	1	0.001	0	0.001	0	0.004	0	0.0045	1
MW-67	8/16/2017	42963.00	0.004	0	0.002	0	-6.21461	0	0.02	1	0.001	0	0.0004	0	0.004	0	0.0043	1
MW-67	9/10/2017	42988.00	0.004	0	0.002	0	-6.21461	0	0.02	1	0.001	0	0.0004	0	0.004	0	0.0047	1
MW-67	10/13/2017	43021.00	0.001	0	0.0027	1	-5.9145	1	0.022	1	0.001	0	0.00016	1	0.001	0	0.0064	1
MW-67	3/16/2018	43175.00	0.004	0	0.0046	1	-5.3817	1	0.019	1	0.001	0	0.0004	0	0.004	0	0.0072	1
MW-67	6/2/2018	43253.00			0.01	0	-4.60517	0	0.02	1							0.01	0
MW-68	11/6/2015	42314.00	0.00045	1	0.0027	1	-5.9145	1	0.0093	1	0.00033	1	0.00046	1	0.0012	1	0.0053	1
MW-68	4/26/2016	42486.00	0.0025	0	0.0032	1	-5.7446	1	0.013	1	0.001	0	0.0001	0	0.0012	1	0.003	1
MW-68	6/5/2016	42526.00	0.00011	1	0.0032	1	-5.7446	1	0.0099	1	0.001	0	0.0001	0	0.00073	1	0.0042	1
MW-68	8/20/2016	42602.00	0.00012	1	0.0065	1	-5.03595	1	0.0078	1	0.001	0	0.00016	1	0.00072	1	0.002	1
MW-68	9/13/2016	42626.00	0.0025	0	0.0016	1	-6.43775	1	0.0074	1	0.001	0	0.0005	0	0.0025	0	0.0025	1
MW-68	10/20/2016	42663.00	0.0005	0	0.0006	1	-7.41858	1	0.0071	1	0.001	0	0.0001	0	0.0005	0	0.0022	1
MW-68	2/1/2017	42767.00	0.001	0	0.0048	1	-5.33914	1	0.0082	1	0.001	0	0.00012	1	0.00081	1	0.0034	1
MW-68	4/17/2017	42842.00	0.004	0	0.0051	1	-5.27851	1	0.0078	1	0.001	0	0.0004	0	0.002	0	0.0028	1
MW-68	5/2/2017	42857.00	0.001	0	0.0084	1	-4.77952	1	0.0068	1	0.001	0	0.0001	0	0.001	0	0.0024	1
MW-68	5/29/2017	42884.00	0.01	0	0.0085	1	-4.76769	1	0.0086	1	0.001	0	0.00025	1	0.005	0	0.0017	1

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Num_Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Ln_As	D_Ln_As	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt
MW-68	6/21/2017	42907.59	0.004	0	0.0079	1	-4.84089	1	0.0075	1	0.001	0	0.0004	0	0.002	0	0.002	0
MW-68	7/21/2017	42937.00	0.004	0	0.0081	1	-4.81589	1	0.0066	1	0.001	0	0.0004	0	0.002	0	0.0017	1
MW-68	8/9/2017	42956.00	0.01	0	0.0055	1	-5.20301	1	0.0074	1	0.001	0	0.001	0	0.004	0	0.0025	1
MW-68	8/16/2017	42963.00	0.004	0	0.0069	1	-4.97623	1	0.0074	1	0.001	0	0.0004	0	0.004	0	0.0026	1
MW-68	9/10/2017	42988.00	0.004	0	0.0086	1	-4.75599	1	0.0075	1	0.001	0	0.0004	0	0.004	0	0.0023	1
MW-68	10/13/2017	43021.00	0.001	0	0.0097	1	-4.63563	1	0.0078	1	0.001	0	0.00011	1	0.001	0	0.0019	1
MW-68	3/16/2018	43175.00	0.004	0	0.0075	1	-4.89285	1	0.0072	1	0.001	0	0.0004	0	0.004	0	0.002	0
MW-68	6/2/2018	43253.00			0.01	0	-4.60517	0	0.01	0							0.01	0
MW-69	11/4/2015	42312.00	0.00046	1	0.0026	1	-5.95224	1	0.013	1	0.00029	1	0.00031	1	0.00081	1	0.0035	1
MW-69	4/26/2016	42486.00	0.0025	0	0.0031	1	-5.77635	1	0.013	1	0.001	0	0.0001	0	0.0005	0	0.0029	1
MW-69	6/5/2016	42526.00	0.00021	1	0.0037	1	-5.59942	1	0.015	1	0.001	0	0.0001	0	0.0005	0	0.0027	1
MW-69	8/20/2016	42602.00	0.00054	1	0.011	1	-4.50986	1	0.016	1	0.001	0	0.0001	0	0.00076	1	0.0037	1
MW-69	9/13/2016	42626.00	0.0025	0	0.0093	1	-4.67774	1	0.016	1	0.001	0	0.0005	0	0.0025	0	0.0042	1
MW-69	10/20/2016	42663.00	0.0005	0	0.0067	1	-5.00565	1	0.016	1	0.001	0	0.0001	0	0.0005	0	0.0037	1
MW-69	2/1/2017	42767.00	0.001	0	0.0042	1	-5.47267	1	0.017	1	0.001	0	0.0001	0	0.00083	1	0.0046	1
MW-69	4/17/2017	42842.00	0.004	0	0.0063	1	-5.06721	1	0.016	1	0.001	0	0.0004	0	0.002	0	0.0044	1
MW-69	5/2/2017	42857.00	0.001	0	0.0087	1	-4.74443	1	0.015	1	0.001	0	0.0001	0	0.001	0	0.0043	1
MW-69	5/29/2017	42884.00	0.01	0	0.0076	1	-4.87961	1	0.018	1	0.001	0	0.001	0	0.005	0	0.0042	1
MW-69	6/21/2017	42907.53	0.004	0	0.0063	1	-5.06721	1	0.016	1	0.001	0	0.0004	0	0.002	0	0.0041	1
MW-69	7/21/2017	42937.00	0.004	0	0.0083	1	-4.7915	1	0.016	1	0.001	0	0.0004	0	0.002	0	0.0048	1
MW-69	8/9/2017	42956.00	0.01	0	0.0066	1	-5.02069	1	0.016	1	0.001	0	0.001	0	0.004	0	0.0044	1
MW-69	8/16/2017	42963.00	0.004	0	0.0063	1	-5.06721	1	0.015	1	0.001	0	0.0004	0	0.004	0	0.0041	1
MW-69	9/10/2017	42988.00	0.004	0	0.0073	1	-4.91988	1	0.018	1	0.001	0	0.0004	0	0.004	0	0.0043	1
MW-69	10/13/2017	43021.00	0.001	0	0.0078	1	-4.85363	1	0.019	1	0.001	0	0.0001	0	0.001	0	0.0051	1
MW-69	3/16/2018	43175.00	0.004	0	0.0089	1	-4.7217	1	0.014	1	0.001	0	0.0004	0	0.004	0	0.0054	1
MW-69	6/2/2018	43253.00			0.01	0	-4.60517	0	0.016	1							0.01	0
MW-70	11/9/2015	42317.00	0.00017	1	0.0094	1	-4.66705	1	0.015	1	0.00011	1	0.00014	1	0.0006	1	0.0057	1
MW-70	4/27/2016	42487.00	0.0025	0	0.0053	1	-5.24005	1	0.012	1	0.001	0	0.0001	0	0.00062	1	0.0057	1
MW-70	6/5/2016	42526.00	0.00011	1	0.0044	1	-5.42615	1	0.013	1	0.001	0	0.0001	0	0.00084	1	0.0051	1
MW-70	8/20/2016	42602.00	0.00026	1	0.0051	1	-5.27851	1	0.016	1	0.001	0	0.0002	0	0.0037	1	0.0032	1
MW-70	9/12/2016	42625.00	0.0025	0	0.001	0	-6.90776	0	0.0073	1	0.001	0	0.0005	0	0.0025	0	0.0023	1
MW-70	10/19/2016	42662.00	0.0005	0	0.00049	1	-7.62111	1	0.0078	1	0.001	0	0.0001	0	0.0005	0	0.0022	1
MW-70	2/1/2017	42767.00	0.001	0	0.0071	1	-4.94766	1			0.001	0	0.00011	1	0.0016	1	0.0031	1
MW-70	4/16/2017	42841.00	0.004	0	0.0045	1	-5.40368	1	0.009	1	0.001	0	0.0004	0	0.002	0	0.0038	1
MW-70	5/1/2017	42856.00	0.001	0	0.007	1	-4.96185	1	0.0097	1	0.001	0	0.0001	0	0.001	0	0.0053	1
MW-70	5/29/2017	42884.00	0.01	0	0.0028	1	-5.87814	1	0.014	1	0.001	0	0.00024	1	0.005	0	0.0071	1
MW-70	6/21/2017	42907.50	0.004	0	0.0049	1	-5.31852	1	0.014	1	0.001	0	0.0004	0	0.002	0	0.0075	1
MW-70	7/21/2017	42937.00	0.004	0	0.0042	1	-5.47267	1	0.0095	1	0.001	0	0.0004	0	0.002	0	0.0055	1
MW-70	8/9/2017	42956.00	0.01	0	0.0047	1	-5.36019	1	0.013	1	0.001	0	0.001	0	0.004	0	0.0077	1
MW-70	8/16/2017	42963.00	0.004	0	0.0073	1	-4.91988	1	0.012	1	0.001	0	0.0004	0	0.004	0	0.0072	1
MW-70	9/9/2017	42987.00	0.004	0	0.0056	1	-5.18499	1	0.01	1	0.001	0	0.0004	0	0.004	0	0.0057	1
MW-70	10/13/2017	43021.00	0.01	0	0.0062	1	-5.08321	1	0.011	1	0.001	0	0.001	0	0.01	0	0.005	0
MW-70	3/16/2018	43175.00	0.004	0	0.0088	1	-4.733	1	0.0093	1	0.001	0	0.0004	0	0.004	0	0.0054	1
MW-70	5/31/2018	43251.00			0.01	0	-4.60517	0	0.012	1							0.01	0

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Lead	D_Lead	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	In_Mb	D_In_Mb	Selenium	D_Selenium	Thallium	D_Thallium	Ln_Tl	D_Ln_Tl
Background	4/26/2016	0.0005	0	0.45	1	0.0002	0	0.0018	1	-6.31997	1	0.31	1	0.00047	1	-7.66278	1
Background	4/26/2016	0.0011	1	0.4	1	0.0002	0	0.0093	1	-4.67774	1	0.16	1	0.00081	1	-7.11848	1
Background	6/6/2016	0.00073	1	0.41	1	0.0002	0	0.0014	1	-6.57128	1	0.28	1	0.00043	1	-7.75173	1
Background	6/6/2016	0.001	0	0.2	0	0.0002	0	0.0052	1	-5.2591	1	0.39	1	0.00058	1	-7.45248	1
Background	8/21/2016	0.001	0	0.37	1	0.0002	0	0.0024	1	-6.03229	1	0.25	1	0.00028	1	-8.18072	1
Background	8/21/2016	0.001	0	0.36	1	0.0002	0	0.0025	1	-5.99146	1	0.26	1	0.00029	1	-8.14563	1
Background	9/12/2016	0.0005	0	0.3	1	0.0002	0	0.0013	1	-6.64539	1	0.18	1	0.0005	0	-7.6009	0
Background	9/13/2016	0.0005	0	0.35	1	0.0002	0	0.011	1	-4.50986	1	0.003	0	0.00056	1	-7.48757	1
Background	10/20/2016	0.0001	0	0.33	1	0.0002	0	0.00062	1	-7.38579	1	0.19	1	0.0002	1	-8.51719	1
Background	10/20/2016	0.0001	0	0.39	1	0.0002	0	0.0011	1	-6.81245	1	0.11	1	0.00087	1	-7.04702	1
Background	2/2/2017	0.0005	0	0.39	1	0.0002	0	0.00078	1	-7.15622	1	0.34	1	0.00037	1	-7.90201	1
Background	2/2/2017	0.001	0	0.39	1	0.0002	0	0.001	1	-6.90776	1	0.12	1	0.00096	1	-6.94858	1
Background	2/2/2017	0.0005	0	0.21	1	0.0002	0	0.0086	1	-4.75599	1	0.029	1	0.0002	1	-8.51719	1
Background	4/17/2017	0.002	0	0.32	1	0.0002	0	0.002	0	-6.21461	0	0.2	1	0.0004	0	-7.82405	0
Background	4/17/2017	0.002	0	0.35	1	0.0002	0	0.002	0	-6.21461	0	0.1	1	0.00096	1	-6.94858	1
Background	4/18/2017	0.002	0	0.22	1	0.0002	0	0.0041	1	-5.49677	1	0.019	1	0.0004	0	-7.82405	0
Background	5/2/2017	0.0005	0	0.34	1	0.0002	0	0.001	0	-6.90776	0	0.27	1	0.00025	1	-8.29405	1
Background	5/2/2017	0.0005	0	0.38	1	0.0002	0	0.001	0	-6.90776	0	0.12	1	0.00091	1	-7.00207	1
Background	5/2/2017	0.0005	0	0.24	1	0.0002	0	0.0037	1	-5.59942	1	0.015	1	0.00024	1	-8.33487	1
Background	5/29/2017	0.005	0	0.37	1	0.0002	0	0.005	0	-5.29832	0	0.11	1	0.0011	1	-6.81245	1
Background	5/29/2017	0.005	0	0.33	1	0.0002	0	0.005	0	-5.29832	0	0.21	1	0.00029	1	-8.14563	1
Background	5/29/2017	0.005	0	0.2	0	0.0002	0	0.0025	1	-5.99146	1	0.043	1	0.00027	1	-8.21709	1
Background	6/22/2017																
Background	6/22/2017	0.002	0	0.38	1	0.0002	0	0.002	0	-6.21461	0	0.25	1	0.0004	0	-7.82405	0
Background	6/22/2017	0.002	0	0.25	1	0.0002	0	0.002	0	-6.21461	0	0.019	1	0.0004	0	-7.82405	0
Background	7/21/2017	0.002	0	0.4	0	0.0002	0	0.002	0	-6.21461	0	0.24	1	0.0004	0	-7.82405	0
Background	7/21/2017	0.002	0	0.8	0	0.0002	0	0.002	0	-6.21461	0	0.13	1	0.00089	1	-7.02429	1
Background	7/22/2017	0.002	0	0.4	0	0.0002	0	0.0021	1	-6.16582	1	0.015	1	0.0004	0	-7.82405	0
Background	8/10/2017	0.005	0	0.34	1	0.0002	0	0.005	0	-5.29832	0	0.21	1	0.001	0	-6.90776	0
Background	8/10/2017	0.0005	0	0.41	1	0.0002	0	0.00087	1	-7.04702	1	0.14	1	0.00091	1	-7.00207	1
Background	8/10/2017	0.005	0	0.27	1	0.0002	0	0.005	0	-5.29832	0	0.017	1	0.001	0	-6.90776	0
Background	8/17/2017	0.002	0	0.35	1	0.0002	0	0.002	0	-6.21461	0	0.21	1	0.0004	0	-7.82405	0
Background	8/17/2017	0.002	0	0.42	1	0.0002	0	0.002	0	-6.21461	0	0.1	1	0.001	1	-6.90776	1
Background	8/17/2017	0.002	0	0.28	1	0.0002	0	0.0029	1	-5.84304	1	0.018	1	0.0004	0	-7.82405	0
Background	9/10/2017	0.002	0	0.37	1	0.0002	0	0.002	0	-6.21461	0	0.1	1	0.00095	1	-6.95905	1
Background	9/10/2017	0.002	0	0.22	1	0.0002	0	0.0024	1	-6.03229	1	0.033	1	0.0004	0	-7.82405	0
Background	9/11/2017	0.002	0	0.32	1	0.0002	0	0.002	0	-6.21461	0	0.2	1	0.0004	0	-7.82405	0
Background	10/12/2017	0.005	0	0.2	0	0.0002	0	0.005	0	-5.29832	0	0.048	1	0.001	0	-6.90776	0
Background	10/13/2017	0.005	0	0.33	1	0.0002	0	0.005	0	-5.29832	0	0.2	1	0.001	0	-6.90776	0
Background	10/13/2017	0.005	0	0.38	1	0.0002	0	0.005	0	-5.29832	0	0.11	1	0.001	1	-6.90776	1
Background	3/16/2018	0.002	0	0.37	1	0.0002	0	0.002	0	-6.21461	0	0.28	1	0.0004	0	-7.82405	0
Background	3/16/2018	0.002	0	0.25	1	0.0002	0	0.002	0	-6.21461	0	0.017	1	0.0004	0	-7.82405	0
Background	3/16/2018	0.002	0	0.37	1	0.0002	0	0.002	0	-6.21461	0	0.11	1	0.001	1	-6.90776	1
Background	6/2/2018			0.32	1			0.01	1	-4.60517	1	0.2	1	0.002	0	-6.21461	0
Background	6/2/2018			0.35	1			0.01	1	-4.60517	1	0.1	1	0.002	0	-6.21461	0
Background	6/2/2018			0.26	1			0.01	1	-4.60517	1	0.011	1	0.002	0	-6.21461	0

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Lead	D_Lead	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	ln_Mb	D_ln_Mb	Selenium	D_Selenium	Thallium	D_Thallium	Ln_Tl	D_Ln_Tl
MW-66	11/5/2015	0.00018	1	0.24	1	0.0002	0	0.016	1	-4.13517	1	0.0022	1	0.00063	1	-7.36979	1
MW-66	4/27/2016	0.00072	1	0.29	1	0.0002	0	0.012	1	-4.42285	1	0.0018	1	0.0007	1	-7.26443	1
MW-66	6/5/2016	0.0005	0	0.28	1	0.0002	0	0.013	1	-4.34281	1	0.0016	1	0.0006	1	-7.41858	1
MW-66	8/20/2016	0.0005	0	0.32	1	0.0002	0	0.039	1	-3.24419	1	0.0018	1	0.00062	1	-7.38579	1
MW-66	9/12/2016	0.0005	0	0.27	1	0.0002	0	0.01	1	-4.60517	1	0.11	1	0.00088	1	-7.03559	1
MW-66	10/19/2016	0.0001	0	0.28	1	0.0002	0	0.022	1	-3.81671	1	0.0019	1	0.00036	1	-7.92941	1
MW-66	2/1/2017	0.0005	0	0.29	1	0.0002	0	0.02	1	-3.91202	1	0.0019	1	0.0004	1	-7.82405	1
MW-66	4/16/2017	0.002	0	0.31	1	0.0002	0	0.022	1	-3.81671	1	0.002	0	0.0004	0	-7.82405	0
MW-66	5/1/2017	0.0005	0	0.32	1	0.0002	0	0.023	1	-3.77226	1	0.0022	1	0.00033	1	-8.01642	1
MW-66	5/29/2017	0.005	0	0.3	1	0.0002	0	0.023	1	-3.77226	1	0.0022	1	0.00057	1	-7.46987	1
MW-66	6/21/2017	0.0005	0	0.32	1	0.0002	0	0.023	1	-3.77226	1	0.0022	1	0.00041	1	-7.79935	1
MW-66	7/21/2017	0.002	0	0.8	0	0.0002	0	0.021	1	-3.86323	1	0.002	0	0.0004	0	-7.82405	0
MW-66	8/9/2017	0.005	0	0.34	1	0.0002	0	0.022	1	-3.81671	1	0.002	0	0.001	0	-6.90776	0
MW-66	8/16/2017	0.002	0	0.36	1	0.0002	0	0.022	1	-3.81671	1	0.002	0	0.00043	1	-7.75173	1
MW-66	9/9/2017	0.002	0	0.32	1	0.0002	0	0.021	1	-3.86323	1	0.002	0	0.0004	0	-7.82405	0
MW-66	10/13/2017	0.0005	0	0.34	1	0.0002	0	0.023	1	-3.77226	1	0.0021	1	0.00036	1	-7.92941	1
MW-66	3/16/2018	0.002	0	0.38	1	0.0002	0	0.022	1	-3.81671	1	0.002	0	0.00054	1	-7.52394	1
MW-66	5/31/2018			0.5	1			0.015	1	-4.19971	1	0.01	0	0.0025	1	-5.99146	1
MW-67	11/4/2015	0.00017	1	0.25	1	0.0002	0	0.05	1	-2.99573	1	0.0053	1	0.00047	1	-7.66278	1
MW-67	4/27/2016	0.0005	0	0.32	1	0.0002	0	0.043	1	-3.14656	1	0.043	1	0.00037	1	-7.90201	1
MW-67	6/6/2016	0.0005	0	0.3	1	0.0002	0	0.041	1	-3.19418	1	0.044	1	0.00031	1	-8.07894	1
MW-67	8/20/2016	0.001	0	0.35	1	0.0002	0	0.063	1	-2.76462	1	0.068	1	0.00034	1	-7.98656	1
MW-67	9/13/2016	0.0005	0	0.31	1	0.0002	0	0.045	1	-3.10109	1	0.059	1	0.0005	0	-7.6009	0
MW-67	10/20/2016	0.0001	0	0.34	1	0.0002	0	0.045	1	-3.10109	1	0.062	1	0.00034	1	-7.98656	1
MW-67	2/1/2017	0.0005	0	0.36	1	0.0002	0	0.046	1	-3.07911	1	0.064	1	0.00039	1	-7.84936	1
MW-67	4/17/2017	0.002	0	0.42	1	0.0002	0	0.039	1	-3.24419	1	0.032	1	0.0004	0	-7.82405	0
MW-67	5/2/2017	0.0005	0	0.43	1	0.0002	0	0.041	1	-3.19418	1	0.048	1	0.00042	1	-7.77526	1
MW-67	5/29/2017	0.005	0	0.38	1	0.0002	0	0.04	1	-3.21888	1	0.03	1	0.00074	1	-7.20886	1
MW-67	6/21/2017	0.002	0	0.4	1	0.0002	0	0.039	1	-3.24419	1	0.024	1	0.00057	1	-7.46987	1
MW-67	7/21/2017	0.002	0	0.8	0	0.0002	0	0.039	1	-3.24419	1	0.053	1	0.0005	1	-7.6009	1
MW-67	8/9/2017	0.005	0	0.44	1	0.0002	0	0.038	1	-3.27017	1	0.021	1	0.001	0	-6.90776	0
MW-67	8/16/2017	0.002	0	0.47	1	0.0002	0	0.037	1	-3.29684	1	0.016	1	0.00062	1	-7.38579	1
MW-67	9/10/2017	0.002	0	0.43	1	0.0002	0	0.038	1	-3.27017	1	0.023	1	0.00056	1	-7.48757	1
MW-67	10/13/2017	0.0005	0	0.49	1	0.0002	0	0.045	1	-3.10109	1	0.038	1	0.00054	1	-7.52394	1
MW-67	3/16/2018	0.002	0	0.55	1	0.0002	0	0.044	1	-3.12357	1	0.0064	1	0.00063	1	-7.36979	1
MW-67	6/2/2018			0.5	1			0.041	1	-3.19418	1	0.01	0	0.002	0	-6.21461	0
MW-68	11/6/2015	0.00019	1	0.22	1	0.0002	0	0.01	1	-4.60517	1	0.045	1	0.00089	1	-7.02429	1
MW-68	4/26/2016	0.00052	1	0.31	1	0.0002	0	0.0075	1	-4.89285	1	0.1	1	0.00056	1	-7.48757	1
MW-68	6/5/2016	0.0005	0	0.27	1	0.0002	0	0.01	1	-4.60517	1	0.11	1	0.00066	1	-7.32327	1
MW-68	8/20/2016	0.0005	0	0.35	1	0.0002	0	0.0095	1	-4.65646	1	0.22	1	0.00063	1	-7.36979	1
MW-68	9/13/2016	0.0005	0	0.29	1	0.0002	0	0.012	1	-4.42285	1	0.15	1	0.0005	0	-7.6009	0
MW-68	10/20/2016	0.0001	0	0.32	1	0.0002	0	0.0086	1	-4.75599	1	0.15	1	0.00059	1	-7.43539	1
MW-68	2/1/2017	0.0005	0	0.32	1	0.0002	0	0.01	1	-4.60517	1	0.17	1	0.0008	1	-7.1309	1
MW-68	4/17/2017	0.002	0	0.38	1	0.0002	0	0.008	1	-4.82831	1	0.16	1	0.00067	1	-7.30823	1
MW-68	5/2/2017	0.0005	0	0.37	1	0.0002	0	0.0073	1	-4.91988	1	0.28	1	0.00068	1	-7.29342	1
MW-68	5/29/2017	0.005	0	0.32	1	0.0002	0	0.0054	1	-5.22136	1	0.29	1	0.00078	1	-7.15622	1

Table A-5
All Constituents Except Fluoride and Radium - All Wells

Well	Sample Date	Lead	D_Lead	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Ln_Mb	D_Ln_Mb	Selenium	D_Selenium	Thallium	D_Thallium	Ln_Tl	D_Ln_Tl
MW-68	6/21/2017	0.002	0	0.33	1	0.0002	0	0.0051	1	-5.27851	1	0.28	1	0.00065	1	-7.33854	1
MW-68	7/21/2017	0.002	0	0.8	0	0.0002	0	0.0058	1	-5.1499	1	0.3	1	0.00062	1	-7.38579	1
MW-68	8/9/2017	0.005	0	0.37	1	0.0002	0	0.0067	1	-5.00565	1	0.27	1	0.001	0	-6.90776	0
MW-68	8/16/2017	0.002	0	0.38	1	0.0002	0	0.0068	1	-4.99083	1	0.25	1	0.00093	1	-6.98033	1
MW-68	9/10/2017	0.002	0	0.34	1	0.0002	0	0.0063	1	-5.06721	1	0.29	1	0.00083	1	-7.09408	1
MW-68	10/13/2017	0.0005	0	0.37	1	0.0002	0	0.0063	1	-5.06721	1	0.37	1	0.00069	1	-7.27882	1
MW-68	3/16/2018	0.002	0	0.4	1	0.0002	0	0.0064	1	-5.05146	1	0.27	1	0.00048	1	-7.64172	1
MW-68	6/2/2018			0.38	1			0.01	0	-4.60517	0	0.24	1	0.002	0	-6.21461	0
MW-69	11/4/2015	0.00021	1	0.27	1	0.0002	0	0.015	1	-4.19971	1	0.01	1	0.00047	1	-7.66278	1
MW-69	4/26/2016	0.0005	0	0.31	1	0.0002	0	0.013	1	-4.34281	1	0.011	1	0.00028	1	-8.18072	1
MW-69	6/5/2016	0.0005	0	0.27	1	0.0002	0	0.015	1	-4.19971	1	0.018	1	0.00022	1	-8.42188	1
MW-69	8/20/2016	0.0005	0	0.37	1	0.0002	0	0.015	1	-4.19971	1	0.015	1	0.00024	1	-8.33487	1
MW-69	9/13/2016	0.0005	0	0.31	1			0.015	1	-4.19971	1	0.012	1	0.0005	0	-7.6009	0
MW-69	10/20/2016	0.0001	0	0.36	1	0.0002	0	0.015	1	-4.19971	1	0.019	1	0.00014	1	-8.87387	1
MW-69	2/1/2017	0.0005	0	0.4	1	0.0002	0	0.016	1	-4.13517	1	0.015	1	0.00017	1	-8.67971	1
MW-69	4/17/2017	0.002	0	0.44	1	0.0002	0	0.014	1	-4.2687	1	0.01	1	0.0004	0	-7.82405	0
MW-69	5/2/2017	0.0005	0	0.45	1	0.0002	0	0.014	1	-4.2687	1	0.019	1	0.00017	1	-8.67971	1
MW-69	5/29/2017	0.005	0	0.37	1	0.0002	0	0.016	1	-4.13517	1	0.013	1	0.00032	1	-8.04719	1
MW-69	6/21/2017	0.002	0	0.36	1	0.0002	0	0.017	1	-4.07454	1	0.017	1	0.0004	0	-7.82405	0
MW-69	7/21/2017	0.002	0	0.8	0	0.0002	0	0.014	1	-4.2687	1	0.013	1	0.0004	0	-7.82405	0
MW-69	8/9/2017	0.005	0	0.44	1	0.0002	0	0.016	1	-4.13517	1	0.014	1	0.001	0	-6.90776	0
MW-69	8/16/2017	0.002	0	0.44	1	0.0002	0	0.017	1	-4.07454	1	0.014	1	0.0004	0	-7.82405	0
MW-69	9/10/2017	0.006	1	0.46	1	0.0002	0	0.016	1	-4.13517	1	0.014	1	0.0004	0	-7.82405	0
MW-69	10/13/2017	0.0005	0	0.5	1	0.0002	0	0.015	1	-4.19971	1	0.023	1	0.00022	1	-8.42188	1
MW-69	3/16/2018	0.002	0	0.52	1	0.0002	0	0.014	1	-4.2687	1	0.011	1	0.0004	0	-7.82405	0
MW-69	6/2/2018			0.49	1			0.016	1	-4.13517	1	0.014	1	0.002	0	-6.21461	0
MW-70	11/9/2015	0.00015	1	0.28	1	0.0002	0	0.0096	1	-4.64599	1	0.2	1	0.00049	1	-7.62111	1
MW-70	4/27/2016	0.0005	0	0.33	1	0.0002	0	0.0062	1	-5.08321	1	0.2	1	0.00038	1	-7.87534	1
MW-70	6/5/2016	0.0005	0	0.32	1	0.0002	0	0.006	1	-5.116	1	0.16	1	0.00027	1	-8.21709	1
MW-70	8/20/2016	0.001	0	0.35	1	0.0002	0	0.027	1	-3.61192	1	0.23	1	0.00057	1	-7.46987	1
MW-70	9/12/2016	0.0005	0	0.29	1	0.0002	0	0.0036	1	-5.62682	1	0.13	1	0.0005	0	-7.6009	0
MW-70	10/19/2016	0.0001	0	0.31	1	0.0002	0	0.0027	1	-5.9145	1	0.16	1	0.00039	1	-7.84936	1
MW-70	2/1/2017	0.0005	0	0.28	1	0.0002	0	0.0026	1	-5.95224	1	0.26	1	0.0004	1	-7.82405	1
MW-70	4/16/2017	0.002	0	0.32	1	0.0002	0	0.0037	1	-5.59942	1	0.2	1	0.00042	1	-7.77526	1
MW-70	5/1/2017	0.0005	0	0.32	1	0.0002	0	0.0057	1	-5.16729	1	0.25	1	0.00039	1	-7.84936	1
MW-70	5/29/2017	0.005	0	0.31	1	0.0002	0	0.009	1	-4.71053	1	0.18	1	0.0005	1	-7.6009	1
MW-70	6/21/2017	0.002	0	0.32	1	0.0002	0	0.0088	1	-4.733	1	0.18	1	0.0004	0	-7.82405	0
MW-70	7/21/2017	0.002	0	0.8	0	0.0002	0	0.0055	1	-5.20301	1	0.21	1	0.0004	0	-7.82405	0
MW-70	8/9/2017	0.005	0	0.34	1	0.0002	0	0.0093	1	-4.67774	1	0.18	1	0.001	0	-6.90776	0
MW-70	8/16/2017	0.002	0	0.35	1	0.0002	0	0.0083	1	-4.7915	1	0.17	1	0.0004	0	-7.82405	0
MW-70	9/9/2017	0.002	0	0.31	1	0.0002	0	0.0063	1	-5.06721	1	0.17	1	0.0004	0	-7.82405	0
MW-70	10/13/2017	0.005	0	0.31	1	0.0002	0	0.005	0	-5.29832	0	0.21	1	0.001	0	-6.90776	0
MW-70	3/16/2018	0.002	0	0.32	1	0.0002	0	0.0048	1	-5.33914	1	0.2	1	0.0004	0	-7.82405	0
MW-70	5/31/2018			0.3	1			0.01	1	-4.60517	1	0.18	1	0.002	0	-6.21461	0

Table A-6
All Constituents Except Fluoride and Radium - Background Wells Only

Well	Sample Date	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Lead	D_Lead	Lithium	D_Lithium
MW-71	4/26/2016	0.0025	0	0.0064	1	0.019	1	0.001	0	0.00015	1	0.0005	0	0.0049	1	0.0005	0	0.45	1
MW-71	6/6/2016	0.00012	1	0.0069	1	0.02	1	0.001	0	0.00015	1	0.0005	0	0.0041	1	0.00073	1	0.41	1
MW-71	8/21/2016	0.00024	1	0.0076	1	0.013	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.001	0	0.37	1
MW-71	9/12/2016	0.0025	0	0.001	0	0.013	1	0.001	0	0.0005	0	0.0025	0	0.0012	1	0.0005	0	0.3	1
MW-71	10/20/2016	0.0005	0	0.00031	1	0.009	1	0.001	0	0.0001	0	0.0005	0	0.0002	0	0.0001	0	0.33	1
MW-71	2/2/2017	0.001	0	0.0094	1	0.012	1	0.001	0	0.00011	1	0.0005	0	0.0012	1	0.0005	0	0.39	1
MW-71	4/17/2017	0.004	0	0.0063	1	0.01	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.32	1
MW-71	5/2/2017	0.001	0	0.0072	1	0.0087	1	0.001	0	0.0001	0	0.001	0	0.001	0	0.0005	0	0.34	1
MW-71	5/29/2017	0.01	0	0.007	1	0.01	1	0.001	0	0.001	0	0.005	0	0.005	0	0.005	0	0.33	1
MW-71	6/22/2017	0.004	0	0.0063	1	0.012	1	0.001	0	0.0004	0	0.002	0	0.002	0	0.002	0	0.38	1
MW-71	7/21/2017	0.004	0	0.0053	1	0.0086	1	0.001	0	0.0004	0	0.002	0	0.001	0	0.002	0	0.4	0
MW-71	8/10/2017	0.01	0	0.0048	1	0.0092	1	0.001	0	0.001	0	0.004	0	0.002	0	0.005	0	0.34	1
MW-71	8/17/2017	0.004	0	0.006	1	0.0093	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.35	1
MW-71	9/11/2017	0.004	0	0.0048	1	0.0089	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.32	1
MW-71	10/13/2017	0.01	0	0.005	0	0.012	1	0.001	0	0.001	0	0.01	0	0.005	0	0.005	0	0.33	1
MW-71	3/16/2018	0.004	0	0.01	1	0.011	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.002	0	0.37	1
MW-71	6/2/2018			0.012	1	0.01	0							0.01	0			0.32	1
MW-72	4/26/2016	0.0025	0	0.0038	1	0.034	1	0.001	0	0.0001	0	0.0028	1	0.0087	1	0.0011	1	0.4	1
MW-72	6/6/2016	0.00027	1	0.0084	1	0.051	1	0.001	0	0.0002	0	0.0006	1	0.0029	1	0.001	0	0.2	0
MW-72	8/21/2016	0.00022	1	0.0066	1	0.014	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.001	0	0.36	1
MW-72	9/13/2016	0.0025	0	0.001	0	0.019	1			0.0005	0	0.0025	0	0.0073	1	0.0005	0	0.35	1
MW-72	10/20/2016	0.0005	0	0.00023	1	0.009	1	0.001	0	0.0001	0	0.0005	0	0.0024	1	0.0001	0	0.39	1
MW-72	2/2/2017	0.002	0	0.0027	1	0.0084	1	0.001	0	0.0002	0	0.001	0	0.0025	1	0.001	0	0.39	1
MW-72	4/17/2017	0.004	0	0.0028	1	0.0096	1	0.001	0	0.0004	0	0.002	0	0.0024	1	0.002	0	0.35	1
MW-72	5/2/2017	0.001	0	0.003	1	0.0079	1	0.001	0	0.0001	0	0.001	0	0.0024	1	0.0005	0	0.38	1
MW-72	5/29/2017	0.01	0	0.003	1	0.0093	1	0.001	0	0.001	0	0.005	0	0.0026	1	0.005	0	0.37	1
MW-72	6/22/2017	0.004	0	0.0026	1	0.0073	1												
MW-72	7/21/2017	0.004	0	0.0026	1	0.0073	1	0.001	0	0.0004	0	0.002	0	0.0024	1	0.002	0	0.8	0
MW-72	8/10/2017	0.01	0	0.004	1	0.0075	1	0.001	0	0.0001	0	0.001	0	0.0023	1	0.0005	0	0.41	1
MW-72	8/17/2017	0.004	0	0.002	0	0.0077	1	0.001	0	0.0004	0	0.004	0	0.0025	1	0.002	0	0.42	1
MW-72	9/10/2017	0.004	0	0.0029	1	0.0086	1	0.001	0	0.0004	0	0.004	0	0.0023	1	0.002	0	0.37	1
MW-72	10/13/2017	0.01	0	0.0052	1	0.011	1	0.001	0	0.001	0	0.01	0	0.005	0	0.005	0	0.38	1
MW-72	3/16/2018	0.004	0	0.0067	1	0.0082	1	0.001	0	0.0004	0	0.004	0	0.0025	1	0.002	0	0.37	1
MW-72	6/2/2018			0.01	0	0.01	0							0.01	0			0.35	1
MW-73	2/2/2017	0.001	0	0.0015	1	0.043	1	0.001	0	0.00017	1	0.001	1	0.0073	1	0.0005	0	0.21	1
MW-73	4/18/2017	0.004	0	0.004	0	0.027	1	0.001	0	0.0004	0	0.002	0	0.0058	1	0.002	0	0.22	1
MW-73	5/2/2017	0.002	0	0.001	0	0.026	1	0.001	0	0.00021	1	0.001	0	0.0067	1	0.0005	0	0.24	1
MW-73	5/29/2017	0.01	0	0.005	0	0.028	1	0.001	0	0.0003	1	0.005	0	0.0034	1	0.005	0	0.2	0
MW-73	6/22/2017	0.004	0	0.002	0	0.029	1	0.001	0	0.0004	0	0.002	0	0.0066	1	0.002	0	0.25	1
MW-73	7/22/2017	0.004	0	0.002	0	0.025	1	0.001	0	0.0004	0	0.002	0	0.0067	1	0.002	0	0.4	0
MW-73	8/10/2017	0.01	0	0.002	0	0.024	1	0.001	0	0.001	0	0.0041	1	0.0065	1	0.005	0	0.27	1
MW-73	8/17/2017	0.004	0	0.002	0	0.024	1	0.001	0	0.0004	0	0.004	0	0.0066	1	0.002	0	0.28	1
MW-73	9/10/2017	0.004	0	0.002	1	0.023	1	0.001	0	0.0004	0	0.004	0	0.0048	1	0.002	0	0.22	1
MW-73	10/12/2017	0.01	0	0.005	0	0.024	1	0.001	0	0.001	0	0.01	0	0.005	0	0.005	0	0.2	0
MW-73	3/16/2018	0.004	0	0.0034	1	0.02	1	0.001	0	0.0004	0	0.004	0	0.0057	1	0.002	0	0.25	1
MW-73	6/2/2018			0.01	0	0.023	1							0.01	0			0.26	1

Table A-6
All Constituents Except Fluoride and Radium - Background Wells Only

Well	Sample Date	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Selenium	D_Selenium	Thallium	D_Thallium
MW-71	4/26/2016	0.0002	0	0.0018	1	0.31	1	0.00047	1
MW-71	6/6/2016	0.0002	0	0.0014	1	0.28	1	0.00043	1
MW-71	8/21/2016	0.0002	0	0.0024	1	0.25	1	0.00028	1
MW-71	9/12/2016	0.0002	0	0.0013	1	0.18	1	0.0005	0
MW-71	10/20/2016	0.0002	0	0.00062	1	0.19	1	0.0002	1
MW-71	2/2/2017	0.0002	0	0.00078	1	0.34	1	0.00037	1
MW-71	4/17/2017	0.0002	0	0.002	0	0.2	1	0.0004	0
MW-71	5/2/2017	0.0002	0	0.001	0	0.27	1	0.00025	1
MW-71	5/29/2017	0.0002	0	0.005	0	0.21	1	0.00029	1
MW-71	6/22/2017	0.0002	0	0.002	0	0.25	1	0.0004	0
MW-71	7/21/2017	0.0002	0	0.002	0	0.24	1	0.0004	0
MW-71	8/10/2017	0.0002	0	0.005	0	0.21	1	0.001	0
MW-71	8/17/2017	0.0002	0	0.002	0	0.21	1	0.0004	0
MW-71	9/11/2017	0.0002	0	0.002	0	0.2	1	0.0004	0
MW-71	10/13/2017	0.0002	0	0.005	0	0.2	1	0.001	0
MW-71	3/16/2018	0.0002	0	0.002	0	0.28	1	0.0004	0
MW-71	6/2/2018			0.01	1	0.2	1	0.002	0
MW-72	4/26/2016	0.0002	0	0.0093	1	0.16	1	0.00081	1
MW-72	6/6/2016	0.0002	0	0.0052	1	0.39	1	0.00058	1
MW-72	8/21/2016	0.0002	0	0.0025	1	0.26	1	0.00029	1
MW-72	9/13/2016	0.0002	0	0.011	1	0.003	0	0.00056	1
MW-72	10/20/2016	0.0002	0	0.0011	1	0.11	1	0.00087	1
MW-72	2/2/2017	0.0002	0	0.001	1	0.12	1	0.00096	1
MW-72	4/17/2017	0.0002	0	0.002	0	0.1	1	0.00096	1
MW-72	5/2/2017	0.0002	0	0.001	0	0.12	1	0.00091	1
MW-72	5/29/2017	0.0002	0	0.005	0	0.11	1	0.0011	1
MW-72	6/22/2017								
MW-72	7/21/2017	0.0002	0	0.002	0	0.13	1	0.00089	1
MW-72	8/10/2017	0.0002	0	0.00087	1	0.14	1	0.00091	1
MW-72	8/17/2017	0.0002	0	0.002	0	0.1	1	0.001	1
MW-72	9/10/2017	0.0002	0	0.002	0	0.1	1	0.00095	1
MW-72	10/13/2017	0.0002	0	0.005	0	0.11	1	0.001	1
MW-72	3/16/2018	0.0002	0	0.002	0	0.11	1	0.001	1
MW-72	6/2/2018			0.01	1	0.1	1	0.002	0
MW-73	2/2/2017	0.0002	0	0.0086	1	0.029	1	0.0002	1
MW-73	4/18/2017	0.0002	0	0.0041	1	0.019	1	0.0004	0
MW-73	5/2/2017	0.0002	0	0.0037	1	0.015	1	0.00024	1
MW-73	5/29/2017	0.0002	0	0.0025	1	0.043	1	0.00027	1
MW-73	6/22/2017	0.0002	0	0.002	0	0.019	1	0.0004	0
MW-73	7/22/2017	0.0002	0	0.0021	1	0.015	1	0.0004	0
MW-73	8/10/2017	0.0002	0	0.005	0	0.017	1	0.001	0
MW-73	8/17/2017	0.0002	0	0.0029	1	0.018	1	0.0004	0
MW-73	9/10/2017	0.0002	0	0.0024	1	0.033	1	0.0004	0
MW-73	10/12/2017	0.0002	0	0.005	0	0.048	1	0.001	0
MW-73	3/16/2018	0.0002	0	0.002	0	0.017	1	0.0004	0
MW-73	6/2/2018			0.01	1	0.011	1	0.002	0

APPENDIX B

PROUCL OUTPUT FILES



TABLE B-1
URS ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.110/9/2018 1:02:00 PM										
User Selected Options											
From File	Table1_AppendixA_URS_AppendixIV_ProUCLUpload_Sept2018.xls										
Full Precision	OFF										
From File: Table1_AppendixA_URS_AppendixIV_ProUCLUpload_Sept2018.xls											
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Antimony (background)	43	3	4	39	90.70%	5.0000E-4	0.01	2.1250E-4	3.1688E-9	5.6292E-5	0.265
Antimony (mw-66)	17	1	1	16	94.12%	1.0000E-4	0.01	1.1500E-4	2.250E-10	1.5000E-5	0.13
Antimony (mw-67)	17	1	3	14	82.35%	5.0000E-4	0.01	2.0667E-4	3.8889E-9	6.2361E-5	0.302
Antimony (mw-68)	17	1	3	14	82.35%	5.0000E-4	0.01	2.2667E-4	2.4956E-8	1.5797E-4	0.697
Antimony (mw-69)	17	1	3	14	82.35%	5.0000E-4	0.01	3.8625E-4	1.9598E-8	1.3999E-4	0.362
Antimony (mw-70)	17	1	3	14	82.35%	5.0000E-4	0.01	1.8000E-4	3.8000E-9	6.1644E-5	0.342
Arsenic (background)	46	0	32	14	30.43%	0.001	0.01	0.0039	9.1882E-6	0.00303	0.776
Arsenic (mw-66)	18	0	11	7	38.89%	0.001	0.01	0.00174	1.2106E-6	0.0011	0.631
Arsenic (mw-67)	18	0	15	3	16.67%	0.002	0.01	0.0025	9.4293E-7	9.7105E-4	0.388
Arsenic (mw-68)	18	0	17	1	5.56%	0.01	0.01	0.00581	7.1046E-6	0.00267	0.459
Arsenic (mw-69)	18	0	17	1	5.56%	0.01	0.01	0.00673	4.9250E-6	0.00222	0.33
Arsenic (mw-70)	18	0	16	2	11.11%	0.001	0.01	0.00519	5.6257E-6	0.00237	0.457
Barium (background)	46	0	44	2	4.35%	0.01	0.01	0.0161	9.7898E-5	0.00989	0.616
Barium (mw-66)	18	0	18	0	0.00%	N/A	N/A	0.0184	2.5525E-5	0.00505	0.274
Barium (mw-67)	18	0	18	0	0.00%	N/A	N/A	0.0199	2.4575E-6	0.00157	0.0788
Barium (mw-68)	18	0	17	1	5.56%	0.01	0.01	0.00806	2.1085E-6	0.00145	0.18
Barium (mw-69)	18	0	18	0	0.00%	N/A	N/A	0.0158	2.5000E-6	0.00158	0.0999
Barium (mw-70)	17	1	17	0	0.00%	N/A	N/A	0.0114	6.3976E-6	0.00253	0.221
Beryllium (background)	41	5	0	41	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (mw-66)	17	1	0	17	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (mw-67)	17	1	1	16	94.12%	0.001	0.001	1.7000E-4	0	0	N/A
Beryllium (mw-68)	17	1	1	16	94.12%	0.001	0.001	3.3000E-4	0	0	N/A
Beryllium (mw-69)	17	1	1	16	94.12%	0.001	0.001	2.9000E-4	0	0	N/A
Beryllium (mw-70)	17	1	1	16	94.12%	0.001	0.001	1.1000E-4	0	0	N/A
Cadmium (background)	42	4	6	36	85.71%	1.0000E-4	0.001	1.3513E-4	2.8975E-9	5.3828E-5	0.398
Cadmium (mw-66)	17	1	1	16	94.12%	1.0000E-4	0.001	6.2000E-5	0	0	N/A
Cadmium (mw-67)	17	1	4	13	76.47%	1.0000E-4	0.001	1.3429E-4	9.673E-10	3.1102E-5	0.232
Cadmium (mw-68)	17	1	5	12	70.59%	1.0000E-4	0.001	1.5200E-4	9.0393E-9	9.5075E-5	0.625
Cadmium (mw-69)	17	1	1	16	94.12%	1.0000E-4	0.001	1.2625E-4	4.8234E-9	6.9451E-5	0.55
Cadmium (mw-70)	17	1	3	14	82.35%	1.0000E-4	0.001	1.2479E-4	2.0833E-9	4.5643E-5	0.366

TABLE B-1
URS ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Chromium (background)	42	4	4	38	90.48%	5.0000E-4	0.01	7.3722E-4	5.2756E-7	7.2633E-4	0.985
Chromium (mw-66)	16	2	6	10	62.50%	0.001	0.005	0.00131	7.3633E-7	8.5810E-4	0.657
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Chromium (mw-67)	17	1	4	13	76.47%	5.0000E-4	0.005	7.3375E-4	1.1777E-7	3.4317E-4	0.468
Chromium (mw-68)	17	1	5	12	70.59%	5.0000E-4	0.005	8.1750E-4	5.8706E-8	2.4229E-4	0.296
Chromium (mw-69)	17	1	3	14	82.35%	5.0000E-4	0.005	6.5000E-4	2.2933E-8	1.5144E-4	0.233
Chromium (mw-70)	17	1	5	12	70.59%	5.0000E-4	0.01	0.00106	8.2307E-7	9.0723E-4	0.853
Cobalt (background)	45	1	27	18	40.00%	2.0000E-4	0.01	0.003	6.1980E-6	0.00249	0.831
Cobalt (mw-66)	18	0	18	0	0.00%	N/A	N/A	0.00708	2.2089E-6	0.00149	0.21
Cobalt (mw-67)	18	0	17	1	5.56%	0.01	0.01	0.00541	1.8876E-6	0.00137	0.254
Cobalt (mw-68)	18	0	15	3	16.67%	0.002	0.01	0.00259	8.7500E-7	9.3542E-4	0.361
Cobalt (mw-69)	18	0	17	1	5.56%	0.01	0.01	0.00414	4.5654E-7	6.7568E-4	0.163
Cobalt (mw-70)	18	0	16	2	11.11%	0.005	0.01	0.00502	3.1096E-6	0.00176	0.351
Lead (background)	42	4	2	40	95.24%	1.0000E-4	0.005	2.0824E-4	7.8238E-8	2.7971E-4	1.343
Lead (mw-66)	17	1	2	15	88.24%	1.0000E-4	0.005	1.9800E-4	3.1716E-8	1.7809E-4	0.899
Lead (mw-67)	17	1	1	16	94.12%	1.0000E-4	0.005	1.3500E-4	1.2250E-9	3.5000E-5	0.259
Lead (mw-68)	17	1	2	15	88.24%	1.0000E-4	0.005	1.8667E-4	1.5689E-8	1.2526E-4	0.671
Lead (mw-69)	17	1	2	15	88.24%	1.0000E-4	0.005	4.9882E-4	1.8943E-6	0.00138	2.759
Lead (mw-70)	17	1	1	16	94.12%	1.0000E-4	0.005	1.2500E-4	6.250E-10	2.5000E-5	0.2
Lithium (background)	45	1	39	6	13.33%	0.2	0.8	0.327	0.00453	0.0673	0.206
Lithium (mw-66)	18	0	17	1	5.56%	0.8	0.8	0.321	0.0031	0.0557	0.173
Lithium (mw-67)	18	0	17	1	5.56%	0.8	0.8	0.396	0.00613	0.0783	0.197
Lithium (mw-68)	18	0	17	1	5.56%	0.8	0.8	0.336	0.00206	0.0454	0.135
Lithium (mw-69)	18	0	17	1	5.56%	0.8	0.8	0.398	0.00578	0.076	0.191
Lithium (mw-70)	18	0	17	1	5.56%	0.8	0.8	0.315	4.0138E-4	0.02	0.0635
Mercury (background)	42	4	0	42	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-66)	17	1	0	17	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-67)	17	1	0	17	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-68)	17	1	0	17	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-69)	16	2	0	16	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (mw-70)	17	1	0	17	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (background)	45	1	23	22	48.89%	0.001	0.005	0.00269	8.8698E-6	0.00298	1.107
Molybdenum (mw-66)	18	0	18	0	0.00%	N/A	N/A	0.0205	3.9324E-5	0.00627	0.306
Molybdenum (mw-67)	18	0	18	0	0.00%	N/A	N/A	0.043	3.6824E-5	0.00607	0.141
Molybdenum (mw-68)	18	0	17	1	5.56%	0.01	0.01	0.0077	3.5494E-6	0.00188	0.245
Molybdenum (mw-69)	18	0	18	0	0.00%	N/A	N/A	0.0152	1.2059E-6	0.0011	0.0724
Molybdenum (mw-70)	18	0	17	1	5.56%	0.005	0.005	0.00737	2.8434E-5	0.00533	0.724
Selenium (background)	45	1	44	1	2.22%	0.003	0.003	0.144	0.0103	0.101	0.706
Selenium (mw-66)	18	0	11	7	38.89%	0.002	0.01	0.00792	6.1296E-4	0.0248	3.125

TABLE B-1
URS ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Selenium (mw-67)	18	0	17	1	5.56%	0.01	0.01	0.0357	4.0441E-4	0.0201	0.563
Selenium (mw-68)	18	0	18	0	0.00%	N/A	N/A	0.219	0.00737	0.0858	0.392
Selenium (mw-69)	18	0	18	0	0.00%	N/A	N/A	0.0146	1.2261E-5	0.0035	0.241
Selenium (mw-70)	18	0	18	0	0.00%	N/A	N/A	0.193	0.00104	0.0323	0.168
General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method											
Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Thallium (background)	45	1	25	20	44.44%	4.0000E-4	0.002	5.0099E-4	9.6164E-8	3.1010E-4	0.619
Thallium (mw-66)	18	0	14	4	22.22%	4.0000E-4	0.001	6.0403E-4	2.3450E-7	4.8426E-4	0.802
Thallium (mw-67)	18	0	14	4	22.22%	4.0000E-4	0.002	4.7023E-4	1.5628E-8	1.2501E-4	0.266
Thallium (mw-68)	18	0	15	3	16.67%	5.0000E-4	0.002	6.8375E-4	1.6461E-8	1.2830E-4	0.188
Thallium (mw-69)	18	0	9	9	50.00%	4.0000E-4	0.002	2.3667E-4	6.8522E-9	8.2778E-5	0.35
Thallium (mw-70)	18	0	9	9	50.00%	4.0000E-4	0.002	3.9832E-4	6.0481E-9	7.7770E-5	0.195
Fluoride (background)	46	0	3	43	93.48%	0.4	4	0.275	0.00578	0.076	0.276
Fluoride (mw-66)	18	0	18	0	0.00%	N/A	N/A	23.33	30	5.477	0.235
Fluoride (mw-67)	18	0	18	0	0.00%	N/A	N/A	22.22	27.83	5.275	0.237
Fluoride (mw-68)	18	0	18	0	0.00%	N/A	N/A	9.211	4.992	2.234	0.243
Fluoride (mw-69)	18	0	18	0	0.00%	N/A	N/A	16.02	22.85	4.78	0.298
Fluoride (mw-70)	18	0	14	4	22.22%	0.4	0.8	1.803	0.909	0.953	0.529
CombinedRadium (background)	46	0	40	6	13.04%	0.5	0.8	2.066	1.25	1.118	0.541
CombinedRadium (mw-66)	18	0	17	1	5.56%	1.5	1.5	2.495	1.531	1.237	0.496
CombinedRadium (mw-67)	18	0	17	1	5.56%	2	2	2.519	0.807	0.899	0.357
CombinedRadium (mw-68)	18	0	17	1	5.56%	0.6	0.6	1.942	0.847	0.92	0.474
CombinedRadium (mw-69)	18	0	18	0	0.00%	N/A	N/A	4.565	1.152	1.073	0.235
CombinedRadium (mw-70)	18	0	16	2	11.11%	0.6	0.7	1.879	0.521	0.722	0.384
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Antimony (background)	4	3	1.2000E-4	2.7000E-4	2.1250E-4	2.3000E-4	4.2250E-9	6.5000E-5	3.7064E-5	-1.408	0.306
Antimony (mw-66)	1	1	1.3000E-4	1.3000E-4	1.3000E-4	1.3000E-4	N/A	N/A	0	N/A	N/A
Antimony (mw-67)	3	1	1.4000E-4	2.9000E-4	2.0667E-4	1.9000E-4	5.8333E-9	7.6376E-5	7.4129E-5	0.935	0.37
Antimony (mw-68)	3	1	1.1000E-4	4.5000E-4	2.2667E-4	1.2000E-4	3.7433E-8	1.9348E-4	1.4826E-5	1.727	0.854
Antimony (mw-69)	3	1	2.1000E-4	5.4000E-4	4.0333E-4	4.6000E-4	2.9633E-8	1.7214E-4	1.1861E-4	-1.321	0.427
Antimony (mw-70)	3	1	1.1000E-4	2.6000E-4	1.8000E-4	1.7000E-4	5.7000E-9	7.5498E-5	8.8955E-5	0.586	0.419
Arsenic (background)	32	0	2.3000E-4	0.012	0.00505	0.005	7.7772E-6	0.00279	0.00297	0.395	0.552
Arsenic (mw-66)	11	0	6.7000E-4	0.005	0.00207	0.0018	1.5705E-6	0.00125	7.4129E-4	1.409	0.605
Arsenic (mw-67)	15	0	9.9000E-4	0.0046	0.00268	0.0027	8.6126E-7	9.2804E-4	8.8955E-4	0.233	0.346
Arsenic (mw-68)	17	0	6.0000E-4	0.0097	0.00581	0.0065	7.5486E-6	0.00275	0.00282	-0.474	0.473
Arsenic (mw-69)	17	0	0.0026	0.011	0.00675	0.0067	5.2814E-6	0.0023	0.00237	-0.281	0.341
Arsenic (mw-70)	16	0	4.9000E-4	0.0094	0.00549	0.0052	4.8092E-6	0.00219	0.00148	-0.282	0.4

TABLE B-1
URS ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Barium (background)	44	0	0.0073	0.051	0.0164	0.012	1.0193E-4	0.0101	0.00586	1.521	0.616
Barium (mw-66)	18	0	0.0013	0.022	0.0184	0.02	2.5525E-5	0.00505	0.00148	-2.68	0.274
Barium (mw-67)	18	0	0.017	0.022	0.0199	0.02	2.4575E-6	0.00157	0.00148	-0.31	0.0788
Barium (mw-68)	17	0	0.0066	0.013	0.00808	0.0075	2.3219E-6	0.00152	4.4477E-4	2.385	0.189
Barium (mw-69)	18	0	0.013	0.019	0.0158	0.016	2.5000E-6	0.00158	0.00148	0.00558	0.0999
Barium (mw-70)	17	1	0.0073	0.016	0.0114	0.012	6.3976E-6	0.00253	0.00297	0.0888	0.221
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Beryllium (background)	0	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (mw-66)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (mw-67)	1	1	1.7000E-4	1.7000E-4	1.7000E-4	1.7000E-4	N/A	N/A	0	N/A	N/A
Beryllium (mw-68)	1	1	3.3000E-4	3.3000E-4	3.3000E-4	3.3000E-4	N/A	N/A	0	N/A	N/A
Beryllium (mw-69)	1	1	2.9000E-4	2.9000E-4	2.9000E-4	2.9000E-4	N/A	N/A	0	N/A	N/A
Beryllium (mw-70)	1	1	1.1000E-4	1.1000E-4	1.1000E-4	1.1000E-4	N/A	N/A	0	N/A	N/A
Cadmium (background)	6	4	1.1000E-4	3.0000E-4	1.8167E-4	1.6000E-4	4.4167E-9	6.6458E-5	4.4477E-5	1.274	0.366
Cadmium (mw-66)	1	1	6.2000E-5	6.2000E-5	6.2000E-5	6.2000E-5	N/A	N/A	0	N/A	N/A
Cadmium (mw-67)	4	1	1.5000E-4	1.8000E-4	1.6000E-4	1.5500E-4	2.000E-10	1.4142E-5	7.4129E-6	1.414	0.0884
Cadmium (mw-68)	5	1	1.1000E-4	4.6000E-4	2.2000E-4	1.6000E-4	2.1050E-8	1.4509E-4	7.4129E-5	1.542	0.659
Cadmium (mw-69)	1	1	3.1000E-4	3.1000E-4	3.1000E-4	3.1000E-4	N/A	N/A	0	N/A	N/A
Cadmium (mw-70)	3	1	1.1000E-4	2.4000E-4	1.6333E-4	1.4000E-4	4.6333E-9	6.8069E-5	4.4477E-5	1.361	0.417
Chromium (background)	4	4	6.0000E-4	0.0041	0.00213	0.0019	2.6492E-6	0.00163	0.00163	0.47	0.766
Chromium (mw-66)	6	2	7.4000E-4	0.0031	0.00167	0.0011	1.2497E-6	0.00112	4.2995E-4	0.89	0.669
Chromium (mw-67)	4	1	5.8000E-4	0.0016	9.1250E-4	7.3500E-4	2.1676E-7	4.6557E-4	1.4826E-4	1.816	0.51
Chromium (mw-68)	5	1	7.2000E-4	0.0012	9.3200E-4	8.1000E-4	6.1070E-8	2.4712E-4	1.3343E-4	0.522	0.265
Chromium (mw-69)	3	1	7.6000E-4	8.3000E-4	8.0000E-4	8.1000E-4	1.3000E-9	3.6056E-5	2.9652E-5	-1.152	0.0451
Chromium (mw-70)	5	1	6.0000E-4	0.0037	0.00147	8.4000E-4	1.7165E-6	0.00131	3.5582E-4	1.765	0.89
Cobalt (background)	27	1	0.0012	0.0087	0.00425	0.0034	4.8511E-6	0.0022	0.00208	0.385	0.518
Cobalt (mw-66)	18	0	0.0029	0.01	0.00708	0.00735	2.2089E-6	0.00149	6.6716E-4	-1.087	0.21
Cobalt (mw-67)	17	0	0.0025	0.0078	0.00541	0.0057	2.0056E-6	0.00142	0.00119	-0.584	0.262
Cobalt (mw-68)	15	0	0.0017	0.0053	0.0027	0.0025	9.5143E-7	9.7541E-4	7.4129E-4	1.619	0.361
Cobalt (mw-69)	17	0	0.0027	0.0054	0.00414	0.0042	4.8507E-7	6.9647E-4	5.9303E-4	-0.427	0.168
Cobalt (mw-70)	16	0	0.0022	0.0077	0.00516	0.00545	3.1866E-6	0.00179	0.00245	-0.295	0.346
Lead (background)	2	4	7.3000E-4	0.0011	9.1500E-4	9.1500E-4	6.8450E-8	2.6163E-4	2.7428E-4	N/A	0.286
Lead (mw-66)	2	1	1.8000E-4	7.2000E-4	4.5000E-4	4.5000E-4	1.4580E-7	3.8184E-4	4.0030E-4	N/A	0.849
Lead (mw-67)	1	1	1.7000E-4	1.7000E-4	1.7000E-4	1.7000E-4	N/A	N/A	0	N/A	N/A
Lead (mw-68)	2	1	1.9000E-4	5.2000E-4	3.5500E-4	3.5500E-4	5.4450E-8	2.3335E-4	2.4463E-4	N/A	0.657
Lead (mw-69)	2	1	2.1000E-4	0.006	0.00311	0.00311	1.6762E-5	0.00409	0.00429	N/A	1.319
Lead (mw-70)	1	1	1.5000E-4	1.5000E-4	1.5000E-4	1.5000E-4	N/A	N/A	0	N/A	N/A
Lithium (background)	39	1	0.21	0.45	0.337	0.35	0.00366	0.0605	0.0445	-0.568	0.18
Lithium (mw-66)	17	0	0.24	0.5	0.321	0.32	0.0033	0.0574	0.0445	1.912	0.179

TABLE B-1
URS ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Lithium (mw-67)	17	0	0.25	0.55	0.396	0.4	0.00651	0.0807	0.089	0.0873	0.204
Lithium (mw-68)	17	0	0.22	0.4	0.336	0.34	0.00219	0.0468	0.0445	-0.961	0.139
Lithium (mw-69)	17	0	0.27	0.52	0.398	0.4	0.00614	0.0784	0.0741	-0.199	0.197
Lithium (mw-70)	17	0	0.28	0.35	0.315	0.32	4.2647E-4	0.0207	0.0148	-0.0474	0.0655
Mercury (background)	0	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (mw-66)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (mw-67)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (mw-68)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Mercury (mw-69)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (mw-70)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (background)	23	1	6.2000E-4	0.011	0.00416	0.0025	1.3162E-5	0.00363	0.00222	0.916	0.873
Molybdenum (mw-66)	18	0	0.01	0.039	0.0205	0.022	3.9324E-5	0.00627	0.00148	1.063	0.306
Molybdenum (mw-67)	18	0	0.037	0.063	0.043	0.041	3.6824E-5	0.00607	0.00445	2.276	0.141
Molybdenum (mw-68)	17	0	0.0051	0.012	0.00775	0.0073	3.8589E-6	0.00196	0.00193	0.633	0.254
Molybdenum (mw-69)	18	0	0.013	0.017	0.0152	0.015	1.2059E-6	0.0011	0.00148	-0.0666	0.0724
Molybdenum (mw-70)	17	0	0.0026	0.027	0.00759	0.0062	3.0949E-5	0.00556	0.00385	2.85	0.733
Selenium (background)	44	1	0.011	0.39	0.147	0.125	0.0103	0.101	0.126	0.344	0.69
Selenium (mw-66)	11	0	0.0016	0.11	0.0118	0.0021	0.00106	0.0326	2.9652E-4	3.316	2.758
Selenium (mw-67)	17	0	0.0053	0.068	0.0375	0.038	3.9599E-4	0.0199	0.0222	-0.0553	0.531
Selenium (mw-68)	18	0	0.045	0.37	0.219	0.245	0.00737	0.0858	0.0741	-0.402	0.392
Selenium (mw-69)	18	0	0.01	0.023	0.0146	0.014	1.2261E-5	0.0035	0.00371	0.816	0.241
Selenium (mw-70)	18	0	0.13	0.26	0.193	0.19	0.00104	0.0323	0.0297	0.401	0.168
Thallium (background)	25	1	2.0000E-4	0.0011	6.3160E-4	5.8000E-4	1.0651E-7	3.2636E-4	4.8925E-4	-0.055	0.517
Thallium (mw-66)	14	0	3.3000E-4	0.0025	6.6643E-4	5.5500E-4	3.0273E-7	5.5021E-4	2.1497E-4	3.247	0.826
Thallium (mw-67)	14	0	3.1000E-4	7.4000E-4	4.8571E-4	4.8500E-4	1.6903E-8	1.3001E-4	1.5567E-4	0.356	0.268
Thallium (mw-68)	15	0	4.8000E-4	9.3000E-4	6.9733E-4	6.7000E-4	1.5650E-8	1.2510E-4	1.1861E-4	0.366	0.179
Thallium (mw-69)	9	0	1.4000E-4	4.7000E-4	2.4778E-4	2.2000E-4	1.0119E-8	1.0060E-4	7.4129E-5	1.444	0.406
Thallium (mw-70)	9	0	2.7000E-4	5.7000E-4	4.2333E-4	4.0000E-4	7.5000E-9	8.6603E-5	2.9652E-5	0.0318	0.205
Fluoride (background)	3	0	0.2	0.44	0.32	0.32	0.0144	0.12	0.178	0	0.375
Fluoride (mw-66)	18	0	17	41	23.33	24	30	5.477	2.965	1.914	0.235
Fluoride (mw-67)	18	0	15	37	22.22	21.5	27.83	5.275	3.706	1.385	0.237
Fluoride (mw-68)	18	0	5.5	14	9.211	9.65	4.992	2.234	2.001	0.139	0.243
Fluoride (mw-69)	18	0	9.6	29	16.02	16.5	22.85	4.78	5.189	1.009	0.298
Fluoride (mw-70)	14	0	0.85	3.2	2.204	2.25	0.48	0.693	0.593	-0.657	0.314
CombinedRadium (background)	40	0	0.4	4.8	2.315	2.2	0.987	0.994	0.964	0.299	0.429
CombinedRadium (mw-66)	17	0	0.4	5.1	2.599	2.8	1.51	1.229	1.334	-0.0361	0.473
CombinedRadium (mw-67)	17	0	0.9	4.2	2.592	2.67	0.8	0.895	0.845	0.00753	0.345
CombinedRadium (mw-68)	17	0	0.6	3.8	2.021	2.1	0.833	0.913	1.186	0.299	0.452

TABLE B-1
 URS ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

CombinedRadium (mw-69)	18	0	3.1	6.7	4.565	4.75	1.152	1.073	1.186	0.153	0.235
CombinedRadium (mw-70)	16	0	1	3.3	2.039	1.95	0.379	0.616	0.667	0.327	0.302

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.19/14/2018 6:39:09 PM
From File	URS_AssessmentMont_Sept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Antimony-background	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	43
Number Values Reported (n)	46
Number Values Missing	3
Number Values Used	43
Minimum	1.2000E-4
Maximum	0.01
Mean	0.00423
Geometric Mean	0.00272
Median	0.004
Standard Deviation	0.0033
Coefficient of Variation	0.78
Mann-Kendall Test	
M-K Test Value (S)	428
Critical Value (0.05)	1.645
Standard Deviation of S	91.22
Standardized Value of S	4.681
Approximate p-value	1.4292E-6
Statistically significant evidence of an increasing trend at the specified level of significance.	
Antimony-mw-66	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	17
Number Values Reported (n)	18
Number Values Missing	1
Number Values Used	17
Minimum	1.0000E-4
Maximum	0.01
Mean	0.00304
Geometric Mean	0.0017
Median	0.0025
Standard Deviation	0.00299
Coefficient of Variation	0.984
Mann-Kendall Test	
M-K Test Value (S)	48
Tabulated p-value	0.023
Standard Deviation of S	23.71
Standardized Value of S	1.983
Approximate p-value	0.0237

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Statistically significant evidence of an increasing trend at the specified level of significance.									
Antimony-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.4000E-4								
Maximum	0.01								
Mean	0.00312								
Geometric Mean	0.00172								
Median	0.0025								
Standard Deviation	0.00302								
Coefficient of Variation	0.966								
Mann-Kendall Test									
M-K Test Value (S)	62								
Tabulated p-value	0.005								
Standard Deviation of S	23.57								
Standardized Value of S	2.589								
Approximate p-value	0.00482								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Antimony-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.1000E-4								
Maximum	0.01								
Mean	0.00313								
Geometric Mean	0.00169								
Median	0.0025								
Standard Deviation	0.00302								
Coefficient of Variation	0.964								
Mann-Kendall Test									
M-K Test Value (S)	60								
Tabulated p-value	0.007								
Standard Deviation of S	23.57								
Standardized Value of S	2.504								
Approximate p-value	0.00615								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Antimony-mw-69									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	2.1000E-4								
Maximum	0.01								
Mean	0.00316								
Geometric Mean	0.00192								
Median	0.0025								
Standard Deviation	0.00299								
Coefficient of Variation	0.945								
Mann-Kendall Test									
M-K Test Value (S)	60								
Tabulated p-value	0.007								
Standard Deviation of S	23.57								
Standardized Value of S	2.504								
Approximate p-value	0.00615								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Antimony-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.1000E-4								
Maximum	0.01								
Mean	0.00365								
Geometric Mean	0.00191								
Median	0.004								
Standard Deviation	0.0034								
Coefficient of Variation	0.93								
Mann-Kendall Test									
M-K Test Value (S)	78								
Tabulated p-value	0								
Standard Deviation of S	23.57								
Standardized Value of S	3.267								
Approximate p-value	5.4253E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 6:40:11 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Level of Significance	0.05								
Arsenic-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	46								
Number Values Reported (n)	46								
Minimum	2.3000E-4								
Maximum	0.012								
Mean	0.00465								
Geometric Mean	0.00357								
Median	0.0044								
Standard Deviation	0.0029								
Coefficient of Variation	0.625								
Mann-Kendall Test									
M-K Test Value (S)	134								
Critical Value (0.05)	1.645								
Standard Deviation of S	105.4								
Standardized Value of S	1.262								
Approximate p-value	0.104								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Arsenic-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	6.7000E-4								
Maximum	0.01								
Mean	0.0026								
Geometric Mean	0.00206								
Median	0.002								
Standard Deviation	0.00221								
Coefficient of Variation	0.852								
Mann-Kendall Test									
M-K Test Value (S)	78								
Tabulated p-value	0.001								
Standard Deviation of S	26.03								
Standardized Value of S	2.959								
Approximate p-value	0.00155								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Arsenic-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	9.9000E-4								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Maximum	0.01							
Mean	0.00301							
Geometric Mean	0.00265							
Median	0.0027							
Standard Deviation	0.00195							
Coefficient of Variation	0.647							
Mann-Kendall Test								
M-K Test Value (S)	22							
Tabulated p-value	0.205							
Standard Deviation of S	26.13							
Standardized Value of S	0.804							
Approximate p-value	0.211							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Arsenic-mw-68								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	6.0000E-4							
Maximum	0.01							
Mean	0.00604							
Geometric Mean	0.00505							
Median	0.0067							
Standard Deviation	0.00284							
Coefficient of Variation	0.47							
Mann-Kendall Test								
M-K Test Value (S)	92							
Tabulated p-value	0							
Standard Deviation of S	26.38							
Standardized Value of S	3.449							
Approximate p-value	2.8097E-4							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Arsenic-mw-69								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	0.0026							
Maximum	0.011							
Mean	0.00693							
Geometric Mean	0.00647							
Median	0.007							
Standard Deviation	0.00236							
Coefficient of Variation	0.34							
Mann-Kendall Test								
M-K Test Value (S)	56							

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.016								
Standard Deviation of S	26.33								
Standardized Value of S	2.089								
Approximate p-value	0.0184								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Arsenic-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	4.9000E-4								
Maximum	0.01								
Mean	0.00549								
Geometric Mean	0.00456								
Median	0.0052								
Standard Deviation	0.00257								
Coefficient of Variation	0.469								
Mann-Kendall Test									
M-K Test Value (S)	39								
Tabulated p-value	0.076								
Standard Deviation of S	26.4								
Standardized Value of S	1.439								
Approximate p-value	0.075								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 6:45:32 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Barium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	46								
Number Values Reported (n)	46								
Minimum	0.0073								
Maximum	0.051								
Mean	0.0161								
Geometric Mean	0.0139								
Median	0.0115								
Standard Deviation	0.00996								
Coefficient of Variation	0.618								
Mann-Kendall Test									
M-K Test Value (S)	-156								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Critical Value (0.05)	-1.645								
Standard Deviation of S	105.5								
Standardized Value of S	-1.469								
Approximate p-value	0.0709								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Barium-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0013								
Maximum	0.022								
Mean	0.0184								
Geometric Mean	0.0165								
Median	0.02								
Standard Deviation	0.00505								
Coefficient of Variation	0.274								
Mann-Kendall Test									
M-K Test Value (S)	24								
Tabulated p-value	0.184								
Standard Deviation of S	25.68								
Standardized Value of S	0.896								
Approximate p-value	0.185								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Barium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.017								
Maximum	0.022								
Mean	0.0199								
Geometric Mean	0.0198								
Median	0.02								
Standard Deviation	0.00157								
Coefficient of Variation	0.0788								
Mann-Kendall Test									
M-K Test Value (S)	28								
Tabulated p-value	0.147								
Standard Deviation of S	25.29								
Standardized Value of S	1.068								
Approximate p-value	0.143								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Barium-mw-68									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0066								
Maximum	0.013								
Mean	0.00818								
Geometric Mean	0.00807								
Median	0.00765								
Standard Deviation	0.00155								
Coefficient of Variation	0.189								
Mann-Kendall Test									
M-K Test Value (S)	-36								
Tabulated p-value	0.008								
Standard Deviation of S	26.24								
Standardized Value of S	-1.334								
Approximate p-value	0.0911								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Barium-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.013								
Maximum	0.019								
Mean	0.0158								
Geometric Mean	0.0158								
Median	0.016								
Standard Deviation	0.00158								
Coefficient of Variation	0.0999								
Mann-Kendall Test									
M-K Test Value (S)	42								
Tabulated p-value	0.056								
Standard Deviation of S	25.02								
Standardized Value of S	1.639								
Approximate p-value	0.0506								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Barium-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	0.0073								
Maximum	0.016								
Mean	0.0114								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Geometric Mean	0.0112								
Median	0.012								
Standard Deviation	0.00253								
Coefficient of Variation	0.221								
Mann-Kendall Test									
M-K Test Value (S)	-15								
Tabulated p-value	0.299								
Standard Deviation of S	24.16								
Standardized Value of S	-0.579								
Approximate p-value	0.281								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 6:52:48 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Beryllium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	41								
Number Values Reported (n)	46								
Number Values Missing	5								
Number Values Used	41								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	6.586E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Critical Value (0.05)	N/A								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Beryllium-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Used	17								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.470E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.516								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Beryllium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.7000E-4								
Maximum	0.001								
Mean	9.5118E-4								
Geometric Mean	9.0102E-4								
Median	0.001								
Standard Deviation	2.0130E-4								
Coefficient of Variation	0.212								
Mann-Kendall Test									
M-K Test Value (S)	16								
Tabulated p-value	0.271								
Standard Deviation of S	9.798								
Standardized Value of S	1.531								
Approximate p-value	0.0629								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Beryllium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	3.3000E-4								
Maximum	0.001								
Mean	9.6059E-4								
Geometric Mean	9.3687E-4								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Median	0.001								
Standard Deviation	1.6250E-4								
Coefficient of Variation	0.169								
Mann-Kendall Test									
M-K Test Value (S)	16								
Tabulated p-value	0.271								
Standard Deviation of S	9.798								
Standardized Value of S	1.531								
Approximate p-value	0.0629								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Beryllium-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	2.9000E-4								
Maximum	0.001								
Mean	9.5824E-4								
Geometric Mean	9.2977E-4								
Median	0.001								
Standard Deviation	1.7220E-4								
Coefficient of Variation	0.18								
Mann-Kendall Test									
M-K Test Value (S)	16								
Tabulated p-value	0.271								
Standard Deviation of S	9.798								
Standardized Value of S	1.531								
Approximate p-value	0.0629								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Beryllium-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.1000E-4								
Maximum	0.001								
Mean	9.4765E-4								
Geometric Mean	8.7824E-4								
Median	0.001								
Standard Deviation	2.1586E-4								
Coefficient of Variation	0.228								
Mann-Kendall Test									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	16								
Tabulated p-value	0.271								
Standard Deviation of S	9.798								
Standardized Value of S	1.531								
Approximate p-value	0.0629								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 6:53:52 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Cadmium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	42								
Number Values Reported (n)	46								
Number Values Missing	4								
Number Values Used	42								
Minimum	1.0000E-4								
Maximum	0.001								
Mean	4.1167E-4								
Geometric Mean	3.2078E-4								
Median	4.0000E-4								
Standard Deviation	2.9394E-4								
Coefficient of Variation	0.714								
Mann-Kendall Test									
M-K Test Value (S)	321								
Critical Value (0.05)	1.645								
Standard Deviation of S	88.55								
Standardized Value of S	3.614								
Approximate p-value	1.5096E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cadmium-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	6.2000E-5								
Maximum	0.001								
Mean	3.1541E-4								
Geometric Mean	2.1068E-4								
Median	1.0000E-4								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation	3.0027E-4								
Coefficient of Variation	0.952								
Mann-Kendall Test									
M-K Test Value (S)	45								
Tabulated p-value	0.038								
Standard Deviation of S	22.5								
Standardized Value of S	1.955								
Approximate p-value	0.0253								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cadmium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.0000E-4								
Maximum	0.001								
Mean	3.5529E-4								
Geometric Mean	2.7334E-4								
Median	4.0000E-4								
Standard Deviation	2.7805E-4								
Coefficient of Variation	0.783								
Mann-Kendall Test									
M-K Test Value (S)	44								
Tabulated p-value	0.038								
Standard Deviation of S	23.57								
Standardized Value of S	1.825								
Approximate p-value	0.034								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cadmium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.0000E-4								
Maximum	0.001								
Mean	3.1765E-4								
Geometric Mean	2.4770E-4								
Median	4.0000E-4								
Standard Deviation	2.3196E-4								
Coefficient of Variation	0.73								
Mann-Kendall Test									
M-K Test Value (S)	29								

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.135								
Standard Deviation of S	23.5								
Standardized Value of S	1.191								
Approximate p-value	0.117								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.0000E-4								
Maximum	0.001								
Mean	3.4765E-4								
Geometric Mean	2.5128E-4								
Median	4.0000E-4								
Standard Deviation	2.8739E-4								
Coefficient of Variation	0.827								
Mann-Kendall Test									
M-K Test Value (S)	33								
Tabulated p-value	0.102								
Standard Deviation of S	22.71								
Standardized Value of S	1.409								
Approximate p-value	0.0794								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.0000E-4								
Maximum	0.001								
Mean	3.5235E-4								
Geometric Mean	2.6446E-4								
Median	4.0000E-4								
Standard Deviation	2.8159E-4								
Coefficient of Variation	0.799								
Mann-Kendall Test									
M-K Test Value (S)	64								
Tabulated p-value	0.004								
Standard Deviation of S	23.48								
Standardized Value of S	2.683								
Approximate p-value	0.00365								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation of S	21.89								
Standardized Value of S	1.462								
Approximate p-value	0.0719								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Chromium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	5.0000E-4								
Maximum	0.005								
Mean	0.00213								
Geometric Mean	0.00161								
Median	0.002								
Standard Deviation	0.00152								
Coefficient of Variation	0.714								
Mann-Kendall Test									
M-K Test Value (S)	61								
Tabulated p-value	0.007								
Standard Deviation of S	23.98								
Standardized Value of S	2.502								
Approximate p-value	0.00617								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Chromium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	5.0000E-4								
Maximum	0.005								
Mean	0.00216								
Geometric Mean	0.00169								
Median	0.002								
Standard Deviation	0.00148								
Coefficient of Variation	0.686								
Mann-Kendall Test									
M-K Test Value (S)	53								
Tabulated p-value	0.017								
Standard Deviation of S	23.98								
Standardized Value of S	2.169								
Approximate p-value	0.0151								
Statistically significant evidence of an increasing trend at the specified level of significance.									

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

From File	URS_AssessmentMont_Sept2018.xls						
Full Precision	OFF						
Confidence Coefficient	0.95						
Level of Significance	0.05						
Cobalt-background							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	45						
Number Values Reported (n)	46						
Number Values Missing	1						
Number Values Used	45						
Minimum	2.0000E-4						
Maximum	0.01						
Mean	0.00402						
Geometric Mean	0.00311						
Median	0.0026						
Standard Deviation	0.00267						
Coefficient of Variation	0.665						
Mann-Kendall Test							
M-K Test Value (S)	184						
Critical Value (0.05)	1.645						
Standard Deviation of S	101.9						
Standardized Value of S	1.796						
Approximate p-value	0.0363						
Statistically significant evidence of an increasing trend at the specified level of significance.							
Cobalt-mw-66							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	18						
Number Values Reported (n)	18						
Minimum	0.0029						
Maximum	0.01						
Mean	0.00708						
Geometric Mean	0.00689						
Median	0.00735						
Standard Deviation	0.00149						
Coefficient of Variation	0.21						
Mann-Kendall Test							
M-K Test Value (S)	52						
Tabulated p-value	0.024						
Standard Deviation of S	26.38						
Standardized Value of S	1.933						
Approximate p-value	0.0266						
Statistically significant evidence of an increasing trend at the specified level of significance.							
Cobalt-mw-67							

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0025								
Maximum	0.01								
Mean	0.00566								
Geometric Mean	0.00539								
Median	0.00575								
Standard Deviation	0.00175								
Coefficient of Variation	0.309								
Mann-Kendall Test									
M-K Test Value (S)	18								
Tabulated p-value	0.25								
Standard Deviation of S	26.38								
Standardized Value of S	0.644								
Approximate p-value	0.26								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cobalt-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0017								
Maximum	0.01								
Mean	0.00303								
Geometric Mean	0.00269								
Median	0.00245								
Standard Deviation	0.00197								
Coefficient of Variation	0.649								
Mann-Kendall Test									
M-K Test Value (S)	-40								
Tabulated p-value	0.066								
Standard Deviation of S	26.29								
Standardized Value of S	-1.483								
Approximate p-value	0.069								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cobalt-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0027								
Maximum	0.01								
Mean	0.00447								
Geometric Mean	0.00429								
Median	0.00425								

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation	0.00154								
Coefficient of Variation	0.344								
Mann-Kendall Test									
M-K Test Value (S)	92								
Tabulated p-value	0								
Standard Deviation of S	26.31								
Standardized Value of S	3.459								
Approximate p-value	2.7079E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cobalt-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0022								
Maximum	0.01								
Mean	0.00542								
Geometric Mean	0.00503								
Median	0.00545								
Standard Deviation	0.00203								
Coefficient of Variation	0.375								
Mann-Kendall Test									
M-K Test Value (S)	48								
Tabulated p-value	0.034								
Standard Deviation of S	26.33								
Standardized Value of S	1.785								
Approximate p-value	0.0371								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/15/2018 4:44:29 PM								
From File	WorkSheet.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
CombinedRadium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	46								
Number Values Reported (n)	46								
Minimum	0.4								
Maximum	4.8								
Mean	2.098								
Geometric Mean	1.778								
Median	2.05								

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation	1.086								
Coefficient of Variation	0.517								
Mann-Kendall Test									
M-K Test Value (S)	-59								
Critical Value (0.05)	-1.645								
Standard Deviation of S	105.5								
Standardized Value of S	-0.55								
Approximate p-value	0.291								
Insufficient evidence to identify a significant trend at the specified level of significance.									
CombinedRadium-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.4								
Maximum	5.1								
Mean	2.538								
Geometric Mean	2.167								
Median	2.65								
Standard Deviation	1.22								
Coefficient of Variation	0.481								
Mann-Kendall Test									
M-K Test Value (S)	15								
Tabulated p-value	0.3								
Standard Deviation of S	26.36								
Standardized Value of S	0.531								
Approximate p-value	0.298								
Insufficient evidence to identify a significant trend at the specified level of significance.									
CombinedRadium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.9								
Maximum	4.2								
Mean	2.559								
Geometric Mean	2.4								
Median	2.635								
Standard Deviation	0.879								
Coefficient of Variation	0.343								
Mann-Kendall Test									
M-K Test Value (S)	-20								
Tabulated p-value	0.227								
Standard Deviation of S	26.34								
Standardized Value of S	-0.721								
Approximate p-value	0.235								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Insufficient evidence to identify a significant trend at the specified level of significance.									
CombinedRadium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.6								
Maximum	3.8								
Mean	1.942								
Geometric Mean	1.702								
Median	2								
Standard Deviation	0.947								
Coefficient of Variation	0.488								
Mann-Kendall Test									
M-K Test Value (S)	-6								
Tabulated p-value	0.411								
Standard Deviation of S	26.24								
Standardized Value of S	-0.191								
Approximate p-value	0.424								
Insufficient evidence to identify a significant trend at the specified level of significance.									
CombinedRadium-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	3.1								
Maximum	6.7								
Mean	4.565								
Geometric Mean	4.444								
Median	4.75								
Standard Deviation	1.073								
Coefficient of Variation	0.235								
Mann-Kendall Test									
M-K Test Value (S)	49								
Tabulated p-value	0.034								
Standard Deviation of S	26.31								
Standardized Value of S	1.824								
Approximate p-value	0.0341								
Statistically significant evidence of an increasing trend at the specified level of significance.									
CombinedRadium-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Minimum	0.6								
Maximum	3.3								
Mean	1.885								
Geometric Mean	1.726								
Median	1.85								
Standard Deviation	0.733								
Coefficient of Variation	0.389								
Mann-Kendall Test									
M-K Test Value (S)	19								
Tabulated p-value	0.25								
Standard Deviation of S	26.36								
Standardized Value of S	0.683								
Approximate p-value	0.247								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/15/2018 5:49:24 PM								
From File	WorkSheet.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Fluoride-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	46								
Number Values Reported (n)	46								
Minimum	0.2								
Maximum	4								
Mean	1.395								
Geometric Mean	1.064								
Median	0.8								
Standard Deviation	0.988								
Coefficient of Variation	0.709								
Mann-Kendall Test									
M-K Test Value (S)	13								
Critical Value (0.05)	1.645								
Standard Deviation of S	100.1								
Standardized Value of S	0.12								
Approximate p-value	0.452								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Minimum	17								
Maximum	41								
Mean	23.33								
Geometric Mean	22.82								
Median	24								
Standard Deviation	5.477								
Coefficient of Variation	0.235								
Mann-Kendall Test									
M-K Test Value (S)	113								
Tabulated p-value	0								
Standard Deviation of S	26.06								
Standardized Value of S	4.298								
Approximate p-value	8.6109E-6								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	15								
Maximum	37								
Mean	22.22								
Geometric Mean	21.7								
Median	21.5								
Standard Deviation	5.275								
Coefficient of Variation	0.237								
Mann-Kendall Test									
M-K Test Value (S)	83								
Tabulated p-value	0.001								
Standard Deviation of S	26.22								
Standardized Value of S	3.127								
Approximate p-value	8.8306E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	5.5								
Maximum	14								
Mean	9.211								
Geometric Mean	8.946								
Median	9.65								
Standard Deviation	2.234								
Coefficient of Variation	0.243								
Mann-Kendall Test									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	89								
Tabulated p-value	0								
Standard Deviation of S	26.26								
Standardized Value of S	3.351								
Approximate p-value	4.0273E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	9.6								
Maximum	29								
Mean	16.02								
Geometric Mean	15.4								
Median	16.5								
Standard Deviation	4.78								
Coefficient of Variation	0.298								
Mann-Kendall Test									
M-K Test Value (S)	103								
Tabulated p-value	0								
Standard Deviation of S	26.22								
Standardized Value of S	3.89								
Approximate p-value	5.0193E-5								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.4								
Maximum	3.2								
Mean	1.825								
Geometric Mean	1.495								
Median	2.1								
Standard Deviation	0.952								
Coefficient of Variation	0.521								
Mann-Kendall Test									
M-K Test Value (S)	28								
Tabulated p-value	0.147								
Standard Deviation of S	26.29								
Standardized Value of S	1.027								
Approximate p-value	0.152								
Insufficient evidence to identify a significant trend at the specified level of significance.									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.19/14/2018 7:11:06 PM
From File	URS_AssessmentMont_Sept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Lead-background	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	42
Number Values Reported (n)	46
Number Values Missing	4
Number Values Used	42
Minimum	1.0000E-4
Maximum	0.005
Mean	0.00201
Geometric Mean	0.00138
Median	0.002
Standard Deviation	0.00161
Coefficient of Variation	0.798
Mann-Kendall Test	
M-K Test Value (S)	342
Critical Value (0.05)	1.645
Standard Deviation of S	88.08
Standardized Value of S	3.872
Approximate p-value	5.4083E-5
Statistically significant evidence of an increasing trend at the specified level of significance.	
Lead-mw-66	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	17
Number Values Reported (n)	18
Number Values Missing	1
Number Values Used	17
Minimum	1.0000E-4
Maximum	0.005
Mean	0.00144
Geometric Mean	8.6257E-4
Median	5.0000E-4
Standard Deviation	0.00152
Coefficient of Variation	1.055
Mann-Kendall Test	
M-K Test Value (S)	48
Tabulated p-value	0.023
Standard Deviation of S	22.96
Standardized Value of S	2.047
Approximate p-value	0.0203

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.0000E-4								
Maximum	0.006								
Mean	0.00175								
Geometric Mean	9.8605E-4								
Median	5.0000E-4								
Standard Deviation	0.00186								
Coefficient of Variation	1.062								
Mann-Kendall Test									
M-K Test Value (S)	64								
Tabulated p-value	0.004								
Standard Deviation of S	22.96								
Standardized Value of S	2.743								
Approximate p-value	0.00304								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Lead-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	1.0000E-4								
Maximum	0.005								
Mean	0.00181								
Geometric Mean	0.00108								
Median	0.002								
Standard Deviation	0.00169								
Coefficient of Variation	0.934								
Mann-Kendall Test									
M-K Test Value (S)	72								
Tabulated p-value	0.001								
Standard Deviation of S	23.25								
Standardized Value of S	3.053								
Approximate p-value	0.00113								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 8:07:54 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Level of Significance	0.05								
Lithium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	45								
Number Values Reported (n)	46								
Number Values Missing	1								
Number Values Used	45								
Minimum	0.2								
Maximum	0.8								
Mean	0.341								
Geometric Mean	0.329								
Median	0.35								
Standard Deviation	0.0973								
Coefficient of Variation	0.286								
Mann-Kendall Test									
M-K Test Value (S)	-126								
Critical Value (0.05)	-1.645								
Standard Deviation of S	102								
Standardized Value of S	-1.226								
Approximate p-value	0.11								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.24								
Maximum	0.8								
Mean	0.348								
Geometric Mean	0.334								
Median	0.32								
Standard Deviation	0.126								
Coefficient of Variation	0.362								
Mann-Kendall Test									
M-K Test Value (S)	104								
Tabulated p-value	0								
Standard Deviation of S	26.18								
Standardized Value of S	3.934								
Approximate p-value	4.1690E-5								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Lithium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Reported (n)	18								
Minimum	0.25								
Maximum	0.8								
Mean	0.419								
Geometric Mean	0.404								
Median	0.41								
Standard Deviation	0.123								
Coefficient of Variation	0.294								
Mann-Kendall Test									
M-K Test Value (S)	118								
Tabulated p-value	0								
Standard Deviation of S	26.38								
Standardized Value of S	4.435								
Approximate p-value	4.6063E-6								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Lithium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.22								
Maximum	0.8								
Mean	0.362								
Geometric Mean	0.35								
Median	0.345								
Standard Deviation	0.118								
Coefficient of Variation	0.327								
Mann-Kendall Test									
M-K Test Value (S)	90								
Tabulated p-value	0								
Standard Deviation of S	26.19								
Standardized Value of S	3.398								
Approximate p-value	3.3936E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Lithium-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.27								
Maximum	0.8								
Mean	0.42								
Geometric Mean	0.406								
Median	0.42								
Standard Deviation	0.122								
Coefficient of Variation	0.289								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test									
M-K Test Value (S)	104								
Tabulated p-value	0								
Standard Deviation of S	26.26								
Standardized Value of S	3.923								
Approximate p-value	4.3720E-5								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Lithium-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.28								
Maximum	0.8								
Mean	0.342								
Geometric Mean	0.331								
Median	0.32								
Standard Deviation	0.116								
Coefficient of Variation	0.339								
Mann-Kendall Test									
M-K Test Value (S)	9								
Tabulated p-value	0.383								
Standard Deviation of S	25.88								
Standardized Value of S	0.309								
Approximate p-value	0.379								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 8:16:07 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Mercury-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	42								
Number Values Reported (n)	46								
Number Values Missing	4								
Number Values Used	42								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation	1.097E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Critical Value (0.05)	N/A								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mercury-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.588E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.516								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mercury-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.588E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.516								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mercury-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.588E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.516								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mercury-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	18								
Number Values Missing	2								
Number Values Used	16								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.599E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.518								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Insufficient evidence to identify a significant trend at the specified level of significance.									
Mercury-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	17								
Number Values Reported (n)	18								
Number Values Missing	1								
Number Values Used	17								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.588E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.516								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 8:11:56 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Molybdenum-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	45								
Number Values Reported (n)	46								
Number Values Missing	1								
Number Values Used	45								
Minimum	6.2000E-4								
Maximum	0.011								
Mean	0.00352								
Geometric Mean	0.00267								
Median	0.002								
Standard Deviation	0.00285								
Coefficient of Variation	0.808								
Mann-Kendall Test									
M-K Test Value (S)	173								
Critical Value (0.05)	1.645								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation of S	100.6								
Standardized Value of S	1.709								
Approximate p-value	0.0437								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Molybdenum-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.01								
Maximum	0.039								
Mean	0.0205								
Geometric Mean	0.0196								
Median	0.022								
Standard Deviation	0.00627								
Coefficient of Variation	0.306								
Mann-Kendall Test									
M-K Test Value (S)	26								
Tabulated p-value	0.165								
Standard Deviation of S	25.9								
Standardized Value of S	0.965								
Approximate p-value	0.167								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Molybdenum-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.037								
Maximum	0.063								
Mean	0.043								
Geometric Mean	0.0427								
Median	0.041								
Standard Deviation	0.00607								
Coefficient of Variation	0.141								
Mann-Kendall Test									
M-K Test Value (S)	-61								
Tabulated p-value	0.011								
Standard Deviation of S	26.17								
Standardized Value of S	-2.292								
Approximate p-value	0.0109								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Molybdenum-mw-68									
General Statistics									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0051								
Maximum	0.012								
Mean	0.00787								
Geometric Mean	0.00764								
Median	0.0074								
Standard Deviation	0.00198								
Coefficient of Variation	0.251								
Mann-Kendall Test									
M-K Test Value (S)	-58								
Tabulated p-value	0.013								
Standard Deviation of S	26.22								
Standardized Value of S	-2.174								
Approximate p-value	0.0148								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Molybdenum-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.013								
Maximum	0.017								
Mean	0.0152								
Geometric Mean	0.0151								
Median	0.015								
Standard Deviation	0.0011								
Coefficient of Variation	0.0724								
Mann-Kendall Test									
M-K Test Value (S)	33								
Tabulated p-value	0.115								
Standard Deviation of S	25.34								
Standardized Value of S	1.263								
Approximate p-value	0.103								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Molybdenum-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0026								
Maximum	0.027								
Mean	0.00745								
Geometric Mean	0.00632								
Median	0.0061								
Standard Deviation	0.00543								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Coefficient of Variation	0.729								
Mann-Kendall Test									
M-K Test Value (S)	3								
Tabulated p-value	0.47								
Standard Deviation of S	26.4								
Standardized Value of S	0.0758								
Approximate p-value	0.47								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Mann-Kendall Trend Test Analysis									
User Selected Options									
Date/Time of Computation	ProUCL 5.19/14/2018 8:18:52 PM								
From File	URS_AssessmentMont_Sept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Selenium-background									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	45								
Number Values Reported (n)	46								
Number Values Missing	1								
Number Values Used	45								
Minimum	0.003								
Maximum	0.39								
Mean	0.144								
Geometric Mean	0.0924								
Median	0.12								
Standard Deviation	0.103								
Coefficient of Variation	0.714								
Mann-Kendall Test									
M-K Test Value (S)	-241								
Critical Value (0.05)	-1.645								
Standard Deviation of S	102.1								
Standardized Value of S	-2.352								
Approximate p-value	0.00934								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Selenium-mw-66									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0016								
Maximum	0.11								
Mean	0.00844								
Geometric Mean	0.00272								

TABLE B-2
 URS ProUCL MANN-KENDALL TREND ANALYSIS*

Median	0.002								
Standard Deviation	0.0254								
Coefficient of Variation	3.012								
Mann-Kendall Test									
M-K Test Value (S)	40								
Tabulated p-value	0.066								
Standard Deviation of S	25.65								
Standardized Value of S	1.52								
Approximate p-value	0.0642								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-mw-67									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.0053								
Maximum	0.068								
Mean	0.0359								
Geometric Mean	0.0287								
Median	0.035								
Standard Deviation	0.0204								
Coefficient of Variation	0.567								
Mann-Kendall Test									
M-K Test Value (S)	-59								
Tabulated p-value	0.013								
Standard Deviation of S	26.4								
Standardized Value of S	-2.197								
Approximate p-value	0.014								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Selenium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	0.045								
Maximum	0.37								
Mean	0.219								
Geometric Mean	0.198								
Median	0.245								
Standard Deviation	0.0858								
Coefficient of Variation	0.392								
Mann-Kendall Test									
M-K Test Value (S)	87								
Tabulated p-value	0								
Standard Deviation of S	26.32								
Standardized Value of S	3.267								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	5.4372E-4									
Statistically significant evidence of an increasing trend at the specified level of significance.										
Selenium-mw-69										
General Statistics										
Number or Reported Events Not Used	0									
Number of Generated Events	18									
Number Values Reported (n)	18									
Minimum	0.01									
Maximum	0.023									
Mean	0.0146									
Geometric Mean	0.0142									
Median	0.014									
Standard Deviation	0.0035									
Coefficient of Variation	0.241									
Mann-Kendall Test										
M-K Test Value (S)	16									
Tabulated p-value	0.275									
Standard Deviation of S	26.14									
Standardized Value of S	0.574									
Approximate p-value	0.283									
Insufficient evidence to identify a significant trend at the specified level of significance.										
Selenium-mw-70										
General Statistics										
Number or Reported Events Not Used	0									
Number of Generated Events	18									
Number Values Reported (n)	18									
Minimum	0.13									
Maximum	0.26									
Mean	0.193									
Geometric Mean	0.19									
Median	0.19									
Standard Deviation	0.0323									
Coefficient of Variation	0.168									
Mann-Kendall Test										
M-K Test Value (S)	-4									
Tabulated p-value	0.441									
Standard Deviation of S	26.01									
Standardized Value of S	-0.115									
Approximate p-value	0.454									
Insufficient evidence to identify a significant trend at the specified level of significance.										
Mann-Kendall Trend Test Analysis										
User Selected Options										
Date/Time of Computation	ProUCL 5.19/14/2018 8:33:02 PM									
From File	URS_AssessmentMont_Sept2018.xls									

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Full Precision	OFF							
Confidence Coefficient	0.95							
Level of Significance	0.05							
Thallium-background								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	45							
Number Values Reported (n)	46							
Number Values Missing	1							
Number Values Used	45							
Minimum	2.0000E-4							
Maximum	0.002							
Mean	6.9089E-4							
Geometric Mean	5.7235E-4							
Median	4.7000E-4							
Standard Deviation	4.5775E-4							
Coefficient of Variation	0.663							
Mann-Kendall Test								
M-K Test Value (S)	312							
Critical Value (0.05)	1.645							
Standard Deviation of S	100.9							
Standardized Value of S	3.082							
Approximate p-value	0.00103							
Statistically significant evidence of an increasing trend at the specified level of significance.								
Thallium-mw-66								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	18							
Number Values Reported (n)	18							
Minimum	3.3000E-4							
Maximum	0.0025							
Mean	6.4056E-4							
Geometric Mean	5.5033E-4							
Median	4.8500E-4							
Standard Deviation	4.9986E-4							
Coefficient of Variation	0.78							
Mann-Kendall Test								
M-K Test Value (S)	-16							
Tabulated p-value	0.275							
Standard Deviation of S	26.22							
Standardized Value of S	-0.572							
Approximate p-value	0.284							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Thallium-mw-67								
General Statistics								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	3.1000E-4								
Maximum	0.002								
Mean	5.9444E-4								
Geometric Mean	5.2800E-4								
Median	5.0000E-4								
Standard Deviation	3.8897E-4								
Coefficient of Variation	0.654								
Mann-Kendall Test									
M-K Test Value (S)	91								
Tabulated p-value	0								
Standard Deviation of S	26.36								
Standardized Value of S	3.414								
Approximate p-value	3.2021E-4								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Thallium-mw-68									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	4.8000E-4								
Maximum	0.002								
Mean	7.7556E-4								
Geometric Mean	7.3133E-4								
Median	6.7500E-4								
Standard Deviation	3.3750E-4								
Coefficient of Variation	0.435								
Mann-Kendall Test									
M-K Test Value (S)	37								
Tabulated p-value	0.008								
Standard Deviation of S	26.4								
Standardized Value of S	1.364								
Approximate p-value	0.0863								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Thallium-mw-69									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	1.4000E-4								
Maximum	0.002								
Mean	4.5167E-4								
Geometric Mean	3.5522E-4								
Median	4.0000E-4								
Standard Deviation	4.3192E-4								

TABLE B-2
URS ProUCL MANN-KENDALL TREND ANALYSIS*

Coefficient of Variation	0.956								
Mann-Kendall Test									
M-K Test Value (S)	36								
Tabulated p-value	0.008								
Standard Deviation of S	25.82								
Standardized Value of S	1.356								
Approximate p-value	0.0876								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Thallium-mw-70									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	18								
Number Values Reported (n)	18								
Minimum	2.7000E-4								
Maximum	0.002								
Mean	5.7278E-4								
Geometric Mean	4.9952E-4								
Median	4.0000E-4								
Standard Deviation	4.0711E-4								
Coefficient of Variation	0.711								
Mann-Kendall Test									
M-K Test Value (S)	39								
Tabulated p-value	0.076								
Standard Deviation of S	25.8								
Standardized Value of S	1.473								
Approximate p-value	0.0704								
Insufficient evidence to identify a significant trend at the specified level of significance.									

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects						
User Selected Options						
Date/Time of Computation	ProUCL 5.110/9/2018 1:33:43 PM					
From File	Table1_AppendixA_URS_AppendixIV_ProUCLUpload_Sept2018.xls					
Full Precision	OFF					
Confidence Coefficient	0.95					
Antimony (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	3	43	4	39	90.70%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	5.0000E-4	0.01	0.00464	0.004	0.00318
Statistics (Non-Detects Only)	4	1.2000E-4	2.7000E-4	2.1250E-4	2.3000E-4	6.5000E-5
Statistics (All: NDs treated as DL value)	43	1.2000E-4	0.01	0.00423	0.004	0.0033
Statistics (All: NDs treated as DL/2 value)	43	1.2000E-4	0.005	0.00212	0.002	0.00164
Statistics (Normal ROS Imputed Data)	43	7.4830E-5	3.5017E-4	2.1250E-4	2.1811E-4	6.4559E-5
Statistics (Gamma ROS Imputed Data)	43	1.2000E-4	0.01	0.00909	0.01	0.00288
Statistics (Lognormal ROS Imputed Data)	43	9.7162E-5	4.2569E-4	2.1554E-4	2.0959E-4	7.4633E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdev	Log CV
Statistics (Non-Detects Only)	11.55	3.055	1.8391E-5	-8.5	0.362	-0.0425
Statistics (NDs = DL)	1.27	1.197	0.00333	-5.908	1.146	-0.194
Statistics (NDs = DL/2)	1.45	1.364	0.00146	-6.537	1.007	-0.154
Statistics (Gamma ROS Estimates)	2.024	1.899	0.00449	-4.968	1.149	-0.231
Statistics (Lognormal ROS Estimates)	--	--	--	-8.5	0.347	-0.0409
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.94	0.906	0.902	0.996		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.894	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.799	0.943	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.792	0.943	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.986	0.943	Data Appear Normal			
Lilliefors (Detects Only)	0.296	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.318	0.134	Data Not Normal			
Lilliefors (NDs = DL/2)	0.321	0.134	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0725	0.134	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.888	0.893	0.898	0.383		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.469	0.657				
Kolmogorov-Smirnov (Detects Only)	0.336	0.395	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.939	0.772				
Kolmogorov-Smirnov (NDs = DL)	0.222	0.138	Data Not Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	1.957	0.768				
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.137	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	14.83	0.76				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.552	0.137	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.907	0.924	0.937	0.996		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.834	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.845	0.943	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.866	0.943	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.985	0.943	Data Appear Lognormal			
Lilliefors (Detects Only)	0.336	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.26	0.134	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.254	0.134	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0779	0.134	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!						
Estimated to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Antimony (mw-66) was not processed!						
Antimony (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	5.0000E-4	0.01	0.00375	0.004	0.00297
Statistics (Non-Detects Only)	3	1.4000E-4	2.9000E-4	2.0667E-4	1.9000E-4	7.6376E-5
Statistics (All: NDs treated as DL value)	17	1.4000E-4	0.01	0.00312	0.0025	0.00302
Statistics (All: NDs treated as DL/2 value)	17	1.4000E-4	0.005	0.00158	0.00125	0.00149
Statistics (Normal ROS Imputed Data)	17	8.7958E-5	3.2538E-4	2.0667E-4	2.0667E-4	6.5669E-5
Statistics (Gamma ROS Imputed Data)	17	1.4000E-4	0.01	0.00827	0.01	0.00385
Statistics (Lognormal ROS Imputed Data)	17	1.1104E-4	3.5160E-4	2.0718E-4	1.9759E-4	6.6084E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	0.968	0.837	0.00323	-6.367	1.31	-0.206
Statistics (NDs = DL/2)	1.164	0.998	0.00136	-6.938	1.109	-0.16
Statistics (Gamma ROS Estimates)	1.132	0.972	0.00731	-5.298	1.547	-0.292
Statistics (Lognormal ROS Estimates)	--	--	--	-8.529	0.318	-0.0373

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.982	0.897	0.891	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.964	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.801	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.79	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.976	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.253	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.268	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.272	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.12	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.942	0.944	0.445		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.589	0.767				
Kolmogorov-Smirnov (NDs = DL)	0.193	0.215	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.658	0.763				
Kolmogorov-Smirnov (NDs = DL/2)	0.187	0.214	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.936	0.763				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.522	0.215	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.996	0.956	0.963	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.991	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.903	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.915	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.976	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.209	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.211	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.213	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.121	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Non-Detects Only)	14	5.0000E-4	0.01	0.00375	0.004	0.00297	
Statistics (Non-Detects Only)	3	1.1000E-4	4.5000E-4	2.2667E-4	1.2000E-4	1.9348E-4	
Statistics (All: NDs treated as DL value)	17	1.1000E-4	0.01	0.00313	0.0025	0.00302	
Statistics (All: NDs treated as DL/2 value)	17	1.1000E-4	0.005	0.00158	0.00125	0.00149	
Statistics (Normal ROS Imputed Data)	17	-4.241E-5	4.9574E-4	2.2667E-4	2.2667E-4	1.5195E-4	
Statistics (Gamma ROS Imputed Data)	17	1.1000E-4	0.01	0.00828	0.01	0.00384	
Statistics (Lognormal ROS Imputed Data)	17	5.9394E-5	5.5223E-4	2.1792E-4	1.8110E-4	1.3992E-4	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A	
Statistics (NDs = DL)	0.945	0.818	0.00331	-6.382	1.36	-0.213	
Statistics (NDs = DL/2)	1.127	0.967	0.00141	-6.953	1.159	-0.167	
Statistics (Gamma ROS Estimates)	1.101	0.946	0.00752	-5.313	1.601	-0.301	
Statistics (Lognormal ROS Estimates)	--	--	--	-8.616	0.628	-0.0728	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	0.879	0.897	0.893	0.986			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.772	0.767	Data Appear Normal				
Shapiro-Wilk (NDs = DL)	0.802	0.892	Data Not Normal				
Shapiro-Wilk (NDs = DL/2)	0.794	0.892	Data Not Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.964	0.892	Data Appear Normal				
Lilliefors (Detects Only)	0.376	0.425	Data Appear Normal				
Lilliefors (NDs = DL)	0.269	0.207	Data Not Normal				
Lilliefors (NDs = DL/2)	0.272	0.207	Data Not Normal				
Lilliefors (Normal ROS Estimates)	0.17	0.207	Data Appear Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	N/A	0.941	0.944	0.442			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	N/A	N/A					
Kolmogorov-Smirnov (Detects Only)	N/A	N/A					
Anderson-Darling (NDs = DL)	0.575	0.768					
Kolmogorov-Smirnov (NDs = DL)	0.193	0.216	Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL/2)	0.607	0.763					
Kolmogorov-Smirnov (NDs = DL/2)	0.186	0.215	Data Appear Gamma Distributed				
Anderson-Darling (Gamma ROS Estimates)	4.877	0.764					
Kolmogorov-Smirnov (Gamma ROS Est.)	0.523	0.215	Data Not Gamma Distributed				
Lognormal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Log ROS			
Correlation Coefficient R	0.892	0.949	0.959	0.987			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.796	0.767	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL)	0.892	0.892	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.91	0.892	Data Appear Lognormal				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Lognormal ROS Estimates)	0.967	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.366	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.207	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.209	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.156	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	5.0000E-4	0.01	0.00375	0.004	0.00297
Statistics (Non-Detects Only)	3	2.1000E-4	5.4000E-4	4.0333E-4	4.6000E-4	1.7214E-4
Statistics (All: NDs treated as DL value)	17	2.1000E-4	0.01	0.00316	0.0025	0.00299
Statistics (All: NDs treated as DL/2 value)	17	2.1000E-4	0.005	0.00162	0.00125	0.00146
Statistics (Normal ROS Imputed Data)	17	1.9622E-4	5.5687E-4	3.7810E-4	3.7654E-4	1.1084E-4
Statistics (Gamma ROS Imputed Data)	17	2.1000E-4	0.01	0.00831	0.01	0.00377
Statistics (Lognormal ROS Imputed Data)	17	2.0817E-4	5.7646E-4	3.6448E-4	3.4641E-4	1.1320E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdev	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.144	0.981	0.00276	-6.254	1.131	-0.181
Statistics (NDs = DL/2)	1.403	1.195	0.00115	-6.825	0.963	-0.141
Statistics (Gamma ROS Estimates)	1.411	1.201	0.00589	-5.185	1.304	-0.251
Statistics (Lognormal ROS Estimates)	--	--	--	-7.963	0.317	-0.0398
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.959	0.891	0.883	0.987		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.919	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.792	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.778	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.96	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.296	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.271	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.278	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.151	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.944	0.943	0.471		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.645	0.763				
Kolmogorov-Smirnov (NDs = DL)	0.187	0.214	Data Appear Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	0.751	0.758				
Kolmogorov-Smirnov (NDs = DL/2)	0.199	0.213	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.812	0.758				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.517	0.213	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.934	0.963	0.961	0.985		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.873	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.919	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.914	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.955	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.326	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.212	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.208	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.149	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	5.0000E-4	0.01	0.00439	0.004	0.00329
Statistics (Non-Detects Only)	3	1.1000E-4	2.6000E-4	1.8000E-4	1.7000E-4	7.5498E-5
Statistics (All: NDs treated as DL value)	17	1.1000E-4	0.01	0.00365	0.004	0.0034
Statistics (All: NDs treated as DL/2 value)	17	1.1000E-4	0.005	0.00184	0.002	0.00168
Statistics (Normal ROS Imputed Data)	17	6.1291E-5	2.9871E-4	1.8000E-4	1.8000E-4	6.5542E-5
Statistics (Gamma ROS Imputed Data)	17	1.1000E-4	0.01	0.00827	0.01	0.00386
Statistics (Lognormal ROS Imputed Data)	17	8.5761E-5	3.3465E-4	1.8091E-4	1.6941E-4	6.7753E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	0.905	0.785	0.00403	-6.258	1.42	-0.227
Statistics (NDs = DL/2)	1.077	0.926	0.00171	-6.829	1.208	-0.177
Statistics (Gamma ROS Estimates)	1.081	0.929	0.00765	-5.325	1.61	-0.302
Statistics (Lognormal ROS Estimates)	--	--	--	-8.683	0.375	-0.0432
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.993	0.91	0.906	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.987	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.814	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.807	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.976	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.219	0.425	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL)	0.282	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.286	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.12	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.92	0.926	0.439		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.63	0.77				
Kolmogorov-Smirnov (NDs = DL)	0.2	0.216	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.647	0.764				
Kolmogorov-Smirnov (NDs = DL/2)	0.189	0.215	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.942	0.764				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.523	0.215	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.945	0.956	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	1	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.881	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.9	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.973	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.176	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.228	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.224	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.121	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	0	46	32	14	30.43%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	0.001	0.01	0.00371	0.002	0.00305
Statistics (Non-Detects Only)	32	2.3000E-4	0.012	0.00505	0.005	0.00279
Statistics (All: NDs treated as DL value)	46	2.3000E-4	0.012	0.00465	0.0044	0.0029
Statistics (All: NDs treated as DL/2 value)	46	2.3000E-4	0.012	0.00408	0.0032	0.00287
Statistics (Normal ROS Imputed Data)	46	-0.00193	0.012	0.00381	0.0032	0.00316
Statistics (Gamma ROS Imputed Data)	46	2.3000E-4	0.012	0.00656	0.00665	0.00326
Statistics (Lognormal ROS Imputed Data)	46	2.3000E-4	0.012	0.00396	0.003	0.0029
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.246	2.057	0.00225	-5.526	0.867	-0.157
Statistics (NDs = DL)	2.041	1.922	0.00228	-5.636	0.853	-0.151
Statistics (NDs = DL/2)	1.592	1.503	0.00256	-5.847	0.969	-0.166

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	2.436	2.291	0.00265	-5.246	0.838	-0.16		
Statistics (Lognormal ROS Estimates)	--	--	--	-5.877	0.941	-0.16		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.987	0.978	0.972	0.991				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.97	0.93	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.945	0.945	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.935	0.945	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.974	0.945	Data Appear Normal					
Lilliefors (Detects Only)	0.113	0.154	Data Appear Normal					
Lilliefors (NDs = DL)	0.128	0.129	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.147	0.129	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.101	0.129	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.975	0.98	0.978	0.881				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.779	0.757						
Kolmogorov-Smirnov (Detects Only)	0.129	0.157	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL)	0.433	0.761						
Kolmogorov-Smirnov (NDs = DL)	0.111	0.132	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.601	0.766						
Kolmogorov-Smirnov (NDs = DL/2)	0.117	0.133	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.044	0.759						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.168	0.132	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.895	0.949	0.961	0.976				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.811	0.93	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.902	0.945	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.913	0.945	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.942	0.945	Data Not Lognormal					
Lilliefors (Detects Only)	0.187	0.154	Data Not Lognormal					
Lilliefors (NDs = DL)	0.136	0.129	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.158	0.129	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.12	0.129	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Arsenic (mw-66)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	11	7	38.89%		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.001	0.01	0.00343	0.002	0.00315
Statistics (Non-Detects Only)	11	6.7000E-4	0.005	0.00207	0.0018	0.00125
Statistics (All: NDs treated as DL value)	18	6.7000E-4	0.01	0.0026	0.002	0.00221
Statistics (All: NDs treated as DL/2 value)	18	5.0000E-4	0.005	0.00193	0.00135	0.00135
Statistics (Normal ROS Imputed Data)	18	1.9522E-6	0.005	0.00169	0.00148	0.00116
Statistics (Gamma ROS Imputed Data)	18	6.7000E-4	0.01	0.00515	0.0031	0.00409
Statistics (Lognormal ROS Imputed Data)	18	6.5069E-4	0.005	0.00171	0.0014	0.00109
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.478	2.59	5.9519E-4	-6.331	0.572	-0.0904
Statistics (NDs = DL)	2.318	1.969	0.00112	-6.184	0.656	-0.106
Statistics (NDs = DL/2)	2.606	2.208	7.4133E-4	-6.453	0.648	-0.1
Statistics (Gamma ROS Estimates)	1.42	1.22	0.00363	-5.66	0.971	-0.171
Statistics (Lognormal ROS Estimates)	--	--	--	-6.518	0.542	-0.0831
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.933	0.825	0.91	0.938		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.879	0.85	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.702	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.823	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.895	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.218	0.251	Data Appear Normal			
Lilliefors (NDs = DL)	0.311	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.208	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.194	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.987	0.934	0.971	0.836		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.228	0.733				
Kolmogorov-Smirnov (Detects Only)	0.146	0.257	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.857	0.75				
Kolmogorov-Smirnov (NDs = DL)	0.258	0.206	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.558	0.748				
Kolmogorov-Smirnov (NDs = DL/2)	0.166	0.206	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.341	0.758				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.265	0.208	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.992	0.968	0.981	0.98		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.988	0.85	Data Appear Lognormal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.945	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.955	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.96	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.117	0.251	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.211	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.147	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.122	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	15	3	16.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.002	0.01	0.00467	0.002	0.00462
Statistics (Non-Detects Only)	15	9.9000E-4	0.0046	0.00268	0.0027	9.2804E-4
Statistics (All: NDs treated as DL value)	18	9.9000E-4	0.01	0.00301	0.0027	0.00195
Statistics (All: NDs treated as DL/2 value)	18	9.9000E-4	0.005	0.00262	0.0027	0.00116
Statistics (Normal ROS Imputed Data)	18	9.3170E-4	0.0046	0.0025	0.0026	9.7747E-4
Statistics (Gamma ROS Imputed Data)	18	9.9000E-4	0.01	0.0039	0.0028	0.00293
Statistics (Lognormal ROS Imputed Data)	18	9.9000E-4	0.0046	0.00251	0.00252	9.4788E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.962	6.414	3.3653E-4	-5.986	0.39	-0.0651
Statistics (NDs = DL)	4.026	3.392	7.4781E-4	-5.935	0.491	-0.0827
Statistics (NDs = DL/2)	4.854	4.082	5.4005E-4	-6.05	0.499	-0.0824
Statistics (Gamma ROS Estimates)	2.544	2.157	0.00153	-5.756	0.637	-0.111
Statistics (Lognormal ROS Estimates)	--	--	--	-6.06	0.409	-0.0675
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.986	0.805	0.979	0.986		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.978	0.881	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.677	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.95	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.97	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.118	0.22	Data Appear Normal			
Lilliefors (NDs = DL)	0.274	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.113	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.0956	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.984	0.887	0.982	0.915		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.285	0.738				
Kolmogorov-Smirnov (Detects Only)	0.156	0.222	Detected Data Appear Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL)	0.807	0.743				
Kolmogorov-Smirnov (NDs = DL)	0.195	0.205	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.404	0.743				
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.204	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.189	0.749				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.24	0.206	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.964	0.952	0.965	0.98		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.939	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.93	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.919	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.96	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.173	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.173	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.163	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.153	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	6.0000E-4	0.0097	0.00581	0.0065	0.00275
Statistics (All: NDs treated as DL value)	18	6.0000E-4	0.01	0.00604	0.0067	0.00284
Statistics (All: NDs treated as DL/2 value)	18	6.0000E-4	0.0097	0.00577	0.006	0.00267
Statistics (Normal ROS Imputed Data)	18	6.0000E-4	0.0097	0.00581	0.00616	0.00267
Statistics (Gamma ROS Imputed Data)	18	6.0000E-4	0.01	0.00604	0.0067	0.00284
Statistics (Lognormal ROS Imputed Data)	18	6.0000E-4	0.0097	0.00576	0.006	0.00268
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.927	2.45	0.00195	-5.328	0.734	-0.138
Statistics (NDs = DL)	2.941	2.488	0.00206	-5.288	0.733	-0.139
Statistics (NDs = DL/2)	3.081	2.604	0.00187	-5.327	0.713	-0.134
Statistics (Gamma ROS Estimates)	2.941	2.488	0.00206	-5.288	0.733	-0.139
Statistics (Lognormal ROS Estimates)	--	--	--	-5.328	0.713	-0.134
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.974	0.977	0.979	0.978		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.936	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.941	0.897	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.947	0.897	Data Appear Normal			

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URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Normal ROS Estimates)	0.946	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.142	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.14	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.131	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.126	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.903	0.908	0.915	0.908		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.812	0.746				
Kolmogorov-Smirnov (Detects Only)	0.181	0.211	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	0.833	0.746				
Kolmogorov-Smirnov (NDs = DL)	0.181	0.205	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.768	0.746				
Kolmogorov-Smirnov (NDs = DL/2)	0.175	0.205	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.833	0.746				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.181	0.205	Detected Data appear Approximate Gamma			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.897	0.897	0.898	0.899		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.813	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.813	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.816	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.818	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.2	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.194	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.215	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.216	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	0.0026	0.011	0.00675	0.0067	0.0023
Statistics (All: NDs treated as DL value)	18	0.0026	0.011	0.00693	0.007	0.00236
Statistics (All: NDs treated as DL/2 value)	18	0.0026	0.011	0.00665	0.00665	0.00227
Statistics (Normal ROS Imputed Data)	18	0.0026	0.011	0.00673	0.00665	0.00223
Statistics (Gamma ROS Imputed Data)	18	0.0026	0.011	0.00693	0.007	0.00236
Statistics (Lognormal ROS Imputed Data)	18	0.0026	0.011	0.00671	0.00665	0.00224
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.554	6.26	8.9314E-4	-5.066	0.403	-0.0796

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (NDs = DL)	7.466	6.259	9.2787E-4	-5.041	0.406	-0.0806		
Statistics (NDs = DL/2)	7.733	6.482	8.5991E-4	-5.079	0.395	-0.0778		
Statistics (Gamma ROS Estimates)	7.466	6.259	9.2787E-4	-5.041	0.406	-0.0806		
Statistics (Lognormal ROS Estimates)	--	--	--	-5.068	0.391	-0.0772		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.982	0.984	0.989	0.98				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.96	0.892	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.962	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.974	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.959	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.188	0.207	Data Appear Normal					
Lilliefors (NDs = DL)	0.173	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.161	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.2	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.961	0.961	0.972	0.961				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.631	0.74						
Kolmogorov-Smirnov (Detects Only)	0.239	0.209	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL)	0.613	0.741						
Kolmogorov-Smirnov (NDs = DL)	0.225	0.204	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL/2)	0.471	0.741						
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.204	Detected Data appear Approximate Gamma					
Anderson-Darling (Gamma ROS Estimates)	0.613	0.741						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.225	0.204	Detected Data appear Approximate Gamma					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.947	0.947	0.96	0.949				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.895	0.892	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.894	0.897	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.92	0.897	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.901	0.897	Data Appear Lognormal					
Lilliefors (Detects Only)	0.264	0.207	Data Not Lognormal					
Lilliefors (NDs = DL)	0.252	0.202	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.234	0.202	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.243	0.202	Data Not Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Arsenic (mw-70)								

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	16	2	11.11%		
	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	2	0.001	0.01	0.0055	0.0055	0.00636		
Statistics (Non-Detects Only)	16	4.9000E-4	0.0094	0.00548	0.0052	0.00219		
Statistics (All: NDs treated as DL value)	18	4.9000E-4	0.01	0.00548	0.0052	0.00257		
Statistics (All: NDs treated as DL/2 value)	18	4.9000E-4	0.0094	0.00518	0.00508	0.00237		
Statistics (Normal ROS Imputed Data)	18	4.9000E-4	0.0094	0.00524	0.00518	0.00229		
Statistics (Gamma ROS Imputed Data)	18	4.9000E-4	0.01	0.00598	0.00548	0.00252		
Statistics (Lognormal ROS Imputed Data)	18	4.9000E-4	0.0094	0.00521	0.005	0.00226		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	3.778	3.111	0.00145	-5.344	0.679	-0.127		
Statistics (NDs = DL)	2.869	2.428	0.00191	-5.389	0.762	-0.141		
Statistics (NDs = DL/2)	2.605	2.208	0.00199	-5.466	0.831	-0.152		
Statistics (Gamma ROS Estimates)	3.641	3.071	0.00164	-5.261	0.681	-0.129		
Statistics (Lognormal ROS Estimates)	--	--	--	-5.409	0.69	-0.128		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal ROS				
Correlation Coefficient R	0.977	0.984	0.972	0.98				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.965	0.887	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.966	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.945	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.963	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.154	0.213	Data Appear Normal					
Lilliefors (NDs = DL)	0.142	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.173	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.158	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma ROS				
Correlation Coefficient R	0.948	0.947	0.925	0.949				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.927	0.742						
Kolmogorov-Smirnov (Detects Only)	0.249	0.216	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	0.914	0.747						
Kolmogorov-Smirnov (NDs = DL)	0.242	0.205	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.482	0.748						
Kolmogorov-Smirnov (NDs = DL/2)	0.287	0.206	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.765	0.744						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.212	0.205	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.82	0.873	0.829	0.865				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.701	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.775	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.695	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.768	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.3	0.213	Data Not Lognormal			
Lilliefors (NDs = DL)	0.29	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.33	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.297	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Barium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	0	46	44	2	4.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.01	0.01	0.01	0.01	0
Statistics (Non-Detects Only)	44	0.0073	0.051	0.0164	0.012	0.0101
Statistics (All: NDs treated as DL value)	46	0.0073	0.051	0.0161	0.0115	0.00996
Statistics (All: NDs treated as DL/2 value)	46	0.005	0.051	0.0159	0.0115	0.0101
Statistics (Normal ROS Imputed Data)	46	0.00558	0.051	0.016	0.0115	0.01
Statistics (Gamma ROS Imputed Data)	46	0.0073	0.051	0.0161	0.0115	0.00996
Statistics (Lognormal ROS Imputed Data)	46	0.0073	0.051	0.0161	0.0115	0.01
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.415	3.198	0.0048	-4.264	0.54	-0.127
Statistics (NDs = DL)	3.465	3.253	0.00465	-4.279	0.532	-0.124
Statistics (NDs = DL/2)	3.137	2.947	0.00507	-4.309	0.569	-0.132
Statistics (Gamma ROS Estimates)	3.465	3.253	0.00465	-4.279	0.532	-0.124
Statistics (Lognormal ROS Estimates)	--	--	--	-4.285	0.538	-0.125
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.9	0.893	0.907	0.9		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.81	0.944	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.799	0.945	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.825	0.945	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.813	0.945	Data Not Normal			
Lilliefors (Detects Only)	0.223	0.132	Data Not Normal			
Lilliefors (NDs = DL)	0.232	0.129	Data Not Normal			
Lilliefors (NDs = DL/2)	0.221	0.129	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.227	0.129	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.971	0.967	0.975	0.967		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (Detects Only)	2.02	0.754			
Kolmogorov-Smirnov (Detects Only)	0.187	0.134	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL)	2.297	0.755			
Kolmogorov-Smirnov (NDs = DL)	0.198	0.131	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL/2)	1.738	0.755			
Kolmogorov-Smirnov (NDs = DL/2)	0.177	0.131	Data Not Gamma Distributed		
Anderson-Darling (Gamma ROS Estimates)	2.297	0.755			
Kolmogorov-Smirnov (Gamma ROS Est.)	0.198	0.131	Data Not Gamma Distributed		
Lognormal GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Log ROS	
Correlation Coefficient R	0.953	0.949	0.969	0.949	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Shapiro-Wilk (Detects Only)	0.89	0.944	Data Not Lognormal		
Shapiro-Wilk (NDs = DL)	0.884	0.945	Data Not Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.929	0.945	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.883	0.945	Data Not Lognormal		
Lilliefors (Detects Only)	0.168	0.132	Data Not Lognormal		
Lilliefors (NDs = DL)	0.187	0.129	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.155	0.129	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.181	0.129	Data Not Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Barium (mw-66)					
Raw Statistics					
Number of Valid Observations	18				
Number of Distinct Observations	7				
Minimum	0.0013				
Maximum	0.022				
Mean of Raw Data	0.0184				
Standard Deviation of Raw Data	0.00505				
Khat	4.77				
Theta hat	0.00386				
Kstar	4.012				
Theta star	0.00459				
Mean of Log Transformed Data	-4.104				
Standard Deviation of Log Transformed Data	0.656				
Normal GOF Test Results					
Correlation Coefficient R	0.794				
Shapiro Wilk Test Statistic	0.65				
Shapiro Wilk Critical (0.05) Value	0.897				
Approximate Shapiro Wilk P Value	5.5713E-6				
Lilliefors Test Statistic	0.325				
Lilliefors Critical (0.05) Value	0.202				
Data not Normal at (0.05) Significance Level					
Gamma GOF Test Results					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.683						
A-D Test Statistic	3.57						
A-D Critical (0.05) Value	0.743						
K-S Test Statistic	0.366						
K-S Critical(0.05) Value	0.204						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.633						
Shapiro Wilk Test Statistic	0.43						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	1.1777E-8						
Lilliefors Test Statistic	0.37						
Lilliefors Critical (0.05) Value	0.202						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Barium (mw-67)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	6						
Minimum	0.017						
Maximum	0.022						
Mean of Raw Data	0.0199						
Standard Deviation of Raw Data	0.00157						
Khat	166.9						
Theta hat	1.1914E-4						
Kstar	139.1						
Theta star	1.4294E-4						
Mean of Log Transformed Data	-3.921						
Standard Deviation of Log Transformed Data	0.0802						
Normal GOF Test Results							
Correlation Coefficient R	0.956						
Shapiro Wilk Test Statistic	0.901						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.068						
Lilliefors Test Statistic	0.195						
Lilliefors Critical (0.05) Value	0.202						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.951						
A-D Test Statistic	0.751						
A-D Critical (0.05) Value	0.737						
K-S Test Statistic	0.206						
K-S Critical(0.05) Value	0.203						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.952					
Shapiro Wilk Test Statistic	0.896					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.0541					
Lilliefors Test Statistic	0.209					
Lilliefors Critical (0.05) Value	0.202					
Data not Lognormal at (0.05) Significance Level						
Barium (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	0.0066	0.013	0.00808	0.0075	0.00152
Statistics (All: NDs treated as DL value)	18	0.0066	0.013	0.00818	0.00765	0.00155
Statistics (All: NDs treated as DL/2 value)	18	0.005	0.013	0.00791	0.0075	0.00165
Statistics (Normal ROS Imputed Data)	18	0.0066	0.013	0.00807	0.00765	0.00148
Statistics (Gamma ROS Imputed Data)	18	0.0066	0.013	0.00818	0.00765	0.00155
Statistics (Lognormal ROS Imputed Data)	18	0.0066	0.013	0.00806	0.00765	0.00148
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	36.48	30.08	2.2138E-4	-4.833	0.163	-0.0338
Statistics (NDs = DL)	35.18	29.36	2.3260E-4	-4.82	0.167	-0.0347
Statistics (NDs = DL/2)	27.56	23	2.8688E-4	-4.858	0.193	-0.0397
Statistics (Gamma ROS Estimates)	35.18	29.36	2.3260E-4	-4.82	0.167	-0.0347
Statistics (Lognormal ROS Estimates)	--	--	--	-4.833	0.158	-0.0328
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.847	0.877	0.894	0.844		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.738	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.785	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.83	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.735	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.278	0.207	Data Not Normal			
Lilliefors (NDs = DL)	0.265	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.248	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.255	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.881	0.908	0.919	0.908		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (Detects Only)	1.258	0.737			
Kolmogorov-Smirnov (Detects Only)	0.267	0.209	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL)	1.12	0.739			
Kolmogorov-Smirnov (NDs = DL)	0.256	0.203	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL/2)	0.967	0.739			
Kolmogorov-Smirnov (NDs = DL/2)	0.225	0.203	Data Not Gamma Distributed		
Anderson-Darling (Gamma ROS Estimates)	1.12	0.739			
Kolmogorov-Smirnov (Gamma ROS Est.)	0.256	0.203	Data Not Gamma Distributed		
Lognormal GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Log ROS	
Correlation Coefficient R	0.894	0.917	0.929	0.891	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Shapiro-Wilk (Detects Only)	0.817	0.892	Data Not Lognormal		
Shapiro-Wilk (NDs = DL)	0.852	0.897	Data Not Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.894	0.897	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.812	0.897	Data Not Lognormal		
Lilliefors (Detects Only)	0.257	0.207	Data Not Lognormal		
Lilliefors (NDs = DL)	0.247	0.202	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.212	0.202	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.256	0.202	Data Not Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Barium (mw-69)					
Raw Statistics					
Number of Valid Observations	18				
Number of Distinct Observations	7				
Minimum	0.013				
Maximum	0.019				
Mean of Raw Data	0.0158				
Standard Deviation of Raw Data	0.00158				
Khat	104.9				
Theta hat	1.5088E-4				
Kstar	87.49				
Theta star	1.8098E-4				
Mean of Log Transformed Data	-4.15				
Standard Deviation of Log Transformed Data	0.101				
Normal GOF Test Results					
Correlation Coefficient R	0.96				
Shapiro Wilk Test Statistic	0.923				
Shapiro Wilk Critical (0.05) Value	0.897				
Approximate Shapiro Wilk P Value	0.144				
Lilliefors Test Statistic	0.236				
Lilliefors Critical (0.05) Value	0.202				
Data appear Approximate Normal at (0.05) Significance Level					
Gamma GOF Test Results					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.96						
A-D Test Statistic	0.778						
A-D Critical (0.05) Value	0.737						
K-S Test Statistic	0.222						
K-S Critical(0.05) Value	0.203						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.957						
Shapiro Wilk Test Statistic	0.917						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.115						
Lilliefors Test Statistic	0.227						
Lilliefors Critical (0.05) Value	0.202						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Barium (mw-70)							
Raw Statistics							
Number of Valid Observations	17						
Number of Missing Observations	1						
Number of Distinct Observations	13						
Minimum	0.0073						
Maximum	0.016						
Mean of Raw Data	0.0114						
Standard Deviation of Raw Data	0.00253						
Khat	21.16						
Theta hat	5.4109E-4						
Kstar	17.46						
Theta star	6.5556E-4						
Mean of Log Transformed Data	-4.494						
Standard Deviation of Log Transformed Data	0.228						
Normal GOF Test Results							
Correlation Coefficient R	0.99						
Shapiro Wilk Test Statistic	0.97						
Shapiro Wilk Critical (0.05) Value	0.892						
Approximate Shapiro Wilk P Value	0.848						
Lilliefors Test Statistic	0.128						
Lilliefors Critical (0.05) Value	0.207						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.987						
A-D Test Statistic	0.259						
A-D Critical (0.05) Value	0.738						
K-S Test Statistic	0.144						
K-S Critical(0.05) Value	0.209						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.987						
Shapiro Wilk Test Statistic	0.965						
Shapiro Wilk Critical (0.05) Value	0.892						
Approximate Shapiro Wilk P Value	0.766						
Lilliefors Test Statistic	0.152						
Lilliefors Critical (0.05) Value	0.207						
Data appear Lognormal at (0.05) Significance Level							
Beryllium (background)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	46	5	41	0	41	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Beryllium (background) was not processed!							
Beryllium (mw-66)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	0	17	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Beryllium (mw-66) was not processed!							
Beryllium (mw-67)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	1	16	94.12%	
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!							
sted to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B							
The data set for variable Beryllium (mw-67) was not processed!							
Beryllium (mw-68)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	1	16	94.12%	
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!							
sted to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B							

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

The data set for variable Beryllium (mw-68) was not processed!						
Beryllium (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Beryllium (mw-69) was not processed!						
Beryllium (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Beryllium (mw-70) was not processed!						
Cadmium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	4	42	6	36	85.71%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	36	1.0000E-4	0.001	4.5000E-4	4.0000E-4	3.0000E-4
Statistics (Non-Detects Only)	6	1.1000E-4	3.0000E-4	1.8167E-4	1.6000E-4	6.6458E-5
Statistics (All: NDs treated as DL value)	42	1.0000E-4	0.001	4.1167E-4	4.0000E-4	2.9394E-4
Statistics (All: NDs treated as DL/2 value)	42	5.0000E-5	5.0000E-4	2.1881E-4	2.0000E-4	1.4136E-4
Statistics (Normal ROS Imputed Data)	42	-9.191E-5	3.0000E-4	8.5343E-5	8.4457E-5	9.2017E-5
Statistics (Gamma ROS Imputed Data)	42	1.1000E-4	0.01	0.0086	0.01	0.00348
Statistics (Lognormal ROS Imputed Data)	42	4.1445E-5	3.0000E-4	1.1700E-4	1.0399E-4	5.8644E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	10.01	5.117	1.8144E-5	-8.664	0.343	-0.0395
Statistics (NDs = DL)	2.156	2.018	1.9093E-4	-8.045	0.736	-0.0915
Statistics (NDs = DL/2)	2.517	2.353	8.6924E-5	-8.639	0.69	-0.0799
Statistics (Gamma ROS Estimates)	1.308	1.23	0.00657	-5.185	1.443	-0.278
Statistics (Lognormal ROS Estimates)	--	--	--	-9.167	0.48	-0.0523
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.94	0.891	0.898	0.997		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.897	0.788	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.753	0.942	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.772	0.942	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.939	0.942	Data Not Normal			
Lilliefors (Detects Only)	0.236	0.325	Data Appear Normal			
Lilliefors (NDs = DL)	0.302	0.135	Data Not Normal			
Lilliefors (NDs = DL/2)	0.291	0.135	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0651	0.135	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.973	0.921	0.922	0.416		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.302	0.698				
Kolmogorov-Smirnov (Detects Only)	0.207	0.332	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.963	0.759				
Kolmogorov-Smirnov (NDs = DL)	0.211	0.138	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.099	0.757				
Kolmogorov-Smirnov (NDs = DL/2)	0.209	0.138	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	13.17	0.771				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.538	0.139	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.974	0.949	0.941	0.997		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.96	0.788	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.846	0.942	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.844	0.942	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.937	0.942	Data Not Lognormal			
Lilliefors (Detects Only)	0.185	0.325	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.237	0.135	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.237	0.135	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0652	0.135	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Requested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, E						
The data set for variable Cadmium (mw-66) was not processed!						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Cadmium (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	4	13	76.47%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	1.0000E-4	0.001	4.1538E-4	4.0000E-4	2.9396E-4
Statistics (Non-Detects Only)	4	1.5000E-4	1.8000E-4	1.6000E-4	1.5500E-4	1.4142E-5
Statistics (All: NDs treated as DL value)	17	1.0000E-4	0.001	3.5529E-4	4.0000E-4	2.7805E-4
Statistics (All: NDs treated as DL/2 value)	17	5.0000E-5	5.0000E-4	1.9647E-4	2.0000E-4	1.2913E-4
Statistics (Normal ROS Imputed Data)	17	1.0708E-4	1.8000E-4	1.4241E-4	1.4247E-4	2.0142E-5
Statistics (Gamma ROS Imputed Data)	17	1.5000E-4	0.01	0.00768	0.01	0.0043
Statistics (Lognormal ROS Imputed Data)	17	1.1551E-4	1.8000E-4	1.4433E-4	1.4336E-4	1.7764E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	177.3	44.48	9.0267E-7	-8.743	0.086	-0.00983
Statistics (NDs = DL)	2.058	1.734	1.7266E-4	-8.205	0.746	-0.091
Statistics (NDs = DL/2)	2.657	2.227	7.3953E-5	-8.735	0.68	-0.0778
Statistics (Gamma ROS Estimates)	0.831	0.724	0.00924	-5.579	1.81	-0.324
Statistics (Lognormal ROS Estimates)	--	--	--	-8.851	0.123	-0.0139
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.912	0.884	0.886	0.995		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.828	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.778	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.787	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.984	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.26	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.26	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.313	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0895	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.926	0.946	0.93	0.474		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.482	0.657				
Kolmogorov-Smirnov (Detects Only)	0.295	0.394	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.808	0.749				
Kolmogorov-Smirnov (NDs = DL)	0.187	0.212	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.929	0.747				
Kolmogorov-Smirnov (NDs = DL/2)	0.231	0.211	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.432	0.773				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.495	0.217	Data Not Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.917	0.958	0.936	0.995		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.836	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.902	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.872	0.892	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.984	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.264	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.224	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.224	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0895	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	5	12	70.59%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	1.0000E-4	0.001	3.5833E-4	4.0000E-4	2.5391E-4
Statistics (Non-Detects Only)	5	1.1000E-4	4.6000E-4	2.2000E-4	1.6000E-4	1.4509E-4
Statistics (All: NDs treated as DL value)	17	1.0000E-4	0.001	3.1765E-4	4.0000E-4	2.3196E-4
Statistics (All: NDs treated as DL/2 value)	17	5.0000E-5	5.0000E-4	1.9118E-4	2.0000E-4	1.2927E-4
Statistics (Normal ROS Imputed Data)	17	-2.453E-4	4.6000E-4	4.7150E-5	4.3419E-5	1.7784E-4
Statistics (Gamma ROS Imputed Data)	17	1.1000E-4	0.01	0.00712	0.01	0.00459
Statistics (Lognormal ROS Imputed Data)	17	2.8142E-5	4.6000E-4	1.2149E-4	9.1829E-5	1.0540E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.481	1.526	6.3201E-5	-8.572	0.591	-0.0689
Statistics (NDs = DL)	2.162	1.82	1.4691E-4	-8.303	0.744	-0.0897
Statistics (NDs = DL/2)	2.324	1.953	8.2245E-5	-8.793	0.737	-0.0839
Statistics (Gamma ROS Estimates)	0.726	0.637	0.00981	-5.772	1.887	-0.327
Statistics (Lognormal ROS Estimates)	--	--	--	-9.28	0.728	-0.0784
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.909	0.886	0.917	0.987		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.828	0.762	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.795	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.84	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.978	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.26	0.343	Data Appear Normal			
Lilliefors (NDs = DL)	0.185	0.207	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.237	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0864	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.981	0.94	0.957	0.516		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.382	0.682				
Kolmogorov-Smirnov (Detects Only)	0.248	0.359	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.104	0.749				
Kolmogorov-Smirnov (NDs = DL)	0.247	0.212	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.779	0.748				
Kolmogorov-Smirnov (NDs = DL/2)	0.202	0.211	Detected Data appear Approximate Gamn			
Anderson-Darling (Gamma ROS Estimates)	3.651	0.778				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.462	0.218	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.959	0.93	0.943	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.911	0.762	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.851	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.878	0.892	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.985	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.212	0.343	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.27	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.234	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0799	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!						
Estimated to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Cadmium (mw-69) was not processed!						
Cadmium (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	1.0000E-4	0.001	3.9286E-4	4.0000E-4	2.9473E-4
Statistics (Non-Detects Only)	3	1.1000E-4	2.4000E-4	1.6333E-4	1.4000E-4	6.8069E-5
Statistics (All: NDs treated as DL value)	17	1.0000E-4	0.001	3.5235E-4	4.0000E-4	2.8159E-4
Statistics (All: NDs treated as DL/2 value)	17	5.0000E-5	5.0000E-4	1.9059E-4	2.0000E-4	1.3562E-4
Statistics (Normal ROS Imputed Data)	17	-9.816E-5	2.4000E-4	5.0842E-5	3.8881E-5	9.0895E-5
Statistics (Gamma ROS Imputed Data)	17	1.1000E-4	0.01	0.00826	0.01	0.00387
Statistics (Lognormal ROS Imputed Data)	17	3.3295E-5	2.4000E-4	9.1733E-5	7.4450E-5	5.3447E-5

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.892	1.597	1.8622E-4	-8.238	0.791	-0.096
Statistics (NDs = DL/2)	2.208	1.857	8.6329E-5	-8.809	0.749	-0.085
Statistics (Gamma ROS Estimates)	1.053	0.906	0.00785	-5.341	1.644	-0.308
Statistics (Lognormal ROS Estimates)	--	--	--	-9.435	0.534	-0.0566
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.955	0.887	0.903	0.993		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.912	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.782	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.812	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.984	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.301	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.256	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.237	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0953	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.947	0.947	0.436		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.864	0.751				
Kolmogorov-Smirnov (NDs = DL)	0.192	0.212	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.763	0.749				
Kolmogorov-Smirnov (NDs = DL/2)	0.205	0.211	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	4.965	0.765				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.524	0.215	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.977	0.946	0.948	0.994		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.954	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.877	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.884	0.892	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.984	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.265	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.229	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.24	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0953	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Chromium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	4	42	4	38	90.48%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	38	5.0000E-4	0.01	0.00304	0.002	0.00253
Statistics (Non-Detects Only)	4	6.0000E-4	0.0041	0.00213	0.0019	0.00163
Statistics (All: NDs treated as DL value)	42	5.0000E-4	0.01	0.00295	0.002	0.00246
Statistics (All: NDs treated as DL/2 value)	42	2.5000E-4	0.005	0.00158	0.001	0.00129
Statistics (Normal ROS Imputed Data)	42	-0.00557	0.0041	-0.00185	-0.00192	0.00219
Statistics (Gamma ROS Imputed Data)	42	6.0000E-4	0.01	0.00925	0.01	0.00238
Statistics (Lognormal ROS Imputed Data)	42	2.3865E-5	0.0041	4.0660E-4	1.7681E-4	7.4610E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.993	0.665	0.00107	-6.425	0.891	-0.139
Statistics (NDs = DL)	1.644	1.542	0.0018	-6.159	0.864	-0.14
Statistics (NDs = DL/2)	1.643	1.541	9.6035E-4	-6.786	0.868	-0.128
Statistics (Gamma ROS Estimates)	5.403	5.033	0.00171	-4.779	0.592	-0.124
Statistics (Lognormal ROS Estimates)	--	--	--	-8.606	1.201	-0.14
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.968	0.895	0.911	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.922	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.76	0.942	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.784	0.942	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.931	0.942	Data Not Normal			
Lilliefors (Detects Only)	0.255	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.177	0.135	Data Not Normal			
Lilliefors (NDs = DL/2)	0.196	0.135	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0608	0.135	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.961	0.957	0.969	0.463		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.309	0.661				
Kolmogorov-Smirnov (Detects Only)	0.257	0.398	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.066	0.765				
Kolmogorov-Smirnov (NDs = DL)	0.152	0.139	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.908	0.765				
Kolmogorov-Smirnov (NDs = DL/2)	0.146	0.139	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	13.37	0.752				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.533	0.137	Data Not Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.976	0.968	0.973	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.937	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.871	0.942	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.88	0.942	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.928	0.942	Data Not Lognormal			
Lilliefors (Detects Only)	0.23	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.175	0.135	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.174	0.135	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0608	0.135	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	2	16	6	10	62.50%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.001	0.005	0.00295	0.00325	0.00142
Statistics (Non-Detects Only)	6	7.4000E-4	0.0031	0.00167	0.0011	0.00112
Statistics (All: NDs treated as DL value)	16	7.4000E-4	0.005	0.00247	0.00225	0.00143
Statistics (All: NDs treated as DL/2 value)	16	5.0000E-4	0.0031	0.00155	0.00123	8.5430E-4
Statistics (Normal ROS Imputed Data)	16	2.7851E-4	0.0031	0.00127	9.9939E-4	8.4158E-4
Statistics (Gamma ROS Imputed Data)	16	7.4000E-4	0.01	0.00688	0.01	0.00421
Statistics (Lognormal ROS Imputed Data)	16	6.0747E-4	0.0031	0.00126	9.6783E-4	7.7937E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.984	1.603	5.5957E-4	-6.572	0.636	-0.0968
Statistics (NDs = DL)	2.828	2.339	8.7355E-4	-6.191	0.661	-0.107
Statistics (NDs = DL/2)	3.422	2.822	4.5241E-4	-6.624	0.588	-0.0887
Statistics (Gamma ROS Estimates)	1.523	1.279	0.00452	-5.343	1.05	-0.196
Statistics (Lognormal ROS Estimates)	--	--	--	-6.811	0.49	-0.0719
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.878	0.953	0.956	0.919		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.745	0.788	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.889	0.887	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.899	0.887	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.841	0.887	Data Not Normal			
Lilliefors (Detects Only)	0.33	0.325	Data Not Normal			
Lilliefors (NDs = DL)	0.188	0.213	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.199	0.213	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.206	0.213	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.905	0.944	0.968	0.68		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.7	0.701				
Kolmogorov-Smirnov (Detects Only)	0.301	0.335	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.759	0.745				
Kolmogorov-Smirnov (NDs = DL)	0.184	0.217	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.457	0.743				
Kolmogorov-Smirnov (NDs = DL/2)	0.187	0.216	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.444	0.754				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.401	0.219	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.921	0.952	0.975	0.936		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.823	0.788	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.886	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.934	0.887	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.871	0.887	Data Not Lognormal			
Lilliefors (Detects Only)	0.262	0.325	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.174	0.213	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.194	0.213	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.197	0.213	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	4	13	76.47%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.005	0.0025	0.002	0.00154
Statistics (Non-Detects Only)	4	5.8000E-4	0.0016	9.1250E-4	7.3500E-4	4.6557E-4
Statistics (All: NDs treated as DL value)	17	5.0000E-4	0.005	0.00213	0.002	0.00152
Statistics (All: NDs treated as DL/2 value)	17	2.5000E-4	0.0025	0.00117	0.001	7.1255E-4
Statistics (Normal ROS Imputed Data)	17	-2.757E-4	0.0016	5.1818E-4	5.1157E-4	4.5861E-4
Statistics (Gamma ROS Imputed Data)	17	5.8000E-4	0.01	0.00786	0.01	0.00398
Statistics (Lognormal ROS Imputed Data)	17	2.6316E-4	0.0016	6.3101E-4	5.6809E-4	3.1723E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	6.26	1.732	1.4577E-4	-7.081	0.446	-0.063
Statistics (NDs = DL)	1.937	1.635	0.0011	-6.433	0.806	-0.125
Statistics (NDs = DL/2)	2.503	2.1	4.6768E-4	-6.963	0.719	-0.103
Statistics (Gamma ROS Estimates)	1.608	1.364	0.00485	-5.188	1.1	-0.212
Statistics (Lognormal ROS Estimates)	--	--	--	-7.467	0.447	-0.0598
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.882	0.94	0.962	0.98		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.788	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.867	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.912	0.892	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.968	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.362	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.186	0.207	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.183	0.207	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.141	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.952	0.948	0.956	0.555		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.5	0.659				
Kolmogorov-Smirnov (Detects Only)	0.348	0.396	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.619	0.75				
Kolmogorov-Smirnov (NDs = DL)	0.181	0.212	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.414	0.747				
Kolmogorov-Smirnov (NDs = DL/2)	0.165	0.211	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.054	0.754				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.483	0.213	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.924	0.964	0.969	0.984		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.864	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.908	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.926	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.974	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.317	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.165	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.145	0.207	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.141	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	5	12	70.59%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	5.0000E-4	0.005	0.00267	0.00225	0.00148
Statistics (Non-Detects Only)	5	7.2000E-4	0.0012	9.3200E-4	8.1000E-4	2.4712E-4
Statistics (All: NDs treated as DL value)	17	5.0000E-4	0.005	0.00216	0.002	0.00148
Statistics (All: NDs treated as DL/2 value)	17	2.5000E-4	0.0025	0.00122	0.001	6.5452E-4
Statistics (Normal ROS Imputed Data)	17	3.8474E-4	0.0012	8.0161E-4	7.9953E-4	2.2251E-4

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Imputed Data)	17	7.2000E-4	0.01	0.00733	0.01	0.00426	
Statistics (Lognormal ROS Imputed Data)	17	5.0834E-4	0.0012	8.1108E-4	7.8824E-4	1.9646E-4	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	18.39	7.489	5.0682E-5	-7.006	0.26	-0.0371	
Statistics (NDs = DL)	2.228	1.874	9.6811E-4	-6.38	0.734	-0.115	
Statistics (NDs = DL/2)	3.347	2.796	3.6306E-4	-6.87	0.612	-0.089	
Statistics (Gamma ROS Estimates)	1.407	1.198	0.00521	-5.311	1.135	-0.214	
Statistics (Lognormal ROS Estimates)	--	--	--	-7.144	0.235	-0.0329	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	0.894	0.934	0.962	0.976			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.765	0.762	Data Appear Normal				
Shapiro-Wilk (NDs = DL)	0.859	0.892	Data Not Normal				
Shapiro-Wilk (NDs = DL/2)	0.918	0.892	Data Appear Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.95	0.892	Data Appear Normal				
Lilliefors (Detects Only)	0.289	0.343	Data Appear Normal				
Lilliefors (NDs = DL)	0.212	0.207	Data Not Normal				
Lilliefors (NDs = DL/2)	0.185	0.207	Data Appear Normal				
Lilliefors (Normal ROS Estimates)	0.191	0.207	Data Appear Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	0.899	0.95	0.964	0.598			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	0.672	0.679					
Kolmogorov-Smirnov (Detects Only)	0.295	0.357	Detected Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL)	0.667	0.749					
Kolmogorov-Smirnov (NDs = DL)	0.187	0.211	Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL/2)	0.389	0.745					
Kolmogorov-Smirnov (NDs = DL/2)	0.173	0.21	Data Appear Gamma Distributed				
Anderson-Darling (Gamma ROS Estimates)	3.59	0.758					
Kolmogorov-Smirnov (Gamma ROS Est.)	0.453	0.213	Data Not Gamma Distributed				
Lognormal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Log ROS			
Correlation Coefficient R	0.903	0.97	0.97	0.978			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.782	0.762	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL)	0.924	0.892	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.942	0.892	Data Appear Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.955	0.892	Data Appear Lognormal				
Lilliefors (Detects Only)	0.268	0.343	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.173	0.207	Data Appear Lognormal				
Lilliefors (NDs = DL/2)	0.152	0.207	Data Appear Lognormal				
Lilliefors (Lognormal ROS Estimates)	0.163	0.207	Data Appear Lognormal				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	3	14	82.35%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	14	5.0000E-4	0.005	0.00236	0.002	0.00157
Statistics (Non-Detects Only)	3	7.6000E-4	8.3000E-4	8.0000E-4	8.1000E-4	3.6056E-5
Statistics (All: NDs treated as DL value)	17	5.0000E-4	0.005	0.00208	0.002	0.00155
Statistics (All: NDs treated as DL/2 value)	17	2.5000E-4	0.0025	0.00111	0.001	7.2501E-4
Statistics (Normal ROS Imputed Data)	17	6.4734E-4	8.3000E-4	7.4151E-4	7.4151E-4	5.2676E-5
Statistics (Gamma ROS Imputed Data)	17	7.6000E-4	0.01	0.00838	0.01	0.00362
Statistics (Lognormal ROS Imputed Data)	17	6.5981E-4	8.3000E-4	7.4429E-4	7.4276E-4	4.9311E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.825	1.543	0.00114	-6.472	0.827	-0.128
Statistics (NDs = DL/2)	2.223	1.87	5.0021E-4	-7.043	0.766	-0.109
Statistics (Gamma ROS Estimates)	2.012	1.696	0.00416	-5.051	0.993	-0.197
Statistics (Lognormal ROS Estimates)	--	--	--	-7.205	0.0663	-0.0092
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.971	0.93	0.951	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.942	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.849	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.89	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.974	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.276	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.229	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.208	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0882	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.943	0.953	0.508		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	0.775	0.752				
Kolmogorov-Smirnov (NDs = DL)	0.204	0.212	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.508	0.749				
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.211	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.865	0.749				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.512	0.212	Data Not Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.968	0.957	0.962	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.938	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.892	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.907	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.974	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.28	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.171	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.155	0.207	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0882	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	5	12	70.59%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	5.0000E-4	0.01	0.00342	0.00325	0.00249
Statistics (Non-Detects Only)	5	6.0000E-4	0.0037	0.00147	8.4000E-4	0.00131
Statistics (All: NDs treated as DL value)	17	5.0000E-4	0.01	0.00284	0.002	0.00235
Statistics (All: NDs treated as DL/2 value)	17	2.5000E-4	0.005	0.00164	0.00125	0.00123
Statistics (Normal ROS Imputed Data)	17	-0.00112	0.0037	7.9383E-4	6.2000E-4	0.00106
Statistics (Gamma ROS Imputed Data)	17	6.0000E-4	0.01	0.00749	0.01	0.00406
Statistics (Lognormal ROS Imputed Data)	17	2.2603E-4	0.0037	9.2925E-4	6.5926E-4	8.0575E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.048	0.952	7.1880E-4	-6.785	0.771	-0.114
Statistics (NDs = DL)	1.723	1.458	0.00165	-6.18	0.858	-0.139
Statistics (NDs = DL/2)	2.11	1.777	7.7676E-4	-6.669	0.762	-0.114
Statistics (Gamma ROS Estimates)	1.565	1.328	0.00479	-5.246	1.094	-0.208
Statistics (Lognormal ROS Estimates)	--	--	--	-7.205	0.645	-0.0895
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.874	0.897	0.92	0.944		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.768	0.762	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.817	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.855	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.914	0.892	Data Appear Normal			
Lilliefors (Detects Only)	0.285	0.343	Data Appear Normal			
Lilliefors (NDs = DL)	0.194	0.207	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.208	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.189	0.207	Data Appear Normal			
Gamma GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.978	0.964	0.984	0.611		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.49	0.684				
Kolmogorov-Smirnov (Detects Only)	0.288	0.36	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.415	0.753				
Kolmogorov-Smirnov (NDs = DL)	0.141	0.212	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.268	0.749				
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.212	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.307	0.755				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.446	0.213	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.938	0.974	0.988	0.966		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.87	0.762	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.942	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.979	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.948	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	0.25	0.343	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.162	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.136	0.207	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.158	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	1	45	27	18	40.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	18	2.0000E-4	0.01	0.00368	0.002	0.0033
Statistics (Non-Detects Only)	27	0.0012	0.0087	0.00425	0.0034	0.0022
Statistics (All: NDs treated as DL value)	45	2.0000E-4	0.01	0.00402	0.0026	0.00267
Statistics (All: NDs treated as DL/2 value)	45	1.0000E-4	0.0087	0.00328	0.0025	0.00231
Statistics (Normal ROS Imputed Data)	45	-0.00246	0.0087	0.00269	0.0024	0.00284
Statistics (Gamma ROS Imputed Data)	45	0.0012	0.01	0.00655	0.0067	0.00331
Statistics (Lognormal ROS Imputed Data)	45	6.8746E-4	0.0087	0.00318	0.0024	0.00222
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.644	3.263	0.00117	-5.605	0.564	-0.101
Statistics (NDs = DL)	2.103	1.977	0.00191	-5.773	0.796	-0.138
Statistics (NDs = DL/2)	1.656	1.56	0.00198	-6.05	0.946	-0.156
Statistics (Gamma ROS Estimates)	2.99	2.805	0.00219	-5.205	0.658	-0.126
Statistics (Lognormal ROS Estimates)	--	--	--	-5.994	0.717	-0.12
Normal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.948	0.953	0.957	0.986		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.887	0.923	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.893	0.945	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.9	0.945	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.957	0.945	Data Appear Normal			
Lilliefors (Detects Only)	0.217	0.167	Data Not Normal			
Lilliefors (NDs = DL)	0.214	0.131	Data Not Normal			
Lilliefors (NDs = DL/2)	0.216	0.131	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.128	0.131	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.952	0.973	0.958	0.845		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.193	0.75				
Kolmogorov-Smirnov (Detects Only)	0.198	0.169	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	0.791	0.76				
Kolmogorov-Smirnov (NDs = DL)	0.148	0.133	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.907	0.766				
Kolmogorov-Smirnov (NDs = DL/2)	0.146	0.134	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.052	0.756				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.235	0.133	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.955	0.959	0.951	0.98		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.901	0.923	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.926	0.945	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.906	0.945	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.938	0.945	Data Not Lognormal			
Lilliefors (Detects Only)	0.175	0.167	Data Not Lognormal			
Lilliefors (NDs = DL)	0.134	0.131	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.201	0.131	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.099	0.131	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (mw-66)						
Raw Statistics						
Number of Valid Observations	18					
Number of Distinct Observations	17					
Minimum	0.0029					
Maximum	0.01					
Mean of Raw Data	0.00708					
Standard Deviation of Raw Data	0.00149					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Khat	18.42					
Theta hat	3.8431E-4					
Kstar	15.38					
Theta star	4.6006E-4					
Mean of Log Transformed Data	-4.978					
Standard Deviation of Log Transformed Data	0.261					
Normal GOF Test Results						
Correlation Coefficient R	0.933					
Shapiro Wilk Test Statistic	0.898					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.0409					
Lilliefors Test Statistic	0.175					
Lilliefors Critical (0.05) Value	0.202					
Data appear Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.914					
A-D Test Statistic	1.181					
A-D Critical (0.05) Value	0.739					
K-S Test Statistic	0.21					
K-S Critical(0.05) Value	0.203					
Data not Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.863					
Shapiro Wilk Test Statistic	0.774					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	3.1955E-4					
Lilliefors Test Statistic	0.225					
Lilliefors Critical (0.05) Value	0.202					
Data not Lognormal at (0.05) Significance Level						
Cobalt (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	0.0025	0.0078	0.00541	0.0057	0.00142
Statistics (All: NDs treated as DL value)	18	0.0025	0.01	0.00566	0.00575	0.00175
Statistics (All: NDs treated as DL/2 value)	18	0.0025	0.0078	0.00538	0.0055	0.00138
Statistics (Normal ROS Imputed Data)	18	0.0025	0.0078	0.00541	0.00555	0.00137
Statistics (Gamma ROS Imputed Data)	18	0.0025	0.01	0.00566	0.00575	0.00175
Statistics (Lognormal ROS Imputed Data)	18	0.0025	0.0078	0.00539	0.0055	0.00137
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	12.78	10.56	4.2306E-4	-5.26	0.308	-0.0585
Statistics (NDs = DL)	10.29	8.608	5.5039E-4	-5.224	0.336	-0.0644
Statistics (NDs = DL/2)	13.46	11.26	3.9981E-4	-5.262	0.299	-0.0568

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	10.29	8.608	5.5039E-4	-5.224	0.336	-0.0644		
Statistics (Lognormal ROS Estimates)	--	--	--	-5.26	0.299	-0.0568		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.977	0.972	0.978	0.977				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.955	0.892	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.957	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.957	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.956	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.112	0.207	Data Appear Normal					
Lilliefors (NDs = DL)	0.149	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.105	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.102	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.956	0.976	0.959	0.976				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.605	0.739						
Kolmogorov-Smirnov (Detects Only)	0.141	0.209	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.426	0.739						
Kolmogorov-Smirnov (NDs = DL)	0.122	0.203	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.606	0.739						
Kolmogorov-Smirnov (NDs = DL/2)	0.13	0.203	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.426	0.739						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.122	0.203	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.933	0.957	0.933	0.932				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.873	0.892	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.926	0.897	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.876	0.897	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.873	0.897	Data Not Lognormal					
Lilliefors (Detects Only)	0.152	0.207	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.14	0.202	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.155	0.202	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.152	0.202	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Cobalt (mw-68)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	15	3	16.67%		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.002	0.01	0.00467	0.002	0.00462
Statistics (Non-Detects Only)	15	0.0017	0.0053	0.0027	0.0025	9.7541E-4
Statistics (All: NDs treated as DL value)	18	0.0017	0.01	0.00303	0.00245	0.00197
Statistics (All: NDs treated as DL/2 value)	18	0.001	0.0053	0.00264	0.00245	0.0012
Statistics (Normal ROS Imputed Data)	18	0.00122	0.0053	0.00255	0.00245	9.7655E-4
Statistics (Gamma ROS Imputed Data)	18	0.0017	0.01	0.00392	0.00255	0.00294
Statistics (Lognormal ROS Imputed Data)	18	0.00153	0.0053	0.00257	0.00242	9.4787E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	9.996	8.041	2.7011E-4	-5.965	0.318	-0.0533
Statistics (NDs = DL)	4.413	3.715	6.8610E-4	-5.917	0.444	-0.075
Statistics (NDs = DL/2)	5.391	4.529	4.8954E-4	-6.033	0.457	-0.0758
Statistics (Gamma ROS Estimates)	2.704	2.291	0.00145	-5.739	0.596	-0.104
Statistics (Lognormal ROS Estimates)	--	--	--	-6.017	0.322	-0.0535
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.915	0.774	0.954	0.93		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.845	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.623	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.908	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.878	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.207	0.22	Data Appear Normal			
Lilliefors (NDs = DL)	0.283	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.18	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.203	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.958	0.875	0.98	0.91		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.481	0.737				
Kolmogorov-Smirnov (Detects Only)	0.172	0.222	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.426	0.743				
Kolmogorov-Smirnov (NDs = DL)	0.227	0.204	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.337	0.743				
Kolmogorov-Smirnov (NDs = DL/2)	0.123	0.204	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.66	0.748				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.25	0.205	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.969	0.907	0.979	0.971		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.938	0.881	Data Appear Lognormal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.833	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.955	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.944	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.15	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.198	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.115	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.143	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	0.0027	0.0054	0.00414	0.00425	6.9647E-4
Statistics (All: NDs treated as DL value)	18	0.0027	0.01	0.00447	0.00425	0.00154
Statistics (All: NDs treated as DL/2 value)	18	0.0027	0.0054	0.00414	0.00425	7.0535E-4
Statistics (Normal ROS Imputed Data)	18	0.0027	0.0054	0.00414	0.0042	6.7568E-4
Statistics (Gamma ROS Imputed Data)	18	0.0027	0.01	0.00447	0.00425	0.00154
Statistics (Lognormal ROS Imputed Data)	18	0.0027	0.0054	0.00414	0.0042	6.7582E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	34.67	28.59	1.1946E-4	-5.501	0.18	-0.0327
Statistics (NDs = DL)	12.55	10.49	3.5593E-4	-5.451	0.274	-0.0503
Statistics (NDs = DL/2)	34.24	28.57	1.2233E-4	-5.49	0.181	-0.033
Statistics (Gamma ROS Estimates)	12.55	10.49	3.5593E-4	-5.451	0.274	-0.0503
Statistics (Lognormal ROS Estimates)	--	--	--	-5.501	0.174	-0.0317
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.978	0.804	0.98	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.959	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.679	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.961	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.954	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.182	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.248	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.172	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.198	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.97	0.85	0.97	0.85		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.501	0.737				
Kolmogorov-Smirnov (Detects Only)	0.205	0.209	Detected Data Appear Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL)	1.193	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.206	0.203	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.472	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.195	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.193	0.739				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.206	0.203	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.958	0.906	0.959	0.956		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.923	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.85	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.923	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.92	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.216	0.207	Data Not Lognormal			
Lilliefors (NDs = DL)	0.185	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.207	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.222	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	16	2	11.11%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.005	0.01	0.0075	0.0075	0.00354
Statistics (Non-Detects Only)	16	0.0022	0.0077	0.00516	0.00545	0.00179
Statistics (All: NDs treated as DL value)	18	0.0022	0.01	0.00542	0.00545	0.00203
Statistics (All: NDs treated as DL/2 value)	18	0.0022	0.0077	0.005	0.00535	0.00179
Statistics (Normal ROS Imputed Data)	18	0.0022	0.0077	0.00504	0.00535	0.00174
Statistics (Gamma ROS Imputed Data)	18	0.0022	0.01	0.00565	0.0056	0.00229
Statistics (Lognormal ROS Imputed Data)	18	0.0022	0.0077	0.00502	0.00535	0.00174
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.484	6.123	6.8893E-4	-5.336	0.403	-0.0755
Statistics (NDs = DL)	6.839	5.736	7.9199E-4	-5.293	0.416	-0.0785
Statistics (NDs = DL/2)	7.121	5.971	7.0218E-4	-5.37	0.409	-0.0762
Statistics (Gamma ROS Estimates)	5.95	4.995	9.5711E-4	-5.255	0.446	-0.0849
Statistics (Lognormal ROS Estimates)	--	--	--	-5.361	0.392	-0.073
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.969	0.977	0.97	0.973		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.923	0.887	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.955	0.897	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.924	0.897	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Normal ROS Estimates)	0.931	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.175	0.213	Data Appear Normal			
Lilliefors (NDs = DL)	0.167	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.167	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.166	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.942	0.976	0.948	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.698	0.74				
Kolmogorov-Smirnov (Detects Only)	0.224	0.215	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	0.491	0.742				
Kolmogorov-Smirnov (NDs = DL)	0.191	0.204	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.724	0.741				
Kolmogorov-Smirnov (NDs = DL/2)	0.217	0.204	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.431	0.742				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.172	0.204	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.945	0.965	0.951	0.959		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.88	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.928	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.889	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.907	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.244	0.213	Data Not Lognormal			
Lilliefors (NDs = DL)	0.217	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.236	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.195	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	4	42	2	40	95.24%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	40	1.0000E-4	0.005	0.00207	0.002	0.00163
Statistics (Non-Detects Only)	2	7.3000E-4	0.0011	9.1500E-4	9.1500E-4	2.6163E-4
Statistics (All: NDs treated as DL value)	42	1.0000E-4	0.005	0.00207	0.002	0.00163
Statistics (All: NDs treated as DL/2 value)	42	5.0000E-5	0.0025	0.00103	0.001	7.9506E-4
Statistics (Normal ROS Imputed Data)	42	-0.00106	0.0011	-6.430E-5	-5.791E-5	5.1369E-4
Statistics (Gamma ROS Imputed Data)	42	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	42	1.0048E-4	0.0011	3.5565E-4	3.0491E-4	2.1834E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (NDs = DL)	1.475	1.386	0.00136	-6.584	0.982	-0.149		
Statistics (NDs = DL/2)	1.518	1.426	6.7713E-4	-7.244	0.978	-0.135		
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A		
Statistics (Lognormal ROS Estimates)	--	--	--	-8.103	0.569	-0.0703		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	1	0.894	0.897	0.997				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (NDs = DL)	0.75	0.942	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.758	0.942	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.939	0.942	Data Not Normal					
Lilliefors (Detects Only)	N/A	N/A						
Lilliefors (NDs = DL)	0.313	0.135	Data Not Normal					
Lilliefors (NDs = DL/2)	0.3	0.135	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.0488	0.135	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	N/A	0.908	0.907	0.366				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	N/A	N/A						
Kolmogorov-Smirnov (Detects Only)	N/A	N/A						
Anderson-Darling (NDs = DL)	1.824	0.767						
Kolmogorov-Smirnov (NDs = DL)	0.203	0.139	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.944	0.766						
Kolmogorov-Smirnov (NDs = DL/2)	0.214	0.139	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	N/A	0.747						
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.136						
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	1	0.939	0.932	N/A				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (NDs = DL)	0.837	0.942	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.829	0.942	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.939	0.942	Data Not Lognormal					
Lilliefors (Detects Only)	N/A	N/A						
Lilliefors (NDs = DL)	0.242	0.135	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.254	0.135	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.0488	0.135	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Lead (mw-66)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	1	17	2	15	88.24%		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	15	1.0000E-4	0.005	0.00157	5.0000E-4	0.00157
Statistics (Non-Detects Only)	2	1.8000E-4	7.2000E-4	4.5000E-4	4.5000E-4	3.8184E-4
Statistics (All: NDs treated as DL value)	17	1.0000E-4	0.005	0.00144	5.0000E-4	0.00152
Statistics (All: NDs treated as DL/2 value)	17	5.0000E-5	0.0025	7.4706E-4	2.5000E-4	7.5013E-4
Statistics (Normal ROS Imputed Data)	17	-5.758E-4	7.2000E-4	-1.936E-5	-2.572E-5	3.4367E-4
Statistics (Gamma ROS Imputed Data)	17	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	17	2.5859E-5	7.2000E-4	1.5846E-4	1.0615E-4	1.6793E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.111	0.954	0.0013	-7.056	1.088	-0.154
Statistics (NDs = DL/2)	1.208	1.034	6.1833E-4	-7.667	1.041	-0.136
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-9.134	0.882	-0.0966
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.856	0.862	0.987		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.732	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.742	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.973	0.892	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.271	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.276	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.128	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.944	0.944	0.424		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	1.039	0.764				
Kolmogorov-Smirnov (NDs = DL)	0.259	0.215	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.079	0.762				
Kolmogorov-Smirnov (NDs = DL/2)	0.285	0.214	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.208				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.952	0.944	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.905	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.893	0.892	Data Appear Lognormal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Lognormal ROS Estimates)	0.973	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.221	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.256	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.128	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Lead (mw-67) was not processed!						
Lead (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	2	15	88.24%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	15	1.0000E-4	0.005	0.00167	0.002	0.00155
Statistics (Non-Detects Only)	2	1.9000E-4	5.2000E-4	3.5500E-4	3.5500E-4	2.3335E-4
Statistics (All: NDs treated as DL value)	17	1.0000E-4	0.005	0.00152	5.2000E-4	0.00151
Statistics (All: NDs treated as DL/2 value)	17	5.0000E-5	0.0025	7.8000E-5	5.2000E-4	7.4335E-4
Statistics (Normal ROS Imputed Data)	17	-2.561E-4	5.2000E-4	7.1580E-5	7.3376E-5	2.1432E-4
Statistics (Gamma ROS Imputed Data)	17	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	17	4.8715E-5	5.2000E-4	1.6312E-4	1.3311E-4	1.1936E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.138	0.976	0.00133	-6.99	1.099	-0.157
Statistics (NDs = DL/2)	1.263	1.08	6.1746E-4	-7.602	1.036	-0.136
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-8.93	0.654	-0.0732
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	1	0.868	0.872	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.751	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.76	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.976	0.892	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.275	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.266	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0814	0.207	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.939	0.941	0.419		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	1.06	0.763				
Kolmogorov-Smirnov (NDs = DL)	0.267	0.214	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.956	0.761				
Kolmogorov-Smirnov (NDs = DL/2)	0.246	0.214	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.208				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.947	0.947	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.894	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.899	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.976	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.23	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.219	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0814	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	2	15	88.24%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	15	1.0000E-4	0.005	0.00157	5.0000E-4	0.00157
Statistics (Non-Detects Only)	2	2.1000E-4	0.006	0.00311	0.00311	0.00409
Statistics (All: NDs treated as DL value)	17	1.0000E-4	0.006	0.00175	5.0000E-4	0.00186
Statistics (All: NDs treated as DL/2 value)	17	5.0000E-5	0.006	0.00106	2.5000E-4	0.00148
Statistics (Normal ROS Imputed Data)	17	-0.00721	0.006	-0.00201	-0.00243	0.00339
Statistics (Gamma ROS Imputed Data)	17	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	17	2.8561E-6	0.006	4.6282E-4	4.5481E-5	0.00143
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.002	0.865	0.00175	-6.922	1.17	-0.169
Statistics (NDs = DL/2)	0.86	0.748	0.00123	-7.533	1.202	-0.159
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-9.752	1.964	-0.201
Normal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.875	0.783	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.76	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.634	0.892	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.966	0.892	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.279	0.207	Data Not Normal			
Lilliefors (NDs = DL/2)	0.34	0.207	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.107	0.207	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.953	0.953	0.436		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				
Kolmogorov-Smirnov (Detects Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	1.014	0.766				
Kolmogorov-Smirnov (NDs = DL)	0.282	0.215	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.17	0.772				
Kolmogorov-Smirnov (NDs = DL/2)	0.286	0.216	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.208				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.953	0.946	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.904	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.902	0.892	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.966	0.892	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.249	0.207	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.266	0.207	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.107	0.207	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	1	16	94.12%
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! Requested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, E						
The data set for variable Lead (mw-70) was not processed!						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lithium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	1	45	39	6	13.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.2	0.8	0.367	0.3	0.234
Statistics (Non-Detects Only)	39	0.21	0.45	0.337	0.35	0.0605
Statistics (All: NDs treated as DL value)	45	0.2	0.8	0.341	0.35	0.0973
Statistics (All: NDs treated as DL/2 value)	45	0.1	0.45	0.316	0.34	0.0866
Statistics (Normal ROS Imputed Data)	45	0.184	0.45	0.327	0.34	0.0661
Statistics (Gamma ROS Imputed Data)	45	0.206	0.45	0.328	0.34	0.0639
Statistics (Lognormal ROS Imputed Data)	45	0.205	0.45	0.327	0.34	0.0642
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	28.8	26.6	0.0117	-1.105	0.195	-0.176
Statistics (NDs = DL)	14.55	13.59	0.0234	-1.111	0.263	-0.237
Statistics (NDs = DL/2)	9.638	9.011	0.0328	-1.203	0.365	-0.303
Statistics (Gamma ROS Estimates)	24.62	23	0.0133	-1.136	0.21	-0.185
Statistics (Lognormal ROS Estimates)	--	--	--	-1.137	0.211	-0.186
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.975	0.881	0.95	0.976		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.94	0.939	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.807	0.945	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.893	0.945	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.941	0.945	Data Not Normal			
Lilliefors (Detects Only)	0.133	0.14	Data Appear Normal			
Lilliefors (NDs = DL)	0.172	0.131	Data Not Normal			
Lilliefors (NDs = DL/2)	0.183	0.131	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.148	0.131	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.96	0.899	0.903	0.962		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.231	0.746				
Kolmogorov-Smirnov (Detects Only)	0.16	0.141	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.421	0.748				
Kolmogorov-Smirnov (NDs = DL)	0.151	0.132	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.61	0.749				
Kolmogorov-Smirnov (NDs = DL/2)	0.223	0.132	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.326	0.748				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.168	0.132	Data Not Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.955	0.945	0.878	0.96		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.903	0.939	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.905	0.945	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.769	0.945	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.905	0.945	Data Not Lognormal			
Lilliefors (Detects Only)	0.174	0.14	Data Not Lognormal			
Lilliefors (NDs = DL)	0.168	0.131	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.236	0.131	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.185	0.131	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lithium (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.8	0.8	0.8	0.8	N/A
Statistics (Non-Detects Only)	17	0.24	0.5	0.321	0.32	0.0574
Statistics (All: NDs treated as DL value)	18	0.24	0.8	0.348	0.32	0.126
Statistics (All: NDs treated as DL/2 value)	18	0.24	0.5	0.326	0.32	0.0587
Statistics (Normal ROS Imputed Data)	18	0.24	0.5	0.321	0.32	0.0557
Statistics (Gamma ROS Imputed Data)	18	0.24	0.5	0.321	0.319	0.0557
Statistics (Lognormal ROS Imputed Data)	18	0.24	0.5	0.321	0.318	0.0557
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	38.28	31.56	0.00839	-1.149	0.162	-0.141
Statistics (NDs = DL)	12.28	10.27	0.0283	-1.097	0.269	-0.245
Statistics (NDs = DL/2)	36.56	30.5	0.00891	-1.136	0.167	-0.147
Statistics (Gamma ROS Estimates)	40.52	33.8	0.00792	-1.149	0.157	-0.137
Statistics (Lognormal ROS Estimates)	--	--	--	-1.149	0.157	-0.137
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.901	0.765	0.928	0.896		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.837	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.613	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.88	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.83	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.214	0.207	Data Not Normal			
Lilliefors (NDs = DL)	0.302	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.204	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.222	0.202	Data Not Normal			
Gamma GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.925	0.827	0.95	0.919		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.61	0.737				
Kolmogorov-Smirnov (Detects Only)	0.193	0.209	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.83	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.271	0.203	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.491	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.186	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.694	0.739				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.21	0.203	Detected Data appear Approximate Gamma			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.945	0.86	0.963	0.94		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.914	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.763	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.943	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.907	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.183	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.25	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.175	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.198	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lithium (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.8	0.8	0.8	0.8	N/A
Statistics (Non-Detects Only)	17	0.25	0.55	0.396	0.4	0.0807
Statistics (All: NDs treated as DL value)	18	0.25	0.8	0.419	0.41	0.123
Statistics (All: NDs treated as DL/2 value)	18	0.25	0.55	0.397	0.4	0.0783
Statistics (Normal ROS Imputed Data)	18	0.25	0.55	0.396	0.398	0.0783
Statistics (Gamma ROS Imputed Data)	18	0.25	0.55	0.396	0.396	0.0783
Statistics (Lognormal ROS Imputed Data)	18	0.25	0.55	0.396	0.394	0.0783
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	24.93	20.57	0.0159	-0.945	0.21	-0.222
Statistics (NDs = DL)	14.42	12.06	0.029	-0.905	0.265	-0.293
Statistics (NDs = DL/2)	26.39	22.03	0.015	-0.944	0.203	-0.216
Statistics (Gamma ROS Estimates)	26.38	22.02	0.015	-0.945	0.203	-0.215
Statistics (Lognormal ROS Estimates)	--	--	--	-0.945	0.203	-0.215
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.995	0.921	0.996	0.996		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.987	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.868	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.991	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.991	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.0861	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.154	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.0725	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.0682	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.993	0.951	0.994	0.995		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.153	0.738				
Kolmogorov-Smirnov (Detects Only)	0.11	0.209	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.314	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.114	0.203	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.135	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.0985	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.12	0.739				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0876	0.203	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.992	0.976	0.992	0.993		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.981	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.966	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.984	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.986	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.115	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.101	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.109	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0936	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lithium (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.8	0.8	0.8	0.8	N/A
Statistics (Non-Detects Only)	17	0.22	0.4	0.336	0.34	0.0468
Statistics (All: NDs treated as DL value)	18	0.22	0.8	0.362	0.345	0.118
Statistics (All: NDs treated as DL/2 value)	18	0.22	0.4	0.34	0.345	0.0478

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Normal ROS Imputed Data)	18	0.22	0.4	0.336	0.338	0.0454	
Statistics (Gamma ROS Imputed Data)	18	0.22	0.4	0.336	0.337	0.0454	
Statistics (Lognormal ROS Imputed Data)	18	0.22	0.4	0.336	0.337	0.0454	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	49.37	40.7	0.00682	-1.099	0.151	-0.138	
Statistics (NDs = DL)	14.36	12	0.0252	-1.051	0.253	-0.241	
Statistics (NDs = DL/2)	48.13	40.15	0.00706	-1.089	0.153	-0.141	
Statistics (Gamma ROS Estimates)	52.26	43.59	0.00644	-1.099	0.147	-0.134	
Statistics (Lognormal ROS Estimates)	--	--	--	-1.099	0.147	-0.134	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	0.959	0.765	0.961	0.96			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.923	0.892	Data Appear Normal				
Shapiro-Wilk (NDs = DL)	0.622	0.897	Data Not Normal				
Shapiro-Wilk (NDs = DL/2)	0.923	0.897	Data Appear Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.927	0.897	Data Appear Normal				
Lilliefors (Detects Only)	0.175	0.207	Data Appear Normal				
Lilliefors (NDs = DL)	0.329	0.202	Data Not Normal				
Lilliefors (NDs = DL/2)	0.179	0.202	Data Appear Normal				
Lilliefors (Normal ROS Estimates)	0.159	0.202	Data Appear Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	0.943	0.809	0.944	0.945			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	0.594	0.737					
Kolmogorov-Smirnov (Detects Only)	0.178	0.208	Detected Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL)	1.543	0.739					
Kolmogorov-Smirnov (NDs = DL)	0.282	0.203	Data Not Gamma Distributed				
Anderson-Darling (NDs = DL/2)	0.592	0.738					
Kolmogorov-Smirnov (NDs = DL/2)	0.184	0.203	Data Appear Gamma Distributed				
Anderson-Darling (Gamma ROS Estimates)	0.583	0.738					
Kolmogorov-Smirnov (Gamma ROS Est.)	0.161	0.203	Data Appear Gamma Distributed				
Lognormal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Log ROS			
Correlation Coefficient R	0.935	0.871	0.936	0.935			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.882	0.892	Data Not Lognormal				
Shapiro-Wilk (NDs = DL)	0.795	0.897	Data Not Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.883	0.897	Data Not Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.883	0.897	Data Not Lognormal				
Lilliefors (Detects Only)	0.168	0.207	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.26	0.202	Data Not Lognormal				
Lilliefors (NDs = DL/2)	0.177	0.202	Data Appear Lognormal				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Lognormal ROS Estimates)	0.17	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lithium (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.8	0.8	0.8	0.8	N/A
Statistics (Non-Detects Only)	17	0.27	0.52	0.398	0.4	0.0784
Statistics (All: NDs treated as DL value)	18	0.27	0.8	0.42	0.42	0.122
Statistics (All: NDs treated as DL/2 value)	18	0.27	0.52	0.398	0.4	0.076
Statistics (Normal ROS Imputed Data)	18	0.27	0.52	0.398	0.399	0.076
Statistics (Gamma ROS Imputed Data)	18	0.27	0.52	0.397	0.397	0.0761
Statistics (Lognormal ROS Imputed Data)	18	0.27	0.52	0.397	0.395	0.0761
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	25.9	21.37	0.0154	-0.942	0.207	-0.219
Statistics (NDs = DL)	14.78	12.36	0.0284	-0.902	0.262	-0.291
Statistics (NDs = DL/2)	27.41	22.88	0.0145	-0.94	0.201	-0.213
Statistics (Gamma ROS Estimates)	27.41	22.88	0.0145	-0.941	0.2	-0.213
Statistics (Lognormal ROS Estimates)	--	--	--	-0.942	0.2	-0.213
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.981	0.912	0.984	0.985		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.947	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.849	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.956	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.956	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.176	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.15	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.155	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.156	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.972	0.94	0.976	0.976		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.424	0.738				
Kolmogorov-Smirnov (Detects Only)	0.193	0.209	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.429	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.119	0.203	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.382	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.17	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.372	0.739				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.172	0.203	Data Appear Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.972	0.965	0.974	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.93	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.94	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.937	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.938	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.191	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.121	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.168	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.171	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lithium (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.8	0.8	0.8	0.8	N/A
Statistics (Non-Detects Only)	17	0.28	0.35	0.315	0.32	0.0207
Statistics (All: NDs treated as DL value)	18	0.28	0.8	0.342	0.32	0.116
Statistics (All: NDs treated as DL/2 value)	18	0.28	0.4	0.32	0.32	0.0283
Statistics (Normal ROS Imputed Data)	18	0.28	0.35	0.315	0.318	0.02
Statistics (Gamma ROS Imputed Data)	18	0.28	0.35	0.315	0.317	0.02
Statistics (Lognormal ROS Imputed Data)	18	0.28	0.35	0.315	0.317	0.02
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	246.1	202.7	0.00128	-1.156	0.0659	-0.057
Statistics (NDs = DL)	15.72	13.14	0.0218	-1.104	0.229	-0.207
Statistics (NDs = DL/2)	142.4	118.7	0.00225	-1.143	0.0853	-0.0747
Statistics (Gamma ROS Estimates)	260.6	217.2	0.00121	-1.156	0.0639	-0.0553
Statistics (Lognormal ROS Estimates)	--	--	--	-1.156	0.0639	-0.0553
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.974	0.614	0.941	0.972		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.94	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.409	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.898	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.938	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.175	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.418	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.222	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.185	0.202	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.972	0.676	0.95	0.971		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.461	0.736				
Kolmogorov-Smirnov (Detects Only)	0.168	0.208	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	3.523	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.376	0.203	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.562	0.737				
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.203	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.503	0.737				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.179	0.203	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.972	0.694	0.955	0.971		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.937	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.514	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.924	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.936	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.175	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.35	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.206	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.186	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Mercury (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	4	42	0	42	100.00%
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!						
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!						
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Mercury (background) was not processed!						
Mercury (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	1	17	0	17	100.00%
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!						
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!						
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

The data set for variable Mercury (mw-66) was not processed!							
Mercury (mw-67)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	0	17	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Mercury (mw-67) was not processed!							
Mercury (mw-68)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	0	17	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Mercury (mw-68) was not processed!							
Mercury (mw-69)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	2	16	0	16	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Mercury (mw-69) was not processed!							
Mercury (mw-70)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	18	1	17	0	17	100.00%	
Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
The data set for variable Mercury (mw-70) was not processed!							

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Molybdenum (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	1	45	23	22	48.89%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	22	0.001	0.005	0.00286	0.002	0.00152
Statistics (Non-Detects Only)	23	6.2000E-4	0.011	0.00416	0.0025	0.00363
Statistics (All: NDs treated as DL value)	45	6.2000E-4	0.011	0.00352	0.002	0.00285
Statistics (All: NDs treated as DL/2 value)	45	5.0000E-4	0.011	0.00282	0.0018	0.00296
Statistics (Normal ROS Imputed Data)	45	-0.00375	0.011	0.00237	0.0018	0.0035
Statistics (Gamma ROS Imputed Data)	45	6.2000E-4	0.011	0.00701	0.01	0.00391
Statistics (Lognormal ROS Imputed Data)	45	3.0133E-4	0.011	0.00271	0.00146	0.00301
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.436	1.278	0.00289	-5.87	0.921	-0.157
Statistics (NDs = DL)	1.944	1.83	0.00181	-5.927	0.746	-0.126
Statistics (NDs = DL/2)	1.406	1.327	0.00201	-6.266	0.849	-0.135
Statistics (Gamma ROS Estimates)	1.863	1.754	0.00376	-5.252	0.913	-0.174
Statistics (Lognormal ROS Estimates)	--	--	--	-6.377	0.937	-0.147
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.903	0.888	0.826	0.945		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.8	0.914	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.779	0.945	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.675	0.945	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.888	0.945	Data Not Normal			
Lilliefors (Detects Only)	0.244	0.18	Data Not Normal			
Lilliefors (NDs = DL)	0.263	0.131	Data Not Normal			
Lilliefors (NDs = DL/2)	0.321	0.131	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.181	0.131	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.934	0.958	0.935	0.719		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.866	0.761				
Kolmogorov-Smirnov (Detects Only)	0.172	0.185	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	1.789	0.761				
Kolmogorov-Smirnov (NDs = DL)	0.204	0.134	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.901	0.77				
Kolmogorov-Smirnov (NDs = DL/2)	0.22	0.134	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	5.807	0.763				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.352	0.134	Data Not Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.973	0.973	0.95	0.98
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.93	0.914	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL)	0.932	0.945	Data Not Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.887	0.945	Data Not Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.945	0.945	Data Not Lognormal	
Lilliefors (Detects Only)	0.148	0.18	Data Appear Lognormal	
Lilliefors (NDs = DL)	0.161	0.131	Data Not Lognormal	
Lilliefors (NDs = DL/2)	0.197	0.131	Data Not Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.0962	0.131	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Molybdenum (mw-66)				
Raw Statistics				
Number of Valid Observations	18			
Number of Distinct Observations	10			
Minimum	0.01			
Maximum	0.039			
Mean of Raw Data	0.0205			
Standard Deviation of Raw Data	0.00627			
Khat	11.57			
Theta hat	0.00177			
Kstar	9.679			
Theta star	0.00212			
Mean of Log Transformed Data	-3.931			
Standard Deviation of Log Transformed Data	0.309			
Normal GOF Test Results				
Correlation Coefficient R	0.891			
Shapiro Wilk Test Statistic	0.82			
Shapiro Wilk Critical (0.05) Value	0.897			
Approximate Shapiro Wilk P Value	0.00183			
Lilliefors Test Statistic	0.29			
Lilliefors Critical (0.05) Value	0.202			
Data not Normal at (0.05) Significance Level				
Gamma GOF Test Results				
Correlation Coefficient R	0.898			
A-D Test Statistic	1.301			
A-D Critical (0.05) Value	0.739			
K-S Test Statistic	0.254			
K-S Critical(0.05) Value	0.203			
Data not Gamma Distributed at (0.05) Significance Level				
Lognormal GOF Test Results				
Correlation Coefficient R	0.918			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Test Statistic	0.862						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0101						
Lilliefors Test Statistic	0.254						
Lilliefors Critical (0.05) Value	0.202						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Molybdenum (mw-67)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	11						
Minimum	0.037						
Maximum	0.063						
Mean of Raw Data	0.043						
Standard Deviation of Raw Data	0.00607						
Khat	61.79						
Theta hat	6.9594E-4						
Kstar	51.53						
Theta star	8.3453E-4						
Mean of Log Transformed Data	-3.155						
Standard Deviation of Log Transformed Data	0.127						
Normal GOF Test Results							
Correlation Coefficient R	0.867						
Shapiro Wilk Test Statistic	0.771						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	3.2012E-4						
Lilliefors Test Statistic	0.204						
Lilliefors Critical (0.05) Value	0.202						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.891						
A-D Test Statistic	0.946						
A-D Critical (0.05) Value	0.738						
K-S Test Statistic	0.184						
K-S Critical(0.05) Value	0.203						
Data follow Appr. Gamma Distribution at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.906						
Shapiro Wilk Test Statistic	0.836						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0038						
Lilliefors Test Statistic	0.178						
Lilliefors Critical (0.05) Value	0.202						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Data appear Approximate_Lognormal at (0.05) Significance Level						
Molybdenum (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A
Statistics (Non-Detects Only)	17	0.0051	0.012	0.00775	0.0073	0.00196
Statistics (All: NDs treated as DL value)	18	0.0051	0.012	0.00787	0.0074	0.00198
Statistics (All: NDs treated as DL/2 value)	18	0.005	0.012	0.00758	0.00705	0.00201
Statistics (Normal ROS Imputed Data)	18	0.0051	0.012	0.00771	0.0072	0.00191
Statistics (Gamma ROS Imputed Data)	18	0.0051	0.012	0.00787	0.0074	0.00198
Statistics (Lognormal ROS Imputed Data)	18	0.0051	0.012	0.0077	0.00711	0.00192
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	17.29	14.27	4.4817E-4	-4.89	0.247	-0.0506
Statistics (NDs = DL)	17.16	14.33	4.5885E-4	-4.874	0.249	-0.0511
Statistics (NDs = DL/2)	15.78	13.19	4.8114E-4	-4.912	0.259	-0.0527
Statistics (Gamma ROS Estimates)	17.16	14.33	4.5885E-4	-4.874	0.249	-0.0511
Statistics (Lognormal ROS Estimates)	--	--	--	-4.894	0.241	-0.0492
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.969	0.969	0.969	0.967		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.932	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.931	0.897	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.93	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.931	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.156	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.151	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.153	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.155	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.981	0.975	0.981	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.387	0.738				
Kolmogorov-Smirnov (Detects Only)	0.144	0.209	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.469	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.145	0.203	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.378	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.469	0.739				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.145	0.203	Data Appear Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.983	0.98	0.983	0.983
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.958	0.892	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL)	0.949	0.897	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.955	0.897	Data Appear Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.959	0.897	Data Appear Lognormal	
Lilliefors (Detects Only)	0.129	0.207	Data Appear Lognormal	
Lilliefors (NDs = DL)	0.142	0.202	Data Appear Lognormal	
Lilliefors (NDs = DL/2)	0.119	0.202	Data Appear Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.128	0.202	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Molybdenum (mw-69)				
Raw Statistics				
Number of Valid Observations	18			
Number of Distinct Observations	5			
Minimum	0.013			
Maximum	0.017			
Mean of Raw Data	0.0152			
Standard Deviation of Raw Data	0.0011			
Khat	200.4			
Theta hat	7.5687E-5			
Kstar	167			
Theta star	9.0804E-5			
Mean of Log Transformed Data	-4.191			
Standard Deviation of Log Transformed Data	0.0729			
Normal GOF Test Results				
Correlation Coefficient R	0.966			
Shapiro Wilk Test Statistic	0.93			
Shapiro Wilk Critical (0.05) Value	0.897			
Approximate Shapiro Wilk P Value	0.212			
Lilliefors Test Statistic	0.171			
Lilliefors Critical (0.05) Value	0.202			
Data appear Normal at (0.05) Significance Level				
Gamma GOF Test Results				
Correlation Coefficient R	0.965			
A-D Test Statistic	0.654			
A-D Critical (0.05) Value	0.737			
K-S Test Statistic	0.173			
K-S Critical(0.05) Value	0.203			
Data appear Gamma Distributed at (0.05) Significance Level				
Lognormal GOF Test Results				
Correlation Coefficient R	0.965			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Test Statistic	0.929					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.198					
Lilliefors Test Statistic	0.176					
Lilliefors Critical (0.05) Value	0.202					
Data appear Lognormal at (0.05) Significance Level						
Molybdenum (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.005	0.005	0.005	0.005	N/A
Statistics (Non-Detects Only)	17	0.0026	0.027	0.0075	0.0062	0.0055
Statistics (All: NDs treated as DL value)	18	0.0026	0.027	0.0074	0.0061	0.0054
Statistics (All: NDs treated as DL/2 value)	18	0.0025	0.027	0.0073	0.0061	0.0055
Statistics (Normal ROS Imputed Data)	18	0.0025	0.027	0.0073	0.0061	0.0055
Statistics (Gamma ROS Imputed Data)	18	0.0026	0.027	0.0077	0.0062	0.0054
Statistics (Lognormal ROS Imputed Data)	18	0.0026	0.027	0.0073	0.0061	0.0054
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.11	2.6	0.0024	-5.05	0.569	-0.113
Statistics (NDs = DL)	3.207	2.709	0.0023	-5.064	0.555	-0.11
Statistics (NDs = DL/2)	2.878	2.436	0.0025	-5.102	0.595	-0.117
Statistics (Gamma ROS Estimates)	3.242	2.739	0.0023	-5.025	0.561	-0.112
Statistics (Lognormal ROS Estimates)	--	--	--	-5.084	0.571	-0.112
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.808	0.803	0.813	0.812		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.68	0.892	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.672	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.686	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.685	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.274	0.207	Data Not Normal			
Lilliefors (NDs = DL)	0.264	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.258	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.258	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.891	0.887	0.898	0.893		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.599	0.745				
Kolmogorov-Smirnov (Detects Only)	0.185	0.211	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.624	0.745				
Kolmogorov-Smirnov (NDs = DL)	0.175	0.205	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.572	0.747				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL/2)	0.17	0.205	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.595	0.745				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.197	0.205	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.962	0.962	0.964	0.964		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.936	0.892	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.937	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.935	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.936	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.158	0.207	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.149	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.146	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.145	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	1	45	44	1	2.22%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.003	0.003	0.003	0.003	N/A
Statistics (Non-Detects Only)	44	0.011	0.39	0.147	0.125	0.101
Statistics (All: NDs treated as DL value)	45	0.003	0.39	0.144	0.12	0.103
Statistics (All: NDs treated as DL/2 value)	45	0.0015	0.39	0.144	0.12	0.103
Statistics (Normal ROS Imputed Data)	45	-0.113	0.39	0.141	0.12	0.107
Statistics (Gamma ROS Imputed Data)	45	0.011	0.39	0.144	0.12	0.102
Statistics (Lognormal ROS Imputed Data)	45	0.00793	0.39	0.144	0.12	0.102
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.441	1.358	0.102	-2.303	1.043	-0.453
Statistics (NDs = DL)	1.274	1.204	0.113	-2.381	1.156	-0.485
Statistics (NDs = DL/2)	1.236	1.168	0.116	-2.397	1.206	-0.503
Statistics (Gamma ROS Estimates)	1.391	1.313	0.104	-2.338	1.056	-0.452
Statistics (Lognormal ROS Estimates)	--	--	--	-2.36	1.098	-0.465
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.975	0.974	0.974	0.984		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.933	0.944	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.932	0.945	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.933	0.945	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.968	0.945	Data Appear Normal			
Lilliefors (Detects Only)	0.108	0.132	Data Appear Normal			
Lilliefors (NDs = DL)	0.114	0.131	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL/2)	0.113	0.131	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.0957	0.131	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.952	0.947	0.945	0.952		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.453	0.769				
Kolmogorov-Smirnov (Detects Only)	0.169	0.136	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.433	0.772				
Kolmogorov-Smirnov (NDs = DL)	0.179	0.135	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.422	0.773				
Kolmogorov-Smirnov (NDs = DL/2)	0.184	0.135	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.498	0.77				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.166	0.134	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.935	0.934	0.924	0.938		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.857	0.944	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.867	0.945	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.857	0.945	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.862	0.945	Data Not Lognormal			
Lilliefors (Detects Only)	0.228	0.132	Data Not Lognormal			
Lilliefors (NDs = DL)	0.238	0.131	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.242	0.131	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.232	0.131	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	11	7	38.89%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.002	0.01	0.00314	0.002	0.00302
Statistics (Non-Detects Only)	11	0.0016	0.11	0.0118	0.0021	0.0326
Statistics (All: NDs treated as DL value)	18	0.0016	0.11	0.00844	0.002	0.0254
Statistics (All: NDs treated as DL/2 value)	18	0.001	0.11	0.00783	0.00185	0.0255
Statistics (Normal ROS Imputed Data)	18	-0.0205	0.11	0.00587	0.002	0.0268
Statistics (Gamma ROS Imputed Data)	18	0.0016	0.11	0.0111	0.0022	0.025
Statistics (Lognormal ROS Imputed Data)	18	7.4540E-4	0.11	0.00785	0.00196	0.0255
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	0.454	0.391	0.026	-5.86	1.216	-0.208
Statistics (NDs = DL)	0.552	0.497	0.0153	-5.908	1.002	-0.17
Statistics (NDs = DL/2)	0.481	0.438	0.0163	-6.178	1.081	-0.175
Statistics (Gamma ROS Estimates)	0.694	0.615	0.016	-5.372	1.125	-0.209

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Lognormal ROS Estimates)	--	--	--	-6.107	1.017	-0.167		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.565	0.505	0.499	0.64				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.351	0.85	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.284	0.897	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.278	0.897	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.448	0.897	Data Not Normal					
Lilliefors (Detects Only)	0.525	0.251	Data Not Normal					
Lilliefors (NDs = DL)	0.486	0.202	Data Not Normal					
Lilliefors (NDs = DL/2)	0.489	0.202	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.417	0.202	Data Not Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.853	0.789	0.79	0.812				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	3.511	0.79						
Kolmogorov-Smirnov (Detects Only)	0.551	0.271	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	5.419	0.796						
Kolmogorov-Smirnov (NDs = DL)	0.522	0.214	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	4.557	0.804						
Kolmogorov-Smirnov (NDs = DL/2)	0.476	0.216	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.402	0.783						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.318	0.212	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.627	0.643	0.751	0.685				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.427	0.85	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.441	0.897	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.591	0.897	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.508	0.897	Data Not Lognormal					
Lilliefors (Detects Only)	0.494	0.251	Data Not Lognormal					
Lilliefors (NDs = DL)	0.472	0.202	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.367	0.202	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.408	0.202	Data Not Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Selenium (mw-67)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	17	1	5.56%		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	1	0.01	0.01	0.01	0.01	N/A		
Statistics (Non-Detects Only)	17	0.0053	0.068	0.0375	0.038	0.0199		
Statistics (All: NDs treated as DL value)	18	0.0053	0.068	0.0359	0.035	0.0204		
Statistics (All: NDs treated as DL/2 value)	18	0.005	0.068	0.0357	0.035	0.0208		
Statistics (Normal ROS Imputed Data)	18	0.00434	0.068	0.0356	0.035	0.0208		
Statistics (Gamma ROS Imputed Data)	18	0.0053	0.068	0.036	0.035	0.0202		
Statistics (Lognormal ROS Imputed Data)	18	0.0053	0.068	0.0359	0.035	0.0204		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	2.609	2.188	0.0144	-3.488	0.756	-0.217		
Statistics (NDs = DL)	2.384	2.023	0.0151	-3.55	0.779	-0.219		
Statistics (NDs = DL/2)	2.113	1.798	0.0169	-3.589	0.848	-0.236		
Statistics (Gamma ROS Estimates)	2.441	2.071	0.0148	-3.543	0.768	-0.217		
Statistics (Lognormal ROS Estimates)	--	--	--	-3.555	0.786	-0.221		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.987	0.985	0.983	0.984				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.957	0.892	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.951	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.946	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.948	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.103	0.207	Data Appear Normal					
Lilliefors (NDs = DL)	0.11	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.101	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.1	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.943	0.945	0.936	0.947				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.463	0.747						
Kolmogorov-Smirnov (Detects Only)	0.138	0.211	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.424	0.75						
Kolmogorov-Smirnov (NDs = DL)	0.136	0.206	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.585	0.752						
Kolmogorov-Smirnov (NDs = DL/2)	0.139	0.206	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.397	0.75						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.135	0.206	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.933	0.949	0.932	0.948				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.866	0.892	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.891	0.897	Data Not Lognormal					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL/2)	0.856	0.897	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.888	0.897	Data Not Lognormal		
Lilliefors (Detects Only)	0.145	0.207	Data Appear Lognormal		
Lilliefors (NDs = DL)	0.142	0.202	Data Appear Lognormal		
Lilliefors (NDs = DL/2)	0.151	0.202	Data Appear Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.143	0.202	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Selenium (mw-68)					
Raw Statistics					
Number of Valid Observations	18				
Number of Distinct Observations	14				
Minimum	0.045				
Maximum	0.37				
Mean of Raw Data	0.219				
Standard Deviation of Raw Data	0.0858				
Khat	5.017				
Theta hat	0.0437				
Kstar	4.218				
Theta star	0.052				
Mean of Log Transformed Data	-1.621				
Standard Deviation of Log Transformed Data	0.521				
Normal GOF Test Results					
Correlation Coefficient R	0.973				
Shapiro Wilk Test Statistic	0.946				
Shapiro Wilk Critical (0.05) Value	0.897				
Approximate Shapiro Wilk P Value	0.386				
Lilliefors Test Statistic	0.168				
Lilliefors Critical (0.05) Value	0.202				
Data appear Normal at (0.05) Significance Level					
Gamma GOF Test Results					
Correlation Coefficient R	0.932				
A-D Test Statistic	0.779				
A-D Critical (0.05) Value	0.743				
K-S Test Statistic	0.194				
K-S Critical(0.05) Value	0.204				
Data follow Appr. Gamma Distribution at (0.05) Significance Level					
Lognormal GOF Test Results					
Correlation Coefficient R	0.917				
Shapiro Wilk Test Statistic	0.852				
Shapiro Wilk Critical (0.05) Value	0.897				
Approximate Shapiro Wilk P Value	0.0074				
Lilliefors Test Statistic	0.2				
Lilliefors Critical (0.05) Value	0.202				
Data appear Approximate_Lognormal at (0.05) Significance Level					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Selenium (mw-69)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	10						
Minimum	0.01						
Maximum	0.023						
Mean of Raw Data	0.0146						
Standard Deviation of Raw Data	0.0035						
Khat	19.42						
Theta hat	7.4958E-4						
Kstar	16.22						
Theta star	8.9744E-4						
Mean of Log Transformed Data	-4.256						
Standard Deviation of Log Transformed Data	0.232						
Normal GOF Test Results							
Correlation Coefficient R	0.966						
Shapiro Wilk Test Statistic	0.932						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.225						
Lilliefors Test Statistic	0.174						
Lilliefors Critical (0.05) Value	0.202						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.982						
A-D Test Statistic	0.331						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.149						
K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.984						
Shapiro Wilk Test Statistic	0.962						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.66						
Lilliefors Test Statistic	0.133						
Lilliefors Critical (0.05) Value	0.202						
Data appear Lognormal at (0.05) Significance Level							
Selenium (mw-70)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	9						
Minimum	0.13						
Maximum	0.26						
Mean of Raw Data	0.193						
Standard Deviation of Raw Data	0.0323						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Khat	37.87						
Theta hat	0.00509						
Kstar	31.6						
Theta star	0.0061						
Mean of Log Transformed Data	-1.659						
Standard Deviation of Log Transformed Data	0.168						
Normal GOF Test Results							
Correlation Coefficient R	0.977						
Shapiro Wilk Test Statistic	0.959						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.557						
Lilliefors Test Statistic	0.154						
Lilliefors Critical (0.05) Value	0.202						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.982						
A-D Test Statistic	0.334						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.142						
K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.979						
Shapiro Wilk Test Statistic	0.966						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.686						
Lilliefors Test Statistic	0.129						
Lilliefors Critical (0.05) Value	0.202						
Data appear Lognormal at (0.05) Significance Level							
Thallium (background)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	46	1	45	25	20	44.44%	
	Number	Minimum	Maximum	Mean	Median	SD	
Statistics (Non-Detects Only)	20	4.0000E-4	0.002	7.6500E-4	4.0000E-4	5.8334E-4	
Statistics (Non-Detects Only)	25	2.0000E-4	0.0011	6.3160E-4	5.8000E-4	3.2636E-4	
Statistics (All: NDs treated as DL value)	45	2.0000E-4	0.002	6.9089E-4	4.7000E-4	4.5775E-4	
Statistics (All: NDs treated as DL/2 value)	45	2.0000E-4	0.0011	5.2089E-4	4.3000E-4	3.3242E-4	
Statistics (Normal ROS Imputed Data)	45	-4.429E-5	0.0011	5.1450E-4	4.3000E-4	3.0372E-4	
Statistics (Gamma ROS Imputed Data)	45	2.0000E-4	0.01	0.0048	0.001	0.00471	
Statistics (Lognormal ROS Imputed Data)	45	1.4920E-4	0.0011	5.0560E-4	3.9301E-4	2.9262E-4	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	3.272	2.906	1.9304E-4	-7.528	0.61	-0.0811	
Statistics (NDs = DL)	2.812	2.639	2.4570E-4	-7.466	0.613	-0.0821	
Statistics (NDs = DL/2)	2.492	2.341	2.0901E-4	-7.774	0.67	-0.0861	

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	0.682	0.652	0.00703	-6.229	1.536	-0.247		
Statistics (Lognormal ROS Estimates)	--	--	--	-7.75	0.571	-0.0737		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.934	0.895	0.906	0.966				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.85	0.918	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.796	0.945	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.793	0.945	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.917	0.945	Data Not Normal					
Lilliefors (Detects Only)	0.207	0.173	Data Not Normal					
Lilliefors (NDs = DL)	0.205	0.131	Data Not Normal					
Lilliefors (NDs = DL/2)	0.223	0.131	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.124	0.131	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.897	0.951	0.913	0.714				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	1.521	0.751						
Kolmogorov-Smirnov (Detects Only)	0.226	0.176	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	1.801	0.757						
Kolmogorov-Smirnov (NDs = DL)	0.203	0.133	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	2.998	0.758						
Kolmogorov-Smirnov (NDs = DL/2)	0.199	0.133	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	5.045	0.796						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.304	0.138	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.933	0.965	0.918	0.97				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.85	0.918	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.915	0.945	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.812	0.945	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.919	0.945	Data Not Lognormal					
Lilliefors (Detects Only)	0.229	0.173	Data Not Lognormal					
Lilliefors (NDs = DL)	0.187	0.131	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.178	0.131	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.135	0.131	Data Not Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Thallium (mw-66)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	14	4	22.22%		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	4.0000E-4	0.001	5.5000E-4	4.0000E-4	3.0000E-4
Statistics (Non-Detects Only)	14	3.3000E-4	0.0025	6.6643E-4	5.5500E-4	5.5021E-4
Statistics (All: NDs treated as DL value)	18	3.3000E-4	0.0025	6.4056E-4	4.8500E-4	4.9986E-4
Statistics (All: NDs treated as DL/2 value)	18	2.0000E-4	0.0025	5.7944E-4	4.6500E-4	5.1333E-4
Statistics (Normal ROS Imputed Data)	18	-8.554E-5	0.0025	5.6335E-4	4.7617E-4	5.3141E-4
Statistics (Gamma ROS Imputed Data)	18	3.3000E-4	0.01	0.00274	6.1000E-4	0.00402
Statistics (Lognormal ROS Imputed Data)	18	2.4087E-4	0.0025	5.9492E-4	4.5481E-4	5.0226E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdev	Log CV
Statistics (Non-Detects Only)	3.175	2.542	2.0993E-4	-7.479	0.517	-0.0691
Statistics (NDs = DL)	3.451	2.913	1.8559E-4	-7.505	0.494	-0.0658
Statistics (NDs = DL/2)	2.587	2.193	2.2401E-4	-7.659	0.601	-0.0785
Statistics (Gamma ROS Estimates)	0.649	0.578	0.00422	-6.841	1.31	-0.191
Statistics (Lognormal ROS Estimates)	--	--	--	-7.596	0.519	-0.0684
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.724	0.735	0.749	0.789		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.554	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.567	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.59	0.897	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.658	0.897	Data Not Normal			
Lilliefors (Detects Only)	0.333	0.226	Data Not Normal			
Lilliefors (NDs = DL)	0.286	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.296	0.202	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.287	0.202	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.839	0.849	0.859	0.868		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.285	0.742				
Kolmogorov-Smirnov (Detects Only)	0.25	0.23	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.486	0.744				
Kolmogorov-Smirnov (NDs = DL)	0.218	0.205	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.894	0.749				
Kolmogorov-Smirnov (NDs = DL/2)	0.199	0.206	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	2.696	0.787				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.352	0.213	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.893	0.898	0.946	0.919		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.815	0.874	Data Not Lognormal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.819	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.908	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.865	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.202	0.226	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.191	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.148	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.165	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	14	4	22.22%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	4.0000E-4	0.002	9.7500E-4	7.5000E-4	7.3201E-4
Statistics (Non-Detects Only)	14	3.1000E-4	7.4000E-4	4.8571E-4	4.8500E-4	1.3001E-4
Statistics (All: NDs treated as DL value)	18	3.1000E-4	0.002	5.9444E-4	5.0000E-4	3.8897E-4
Statistics (All: NDs treated as DL/2 value)	18	2.0000E-4	0.001	4.8611E-4	4.8500E-4	1.9122E-4
Statistics (Normal ROS Imputed Data)	18	3.1000E-4	7.4000E-4	4.7131E-4	4.6978E-4	1.1953E-4
Statistics (Gamma ROS Imputed Data)	18	3.1000E-4	0.01	0.0026	5.5000E-4	0.00407
Statistics (Lognormal ROS Imputed Data)	18	3.1000E-4	7.4000E-4	4.6939E-4	4.5426E-4	1.1977E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	15.07	11.89	3.2238E-5	-7.663	0.27	-0.0352
Statistics (NDs = DL)	4.378	3.685	1.3578E-4	-7.546	0.447	-0.0593
Statistics (NDs = DL/2)	7.168	6.01	6.7820E-5	-7.7	0.393	-0.051
Statistics (Gamma ROS Estimates)	0.599	0.536	0.00434	-6.984	1.329	-0.19
Statistics (Lognormal ROS Estimates)	--	--	--	-7.694	0.248	-0.0323
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.981	0.774	0.965	0.976		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.952	0.874	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.624	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.941	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.946	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.126	0.226	Data Appear Normal			
Lilliefors (NDs = DL)	0.297	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.115	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.141	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.987	0.869	0.988	0.852		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.288	0.734				
Kolmogorov-Smirnov (Detects Only)	0.126	0.228	Detected Data Appear Gamma Distributed			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL)	1.144	0.743				
Kolmogorov-Smirnov (NDs = DL)	0.222	0.204	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.145	0.741				
Kolmogorov-Smirnov (NDs = DL/2)	0.0872	0.204	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.383	0.791				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.413	0.214	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.985	0.923	0.992	0.988		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.956	0.874	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.865	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.989	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.966	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.126	0.226	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.18	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.1	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.124	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (mw-68)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	15	3	16.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	5.0000E-4	0.002	0.00117	0.001	7.6376E-4
Statistics (Non-Detects Only)	15	4.8000E-4	9.3000E-4	6.9733E-4	6.7000E-4	1.2510E-4
Statistics (All: NDs treated as DL value)	18	4.8000E-4	0.002	7.7556E-4	6.7500E-4	3.3750E-4
Statistics (All: NDs treated as DL/2 value)	18	2.5000E-4	0.001	6.7833E-4	6.6500E-4	1.7876E-4
Statistics (Normal ROS Imputed Data)	18	4.5814E-4	9.3000E-4	6.8255E-4	6.7500E-4	1.2666E-4
Statistics (Gamma ROS Imputed Data)	18	4.8000E-4	0.01	0.00225	6.8500E-4	0.00357
Statistics (Lognormal ROS Imputed Data)	18	4.8000E-4	9.3000E-4	6.8299E-4	6.7186E-4	1.2391E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	33.55	26.88	2.0785E-5	-7.283	0.179	-0.0246
Statistics (NDs = DL)	8.679	7.27	8.9360E-5	-7.221	0.322	-0.0446
Statistics (NDs = DL/2)	12.57	10.51	5.3957E-5	-7.336	0.313	-0.0426
Statistics (Gamma ROS Estimates)	0.803	0.706	0.0028	-6.837	1.04	-0.152
Statistics (Lognormal ROS Estimates)	--	--	--	-7.305	0.182	-0.0249
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.982	0.792	0.981	0.982		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.962	0.881	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.656	0.897	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.971	0.897	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Normal ROS Estimates)	0.962	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.19	0.22	Data Appear Normal			
Lilliefors (NDs = DL)	0.214	0.202	Data Not Normal			
Lilliefors (NDs = DL/2)	0.141	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.199	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.986	0.857	0.969	0.856		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.272	0.735				
Kolmogorov-Smirnov (Detects Only)	0.168	0.221	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.065	0.74				
Kolmogorov-Smirnov (NDs = DL)	0.199	0.204	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.441	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.203	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	4.065	0.776				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.449	0.211	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.987	0.914	0.924	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.973	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.855	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.873	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.958	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.157	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.183	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.159	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.166	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (mw-69)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	9	9	50.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	9	4.0000E-4	0.002	6.5556E-4	4.0000E-4	5.4109E-4
Statistics (Non-Detects Only)	9	1.4000E-4	4.7000E-4	2.4778E-4	2.2000E-4	1.0060E-4
Statistics (All: NDs treated as DL value)	18	1.4000E-4	0.002	4.5167E-4	4.0000E-4	4.3192E-4
Statistics (All: NDs treated as DL/2 value)	18	1.4000E-4	0.001	2.8778E-4	2.1000E-4	2.0224E-4
Statistics (Normal ROS Imputed Data)	18	1.2289E-4	4.7000E-4	2.3871E-4	2.3683E-4	8.0142E-5
Statistics (Gamma ROS Imputed Data)	18	1.4000E-4	0.01	0.00512	0.00524	0.00502
Statistics (Lognormal ROS Imputed Data)	18	1.4000E-4	4.7000E-4	2.3468E-4	2.2301E-4	7.7412E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.978	5.393	3.1058E-5	-8.367	0.37	-0.0442

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (NDs = DL)	2.234	1.899	2.0219E-4	-7.943	0.64	-0.0806		
Statistics (NDs = DL/2)	3.834	3.232	7.5056E-5	-8.289	0.475	-0.0573		
Statistics (Gamma ROS Estimates)	0.521	0.471	0.00984	-6.486	1.952	-0.301		
Statistics (Lognormal ROS Estimates)	--	--	--	-8.401	0.296	-0.0353		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.931	0.755	0.766	0.941				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.878	0.829	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.597	0.897	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.611	0.897	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.901	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.197	0.274	Data Appear Normal					
Lilliefors (NDs = DL)	0.344	0.202	Data Not Normal					
Lilliefors (NDs = DL/2)	0.296	0.202	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.189	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.972	0.88	0.874	0.654				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.291	0.722						
Kolmogorov-Smirnov (Detects Only)	0.155	0.28	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	1.205	0.751						
Kolmogorov-Smirnov (NDs = DL)	0.258	0.206	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.775	0.743						
Kolmogorov-Smirnov (NDs = DL/2)	0.261	0.205	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.708	0.798						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.338	0.215	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.979	0.942	0.894	0.972				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.962	0.829	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.898	0.897	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.814	0.897	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.951	0.897	Data Appear Lognormal					
Lilliefors (Detects Only)	0.135	0.274	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.204	0.202	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.226	0.202	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.139	0.202	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Thallium (mw-70)								

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	18	0	18	9	9	50.00%		
	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	9	4.0000E-4	0.002	7.2222E-4	4.0000E-4	5.4263E-4		
Statistics (Non-Detects Only)	9	2.7000E-4	5.7000E-4	4.2333E-4	4.0000E-4	8.6603E-5		
Statistics (All: NDs treated as DL value)	18	2.7000E-4	0.002	5.7278E-4	4.0000E-4	4.0711E-4		
Statistics (All: NDs treated as DL/2 value)	18	2.0000E-4	0.001	3.9222E-4	3.9000E-4	1.9798E-4		
Statistics (Normal ROS Imputed Data)	18	2.7000E-4	5.7000E-4	3.9476E-4	3.9000E-4	7.2673E-5		
Statistics (Gamma ROS Imputed Data)	18	2.7000E-4	0.01	0.0052	0.0052	0.0049		
Statistics (Lognormal ROS Imputed Data)	18	2.7000E-4	5.7000E-4	3.9304E-4	3.8747E-4	7.1892E-5		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	25.71	17.21	1.6468E-5	-7.787	0.214	-0.0274		
Statistics (NDs = DL)	3.812	3.214	1.5025E-4	-7.602	0.473	-0.0623		
Statistics (NDs = DL/2)	4.934	4.148	7.9502E-5	-7.948	0.464	-0.0584		
Statistics (Gamma ROS Estimates)	0.65	0.579	0.00802	-6.196	1.644	-0.265		
Statistics (Lognormal ROS Estimates)	--	--	--	-7.857	0.179	-0.0227		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.965	0.743	0.899	0.965				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.945	0.829	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.577	0.897	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.819	0.897	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.94	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.197	0.274	Data Appear Normal					
Lilliefors (NDs = DL)	0.349	0.202	Data Not Normal					
Lilliefors (NDs = DL/2)	0.182	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.185	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.966	0.855	0.946	0.681				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.386	0.721						
Kolmogorov-Smirnov (Detects Only)	0.208	0.279	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	2.379	0.743						
Kolmogorov-Smirnov (NDs = DL)	0.312	0.205	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.707	0.743						
Kolmogorov-Smirnov (NDs = DL/2)	0.16	0.204	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.857	0.787						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.338	0.213	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.953	0.856	0.951	0.976				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.926	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.752	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.897	0.897	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.962	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.228	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.277	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.174	0.202	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.149	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Fluoride (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	0	46	3	43	93.48%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	43	0.4	4	1.47	2	0.979
Statistics (Non-Detects Only)	3	0.2	0.44	0.32	0.32	0.12
Statistics (All: NDs treated as DL value)	46	0.2	4	1.395	0.8	0.988
Statistics (All: NDs treated as DL/2 value)	46	0.2	2	0.708	0.42	0.485
Statistics (Normal ROS Imputed Data)	46	0.0965	0.44	0.268	0.268	0.0863
Statistics (Gamma ROS Imputed Data)	46	0.141	0.44	0.271	0.264	0.0758
Statistics (Lognormal ROS Imputed Data)	46	0.148	0.447	0.268	0.257	0.0753
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	1.995	1.879	0.699	0.0616	0.781	12.67
Statistics (NDs = DL/2)	2.229	2.098	0.318	-0.586	0.724	-1.235
Statistics (Gamma ROS Estimates)	13.05	12.21	0.0208	-1.345	0.284	-0.211
Statistics (Lognormal ROS Estimates)	--	--	--	-1.356	0.279	-0.206
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.899	0.893	0.996		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	1	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.8	0.945	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.788	0.945	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.978	0.945	Data Appear Normal			
Lilliefors (Detects Only)	0.175	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.248	0.129	Data Not Normal			
Lilliefors (NDs = DL/2)	0.237	0.129	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0563	0.129	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.923	0.924	0.995		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Anderson-Darling (Detects Only)	N/A	N/A		
Kolmogorov-Smirnov (Detects Only)	N/A	N/A		
Anderson-Darling (NDs = DL)	2.819	0.761		
Kolmogorov-Smirnov (NDs = DL)	0.258	0.132	Data Not Gamma Distributed	
Anderson-Darling (NDs = DL/2)	3.005	0.76		
Kolmogorov-Smirnov (NDs = DL/2)	0.256	0.132	Data Not Gamma Distributed	
Anderson-Darling (Gamma ROS Estimates)	0.148	0.749		
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0559	0.13	Data Appear Gamma Distributed	
Lognormal GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.994	0.94	0.93	0.996
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.988	0.767	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL)	0.871	0.945	Data Not Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.842	0.945	Data Not Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.977	0.945	Data Appear Lognormal	
Lilliefors (Detects Only)	0.217	0.425	Data Appear Lognormal	
Lilliefors (NDs = DL)	0.269	0.129	Data Not Lognormal	
Lilliefors (NDs = DL/2)	0.269	0.129	Data Not Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.0559	0.129	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Fluoride (mw-66)				
Raw Statistics				
Number of Valid Observations	18			
Number of Distinct Observations	9			
Minimum	17			
Maximum	41			
Mean of Raw Data	23.33			
Standard Deviation of Raw Data	5.477			
Khat	22.67			
Theta hat	1.029			
Kstar	18.93			
Theta star	1.233			
Mean of Log Transformed Data	3.128			
Standard Deviation of Log Transformed Data	0.21			
Normal GOF Test Results				
Correlation Coefficient R	0.873			
Shapiro Wilk Test Statistic	0.783			
Shapiro Wilk Critical (0.05) Value	0.897			
Approximate Shapiro Wilk P Value	4.8921E-4			
Lilliefors Test Statistic	0.258			
Lilliefors Critical (0.05) Value	0.202			
Data not Normal at (0.05) Significance Level				
Gamma GOF Test Results				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.898						
A-D Test Statistic	0.935						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.221						
K-S Critical(0.05) Value	0.203						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.924						
Shapiro Wilk Test Statistic	0.867						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0136						
Lilliefors Test Statistic	0.212						
Lilliefors Critical (0.05) Value	0.202						
Data not Lognormal at (0.05) Significance Level							
Non-parametric GOF Test Results							
Data do not follow a discernible distribution at (0.05) Level of Significance							
Fluoride (mw-67)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	12						
Minimum	15						
Maximum	37						
Mean of Raw Data	22.22						
Standard Deviation of Raw Data	5.275						
Khat	21.1						
Theta hat	1.053						
Kstar	17.62						
Theta star	1.261						
Mean of Log Transformed Data	3.077						
Standard Deviation of Log Transformed Data	0.22						
Normal GOF Test Results							
Correlation Coefficient R	0.936						
Shapiro Wilk Test Statistic	0.889						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.0327						
Lilliefors Test Statistic	0.188						
Lilliefors Critical (0.05) Value	0.202						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.959						
A-D Test Statistic	0.431						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.156						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.973						
Shapiro Wilk Test Statistic	0.955						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.476						
Lilliefors Test Statistic	0.149						
Lilliefors Critical (0.05) Value	0.202						
Data appear Lognormal at (0.05) Significance Level							
Fluoride (mw-68)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	14						
Minimum	5.5						
Maximum	14						
Mean of Raw Data	9.211						
Standard Deviation of Raw Data	2.234						
Khat	17.27						
Theta hat	0.533						
Kstar	14.43						
Theta star	0.638						
Mean of Log Transformed Data	2.191						
Standard Deviation of Log Transformed Data	0.253						
Normal GOF Test Results							
Correlation Coefficient R	0.987						
Shapiro Wilk Test Statistic	0.973						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.852						
Lilliefors Test Statistic	0.125						
Lilliefors Critical (0.05) Value	0.202						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.986						
A-D Test Statistic	0.287						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.155						
K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.982						
Shapiro Wilk Test Statistic	0.962						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.643						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors Test Statistic	0.165					
Lilliefors Critical (0.05) Value	0.202					
Data appear Lognormal at (0.05) Significance Level						
Fluoride (mw-69)						
Raw Statistics						
Number of Valid Observations	18					
Number of Distinct Observations	12					
Minimum	9.6					
Maximum	29					
Mean of Raw Data	16.02					
Standard Deviation of Raw Data	4.78					
Khat	12.76					
Theta hat	1.256					
Kstar	10.67					
Theta star	1.501					
Mean of Log Transformed Data	2.734					
Standard Deviation of Log Transformed Data	0.288					
Normal GOF Test Results						
Correlation Coefficient R	0.957					
Shapiro Wilk Test Statistic	0.923					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.143					
Lilliefors Test Statistic	0.125					
Lilliefors Critical (0.05) Value	0.202					
Data appear Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.976					
A-D Test Statistic	0.292					
A-D Critical (0.05) Value	0.739					
K-S Test Statistic	0.123					
K-S Critical(0.05) Value	0.203					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.983					
Shapiro Wilk Test Statistic	0.967					
Shapiro Wilk Critical (0.05) Value	0.897					
Approximate Shapiro Wilk P Value	0.729					
Lilliefors Test Statistic	0.134					
Lilliefors Critical (0.05) Value	0.202					
Data appear Lognormal at (0.05) Significance Level						
Fluoride (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	14	4	22.22%

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	4	0.4	0.8	0.5	0.4	0.2		
Statistics (Non-Detects Only)	14	0.85	3.2	2.204	2.25	0.693		
Statistics (All: NDs treated as DL value)	18	0.4	3.2	1.825	2.1	0.952		
Statistics (All: NDs treated as DL/2 value)	18	0.2	3.2	1.769	2.1	1.033		
Statistics (Normal ROS Imputed Data)	18	0.28	3.2	1.851	2.1	0.915		
Statistics (Gamma ROS Imputed Data)	18	0.708	3.2	1.918	2.1	0.821		
Statistics (Lognormal ROS Imputed Data)	18	0.767	3.2	1.918	2.1	0.819		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	8.436	6.676	0.261	0.73	0.39	0.534		
Statistics (NDs = DL)	2.665	2.258	0.685	0.402	0.731	1.817		
Statistics (NDs = DL/2)	1.699	1.453	1.042	0.248	0.998	4.018		
Statistics (Gamma ROS Estimates)	4.898	4.119	0.392	0.546	0.498	0.912		
Statistics (Lognormal ROS Estimates)	--	--	--	0.547	0.492	0.899		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.976	0.965	0.959	0.972				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.946	0.874	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.911	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.899	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.93	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.155	0.226	Data Appear Normal					
Lilliefors (NDs = DL)	0.169	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.181	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.163	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.943	0.908	0.868	0.946				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.617	0.736						
Kolmogorov-Smirnov (Detects Only)	0.205	0.229	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	1.042	0.748						
Kolmogorov-Smirnov (NDs = DL)	0.225	0.205	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.375	0.755						
Kolmogorov-Smirnov (NDs = DL/2)	0.249	0.207	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.79	0.743						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.194	0.204	Detected Data appear Approximate Gamma					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.923	0.918	0.888	0.945				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.853	0.874	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.826	0.897	Data Not Lognormal					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL/2)	0.774	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.875	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.227	0.226	Data Not Lognormal			
Lilliefors (NDs = DL)	0.236	0.202	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.278	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.209	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Combined Radium (background)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	46	0	46	40	6	13.04%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.5	0.8	0.65	0.65	0.105
Statistics (Non-Detects Only)	40	0.4	4.8	2.315	2.2	0.994
Statistics (All: NDs treated as DL value)	46	0.4	4.8	2.098	2.05	1.086
Statistics (All: NDs treated as DL/2 value)	46	0.25	4.8	2.055	2.05	1.147
Statistics (Normal ROS Imputed Data)	46	-0.00877	4.8	2.045	2.05	1.165
Statistics (Gamma ROS Imputed Data)	46	0.4	4.8	2.106	2.05	1.075
Statistics (Lognormal ROS Imputed Data)	46	0.4	4.8	2.11	2.05	1.068
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	4.662	4.329	0.497	0.728	0.519	0.712
Statistics (NDs = DL)	3.184	2.99	0.659	0.576	0.628	1.092
Statistics (NDs = DL/2)	2.279	2.145	0.902	0.485	0.799	1.647
Statistics (Gamma ROS Estimates)	3.34	3.137	0.63	0.588	0.609	1.036
Statistics (Lognormal ROS Estimates)	--	--	--	0.595	0.597	1.004
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.995	0.987	0.988	0.993		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.985	0.94	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.961	0.945	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.962	0.945	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.974	0.945	Data Appear Normal			
Lilliefors (Detects Only)	0.081	0.139	Data Appear Normal			
Lilliefors (NDs = DL)	0.0825	0.129	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.0777	0.129	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.0676	0.129	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.989	0.981	0.963	0.983		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.338	0.752				
Kolmogorov-Smirnov (Detects Only)	0.0992	0.14	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.692	0.755				

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL)	0.115	0.131	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.335	0.76				
Kolmogorov-Smirnov (NDs = DL/2)	0.151	0.132	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.626	0.755				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.109	0.131	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.964	0.969	0.934	0.972		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.935	0.94	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.925	0.945	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.859	0.945	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.936	0.945	Data Not Lognormal			
Lilliefors (Detects Only)	0.134	0.139	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.151	0.129	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.186	0.129	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.14	0.129	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
CombinedRadium (mw-66)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	1.5	1.5	1.5	1.5	N/A
Statistics (Non-Detects Only)	17	0.4	5.1	2.599	2.8	1.229
Statistics (All: NDs treated as DL value)	18	0.4	5.1	2.538	2.65	1.22
Statistics (All: NDs treated as DL/2 value)	18	0.4	5.1	2.496	2.65	1.269
Statistics (Normal ROS Imputed Data)	18	0.4	5.1	2.5	2.65	1.264
Statistics (Gamma ROS Imputed Data)	18	0.4	5.1	2.514	2.65	1.245
Statistics (Lognormal ROS Imputed Data)	18	0.4	5.1	2.504	2.65	1.258
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	3.283	2.743	0.792	0.795	0.67	0.843
Statistics (NDs = DL)	3.325	2.808	0.763	0.773	0.657	0.849
Statistics (NDs = DL/2)	2.937	2.485	0.85	0.735	0.699	0.95
Statistics (Gamma ROS Estimates)	3.151	2.663	0.798	0.755	0.672	0.89
Statistics (Lognormal ROS Estimates)	--	--	--	0.744	0.685	0.921
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.99	0.992	0.989	0.99		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.98	0.892	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.984	0.897	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.974	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.975	0.897	Data Appear Normal			

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Detects Only)	0.115	0.207	Data Appear Normal			
Lilliefors (NDs = DL)	0.0988	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.112	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.111	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.962	0.97	0.962	0.967		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.61	0.745				
Kolmogorov-Smirnov (Detects Only)	0.193	0.21	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.481	0.745				
Kolmogorov-Smirnov (NDs = DL)	0.173	0.205	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.589	0.746				
Kolmogorov-Smirnov (NDs = DL/2)	0.19	0.205	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.496	0.745				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.182	0.205	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.921	0.934	0.938	0.941		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.854	0.892	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.878	0.897	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.88	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.887	0.897	Data Not Lognormal			
Lilliefors (Detects Only)	0.219	0.207	Data Not Lognormal			
Lilliefors (NDs = DL)	0.197	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.214	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.21	0.202	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
CombinedRadium (mw-67)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	17	1	5.56%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	2	2	2	2	N/A
Statistics (Non-Detects Only)	17	0.9	4.2	2.592	2.67	0.895
Statistics (All: NDs treated as DL value)	18	0.9	4.2	2.559	2.635	0.879
Statistics (All: NDs treated as DL/2 value)	18	0.9	4.2	2.504	2.635	0.946
Statistics (Normal ROS Imputed Data)	18	0.9	4.2	2.52	2.635	0.92
Statistics (Gamma ROS Imputed Data)	18	0.9	4.2	2.527	2.635	0.912
Statistics (Lognormal ROS Imputed Data)	18	0.9	4.2	2.525	2.635	0.914
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.692	6.374	0.337	0.886	0.398	0.449
Statistics (NDs = DL)	7.932	6.647	0.323	0.875	0.388	0.444

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Statistics (NDs = DL/2)	6.341	5.321	0.395	0.837	0.439	0.524		
Statistics (Gamma ROS Estimates)	7.212	6.047	0.35	0.856	0.406	0.475		
Statistics (Lognormal ROS Estimates)	--	--	--	0.855	0.408	0.477		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.989	0.988	0.988	0.989				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.975	0.892	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.974	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.967	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.971	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.0968	0.207	Data Appear Normal					
Lilliefors (NDs = DL)	0.103	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.096	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.0901	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.976	0.98	0.973	0.978				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.323	0.74						
Kolmogorov-Smirnov (Detects Only)	0.139	0.209	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.292	0.741						
Kolmogorov-Smirnov (NDs = DL)	0.126	0.204	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.393	0.742						
Kolmogorov-Smirnov (NDs = DL/2)	0.146	0.204	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.321	0.741						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.135	0.204	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.962	0.966	0.963	0.971				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.93	0.892	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.939	0.897	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.922	0.897	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.941	0.897	Data Appear Lognormal					
Lilliefors (Detects Only)	0.157	0.207	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.153	0.202	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.162	0.202	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.153	0.202	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Combined Radium (mw-68)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Raw Statistics	18	0	18	17	1	5.56%		
	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	1	0.6	0.6	0.6	0.6	N/A		
Statistics (Non-Detects Only)	17	0.6	3.8	2.021	2.1	0.913		
Statistics (All: NDs treated as DL value)	18	0.6	3.8	1.942	2	0.947		
Statistics (All: NDs treated as DL/2 value)	18	0.3	3.8	1.925	2	0.974		
Statistics (Normal ROS Imputed Data)	18	-0.237	3.8	1.895	2	1.033		
Statistics (Gamma ROS Imputed Data)	18	0.37	3.8	1.929	2	0.967		
Statistics (Lognormal ROS Imputed Data)	18	0.527	3.8	1.938	2	0.953		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	4.688	3.9	0.431	0.593	0.508	0.857		
Statistics (NDs = DL)	3.95	3.328	0.492	0.532	0.557	1.048		
Statistics (NDs = DL/2)	3.248	2.743	0.593	0.493	0.65	1.318		
Statistics (Gamma ROS Estimates)	3.444	2.907	0.56	0.505	0.619	1.226		
Statistics (Lognormal ROS Estimates)	--	--	--	0.524	0.572	1.091		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.985	0.983	0.99	0.991				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.962	0.892	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.954	0.897	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.972	0.897	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.983	0.897	Data Appear Normal					
Lilliefors (Detects Only)	0.128	0.207	Data Appear Normal					
Lilliefors (NDs = DL)	0.124	0.202	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.119	0.202	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.112	0.202	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.981	0.978	0.972	0.975				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.267	0.742						
Kolmogorov-Smirnov (Detects Only)	0.131	0.21	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.307	0.743						
Kolmogorov-Smirnov (NDs = DL)	0.128	0.205	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.298	0.745						
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.205	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.283	0.744						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.133	0.205	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.98	0.976	0.956	0.975				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Detects Only)	0.956	0.892	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL)	0.94	0.897	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.917	0.897	Data Appear Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.943	0.897	Data Appear Lognormal				
Lilliefors (Detects Only)	0.145	0.207	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.147	0.202	Data Appear Lognormal				
Lilliefors (NDs = DL/2)	0.149	0.202	Data Appear Lognormal				
Lilliefors (Lognormal ROS Estimates)	0.148	0.202	Data Appear Lognormal				
Note: Substitution methods such as DL or DL/2 are not recommended.							
CombinedRadium (mw-69)							
Raw Statistics							
Number of Valid Observations	18						
Number of Distinct Observations	15						
Minimum	3.1						
Maximum	6.7						
Mean of Raw Data	4.565						
Standard Deviation of Raw Data	1.073						
Khat	18.8						
Theta hat	0.243						
Kstar	15.7						
Theta star	0.291						
Mean of Log Transformed Data	1.492						
Standard Deviation of Log Transformed Data	0.24						
Normal GOF Test Results							
Correlation Coefficient R	0.973						
Shapiro Wilk Test Statistic	0.936						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.287						
Lilliefors Test Statistic	0.149						
Lilliefors Critical (0.05) Value	0.202						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.974						
A-D Test Statistic	0.546						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.152						
K-S Critical(0.05) Value	0.203						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.971						
Shapiro Wilk Test Statistic	0.928						
Shapiro Wilk Critical (0.05) Value	0.897						
Approximate Shapiro Wilk P Value	0.216						
Lilliefors Test Statistic	0.158						
Lilliefors Critical (0.05) Value	0.202						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

Data appear Lognormal at (0.05) Significance Level						
CombinedRadium (mw-70)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	18	0	18	16	2	11.11%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.6	0.7	0.65	0.65	0.0707
Statistics (Non-Detects Only)	16	1	3.3	2.039	1.95	0.616
Statistics (All: NDs treated as DL value)	18	0.6	3.3	1.885	1.85	0.733
Statistics (All: NDs treated as DL/2 value)	18	0.3	3.3	1.849	1.85	0.801
Statistics (Normal ROS Imputed Data)	18	0.591	3.3	1.878	1.85	0.744
Statistics (Gamma ROS Imputed Data)	18	0.821	3.3	1.904	1.85	0.7
Statistics (Lognormal ROS Imputed Data)	18	0.942	3.3	1.917	1.85	0.679
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	11.36	9.268	0.18	0.668	0.314	0.47
Statistics (NDs = DL)	5.819	4.886	0.324	0.546	0.463	0.849
Statistics (NDs = DL/2)	3.582	3.022	0.516	0.469	0.652	1.391
Statistics (Gamma ROS Estimates)	7.094	5.949	0.268	0.572	0.407	0.711
Statistics (Lognormal ROS Estimates)	--	--	--	0.587	0.377	0.643
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.988	0.992	0.985	0.99		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.974	0.887	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.98	0.897	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.968	0.897	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.975	0.897	Data Appear Normal			
Lilliefors (Detects Only)	0.122	0.213	Data Appear Normal			
Lilliefors (NDs = DL)	0.0922	0.202	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.109	0.202	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.0916	0.202	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.99	0.976	0.944	0.984		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.201	0.739				
Kolmogorov-Smirnov (Detects Only)	0.121	0.215	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.352	0.742				
Kolmogorov-Smirnov (NDs = DL)	0.126	0.204	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.874	0.744				
Kolmogorov-Smirnov (NDs = DL/2)	0.198	0.205	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.282	0.741				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.111	0.204	Data Appear Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
URS ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.988	0.959	0.889	0.98		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.976	0.887	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.919	0.897	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.795	0.897	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.947	0.897	Data Appear Lognormal			
Lilliefors (Detects Only)	0.121	0.213	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.159	0.202	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.239	0.202	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.111	0.202	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

User Selected Options		Outlier Tests for Selected Variables excluding nondetects					
Date/Time of Computation	ProUCL 5.110/9/2018 1:51:29 PM						
From File	Table1_AppendixA_URS_AppendixIV_ProUCLUpload_Sept2018.xls						
Full Precision	OFF						
Dixon's Outlier Test for Antimony (background)							
Total N = 43							
Number NDs = 39							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00027 is a Potential Outlier (Upper T							
Test Statistic: 0.200							
For 10% significance level, 0.00027 is not an outlier.							
For 5% significance level, 0.00027 is not an outlier.							
For 1% significance level, 0.00027 is not an outlier.							
2. Data Value 0.00012 is a Potential Outlier (Lower T							
Test Statistic: 0.667							
For 10% significance level, 0.00012 is not an outlier.							
For 5% significance level, 0.00012 is not an outlier.							
For 1% significance level, 0.00012 is not an outlier.							
No Outlier Test for Antimony (mw-66)							
Dixon's Outlier Test for Antimony (mw-67)							
Total N = 17							
Number NDs = 14							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00029 is a Potential Outlier (Upper T							
Test Statistic: 0.667							
For 10% significance level, 0.00029 is not an outlier.							
For 5% significance level, 0.00029 is not an outlier.							
For 1% significance level, 0.00029 is not an outlier.							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

2. Data Value 0.00014 is a Potential Outlier (Lower T								
Test Statistic: 0.333								
For 10% significance level, 0.00014 is not an outlier.								
For 5% significance level, 0.00014 is not an outlier.								
For 1% significance level, 0.00014 is not an outlier.								
Dixon's Outlier Test for Antimony (mw-68)								
Total N = 17								
Number NDs = 14								
Number Detects = 3								
10% critical value: 0.886								
5% critical value: 0.941								
1% critical value: 0.988								
Note: NDs excluded from Outlier Test								
1. Data Value 0.00045 is a Potential Outlier (Upper T								
Test Statistic: 0.971								
For 10% significance level, 0.00045 is an outlier.								
For 5% significance level, 0.00045 is an outlier.								
For 1% significance level, 0.00045 is not an outlier.								
2. Data Value 0.00011 is a Potential Outlier (Lower T								
Test Statistic: 0.029								
For 10% significance level, 0.00011 is not an outlier.								
For 5% significance level, 0.00011 is not an outlier.								
For 1% significance level, 0.00011 is not an outlier.								
Dixon's Outlier Test for Antimony (mw-69)								
Total N = 17								
Number NDs = 14								
Number Detects = 3								
10% critical value: 0.886								
5% critical value: 0.941								
1% critical value: 0.988								
Note: NDs excluded from Outlier Test								
1. Data Value 0.00054 is a Potential Outlier (Upper T								
Test Statistic: 0.242								
For 10% significance level, 0.00054 is not an outlier.								
For 5% significance level, 0.00054 is not an outlier.								
For 1% significance level, 0.00054 is not an outlier.								

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

2. Data Value 0.00021 is a Potential Outlier (Lower T							
Test Statistic: 0.758							
For 10% significance level, 0.00021 is not an outlier.							
For 5% significance level, 0.00021 is not an outlier.							
For 1% significance level, 0.00021 is not an outlier.							
Dixon's Outlier Test for Antimony (mw-70)							
Total N = 17							
Number NDs = 14							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00026 is a Potential Outlier (Upper T							
Test Statistic: 0.600							
For 10% significance level, 0.00026 is not an outlier.							
For 5% significance level, 0.00026 is not an outlier.							
For 1% significance level, 0.00026 is not an outlier.							
2. Data Value 0.00011 is a Potential Outlier (Lower T							
Test Statistic: 0.400							
For 10% significance level, 0.00011 is not an outlier.							
For 5% significance level, 0.00011 is not an outlier.							
For 1% significance level, 0.00011 is not an outlier.							
Rosner's Outlier Test for 1 Outliers in Arsenic (background)							
Total N		46					
Number NDs		14					
Number Detects		32					
Mean of Detects		0.00505					
SD of Detects		0.00279					
Number of data		32					
Number of suspected outliers		1					
s not included in the following:							
			Potential	Obs.	Test	Critical	Critical
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)
1	0.00505	0.00274	0.012	32	2.53	2.94	3.27
For 5% Significance Level, there is no Potential Outlier							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 1% Significance Level, there is no Potential Outlier						
Dixon's Outlier Test for Arsenic (mw-66)						
Total N = 18						
Number NDs = 7						
Number Detects = 11						
10% critical value: 0.517						
5% critical value: 0.576						
1% critical value: 0.679						
Note: NDs excluded from Outlier Test						
1. Data Value 0.005 is a Potential Outlier (Upper Tail)						
Test Statistic: 0.550						
For 10% significance level, 0.005 is an outlier.						
For 5% significance level, 0.005 is not an outlier.						
For 1% significance level, 0.005 is not an outlier.						
2. Data Value 0.00067 is a Potential Outlier (Lower Tail)						
Test Statistic: 0.231						
For 10% significance level, 0.00067 is not an outlier.						
For 5% significance level, 0.00067 is not an outlier.						
For 1% significance level, 0.00067 is not an outlier.						
Dixon's Outlier Test for Arsenic (mw-67)						
Total N = 18						
Number NDs = 3						
Number Detects = 15						
10% critical value: 0.472						
5% critical value: 0.525						
1% critical value: 0.616						
Note: NDs excluded from Outlier Test						
1. Data Value 0.0046 is a Potential Outlier (Upper Tail)						
Test Statistic: 0.500						
For 10% significance level, 0.0046 is an outlier.						
For 5% significance level, 0.0046 is not an outlier.						
For 1% significance level, 0.0046 is not an outlier.						
2. Data Value 0.00099 is a Potential Outlier (Lower Tail)						
Test Statistic: 0.437						
For 10% significance level, 0.00099 is not an outlier.						
For 5% significance level, 0.00099 is not an outlier.						

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 1% significance level, 0.00099 is not an outlier.							
Dixon's Outlier Test for Arsenic (mw-68)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0097 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.171							
For 10% significance level, 0.0097 is not an outlier.							
For 5% significance level, 0.0097 is not an outlier.							
For 1% significance level, 0.0097 is not an outlier.							
2. Data Value 0.0006 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.266							
For 10% significance level, 0.0006 is not an outlier.							
For 5% significance level, 0.0006 is not an outlier.							
For 1% significance level, 0.0006 is not an outlier.							
Dixon's Outlier Test for Arsenic (mw-69)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.011 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.288							
For 10% significance level, 0.011 is not an outlier.							
For 5% significance level, 0.011 is not an outlier.							
For 1% significance level, 0.011 is not an outlier.							
2. Data Value 0.0026 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.175							
For 10% significance level, 0.0026 is not an outlier.							
For 5% significance level, 0.0026 is not an outlier.							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.022 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.022 is not an outlier.							
For 5% significance level, 0.022 is not an outlier.							
For 1% significance level, 0.022 is not an outlier.							
2. Data Value 0.0013 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.710							
For 10% significance level, 0.0013 is an outlier.							
For 5% significance level, 0.0013 is an outlier.							
For 1% significance level, 0.0013 is an outlier.							
Dixon's Outlier Test for Barium (mw-67)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.022 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.022 is not an outlier.							
For 5% significance level, 0.022 is not an outlier.							
For 1% significance level, 0.022 is not an outlier.							
2. Data Value 0.017 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.017 is not an outlier.							
For 5% significance level, 0.017 is not an outlier.							
For 1% significance level, 0.017 is not an outlier.							
Dixon's Outlier Test for Barium (mw-68)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.013 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.627							
For 10% significance level, 0.013 is an outlier.							
For 5% significance level, 0.013 is an outlier.							
For 1% significance level, 0.013 is an outlier.							
2. Data Value 0.0066 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.185							
For 10% significance level, 0.0066 is not an outlier.							
For 5% significance level, 0.0066 is not an outlier.							
For 1% significance level, 0.0066 is not an outlier.							
Dixon's Outlier Test for Barium (mw-69)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.019 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.019 is not an outlier.							
For 5% significance level, 0.019 is not an outlier.							
For 1% significance level, 0.019 is not an outlier.							
2. Data Value 0.013 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.200							
For 10% significance level, 0.013 is not an outlier.							
For 5% significance level, 0.013 is not an outlier.							
For 1% significance level, 0.013 is not an outlier.							
Dixon's Outlier Test for Barium (mw-70)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N = 17							
Number NDs = 0							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.016 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.286							
For 10% significance level, 0.016 is not an outlier.							
For 5% significance level, 0.016 is not an outlier.							
For 1% significance level, 0.016 is not an outlier.							
2. Data Value 0.0073 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.254							
For 10% significance level, 0.0073 is not an outlier.							
For 5% significance level, 0.0073 is not an outlier.							
For 1% significance level, 0.0073 is not an outlier.							
No Outlier Test for Beryllium (background)							
No Outlier Test for Beryllium (mw-66)							
No Outlier Test for Beryllium (mw-67)							
No Outlier Test for Beryllium (mw-68)							
No Outlier Test for Beryllium (mw-69)							
No Outlier Test for Beryllium (mw-70)							
Dixon's Outlier Test for Cadmium (background)							
Total N = 42							
Number NDs = 36							
Number Detects = 6							
10% critical value: 0.482							
5% critical value: 0.56							
1% critical value: 0.698							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0003 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.474							
For 10% significance level, 0.0003 is not an outlier.							
For 5% significance level, 0.0003 is not an outlier.							
For 1% significance level, 0.0003 is not an outlier.							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

2. Data Value 0.00011 is a Potential Outlier (Lower T							
Test Statistic: 0.211							
For 10% significance level, 0.00011 is not an outlier.							
For 5% significance level, 0.00011 is not an outlier.							
For 1% significance level, 0.00011 is not an outlier.							
No Outlier Test for Cadmium (mw-66)							
Dixon's Outlier Test for Cadmium (mw-67)							
Total N = 17							
Number NDs = 13							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00018 is a Potential Outlier (Upper T							
Test Statistic: 0.667							
For 10% significance level, 0.00018 is not an outlier.							
For 5% significance level, 0.00018 is not an outlier.							
For 1% significance level, 0.00018 is not an outlier.							
2. Data Value 0.00015 is a Potential Outlier (Lower T							
Test Statistic: 0.000							
For 10% significance level, 0.00015 is not an outlier.							
For 5% significance level, 0.00015 is not an outlier.							
For 1% significance level, 0.00015 is not an outlier.							
Dixon's Outlier Test for Cadmium (mw-68)							
Total N = 17							
Number NDs = 12							
Number Detects = 5							
10% critical value: 0.557							
5% critical value: 0.642							
1% critical value: 0.78							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00046 is a Potential Outlier (Upper T							
Test Statistic: 0.600							
For 10% significance level, 0.00046 is an outlier.							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 5% significance level, 0.00046 is not an outlier.							
For 1% significance level, 0.00046 is not an outlier.							
2. Data Value 0.00011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.029							
For 10% significance level, 0.00011 is not an outlier.							
For 5% significance level, 0.00011 is not an outlier.							
For 1% significance level, 0.00011 is not an outlier.							
No Outlier Test for Cadmium (mw-69)							
Dixon's Outlier Test for Cadmium (mw-70)							
Total N = 17							
Number NDs = 14							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00024 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.769							
For 10% significance level, 0.00024 is not an outlier.							
For 5% significance level, 0.00024 is not an outlier.							
For 1% significance level, 0.00024 is not an outlier.							
2. Data Value 0.00011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.231							
For 10% significance level, 0.00011 is not an outlier.							
For 5% significance level, 0.00011 is not an outlier.							
For 1% significance level, 0.00011 is not an outlier.							
Dixon's Outlier Test for Chromium (background)							
Total N = 42							
Number NDs = 38							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0041 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.371							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.0041 is not an outlier.							
For 5% significance level, 0.0041 is not an outlier.							
For 1% significance level, 0.0041 is not an outlier.							
2. Data Value 0.0006 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.114							
For 10% significance level, 0.0006 is not an outlier.							
For 5% significance level, 0.0006 is not an outlier.							
For 1% significance level, 0.0006 is not an outlier.							
Dixon's Outlier Test for Chromium (mw-66)							
Total N = 16							
Number NDs = 10							
Number Detects = 6							
10% critical value: 0.482							
5% critical value: 0.56							
1% critical value: 0.698							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0031 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.0031 is not an outlier.							
For 5% significance level, 0.0031 is not an outlier.							
For 1% significance level, 0.0031 is not an outlier.							
2. Data Value 0.00074 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.059							
For 10% significance level, 0.00074 is not an outlier.							
For 5% significance level, 0.00074 is not an outlier.							
For 1% significance level, 0.00074 is not an outlier.							
Dixon's Outlier Test for Chromium (mw-67)							
Total N = 17							
Number NDs = 13							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0016 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.804							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.0016 is an outlier.							
For 5% significance level, 0.0016 is an outlier.							
For 1% significance level, 0.0016 is not an outlier.							
2. Data Value 0.00058 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.108							
For 10% significance level, 0.00058 is not an outlier.							
For 5% significance level, 0.00058 is not an outlier.							
For 1% significance level, 0.00058 is not an outlier.							
Dixon's Outlier Test for Chromium (mw-68)							
Total N = 17							
Number NDs = 12							
Number Detects = 5							
10% critical value: 0.557							
5% critical value: 0.642							
1% critical value: 0.78							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0012 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.0012 is not an outlier.							
For 5% significance level, 0.0012 is not an outlier.							
For 1% significance level, 0.0012 is not an outlier.							
2. Data Value 0.00072 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.021							
For 10% significance level, 0.00072 is not an outlier.							
For 5% significance level, 0.00072 is not an outlier.							
For 1% significance level, 0.00072 is not an outlier.							
Dixon's Outlier Test for Chromium (mw-69)							
Total N = 17							
Number NDs = 14							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00083 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.286							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.00083 is not an outlier.											
For 5% significance level, 0.00083 is not an outlier.											
For 1% significance level, 0.00083 is not an outlier.											
2. Data Value 0.00076 is a Potential Outlier (Lower Tail)											
Test Statistic: 0.714											
For 10% significance level, 0.00076 is not an outlier.											
For 5% significance level, 0.00076 is not an outlier.											
For 1% significance level, 0.00076 is not an outlier.											
Dixon's Outlier Test for Chromium (mw-70)											
Total N = 17											
Number NDs = 12											
Number Detects = 5											
10% critical value: 0.557											
5% critical value: 0.642											
1% critical value: 0.78											
Note: NDs excluded from Outlier Test											
1. Data Value 0.0037 is a Potential Outlier (Upper Tail)											
Test Statistic: 0.677											
For 10% significance level, 0.0037 is an outlier.											
For 5% significance level, 0.0037 is an outlier.											
For 1% significance level, 0.0037 is not an outlier.											
2. Data Value 0.0006 is a Potential Outlier (Lower Tail)											
Test Statistic: 0.006											
For 10% significance level, 0.0006 is not an outlier.											
For 5% significance level, 0.0006 is not an outlier.											
For 1% significance level, 0.0006 is not an outlier.											
Rosner's Outlier Test for 1 Outliers in Cobalt (background)											
Total N	45										
Number NDs	18										
Number Detects	27										
Mean of Detects	0.00425										
SD of Detects	0.0022										
Number of data	27										
Number of suspected outliers	1										
s not included in the following:											
		Potential	Obs.	Test	Critical	Critical					

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
1	0.00425	0.00216	0.0087	2	2.06	2.86	3.18				
For 5% Significance Level, there is no Potential Outlier											
For 1% Significance Level, there is no Potential Outlier											
Dixon's Outlier Test for Cobalt (mw-66)											
Total N = 18											
Number NDs = 0											
Number Detects = 18											
10% critical value: 0.424											
5% critical value: 0.475											
1% critical value: 0.561											
Note: NDs excluded from Outlier Test											
1. Data Value 0.01 is a Potential Outlier (Upper Tail)											
Test Statistic: 0.465											
For 10% significance level, 0.01 is an outlier.											
For 5% significance level, 0.01 is not an outlier.											
For 1% significance level, 0.01 is not an outlier.											
2. Data Value 0.0029 is a Potential Outlier (Lower Tail)											
Test Statistic: 0.549											
For 10% significance level, 0.0029 is an outlier.											
For 5% significance level, 0.0029 is an outlier.											
For 1% significance level, 0.0029 is not an outlier.											
Dixon's Outlier Test for Cobalt (mw-67)											
Total N = 18											
Number NDs = 1											
Number Detects = 17											
10% critical value: 0.438											
5% critical value: 0.49											
1% critical value: 0.577											
Note: NDs excluded from Outlier Test											
1. Data Value 0.0078 is a Potential Outlier (Upper Tail)											
Test Statistic: 0.371											
For 10% significance level, 0.0078 is not an outlier.											
For 5% significance level, 0.0078 is not an outlier.											
For 1% significance level, 0.0078 is not an outlier.											
2. Data Value 0.0025 is a Potential Outlier (Lower Tail)											

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Test Statistic: 0.450							
For 10% significance level, 0.0025 is an outlier.							
For 5% significance level, 0.0025 is not an outlier.							
For 1% significance level, 0.0025 is not an outlier.							
Dixon's Outlier Test for Cobalt (mw-68)							
Total N = 18							
Number NDs = 3							
Number Detects = 15							
10% critical value: 0.472							
5% critical value: 0.525							
1% critical value: 0.616							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0053 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.559							
For 10% significance level, 0.0053 is an outlier.							
For 5% significance level, 0.0053 is an outlier.							
For 1% significance level, 0.0053 is not an outlier.							
2. Data Value 0.0017 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.118							
For 10% significance level, 0.0017 is not an outlier.							
For 5% significance level, 0.0017 is not an outlier.							
For 1% significance level, 0.0017 is not an outlier.							
Dixon's Outlier Test for Cobalt (mw-69)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0054 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.316							
For 10% significance level, 0.0054 is not an outlier.							
For 5% significance level, 0.0054 is not an outlier.							
For 1% significance level, 0.0054 is not an outlier.							
2. Data Value 0.0027 is a Potential Outlier (Lower Tail)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Test Statistic: 0.381									
For 10% significance level, 0.0027 is not an outlier.									
For 5% significance level, 0.0027 is not an outlier.									
For 1% significance level, 0.0027 is not an outlier.									
Dixon's Outlier Test for Cobalt (mw-70)									
Total N = 18									
Number NDs = 2									
Number Detects = 16									
10% critical value: 0.454									
5% critical value: 0.507									
1% critical value: 0.595									
Note: NDs excluded from Outlier Test									
1. Data Value 0.0077 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.109									
For 10% significance level, 0.0077 is not an outlier.									
For 5% significance level, 0.0077 is not an outlier.									
For 1% significance level, 0.0077 is not an outlier.									
2. Data Value 0.0022 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.180									
For 10% significance level, 0.0022 is not an outlier.									
For 5% significance level, 0.0022 is not an outlier.									
For 1% significance level, 0.0022 is not an outlier.									
No Outlier Test for Lead (background)									
No Outlier Test for Lead (mw-66)									
No Outlier Test for Lead (mw-67)									
No Outlier Test for Lead (mw-68)									
No Outlier Test for Lead (mw-69)									
No Outlier Test for Lead (mw-70)									
Rosner's Outlier Test for 1 Outliers in Lithium (background)									
Total N	45								
Number NDs	6								
Number Detects	39								
Mean of Detects	0.337								

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

SD of Detects			0.0605									
Number of data			39									
Number of suspected outliers			1									
s not included in the following:												
			Potential	Obs.	Test	Critical	Critical					
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)					
1	0.337	0.0597	0.21	12	2.126	3.03	3.37					
For 5% Significance Level, there is no Potential Outlier												
For 1% Significance Level, there is no Potential Outlier												
Dixon's Outlier Test for Lithium (mw-66)												
Total N = 18												
Number NDs = 1												
Number Detects = 17												
10% critical value: 0.438												
5% critical value: 0.49												
1% critical value: 0.577												
Note: NDs excluded from Outlier Test												
1. Data Value 0.5 is a Potential Outlier (Upper Tail)?												
Test Statistic: 0.636												
For 10% significance level, 0.5 is an outlier.												
For 5% significance level, 0.5 is an outlier.												
For 1% significance level, 0.5 is an outlier.												
2. Data Value 0.24 is a Potential Outlier (Lower Tail)?												
Test Statistic: 0.333												
For 10% significance level, 0.24 is not an outlier.												
For 5% significance level, 0.24 is not an outlier.												
For 1% significance level, 0.24 is not an outlier.												
Dixon's Outlier Test for Lithium (mw-67)												
Total N = 18												
Number NDs = 1												
Number Detects = 17												
10% critical value: 0.438												
5% critical value: 0.49												
1% critical value: 0.577												
Note: NDs excluded from Outlier Test												
1. Data Value 0.55 is a Potential Outlier (Upper Tail)												
Test Statistic: 0.250												

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.55 is not an outlier.							
For 5% significance level, 0.55 is not an outlier.							
For 1% significance level, 0.55 is not an outlier.							
2. Data Value 0.25 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.250							
For 10% significance level, 0.25 is not an outlier.							
For 5% significance level, 0.25 is not an outlier.							
For 1% significance level, 0.25 is not an outlier.							
Dixon's Outlier Test for Lithium (mw-68)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.4 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.182							
For 10% significance level, 0.4 is not an outlier.							
For 5% significance level, 0.4 is not an outlier.							
For 1% significance level, 0.4 is not an outlier.							
2. Data Value 0.22 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.438							
For 10% significance level, 0.22 is not an outlier.							
For 5% significance level, 0.22 is not an outlier.							
For 1% significance level, 0.22 is not an outlier.							
Dixon's Outlier Test for Lithium (mw-69)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.52 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.143							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.52 is not an outlier.							
For 5% significance level, 0.52 is not an outlier.							
For 1% significance level, 0.52 is not an outlier.							
2. Data Value 0.27 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.182							
For 10% significance level, 0.27 is not an outlier.							
For 5% significance level, 0.27 is not an outlier.							
For 1% significance level, 0.27 is not an outlier.							
Dixon's Outlier Test for Lithium (mw-70)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.35 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.167							
For 10% significance level, 0.35 is not an outlier.							
For 5% significance level, 0.35 is not an outlier.							
For 1% significance level, 0.35 is not an outlier.							
2. Data Value 0.28 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.167							
For 10% significance level, 0.28 is not an outlier.							
For 5% significance level, 0.28 is not an outlier.							
For 1% significance level, 0.28 is not an outlier.							
No Outlier Test for Mercury (background)							
No Outlier Test for Mercury (mw-66)							
No Outlier Test for Mercury (mw-67)							
No Outlier Test for Mercury (mw-68)							
No Outlier Test for Mercury (mw-69)							
No Outlier Test for Mercury (mw-70)							
Dixon's Outlier Test for Molybdenum (background)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N = 45							
Number NDs = 22							
Number Detects = 23							
10% critical value: 0.374							
5% critical value: 0.421							
1% critical value: 0.505							
Note: NDs excluded from Outlier Test							
1. Data Value 0.011 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.099							
For 10% significance level, 0.011 is not an outlier.							
For 5% significance level, 0.011 is not an outlier.							
For 1% significance level, 0.011 is not an outlier.							
2. Data Value 0.00062 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.027							
For 10% significance level, 0.00062 is not an outlier.							
For 5% significance level, 0.00062 is not an outlier.							
For 1% significance level, 0.00062 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-66)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.039 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.615							
For 10% significance level, 0.039 is an outlier.							
For 5% significance level, 0.039 is an outlier.							
For 1% significance level, 0.039 is an outlier.							
2. Data Value 0.01 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.231							
For 10% significance level, 0.01 is not an outlier.							
For 5% significance level, 0.01 is not an outlier.							
For 1% significance level, 0.01 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-67)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.063 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.680							
For 10% significance level, 0.063 is an outlier.							
For 5% significance level, 0.063 is an outlier.							
For 1% significance level, 0.063 is an outlier.							
2. Data Value 0.037 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.111							
For 10% significance level, 0.037 is not an outlier.							
For 5% significance level, 0.037 is not an outlier.							
For 1% significance level, 0.037 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-68)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.012 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.323							
For 10% significance level, 0.012 is not an outlier.							
For 5% significance level, 0.012 is not an outlier.							
For 1% significance level, 0.012 is not an outlier.							
2. Data Value 0.0051 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.143							
For 10% significance level, 0.0051 is not an outlier.							
For 5% significance level, 0.0051 is not an outlier.							
For 1% significance level, 0.0051 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-69)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.017 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.333							
For 10% significance level, 0.017 is not an outlier.							
For 5% significance level, 0.017 is not an outlier.							
For 1% significance level, 0.017 is not an outlier.							
2. Data Value 0.013 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.333							
For 10% significance level, 0.013 is not an outlier.							
For 5% significance level, 0.013 is not an outlier.							
For 1% significance level, 0.013 is not an outlier.							
Dixon's Outlier Test for Molybdenum (mw-70)							
Total N = 18							
Number NDs = 1							
Number Detects = 17							
10% critical value: 0.438							
5% critical value: 0.49							
1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.027 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.744							
For 10% significance level, 0.027 is an outlier.							
For 5% significance level, 0.027 is an outlier.							
For 1% significance level, 0.027 is an outlier.							
2. Data Value 0.0026 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.143							
For 10% significance level, 0.0026 is not an outlier.							
For 5% significance level, 0.0026 is not an outlier.							
For 1% significance level, 0.0026 is not an outlier.							
Rosner's Outlier Test for 1 Outliers in Selenium (background)							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

Total N		45						
Number NDs		1						
Number Detects		44						
Mean of Detects		0.147						
SD of Detects		0.101						
Number of data		44						
Number of suspected outliers		1						
s not included in the following:								
			Potential	Obs.	Test	Critical	Critical	
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)	
1	0.147	0.1	0.39	4	2.424	3.08	3.43	
For 5% Significance Level, there is no Potential Outlier								
For 1% Significance Level, there is no Potential Outlier								
Dixon's Outlier Test for Selenium (mw-66)								
Total N = 18								
Number NDs = 7								
Number Detects = 11								
10% critical value: 0.517								
5% critical value: 0.576								
1% critical value: 0.679								
Note: NDs excluded from Outlier Test								
1. Data Value 0.11 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.996								
For 10% significance level, 0.11 is an outlier.								
For 5% significance level, 0.11 is an outlier.								
For 1% significance level, 0.11 is an outlier.								
2. Data Value 0.0016 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.333								
For 10% significance level, 0.0016 is not an outlier.								
For 5% significance level, 0.0016 is not an outlier.								
For 1% significance level, 0.0016 is not an outlier.								
Dixon's Outlier Test for Selenium (mw-67)								
Total N = 18								
Number NDs = 1								
Number Detects = 17								
10% critical value: 0.438								
5% critical value: 0.49								

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

1% critical value: 0.577							
Note: NDs excluded from Outlier Test							
1. Data Value 0.068 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.115							
For 10% significance level, 0.068 is not an outlier.							
For 5% significance level, 0.068 is not an outlier.							
For 1% significance level, 0.068 is not an outlier.							
2. Data Value 0.0053 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.189							
For 10% significance level, 0.0053 is not an outlier.							
For 5% significance level, 0.0053 is not an outlier.							
For 1% significance level, 0.0053 is not an outlier.							
Dixon's Outlier Test for Selenium (mw-68)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 0.37 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.308							
For 10% significance level, 0.37 is not an outlier.							
For 5% significance level, 0.37 is not an outlier.							
For 1% significance level, 0.37 is not an outlier.							
2. Data Value 0.045 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.265							
For 10% significance level, 0.045 is not an outlier.							
For 5% significance level, 0.045 is not an outlier.							
For 1% significance level, 0.045 is not an outlier.							
Dixon's Outlier Test for Selenium (mw-69)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

1% critical value: 0.561									
Note: NDs excluded from Outlier Test									
1. Data Value 0.023 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.333									
For 10% significance level, 0.023 is not an outlier.									
For 5% significance level, 0.023 is not an outlier.									
For 1% significance level, 0.023 is not an outlier.									
2. Data Value 0.01 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.111									
For 10% significance level, 0.01 is not an outlier.									
For 5% significance level, 0.01 is not an outlier.									
For 1% significance level, 0.01 is not an outlier.									
Dixon's Outlier Test for Selenium (mw-70)									
Total N = 18									
Number NDs = 0									
Number Detects = 18									
10% critical value: 0.424									
5% critical value: 0.475									
1% critical value: 0.561									
Note: NDs excluded from Outlier Test									
1. Data Value 0.26 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.300									
For 10% significance level, 0.26 is not an outlier.									
For 5% significance level, 0.26 is not an outlier.									
For 1% significance level, 0.26 is not an outlier.									
2. Data Value 0.13 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.300									
For 10% significance level, 0.13 is not an outlier.									
For 5% significance level, 0.13 is not an outlier.									
For 1% significance level, 0.13 is not an outlier.									
Rosner's Outlier Test for 1 Outliers in Thallium (background)									
Total N	45								
Number NDs	20								
Number Detects	25								
Mean of Detects	6.3160E-4								

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

SD of Detects		3.2636E-4							
Number of data		25							
Number of suspected outliers		1							
s not included in the following:									
			Potential	Obs.	Test	Critical	Critical		
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)		
1	3.3160E-4	3.1977E-4	0.0011	17	1.465	2.82	3.14		
For 5% Significance Level, there is no Potential Outlier									
For 1% Significance Level, there is no Potential Outlier									
Dixon's Outlier Test for Thallium (mw-66)									
Total N = 18									
Number NDs = 4									
Number Detects = 14									
10% critical value: 0.492									
5% critical value: 0.546									
1% critical value: 0.641									
Note: NDs excluded from Outlier Test									
1. Data Value 0.0025 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.841									
For 10% significance level, 0.0025 is an outlier.									
For 5% significance level, 0.0025 is an outlier.									
For 1% significance level, 0.0025 is an outlier.									
2. Data Value 0.00033 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.081									
For 10% significance level, 0.00033 is not an outlier.									
For 5% significance level, 0.00033 is not an outlier.									
For 1% significance level, 0.00033 is not an outlier.									
Dixon's Outlier Test for Thallium (mw-67)									
Total N = 18									
Number NDs = 4									
Number Detects = 14									
10% critical value: 0.492									
5% critical value: 0.546									
1% critical value: 0.641									
Note: NDs excluded from Outlier Test									
1. Data Value 0.00074 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.300									

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.00074 is not an outlier.							
For 5% significance level, 0.00074 is not an outlier.							
For 1% significance level, 0.00074 is not an outlier.							
2. Data Value 0.00031 is a Potential Outlier (Lower T							
Test Statistic: 0.097							
For 10% significance level, 0.00031 is not an outlier.							
For 5% significance level, 0.00031 is not an outlier.							
For 1% significance level, 0.00031 is not an outlier.							
Dixon's Outlier Test for Thallium (mw-68)							
Total N = 18							
Number NDs = 3							
Number Detects = 15							
10% critical value: 0.472							
5% critical value: 0.525							
1% critical value: 0.616							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00093 is a Potential Outlier (Upper T							
Test Statistic: 0.294							
For 10% significance level, 0.00093 is not an outlier.							
For 5% significance level, 0.00093 is not an outlier.							
For 1% significance level, 0.00093 is not an outlier.							
2. Data Value 0.00048 is a Potential Outlier (Lower T							
Test Statistic: 0.314							
For 10% significance level, 0.00048 is not an outlier.							
For 5% significance level, 0.00048 is not an outlier.							
For 1% significance level, 0.00048 is not an outlier.							
Dixon's Outlier Test for Thallium (mw-69)							
Total N = 18							
Number NDs = 9							
Number Detects = 9							
10% critical value: 0.441							
5% critical value: 0.512							
1% critical value: 0.635							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00047 is a Potential Outlier (Upper T							
Test Statistic: 0.500							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.00047 is an outlier.							
For 5% significance level, 0.00047 is not an outlier.							
For 1% significance level, 0.00047 is not an outlier.							
2. Data Value 0.00014 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.167							
For 10% significance level, 0.00014 is not an outlier.							
For 5% significance level, 0.00014 is not an outlier.							
For 1% significance level, 0.00014 is not an outlier.							
Dixon's Outlier Test for Thallium (mw-70)							
Total N = 18							
Number NDs = 9							
Number Detects = 9							
10% critical value: 0.441							
5% critical value: 0.512							
1% critical value: 0.635							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00057 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.368							
For 10% significance level, 0.00057 is not an outlier.							
For 5% significance level, 0.00057 is not an outlier.							
For 1% significance level, 0.00057 is not an outlier.							
2. Data Value 0.00027 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.478							
For 10% significance level, 0.00027 is an outlier.							
For 5% significance level, 0.00027 is not an outlier.							
For 1% significance level, 0.00027 is not an outlier.							
Dixon's Outlier Test for Fluoride (background)							
Total N = 46							
Number NDs = 43							
Number Detects = 3							
10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.44 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.500							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 0.44 is not an outlier.							
For 5% significance level, 0.44 is not an outlier.							
For 1% significance level, 0.44 is not an outlier.							
2. Data Value 0.2 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.500							
For 10% significance level, 0.2 is not an outlier.							
For 5% significance level, 0.2 is not an outlier.							
For 1% significance level, 0.2 is not an outlier.							
Dixon's Outlier Test for Fluoride (mw-66)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 41 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.652							
For 10% significance level, 41 is an outlier.							
For 5% significance level, 41 is an outlier.							
For 1% significance level, 41 is an outlier.							
2. Data Value 17 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.111							
For 10% significance level, 17 is not an outlier.							
For 5% significance level, 17 is not an outlier.							
For 1% significance level, 17 is not an outlier.							
Dixon's Outlier Test for Fluoride (mw-67)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 37 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.600							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 37 is an outlier.							
For 5% significance level, 37 is an outlier.							
For 1% significance level, 37 is an outlier.							
2. Data Value 15 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.200							
For 10% significance level, 15 is not an outlier.							
For 5% significance level, 15 is not an outlier.							
For 1% significance level, 15 is not an outlier.							
Dixon's Outlier Test for Fluoride (mw-68)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 14 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.417							
For 10% significance level, 14 is not an outlier.							
For 5% significance level, 14 is not an outlier.							
For 1% significance level, 14 is not an outlier.							
2. Data Value 5.5 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.236							
For 10% significance level, 5.5 is not an outlier.							
For 5% significance level, 5.5 is not an outlier.							
For 1% significance level, 5.5 is not an outlier.							
Dixon's Outlier Test for Fluoride (mw-69)							
Total N = 18							
Number NDs = 0							
Number Detects = 18							
10% critical value: 0.424							
5% critical value: 0.475							
1% critical value: 0.561							
Note: NDs excluded from Outlier Test							
1. Data Value 29 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.500							

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

For 10% significance level, 29 is an outlier.									
For 5% significance level, 29 is an outlier.									
For 1% significance level, 29 is not an outlier.									
2. Data Value 9.6 is a Potential Outlier (Lower Tail)?									
Test Statistic: 0.135									
For 10% significance level, 9.6 is not an outlier.									
For 5% significance level, 9.6 is not an outlier.									
For 1% significance level, 9.6 is not an outlier.									
Dixon's Outlier Test for Fluoride (mw-70)									
Total N = 18									
Number NDs = 4									
Number Detects = 14									
10% critical value: 0.492									
5% critical value: 0.546									
1% critical value: 0.641									
Note: NDs excluded from Outlier Test									
1. Data Value 3.2 is a Potential Outlier (Upper Tail)?									
Test Statistic: 0.200									
For 10% significance level, 3.2 is not an outlier.									
For 5% significance level, 3.2 is not an outlier.									
For 1% significance level, 3.2 is not an outlier.									
2. Data Value 0.85 is a Potential Outlier (Lower Tail)?									
Test Statistic: 0.415									
For 10% significance level, 0.85 is not an outlier.									
For 5% significance level, 0.85 is not an outlier.									
For 1% significance level, 0.85 is not an outlier.									
Rosner's Outlier Test for 1 Outliers in Combined Radium (background)									
Total N		46							
Number NDs		6							
Number Detects		40							
Mean of Detects		2.315							
SD of Detects		0.994							
Number of data		40							
Number of suspected outliers		1							
s not included in the following:									

TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

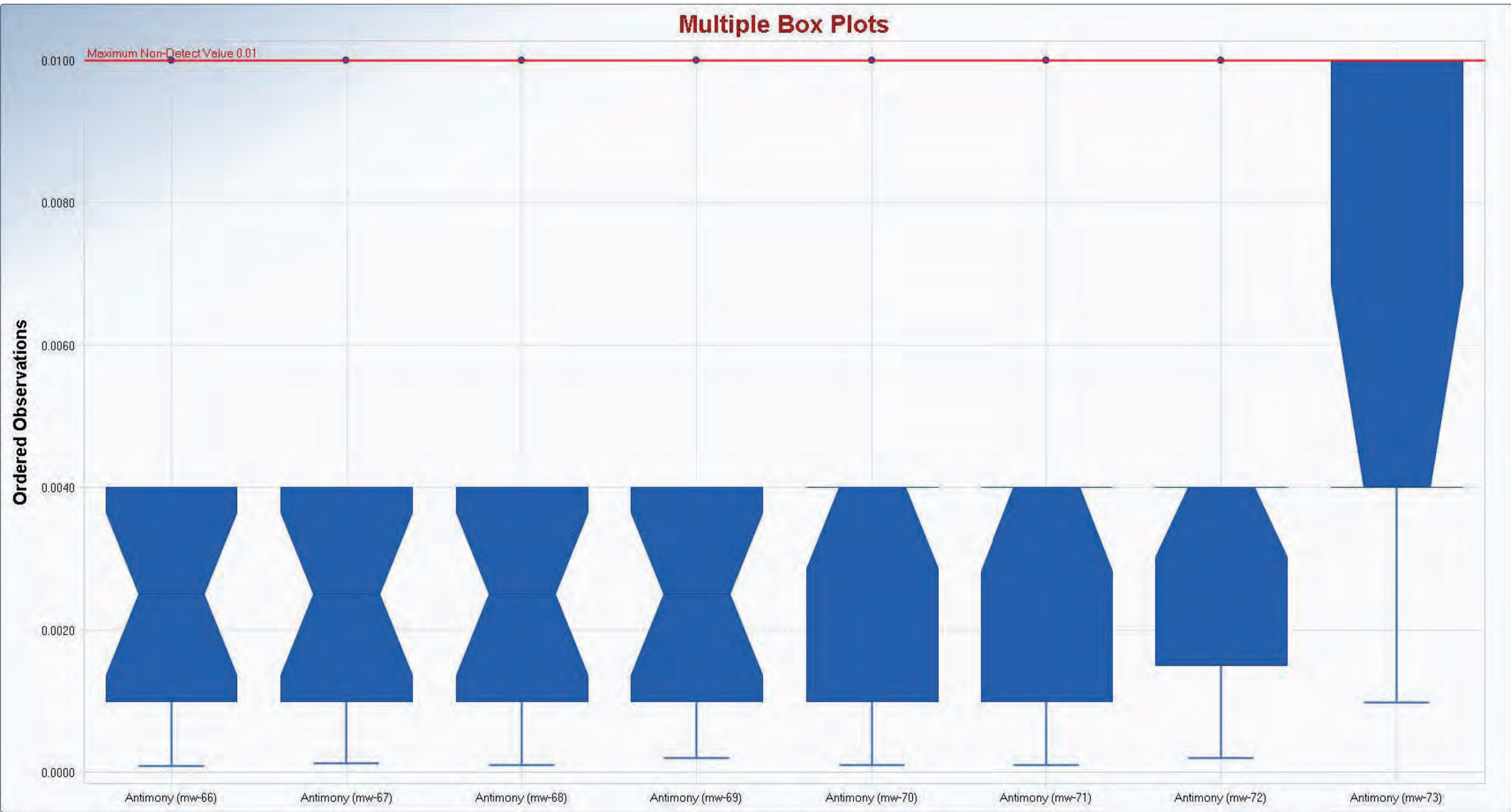
			Potential	Obs.	Test	Critical	Critical				
#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
1	2.315	0.981	4.8	11	2.533	3.04	3.38				
For 5% Significance Level, there is no Potential Outlier											
For 1% Significance Level, there is no Potential Outlier											
Dixon's Outlier Test for CombinedRadium (mw-66)											
Total N = 18											
Number NDs = 1											
Number Detects = 17											
10% critical value: 0.438											
5% critical value: 0.49											
1% critical value: 0.577											
Note: NDs excluded from Outlier Test											
1. Data Value 5.1 is a Potential Outlier (Upper Tail)?											
Test Statistic: 0.333											
For 10% significance level, 5.1 is not an outlier.											
For 5% significance level, 5.1 is not an outlier.											
For 1% significance level, 5.1 is not an outlier.											
2. Data Value 0.4 is a Potential Outlier (Lower Tail)?											
Test Statistic: 0.235											
For 10% significance level, 0.4 is not an outlier.											
For 5% significance level, 0.4 is not an outlier.											
For 1% significance level, 0.4 is not an outlier.											
Dixon's Outlier Test for CombinedRadium (mw-67)											
Total N = 18											
Number NDs = 1											
Number Detects = 17											
10% critical value: 0.438											
5% critical value: 0.49											
1% critical value: 0.577											
Note: NDs excluded from Outlier Test											
1. Data Value 4.2 is a Potential Outlier (Upper Tail)?											
Test Statistic: 0.333											
For 10% significance level, 4.2 is not an outlier.											
For 5% significance level, 4.2 is not an outlier.											
For 1% significance level, 4.2 is not an outlier.											

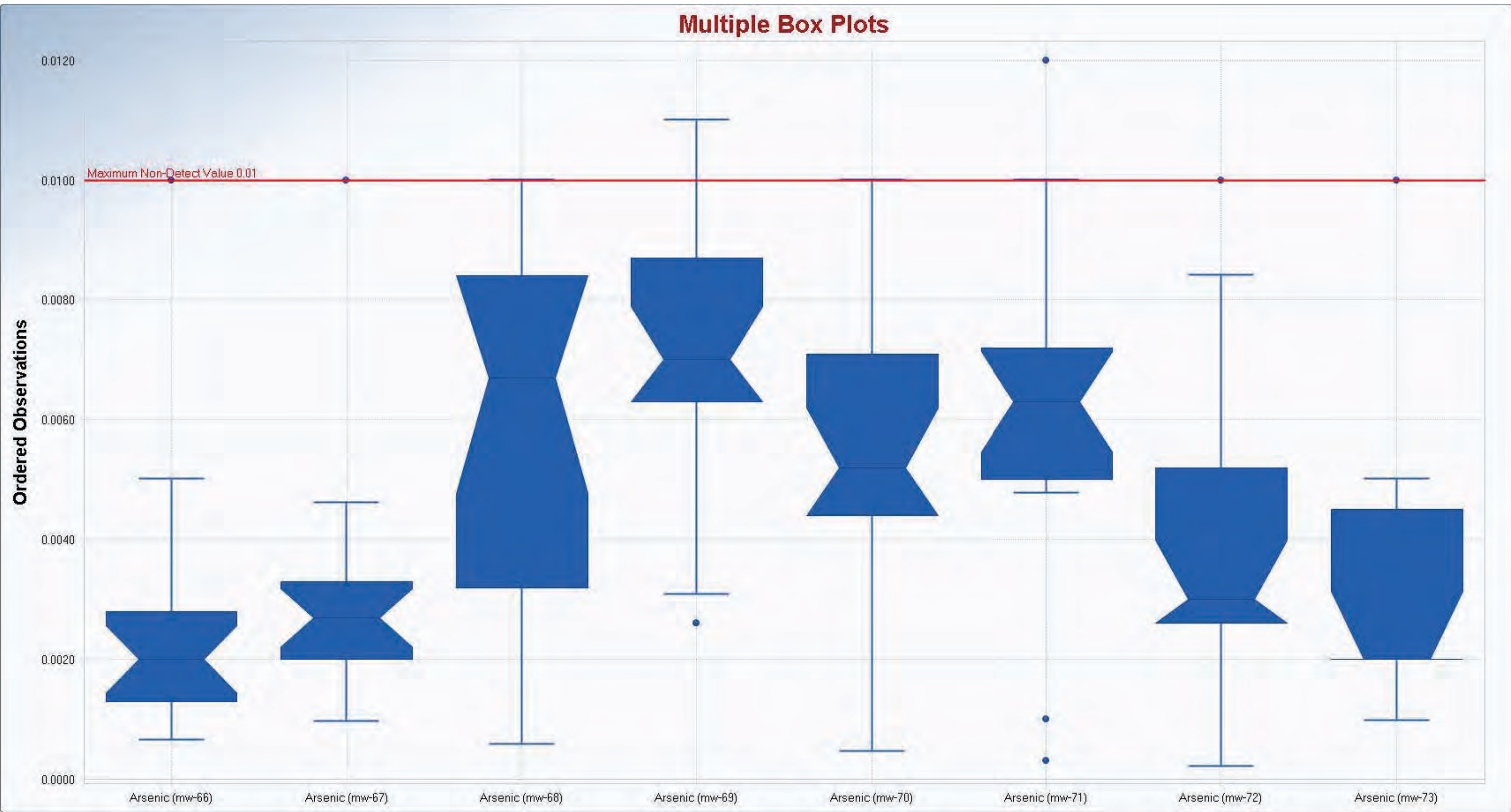
TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

2. Data Value 0.9 is a Potential Outlier (Lower Tail)?								
Test Statistic: 0.250								
For 10% significance level, 0.9 is not an outlier.								
For 5% significance level, 0.9 is not an outlier.								
For 1% significance level, 0.9 is not an outlier.								
Dixon's Outlier Test for Combined Radium (mw-68)								
Total N = 18								
Number NDs = 1								
Number Detects = 17								
10% critical value: 0.438								
5% critical value: 0.49								
1% critical value: 0.577								
Note: NDs excluded from Outlier Test								
1. Data Value 3.8 is a Potential Outlier (Upper Tail)?								
Test Statistic: 0.321								
For 10% significance level, 3.8 is not an outlier.								
For 5% significance level, 3.8 is not an outlier.								
For 1% significance level, 3.8 is not an outlier.								
2. Data Value 0.6 is a Potential Outlier (Lower Tail)?								
Test Statistic: 0.174								
For 10% significance level, 0.6 is not an outlier.								
For 5% significance level, 0.6 is not an outlier.								
For 1% significance level, 0.6 is not an outlier.								
Dixon's Outlier Test for Combined Radium (mw-69)								
Total N = 18								
Number NDs = 0								
Number Detects = 18								
10% critical value: 0.424								
5% critical value: 0.475								
1% critical value: 0.561								
Note: NDs excluded from Outlier Test								
1. Data Value 6.7 is a Potential Outlier (Upper Tail)?								
Test Statistic: 0.343								
For 10% significance level, 6.7 is not an outlier.								
For 5% significance level, 6.7 is not an outlier.								
For 1% significance level, 6.7 is not an outlier.								

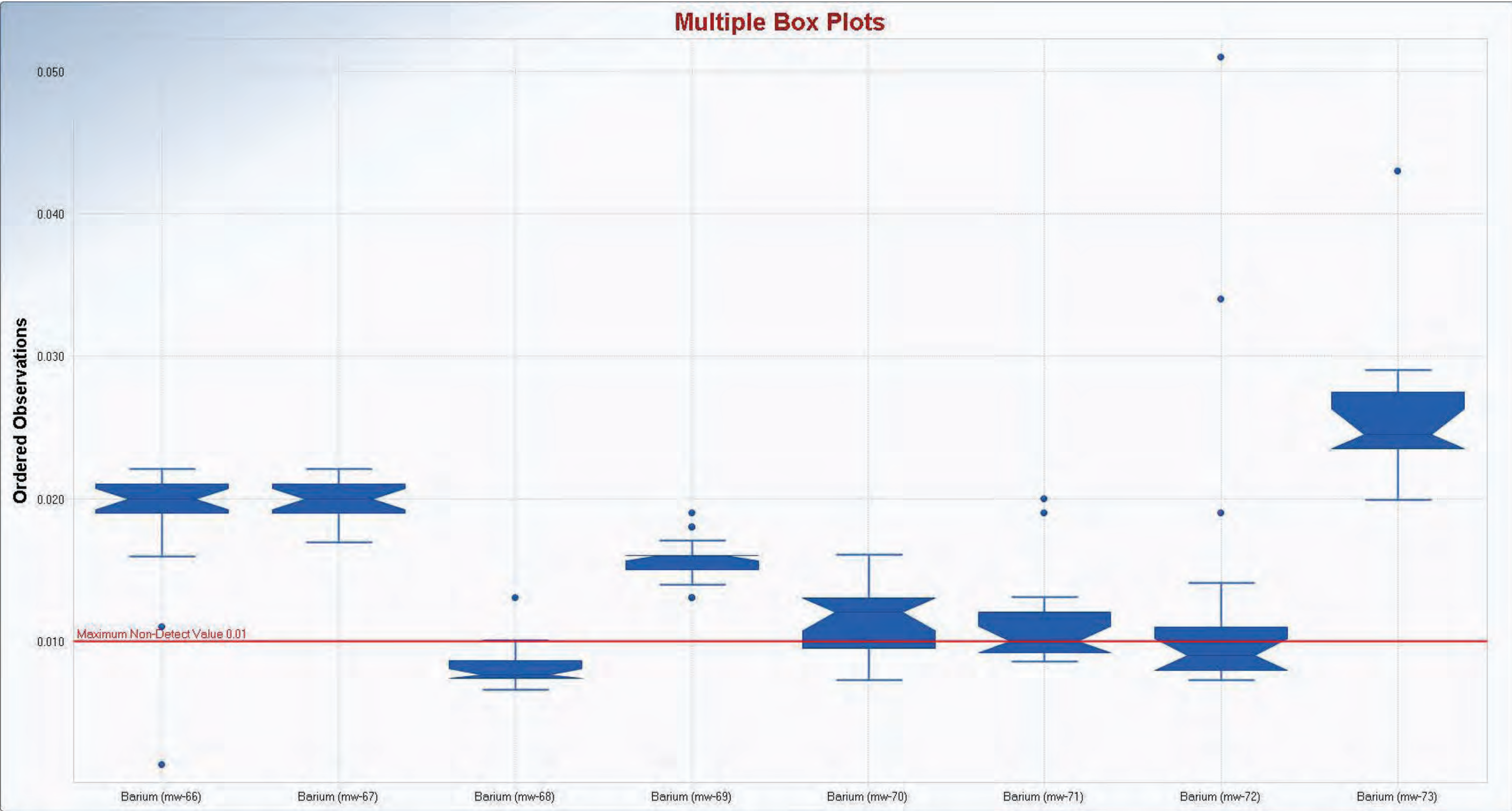
TABLE B-4 *Outputs do not reflect the exploration of outlier exclusion
 URS ProUCL OUTLIER TESTING*

2. Data Value 3.1 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.042							
For 10% significance level, 3.1 is not an outlier.							
For 5% significance level, 3.1 is not an outlier.							
For 1% significance level, 3.1 is not an outlier.							
Dixon's Outlier Test for Combined Radium (mw-70)							
Total N = 18							
Number NDs = 2							
Number Detects = 16							
10% critical value: 0.454							
5% critical value: 0.507							
1% critical value: 0.595							
Note: NDs excluded from Outlier Test							
1. Data Value 3.3 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.389							
For 10% significance level, 3.3 is not an outlier.							
For 5% significance level, 3.3 is not an outlier.							
For 1% significance level, 3.3 is not an outlier.							
2. Data Value 1 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.313							
For 10% significance level, 1 is not an outlier.							
For 5% significance level, 1 is not an outlier.							
For 1% significance level, 1 is not an outlier.							

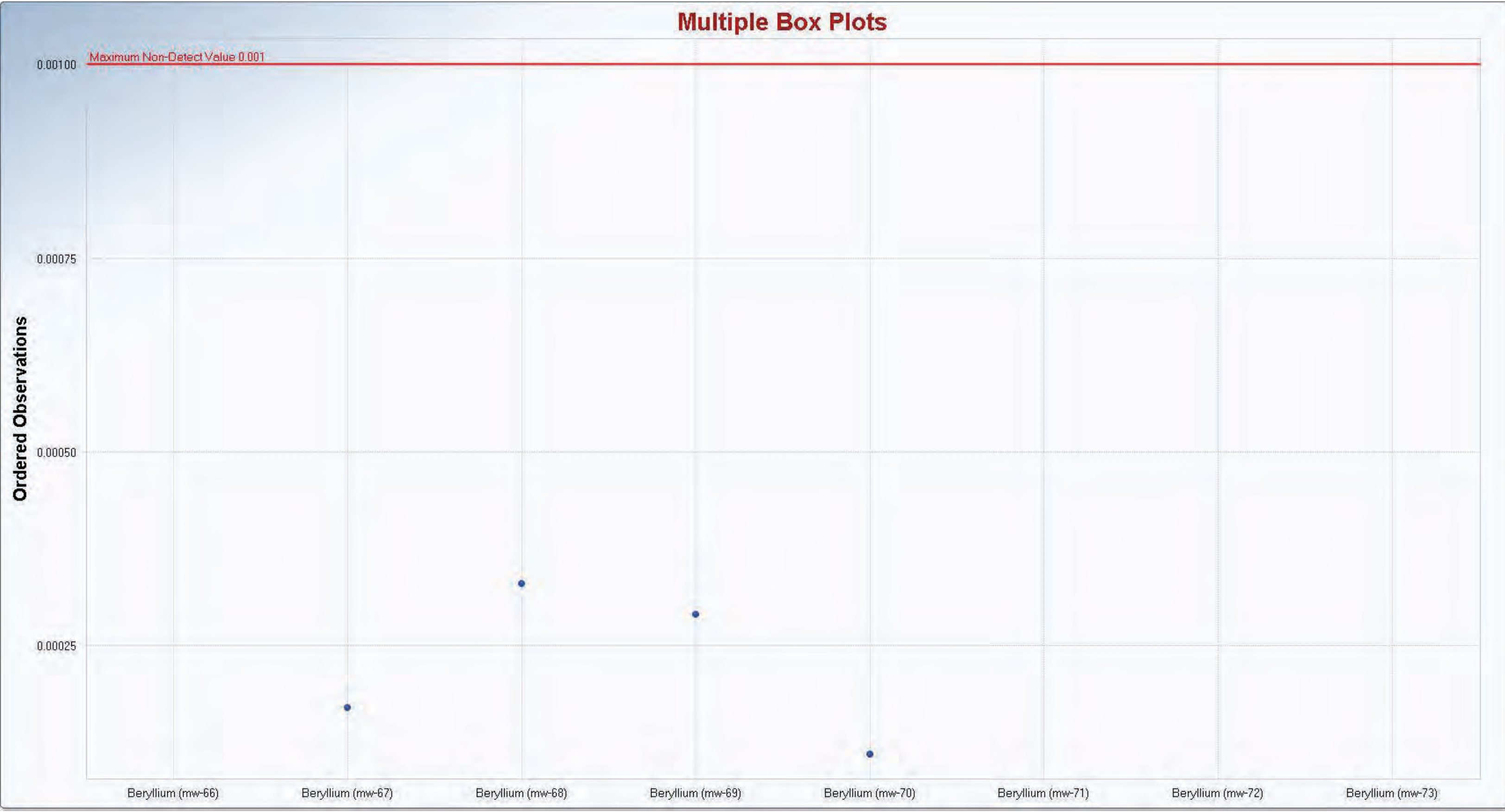


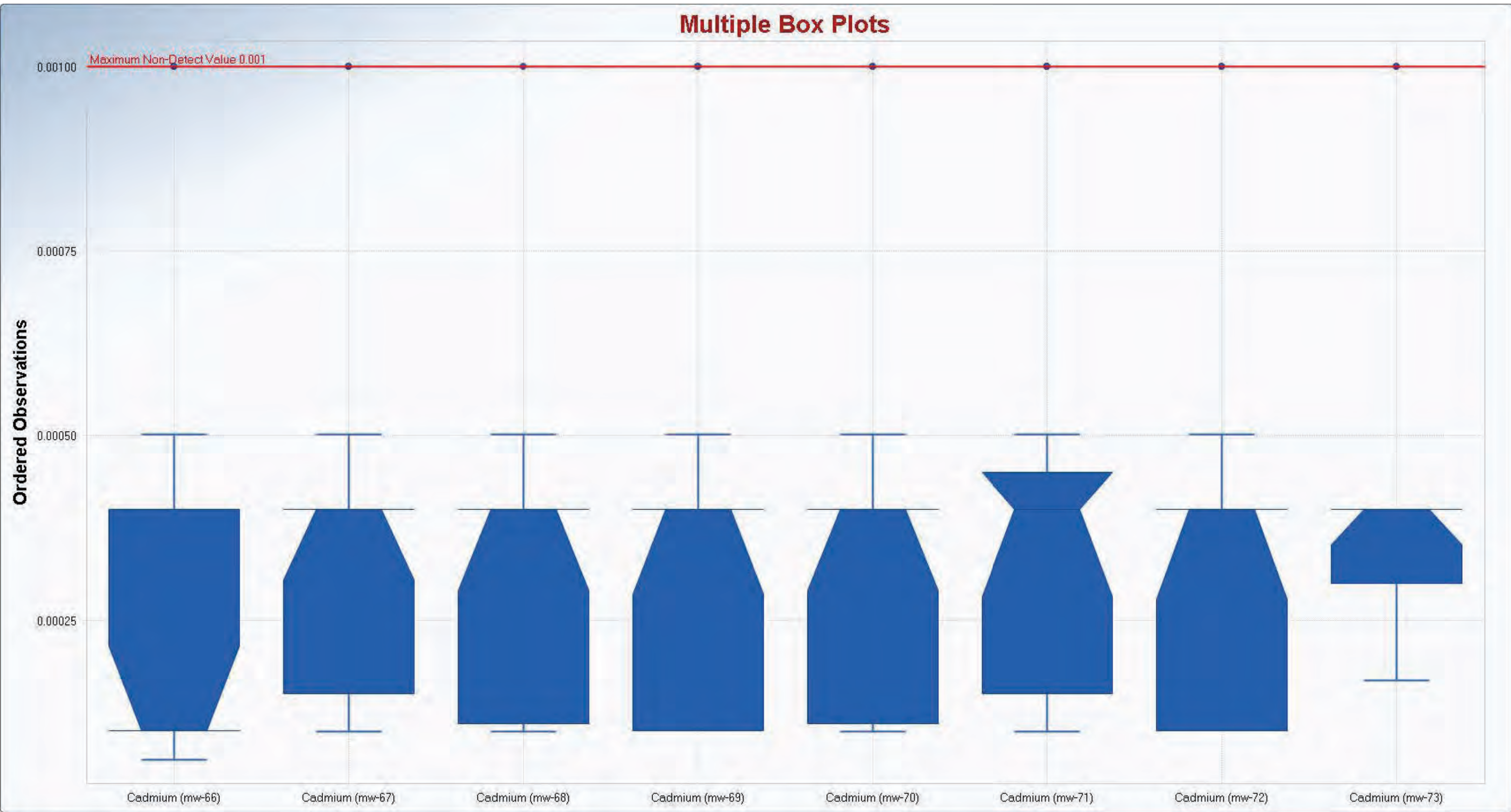


Multiple Box Plots

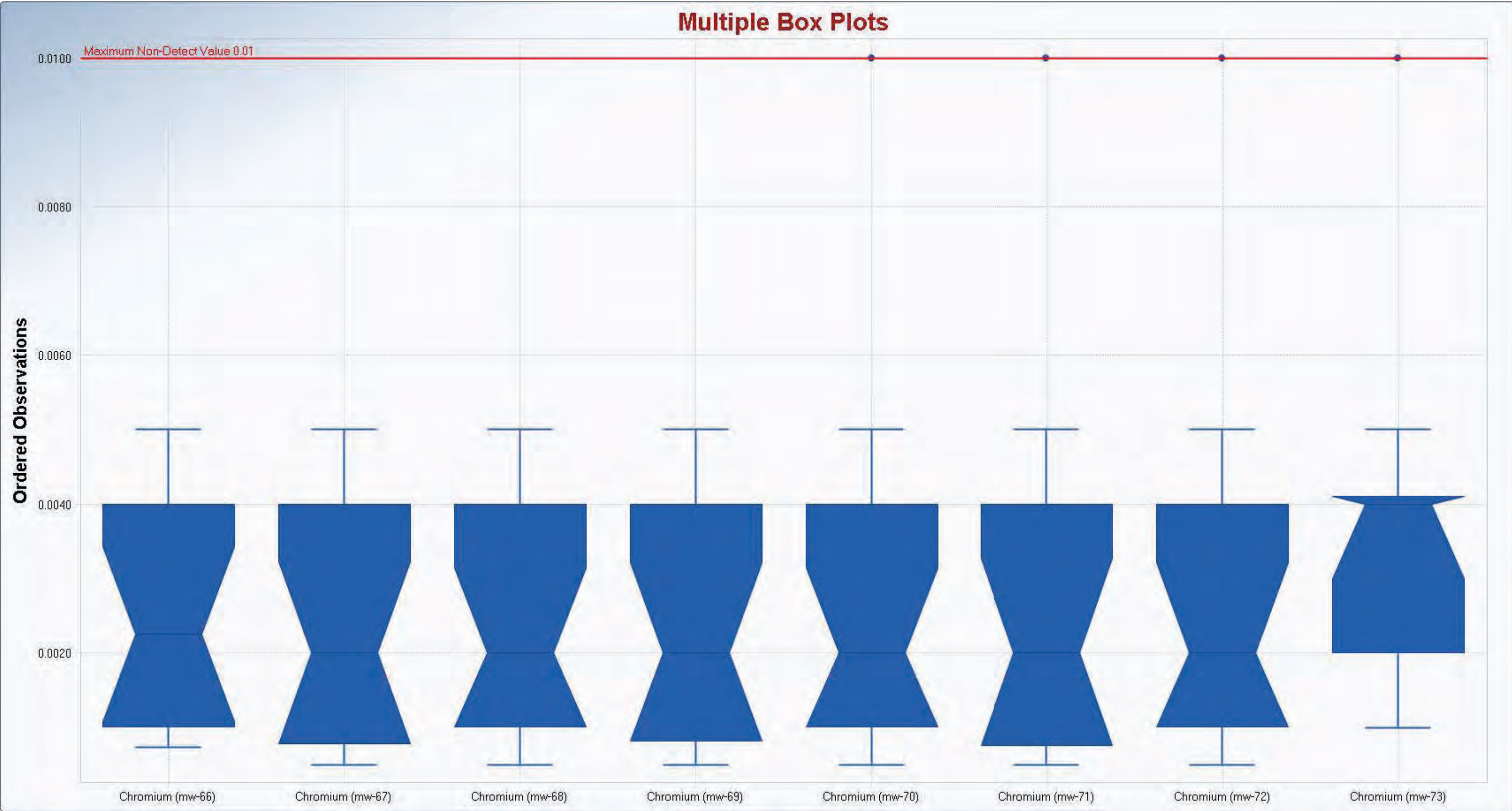


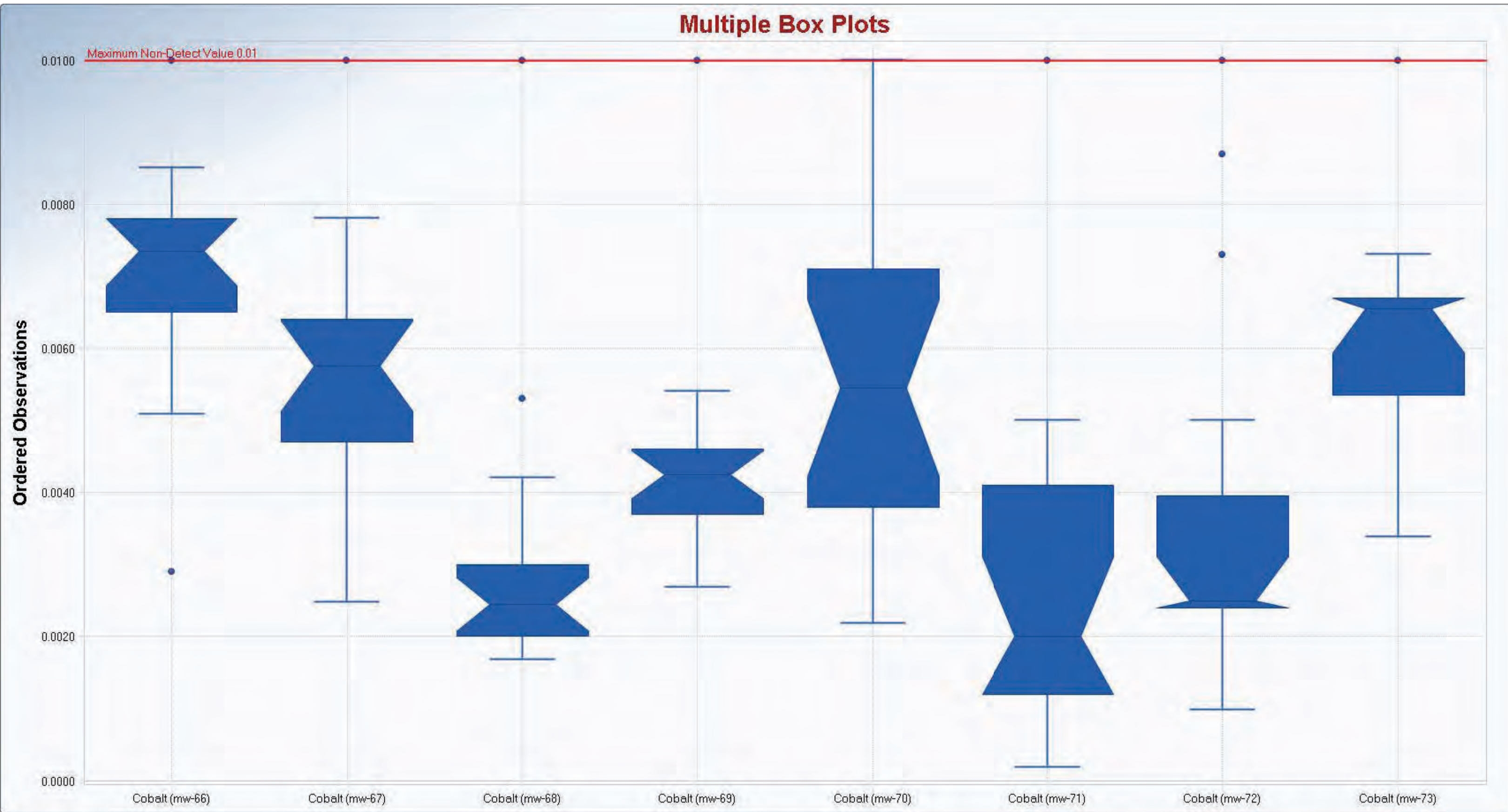
Multiple Box Plots

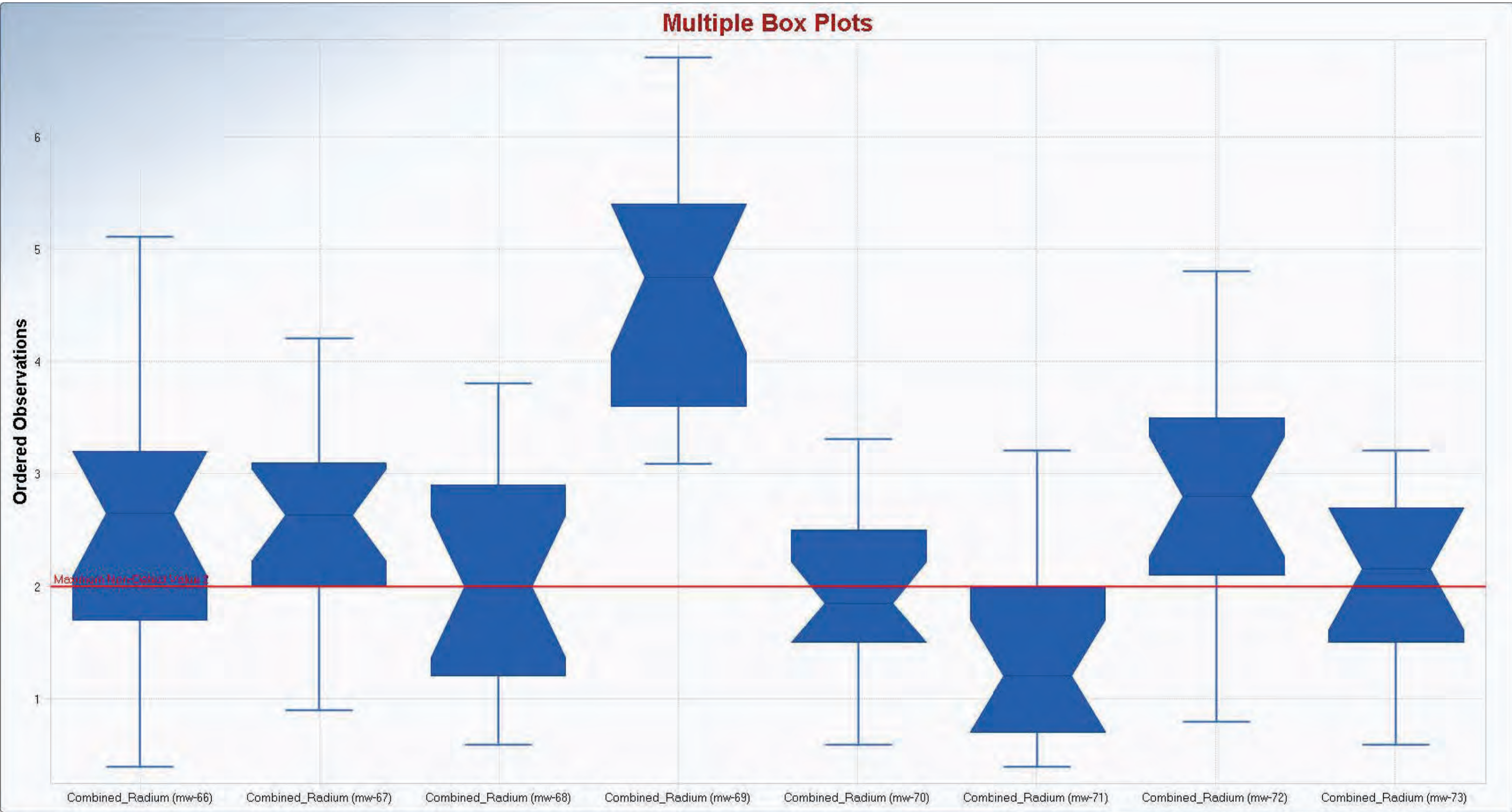


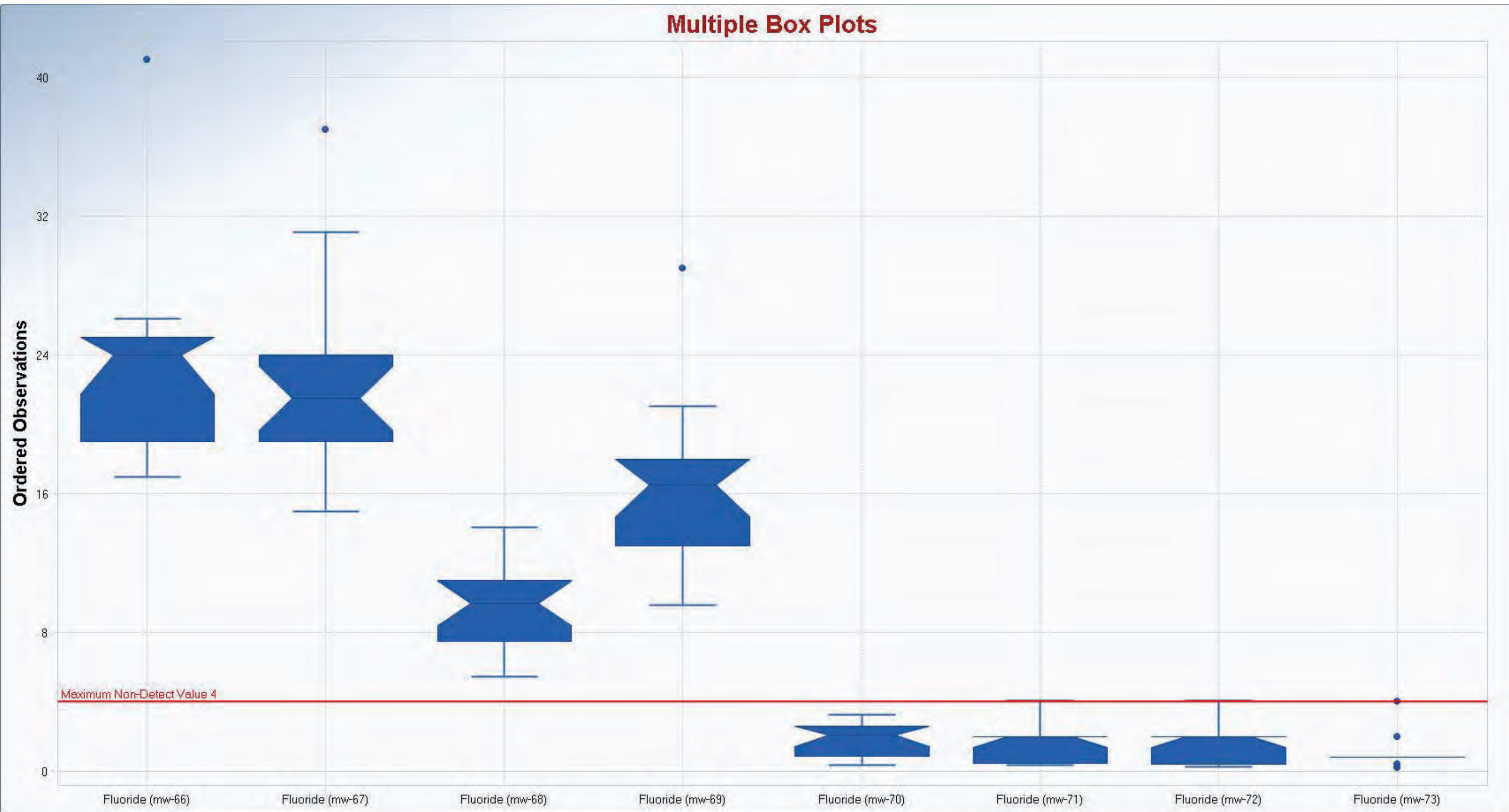


Multiple Box Plots



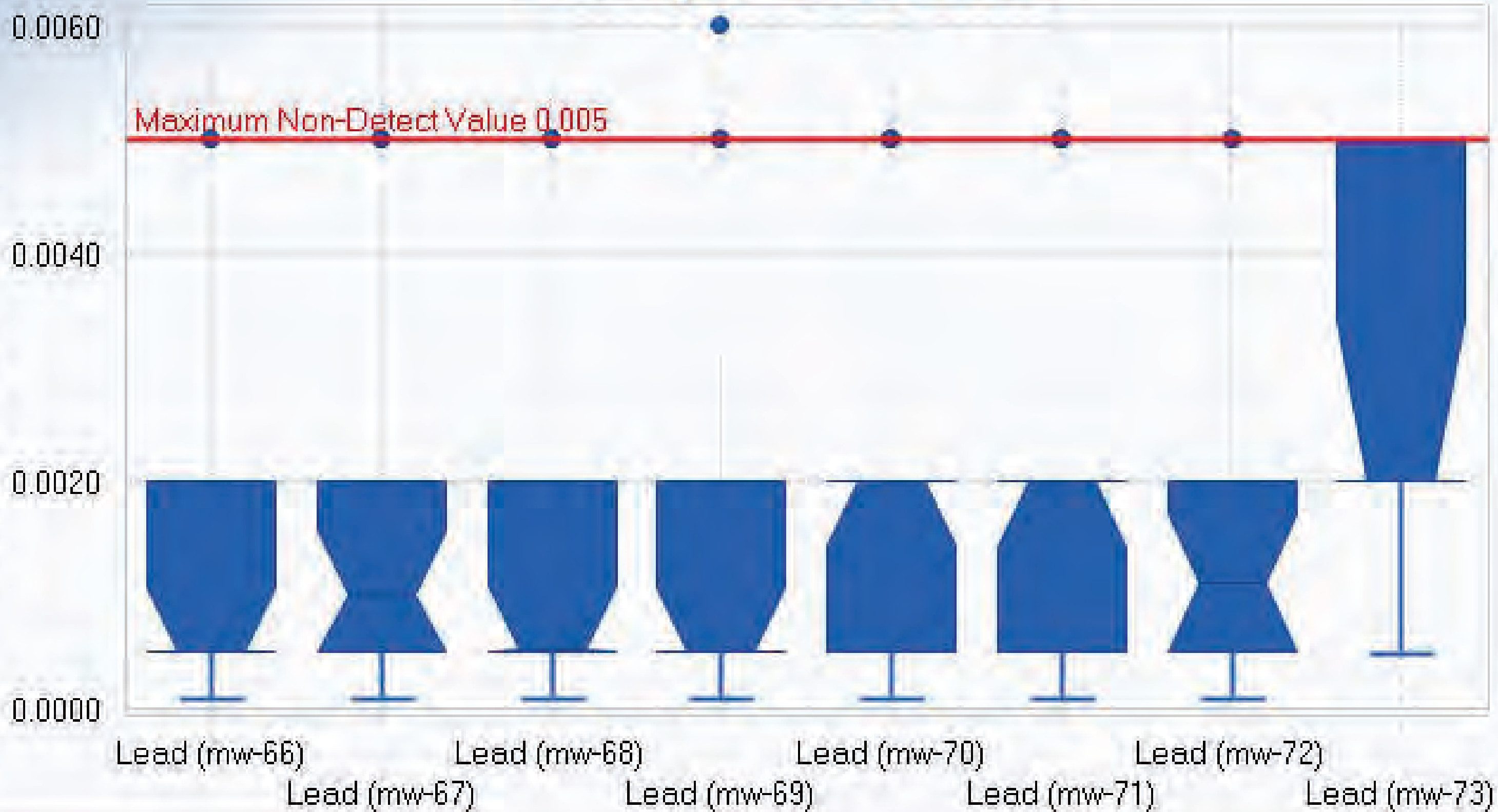


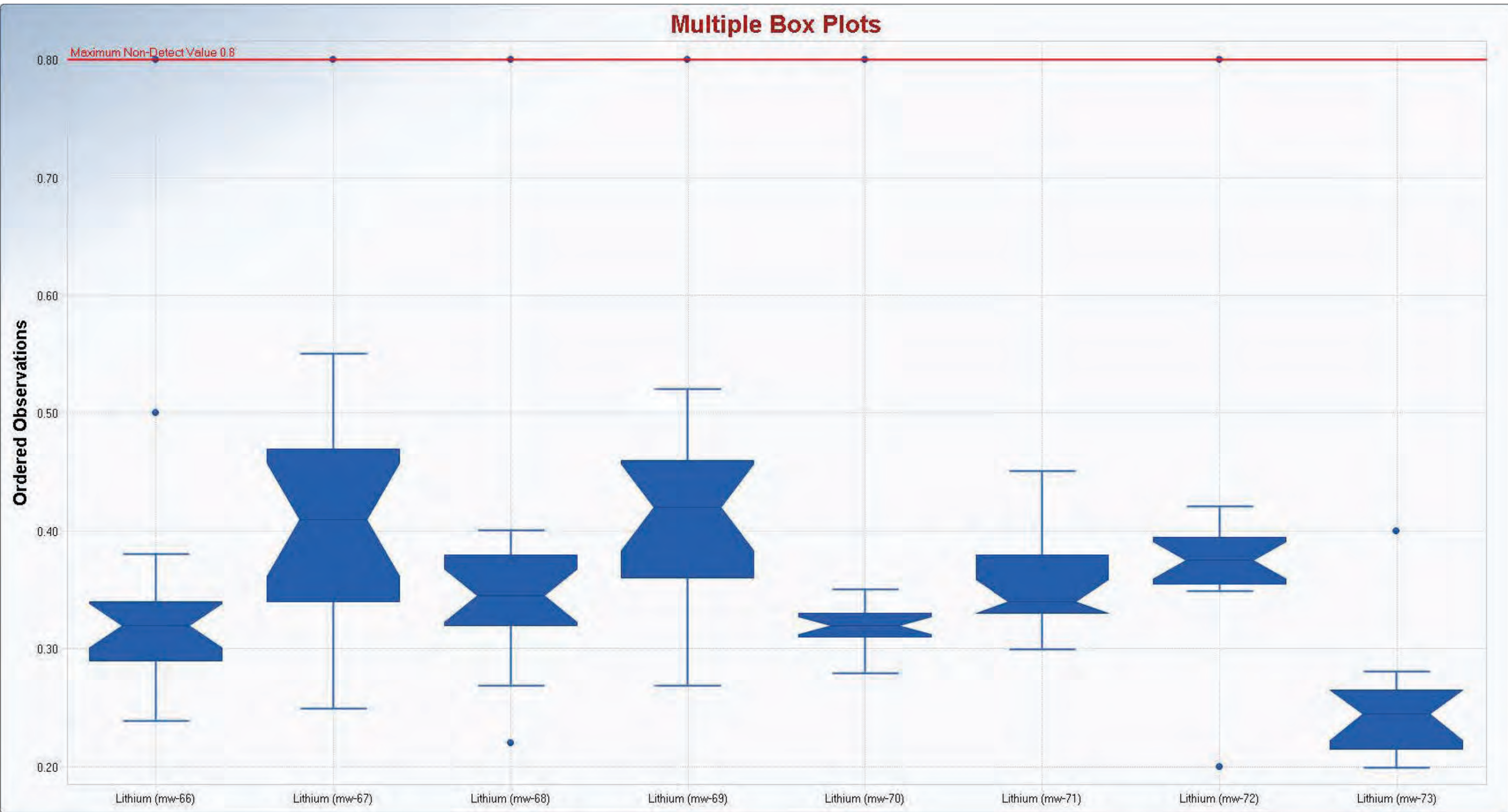


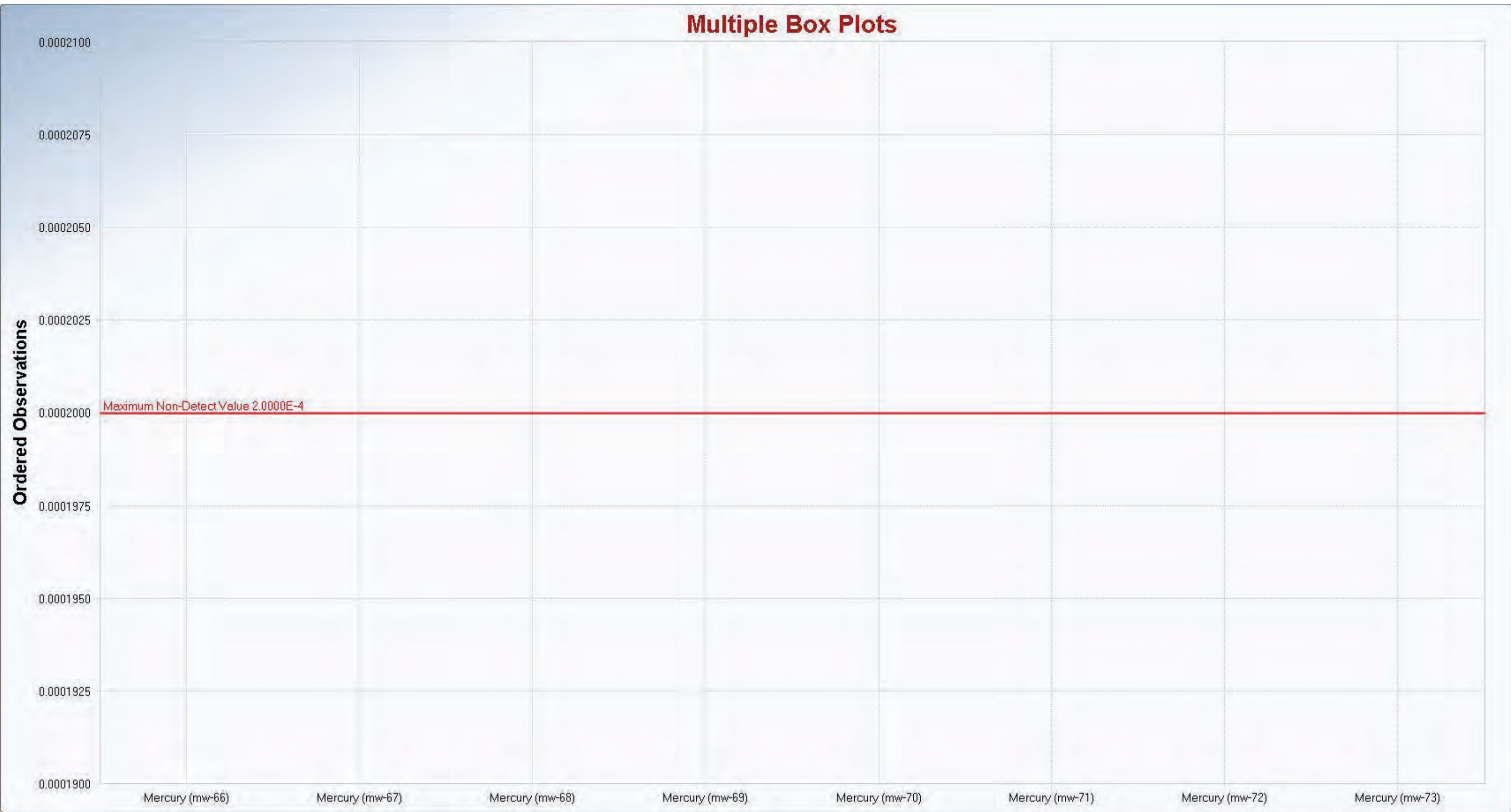


Multiple Box Plots

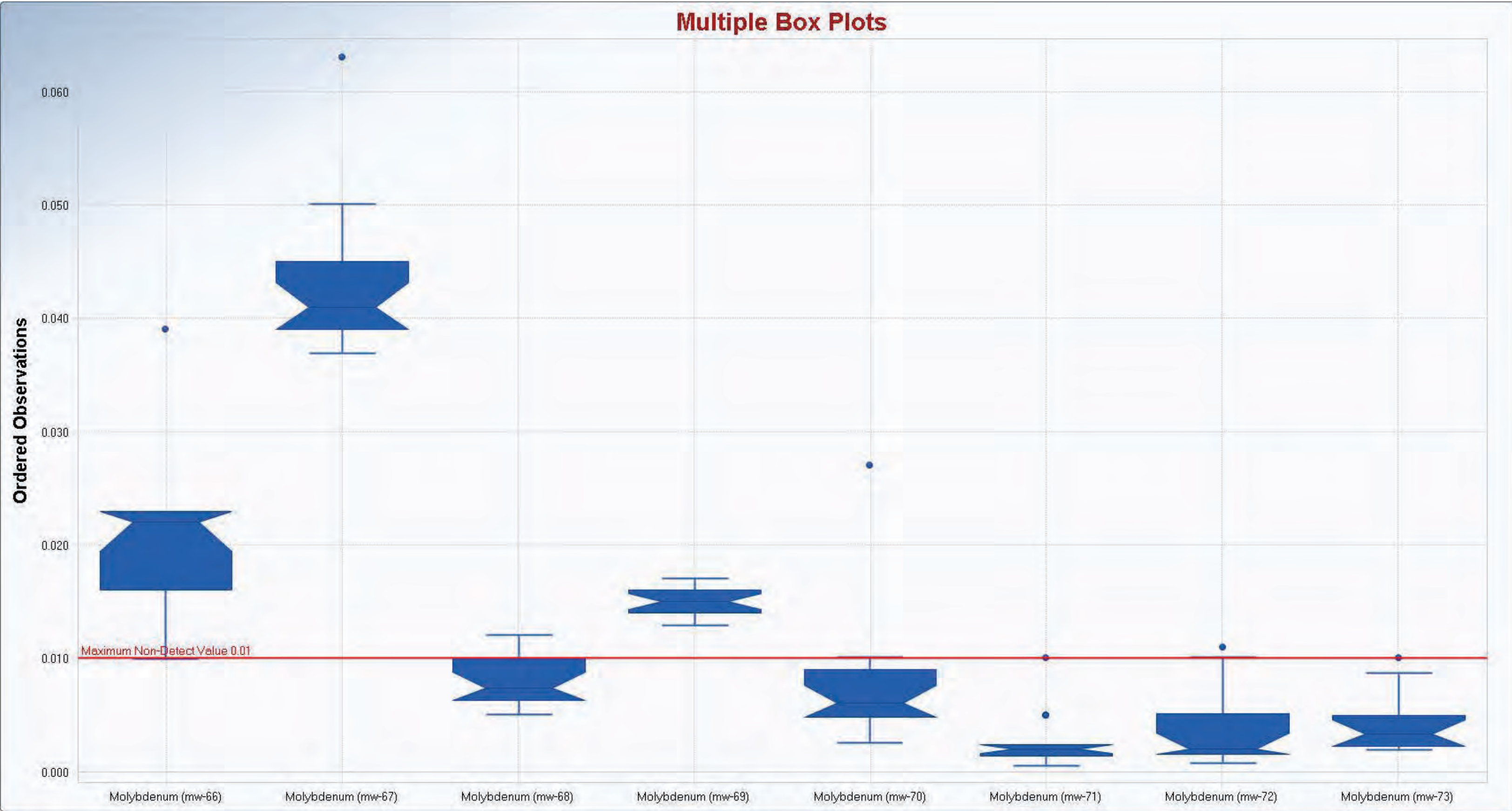
Ordered Observations



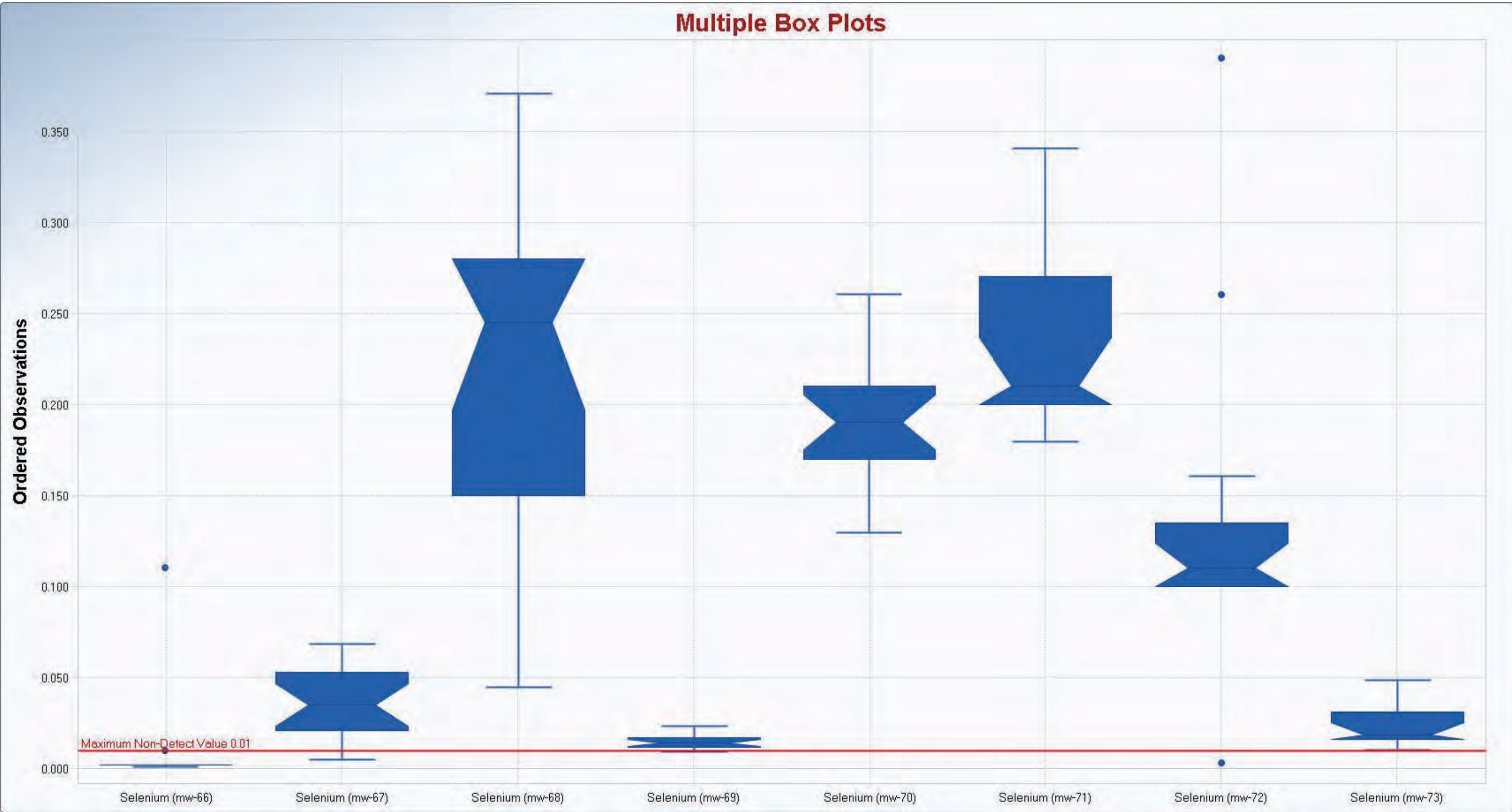




Multiple Box Plots



Multiple Box Plots



Multiple Box Plots

