



**ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT FOR 2018
Coal Combustion Residual Rule Groundwater Monitoring System Compliance
Cholla Power Plant
Navajo County, Arizona**

Submitted to:

Arizona Public Service

Submitted by:

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LIST OF ACRONYMS AND ABBREVIATIONS

§	Section
Annual Report	Annual Groundwater Monitoring and Corrective Action Report
AMEC	AMEC Environment & Infrastructure, Inc.
AMSL	above mean sea level
APS	Arizona Public Service
BAM	Bottom Ash Monofill
BAP	Bottom Ash Pond
BTV(s)	Background Threshold Value(s)
CCR	coal combustion residuals
CCR units	CCR landfills and surface impoundments
CFR	Code of Federal Regulations
Cholla	Cholla Power Plant
CSM	Conceptual Site Model
FAP	Fly Ash Pond
ft	foot, feet
GWPS(s)	Groundwater Protection Standard(s)
I-40	Interstate 40
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
SAP	Sampling and Analysis Plan
SEDI	Sedimentation Pond
SSI(s)	statistically significant increase(s)
SSL(s)	statistically significant level(s)
TestAmerica	TestAmerica Laboratories, Inc.
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 Cholla Power Plant (Cholla) located in Navajo County, Arizona. 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. Cholla is an operating power plant owned by APS and PacifiCorp. The plant burns coal in three electrical generating units (Units 1, 3, and 4) and has a net generating capacity of 767 megawatts. Coal burned at the plant was previously sourced from the McKinley Mine in New Mexico. When the McKinley Mine closed in 2009, the source of coal switched to the Lee Ranch and El Segundo mines near Grants, New Mexico.

Facility Location. The plant and associated infrastructure are located on land owned/leased by APS adjacent to Interstate 40 (I-40) between the City of Winslow and the City of Holbrook in Navajo County, Arizona (Figure 1-1). The plant sits next to the Cholla Reservoir, a cooling pond and water storage reservoir that was originally constructed in the early 1900s by the Joseph City Irrigation Company (Shilling, 2005). Now used by APS for cooling water, Cholla Reservoir receives deliveries of groundwater pumped from the nearby Cholla Well Field extracting from the Coconino Sandstone Aquifer. The typical water surface elevation of Cholla Reservoir is 5,022 feet (ft) above mean sea level (amsl).

CCR Unit Description. Plant infrastructure includes four single CCR units referred to as the Fly Ash Pond (FAP), Bottom Ash Pond (BAP), Bottom Ash Monofill (BAM), and Sedimentation Pond (SEDI). All the CCR units except the SEDI are located north of I-40 (Figure 1-2). The SEDI was the first of the CCR Units placed into service in 1976. The FAP and BAP dams were completed in 1978, and the BAM came into operation in the late 1990s. 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 Montgomery & Associates (2011), Montgomery & Associates (2017a), and AMEC Environment & Infrastructure, Inc. (2012).

Climate. The plant is located in an arid climate within the Little Colorado River Basin. The area receives an average of 6 to 12 inches of precipitation annually. The evaporation rate exceeds the rate of precipitation by an order of magnitude.

Topography. Cholla is located at an elevation of approximately 5,025 ft amsl in the Colorado Plateau physiographic province of northeastern Arizona. This area is characterized by canyons, high elevations, and narrow, widely-spaced riverbeds. The topography of the plant area is characterized by rolling terrain, open vistas, and incised drainages/arroyos. In the vicinity of the plant, the ground surface gently slopes towards the Little Colorado River to the south at approximately 60 ft per mile; however, surface drainage immediately near Cholla Reservoir flows towards the reservoir. About two miles north and south of the plant, the ground surface rises out of the alluvial floodplain to an elevation of 5,100 to 5,200 ft amsl

Surface Water Hydrology. The plant is located north of the Little Colorado River within the Middle Little Colorado watershed. The Little Colorado River is a meandering, perennial stream with a large alluvial floodplain.

Site Geology. The Colorado Plateau, on which the plant is located, is typified by horizontal layered sequences of sedimentary rock, primarily sandstones, siltstones, and claystones. At the plant and nearby CCR units, the uppermost geologic units that are expected to influence groundwater flow and variations in naturally occurring constituent concentrations across the site are as follows (in descending order):

- Little Colorado River and Tanner Wash Alluviums: These quaternary surface alluviums overlie the bedrock formations in localized areas at Cholla and surrounding CCR units. The alluvium is unconsolidated, heterogeneous, and consists of clay, silt, sand, and gravel. In general, the Tanner Wash Alluvium is finer-grained than the Little Colorado River Alluvium. The alluvium ranges in thickness from non-existent to approximately 200 feet, and in general is thickest underneath the plant and Cholla Reservoir. Around the CCR units, the alluvium ranges from approximately 50 feet thick in the vicinity of the FAP Dam to 100 feet thick in the vicinity of the BAP Dam.
- Moenkopi Formation: The Moenkopi Formation is the uppermost geologic unit beneath the plant and the CCR units (as depicted in Figure 1-2) and is present at land surface in areas where the alluvium is non-existent. The thickness of the Moenkopi Formation near the plant ranges from non-existent to over 300 feet thick; where it is sufficiently thick, the Moenkopi Formation acts as an aquitard between the shallow alluvial aquifer to the underlying Coconino Sandstone Aquifer. The Moenkopi Formation consists of three members, described below:
 - Holbrook Member: this is a relatively permeable, well-consolidated sandstone. The Holbrook Member is the uppermost member of the Moenkopi Formation and is not known to be present in the vicinity of the plant.
 - Moqui Member: this is the primary confining unit within the Moenkopi Formation and consists of maroon and greenish mudstone with abundant gypsum. The Moqui Member is approximately 250 to 300 feet thick near the plant.
 - Wupatki Member: this is the lowest member of the Moenkopi Formation and is approximately 30 to 50 feet thick. The Wupatki Formation is comprised of relatively

permeable sandstone and is in hydraulic connection with the underlying Coconino Sandstone.

- **Coconino Sandstone:** The Permian-age Coconino Sandstone is the principal lithologic unit of the C-aquifer, a regionally important aquifer for water supply. It is composed of very fine- to fine-grained sandstone with variable permeability depending on the degree of fracturing and cementation. The unit is approximately 375 to 400 ft thick in the vicinity of the plant.
- **Schnebly Hill Formation:** The Schnebly Hill Formation is a very fine-grained, reddish sandstone that is about 300 to 350 feet thick near the plant. It is part of the C-aquifer, but its hydraulic conductivity is about 10 to 28 percent that of the Coconino Sandstone.
- **Supai Formation:** The Pennsylvanian to Lower Permian Supai Formation underlies the Coconino Sandstone. It has minimal impact on the surface operations of Cholla, other than containing an approximately 600-ft thick deposit of halite and anhydrite in the Cholla well field area that impacts groundwater quality both regionally and in the vicinity of the plant.

Applicable Hydrostratigraphy. Two hydrostratigraphic units are conceptualized beneath the plant and associated CCR units. These units form the basis for the hydrogeologic Conceptual Site Model (CSM) developed by Montgomery & Associates (2011 and 2017a) for the purpose of evaluating point of compliance wells for Cholla's Arizona Aquifer Protection Permit and the CCR Groundwater Monitoring System.

The first hydrogeologic unit, the Lower Colorado and Tanner Wash Alluvial Aquifers, is present under the plant area, Cholla Reservoir, and the Tanner Wash and Little Colorado River drainage channels. The alluvial aquifer in this area receives recharge from the Little Colorado River and any leakage through anthropogenic features such as the reservoir and the nearby Joseph City Canal. The alluvial aquifer is not used as a drinking water supply but does support a riparian habitat. Depth to water level in the alluvial aquifers ranges from several feet to several tens of feet below land surface in the Cholla area, varying spatially based on proximity to recharge sources and topography and seasonally based on rainfall-runoff patterns. Where present, groundwater flows generally in the downstream direction of the drainages under which it is present, that is, east to west in the Little Colorado River alluvium and north to south in the Tanner Wash alluvium. Groundwater flow in the Little Colorado River alluvial aquifer is also influenced by deeper paleochannels that may not coincide with the present river channel.

The second hydrogeologic unit is the C-aquifer, which consists of the Coconino Sandstone and Schnebly Hill Formation in the vicinity of the plant. Groundwater in this aquifer is under confined conditions in areas north of the Little Colorado River where the Moqui member of the Moenkopi Formation acts as a confining bed. Groundwater movement in the C-aquifer is generally to the north. However, the Cholla well field (southwest of the plant) has created a cone of depression that has made the groundwater flow in a westerly direction in that area. Near the FAP, the inferred flow of the groundwater in the C-aquifer is to the west or southwest, possibly due to the broad, northwest-trending anticline that extends from the vicinity of the FAP to near Joseph City.

The alluvial aquifer and the C-aquifer are separated by the Moenkopi Formation, a regional aquitard that creates a barrier between the two aquifers in the vicinity of Cholla. In areas where the C-aquifer in the Coconino Sandstone is confined (primarily north of the Little Colorado River), the Wupatki member of the Moenkopi has been observed to be water-bearing; however, the Moqui member, which is 250 to 300 feet thick in the vicinity of the plant, prevents hydraulic connection between the alluvial aquifer and the C-aquifer

and is effectively bedrock when considering water quality conditions and groundwater movement in the alluvial aquifer.

Uppermost Aquifer by CCR Unit. The CCR Rule requires that the uppermost aquifer underlying each CCR unit be monitored to evaluate potential impacts from the unit. At Cholla, the uppermost aquifer by unit is as follows:

- FAP (Little Colorado River Alluvium): The FAP is constructed primarily on the impermeable Moenkopi Formation; however, alluvial sediments are present in the vicinity of the FAP while the dam itself extends to bedrock. Groundwater at the toe of the FAP dam flows west-southwest through localized shallow alluvial sediments (which are fairly fine grained) and then merges with the Little Colorado River Alluvium where the predominant direction of groundwater flow is to the west.
- BAP (Tanner Wash Alluvium): The BAP is located in the Tanner Wash drainage area. The northern and western edges of the BAP are constructed on the Moenkopi Formation, whereas the southern edge rests primarily on alluvial material. The BAP dam extends to bedrock where bedrock is shallow; in the central portion of the dam, where bedrock is deeper, a slurry cutoff wall extends into bedrock or stiff clay. Groundwater near the BAP flows south-southwest through the Tanner Wash Alluvium to its confluence with the Little Colorado River Alluvium.
- BAM (Coconino Sandstone): The BAM is a CCR landfill constructed in the Tanner Wash watershed. It is constructed on the Moenkopi Formation where no saturated alluvium is present; water levels from nearby wells indicate that the Moenkopi is unsaturated beneath the BAM. Therefore, the uppermost hydrogeologic unit at the BAM is Coconino Sandstone Aquifer which exists under confined conditions more than 300 ft bgs in the vicinity of the BAM. Groundwater in the Coconino Aquifer beneath the BAM flows to the north-northwest.
- SEDI (Little Colorado River Alluvium): The SEDI is constructed on the Little Colorado Alluvium. Groundwater near the SEDI flows parallel to the direction of Little Colorado River surface flows, approximately to the southwest.

1.2 CCR Groundwater Monitoring System

Multiple monitoring well systems are in place at Cholla 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 these networks is summarized in the report *Cholla Power Plant Coal Combustion Residuals Program – Design, Installation, and Evaluation of Completeness of Groundwater Monitoring Networks* (CCR Groundwater Monitoring System Certification Report) and is identified as compliant with 40 CFR §257.91(a) through (e) (Montgomery & Associates, 2017a). 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 groundwater 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 Cholla to assess background water quality are assumed adequate until proven otherwise.

Per the CCR Groundwater Monitoring System Certification Report, the following monitoring wells are designated as “background monitoring wells” for the respective geologic and hydrostratigraphic conditions underlying Cholla (Montgomery & Associates, 2017a):

- Background Wells for the FAP and the BAP (Little Colorado River and Tanner Wash Alluvium): The upgradient boundary of the FAP rests on a thick section of the Moenkopi Formation; there is no saturated alluvium present in the area upgradient from the FAP boundary. Therefore, background well M-64A was installed west of the plant in the Little Colorado River floodplain to serve as a background well for FAP. The BAP, in the Tanner Wash alluvium, discharges to and is hydraulically connected to the Little Colorado River alluvium. Because hydrogeologic conditions at the BAP prevented installation of an upgradient background well (as they did at the FAP), M-64A also serves as the background well for the BAP. Travel time calculations performed for the CCR Groundwater Monitoring System Certification Report (Montgomery & Associates, 2017a) indicated that M-64A is located far enough downgradient from the FAP and the BAP to represent unimpacted groundwater; however, it is notable that selection of this background well location is not ideal and has the potential to promote spatial heterogeneity issues in statistical data analysis.
- Background Wells for the SEDI (Little Colorado River Alluvium): The groundwater flow direction in the vicinity of the SEDI is to the west-southwest. Background well M-62A is installed in the alluvium on the east (upgradient) side of the SEDI.
- Background Wells for the BAM (Coconino Sandstone): The groundwater flow direction in the Coconino Sandstone Aquifer in the vicinity of the BAM is to the north-northwest. Background well M-54 is installed in the Coconino Sandstone on the southeast (upgradient) side of the BAM.

Due to the natural heterogeneity of the geologic and hydrogeologic conditions underlying Cholla, background constituent concentrations are expected to be spatially heterogeneous (varying) across the site. The site is also expected to exhibit both spatial and temporal heterogeneity attributable to local climatic regimes, potential leakage from Cholla Reservoir, and potential operational activity at the site. The groundwater monitoring well networks, respective to sampling coverage and frequency, appear to adequately represent this spatial and temporal heterogeneity, pending further review.

Downgradient Monitoring Well Networks. A total of 17 downgradient wells are in place at the site to monitor the downgradient groundwater conditions of each CCR unit (Table 1-2). Fourteen of these monitoring wells are installed in either the Little Colorado River or Tanner Wash Alluvium. The remaining three wells are completed in the Coconino Sandstone. 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 grouped by respective CCR unit, as described below:

- FAP Downgradient Wells (Little Colorado River Alluvium): The groundwater flow direction in the alluvium downgradient of the FAP dam (i.e., the waste boundary) is west-southwest. The alluvial thickness in this area is limited; in some places it may be up to 50 feet thick but in others it is non-existent. On this basis, three downgradient wells were initially designated for the FAP boundary. Efforts undertaken by Montgomery & Associates to install a fourth downgradient FAP waste boundary well were unsuccessful (Montgomery & Associates, 2017a). The three downgradient boundary wells are named W-123, M-50A, and M-51A. In 2018, three additional wells were installed

to evaluate groundwater conditions downgradient of the FAP (see Section 1.2.2). These wells are identified as MW-65A, MW-66A, and MW-67A. FAP downgradient wells are screened within the Little Colorado River Alluvium.

- SEDI Downgradient Wells (Little Colorado River Alluvium): The groundwater flow direction in the alluvium underlying the SEDI is to the west-southwest. Three downgradient wells were designated for the SEDI: M-56A, M-57A, and M-58A; these are screened within the Little Colorado River Alluvium.
- BAP Downgradient Wells (Tanner Wash Alluvium): The groundwater flow direction in the alluvium underlying the BAP is generally to the southwest along Tanner Wash; however, there is a radial component of groundwater flow towards the east-southeast due to hydraulic head from the BAP. Five downgradient monitoring wells are designated for the BAP: M-52A, M-53A, W-305, W-306, and W-314; these are screened in the Tanner Wash Alluvium.
- BAM Downgradient Wells (Coconino Sandstone): The uppermost hydrogeologic unit underlying the BAM is the C-aquifer in the Coconino Sandstone, which flows towards the north-northwest in this vicinity. Three downgradient monitoring wells were installed to monitor the quality of groundwater passing the waste boundary of the BAM. These wells are named M-59, M-60, and M-61, and they are completed in the Coconino Sandstone.

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, particularly in the region downgradient of the FAP and BAP. Figure 1-2 identifies these wells which are all completed in either the Little Colorado River or Tanner Wash Alluvium.

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 2015 (Table 1-2). During the reporting period, implemented changes to the monitoring system included:

- Installation of FAP downgradient wells MW-65A, MW-66A, and MW-67A: In response to statistical evaluations of data collected from the CCR monitoring well network (Section 2.3.2), three new wells were installed to promote characterization of the nature and extent of fluoride concentrations downgradient of the FAP. Well installation activities occurred from November 12 through November 17, 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 generally are 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 statistical analysis for site CCR units which concluded that there is enough evidence to declare an SSI over background for multiple Appendix III constituents at both the FAP and BAP. The statistical analysis also recommended that additional evaluation was required to confirm whether there was enough evidence to declare an SSI over background for select Appendix III constituents at the SEDI.
- 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 *Annual Groundwater Monitoring and Corrective Action Report for Cholla Power Plant Coal Combustion Residuals Program, November 2015 – December 2017* (Montgomery & Associates, 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).
- Conduct of an Alternative Source Demonstration (ASD) for the SEDI – 40 CFR §257.94(e)(2) allows owners to evaluate whether a source other than the subject CCR unit or an error in sampling, analysis, statistical evaluation, or variation in groundwater quality resulted in declaring an SSI over background during a statistical analysis conducted pursuant to the CCR Rule. Section 2.1.4 summarizes an ASD conducted for the SEDI. The ASD was inconclusive.

- Transition to Assessment Monitoring at the FAP, BAP, and SEDI – 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 FAP, BAP, and SEDI during 2018.
- Continuation of the Detection Monitoring Program at the BAM – 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 BAM during 2018.
- Statistical Analyses of Collected Appendix IV Constituent Data at the FAP, BAP, and SEDI – 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 prepared a *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 FAP, BAP and SEDI which establish GWPSs for detected Appendix IV constituents and concluded that there is enough evidence to declare that multiple Appendix IV constituents are present at SSLs above GWPSs at both the FAP and BAP.
- Characterization of the Nature and Extent of Potential Releases Indicated at the FAP and BAP – 40 CFR §257.95(g)(1) requires characterization of the nature and extent of releases from CCR units be conducted 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 FAP and sampling of existing wells downgradient of the BAP.

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 FAP and BAP transitioned to assessment monitoring on February 12, 2018. The SEDI transitioned to assessment monitoring on May 16, 2018. Appendix A presents notifications prepared per 40 CFR §257.94(e)(3) documenting the establishment of an assessment monitoring program for the FAP, BAP, and SEDI. 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)(5) and 40 CFR §257.106(h)(4).

2.1.4 Alternative Source Demonstrations

Based on the results of a statistical analysis of initial Appendix III constituent data (Section 2.3.1), APS conducted an ASD to evaluate SSIs over background for boron and sulfate at two monitoring wells (MW-56A and MW-57A) downgradient of the SEDI (Appendix B). The ASD included:

- Comparison of well construction and lithologic conditions at the four SEDI CCR monitoring wells;
- Evaluation of water level trends, directions of groundwater movement, and gradients in the SEDI area;

- Estimates of travel time from potential alternate source areas to downgradient SEDI monitoring wells;
- Review of the distribution of various Appendix III monitoring constituents in the SEDI and SEDI CCR wells using box plots;
- Evaluation of water quality trends for various Appendix III monitoring constituents in the SEDI and SEDI CCR wells
- Evaluation of the relative distribution of cations and anions in the SEDI CCR wells, other area monitoring wells, and various potential source waters using trilinear diagrams; and
- Analysis of the potential leakage rate through the SEDI pond liner and resultant downgradient concentrations of Appendix III monitoring constituents using a simple mixing cell.

There were a number of issues noted in the ASD that made drawing conclusions from these evaluations challenging. Since an alternative source could not be identified with any certainty, initiation of assessment monitoring at the SEDI was recommended.

2.2 Monitoring Data Collected

APS conducted CCR groundwater monitoring at Cholla in accordance with the Sampling and Analysis Plan (SAP) entitled *Groundwater Sampling and Analysis Program* (Montgomery & Associates, 2015). 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 C presents groundwater elevation data collected during groundwater sampling with hydrographs depicting collected groundwater elevations over time. Groundwater elevations for each CCR unit are graphed independently based on assessment of the data during initial CSM development; review of the data indicate that the Coconino Sandstone Aquifer underlying the BAM is distinct from the alluvial aquifer underlying the FAP, BAP, and SEDI. As shown in monitoring well hydrographs, groundwater elevations in 2018 were relatively stable and/or consistent with nearby wells with the following exceptions:

- M-52A, M-53A, W-305, W-306, and W-314 (downgradient wells for the BAP): The range of groundwater elevations at nearby wells located downgradient of the BAP was approximately 13 to 14 ft in 2018 with M-53A and W-314 exhibiting the highest groundwater elevations and M-52A, W-305, and W-306 indicating lower groundwater elevations. During the reporting period, groundwater elevations at W-314 continued a trend of declining water level elevations from the previous year.
- M-50A, M-51A, and W-123 (the downgradient wells for the FAP): There was an 18-ft range in groundwater elevations in nearby wells located downgradient FAP in 2018. The lowest elevations were associated with monitoring well M-50A which is located downgradient of the middle portion

of the FAP dam. Groundwater elevation trends downgradient of the FAP have remained relatively consistent since the initiation of CCR groundwater monitoring in November 2015.

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

Figures 2-1 through 2-4 present quarterly potentiometric surface maps that are representative of conditions at the time of groundwater sampling based on hydrograph data. The estimated direction of groundwater flow derived from collected groundwater elevation data are noted in these figures. As indicated, groundwater in the alluvium appears to flow to the south to southwest from the FAP and the drainage area associated with Tanner Wash (where the BAP is located), towards the Little Colorado River where flows trend more west (consistent with surface water flows). Groundwater flow in the Coconino Sandstone Aquifer underlying the BAM is to the north.

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 identifies the wells used in the analysis and summarizes the results of these calculations.

For the Tanner Wash Alluvium downgradient of the BAP, the hydraulic gradient and flow direction were consistent throughout the reporting period. The magnitude of the hydraulic gradient ranged from 0.09 to 0.10 ft per ft and the direction of groundwater flow was south in the direction of surface water flows in Tanner Wash (181 degrees from north). Corresponding groundwater flow rates ranged from 0.66 to 0.72 ft per day.

For the localized alluvial sediments in the vicinity of the FAP, the hydraulic gradient and flow direction were also relatively stable. The magnitude of the hydraulic gradient was 0.66 to 0.68 ft per ft during each calendar quarter and the direction of groundwater flow was to the southwest towards the Little Colorado River (226 degrees from north). The corresponding groundwater flow rate was 0.16 to 0.17 ft per day.

For the Little Colorado River Alluvium downgradient of the SEDI, the hydraulic gradient and flow direction was more variable than the other units. The magnitude of the hydraulic gradient was 0.0005 to 0.0008 ft per ft during each calendar quarter and the direction of groundwater flow was west to southwest towards the Little Colorado River (238 to 260 degrees from north). The corresponding groundwater flow rate was 0.24 to 0.39 ft per day.

For the Coconino Sandstone Aquifer underlying the BAM, the hydraulic gradient and flow direction were stable throughout the reporting period. The magnitude of the hydraulic gradient was 0.009 ft per ft and the direction of groundwater flow was generally to the north (357 to 359 degrees from north). The corresponding groundwater flow rate was 1.8 ft per day.

2.2.3 Sample Collection

APS collected, labeled, preserved, and shipped groundwater samples in accordance with the SAP (Montgomery & Associates, 2015). 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 D 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 E presents multiple technical memoranda which document these reviews.

As noted in the technical memorandum reviewing data collected during the May 2018 sampling rounds, anomalous analytical data associated with a sample collected from M-52A prompted rejection of analytical results and resampling of this well in June 2018.

2.2.5 Sample Results

Appendix D 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 pursuant to *Cholla Power Plant Coal Combustion Residuals Program – Statistical Method Selected for Evaluation of Groundwater Monitoring Data* (Montgomery & Associates, 2017b) and the *Statistical Data Analysis Work Plan* (Wood, 2018). These analyses 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 F presents a technical memorandum documenting this initial analysis conducted by Montgomery & Associates for site CCR units.

Table 2-3 summarizes the statistical results put forth in Appendix F. The initial statistical analysis for site CCR units included the development of background concentrations by calculating upper prediction limits

for each Appendix III constituent, except pH, using data collected from site background wells. Background concentrations for pH correspond to a "KM Mean" for the background well dataset. Based on a comparison of the central tendency of downgradient well data sets to the background concentrations, the analysis concluded that there is enough evidence to declare an SSI over background for boron, calcium, fluoride, sulfate, and total dissolved solids at the BAP as well as boron, calcium, chloride, and fluoride at the FAP.

For the SEDI, the Appendix III constituent statistical analysis documented in Appendix F recommended additional evaluation to assess exceedances for boron and sulfate (Table 2-3). Based on the results of an inconclusive ASD (Section 2.1.4), APS transitioned to assessment monitoring at the SEDI in May 2018.

The initial statistical analysis documented in Appendix F to evaluate the BAM indicated that there were no SSIs over background for Appendix III constituents in initial monitoring round data. Based on an assessment conducted to evaluate the statistical method used to calculate background concentrations, Wood concluded during the reporting period that the background concentrations presented in Table 2-3 are overly conservative and not appropriate for comparisons of data collected after initial monitoring rounds. To promote ongoing evaluation of BAM groundwater data, APS will recalculate background concentrations in early 2019 using more robust statistical methods for Appendix III constituents at the BAM.

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 G, H, and I present technical memoranda documenting these statistical analyses for the BAP, FAP, and SEDI, respectively.

Table 2-4 summarizes the results of statistical analyses of Appendix IV constituent data collected from the BAP, FAP, and SEDI. Background Threshold Values (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 lithium are present at SSLs above GWPSs in groundwater downgradient of the BAP and arsenic, cobalt, fluoride, lithium, and molybdenum are present at SSLs above the GWPS in groundwater downgradient of the FAP. None of the Appendix IV constituents were present at SSLs in groundwater downgradient of the SEDI.

3.0 CORRECTIVE ACTION PROGRAM

Based on the declaration that one or more Appendix IV constituents are present at SSLs above GWPSs downgradient of the BAP and FAP, APS prepared notices of Appendix IV exceedances and progressed characterization of potential releases from these units 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 lithium exceeded GWPSs at the BAP and arsenic, cobalt, fluoride, lithium, and molybdenum exceeded the GWPS at the FAP. Appendix A 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 the BAP and FAP included:

- A review of the existing well groundwater monitoring network at Cholla to assess whether any of these supplementary wells could provide useful information regarding the nature and extent of cobalt and lithium downgradient of the BAP and arsenic, cobalt, fluoride, lithium, and molybdenum downgradient of the FAP.
- Installation of a new CCR well (MW-66A) near the property boundary in the direction of contaminant migration downgradient of the FAP; APS owns the property located between the FAP and I-40 as well as a small parcel south of I-40 where MW-66A is located (Figure 1-2).
- Installation of two additional CCR wells (MW-65A and MW-67A) to define the extent of arsenic, cobalt, fluoride, lithium, and molybdenum downgradient of the FAP (Figure 1-2).
- Sampling of new and existing wells occurred from December 7 to 8, 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.

A new well near the APS property boundary in the direction of contaminant migration was not installed downgradient of the BAP. Existing CCR wells M-53A, W-305, W-306, and M-52 are located at the property boundary and fulfill the requirement of providing information regarding whether impacts have migrated off-site.

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

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 BAM 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]). Given that previously derived background concentrations for Appendix III constituents at the BAM are not appropriate for this ongoing use (Section 2.3.1), APS will recalculate background concentrations in early 2019 for continuing evaluation of BAM detection monitoring data.

- 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 the BAP, FAP, and SEDI – While corrective action evaluation progresses at the BAP and FAP, 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). At the SEDI, assessment monitoring must be conducted for as long as concentrations of Appendix III and IV constituents exceed background values per 40 CFR §257.95(f).
- Characterization of the Nature and Extent of Potential Releases from the BAP and FAP – 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 the BAP and FAP - 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 the BAP and FAP 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

- AMEC Earth & Infrastructure, Inc. (AMEC), 2012. Well Completion Report, Installation of Aquifer Protection Permit Monitor Wells, Arizona Public Service Company, Cholla Power Plant, Navajo County, Arizona. AMEC Job No. 17-2011-4054. May 7, 2012.
- Federal Register, 2018. *40 Code of Federal Regulations Part 257 – Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule promulgated April 17, 2015 with Amendments to the National Minimum Criteria (Phase One, Part One) effective August 29, 2018.*
- Montgomery & Associates, 2011. Arizona Public Service Cholla Power Plant Point of Compliance Evaluation. Prepared for APS. January 26, 2011.
- Montgomery & Associates, 2015. Groundwater Sampling and Analysis Program, Cholla Power Plant, Joseph City, Arizona. #CH_GW_SAP_021_11-30-15. November 30, 2015.
- Montgomery & Associates, 2017a. *Cholla Power Plant Coal Combustion Residuals Program – Design, Installation, and Evaluation of Completeness of Groundwater Monitoring Networks.* Navajo County, Arizona. Document #CH_GW_SystemCert_020_20170919. September 19, 2017.
- Montgomery & Associates, 2017b. *Cholla Power Plant Coal Combustion Residuals Program – Statistical Analysis of Baseline Groundwater Monitoring Data, November 2015 through September 2017.* Navajo County, Arizona. January 12, 2018.
- Montgomery & Associates, 2018. *Annual Groundwater Monitoring and Corrective Action Report for Cholla Power Plant Coal Combustion Residuals Program, November 2015 – December 2017.* Navajo County, Arizona. Document #CH_GW_ANCAR_020_20180131. January 30, 2018.
- Shilling, 2005. A Description, History, and Finder's Guide for the Joseph City Irrigation System, Navajo County, Arizona. Report. Linda Shilling. Tempe, Arizona: Archaeological Consulting Services, Ltd. July 8, 2005.
- Wood Environment & Infrastructure Solutions, Inc. (Wood), 2018. Statistical Data Analysis Work Plan. Coal Combustion Residual Rule Groundwater Monitoring System Compliance. Cholla Power Plant, Navajo County, Arizona. October 15, 2018.

wood.

TABLES



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

CCR Unit	Function	Operation	Size/Construction	History
Fly Ash Pond (FAP)	<i>Single CCR unit</i> - surface impoundment to store slurried fly ash from the plant.	Receives a slurry from the plant that contains primarily fly ash but may also contain some bottom ash, boiler slag, flue gas emission control residuals, boiler cleaning waste, oil/water separator solids, and storm water. Periodically receives solids from the SEDI.	- 430 acres in aerial extent. - Total storage capacity of about 18,000 acre-feet. - Normal operating pool elevation of 5,114 feet amsl.	- Constructed beginning in 1976 and placed into service in 1978. - Unlined; constructed on Moenkopi bedrock and a thin veneer of alluvial sediments. - The dam is constructed of earth fill with a central clay core that extends to bedrock where bedrock is shallow. In the central portion of the dam, where bedrock is deeper, a slurry cutoff wall extends one foot into bedrock or two feet into stiff clay.
Sedimentation Pond (SEDI)	<i>Single CCR unit</i> - collects water from drains around plant site, including storm water, process water, plant water, and slurry from plant leaks.	Collects discharge from on-site secondary wastewater treatment plant, effluent from the oil/water separator, vehicle wash water, plant wash water, and FGD wastes from scrubber or scrubber feed tank upsets. Water collected in the SEDI is pumped to Cholla's general water sump for recycling as process water.	- 1.3 acres in aerial extent. - Total storage capacity of 10.5 acre-feet. - Maximum pond depth of 10 feet. - the top of the pond side slope is at 5,019 feet amsl	- Placed into service in 1976. - Lined with a 2-foot-thick layer of compacted clay. - Constructed below grade.
Bottom Ash Pond (BAP)	<i>Single CCR unit</i> - surface impoundment to store slurried bottom ash from the plant.	Bottom ash is pumped to the BAP as a slurry. The bottom ash settles in the east and west upstream storage cells and the water is decanted to the reservoir and ultimately siphoned back to the plant for reuse. Slurry may also contain fly ash, boiler slag, flue gas emission control residuals, sedimentation pond effluent, cooling tower blowdown, oil/water separator effluent and solids, boiler cleaning waste, and storm water. Periodically receives solids from the SEDI.	- 105 acres in aerial extent. - Total storage capacity of 2,300 acre-feet. - Normal operating pool elevation of 5,117.8 feet amsl.	- Constructed beginning in 1976 and placed into service in 1978. - Unlined; constructed on Moenkopi bedrock and Tanner Wash alluvium. - Consists of a reservoir directly behind the dam and two storage cells upstream of the reservoir. - The dam is constructed of earth fill with a central clay core that extends to bedrock where bedrock is shallow. In the central portion of the dam, where bedrock is deeper, a slurry cutoff wall extends one foot into bedrock or two feet into stiff clay.
Bottom Ash Monofill (BAM)	<i>Single CCR unit</i> - landfill for bottom ash solids excavated from the BAP.	Bottom ash that has been drained of water is excavated from the BAP and permanently stored in the BAM.	- 41 acres in aerial extent.	- Placed into service in 1999.

Notes:

amsl - above mean sea level

BAP - Bottom Ash Pond

BAM - Bottom Ash Monofill

CCR - Coal combustion residuals

FAP - Fly Ash Pond

FGD - flue gas deulfurization

SEDI - Sedimentation Pond

Source:GEI Consultants, Inc. 2009. *Final Coal Ash Impoundment Specific Site Assessment Report, Arizona Public Service, Cholla Power Plant.* Submitted to Lockheed-Martin Corporation. December 2009.

**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]
M-50A	FAP	Downgradient	LCR Alluvium	9/18/2015	32	5038.18	5035.65	9	29	10	5,026.65	5,006.65	5,003.65
M-51A	FAP	Downgradient	LCR Alluvium	9/19/2015	14	5041.77	5039.10	7	12	10	5,334.42	5,324.42	5,323.02
W-123	FAP	Downgradient	LCR Alluvium	11/4/1983	40	5039.84	5038.53	14	29	10	5,024.53	5,009.53	4,998.53
M-64A	FAP/BAP	Background	LCR Alluvium	2/9/2017	69	4991.90	4988.90	30	60	10	4,958.90	4,928.90	4,919.90
MW-65A	FAP	Downgradient	LCR Alluvium	11/15/2018	25	5027.86	5026.21	9	19	10	5,017.31	5,007.31	5,001.21
MW-66A	FAP	Downgradient	LCR Alluvium	11/14/2018	58.5	5033.35	5032.46	24	49	20	5,008.86	4,983.76	4,973.96
MW-67A	FAP	Downgradient	LCR Alluvium	11/16/2018	50	5025.38	5024.05	15	45	10	5,009.45	4,979.35	4,974.05
M-56A	SEDI	Downgradient	LCR Alluvium	10/7/2015	100	5023.17	5020.63	40	85	10	4,980.63	4,935.63	4,920.63
M-57A	SEDI	Downgradient	LCR Alluvium	10/8/2015	100	5023.82	5021.16	40	85	45	4,981.16	4,936.16	4,921.16
M-58A	SEDI	Downgradient	LCR Alluvium	10/13/2015	100	5023.84	5021.24	39	84	45	4,982.24	4,937.24	4,921.24
M-62A	SEDI	Background	LCR Alluvium	11/17/2015	97	5020.87	5021.01	39	84	45	4,982.01	4,937.01	4,924.01
M-52A	BAP	Downgradient	Tanner Wash Alluvium	9/22/2015	83	5049.36	5047.08	20	70	15	5,027.08	4,977.08	4,964.08
M-53A	BAP	Downgradient	Tanner Wash Alluvium	9/22/2015	38	5044.68	5042.09	10	35	10	5,032.09	5,007.09	5,004.09
W-305	BAP	Downgradient	Tanner Wash Alluvium	10/7/1983	108	5046.80	5044.65	80	100	10	4,964.65	4,944.65	4,936.65
W-306	BAP	Downgradient	Tanner Wash Alluvium	10/11/1983	54	5046.74	5044.78	30	50	10	5,014.78	4,994.78	4,990.78
W-314	BAP	Downgradient	Tanner Wash Alluvium	1/27/1992	63	5051.10	5051.32	41	61	10	5,010.32	4,990.32	4,988.32
M-54	BAM	Background	Coconino Sandstone	10/2/2015	370	5070.71	5068.21	315	365	20	4,753.21	4,703.21	4,698.21
M-59	BAM	Downgradient	Coconino Sandstone	10/21/2015	425	5136.00	5133.86	373	423	20	4,760.86	4,710.86	4,708.86
M-60	BAM	Downgradient	Coconino Sandstone	11/1/2015	450	5151.18	5148.69	395	445	10	4,753.69	4,703.69	4,698.69
M-61	BAM	Downgradient	Coconino Sandstone	11/13/2015	420	5127.58	5124.95	365	415	10	4,759.95	4,709.95	4,704.95

Notes:

Source of presented information presented is Montgomery & Associates, 2017; and Wood Environment & Infrastructure Solutions, Inc. Surveying, 2018.

Vertical datum is NAVD 88

AMSL - Above mean sea level

BAM - Bottom Ash Monofill

BAP - Bottom Ash Pond

bgs - below ground surface

CCR - Coal combustion residuals

FAP - Fly Ash Pond

ft - feet

LCR - Little Colorado River

SEDI - Sedimentation Pond

**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**
			Feb 14-15, 2018 (Assessment)	Mar 8-9, 2018 (ASD)	May 19-21, 2018 (Assessment)	May 21, 2018 (Assessment)	May 25, 2018 (Detection)	Jun 7, 2018 (Assessment)	Aug 28, 2018 (Assessment)	Oct 22-26, 2018 (Assessment)	Oct 24, 2018 (Assessment)	Oct 26, 2018 (Detection)	Dec 5, 2018 (Characterization)	Dec 7-8, 2018 (Characterization)	
BAP	M-52A	CCR	X	---	X	---	---	X	---	X	---	---	---	X	5
	M-53A	CCR	X	---	X	---	---	---	---	X	---	---	---	X	4
	M-55A	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
	M-64A*	CCR	X	---	X	---	---	---	---	X	---	---	---	---	3
	W-301	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
	W-302	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
	W-304	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
	W-305	CCR	X	---	X	---	---	---	---	X	---	---	---	X	4
	W-306	CCR	X	---	X	---	---	---	---	X	---	---	---	X	4
	W-307	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
	W-308	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
	W-309	Supplementary	---	---	---	---	---	---	---	---	---	---	---	X	1
W-314	CCR	X	---	X	---	---	---	---	X	---	---	---	X	4	
BAM	M-54	CCR	---	---	---	---	X	---	---	---	X	---	---	---	2
	M-59	CCR	---	---	---	---	X	---	---	---	X	---	---	---	2
	M-60	CCR	---	---	---	---	X	---	---	---	X	---	---	---	2
	M-61	CCR	---	---	---	---	X	---	---	---	X	---	---	---	2
SEDI	CR-1	Supplementary	---	X	---	---	---	---	---	---	---	---	---	---	1
	DM-5	Supplementary	---	X	---	---	---	---	---	---	---	---	---	---	1
	M-56A	CCR	---	X	---	X	---	---	X	---	X	---	---	---	4
	M-57A	CCR	---	X	---	X	---	---	X	---	X	---	---	---	4
	M-58A	CCR	---	X	---	X	---	---	X	---	X	---	---	---	4
	M-62A	CCR	---	X	---	X	---	---	X	---	X	---	---	---	4
FAP	M-50A	CCR	X	---	X	---	---	---	---	X	---	---	---	---	3
	M-51A	CCR	X	---	X	---	---	---	---	X	---	---	---	---	3
	M-65A	CCR	---	---	---	---	---	---	---	---	---	---	X	---	1
	M-66A	CCR	---	---	---	---	---	---	---	---	---	---	X	---	1
	M-67A	CCR	---	---	---	---	---	---	---	---	---	---	X	---	1
	W-123	CCR	X	---	X	---	---	---	---	X	---	---	---	---	3
	W-126	Supplementary	---	---	---	---	---	---	---	---	---	---	X	---	1
Analyzed Constituents			App IV	Select App III and App IV; Supplementary Parameters	App III and Dected App IV	App III and App IV	App III	App III and Dected App IV	Dected App IV	App III and IV	App III	App III	App III and Supplementary Parameters	App III, App IV, and Supplementary Parameters	70

Notes:
 X - Well Monitored
 --- - Well Not Monitored
 App - Appendix
 ASD - Alternative Source Demonstration
 BAM - Bottom Ash Monofill
 BAP - Bottom Ash Pond
 CCR - coal combustion residuals
 FAP - Fly Ash Pond
 ID - Identification
 SEDI - Sedimentation Pond
 * MW-64 serves as a background well for both the BAP and FAP but is only listed with the BAP.
 ** Totals exclude field duplicate samples.

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

CCR Unit	Estimated Hydraulic Conductivity [ft/d]	Estimated Effective Porosity	Calendar Quarter	Calculated Hydraulic Gradient [ft/ft]	Calculated Groundwater Flow Direction [degrees from North]	Estimated Groundwater Flow Rate [ft/d]
BAP (M-52A, M-53A, W-306)	0.96 ^(a)	0.13 ^(a)	1st Quarter 2018	0.10	181	0.72
			2nd Quarter 2018	0.09	181	0.66
			4th Quarter 2018	0.10	181	0.72
FAP (M-50A, M-51A, W-123)	0.032 ^(a)	0.13 ^(a)	1st Quarter 2018	0.68	226	0.17
			2nd Quarter 2018	0.66	226	0.16
			3rd Quarter 2018	0.68	226	0.17
			4th Quarter 2018	0.68	226	0.17
SEDI (M-56A, M-62A, M-58A)	66 ^(a)	0.13 ^(a)	1st Quarter 2018	0.0005	238	0.24
			2nd Quarter 2018	0.0006	252	0.31
			3rd Quarter 2018	0.0008	255	0.39
			4th Quarter 2018	0.0005	260	0.25
BAM (M-59, M-61, M-54)	31 ^(a)	0.15 ^(a)	2nd Quarter 2018	0.009	357	1.76
			4th Quarter 2018	0.009	359	1.80

Notes:

CCR - Coal Combustion Residuals
 BAP - Bottom Ash Pond
 FAP - Fly Ash Pond
 SEDI - Sedimentation Pond
 BAM - Bottom Ash Monofill
 d - day
 ft - feet

References:

^(a) Montgomery & Associates, 2018

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

Constituent	BAM				BAP				FAP				SEDI			
	Background Concentration	Location of SSI Over Background	Exceeding KM Means of Down-Gradient Data	Conclusion	Background Concentration	Location of SSI Over Background	Exceeding KM Means of Down-Gradient Data	Conclusion	Background Concentration	Location of SSI Over Background	Exceeding KM Means of Down-Gradient Data	Conclusion	Background Concentration	Location of SSI Over Background	Exceeding KM Means of Down-Gradient Data	Conclusion
Boron	0.57 mg/L	---	---	No SSI	1.3 mg/L	MW-52A and MW-53A	3.0 to 3.5 mg/L	SSI Over Background Declared	1.3 mg/L	M-50A, M-51A, and W-123	2.8 to 36 mg/L	SSI Over Background Declared	0.23 mg/L	M-56A and M-57A	0.26 to 0.55 mg/L	Additional Evaluation Required
Calcium	110 mg/L	---	---	No SSI	740 mg/L	MW-52A and W-314	800-830 mg/L	SSI Over Background Declared	740 mg/L	M-51A, and W-123	830 to 930 mg/L	SSI Over Background Declared	600 mg/L	---	---	No SSI
Chloride	1,600 mg/L	---	---	No SSI	5,700 mg/L	---	---	No SSI	5,700 mg/L	M-51A and W-123	6,300 to 6,700 mg/L	SSI Over Background Declared	3,700 mg/L	---	---	No SSI
Fluoride	1.4 mg/L	---	---	No SSI	0.8 mg/L**	M-53A and W-306	1.3 to 1.8 mg/L	SSI Over Background Declared	0.8 mg/L**	M-50A, M-51A, and W-123	2.2 to 5.1 mg/L	SSI Over Background Declared	0.8 mg/L**	---	---	No SSI
pH	7.6 SU*	---	---	No SSI	7.4 SU*	M-52A and W-306	7.1 to 7.8 SU	SSD Noted	7.4 SU*	M-51A	7.3 SU	SSD Noted	7.5 SU*	M-57A	7.3	SSD Noted
Sulfate	400 mg/L	---	---	No SSI	5,100 mg/L	W-306	11,000 mg/L	SSI Over Background Declared	5,100 mg/L	---	---	No SSI	630 mg/L	M-57A	1,300 mg/L	Additional Evaluation Required
TDS	3,400 mg/L	---	---	No SSI	15,000 mg/L	W-306	17,000 mg/L	SSI Over Background Declared	15,000 mg/L	---	---	No SSI	7,800 mg/L	---	---	No SSI

Notes:

BAM - Bottom Ash Monofill
 BAP - Bottom Ash Pond
 BTV - Background Threshold Value
 FAP - Fly Ash Pond
 KM - Kaplan Meier
 mg/L - milligrams per liter

SEDI - Sedimentation Pond
 SSD - statistically significant difference
 SSI - statistically significant increase
 SU - standard pH units
 TDS - Total Dissolved Solids

Information presented in this table is summarized from Montgomery & Associates 'Cholla Power Plant Coal Combustion Residuals Program - Statistical Analysis of Baseline Groundwater Monitoring Data, November 2015 through September 2017, Navajo County, Arizona'. May 22, 2018.

* In lieu of calculating an upper and lower prediction limit for pH, comparison of the central tendency of background data to the central tendency of downgradient data was conducted.

** High frequency of non-detect values in background data; BTV is the maximum reporting limit of the data set.

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

Constituent	BAP					FAP					SEDI				
	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]	BTV [mg/L]	GWPS [mg/L]	Basis for GWPS	Location of SSLs Over GWPS	Range of Exceeding LCLs [mg/L]
Antimony	0.004	0.006	US EPA MCL	None	---	0.004	0.006	US EPA MCL	None	---	0.05	0.05	BTV	None	---
Arsenic	0.004	0.01	US EPA MCL	None	---	0.004	0.01	US EPA MCL	M-51A	0.012	0.004	0.01	US EPA MCL	None	---
Barium	0.05	2	US EPA MCL	None	---	0.05	2	US EPA MCL	None	---	0.08	2	US EPA MCL	None	---
Beryllium	0.001	0.004	US EPA MCL	None	---	0.001	0.004	US EPA MCL	None	---	0.001	0.004	US EPA MCL	None	---
Cadmium	0.0004	0.005	US EPA MCL	None	---	0.0004	0.005	US EPA MCL	None	---	0.002	0.005	US EPA MCL	None	---
Chromium	0.004	0.1	US EPA MCL	None	---	0.004	0.1	US EPA MCL	None	---	0.004	0.1	US EPA MCL	None	---
Cobalt	0.002	0.006	Alternative Risk-Based GWPS	M-52A, M-53A, W-305, and W-314	0.010-0.038	0.002	0.006	Alternative Risk-Based GWPS	M-51A	0.01*	0.002	0.006	Alternative Risk-Based GWPS	None	---
Fluoride	0.8	4	US EPA MCL	None	---	0.8	4	US EPA MCL	M-51A	4.3	0.8	4	US EPA MCL	None	---
Lead	0.002	0.015	Alternative Risk-Based GWPS	None	---	0.002	0.015	Alternative Risk-Based GWPS	None	---	0.01	0.015	Alternative Risk-Based GWPS	None	---
Lithium	0.31	0.31	BTV	W-306	0.52	0.31	0.31	BTV	M-50A, M-51A, and W-123	0.43 to 0.63	0.2	0.2	BTV	None	---
Mercury	0.0002	0.002	US EPA MCL	None	---	0.0002	0.002	US EPA MCL	None	---	0.0002	0.002	US EPA MCL	None	---
Molybdenum	0.0061	0.1	Alternative Risk-Based GWPS	None	---	0.0061	0.1	Alternative Risk-Based GWPS	W-123	0.32	0.011	0.1	Alternative Risk-Based GWPS	None	---
Selenium	0.002	0.05	US EPA MCL	None	---	0.002	0.05	US EPA MCL	None	---	0.01	0.05	US EPA MCL	None	---
Thallium	0.0014	0.002	US EPA MCL	None	---	0.0014	0.002	US EPA MCL	None	---	0.0004	0.002	US EPA MCL	None	---
Combined Radium	1.6	5	US EPA MCL	None	---	1.6	5	US EPA MCL	None	---	1.1	5	US EPA MCL	None	---

Notes:

BAP - Bottom Ash Pond

BTV - Background Threshold Value

FAP - Fly Ash Pond

GWPS - Groundwater Protection Standard

LCL - Lower Confidence Limit

mg/L - milligrams per liter

SEDI - Sedimentation Pond

SSLs - statistically significant levels

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

*The reporting limit for cobalt is in exceedance of the GWPS; it is possible this is a false positive SSL over the GWPS on account of the laboratory's inability to detect a concentration below the GWPS.

FIGURES

Path: X:\Projects\2018 Projects\1420182040 APS Cholla Compliance Support\WXD\Annual Groundwater Monitoring\2018\Figure1-1_Site_LocationMap_SMALL1.mxd



Job No. 14-2018-2040
 PM: NC
 Date: 1/24/2019
 Scale: 1" = 1.5 miles



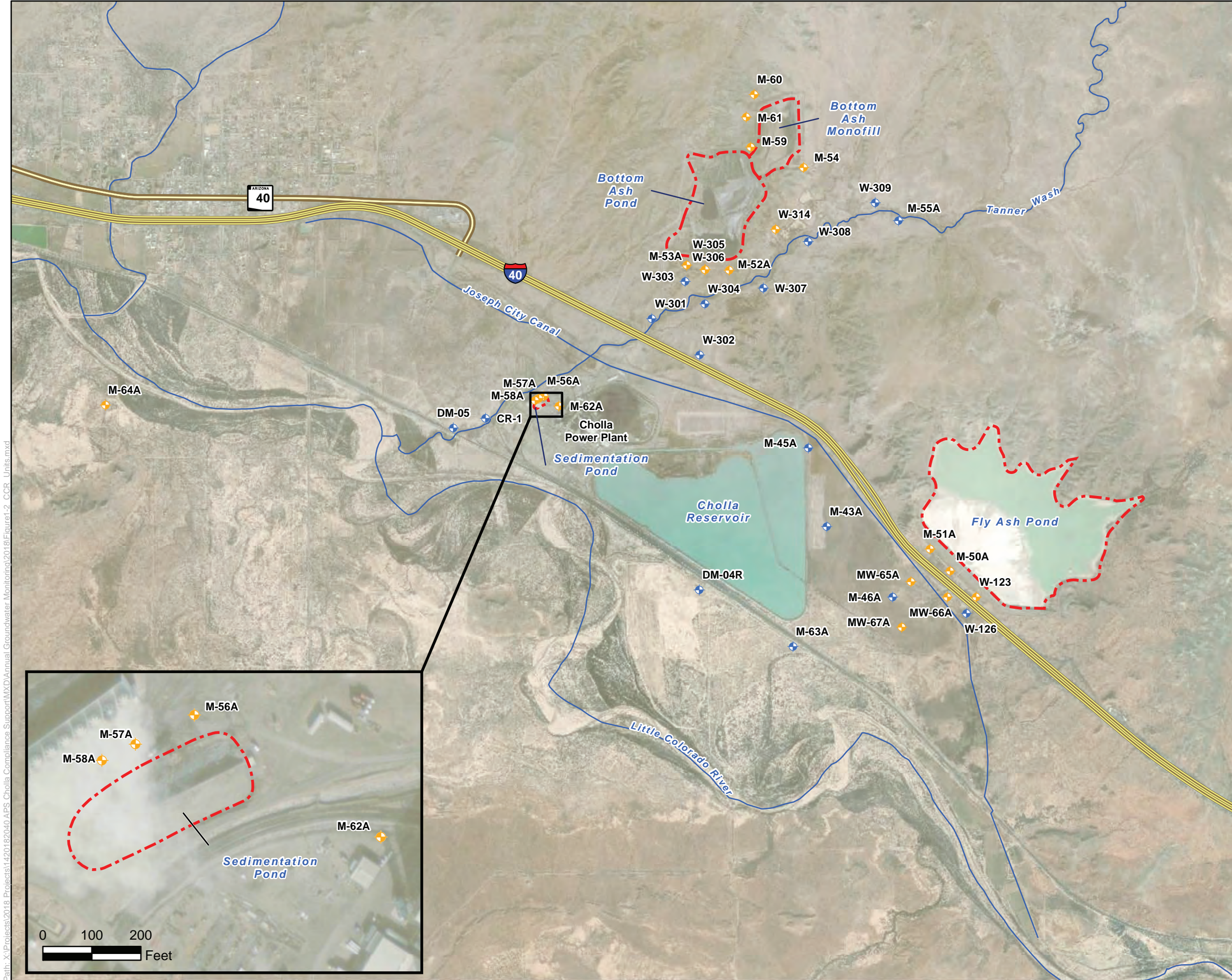
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 Cholla Power Plant
 Navajo County, Arizona

Site Location Map

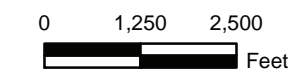
FIGURE
 1-1





- Legend**
- ◆ CCR Monitoring Well Location
 - ◆ Supplementary Site Monitoring Well Location
 - Surface Water Feature
 - Approximate Extent of CCR Unit

Notes:
 CCR Coal Combustion Residuals



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 Navajo County, Arizona

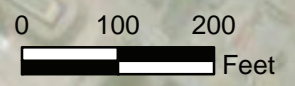
FIGURE 1-2 CCR Units and Monitoring System Summary

Job No. 1420182040
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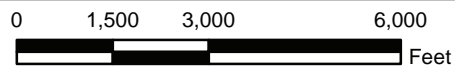
Legend

-  CCR Monitoring Well Location
-  Supplementary Site Monitoring Well Location
-  Groundwater Elevation Contour (ft amsl)
-  Alluvial Aquifer; dashed where inferred
-  Groundwater Elevation Contour (ft amsl)
-  Coconino Aquifer
-  Groundwater Flow Direction
-  Extent of Alluvial Material

 Approximate Extent of CCR Unit

Notes and Abbreviations:

- MW-64A** Well Identification
 - 4966.37 Groundwater Elevation (ft amsl)
 - CCR Coal Combustion Residuals
 - ft amsl Feet above mean sea level
 - NM Not Monitored
- Note: Only wells with groundwater elevations were used in contouring



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**Potentiometric Surface Map
2nd Quarter 2018 (May Event)**

**FIGURE
2-2**



Path: X:\Projects\2018-Projects\1420182040-APS-Cholla-Compliance-Support\WXD\Annual-Groundwater-Monitoring\2018\Figure2-2_202018.mxd

Legend

-  CCR Monitoring Well Location
-  Supplementary Site Monitoring Well Location
-  Groundwater Elevation Contour (ft amsl)
-  Alluvial Aquifer; dashed where inferred
-  Groundwater Flow Direction
-  Extent of Alluvial Material

 Approximate Extent of CCR Unit

Notes and Abbreviations:

MW-64A Well Identification
4965.89 Groundwater Elevation (ft amsl)

CCR Coal Combustion Residuals
ft amsl Feet above mean sea level
NM Not Monitored

Note: Only wells with groundwater elevations were used in contouring



Job No.	14-2018-2040
PM:	NC
Date:	1/29/2019
Scale:	1" = 3,000'



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Navajo County, Arizona

Potentiometric Surface Map
3rd Quarter 2018 (August Event)

FIGURE
2-3



Path: X:\Projects\2018\Projects\1420182040\APS Cholla Compliance_Support\WXD\Annual_Groundwater_Monitoring\2018\Figure2-3_3Q2018.mxd

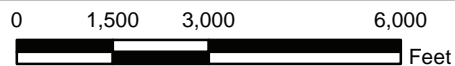
Legend

- CCR Monitoring Well Location
- Supplementary Site Monitoring Well Location
- Groundwater Elevation Contour (ft amsl)
Alluvial Aquifer; dashed where inferred
- Groundwater Elevation Contour (ft amsl)
Coconino Aquifer
- Groundwater Flow Direction
- Extent of Alluvial Material

Approximate Extent of CCR Unit

Notes and Abbreviations:

- MW-64A** Well Identification
 - 4966.15 Groundwater Elevation (ft amsl)
 - CCR Coal Combustion Residuals
 - ft amsl Feet above mean sea level
 - NM Not Monitored
- Note: Only wells with groundwater elevations were used in contouring



Arizona Public Service
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Navajo County, Arizona

Job No.	14-2018-2040
PM:	NC
Date:	1/29/2019
Scale:	1" = 3,000'



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Potentiometric Surface Map
4th Quarter 2018 (October Event)

FIGURE
2-4



Path: X:\Projects\2018\Projects\1420182040\APS Cholla Compliance_Support\WXD\Annual_Groundwater_Monitoring\2018\Figure2-4_4Q2018.mxd

APPENDIX A

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

CH_GW_AMonTrigNotif_020_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 Fly Ash Pond and the Bottom Ash Pond at Cholla 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.



Arizona Public Service Company
CCR Program
Environmental Policy & Programs

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

Telephone: 602-250-1000

May 16, 2018

**CCR Program Documentation
Groundwater Monitoring Program – Notification of Change to Monitoring Schedule
CH_GW_AMonTrigNotif_020_20180516**

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 Sedimentation Pond (SEDI) at the Cholla 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.



Arizona Public Service Company
CCR Program
Environmental Policy & Programs

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

Telephone: 602-250-1000

November 14, 2018

CCR Program Documentation

Groundwater Monitoring Program – Notification of Appendix IV Exceedances

CH_GW_AppIVExc_002_20181114

CH_GW_AppIVExc_003_20181114

Subject: GW – Notification of Appendix IV Exceedances; Cholla 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:

- Fly Ash Pond
 - Arsenic, Cobalt, Fluoride, Lithium, Molybdenum
- Bottom Ash Pond
 - Cobalt, Lithium

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.

APPENDIX B

**MONTGOMERY & ASSOCIATES TECHNICAL MEMORANDUM DOCUMENTING THE
RESULTS OF AN ALTERNATIVE SOURCE DEMONSTRATION FOR THE SEDI**



TECHNICAL MEMORANDUM

DATE: April 13, 2018 **PROJECT #:** 897.0705

TO: Michele Robertson & Douglas Lavarney, Arizona Public Service

FROM: Leslie Katz, P.G.

PROJECT: Cholla Power Plant Coal Combustion Residuals Program

SUBJECT: Results of Alternate Source Demonstration Evaluation for the SEDI Pond

Introduction

In accordance with a request from Arizona Public Service (APS), Montgomery & Associates (M&A) has conducted a hydrogeologic evaluation to assess the occurrence, chemical distribution, and potential sources of elevated sulfate and boron concentrations detected in two Coal Combustion Residuals (CCR) network monitor wells located downgradient of the Sedimentation Pond (SEDI) at the Cholla Power Plant, located near Joseph City, Arizona. Results of statistical analyses conducted on baseline water chemistry data from monitor wells M-56A and M-57A showed statistically higher concentrations relative to the SEDI background well (M-62A) for boron and sulfate, but not for the other Appendix III monitoring constituents (M&A, 2018a). Results of statistical analyses conducted for the SEDI are summarized in **Table 1** below.

Table 1. Mean Concentrations of Appendix III Constituents in Background and Downgradient SEDI Monitor Wells for Baseline Monitoring Period, November 2015 through September 2017

Well Identifier	Type	Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	pH (s.u.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
M-62A	Background	0.22	480	3,000	0.8	7.5	570	6,200
M-56A	Downgradient	0.26	240	1,900	0.4	7.6	630	3,900
M-57A	Downgradient	0.55	370	1,700	0.4	7.3	1,300	4,500
M-58A	Downgradient	0.22	270	1,900	0.4	7.6	500	3,900

Note: **Bold values indicate exceedances of background concentrations in downgradient monitor wells*

Although M-56A also had elevated concentrations relative to background monitor well M-62A, concentrations at M-57A were more distinct compared to the other SEDI CCR network wells and, therefore, this well was the principal focus of the evaluation.

The source of elevated sulfate and boron concentrations in M-57A is unclear. Considering the close proximity of M-57A to downgradient wells M-56A and M-58A, it is unexpected that its chemical composition would be distinct. And, although the SEDI pond is the nearest known potential source, water level gradients indicate that M-57A is situated in an area that could potentially be affected by several other upgradient or nearby sources. Due to this complexity, the SEDI was evaluated as the potential source for elevated concentrations at M-57A in addition to several potential alternate sources, including; the Bottom Ash Pond (BAP), the Fly Ash Pond (FAP), Cholla Reservoir, the West Area Retention Pond (WARP), the Storm Water Retention Pond (SWRP), and leaking pipelines. Regional variability in alluvium water chemistry was also evaluated.

Work conducted as part of the alternate source evaluation included the following:

1. Comparison of well construction and lithologic conditions at the four SEDI pond CCR monitor wells
2. Evaluation of water level trends, directions of groundwater movement, and gradients in the SEDI pond area
3. Estimates of travel time from potential alternate source areas to downgradient SEDI pond monitor wells
4. Review of the distribution of various Appendix III monitoring constituents in the SEDI pond and SEDI CCR wells using box plots
5. Evaluation of water quality trends for various Appendix III monitoring constituents in the SEDI pond and SEDI CCR wells
6. Evaluation of the relative distribution of cations and anions in the SEDI CCR wells, other area monitor wells, and various potential source waters using trilinear diagrams, and
7. Analysis of the potential leakage rate through the SEDI pond liner and resultant downgradient concentrations of Appendix III monitoring constituents using a simple mixing cell.

Because analyses were limited by available data and information, recommendations for further data collection are discussed in the sections below. The location of the CCR

network wells, other monitoring wells used in analyses, the CCR Units, and other potential alternate sources are shown on **Figure 1**. **Figure 2** shows alluvial aquifer water level elevation contours for the Cholla area based on data obtained in June-July 2017.

Potential Sources

Sedimentation Pond (SEDI)

The SEDI is a one-half acre holding pond located northwest from the main power plant area, near the confluence of the Tanner Wash and the Little Colorado River (**Figure 1**). Based on the storage capacity of 3,500,000 gallons provided in the Cholla Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit (APP), the pond is on average about 21 feet deep (ADEQ, 2017). The SEDI was constructed with a 2 foot thick compacted clay liner with a reported permeability of 1×10^{-7} centimeters/second (cm/sec). It receives discharge from multiple sources, including the WARP and Secondary Wastewater Treatment Plant (SWTP). Excess water from the SEDI discharges to the General Water Sump or to the Bottom Ash Transfer Sump (ADEQ, 2017).

The uppermost aquifer for the SEDI is the Little Colorado River (LCR) alluvial aquifer. In the Cholla area, direction of groundwater movement in the LCR alluvium is generally from east to west (**Figure 2**). The SEDI monitoring network includes four alluvial wells, all with nearly identical construction details (M&A, 2017). The three downgradient SEDI CCR network wells (M-56A, M-57A, and M-58A) are situated in a roughly northeast-southwest trending line along the northwestern edge of the SEDI; the background well, M-62A, is located less than 300 feet to the east-southeast of the SEDI (**Figure 1**).

Potential Alternate Sources

- Several pipelines are reported by Cholla operations personnel to run through the SEDI Pond area, although their exact locations and the chemistry of the water they convey are not known. A pipeline leak could serve as a localized source that would potentially explain the difference in water quality observed between the SEDI monitor wells.
- The SWRP is a 7.6 acre holding pond located upgradient of the SEDI Pond, just east of the coal pile (**Figure 1**). It receives surface runoff, among other discharges, and water quality data for this pond has historically shown elevated sulfate and boron concentrations.

- The WARP receives surface runoff and discharge of various process waters. Although it is located downgradient of the SEDI pond, it is in close proximity (less than 300 feet) to the southwest edge of the SEDI and water quality data for this pond has historically shown elevated sulfate concentrations.
- Cholla Reservoir is the largest water body upgradient of the SEDI Pond. Cholla Reservoir is used to store and cool blow-down water from selected plant cooling towers. Water in Cholla Reservoir generally comprises groundwater from the industrial wellfield, which is sourced from the Coconino aquifer concentrated through the cooling tower cycling process. Therefore, concentrations of most common constituents are elevated in Cholla Reservoir water; concentrations of boron in Cholla Reservoir are largely unknown.
- The BAP is an unlined CCR unit located upgradient from the SEDI along Tanner Wash, which discharges into the LCR alluvium in the vicinity of the SEDI (**Figure 2**). Elevated concentrations of sulfate and boron have been documented both in the BAP and in downgradient monitor wells, and it may comprise a source of water to the SEDI area. The BAP was constructed in 1978.
- The FAP is an unlined CCR unit located upgradient from the SEDI. Elevated concentrations of sulfate and boron have been documented both in the FAP and in downgradient monitor wells, and it may comprise a source of water to the SEDI area. The FAP was constructed in 1978.

Alluvial Water Quality

Background alluvial water quality is known to vary widely based on geologic factors. For the purpose of investigating whether concentrations of boron and sulfate at M-57A are anomalous, water quality in SEDI CCR wells was compared with other alluvial wells in the area, including along Tanner Wash and both up- and downgradient of the SEDI in the LCR alluvium.

With respect to Tanner Wash, there is reason to suspect that background water quality has naturally elevated sulfate and total dissolved solids (TDS) concentrations. Groundwater in the Tanner Wash alluvial aquifer moves through sediments derived from erosion of the Moenkopi and Chinle Formations, which occur at the surface in the Tanner Wash watershed. Both of these formations are composed of fine-grained evaporitic sediments, which would be anticipated to produce high TDS concentrations in groundwater.

Similarly, data from the LCR alluvium suggests that background water quality is variable and in some cases fairly poor. Due to elevated TDS concentrations, limited saturated thickness, and recharge reliability constraints, groundwater in the LCR and Tanner Wash Alluvium is not used to a significant extent for water supplies. Outside of the Cholla area, the alluvium is reported to supply groundwater to stock wells along LCR tributaries and to a few domestic wells along the LCR.

Well Construction and Lithology

Well construction and lithology for the SEDI CCR wells (M-56A, M-57A, M-58A and M-62A) were evaluated to determine if construction and/or geologic conditions at M-57A are unique in any manner relative to the other SEDI CCR wells, possibly helping to explain observed differences in water chemistry.

Review of well construction diagrams shows that all four SEDI CCR wells are similarly constructed. Well casings comprise a 4 inch diameter PVC pipe set to a total depth of approximately 85 feet below land surface (bls), with a screened interval from about 40 feet to 85 feet and a stainless steel end cap. The downgradient wells were constructed between October 7 and October 13, 2015 and M-62A was constructed on November 17, 2015. SEDI CCR well schematics are given in **Appendix A**.

The lithologic descriptions prepared from drill cuttings from the SEDI CCR wells show generally similar geologic conditions at all of the wells. The one exception is the uppermost 10 feet. At M-57A, the interval from 0 feet to 10 feet has a significantly higher gravel content (about 30%) compared to the other wells (with 5% to 10%). In addition, the gravel fraction size is larger in the upper 10-foot interval at M-57A - 1.2 inches compared to the other wells, where gravel ranges from 0.2 inches to 0.8 inches in diameter. Additionally, lithologic descriptions for the two SEDI wells where downgradient exceedances of background were noted, M-56A and M-57A, both indicate the presence of “coal” in the top 10 feet. No coal is noted in the lithologic descriptions for M-58A or M-62A. The increase in gravel content at M-57A and presence of coal at M-56A and M-57A could indicate the presence of non-native fill materials in the upper 10-feet. It is not unexpected that surface soils containing non-native materials would occur in the vicinity of the SEDI pond. APS reports that significant underground pipeline and other construction activities have occurred in this area, possibly closer to M-56A and M-57A

than the other two SEDI CCR wells. Sediments at a depth greater than 10 feet bls are fairly similar for the four SEDI CCR wells. Clay with sand is reported to about 40 feet bls. Lithology across the screened interval (40 to 80 feet bls) in the downgradient wells is generally well graded gravel with sand or well graded sand with gravel; whereas the screened interval at M-62A consists of mostly sand with a greater percentage of fines throughout the screened interval. Lithologic descriptions of the SEDI CCR wells are shown in **Appendix B**.

Since no substantial differences in well construction or geologic conditions were observed across the screened interval, it seems unlikely that M-57A is receiving water from a different region within the aquifer than the other SEDI CCR wells, leading to differences in water chemistry. However, the increased gravel fraction and larger gravel size in the top 10 feet observed at M-57A could result in a greater potential for vertical infiltration to occur from shallow/surface sources at M-57A compared to the other SEDI CCR wells. For example, there is a potential for preferential flow toward M-57A if a surface or near surface leak is present and a greater potential for that water to infiltrate at M-57A. Additional information regarding the locations of pipelines and/or other potentially shallow sources in the vicinity of the SEDI could help explain if differences observed in M-57A, and to a lesser extent M-56A, could be a result of a localized leak.

Groundwater Levels and Gradients

Alluvial Water Levels

Depth to water level in the LCR and Tanner Wash Alluvium ranges from a few feet to more than 40 feet bls in the Cholla area. In the vicinity of the SEDI CCR wells, depth to water is about 40 feet bls. Regionally, direction of groundwater movement generally parallels the stream channels, flowing predominantly from the east to west in the LCR and northeast to southwest in the Tanner Wash Alluvium (**Figure 2**). Groundwater movement in the LCR appears to be influenced by the presence of deeper paleochannels, where alluvium thickness exceeds 100 feet, as shown on **Figure 3**. As shown on **Figure 4**, water levels at LCR alluvium wells generally show a decreasing trend from January 2007 until mid-2015 (approximately 4 feet decline), followed by generally increasing trend through early 2017 (approximately 3 feet rise). Although the period of record for water levels in the SEDI CCR wells is only from November 2015 through February 2018, these wells

appear to be generally increasing over that period, following a similar trend to that observed in other LCR alluvium wells (**Figure 4**).

The fact that water level rise is observed regionally in the LCR alluvium, not just locally near the SEDI, indicates that the cause for the rise is not related to the SEDI. Changes in alluvium water levels may be caused by changes in factors such as precipitation, surface water runoff, and/or pumping. However, because the SEDI wells were installed near the beginning of the period of regional increasing water levels, it is possible that changing water levels may have had a localized effect on groundwater gradients and flow directions in the vicinity of the SEDI. Additionally, the observed water level rise would have resulted in resaturation of sediments, which could potentially mobilize constituents present in the vadose zone.

Groundwater Gradients and Flow Direction

As reported in the Design, Installation, and Evaluation of Completeness of Groundwater Monitoring Networks Report (CCR Network Certification Report, M&A, 2017), groundwater gradients in the area immediately downgradient of the FAP (0.0240 feet/foot) and BAP (0.0196 feet/foot) are substantially higher than in the LCR alluvium near the SEDI (0.0015 feet/foot). Data from a total of 15 monitoring rounds (November 2015 through February 2018) indicates that the flow direction in the vicinity of the SEDI is generally to the west-southwest, with some variability in direction and velocity, as shown on **Figure 5**. Groundwater flow direction and gradient were calculated by method of triangulation, using locations and water level elevations from three of the SEDI wells (M-56A, M-58A, and M-62A) for each monitoring round during the baseline monitoring period. Groundwater velocity was computed using reported LCR aquifer parameters (hydraulic conductivity of 66 feet/day and an effective porosity of 0.13). Groundwater flow direction ranged from about 219 degrees to 303 degrees (clockwise from north) and was predominantly between 255 degrees and 260 degrees (**Figure 5**). The groundwater velocity ranged from approximately 0.14 feet/day to 0.49 feet/day and was predominantly between 0.20 feet/day and 0.30 feet/day (**Figure 5**).

A round of water level measurements was obtained from wells in the vicinity of the SEDI on February 22, 2018. **Figure 6** shows water level elevations and inferred water level contours from this monitoring round. The groundwater flow direction and velocity from

February 2018 round was consistent with the predominant direction and velocity from the other 14 monitoring rounds, with a groundwater flow direction of about 260 degrees and a velocity of about 0.25 feet/day (**Figure 5**). There is no mounding observed below or in the vicinity of the SEDI that would indicate a substantial flux of water from the SEDI; in fact, water levels in the downgradient SEDI CCR wells are actually lower than nearby wells, resulting in what appears to be a depression near the SEDI. It is important to note that because the gradient is so shallow near the SEDI (0.0003 feet/foot to 0.0096 feet/foot), even minor measurement discrepancies between wells could affect the inferred water level contours. Based on **Figure 6**, potential alternate sources located upgradient of the SEDI CCR wells include: the FAP, the BAP, Cholla Reservoir, and the SWRP (**Figure 1**).

Travel Time Estimates

Travel time calculations were conducted to estimate how long it would take for groundwater to travel from the various alternate potential upgradient sources to SEDI monitor well M-57A. **Table 2** below summarizes the potential upgradient sources and the estimated time it would take for water from these sources, once it entered the aquifer, to reach M-57A. The aquifer parameters and method for calculating travel time can be found in the CCR Network Certification Report (M&A, 2017); gradients were based on the June-July 2017 water levels.

Table 2. Travel Time Estimates from Potential Upgradient Alternate Sources to SEDI CCR Well M-57A

Description of Travel Path	Distance ^a (feet)	n _e ^b	K ^c (feet/day)	ΔH ^d (feet)	Gradient ^e (feet/foot)	Travel time (years)
FAP to edge of FAP Alluvium	1,667	0.13	1	40	0.0240	25
Edge of FAP Alluvium to M-57A	8,875	0.13	66	9	0.0010	47
FAP to M-57A						72
BAP to edge of Tanner Wash Alluvium	2,554	0.13	1	50	0.0196	46
Edge of Tanner Wash Alluvium to M-57A	2,720	0.13	66	9	0.0033	4
BAP to M-57A						51
Cholla Reservoir (M-40AS) to M-57A	4,300	0.13	66	4	0.0009	24
SWRP to M-57A	2,950	0.13	66	4	0.0014	12

- a) Straight-line distance*
- b) Effective porosity*
- c) Hydraulic conductivity of alluvium on travel path*
- d) Change in hydraulic head across travel path*
- e) Hydraulic gradient across travel path*

Based on the travel time calculations, and given the fact that the FAP and BAP were both constructed in 1978, it appears unlikely that groundwater would have travelled from the FAP or BAP to impact groundwater in the vicinity of the SEDI CCR wells. Groundwater from the vicinity of Cholla Reservoir (M-40AS) or the SWRP could more reasonably have affected the SEDI wells.

Water Chemistry Analysis

Water Chemistry Distribution in Box Plots

Box plots were created to understand how the distribution of concentrations observed in groundwater samples from M-57A compares to the SEDI itself and to other wells in the region. **Appendix C** shows box plots for the Appendix III monitoring constituents for the SEDI, the SEDI CCR wells, and a group of wells nearby for which data was available,

including: CR-1, DM-5, M-47A, M-48A, W-317, and the other CCR network wells, as shown on **Figure 1**. The plots present a five point summary of the data separated by quartiles; dots represent outliers, and the notches represent 95% confidence intervals for the median. Only recent data (since 2012) was used to generate the box plots. It should be noted that in some cases, fewer than five data points were available for a given well or source.

Review of the box plots indicates that water chemistry at M-57A appears most anomalous in relation to pH and concentrations of boron and sulfate. The range of boron concentrations at M-57A does not overlap with the range seen at any of the other nearby wells, as shown on **Figure C-1**. Boron data for the SEDI spans from 1987 to 2002, historically varying from 0.40 to 3.1 mg/L. The most recent boron sample for the SEDI was collected in 2002, and is therefore not shown on the box plot. The concentration of the SEDI in 2002 was 0.58 milligrams per liter (mg/L) and is similar to recent M-57A boron concentrations. Collection of more recent boron data from the SEDI would be helpful for understanding current concentrations in the SEDI and potential variability since 2002.

Figure C-6 shows the relative concentrations of sulfate at the SEDI and SEDI CCR monitor wells. Sulfate concentrations at the SEDI have been as high as 3,200 mg/L. However, excluding outliers, the range of sulfate concentration seen at M-57A (750 to 1,600 mg/L) is similar to the range in the SEDI (675 to 1,440 mg/L).

The pH at M-57A is relatively low. The median pH value at M-57A is lower than that reported for any of the other SEDI wells or for the SEDI itself, as shown on **Figure C-5**. This may point to impacts to M-57A from a different, unidentified source with greater acidity than the SEDI.

In relation to the other Appendix III monitoring constituents, including calcium, chloride, and TDS, the range of concentrations reported for M-57A falls within the range of M-62A and the SEDI. This indicates that concentrations observed at M-57A could be the result of mixing between M-62A and the SEDI. On the other hand, M-57A generally appears different from the other two downgradient SEDI wells, M-56A and M-58A, which look similar to each other. M-57A is higher in calcium, lower in chloride, and higher in TDS

than M-56A and M-58A. With the exception of the SEDI pond, there have been very few detectable concentrations of fluoride in monitoring wells in this area.

Water Chemistry Distribution in Time Series Plots

Time series plots help define the magnitude and trends of constituents over time. Since the SEDI wells only have data from November 2015, but other wells tend to have more data earlier than 2015, data from 2012 through February 2018 was evaluated. Boron and sulfate are the two constituents with exceedances in downgradient SEDI CCR wells; time series plots for boron and sulfate are shown on **Figures 7 and 8** for the SEDI, the SEDI CCR wells, and other wells in the SEDI area. Time series plots for a broader set of wells and constituents, including boron, calcium, chloride, fluoride, magnesium, pH, potassium, sodium, sulfate, and TDS, are provided in **Appendix D**.

Results of the statistical analysis of baseline CCR data (M&A, 2018b) indicated increasing trends in boron, calcium, and TDS at downgradient monitor well M-57A. Downgradient monitor well M-56A showed trends in calcium and sulfate. The SEDI CCR background well, M-62A, also shows increasing concentrations of calcium, chloride, and TDS which suggests that there are conditions in the area causing concentrations to rise that are unrelated to the SEDI. As noted above in the discussion of rising water levels, resaturation of vadose zone sediments and resultant mobilization of constituents could be a factor.

Water quality for the initial November 21, 2015 development sample from M-57A is more similar to concentrations at M-56A and M-58A than more recent samples from this well. While this is particularly true for calcium, chloride, pH, and TDS (**Appendix D**), it is also for sulfate. The sulfate concentration from the M-57A development sample is the lowest, at 750 mg/L, and jumps to 1,000 mg/L in a sample from the first official CCR monitoring round just 9 days later. While development samples are not considered representative of long-term conditions, this difference may provide further support for the view that anomalous water quality conditions at M-57A are localized.

Trilinear Diagrams

Trilinear (Piper) diagrams show relative proportions of major cations and anions for all samples simultaneously so that distinct groupings and mixing relationships, if present, can be identified and compared. Data shown in the trilinear diagrams is from 2012 through

present with the exception of four LCR alluvium wells (M-40AS, M-40AD, M-41A and M-43A). These wells only have one data point from 2008.

Figure 9 shows a trilinear diagram of the chemical composition of water from all SEDI CCR wells and the SEDI pond. Samples from the SEDI CCR wells plot in a relatively tight cluster in the cation triangle. This is also true of the anion triangle, with the exception of M-57A. The SEDI CCR wells have a sodium-magnesium-chloride water type. Well M-57A has a higher sulfate proportion than the other SEDI CCR wells. The SEDI pond has a magnesium-chloride to magnesium-sulfate water type, consisting of a greater proportion of sulfate and lower chloride relative to the SEDI CCR wells. Relative to the other SEDI CCR wells, M-57A has a unique anion composition that appears to be trending toward the SEDI, most notably with respect to sulfate. However, the cation composition of M-57A does not appear to be as closely aligned with the SEDI. This suggests that additional information is needed to point to the SEDI as the source of the elevated sulfate composition at M-57A with any certainty.

Figure 10 shows a trilinear diagram of the composition of M-57A along with potential surface sources, including: the SEDI, BAP, FAP, SWRP, Cholla Reservoir, and the WARP. M-57A has a composition similar to the SWRP in relation to calcium and bicarbonate. Cholla Reservoir has a distinct anion signature due to a greater proportion of carbonates; however, the sulfate proportion in Cholla Reservoir is similar to M-57A. The WARP composition is most similar to the SEDI. The composition of the FAP and BAP are variable. Because other potential alternate sources have similar ion compositions to the SEDI, it is difficult to conclude the SEDI or any potential alternate sources are responsible for the elevated concentrations observed at M-57A.

Figure 11 shows a trilinear diagram of the composition of SEDI CCR wells along with the FAP and BAP downgradient CCR wells. Since the FAP and BAP pond chemical signatures are variable, showing the downgradient wells is useful to capture the transformations and mixing that occur in groundwater. The groundwater composition in the downgradient FAP wells (M-50A, M-51A, and W-123) is a sodium-chloride water type and the BAP wells (W-305, W-306, W-314, and M-52A) are generally a sodium-sulfate water type. The SEDI wells have more carbonate than the FAP and BAP wells, a slightly greater proportion of magnesium than the BAP wells and a slightly smaller proportion of sodium than the FAP wells.

Figure 12 shows a trilinear diagram of the compositions of the M-57A along with the other LCR alluvium wells. Wells located along the northern side of Cholla Reservoir (M-40AD, M-40AS, and M-43A) have very similar composition, based on 2008 data, to that observed at M-57A during the period November 2015 through February 2018. Additionally, M-64A, the background LCR alluvial well for the FAP and BAP, also plots close to M-57A. Obtaining more recent data from M-40AS, M-40AD, and M-43A may provide insights into why the chemical composition of groundwater in those wells appears to be similar to M-57A and the extent to which changes in regional water quality in the LCR alluvium are occurring over time. Overall, these diagrams indicate that there is significant variability in ion composition in the LCR alluvial aquifer.

The trilinear diagrams provide valuable insight into the ion composition in SEDI CCR wells, the SEDI, potential alternate sources, and other LCR alluvium wells. These diagrams indicate M-57A is unique from the other SEDI wells in its anion composition, which could indicate mixing of background water with water from either the SEDI or another potential alternate source with similar ionic composition. Additionally, the existence of LCR alluvium wells upgradient to the SEDI with similar ion composition to M-57A indicates significant variability in the LCR alluvial aquifer and demonstrates that this range includes the water quality at M-57A. Overall, this analysis shows that the SEDI cannot be either ruled out or concluded to be a source.

Sedimentation Pond Mass Balance

A conservative analysis was conducted to put bounds on potential impacts that could occur from infiltration of SEDI water through the clay liner into the underlying aquifer. Assuming the entire ½-acre area of the SEDI pond is being used and that it is maintained at a fairly constant level of about half full (10.7 feet), and using the reported liner permeability of 1×10^{-7} cm/sec and an evaporation rate near Holbrook of about 4.5 feet/year (Cooley, 1970), there is potential for vertical infiltration. Results indicate a potential flux through the liner of approximately 0.6 acre-feet/year.

A simple mixing model was then used to estimate potential aquifer concentrations resulting from the mixing of the water infiltrating from the SEDI with groundwater flowing in the upper 40 feet of the aquifer beneath the SEDI. Using an average gradient of 0.0006 (calculated with the triangulation method using CCR network wells M-56A,

M-58A, and M-62A), and a hydraulic conductivity of 66 feet/day (M&A, 2017), the aquifer flux beneath the SEDI was estimated to be 1.8 acre-feet/year. It should be noted that the calculation assumed complete and instantaneous mixing and is sensitive to many parameters which are uncertain, including: average hydraulic head in the SEDI, wetted area of the SEDI, aquifer hydraulic conductivity, and aquifer thickness for mixing. Additionally, the calculation was not performed for constituents which displayed a trend in background well M-62A (calcium, chloride, TDS). Results of the mixing cell calculation for boron, fluoride, and sulfate are summarized in **Table 3** below.

Table 3. Mixing Cell Calculation Results for Boron, Fluoride, and Sulfate

	Concentrations (mg/L)						
	Mixing Cell Components				Mixing Result	M-57A for Comparison	
	SEDI	Data Type	M-62A	Data Type		M-57A	Data Type
Boron	1.15	1987-2002 average	0.21	2015-2018 average	0.43	0.55	2015-2018 average
Fluoride	1.5	2012-2017 average	0	minimum possible	0.35	0.4	detection limit
Fluoride	1.5	2012-2017 average	0.2	half detection limit	0.50	0.42	maximum
Sulfate	1,437	2012-2017 average	551	2015-2018 average	758	1,225	2015-2018 average
Sulfate	3,200	2012-2017 maximum	551	2015-2018 average	1,169	1,225	2015-2018 average

For boron, the mixing calculation used an average concentration of 1.15 mg/L in the SEDI water based on data from 1987 through 2002. Mixing with the average aquifer background concentration for boron of 0.21 mg/L from M-62A results in a concentration of 0.43 mg/L. Because early time boron data was used for the SEDI and because there is an increasing trend in boron at M-57A, it may be most appropriate to compare the mixing result to the earliest measured concentration in November 2015, which was 0.42 mg/L. The calculation indicates that it is possible for boron concentrations observed at M-57A to be the result of mixing from water infiltrating through the liner at the SEDI with background aquifer water in the area. However, more recent boron samples from the SEDI are needed to improve the calculation.

In the SEDI area, fluoride concentrations of any significance are only detected in the SEDI pond itself, with an average concentration of 1.5 mg/L since 2012. There have been no

fluoride detections at M-62A, detections at M-56A ranging from 0.42 to 0.49 mg/L, only one detection at M-58A of 0.43 mg/L, and only one detection at M-57A of 0.42 mg/L. All of these concentrations are close to the detection limit of 0.40 mg/L. If the mixing calculation is performed assuming no fluoride at M-62A, the resulting concentration from mixing SEDI water with background aquifer water results in a concentration that is below the detection limit. If the calculation is performed using one-half the detection limit at M-62A (0.2 mg/L), the resulting concentration is 0.50 mg/L, which is higher than the concentrations detected at any of the SEDI CCR network wells. Due to the fact that the mixing result for fluoride is sensitive to the value assumed for non-detect values at M-62A, the results of the calculation are inconclusive.

Sulfate concentrations in the SEDI have historically been highly variable. If the mixing calculation is performed using the average concentrations since 2012, with concentrations of 551 mg/L at M-62A and 1,437 mg/L at the SEDI, the resulting concentration of 758 mg/L would not explain the high concentrations observed at M-57A, which has an average sulfate concentration of 1,225 mg/L. However, if the highest value recorded for the SEDI in recent years (3,200 mg/L) is used instead of the average SEDI concentration for the mixing cell calculation, the resulting concentration is 1,169 mg/L. Based on these calculations, it is unlikely that mixing of water potentially infiltrating through the liner at the SEDI with background aquifer water would explain the high sulfate concentrations observed at M-57A.

Summary and Recommendations

While the SEDI cannot be ruled out as the source for elevated concentrations of boron and sulfate in downgradient SEDI CCR monitor wells, particularly M-57A, there are several reasons that it cannot, conversely, be concluded with any certainty that the SEDI is the source. Some of the issues that make drawing conclusions more challenging include:

1. Trends in specific Appendix III monitoring constituents, particularly in the upgradient monitor well M-62A
2. Water quality at M-57A that is distinct from the other downgradient wells, which are located in very close proximity to each other
3. Differences in the distribution of chemical constituents between the SEDI and M-57A that cannot be explained through a simple mixing calculation

4. The presence of coarser-grained material in the upper part of the vadose zone at M-57A, and the associated potential for enhanced infiltration
5. Rising regional water levels in the LCR alluvium that may be mobilizing constituents in the vadose zone
6. A dominant direction of flow in the SEDI area that would favor migration of potential water leaking from the SEDI to the one downgradient well (M-58A) that does not show elevated concentrations of any of the Appendix III constituents relative to background
7. The presence of pipelines in the area that transport concentrated wastewater and acid streams that could be leaking and causing the observed localized impacts at M-57A
8. The presence of other sources of water with elevated sulfate and boron concentrations in the area that could be contributing to observed concentrations at M-57A (specifically the WARP, SWRP, and/or Tanner Wash)
9. The existence of similar ion compositions to the SEDI in potential alternate sources (specifically the WARP and to a lesser extent the SWRP)
10. The existence of similar ion compositions to M-57A in other LCR wells (M-40AS, M-40AD and M-43A) located upgradient of the SEDI

Because an alternate source cannot be identified with any certainty, it is recommended that the SEDI monitor wells move into assessment monitoring, adding Appendix IV constituents to the list of analytes and maintaining a semi-annual monitoring schedule, consistent with the CCR Rule. However, in an effort to fill in data/information gaps and potentially clarify inconsistencies, the following should be considered for future work to enhance the understanding of water quality conditions in the SEDI area:

1. Add boron to the sampling program for the SEDI to provide an opportunity to evaluate more recent concentrations.
2. Add nitrate to the sampling program for the SEDI and the SEDI CCR wells as a unique indicator parameter to evaluate potential impacts from SWTP wastewater that discharges to the SEDI.
3. Sample additional LCR alluvium wells in the vicinity of and downgradient from the SEDI, including VRP wells, to evaluate potential impacts and changes over time.

4. Sample additional LCR alluvium wells across the Cholla area, including M-40AS, M-40AD, and M-43A, to evaluate similarities and differences with water quality in the SEDI area and evaluate associated changes over time.
5. Record additional information concerning operations of the SEDI, including pond levels, inflow, outflows, and maintenance activities.
6. Evaluate the potential usefulness of sulfate isotopes to characterize signatures for the various sources of sulfate at the site (CCR units, Tanner Wash, water or acids in area pipelines, Cholla Reservoir, etc.) and compare them to groundwater signatures.
7. Obtain additional information on pipeline locations and fluids being transported in these pipelines.
8. Obtain information on the timing and location of past spills in the area of the SEDI.

References

- Cooley, K.R., 1970, Evaporation from open water surfaces in Arizona, University of Arizona. Agricultural Experiment Station, United States. Department of Agriculture, United States. Extension Service, Folder 159.
- ADEQ, 2017, State of Arizona Aquifer Protection Permit No. P- 100568 Place ID 447, LTF 65132.
- Montgomery & Associates, 2017, Cholla Power Plant Coal Combustion Residuals Program – Design, Installation, and Evaluation of Completeness of Groundwater Monitoring Networks, September 19, 2017.
- _____, 2018a, Cholla Power Plant Coal Combustion Residuals Program - Statistical Analysis of Baseline Groundwater Monitoring Data November 2015 through September 2017, January 12, 2018.
- _____, 2018b, Annual Groundwater Monitoring and Corrective Action Report for Cholla Power Plant Coal Combustion Residuals Program, November 2015 - December 2017, January 30, 2018.

EXPLANATION

Approximate Extent of Coal Combustion Residual Unit

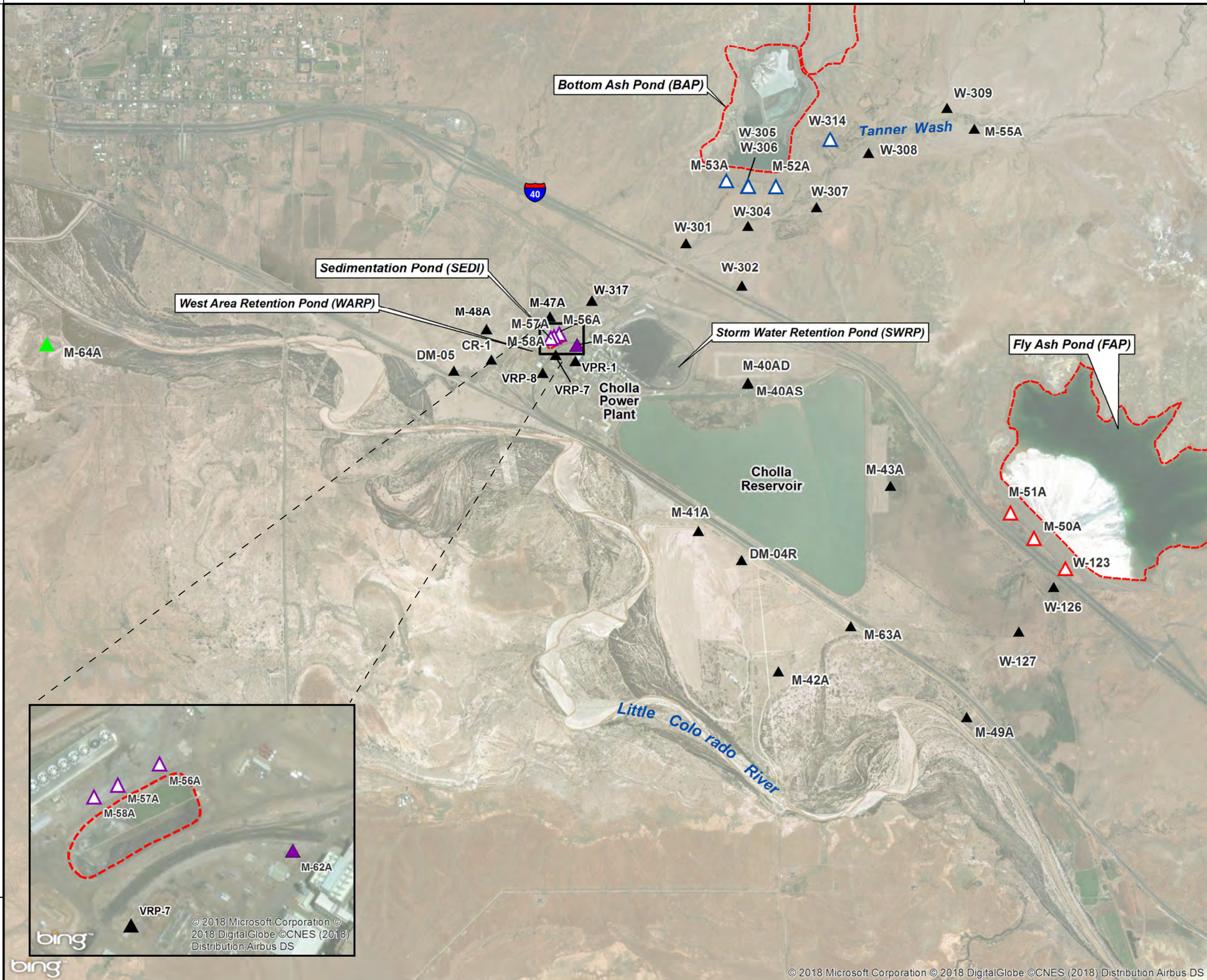
M-51A Alluvium Monitor Well Location and Identifier

CCR WELLS:

- Background, Fly Ash Pond and Bottom Ash Pond Well
- Downgradient, Bottom Ash Pond
- Downgradient, Fly Ash Pond
- Upgradient, Sedimentation Pond
- Downgradient, Sedimentation Pond

OTHER WELLS:

Monitor Well

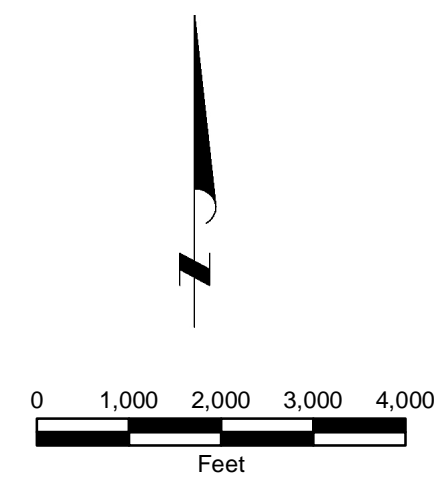


T. 18 N.

T. 18 N.

T. 17 N.

T. 17 N.



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ALTERNATE SOURCE DEMONSTRATION SITE LOCATION MAP

MONTGOMERY & ASSOCIATES
 Water Resource Consultants

2018
 FIGURE 1

© 2018 Microsoft Corporation ©
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 Distribution Airbus DS

EXPLANATION

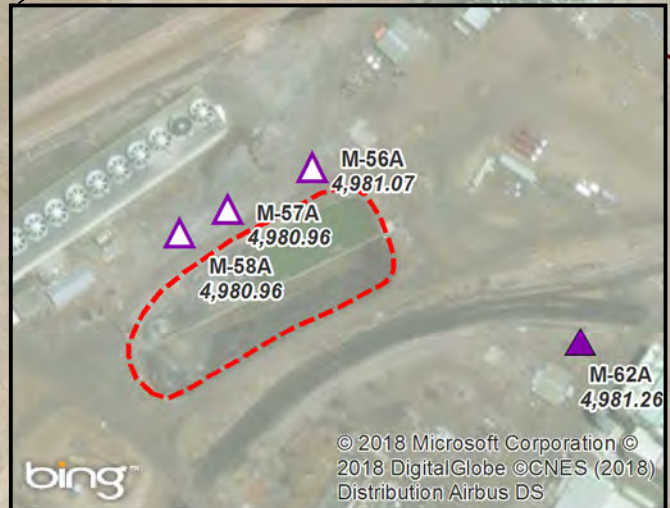
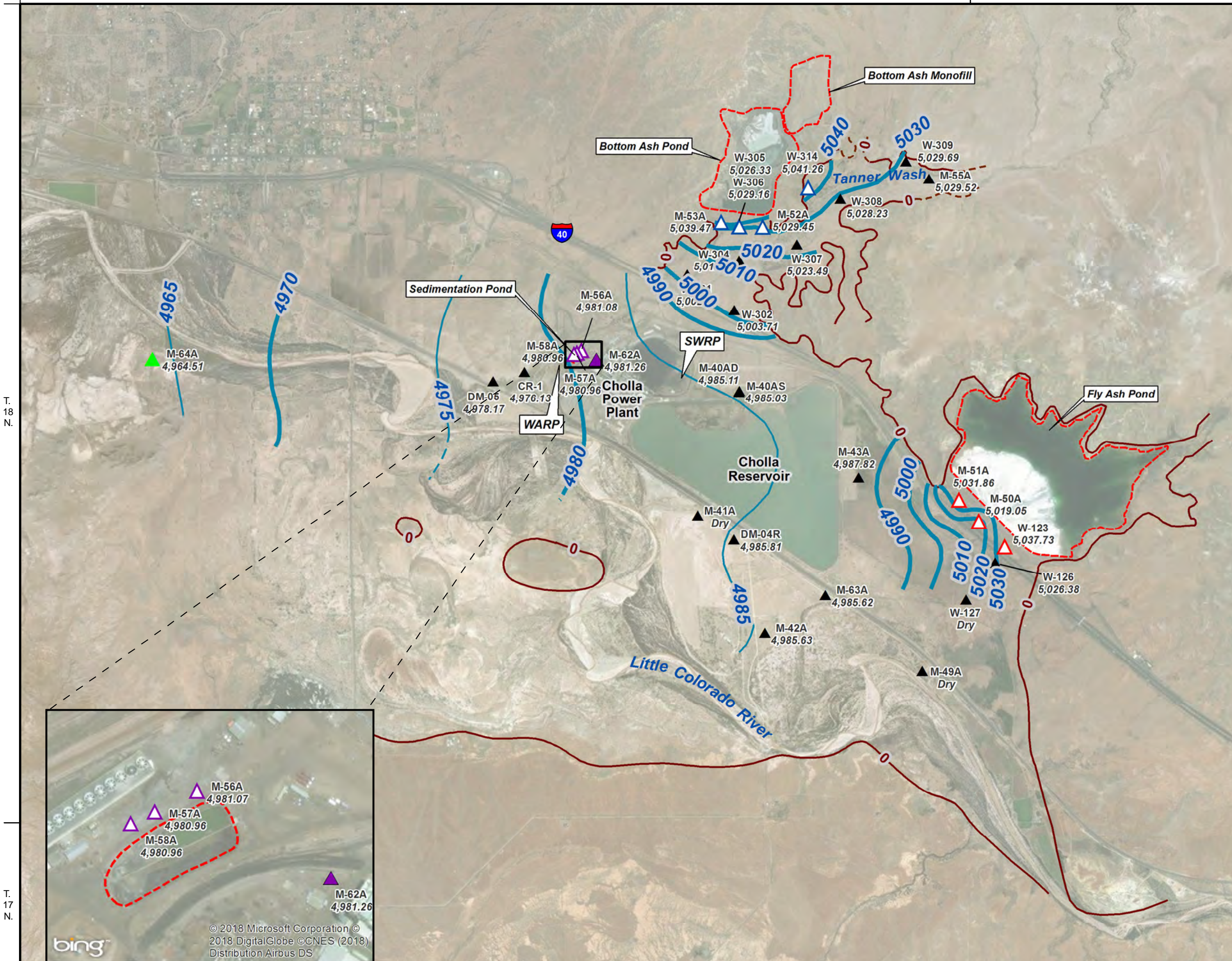
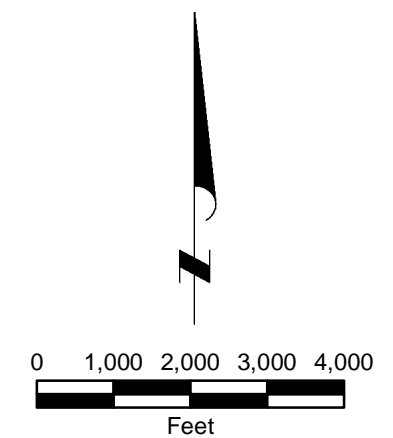
- Approximate Extent of Coal Combustion Residual Unit
- Estimated Extent of Alluvium
- 5,030 --- 10-Foot Contour of Water Level Elevation in Alluvial Aquifer, in feet above mean sea level (dashed where inferred)
- 4,985 --- 5-Foot Contour of Water Level Elevation in Alluvial Aquifer, in feet above mean sea level (dashed where inferred)
- ▲ M-51A Alluvium Monitor Well Location and Identifier
5,031.85 — Elevation of Water Level, June - July 2017, in feet above mean sea level

CCR WELLS:

- ▲ Background, Fly Ash Pond and Bottom Ash Pond Well
- ▲ Downgradient, Bottom Ash Pond
- ▲ Downgradient, Fly Ash Pond
- ▲ Upgradient, Sedimentation Pond
- ▲ Downgradient, Sedimentation Pond

OTHER WELLS:

- ▲ Monitor Well



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NAVAJO COUNTY, ARIZONA

**ALLUVIAL AQUIFER
WATER LEVEL ELEVATION
JUNE - JULY 2017**

MONTGOMERY & ASSOCIATES
Water Resource Consultants

2017
FIGURE 2

© 2018 Microsoft Corporation ©
2018 DigitalGlobe ©CNES (2018)
Distribution Airbus DS

EXPLANATION

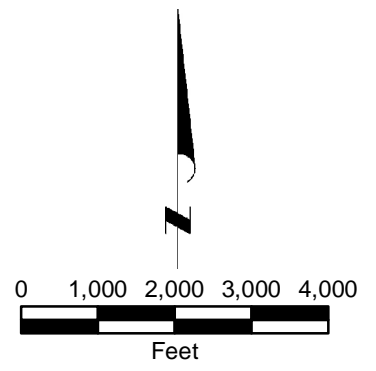
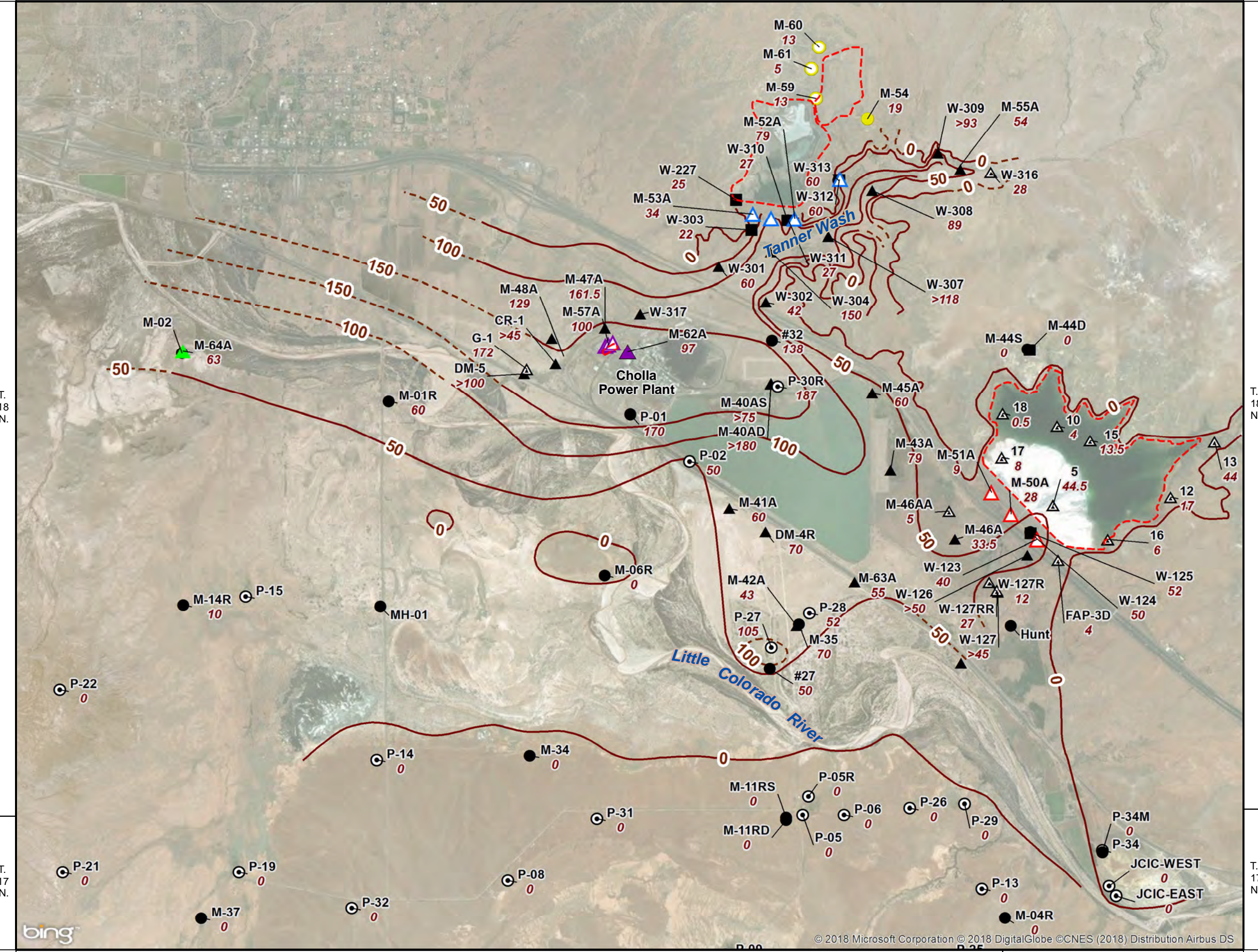
- Approximate Extent of Coal Combustion Residual Unit
- 50 Contour of Alluvium Thickness, in feet (dashed where inferred)
- ▲ Well Location and Identifier
- 9 Thickness of Alluvium, in feet

CCR WELLS:

- ▲ Alluvium, Background, Fly Ash Pond and Bottom Ash Pond
- ▲ Alluvium, Downgradient, Bottom Ash Pond
- ▲ Alluvium, Downgradient, Fly Ash Pond
- ▲ Alluvium, Downgradient, Sedimentation Pond
- ▲ Alluvium, Upgradient, Sedimentation Pond
- Coconino, Downgradient, Bottom Ash Monofill
- Coconino, Upgradient, Bottom Ash Monofill


OTHER WELLS:

- ▲ Alluvium, Boring
- ▲ Alluvium, Monitor
- Moenkopi, Monitor
- Coconino, Monitor
- ⊙ Coconino, Production



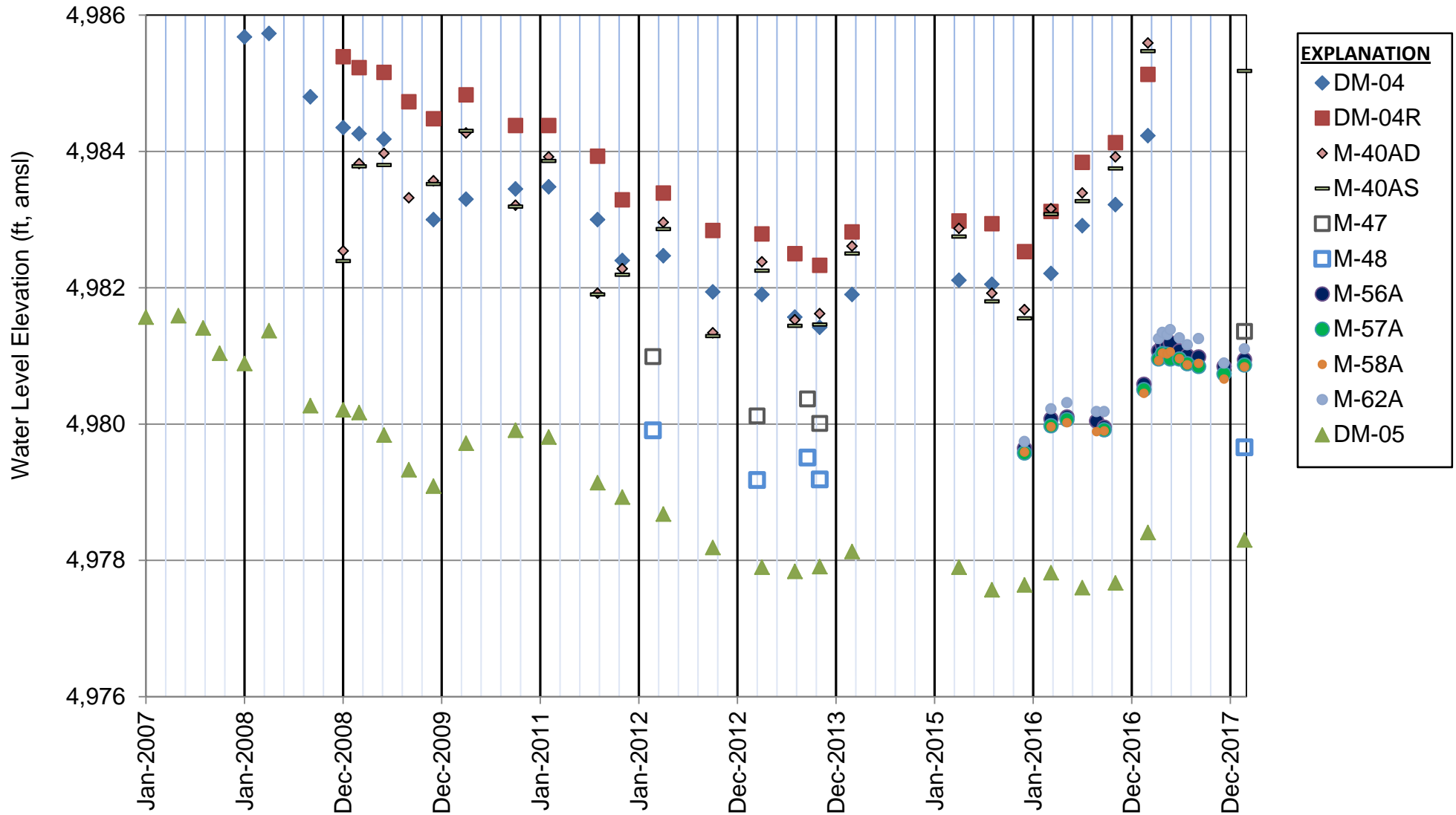
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ALLUVIUM THICKNESS



2017

FIGURE 3



**FIGURE 4. HYDROGRAPH FOR ALLUVIAL GROUNDWATER WELLS IN THE VICINITY OF THE SEDIMENTATION POND
JANUARY 2007 THROUGH FEBRUARY 2018, APS CHOLLA COAL RESIDUAL (CCR), NAVAJO COUNTY, ARIZONA**

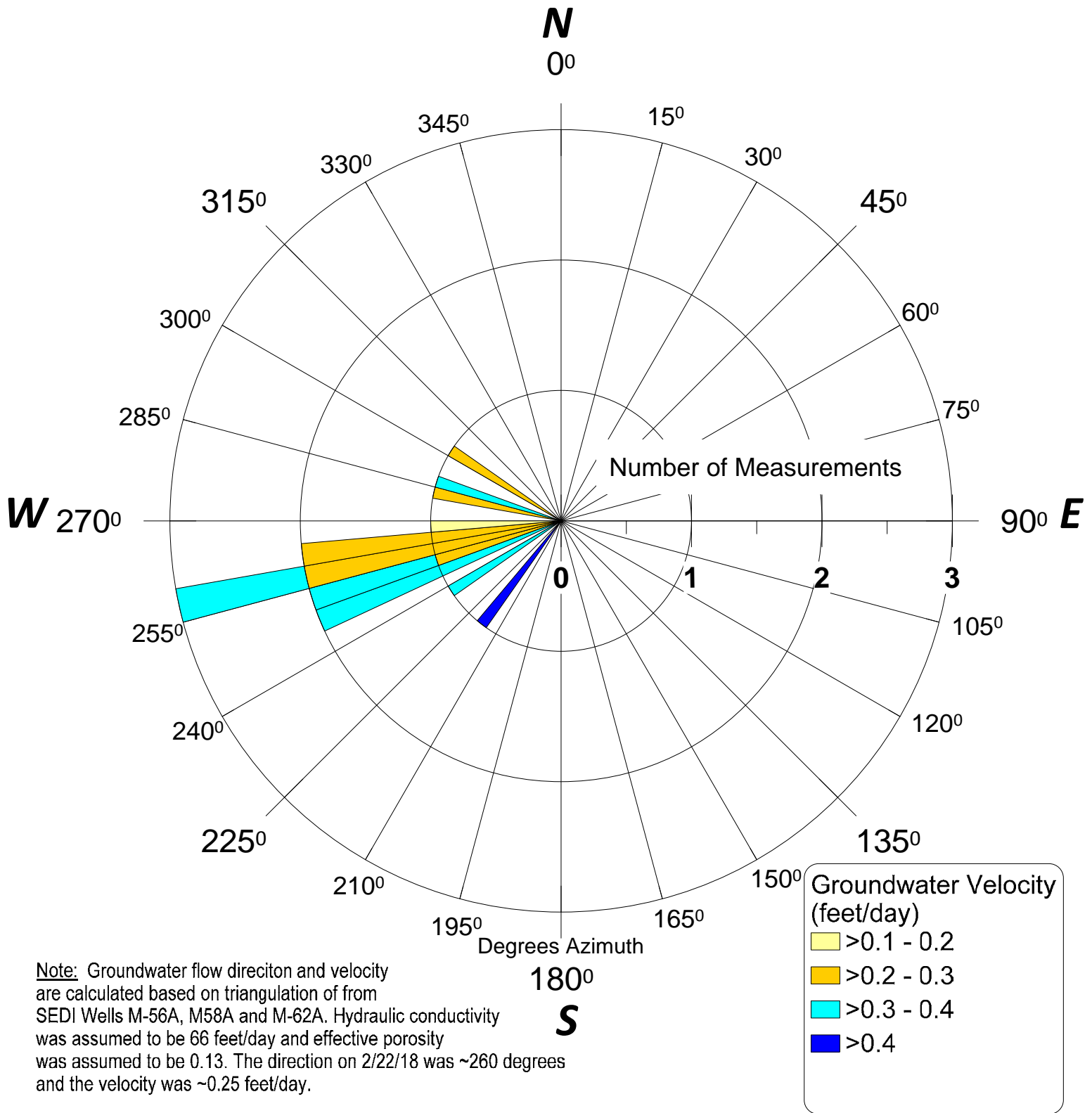

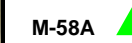
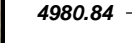


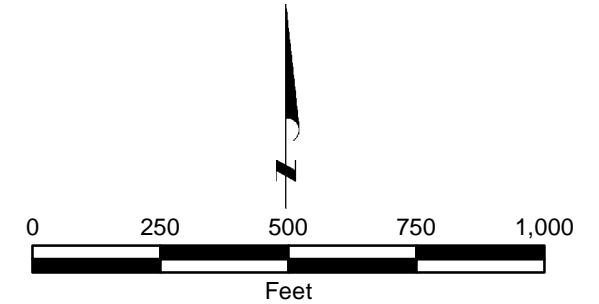
FIGURE 5. GROUNDWATER FLOW DIRECTION AND VELOCITY FROM SEDI CCR WELLS FROM NOVEMEBR 2015 THROUGH FEBRUARY 2018, APS CHOLLA COAL RESIDUAL, NAVAJO COUNTY, ARIZONA

EXPLANATION

 Approximate Extent of Sedimentation Pond Coal Combustion Residual Unit

 4,979 — 1-Foot Contour of Water Level Elevation in Alluvial Aquifer, in feet above mean sea level

 M-58A Alluvium Monitor Well Location and Identifier
 4980.84 — Elevation of Water Level, February 22, 2018, in feet above mean sea level



ARIZONA PUBLIC SERVICE
CHOLLA POWER PLANT
NAVAJO COUNTY, ARIZONA

**FEBRUARY 22, 2018
WATER LEVEL ELEVATIONS
NEAR SEDI POND**

 **MONTGOMERY & ASSOCIATES**
Water Resource Consultants

2017

FIGURE 6

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. © 2018 Microsoft Corporation © 2018 DigitalGlobe © CNES (2018) Distribution Airbus DS, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

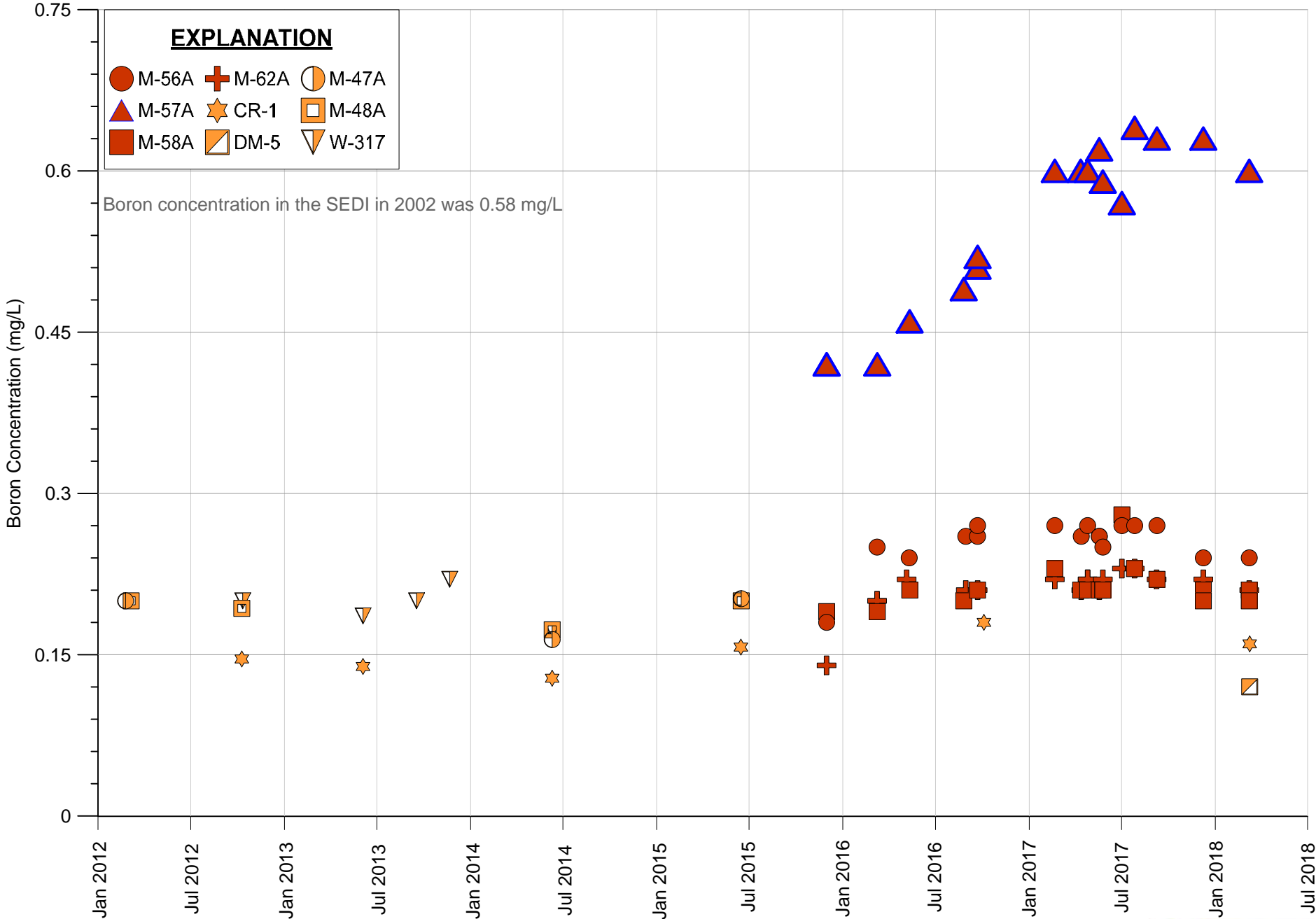


FIGURE 7. BORON CONCENTRATIONS IN SEDIMENTATION POND AND CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

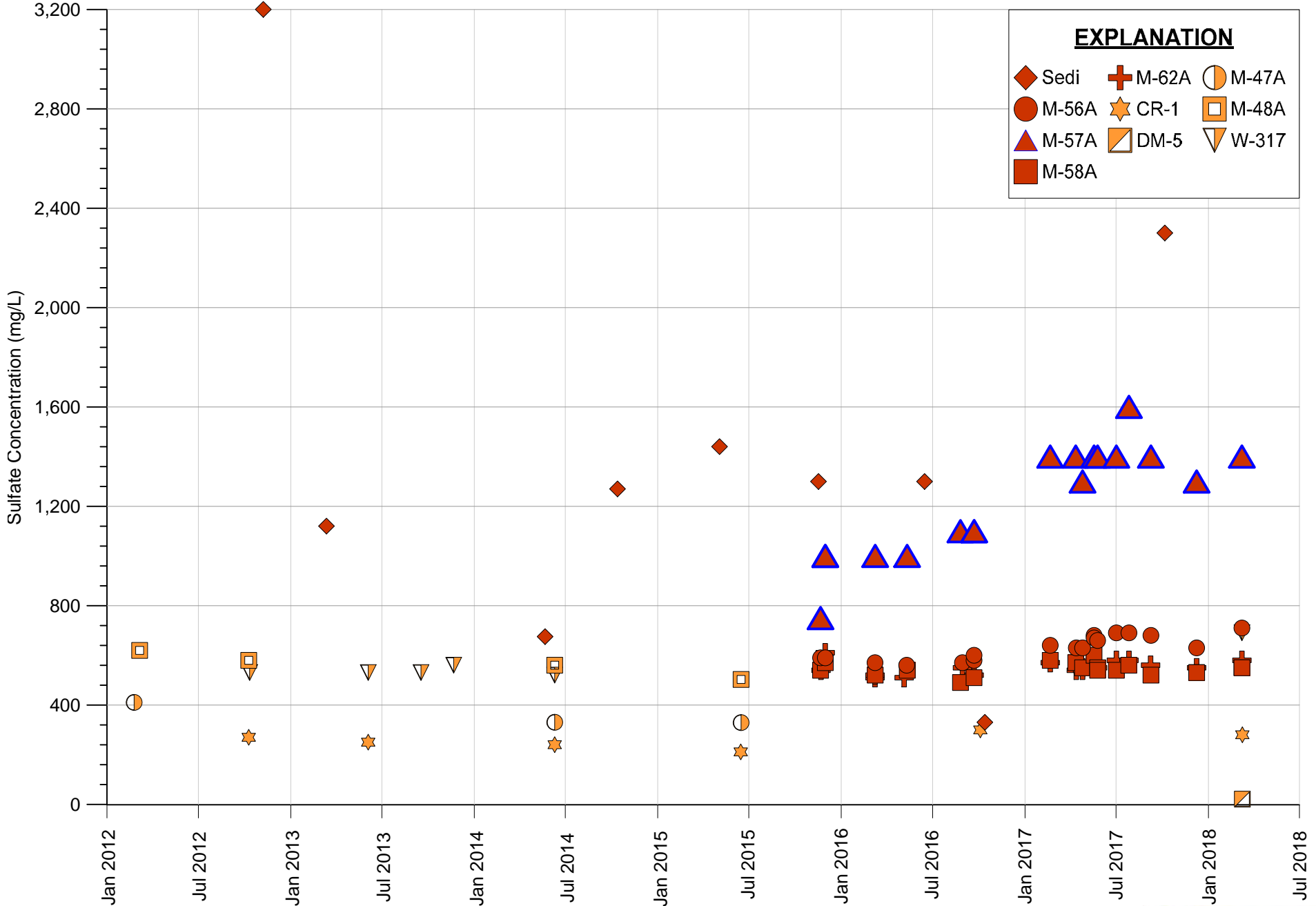


FIGURE 8. SULFATE CONCENTRATIONS IN SEDIMENTATION POND AND CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

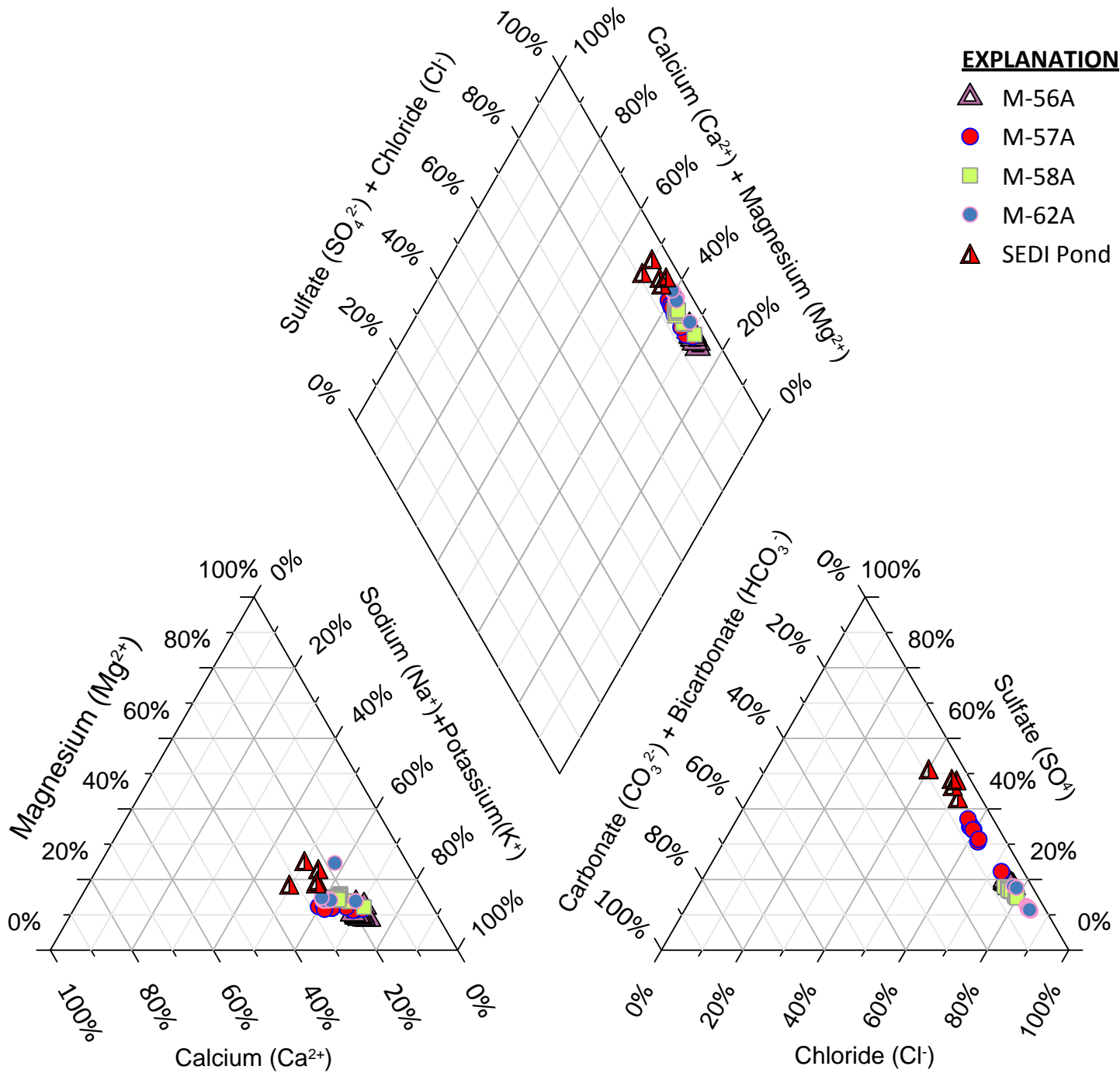


FIGURE 9. TRILINEAR DIAGRAM OF COMMON ION COMPOSITIONS OF GROUNDWATER IN THE SEDI CCR NETWORK WELLS AND AT THE SEDIMENTATION POND

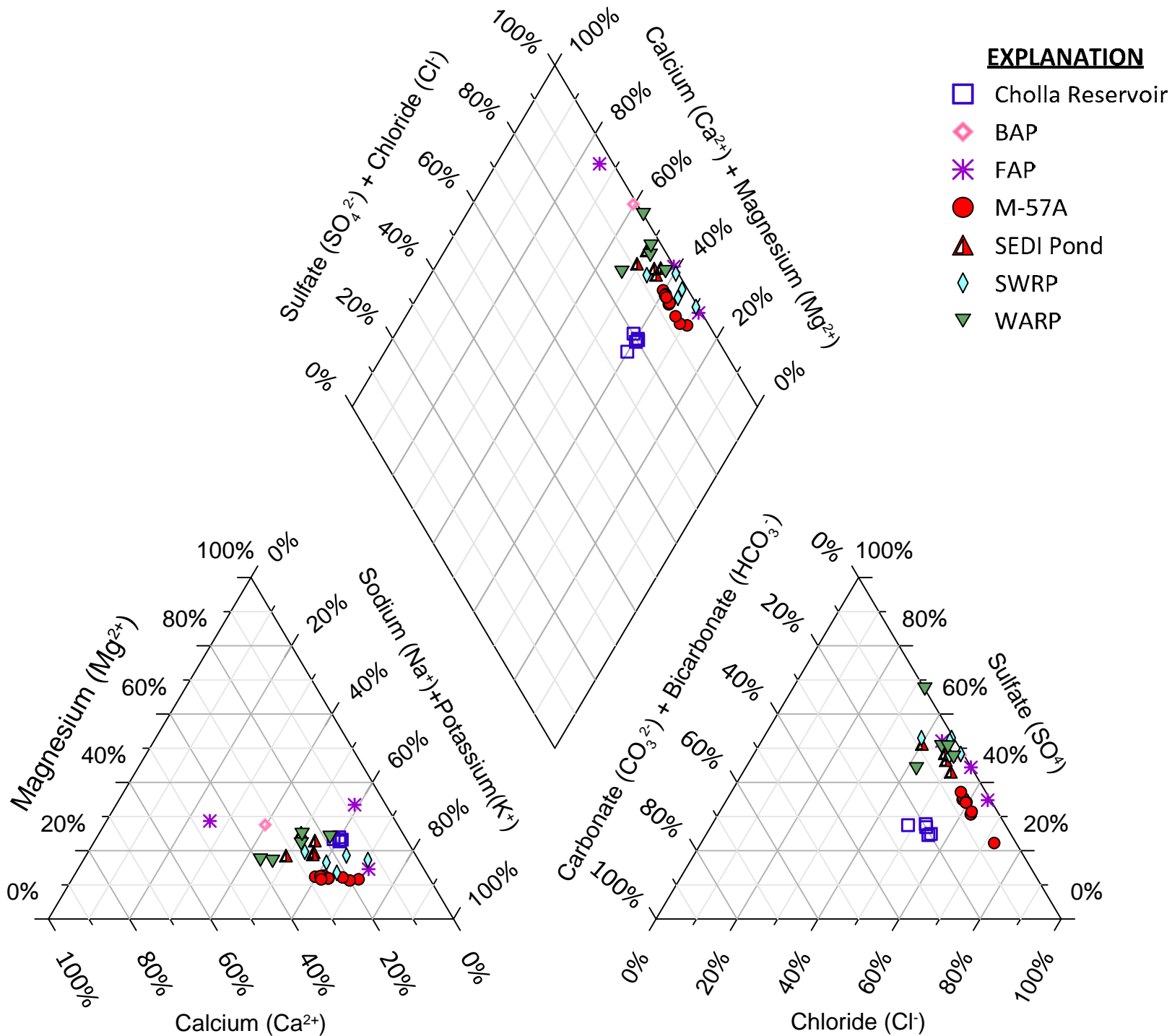


FIGURE 10. TRILINEAR DIAGRAM OF COMMON ION COMPOSITIONS OF GROUNDWATER IN M-57A AND AT POTENTIAL SURFACE SOURCES

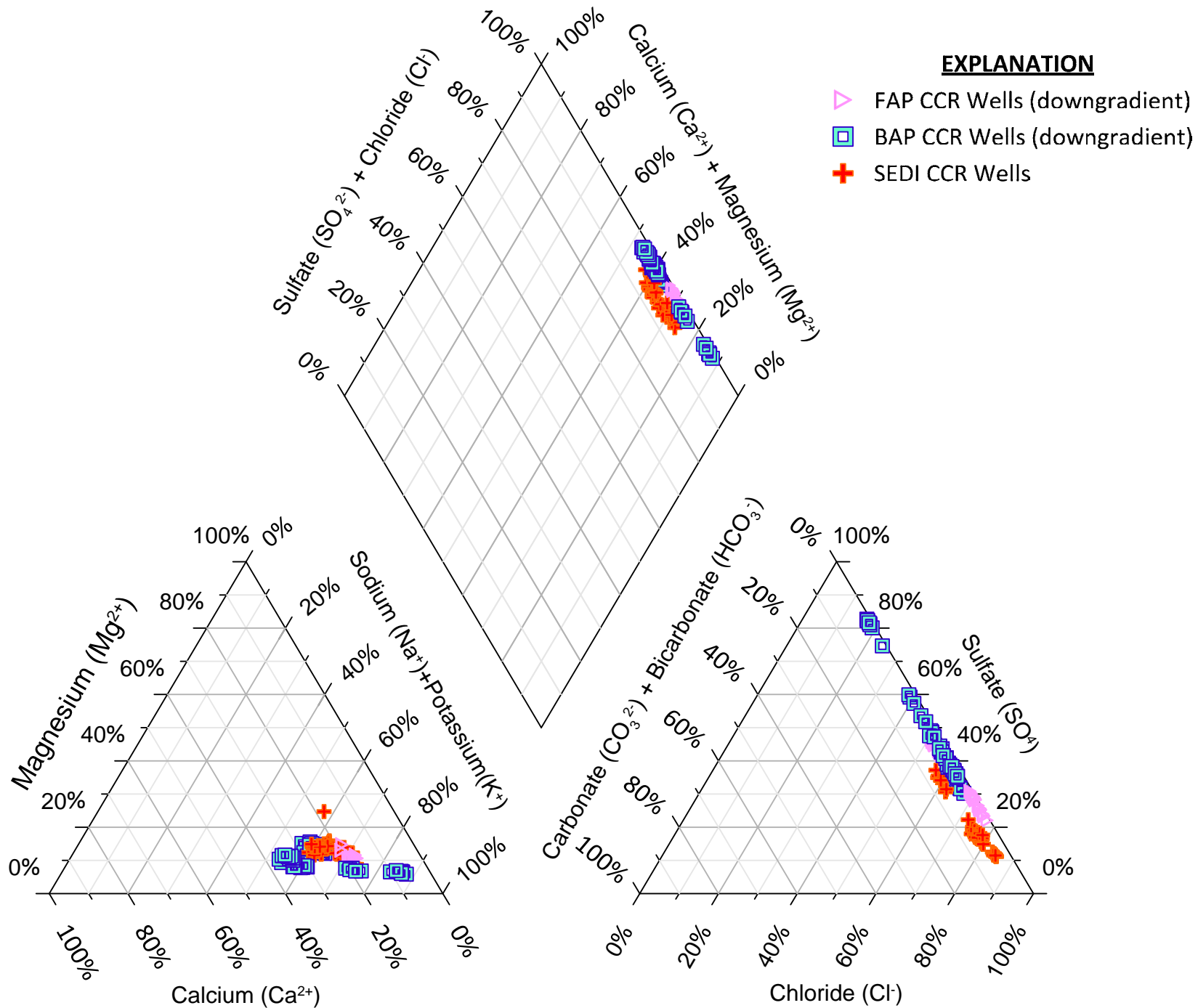


FIGURE 11. TRILINEAR DIAGRAM OF COMMON ION COMPOSITIONS OF GROUNDWATER AT CCR ALLUVIAL NETWORK WELLS

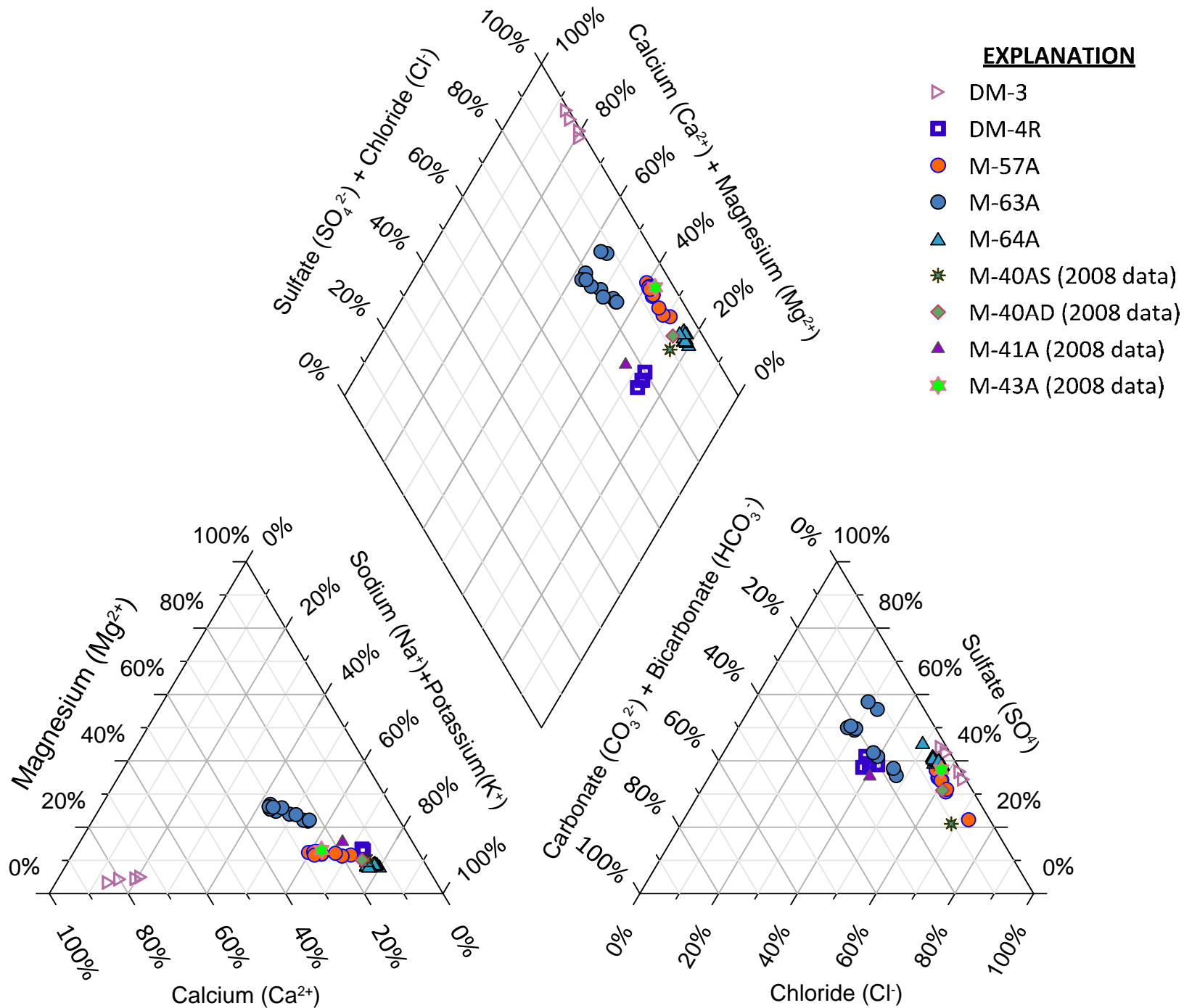
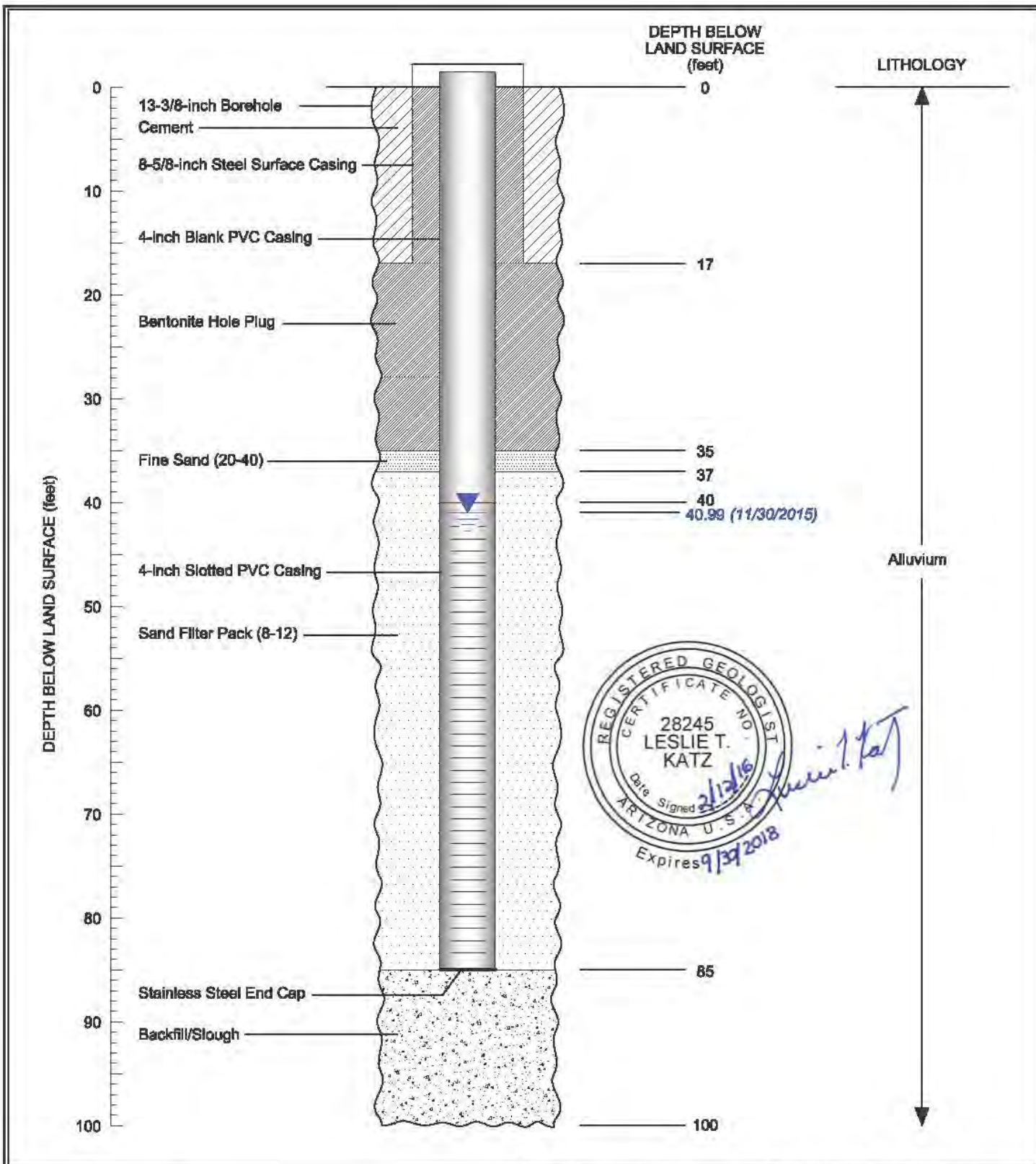



FIGURE 12. TRILINEAR DIAGRAM OF COMMON ION COMPOSITIONS OF GROUNDWATER IN LCR ALLUVIAL WELLS



APPENDIX A
CONSTRUCTION DETAILS FOR SEDIMENTATION POND
CCR NETWORK MONITOR WELLS



EXPLANATION

 Depth to Water Level

Note: All PVC blank and slotted casing is Schedule 80; slot size is 0.020 inches.

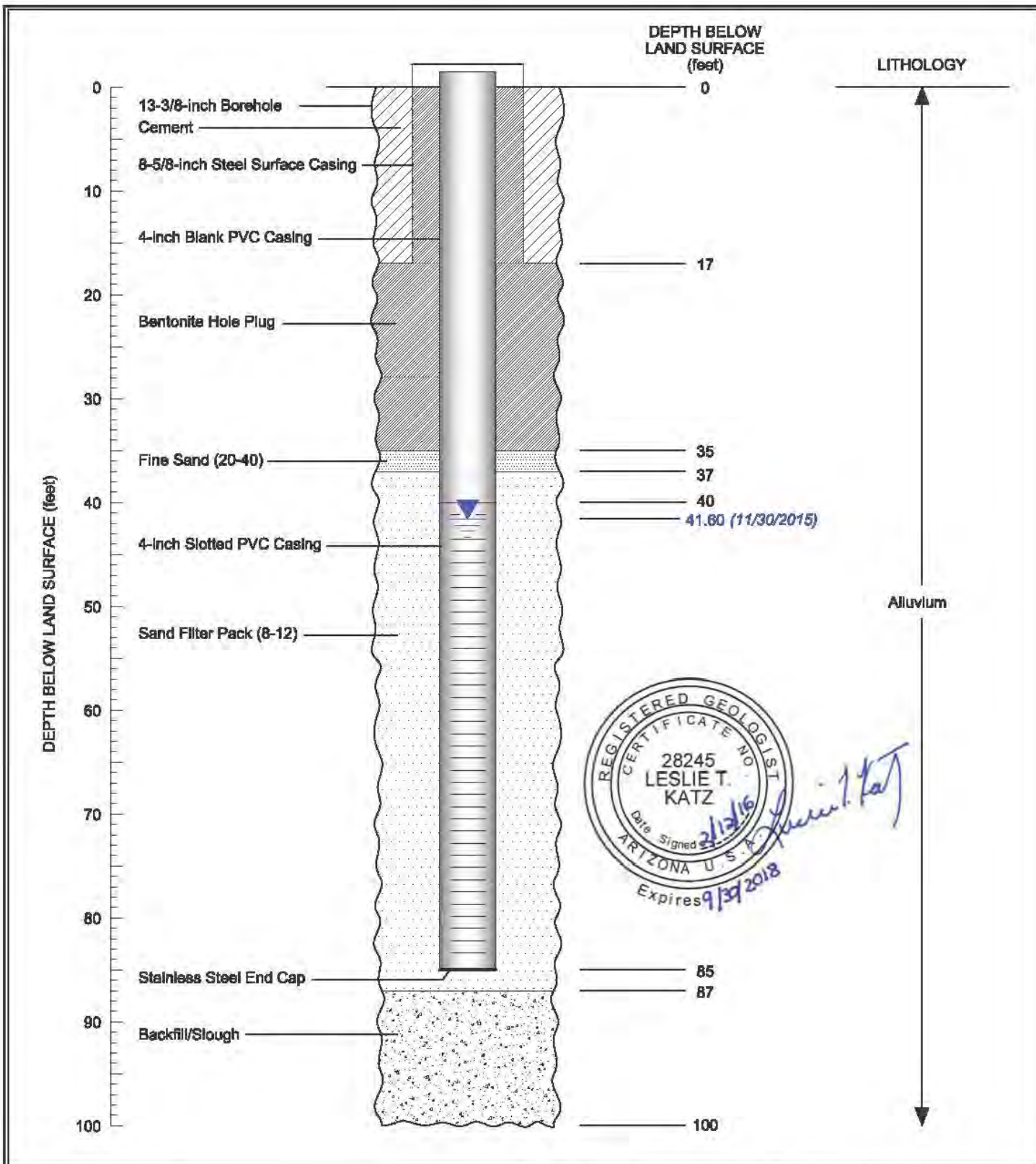
WELL: M-56A (SP-3D)	NORTHING: 1434257.73
REGISTRATION: 55-918661	EASTING: 658887.35
COUNTY: Navajo, Arizona	MP Elevation: 5023.165 feet amsl
DATE COMPLETED: 10/07/15	DATUM: NAD83, State Plane 1983

**SCHEMATIC DIAGRAM OF CONSTRUCTION FOR ALLUVIAL WELL M-56A
APS CHOLLA POWER PLANT**




2016

FIGURE A-1



EXPLANATION

 Depth to Water Level

Note: All PVC blank and slotted casing is Schedule 80; slot size is 0.020 inches.

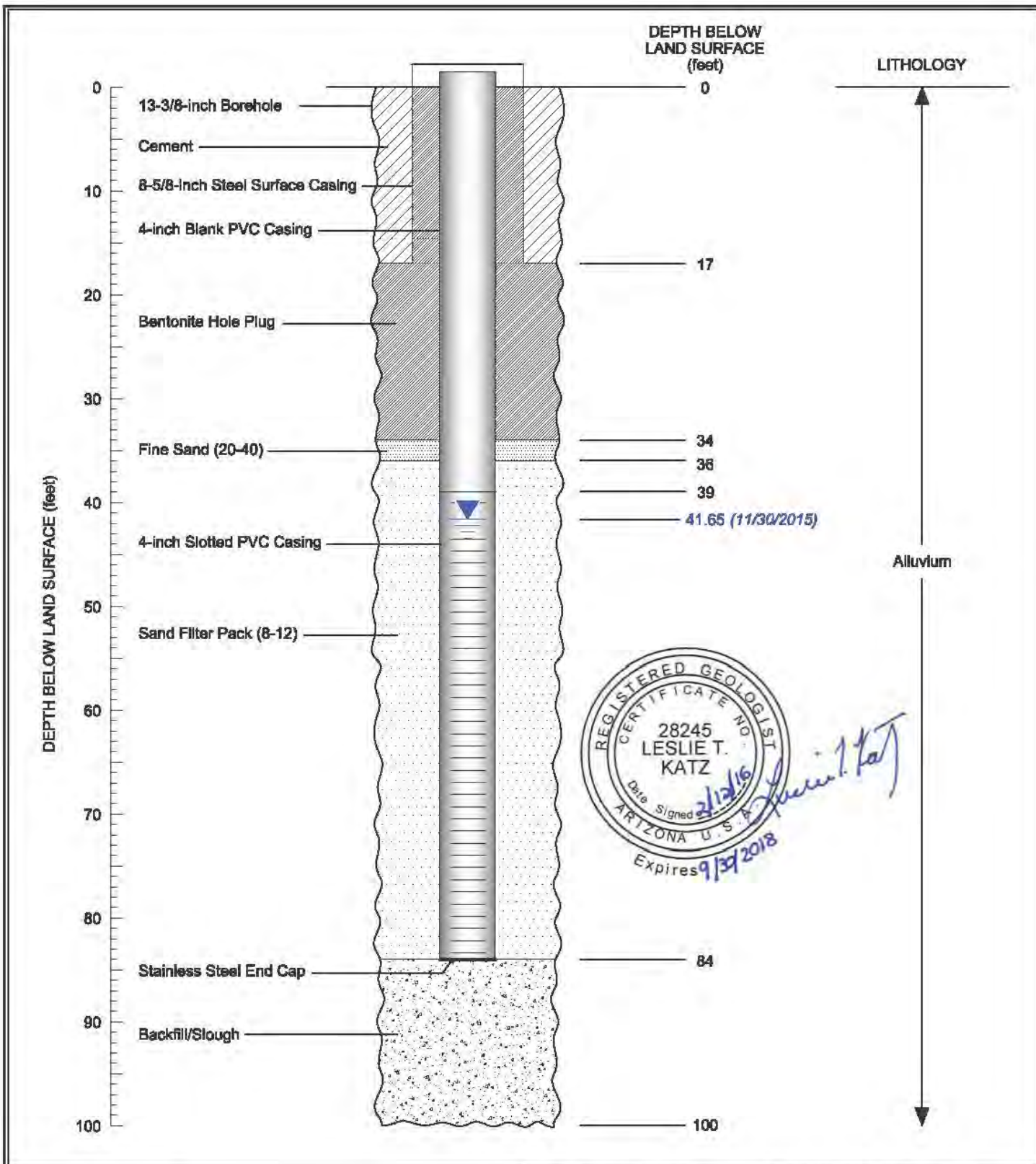
WELL: M-57A (SP-2D)	NORTHING: 1434198.88
REGISTRATION: 55-918660	EASTING: 658767.25
COUNTY: Navajo, Arizona	MP Elevation: 5023.816 feet amsl
DATE COMPLETED: 10/08/15	DATUM: NAD83, State Plane 1983

**SCHEMATIC DIAGRAM OF CONSTRUCTION FOR ALLUVIAL WELL M-57A
APS CHOLLA POWER PLANT**




2016

FIGURE A-2



EXPLANATION

 Depth to Water Level

Note: All PVC blank and slotted casing is Schedule 80; slot size is 0.020 inches.

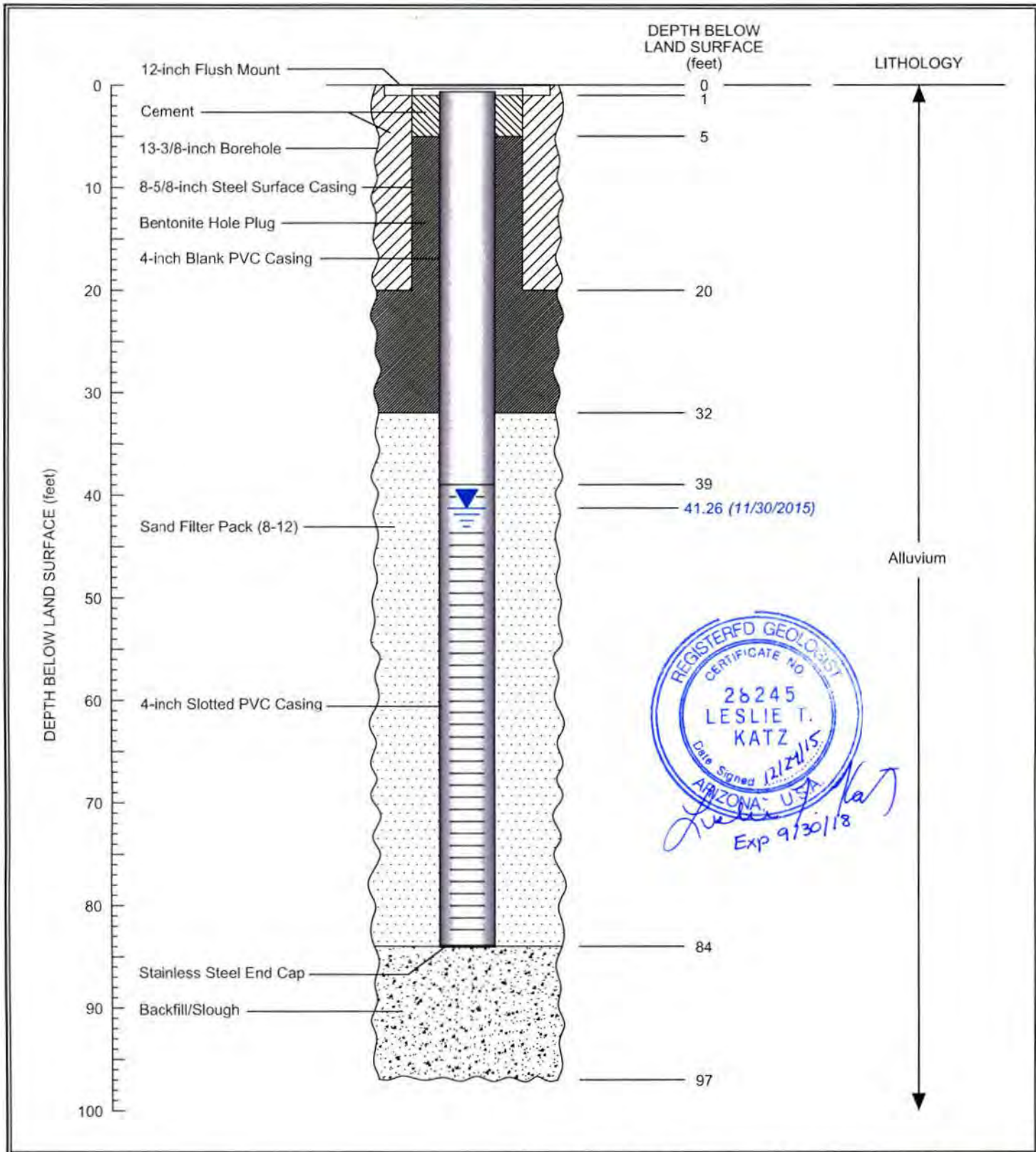
WELL: M-58A (SP-1D)	NORTHING: 1434165.11
REGISTRATION: 55-918659	EASTING: 658698.92
COUNTY: Navajo, Arizona	MP Elevation: 5023.841 feet amsl
DATE COMPLETED: 10/13/15	DATUM: NAD83, State Plane 1983

**SCHEMATIC DIAGRAM OF CONSTRUCTION FOR ALLUVIAL WELL M-58A
APS CHOLLA POWER PLANT**



2016

FIGURE A-3



EXPLANATION



Depth to Water Level

Note: All PVC blank and slotted casing is Schedule 80; slot size is 0.020 inches.

WELL: M-62A (SP-1U)	NORTHING: 1434008.665
REGISTRATION: 55-918658	EASTING: 659268.051
COUNTY: Navajo, Arizona	MP Elevation: 5020.874 feet amsl
DATE COMPLETED: 11/17/15	DATUM: NAD83, State Plane 1983

**SCHEMATIC DIAGRAM OF CONSTRUCTION
FOR ALLUVIAL WELL M-62A
APS CHOLLA POWER PLANT**



2015

FIGURE A-4



APPENDIX B
LITHOLOGIC DESCRIPTIONS FOR SEDIMENTATION POND
CCR NETWORK MONITOR WELLS

**TABLE B-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-56A [55-918661]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DRILLING COMPANY: National Exploration Wells Pumps

LOGGED BY: J. Laney, C. Stielstra

DEPTH DRILLED / LAND SURFACE ELEVATION: 100.0 feet / 5020.630 feet msl

DATE DRILLED: 10/4 - 10/7/2015

CADASTRAL / NAD83 : (A-18-19)23cbc / 1434257.733 N / 658887.345 E

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
QUATERNARY ALLUVIUM (Qal)		
0.0 - 5.0	Qal	SANDY LEAN CLAY (CL): Dark reddish gray [5YR4/2]; silt and clay 65%, rounded fine sand 25%, gravel 10%. Gravel fraction: subangular gravel to 0.5 in. consisting of chert, coal (fill), and sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate to strong. Disturbed surface sample. Disturbed surface sample.
5.0 - 10.0	Qal	SANDY LEAN CLAY (CL): Dark reddish gray [5YR4/2]; silt and clay 65%, rounded fine sand 30%, gravel 5%. Gravel fraction: subangular gravel to 0.2 in. consisting of chert, coal (fill), and sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate to strong. Disturbed surface sample. Disturbed surface sample.
10.0 - 15.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 80%, rounded very fine sand 20%, trace gravel. Gravel fraction: subrounded gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Medium plasticity. Poorly graded. Reaction to acid: moderate.
15.0 - 20.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 70%, rounded very fine sand 30%, trace gravel. Gravel fraction: subrounded gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
20.0 - 25.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded very fine sand 15%, gravel 10%. Gravel fraction: subangular gravel to 0.2 in. consisting of chert, sandstone, and quartz. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
25.0 - 30.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 80%, rounded very fine sand 15%, gravel 5%. Gravel fraction: subangular to subrounded gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: moderate.
30.0 - 35.0	Qal	FAT CLAY (CH): Dark reddish gray [5YR4/2]; silt and clay 90%, rounded very fine sand 10%, trace gravel. Gravel fraction: subangular gravel to 0.1 in. consisting of chert. Non-lithified. High plasticity. Poorly graded. Reaction to acid: moderate.
35.0 - 40.0	Qal	FAT CLAY (CH): Dark reddish gray [5YR4/2]; silt 95%, rounded very fine sand 5%. Non-lithified. Non-plastic. Poorly graded. Reaction to acid: moderate.
40.0 - 45.0	Qal	SILTY SAND WITH GRAVEL (SM): Dark reddish gray [5YR4/2]; rounded very fine sand 45%, silt 40%, gravel 15%. Gravel fraction: subangular to subrounded gravel to 0.2 in. consisting of chert, sandstone, and green siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-56A [55-918661]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
45.0 - 50.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded fine sand 80%, gravel 15%, silt 5%. Gravel fraction: subangular gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
50.0 - 55.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 75%, gravel 20%, silt 5%. Gravel fraction: subangular to subrounded gravel to 0.2 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
55.0 - 60.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 75%, gravel 25%. Gravel fraction: subangular to subrounded gravel to 0.2 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
60.0 - 65.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 70%, gravel 30%. Gravel fraction: subangular to subrounded gravel to 0.6 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
65.0 - 70.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 80%, gravel 20%. Gravel fraction: subangular to subrounded gravel to 0.6 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
70.0 - 75.0	Qal	WELL GRADED SAND (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 90%, gravel 10%. Gravel fraction: subrounded gravel to 0.3 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
75.0 - 80.0	Qal	WELL GRADED SAND (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 90%, gravel 10%. Gravel fraction: subrounded gravel to 0.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
80.0 - 85.0	Qal	WELL GRADED GRAVEL WITH SAND (GW): Reddish brown [5YR5/3]; gravel 80%, rounded fine sand 20%. Gravel fraction: subangular to rounded gravel to 1.6 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
85.0 - 90.0	Qal	WELL GRADED GRAVEL WITH SAND (GW): Reddish brown [5YR5/3]; gravel 80%, rounded, fine to medium sand 20%. Gravel fraction: subangular to rounded gravel to 1.6 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.
90.0 - 95.0	Qal	WELL GRADED GRAVEL WITH SAND (GW): Reddish brown [5YR5/3]; gravel 75%, subrounded, fine to coarse sand 20%, silt 5%. Gravel fraction: subangular to rounded gravel to 2 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-1. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-56A [55-918661]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
95.0 - 100.0	Qal	WELL GRADED GRAVEL WITH SAND (GW): Reddish brown [5YR5/3]; gravel 80%, subrounded, fine to coarse sand 20%. Gravel fraction: angular to rounded gravel to 3.1 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-57A [55-918660]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DRILLING COMPANY: National Exploration Wells Pumps

LOGGED BY: J. Laney

DEPTH DRILLED / LAND SURFACE ELEVATION: 100.0 feet / 5021.164 feet msl

DATE DRILLED: 10/7 - 10/8/2015

CADASTRAL / NAD83 : (A-18-19)23cbc / 1434198.679 N / 658767.25 E

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
QUATERNARY ALLUVIUM (Qal)		
0.0 - 5.0	Qal	CLAYEY GRAVEL WITH SAND (GC): Dark reddish gray [5YR4/2]; silt and clay 50%, gravel 30%, rounded fine sand 20%. Gravel fraction: subangular to rounded gravel to 1.2 in. consisting of chert, sandstone, coal. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate. Disturbed surface sample. Disturbed surface sample.
5.0 - 10.0	Qal	CLAYEY GRAVEL WITH SAND (GC): Dark reddish gray [5YR4/2]; silt and clay 50%, gravel 30%, rounded fine sand 20%. Gravel fraction: subangular to rounded gravel to 1.2 in. consisting of chert, sandstone, coal. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate. Disturbed surface sample. Disturbed surface sample.
10.0 - 15.0	Qal	SANDY FAT CLAY (CH): Dark reddish gray [5YR4/2]; silt and clay 60%, rounded very fine sand 30%, gravel 10%. Gravel fraction: subrounded gravel to 0.1 in. consisting of chert, sandstone. Non-lithified. High plasticity. Well graded. Reaction to acid: moderate.
15.0 - 20.0	Qal	SANDY LEAN CLAY (CL): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded very fine sand 25%, trace gravel. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
20.0 - 25.0	Qal	SANDY LEAN CLAY (CL): Dark reddish gray [5YR4/2]; silt and clay 80%, rounded very fine sand 20%, trace gravel. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
25.0 - 30.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 80%, rounded very fine sand 15%, gravel 5%. Gravel fraction: subrounded gravel to 0.1 in. consisting of chert, sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
30.0 - 35.0	Qal	FAT CLAY (CH): Dark reddish gray [5YR4/2]; silt and clay 80%, gravel 10%, rounded very fine sand 10%. Gravel fraction: subangular to subrounded gravel to 0.1 in. consisting of chert, sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
35.0 - 40.0	Qal	FAT CLAY (CH): Dark reddish gray [5YR4/2]; silt and clay 95%, rounded very fine sand 5%, trace gravel. Non-lithified. High plasticity. Well graded. Reaction to acid: moderate.
40.0 - 45.0	Qal	SILTY SAND WITH GRAVEL (SM): Reddish brown [5YR5/3]; rounded, very fine to fine sand 60%, silt and clay 35%, gravel 5%. Gravel fraction: subrounded gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Low plasticity. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-57A [55-918660]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
45.0 - 50.0	Qal	WELL GRADED SAND WITH SILT (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 80%, gravel 10%, silt 10%. Gravel fraction: subangular to subrounded gravel to 0.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Poorly graded. Reaction to acid: weak.
50.0 - 55.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 65%, gravel 30%, silt 5%. Gravel fraction: subangular to rounded gravel to 0.8 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Poorly graded. Reaction to acid: weak.
55.0 - 60.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 80%, gravel 15%, silt 5%. Gravel fraction: subrounded to rounded gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
60.0 - 65.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to coarse sand 60%, gravel 40%, trace silt. Gravel fraction: subangular to rounded gravel to 1.2 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
65.0 - 70.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 70%, gravel 30%, trace silt. Gravel fraction: subangular to subrounded gravel to 2 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
70.0 - 75.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 80%, gravel 20%, trace silt. Gravel fraction: subangular to rounded gravel to 1.2 in. consisting of chert, sandstone, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
75.0 - 80.0	Qal	WELL GRADED SAND (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 90%, gravel 10%, trace silt. Gravel fraction: subangular to subrounded gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
80.0 - 85.0	Qal	WELL GRADED GRAVEL WITH SAND (GW): Reddish brown [5YR5/3]; gravel 80%, rounded, fine to coarse sand 20%, trace silt. Gravel fraction: subangular to rounded gravel to 2.4 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
85.0 - 90.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 70%, gravel 30%, trace silt. Gravel fraction: subangular to rounded gravel to 0.4 in. consisting of chert, sandstone, and petrified wood. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-2. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-57A [55-918660]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
90.0 - 95.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to coarse sand 60%, gravel 40%, trace silt. Gravel fraction: subangular to subrounded gravel to 1.2 in. consisting of chert, sandstone, and petrified wood. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
95.0 - 100.0	Qal	WELL GRADED GRAVEL WITH SAND (GW): Reddish brown [5YR5/3]; gravel 80%, rounded, fine to coarse sand 20%, trace silt. Gravel fraction: subangular to rounded gravel to 2 in. consisting of chert, sandstone, and petrified wood. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-3. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-58A [55-918659]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DRILLING COMPANY: National Exploration Wells Pumps

LOGGED BY: J. Laney

DEPTH DRILLED / LAND SURFACE ELEVATION: 100.0 feet / 5021.237 feet msl

DATE DRILLED: 10/8 - 10/13/2015

CADASTRAL / NAD83 : (A-18-19)23cbc / 1434165.11 N / 658698.919 E

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
QUATERNARY ALLUVIUM (Qal)		
0.0 - 5.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 65%, rounded, very fine to fine sand 25%, gravel 10%. Gravel fraction: subrounded gravel to 0.8 in. consisting of chert and sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate to strong.
5.0 - 10.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded, very fine to fine sand 20%, gravel 5%. Gravel fraction: subrounded gravel to 0.8 in. consisting of chert and sandstone. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate to strong.
10.0 - 15.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 80%, rounded, very fine to fine sand 20%, trace gravel. Gravel fraction: angular gravel to 0.4 in. consisting of chert. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
15.0 - 20.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 70%, rounded very fine sand 30%, trace gravel. Gravel fraction: angular gravel to 0.2 in. consisting of chert. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
20.0 - 25.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded very fine sand 25%, trace gravel. Gravel fraction: angular gravel to 0.2 in. consisting of chert. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
25.0 - 30.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 85%, rounded very fine sand 15%. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
30.0 - 35.0	Qal	LEAN CLAY (CL): Dark reddish gray [5YR4/2]; silt and clay 90%, rounded very fine sand 10%. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: moderate.
35.0 - 40.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 80%, rounded very fine sand 20%. Non-lithified. Medium plasticity. Well graded. Reaction to acid: moderate.
40.0 - 45.0	Qal	SILTY SAND (SM): Dark reddish gray [5YR4/2]; rounded fine sand 50%, silt and clay 40%, gravel 10%. Gravel fraction: subangular to rounded gravel to 0.8 in. consisting of chert and sandstone. Non-lithified. Low plasticity. Well graded. Reaction to acid: moderate.
45.0 - 50.0	Qal	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Reddish brown [5YR5/3]; rounded, fine to medium sand 50%, gravel 40%, silt 10%. Gravel fraction: subangular to rounded gravel to 2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-3. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-58A [55-918659]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
50.0 - 55.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 80%, gravel 20%. Gravel fraction: subangular to subrounded gravel to 1.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
55.0 - 60.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 90%, gravel 10%. Gravel fraction: subangular to subrounded gravel to 2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
60.0 - 65.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to coarse sand 70%, gravel 30%. Gravel fraction: subangular to subrounded gravel to 1.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
65.0 - 70.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 85%, gravel 15%. Gravel fraction: subangular to subrounded gravel to 0.4 in. consisting of sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
70.0 - 75.0	Qal	WELL GRADED SAND (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 90%, gravel 10%. Gravel fraction: subangular to subrounded gravel to 0.2 in. consisting of sandstone and chert. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
75.0 - 80.0	Qal	WELL GRADED SAND (SW): Reddish brown [5YR5/3]; rounded, very fine to fine sand 90%, gravel 10%. Gravel fraction: subangular to subrounded gravel to 0.1 in. consisting of sandstone and chert. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
80.0 - 85.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 80%, gravel 20%. Gravel fraction: subangular to subrounded gravel to 0.4 in. consisting of sandstone and chert. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
85.0 - 90.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to medium sand 80%, gravel 20%. Gravel fraction: subangular to subrounded gravel to 0.6 in. consisting of sandstone and chert. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
90.0 - 95.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to coarse sand 70%, gravel 30%. Gravel fraction: subangular to subrounded gravel to 2 in. consisting of sandstone and chert. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
95.0 - 100.0	Qal	WELL GRADED SAND WITH GRAVEL (SW): Reddish brown [5YR5/3]; rounded, fine to coarse sand 70%, gravel 30%. Gravel fraction: subangular to rounded gravel to 2.4 in. consisting of sandstone, chert, and siltstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-4. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-62A [55-918658]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DRILLING COMPANY: National Exploration Wells Pumps

LOGGED BY: J. Laney, M. Zelazny

DEPTH DRILLED / LAND SURFACE ELEVATION: 97.0 feet / 5021.006 feet msl

DATE DRILLED: 11/17/2015

CADASTRAL / NAD83 : (A-18-19)23cbd / 1434008.665 N / 659268.051 E

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
QUATERNARY ALLUVIUM (Qal)		
0.0 - 5.0	Qal	SANDY LEAN CLAY (CL): Dark reddish brown [5YR2.5/2]; silt and clay 60%, rounded to angular, fine to coarse sand 30%, gravel 10%. Gravel fraction: subrounded to subangular gravel to 0.8 in. consisting of chert and sandstone. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: weak.
5.0 - 10.0	Qal	SANDY LEAN CLAY (CL): Dark reddish brown [5YR2.5/2]; silt and clay 60%, rounded to angular, fine to coarse sand 30%, gravel 10%. Gravel fraction: subrounded to subangular gravel to 0.4 in. consisting of chert and sandstone. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: weak.
10.0 - 15.0	Qal	FAT CLAY WITH SAND (CH): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded to angular medium sand 25%. Gravel fraction: subrounded to subangular gravel. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: weak.
15.0 - 20.0	Qal	SANDY FAT CLAY (CH): Dark reddish gray [5YR4/2]; silt and clay 70%, rounded to angular medium sand 30%. Gravel fraction: subrounded to subangular gravel. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: moderate.
20.0 - 25.0	Qal	SANDY FAT CLAY (CH): Dark reddish gray [5YR4/2]; rounded to angular fine sand 50%, silt and clay 50%. Gravel fraction: subrounded to subangular gravel. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: weak.
25.0 - 30.0	Qal	SANDY FAT CLAY (CH): Dark reddish gray [5YR4/2]; rounded to angular fine sand 50%, silt and clay 50%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of sandstone. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: weak.
30.0 - 35.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded to angular, fine to medium sand 25%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of sandstone. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: moderate.
35.0 - 40.0	Qal	LEAN CLAY WITH SAND (CL): Dark reddish gray [5YR4/2]; silt and clay 75%, rounded to angular, fine to medium sand 25%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of sandstone. Non-lithified. Medium to high plasticity. Well graded. Reaction to acid: moderate.
40.0 - 45.0	Qal	SANDY SILT (ML): Light reddish brown [5YR6/3]; silt and clay 55%, rounded to angular, fine to medium sand 45%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of chert and sandstone. Non-lithified. Low plasticity. Well graded. Reaction to acid: weak.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-4. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-62A [55-918658]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
45.0 - 50.0	Qal	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Light reddish brown [5YR6/3]; angular, medium to coarse sand 70%, gravel 20%, silt 10%. Gravel fraction: subrounded to subangular gravel to 0.4 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
50.0 - 55.0	Qal	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Light reddish brown [5YR6/3]; angular, medium to coarse sand 70%, gravel 20%, silt 10%. Gravel fraction: subrounded to subangular gravel to 0.8 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
55.0 - 60.0	Qal	WELL GRADED SAND WITH SILT (SW-SM): Light reddish brown [5YR6/3]; angular, medium to coarse sand 90%, silt 10%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
60.0 - 65.0	Qal	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Light reddish brown [5YR6/3]; angular, medium to coarse sand 60%, gravel 30%, silt 10%. Gravel fraction: subrounded to subangular gravel to 0.6 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: weak.
65.0 - 70.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 90%, gravel 5%, silt 5%. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.
70.0 - 75.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 90%, gravel 5%, silt 5%. Gravel fraction: subrounded to subangular gravel to 0.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.
75.0 - 80.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 90%, gravel 5%, silt 5%. Gravel fraction: subrounded to subangular gravel to 1.2 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.
80.0 - 85.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 90%, gravel 5%, silt 5%. Gravel fraction: subrounded to subangular gravel to 1.0 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.
85.0 - 90.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 90%, gravel 5%, silt 5%. Gravel fraction: subrounded to subangular gravel to 0.1 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.

**TABLE B-4. LITHOLOGIC DESCRIPTIONS FOR
DRILL CUTTINGS FROM MONITOR WELL M-62A [55-918658]
CCR MONITOR WELLS
ARIZONA PUBLIC SERVICE CHOLLA POWER PLANT**

DEPTH INTERVAL (feet)	FORMATION	DESCRIPTION
90.0 - 95.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 95%, silt 5%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.4 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.
95.0 - 97.0	Qal	WELL GRADED SAND (SW): Light reddish brown [5YR6/3]; angular, medium to coarse sand 95%, silt 5%, trace gravel. Gravel fraction: subrounded to subangular gravel to 0.4 in. consisting of chert and sandstone. Non-lithified. Non-plastic. Well graded. Reaction to acid: moderate.

Gravel/sand division based on USCS scale. Grain size fractions estimated using manual field methods.



APPENDIX C
BOX PLOTS FOR APPENDIX III MONITORING CONSTITUENTS
FOR SEDIMENTATION POND, CCR NETWORK MONITOR WELLS,
AND NEARBY WELLS

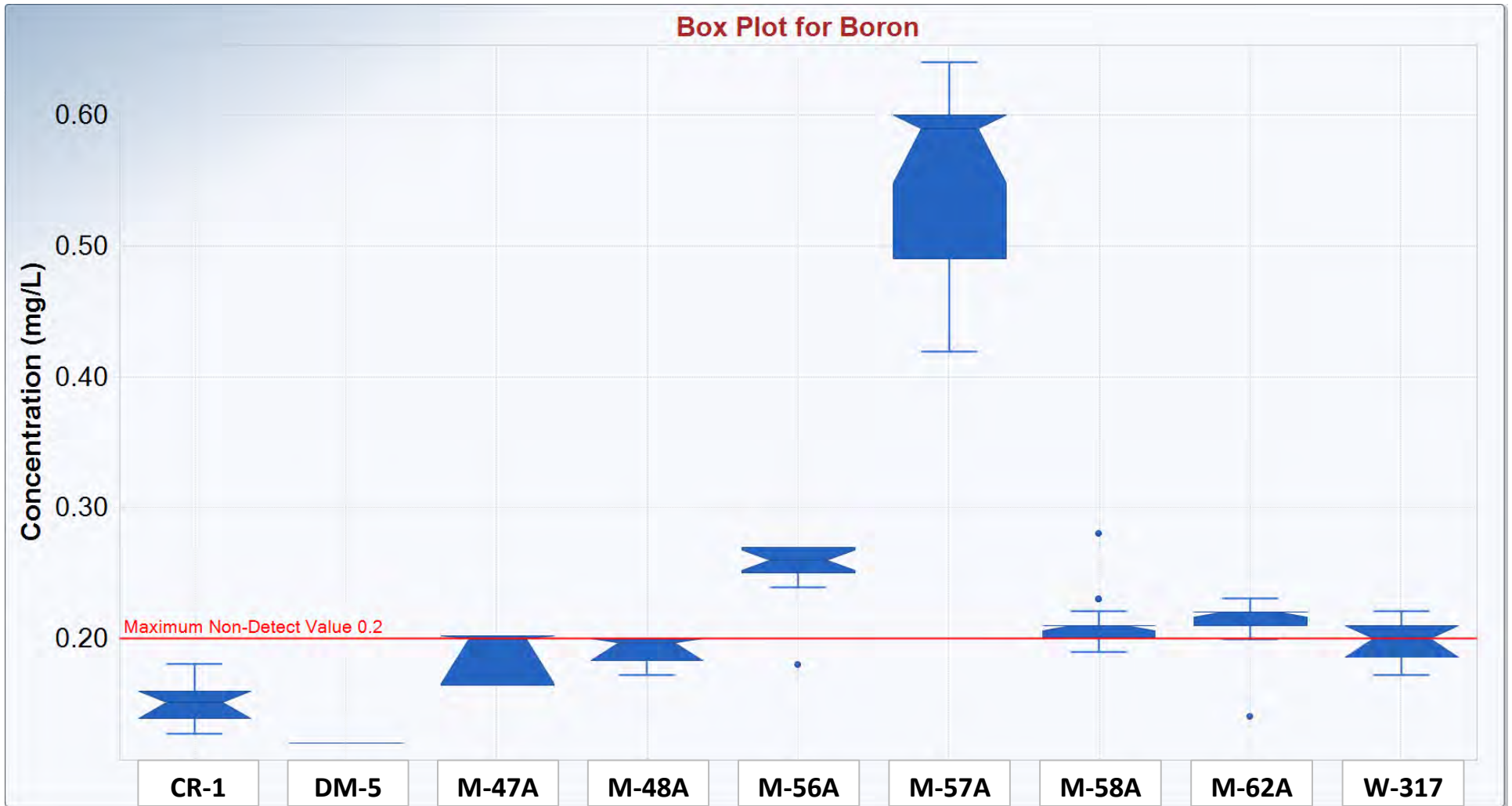


FIGURE C-1. BORON CONCENTRATION DISTRIBUTION IN SEDIMENTATION POND CCR NETWORK MONITORING WELLS, AND NEARBY WELLS

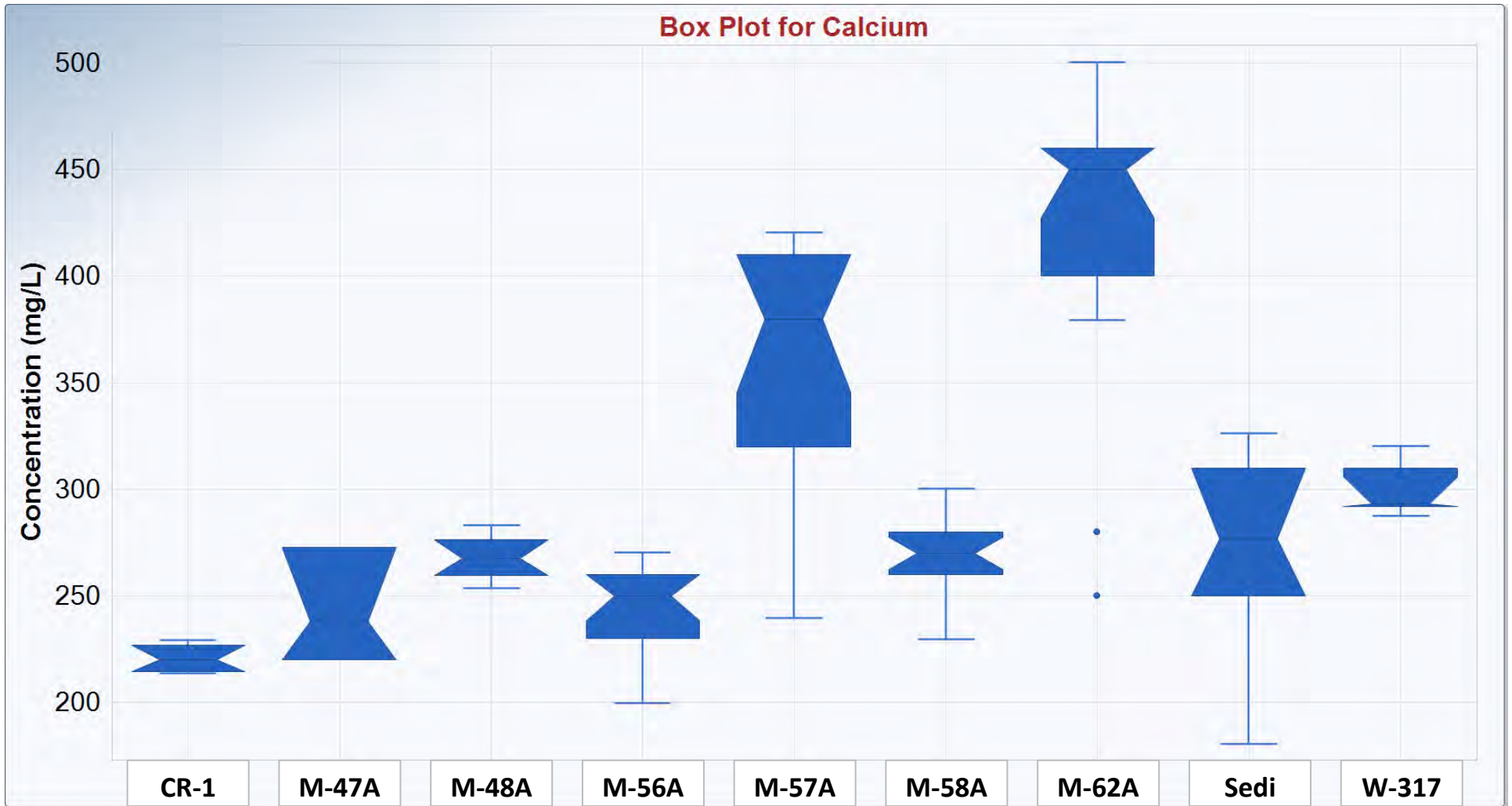


FIGURE C-2. CALCIUM CONCENTRATION DISTRIBUTION IN SEDIMENTATION POND, CCR NETWORK MONITORING WELLS, AND NEARBY WELLS

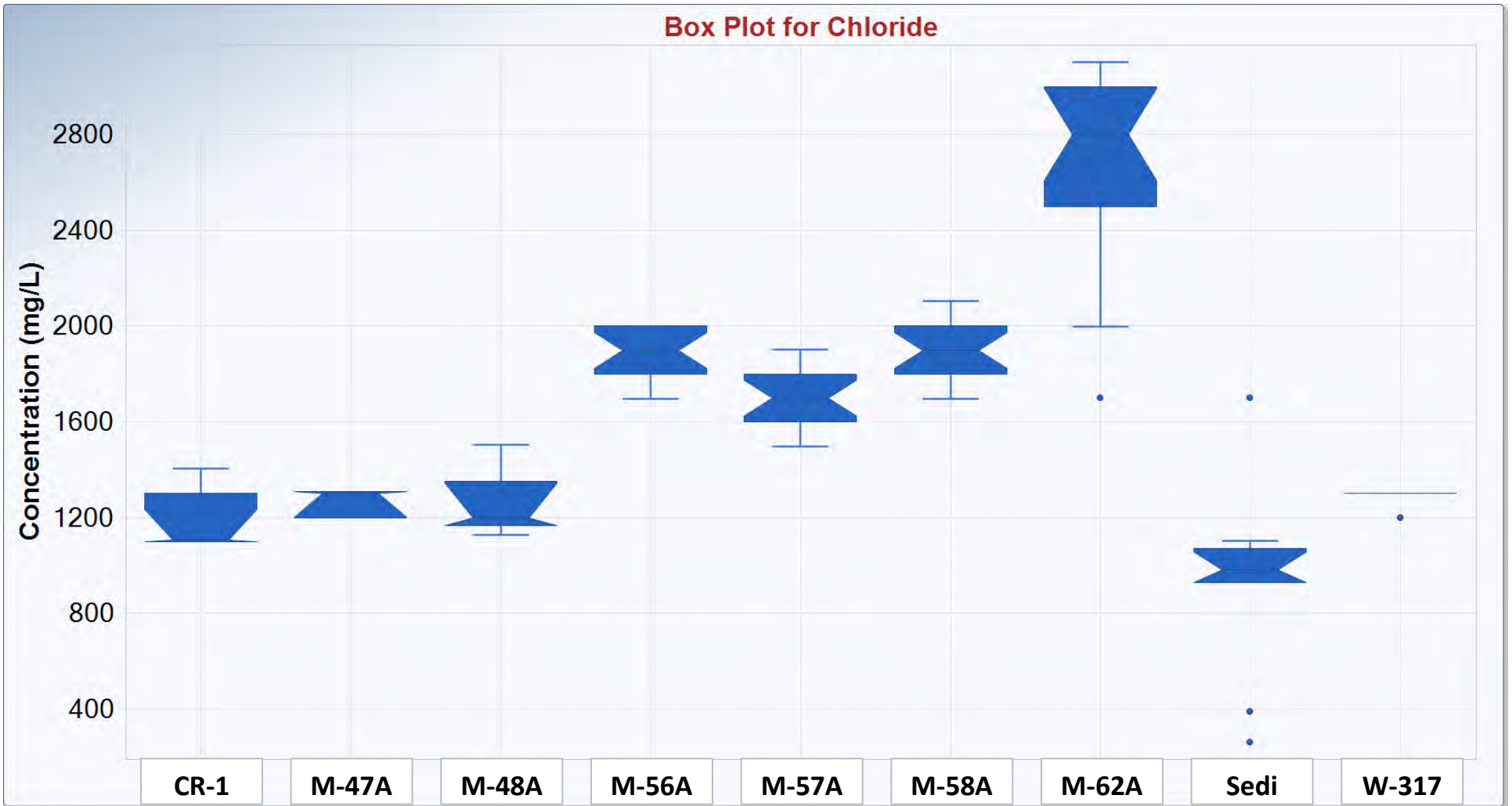
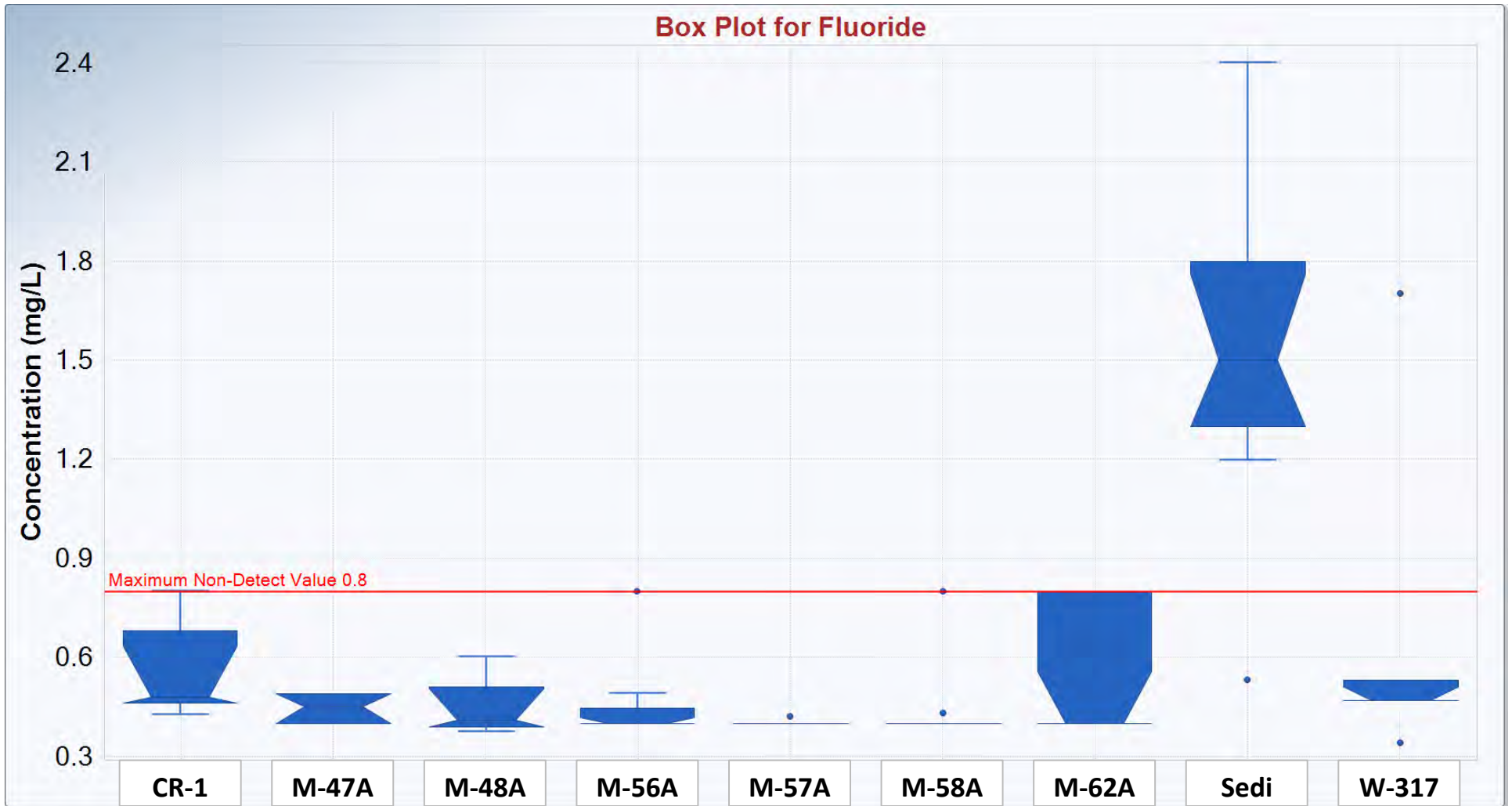


FIGURE C-3. CHLORIDE CONCENTRATION DISTRIBUTION IN SEDIMENTATION POND, CCR NETWORK MONITORING WELLS, AND NEARBY WELLS



FIGUER C-4. FLUORIDE CONCENTRATION DISTRIBUTION IN SEDIMENTATION POND, CCR NETWORK MONITORING WELLS, AND NEARBY WELLS

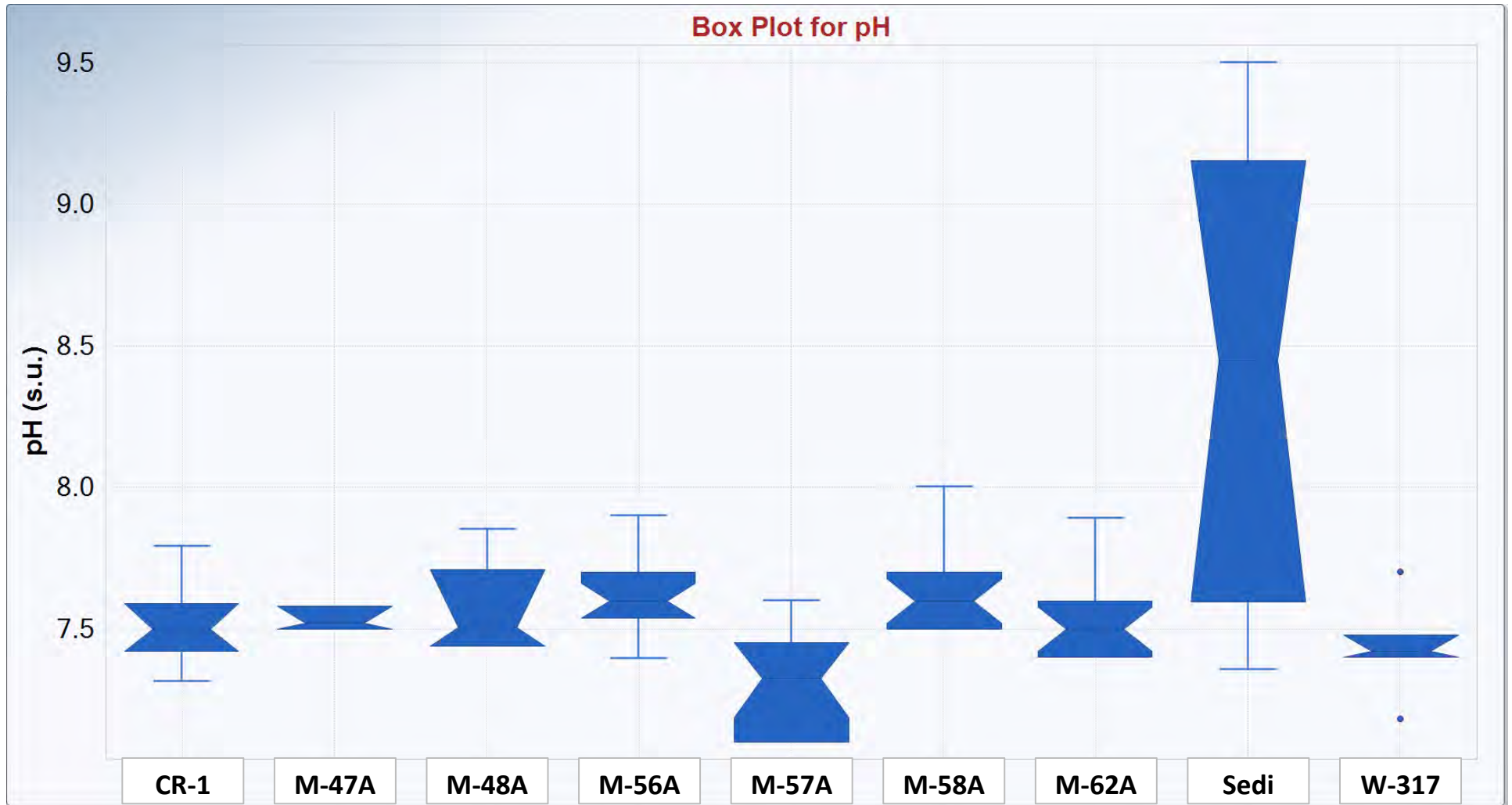


FIGURE C-5. pH DISTRIBUTION IN SEDIMENTATION POND, CCR NETWORK MONITORING WELLS, AND NEARBY WELLS

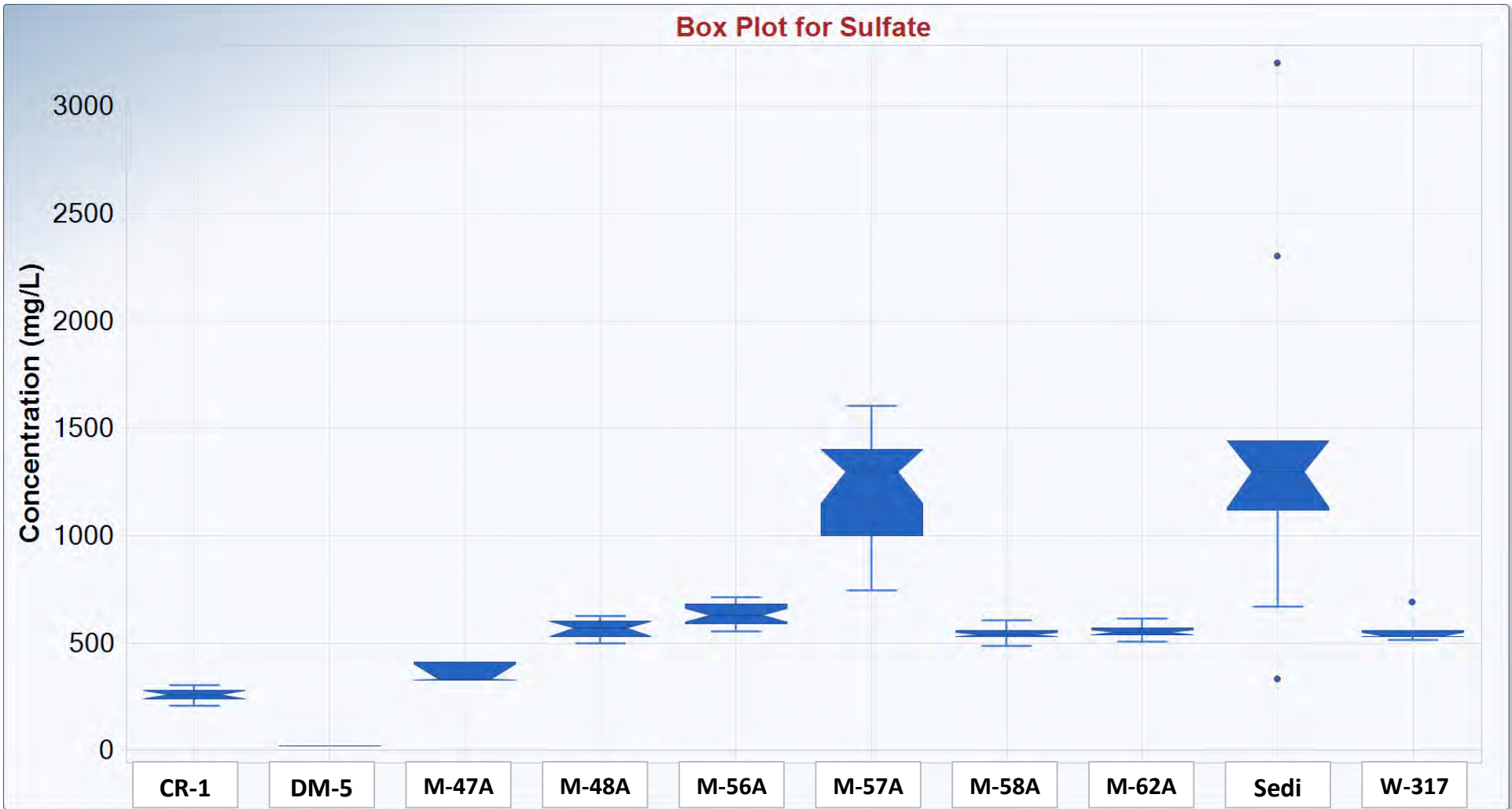


FIGURE C-6. SULFATE CONCENTRATION DISTRIBUTION IN SEDIMENTATION POND, CCR NETWORK MONITORING WELLS, AND NEARBY WELLS

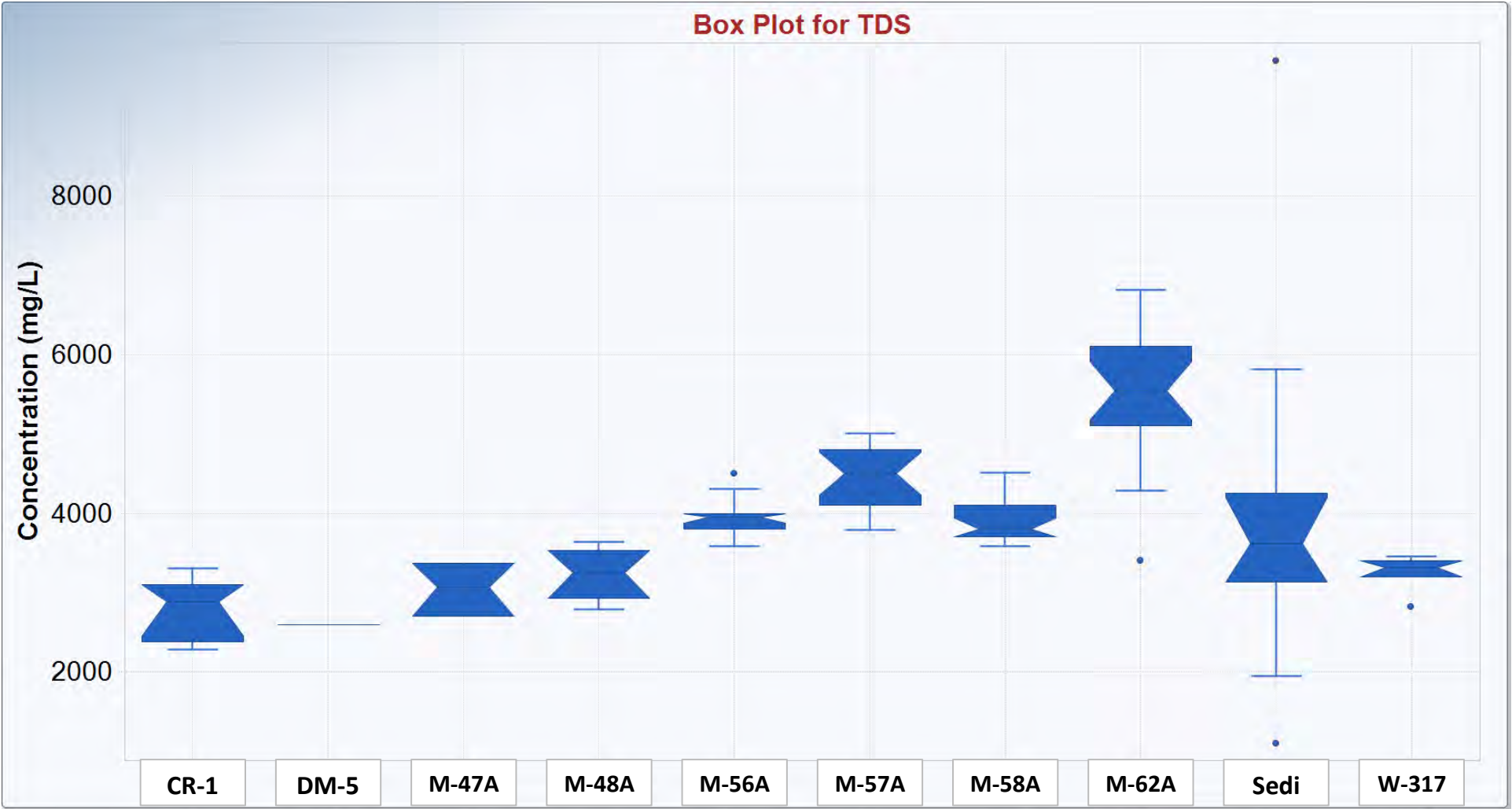


FIGURE C-7. TDS CONCENTRATION DISTRIBUTION IN SEDIMENTATION POND, CCR NETWORK MONITORING WELLS, AND NEARBY WELLS





APPENDIX D
TIME SERIES GRAPHS FOR SEDIMENTATION POND,
CCR NETWORK MONITOR WELLS,
AND POTENTIAL ALTERNATE SOURCES

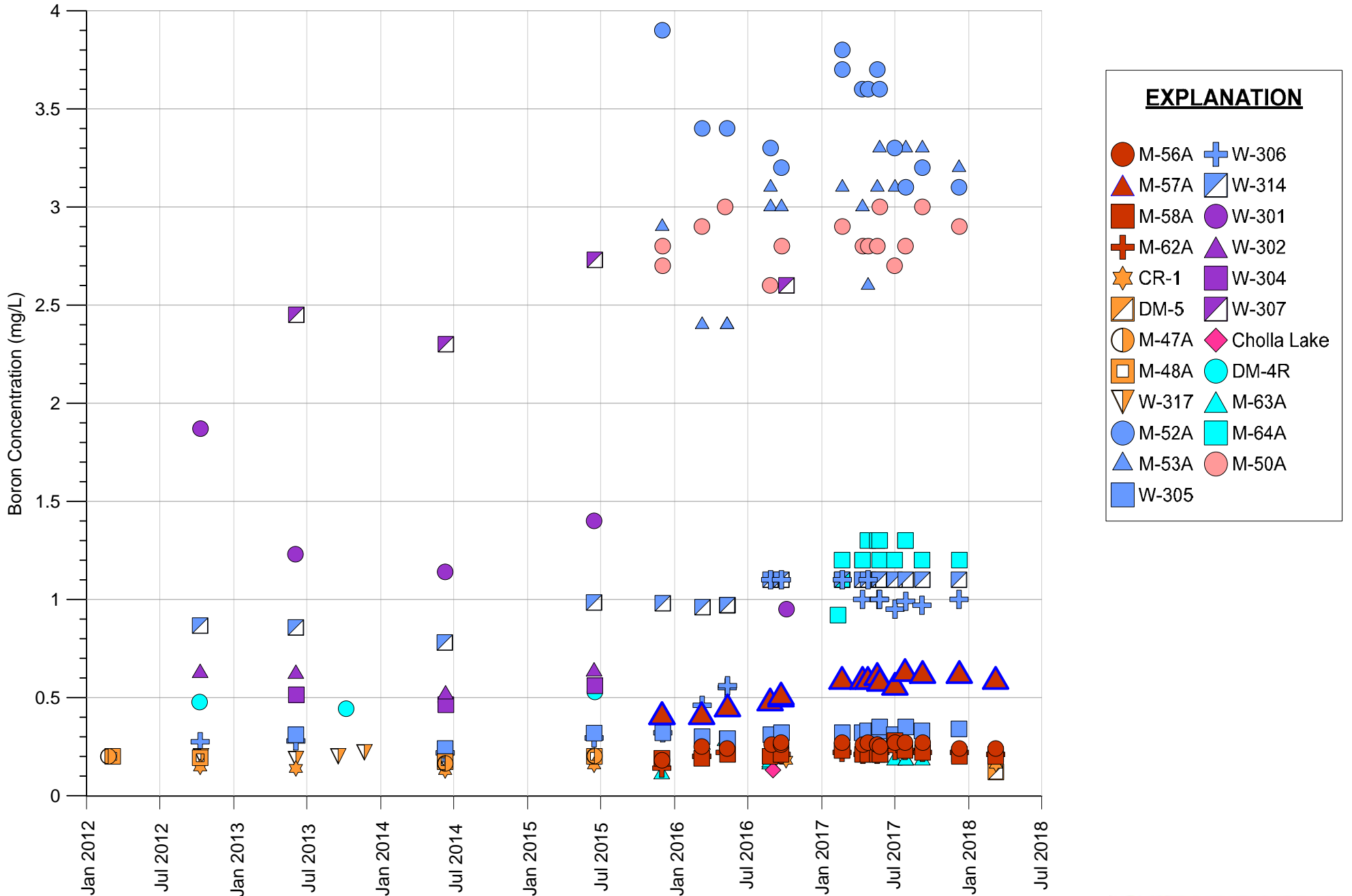


FIGURE D-1. BORON CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

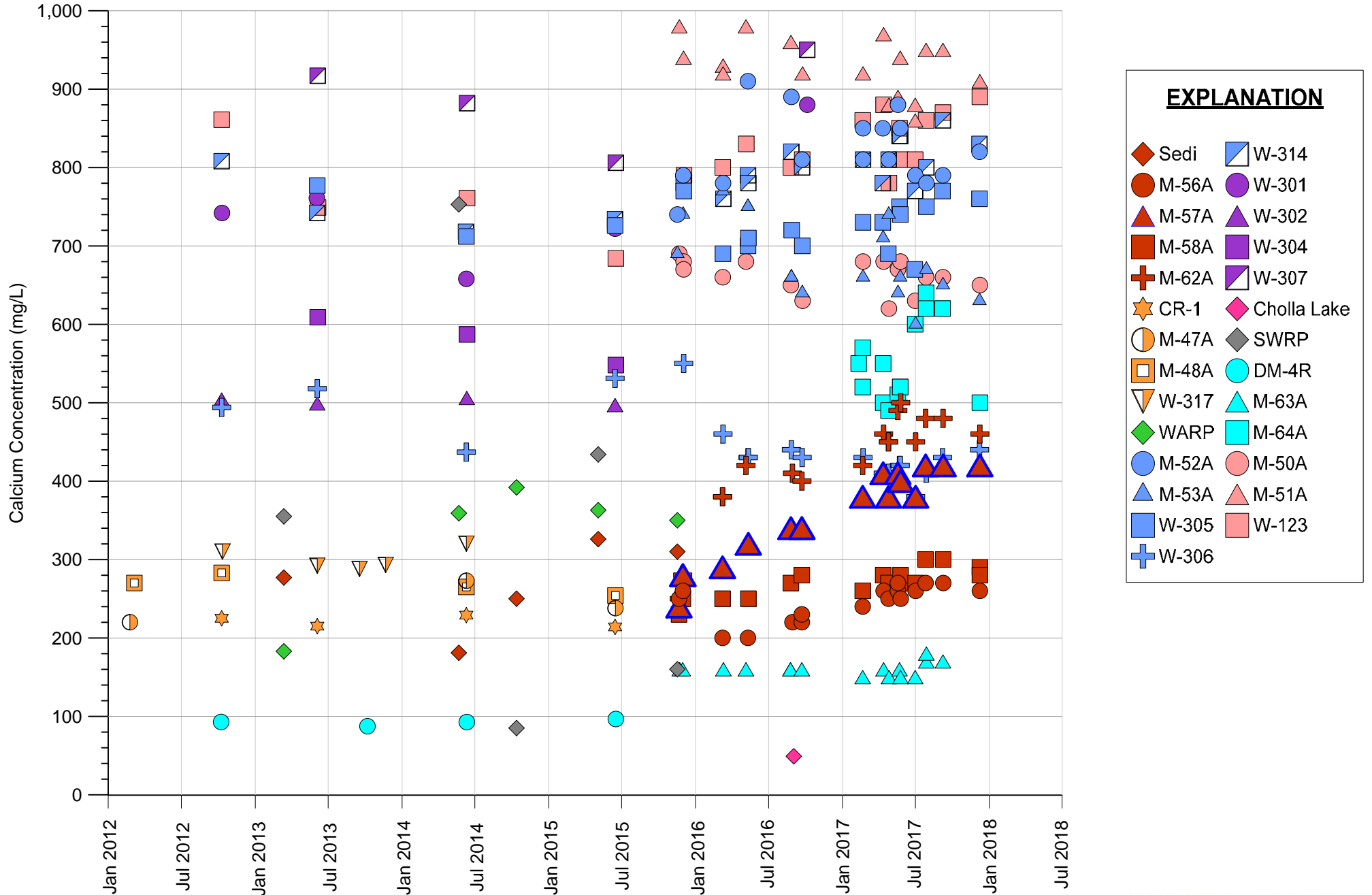


FIGURE D-2. CALCIUM CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

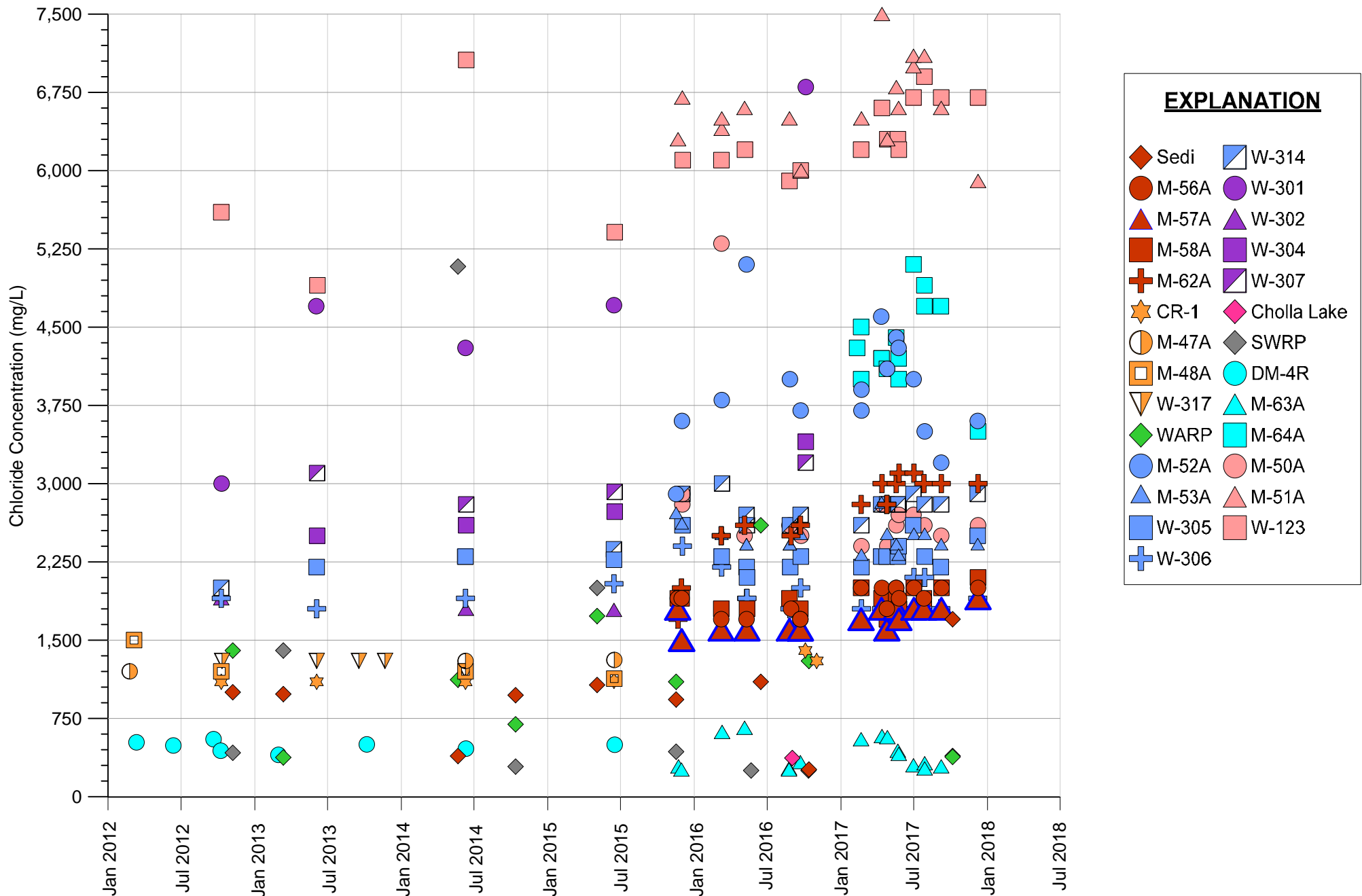


FIGURE D-3. CHLORIDE CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

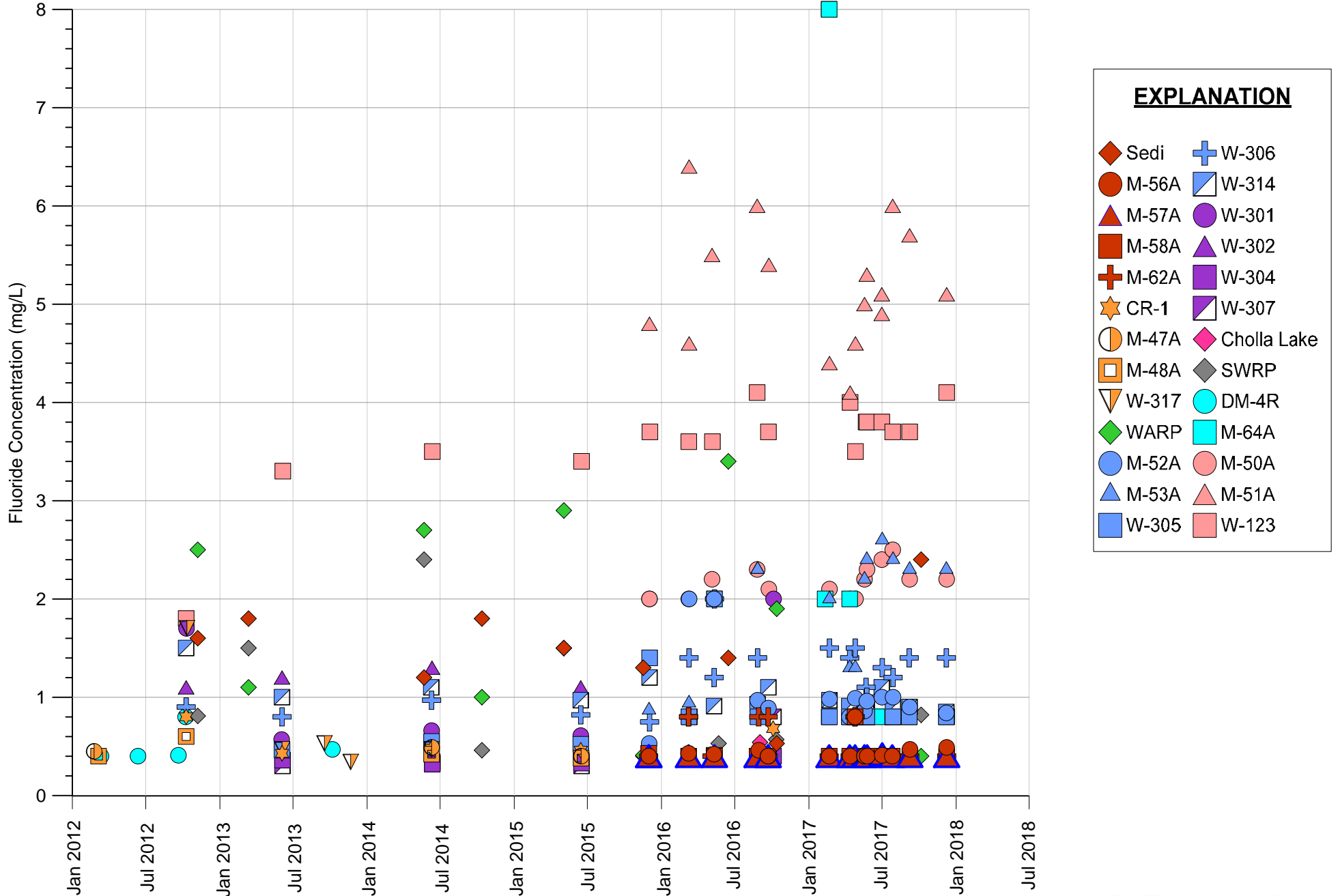


FIGURE D-4. FLUORIDE CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

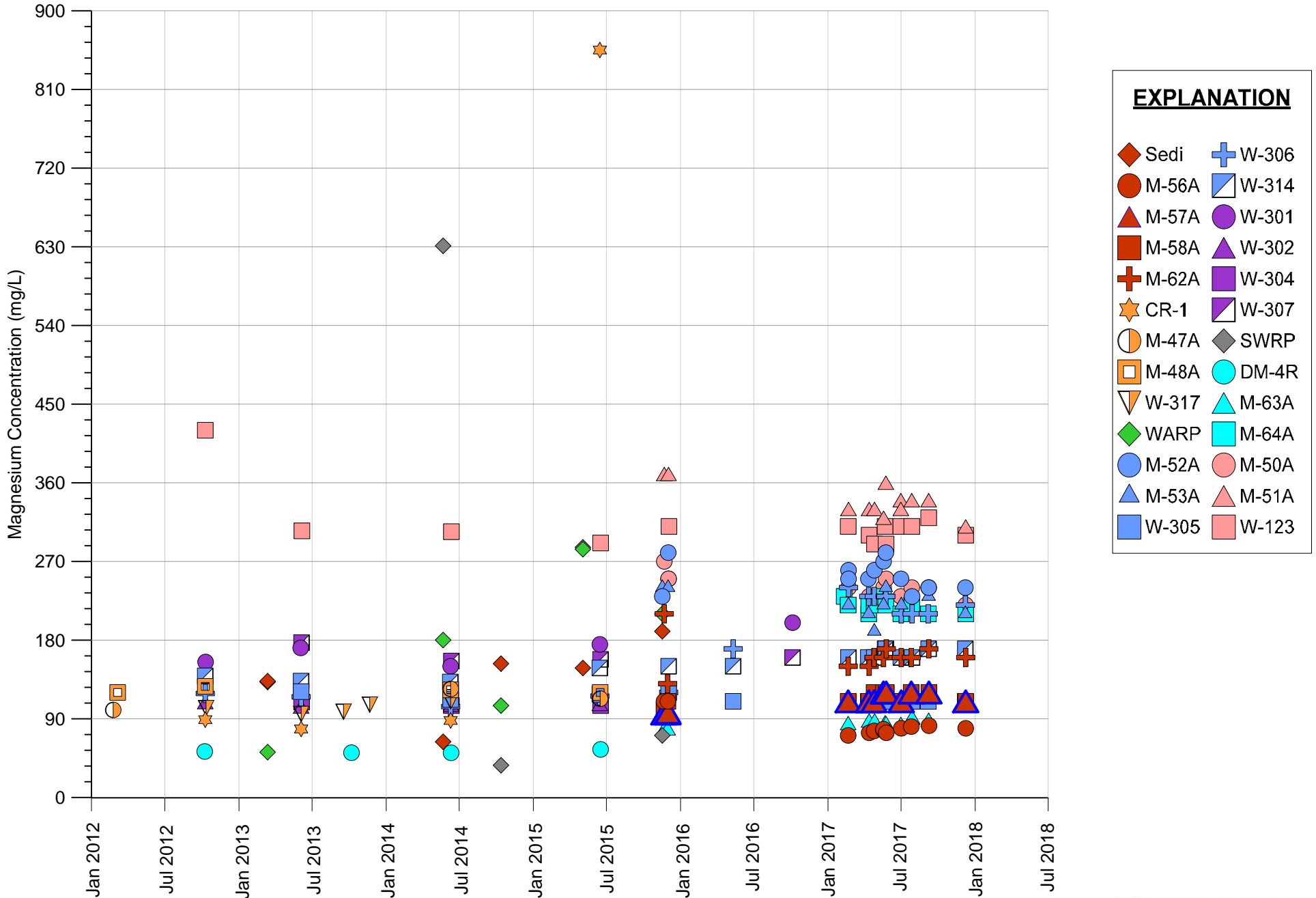


FIGURE D-5. MAGNESIUM CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

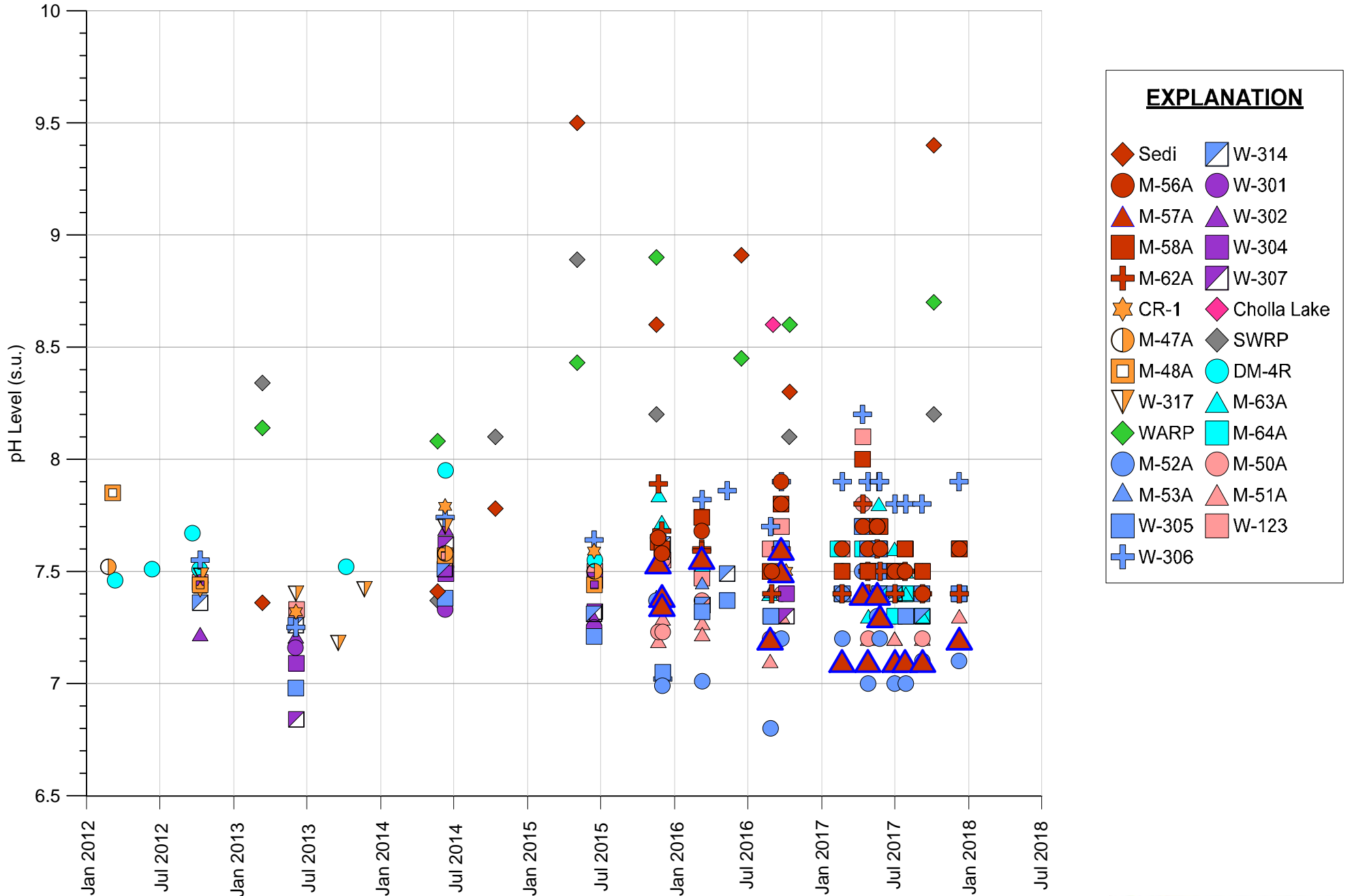


FIGURE D-6. pH LEVELS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

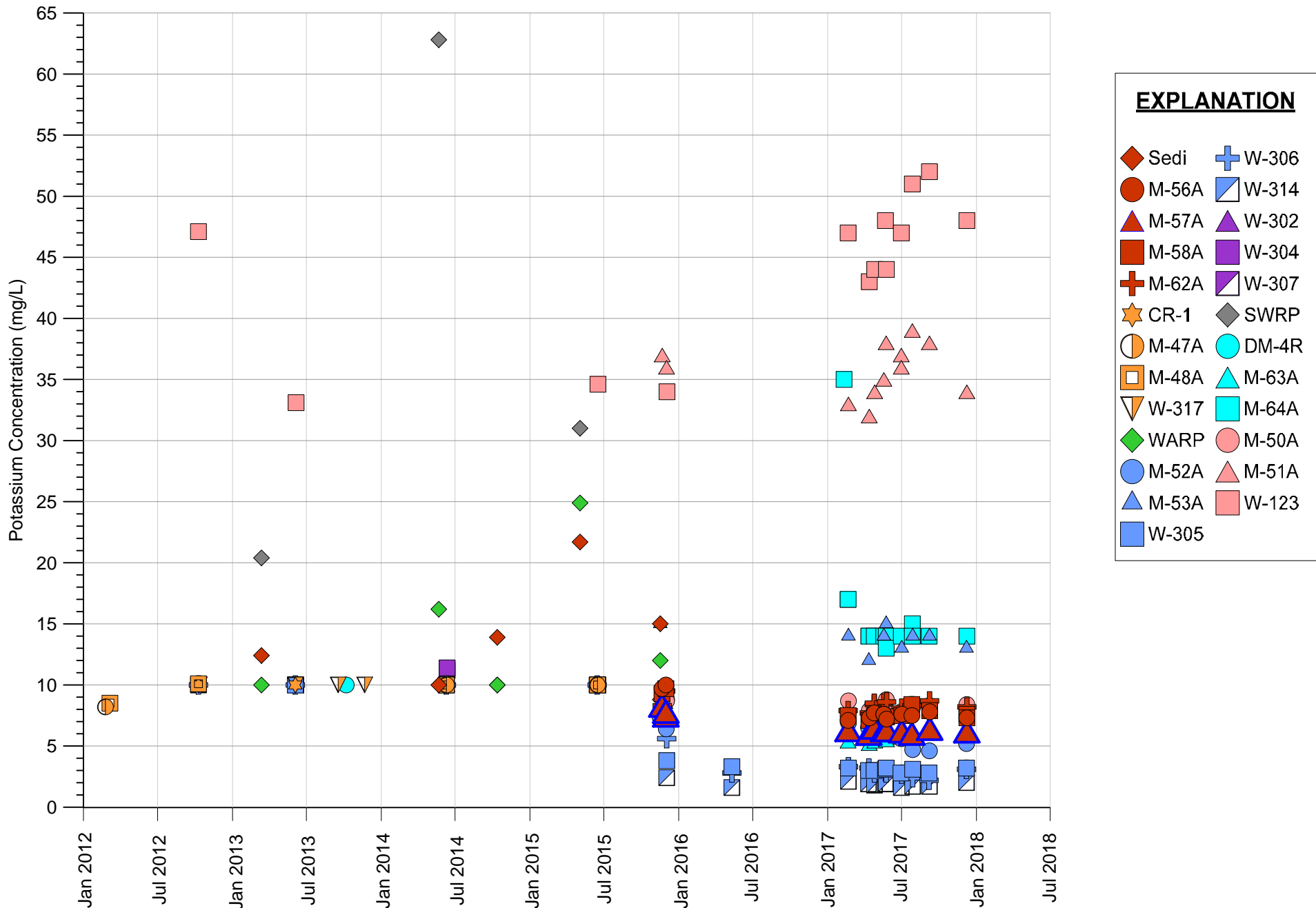


FIGURE D-7. POTASSIUM CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

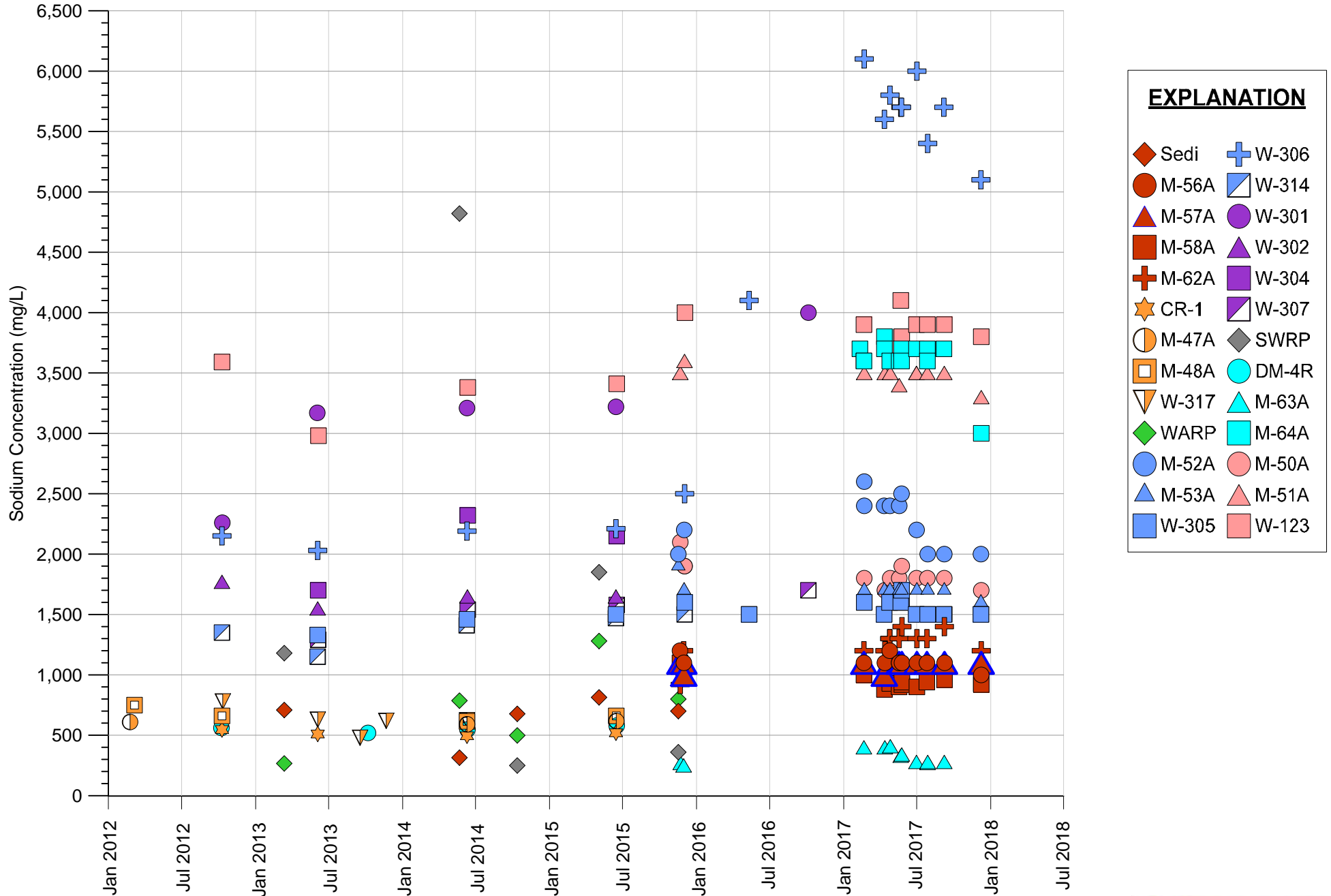


FIGURE D-8. SODIUM CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

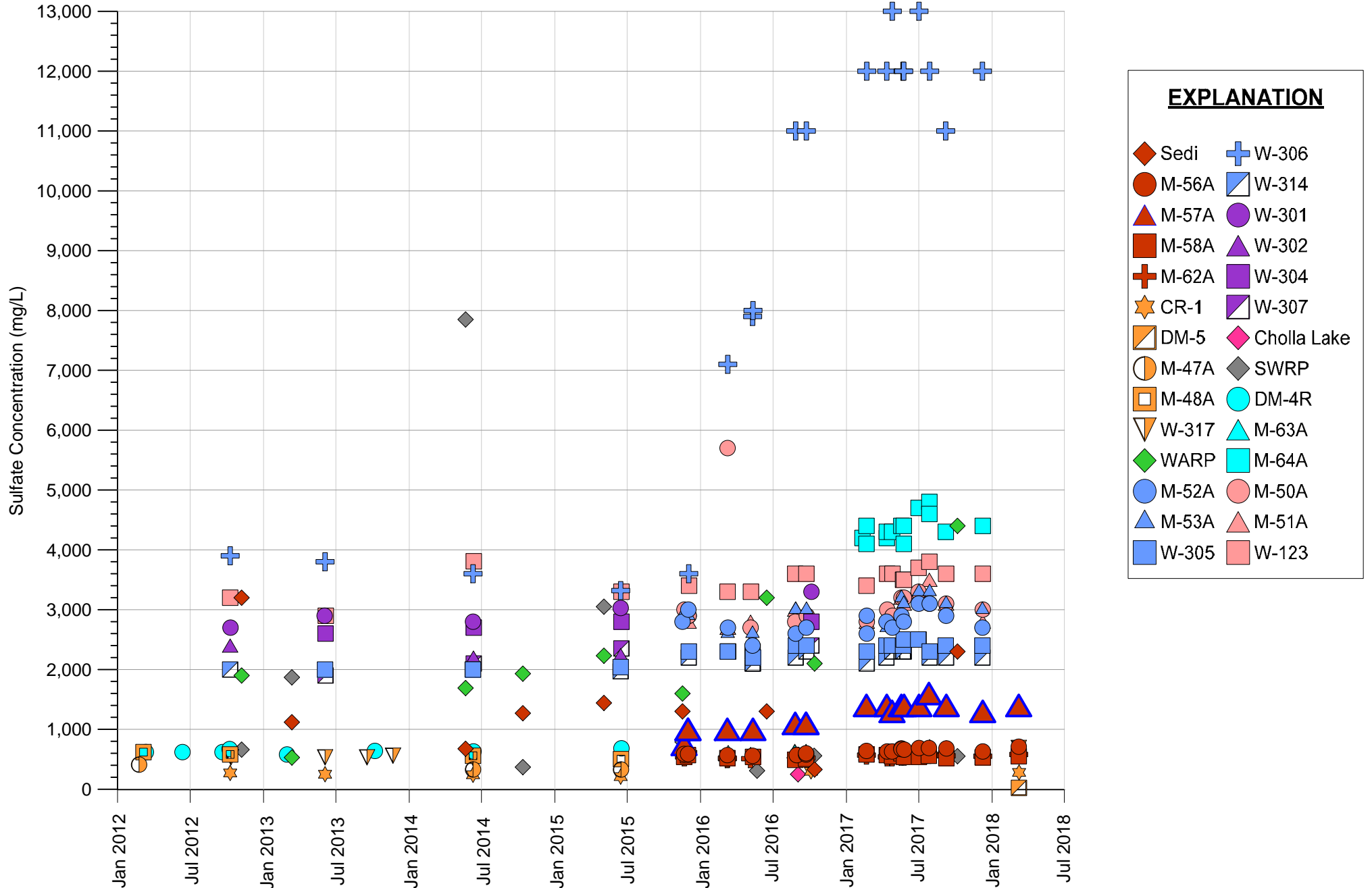


FIGURE D-9. SULFATE CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

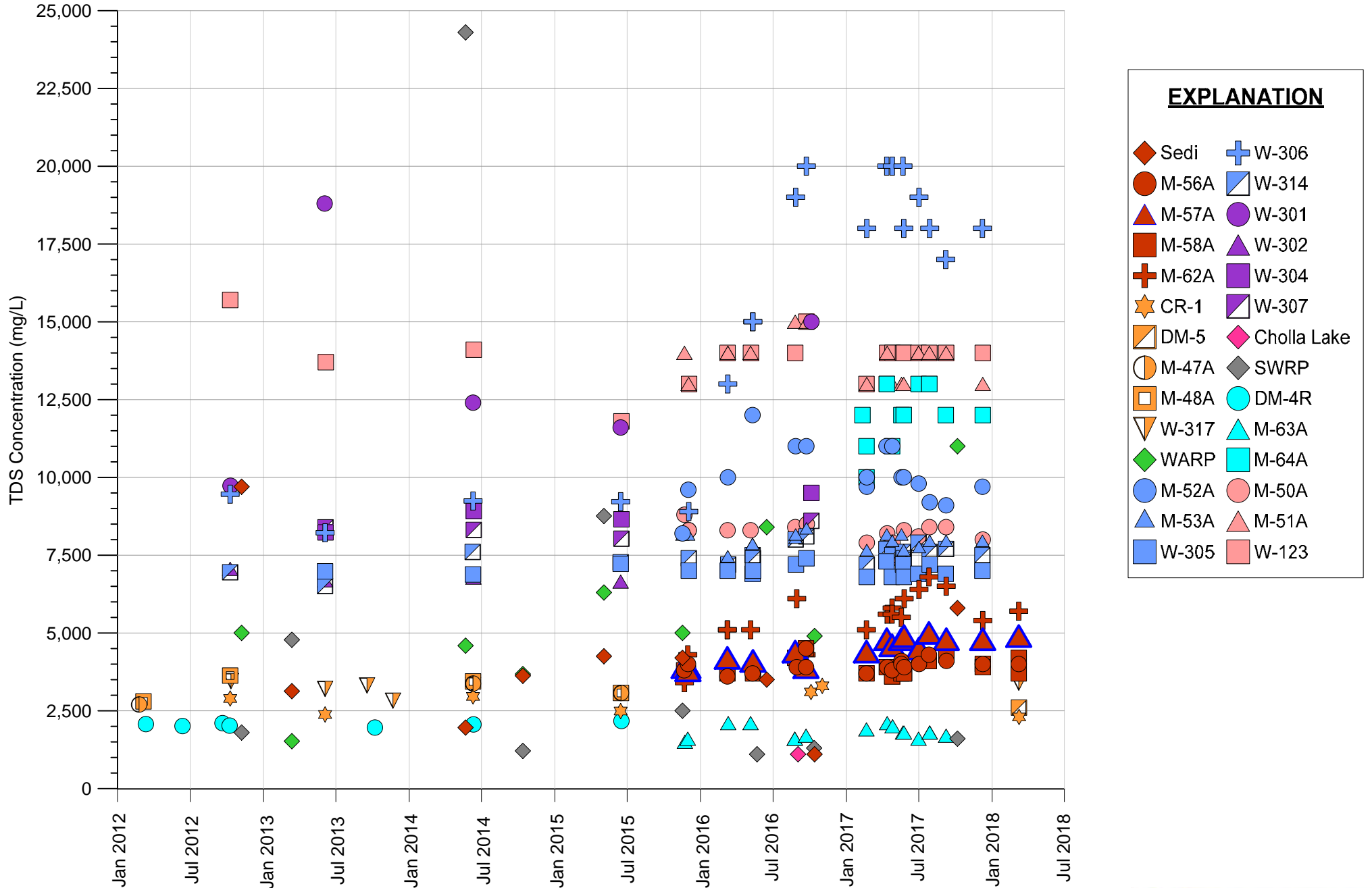
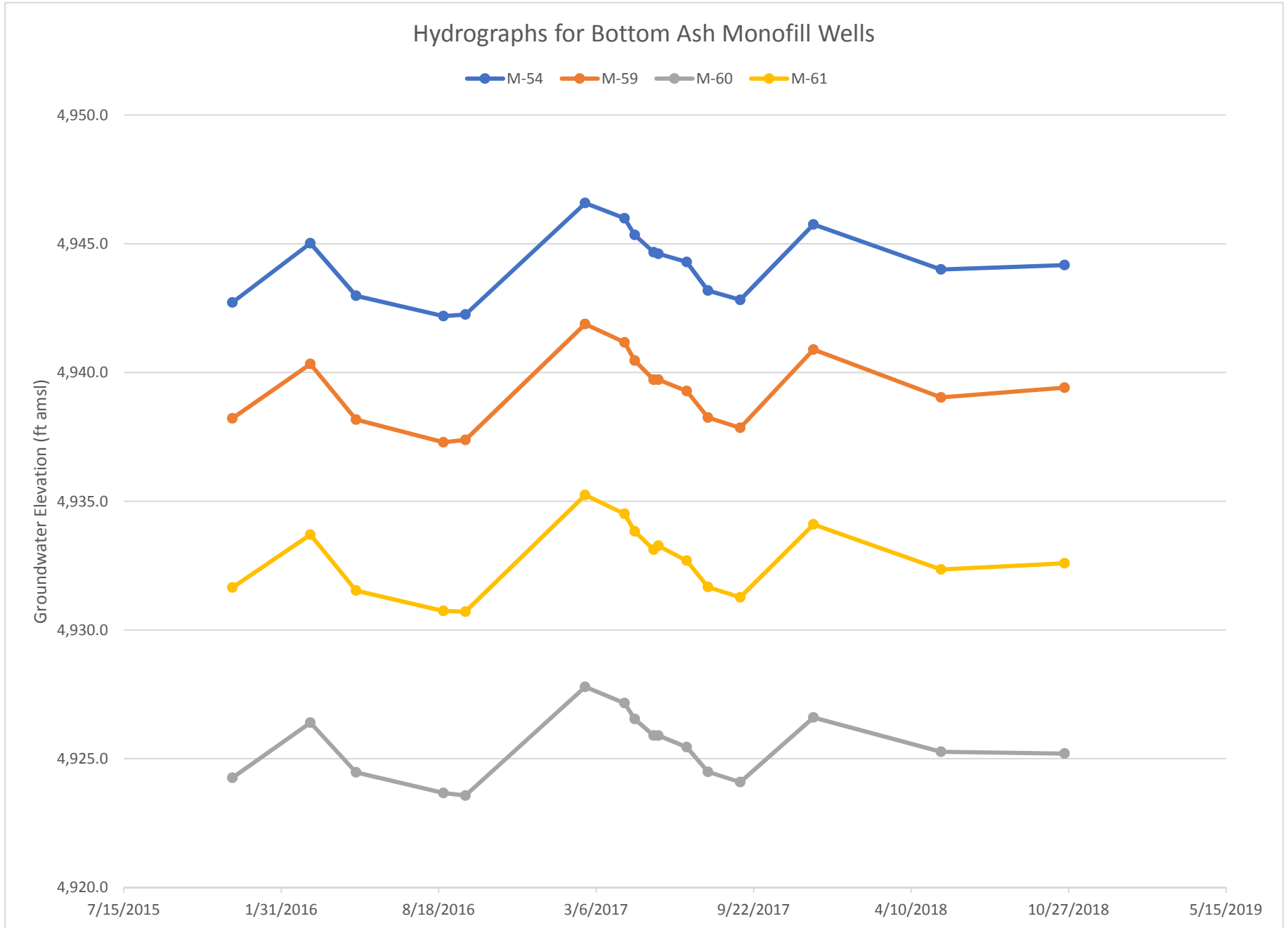


FIGURE D-10. TDS CONCENTRATIONS IN SEDIMENTATION POND, CCR NETWORK MONITOR WELLS, AND POTENTIAL ALTERNATE SOURCES

APPENDIX C

GROUNDWATER ELEVATION DATA AND HYDROGRAPHS





Appendix C - Groundwater Elevation Data and Hydrographs

M-54				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5070.71	127.99	4942.72	
3/8/2016	5070.71	125.69	4945.02	
5/5/2016	5070.71	127.73	4942.98	
8/24/2016	5070.71	128.52	4942.19	
9/21/2016	5070.71	128.46	4942.25	
2/20/2017	5070.71	124.13	4946.58	
4/11/2017	5070.71	124.72	4945.99	
4/24/2017	5070.71	125.37	4945.34	
5/18/2017	5070.71	126.04	4944.67	
5/24/2017	5070.71	126.10	4944.61	
6/29/2017	5070.71	126.42	4944.29	
7/26/2017	5070.71	127.53	4943.18	
9/5/2017	5070.71	127.89	4942.82	
12/7/2017	5070.71	124.96	4945.75	
2/13/2018	5070.71			
5/18/2018	5070.71	126.71	4944.00	
8/2/2018	5070.71			
10/22/2018	5070.71	126.54	4944.17	

Maximum Observed: 4946.58 ft AMSL

Minimum Observed: 4942.19 ft AMSL

Range: 4.39 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-59				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5136	197.78	4938.22	
3/8/2016	5136	195.67	4940.33	
5/5/2016	5136	197.83	4938.17	
8/24/2016	5136	198.71	4937.29	
9/21/2016	5136	198.62	4937.38	
2/20/2017	5136	194.12	4941.88	
4/11/2017	5136	194.83	4941.17	
4/24/2017	5136	195.54	4940.46	
5/18/2017	5136	196.28	4939.72	
5/24/2017	5136	196.28	4939.72	
6/29/2017	5136	196.72	4939.28	
7/26/2017	5136	197.75	4938.25	
9/5/2017	5136	198.15	4937.85	
12/7/2017	5136	195.11	4940.89	
2/13/2018	5136			
5/18/2018	5136	196.97	4939.03	
8/2/2018	5136			
10/22/2018	5136	196.59	4939.41	

Maximum Observed: 4941.88 ft AMSL

Minimum Observed: 4937.29 ft AMSL

Range: 4.59 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-60				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5151.18	226.92	4924.26	
3/8/2016	5151.18	224.78	4926.40	
5/5/2016	5151.18	226.71	4924.47	
8/24/2016	5151.18	227.51	4923.67	
9/21/2016	5151.18	227.61	4923.57	
2/20/2017	5151.18	223.39	4927.79	
4/11/2017	5151.18	224.02	4927.16	
4/24/2017	5151.18	224.64	4926.54	
5/18/2017	5151.18	225.28	4925.90	
5/24/2017	5151.18	225.28	4925.90	
6/29/2017	5151.18	225.73	4925.45	
7/26/2017	5151.18	226.69	4924.49	
9/5/2017	5151.18	227.09	4924.09	
12/7/2017	5151.18	224.58	4926.60	
2/13/2018	5151.18			
5/18/2018	5151.18	225.91	4925.27	
8/2/2018	5151.18			
10/22/2018	5151.18	225.98	4925.20	

Maximum Observed: 4927.79 ft AMSL

Minimum Observed: 4923.57 ft AMSL

Range: 4.22 ft

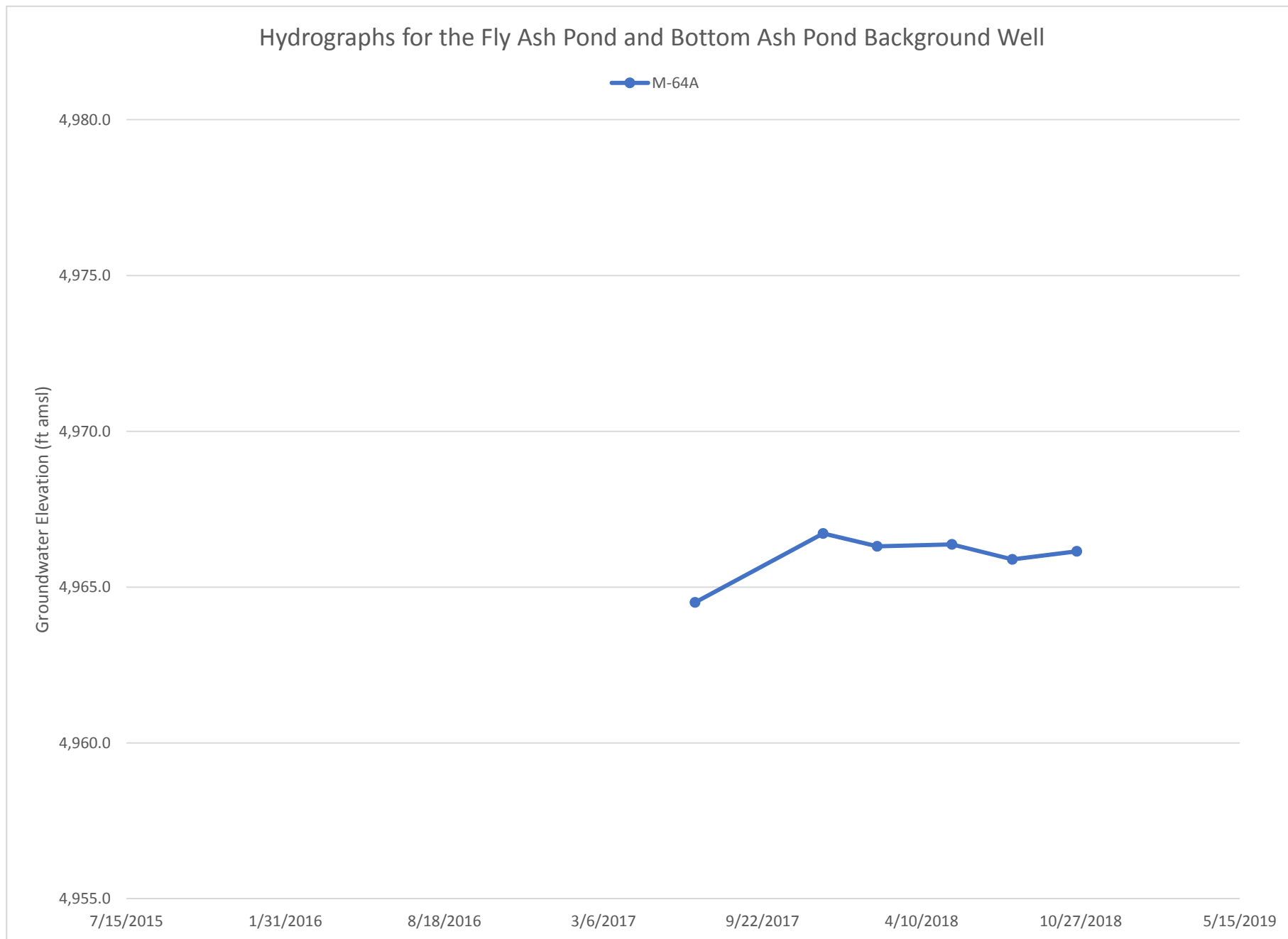
Appendix C - Groundwater Elevation Data and Hydrographs

M-61				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5127.58	195.93	4931.65	
3/8/2016	5127.58	193.88	4933.70	
5/5/2016	5127.58	196.05	4931.53	
8/24/2016	5127.58	196.84	4930.74	
9/21/2016	5127.58	196.87	4930.71	
2/20/2017	5127.58	192.34	4935.24	
4/11/2017	5127.58	193.07	4934.51	
4/24/2017	5127.58	193.75	4933.83	
5/18/2017	5127.58	194.46	4933.12	
5/24/2017	5127.58	194.31	4933.27	
6/29/2017	5127.58	194.89	4932.69	
7/26/2017	5127.58	195.91	4931.67	
9/5/2017	5127.58	196.31	4931.27	
12/7/2017	5127.58	193.48	4934.10	
2/13/2018				
5/18/2018	5127.58	195.23	4932.35	
8/2/2018				
10/22/2018	5127.58	194.99	4932.59	

Maximum Observed: 4935.24 ft AMSL

Minimum Observed: 4930.71 ft AMSL

Range: 4.53 ft



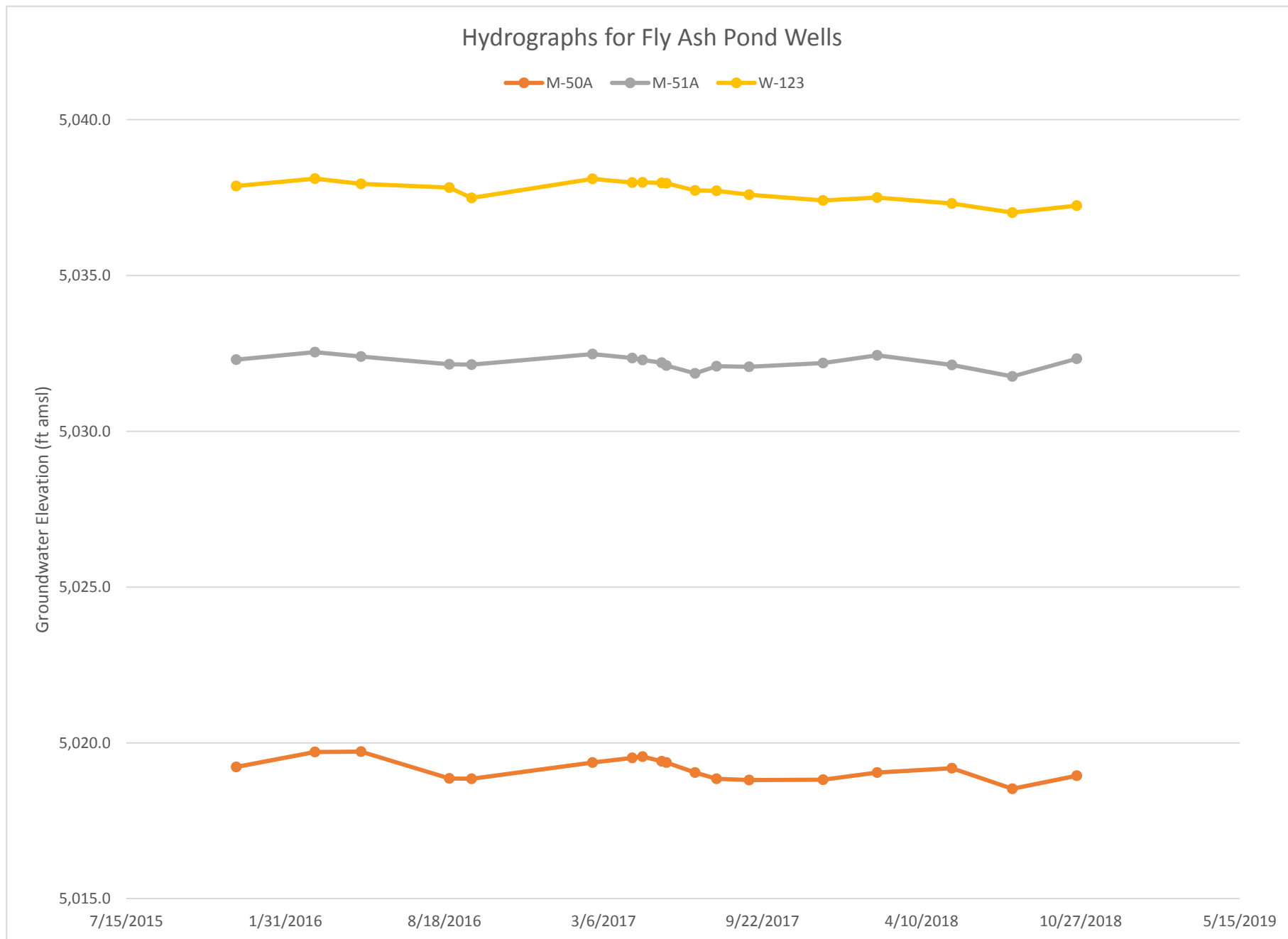
Appendix C - Groundwater Elevation Data and Hydrographs

M-64				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	4991.9			
3/8/2016	4991.9			
5/5/2016	4991.9			
8/24/2016	4991.9			
9/21/2016	4991.9			
2/20/2017	4991.9			
4/11/2017	4991.9			
4/24/2017	4991.9			
5/18/2017	4991.9			
5/24/2017	4991.9			
6/29/2017	4991.9	27.39	4964.51	
7/26/2017	4991.9			
9/5/2017	4991.9			
12/7/2017	4991.9	25.18	4966.72	
2/13/2018	4991.9	25.59	4966.31	
5/18/2018	4991.9	25.53	4966.37	
8/2/2018	4991.9	26.01	4965.89	
10/22/2018	4991.9	25.75	4966.15	

Maximum Observed: 4966.72 ft AMSL

Minimum Observed: 4964.51 ft AMSL

Range: 2.21 ft



Appendix C - Groundwater Elevation Data and Hydrographs

M-50A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5038.18	18.95	5019.23	
3/8/2016	5038.18	18.47	5019.71	
5/5/2016	5038.18	18.46	5019.72	
8/24/2016	5038.18	19.32	5018.86	
9/21/2016	5038.18	19.33	5018.85	
2/20/2017	5038.18	18.81	5019.37	
4/11/2017	5038.18	18.66	5019.52	
4/24/2017	5038.18	18.62	5019.56	
5/18/2017	5038.18	18.77	5019.41	
5/24/2017	5038.18	18.81	5019.37	
6/29/2017	5038.18	19.13	5019.05	
7/26/2017	5038.18	19.33	5018.85	
9/5/2017	5038.18	19.37	5018.81	
12/7/2017	5038.18	19.36	5018.82	
2/13/2018	5038.18	19.13	5019.05	
5/18/2018	5038.18	18.99	5019.19	
8/2/2018	5038.18	19.65	5018.53	
10/22/2018	5038.18	19.23	5018.95	

Maximum Observed: 5019.72 ft AMSL

Minimum Observed: 5018.53 ft AMSL

Range: 1.19 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-51A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5041.77	9.47	5032.30	
3/8/2016	5041.77	9.23	5032.54	
5/5/2016	5041.77	9.37	5032.40	
8/24/2016	5041.77	9.62	5032.15	
9/21/2016	5041.77	9.63	5032.14	
2/20/2017	5041.77	9.29	5032.48	
4/11/2017	5041.77	9.42	5032.35	
4/24/2017	5041.77	9.48	5032.29	
5/18/2017	5041.77	9.57	5032.20	
5/24/2017	5041.77	9.66	5032.11	
6/29/2017	5041.77	9.91	5031.86	
7/26/2017	5041.77	9.68	5032.09	
9/5/2017	5041.77	9.7	5032.07	
12/7/2017	5041.77	9.58	5032.19	
2/13/2018	5041.77	9.33	5032.44	
5/18/2018	5041.77	9.64	5032.13	
8/2/2018	5041.77	10.01	5031.76	
10/22/2018	5041.77	9.44	5032.33	

Maximum Observed: 5032.54 ft AMSL

Minimum Observed: 5031.76 ft AMSL

Range: 0.78 ft

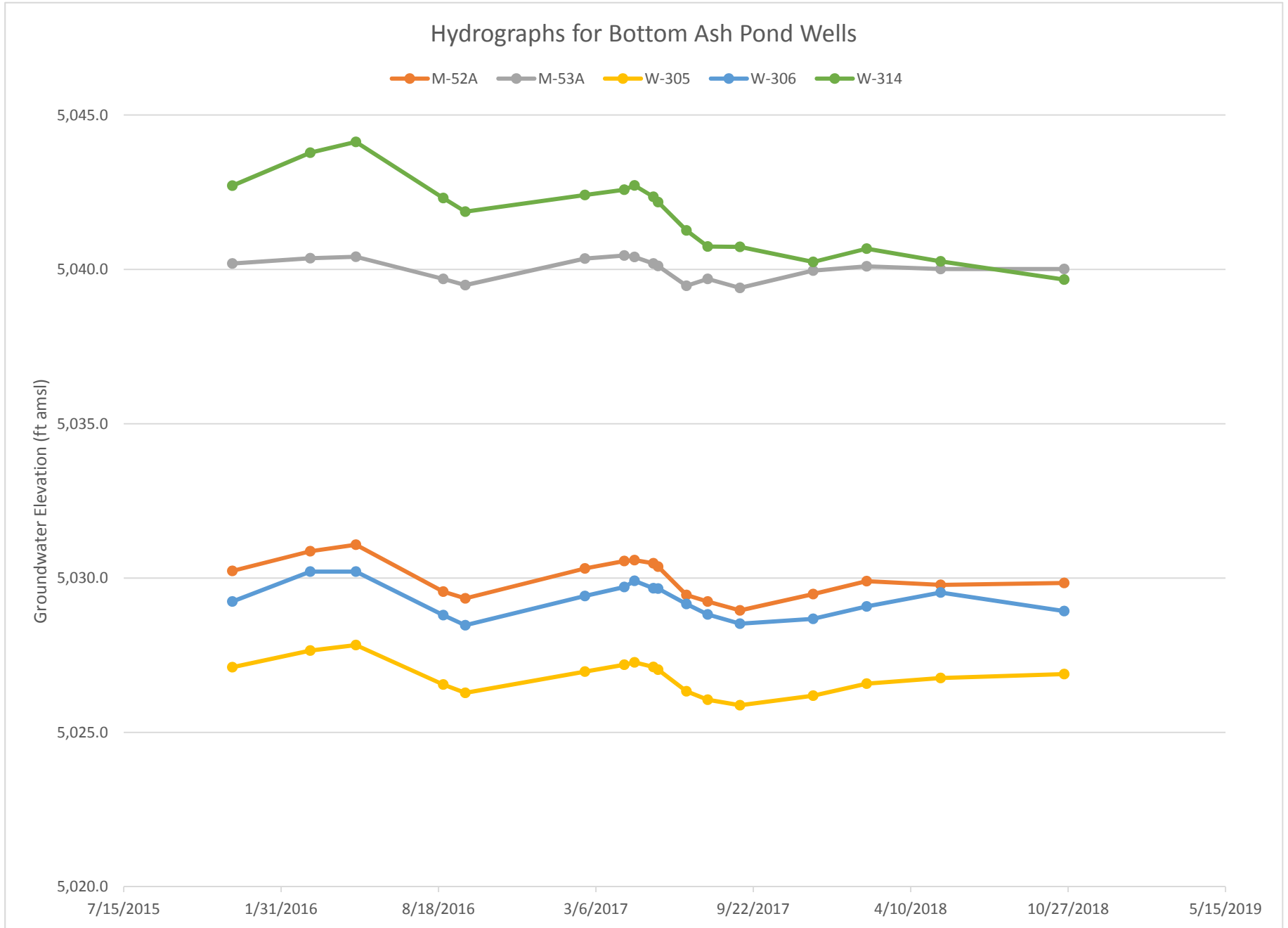
Appendix C - Groundwater Elevation Data and Hydrographs

W-123				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5039.84	1.97	5037.87	
3/8/2016	5039.84	1.73	5038.11	
5/5/2016	5039.84	1.90	5037.94	
8/24/2016	5039.84	2.02	5037.82	
9/21/2016	5039.84	2.35	5037.49	
2/20/2017	5039.84	1.74	5038.10	
4/11/2017	5039.84	1.86	5037.98	
4/24/2017	5039.84	1.85	5037.99	
5/18/2017	5039.84	1.87	5037.97	
5/24/2017	5039.84	1.88	5037.96	
6/29/2017	5039.84	2.11	5037.73	
7/26/2017	5039.84	2.12	5037.72	
9/5/2017	5039.84	2.25	5037.59	
12/7/2017	5039.84	2.43	5037.41	
2/13/2018	5039.84	2.34	5037.5	
5/18/2018	5039.84	2.53	5037.31	
8/2/2018	5039.84	2.82	5037.02	
10/22/2018	5039.84	2.60	5037.24	

Maximum Observed: 5038.11 ft AMSL

Minimum Observed: 5037.02 ft AMSL

Range: 1.09 ft



Appendix C - Groundwater Elevation Data and Hydrographs

M-52A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5049.36	19.13	5030.23	
3/8/2016	5049.36	18.49	5030.87	
5/5/2016	5049.36	18.28	5031.08	
8/24/2016	5049.36	19.80	5029.56	
9/21/2016	5049.36	20.02	5029.34	
2/20/2017	5049.36	19.05	5030.31	
4/11/2017	5049.36	18.81	5030.55	
4/24/2017	5049.36	18.78	5030.58	
5/18/2017	5049.36	18.88	5030.48	
5/24/2017	5049.36	18.99	5030.37	
6/29/2017	5049.36	19.91	5029.45	
7/26/2017	5049.36	20.12	5029.24	
9/5/2017	5049.36	20.41	5028.95	
12/7/2017	5049.36	19.88	5029.48	
2/13/2018	5049.36	19.46	5029.90	
5/18/2018	5049.36	19.58	5029.78	
8/2/2018	5049.36			
10/22/2018	5049.36	19.52	5029.84	

Maximum Observed: 5031.08 ft AMSL

Minimum Observed: 5028.95 ft AMSL

Range: 2.13 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-53A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5044.68	4.49	5040.19	
3/8/2016	5044.68	4.32	5040.36	
5/5/2016	5044.68	4.27	5040.41	
8/24/2016	5044.68	4.99	5039.69	
9/21/2016	5044.68	5.19	5039.49	
2/20/2017	5044.68	4.33	5040.35	
4/11/2017	5044.68	4.23	5040.45	
4/24/2017	5044.68	4.28	5040.4	
5/18/2017	5044.68	4.49	5040.19	
5/24/2017	5044.68	4.57	5040.11	
6/29/2017	5044.68	5.21	5039.47	
7/26/2017	5044.68	4.99	5039.69	
9/5/2017	5044.68	5.28	5039.40	
12/7/2017	5044.68	4.72	5039.96	
2/13/2018	5044.68	4.58	5040.10	
5/18/2018	5044.68	4.67	5040.01	
8/2/2018	5044.68			
10/22/2018	5044.68	4.67	5040.01	

Maximum Observed: 5040.45 ft AMSL

Minimum Observed: 5039.40 ft AMSL

Range: 1.05 ft

Appendix C - Groundwater Elevation Data and Hydrographs

W-305				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5046.8	19.69	5027.11	
3/8/2016	5046.8	19.15	5027.65	
5/5/2016	5046.8	18.97	5027.83	
8/24/2016	5046.8	20.25	5026.55	
9/21/2016	5046.8	20.52	5026.28	
2/20/2017	5046.8	19.83	5026.97	
4/11/2017	5046.8	19.61	5027.19	
4/24/2017	5046.8	19.53	5027.27	
5/18/2017	5046.8	19.68	5027.12	
5/24/2017	5046.8	19.77	5027.03	
6/29/2017	5046.8	20.47	5026.33	
7/26/2017	5046.8	20.74	5026.06	
9/5/2017	5046.8	20.92	5025.88	
12/7/2017	5046.8	20.61	5026.19	
2/13/2018	5046.8	20.22	5026.58	
5/18/2018	5046.8	20.04	5026.76	
8/2/2018	5046.8			
10/22/2018	5046.8	19.91	5026.89	

Maximum Observed: 5027.83 ft AMSL

Minimum Observed: 5025.88 ft AMSL

Range: 1.95 ft

Appendix C - Groundwater Elevation Data and Hydrographs

W-306				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5046.74	17.50	5029.24	
3/8/2016	5046.74	16.53	5030.21	
5/5/2016	5046.74	16.53	5030.21	
8/24/2016	5046.74	17.94	5028.80	
9/21/2016	5046.74	18.27	5028.47	
2/20/2017	5046.74	17.32	5029.42	
4/11/2017	5046.74	17.03	5029.71	
4/24/2017	5046.74	16.83	5029.91	
5/18/2017	5046.74	17.07	5029.67	
5/24/2017	5046.74	17.08	5029.66	
6/29/2017	5046.74	17.58	5029.16	
7/26/2017	5046.74	17.92	5028.82	
9/5/2017	5046.74	18.22	5028.52	
12/7/2017	5046.74	18.06	5028.68	
2/13/2018	5046.74	17.66	5029.08	
5/18/2018	5046.74	17.21	5029.53	
8/2/2018	5046.74			
10/22/2018	5046.74	17.81	5028.93	

Maximum Observed: 5030.21 ft AMSL

Minimum Observed: 5028.47 ft AMSL

Range: 1.74 ft

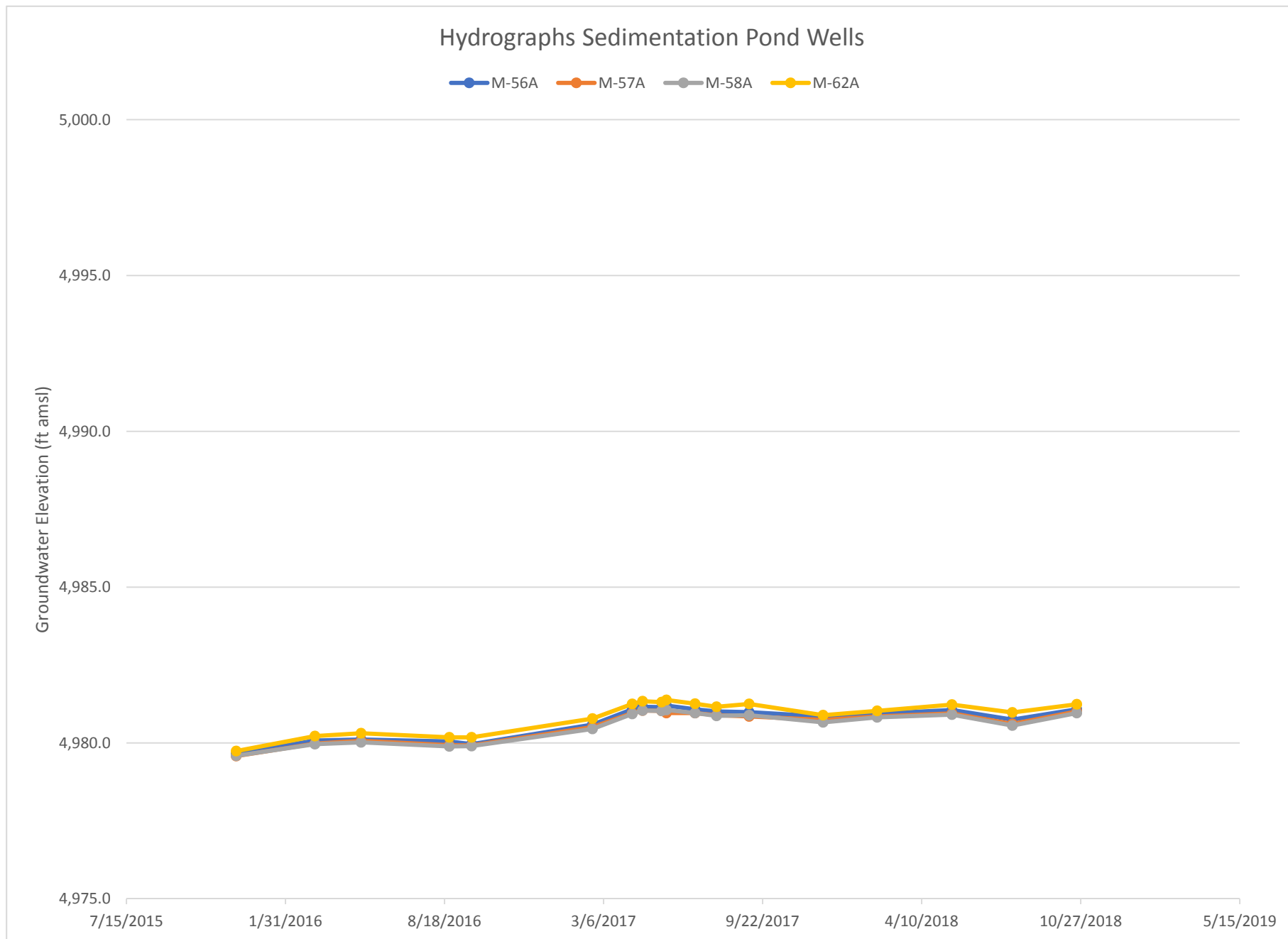
Appendix C - Groundwater Elevation Data and Hydrographs

W-314				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5051.1	8.39	5042.71	
3/8/2016	5051.1	7.32	5043.78	
5/5/2016	5051.1	6.97	5044.13	
8/24/2016	5051.1	8.79	5042.31	
9/21/2016	5051.1	9.23	5041.87	
2/20/2017	5051.1	8.69	5042.41	
4/11/2017	5051.1	8.52	5042.58	
4/24/2017	5051.1	8.38	5042.72	
5/18/2017	5051.1	8.75	5042.35	
5/24/2017	5051.1	8.92	5042.18	
6/29/2017	5051.1	9.84	5041.26	
7/26/2017	5051.1	10.36	5040.74	
9/5/2017	5051.1	10.37	5040.73	
12/7/2017	5051.1	10.86	5040.24	
2/13/2018	5051.1	10.43	5040.67	
5/18/2018	5051.1	10.84	5040.26	
8/2/2018	5051.1			
10/22/2018	5051.1	11.43	5039.67	

Maximum Observed: 5044.13 ft AMSL

Minimum Observed: 5039.67 ft AMSL

Range: 4.46 ft



Appendix C - Groundwater Elevation Data and Hydrographs

M-56A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5023.17	43.52	4979.65	
3/8/2016	5023.17	43.09	4980.08	
5/5/2016	5023.17	43.06	4980.11	
8/24/2016	5023.17	43.12	4980.05	
9/21/2016	5023.17	43.21	4979.96	
2/20/2017	5023.17	42.58	4980.59	
4/11/2017	5023.17	42.09	4981.08	
4/24/2017	5023.17	42.01	4981.16	
5/18/2017	5023.17	42.02	4981.15	
5/24/2017	5023.17	41.97	4981.20	
6/29/2017	5023.17	42.09	4981.08	
7/26/2017	5023.17	42.16	4981.01	
9/5/2017	5023.17	42.18	4980.99	
12/7/2017	5023.17	42.32	4980.85	
2/13/2018	5023.17	42.23	4980.94	
5/18/2018	5023.17	42.11	4981.06	
8/2/2018	5023.17	42.42	4980.75	
10/22/2018	5023.17	42.09	4981.08	

Maximum Observed: 4981.20 ft AMSL

Minimum Observed: 4979.65 ft AMSL

Range: 1.55 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-57A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5023.82	44.24	4979.58	
3/8/2016	5023.82	43.84	4979.98	
5/5/2016	5023.82	43.75	4980.07	
8/24/2016	5023.82	43.89	4979.93	
9/21/2016	5023.82	43.90	4979.92	
2/20/2017	5023.82	43.31	4980.51	
4/11/2017	5023.82	42.86	4980.96	
4/24/2017	5023.82	42.78	4981.04	
5/18/2017	5023.82	42.79	4981.03	
5/24/2017	5023.82	42.86	4980.96	
6/29/2017	5023.82	42.86	4980.96	
7/26/2017	5023.82	42.93	4980.89	
9/5/2017	5023.82	42.97	4980.85	
12/7/2017	5023.82	43.08	4980.74	
2/13/2018	5023.82	42.97	4980.85	
5/18/2018	5023.82	42.87	4980.95	
8/2/2018	5023.82	43.21	4980.61	
10/22/2018	5023.82	42.81	4981.01	

Maximum Observed: 4981.04 ft AMSL

Minimum Observed: 4979.58 ft AMSL

Range: 1.46 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-58A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5023.84	44.25	4979.59	
3/8/2016	5023.84	43.88	4979.96	
5/5/2016	5023.84	43.82	4980.02	
8/24/2016	5023.84	43.95	4979.89	
9/21/2016	5023.84	43.94	4979.9	
2/20/2017	5023.84	43.39	4980.45	
4/11/2017	5023.84	42.91	4980.93	
4/24/2017	5023.84	42.8	4981.04	
5/18/2017	5023.84	42.81	4981.03	
5/24/2017	5023.84	42.78	4981.06	
6/29/2017	5023.84	42.88	4980.96	
7/26/2017	5023.84	42.97	4980.87	
9/5/2017	5023.84	42.95	4980.89	
12/7/2017	5023.84	43.18	4980.66	
2/13/2018	5023.84	43.02	4980.82	
5/18/2018	5023.84	42.93	4980.91	
8/2/2018	5023.84	43.28	4980.56	
10/22/2018	5023.84	42.88	4980.96	

Maximum Observed: 4981.06 ft AMSL

Minimum Observed: 4979.59 ft AMSL

Range: 1.47 ft

Appendix C - Groundwater Elevation Data and Hydrographs

M-62A				
Date of Measurement	Measuring Pt Elevation [ft AMSL]	Water Level [ft bmp]	GW Elevation [ft AMSL]	Well TD
11/30/2015	5020.87	41.13	4979.74	
3/8/2016	5020.87	40.65	4980.22	
5/5/2016	5020.87	40.56	4980.31	
8/24/2016	5020.87	40.69	4980.18	
9/21/2016	5020.87	40.69	4980.18	
2/20/2017	5020.87	40.09	4980.78	
4/11/2017	5020.87	39.62	4981.25	
4/24/2017	5020.87	39.53	4981.34	
5/18/2017	5020.87	39.56	4981.31	
5/24/2017	5020.87	39.49	4981.38	
6/29/2017	5020.87	39.61	4981.26	
7/26/2017	5020.87	39.71	4981.16	
9/5/2017	5020.87	39.62	4981.25	
12/7/2017	5020.87	39.98	4980.89	
2/13/2018	5020.87	39.84	4981.03	
5/18/2018	5020.87	39.64	4981.23	
8/2/2018	5020.87	39.89	4980.98	
10/22/2018	5020.87	39.63	4981.24	

Maximum Observed: 4981.38 ft AMSL

Minimum Observed: 4979.74 ft AMSL

Range: 1.64 ft

APPENDIX D
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: 550-103497-1

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:

5/31/2018 2:58:53 PM

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: 550-103497-1
SDG: Cholla

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
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.

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: 550-103497-1
SDG: Cholla

Job ID: 550-103497-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103497-1**

Comments

No additional comments.

Receipt

The samples were received on 5/29/2018 6:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.1° 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: 550-103497-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103497-1	CH-CCR-M-54-52518	Water	05/25/18 18:19	05/29/18 06:45
550-103497-2	CH-CCR-M-59-52518	Water	05/25/18 15:53	05/29/18 06:45
550-103497-3	CH-CCR-M-60-52518	Water	05/25/18 17:35	05/29/18 06:45
550-103497-4	CH-CCR-M-61-52518	Water	05/25/18 16:38	05/29/18 06:45

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Client Sample ID: CH-CCR-M-54-52518

Lab Sample ID: 550-103497-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1500	D2	100	mg/L	50		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	0.50		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	96		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	33		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.9		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	920		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	220		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	220		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	3000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-59-52518

Lab Sample ID: 550-103497-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	100	mg/L	50		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	0.49		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	30		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.9		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	850		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	220		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	220		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	2700	D2	40	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-60-52518

Lab Sample ID: 550-103497-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.5		0.40	mg/L	1		300.0	Total/NA
Sulfate	350	D2	100	mg/L	50		300.0	Total/NA
Boron	0.50		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	83		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	29		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.6		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	870		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	2800	D2	40	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-61-52518

Lab Sample ID: 550-103497-4

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Client Sample ID: CH-CCR-M-61-52518 (Continued)

Lab Sample ID: 550-103497-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.5		0.40	mg/L	1		300.0	Total/NA
Sulfate	390	D2	100	mg/L	50		300.0	Total/NA
Boron	0.48		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	87		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	30		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.6		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	860		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	2800	D2	40	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.9	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: 550-103497-1
SDG: Cholla

Client Sample ID: CH-CCR-M-54-52518

Lab Sample ID: 550-103497-1

Date Collected: 05/25/18 18:19

Matrix: Water

Date Received: 05/29/18 06:45

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1500	D2	100	mg/L			05/30/18 22:43	50
Fluoride	1.4		0.40	mg/L			05/30/18 22:24	1
Sulfate	350	D2	100	mg/L			05/30/18 22:43	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.50		0.050	mg/L		05/29/18 12:11	05/30/18 18:48	1
Calcium	96		2.0	mg/L		05/29/18 12:11	05/30/18 18:48	1
Magnesium	33		2.0	mg/L		05/29/18 12:11	05/30/18 18:48	1
Potassium	3.9		0.50	mg/L		05/29/18 12:11	05/30/18 18:48	1
Sodium	920		0.50	mg/L		05/29/18 12:11	05/30/18 18:48	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	220		6.0	mg/L			05/30/18 02:17	1
Bicarbonate Alkalinity as CaCO3	220		6.0	mg/L			05/30/18 02:17	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 02:17	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/30/18 02:17	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 02:17	1
Total Dissolved Solids	3000	D2	100	mg/L			05/29/18 12:17	1
pH	7.4	H5	1.7	SU			05/29/18 09:45	1
Temperature	19.8	H5	0.1	Degrees C			05/29/18 09:45	1

Client Sample ID: CH-CCR-M-59-52518

Lab Sample ID: 550-103497-2

Date Collected: 05/25/18 15:53

Matrix: Water

Date Received: 05/29/18 06:45

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	100	mg/L			05/30/18 23:19	50
Fluoride	1.4		0.40	mg/L			05/30/18 23:01	1
Sulfate	350	D2	100	mg/L			05/30/18 23:19	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.49		0.050	mg/L		05/29/18 12:11	05/30/18 18:54	1
Calcium	85		2.0	mg/L		05/29/18 12:11	05/30/18 18:54	1
Magnesium	30		2.0	mg/L		05/29/18 12:11	05/30/18 18:54	1
Potassium	3.9		0.50	mg/L		05/29/18 12:11	05/30/18 18:54	1
Sodium	850		0.50	mg/L		05/29/18 12:11	05/30/18 18:54	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	220		6.0	mg/L			05/30/18 01:40	1
Bicarbonate Alkalinity as CaCO3	220		6.0	mg/L			05/30/18 01:40	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 01:40	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/30/18 01:40	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 01:40	1
Total Dissolved Solids	2700	D2	40	mg/L			05/29/18 12:17	1
pH	7.5	H5	1.7	SU			05/29/18 09:45	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Client Sample ID: CH-CCR-M-59-52518

Lab Sample ID: 550-103497-2

Date Collected: 05/25/18 15:53

Matrix: Water

Date Received: 05/29/18 06:45

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	19.5	H5	0.1	Degrees C			05/29/18 09:45	1

Client Sample ID: CH-CCR-M-60-52518

Lab Sample ID: 550-103497-3

Date Collected: 05/25/18 17:35

Matrix: Water

Date Received: 05/29/18 06:45

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	100	mg/L			05/30/18 23:56	50
Fluoride	1.5		0.40	mg/L			05/30/18 23:38	1
Sulfate	350	D2	100	mg/L			05/30/18 23:56	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.50		0.050	mg/L		05/29/18 12:11	05/30/18 18:59	1
Calcium	83		2.0	mg/L		05/29/18 12:11	05/30/18 18:59	1
Magnesium	29		2.0	mg/L		05/29/18 12:11	05/30/18 18:59	1
Potassium	3.6		0.50	mg/L		05/29/18 12:11	05/30/18 18:59	1
Sodium	870		0.50	mg/L		05/29/18 12:11	05/30/18 18:59	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	230		6.0	mg/L			05/30/18 01:49	1
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L			05/30/18 01:49	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 01:49	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/30/18 01:49	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 01:49	1
Total Dissolved Solids	2800	D2	40	mg/L			05/29/18 12:17	1
pH	7.5	H5	1.7	SU			05/29/18 09:45	1
Temperature	19.6	H5	0.1	Degrees C			05/29/18 09:45	1

Client Sample ID: CH-CCR-M-61-52518

Lab Sample ID: 550-103497-4

Date Collected: 05/25/18 16:38

Matrix: Water

Date Received: 05/29/18 06:45

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	100	mg/L			05/31/18 00:33	50
Fluoride	1.5		0.40	mg/L			05/31/18 00:15	1
Sulfate	390	D2	100	mg/L			05/31/18 00:33	50

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		05/29/18 12:11	05/30/18 19:05	1
Calcium	87		2.0	mg/L		05/29/18 12:11	05/30/18 19:05	1
Magnesium	30		2.0	mg/L		05/29/18 12:11	05/30/18 19:05	1
Potassium	3.6		0.50	mg/L		05/29/18 12:11	05/30/18 19:05	1
Sodium	860		0.50	mg/L		05/29/18 12:11	05/30/18 19:05	1

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103497-1
 SDG: Cholla

Client Sample ID: CH-CCR-M-61-52518

Lab Sample ID: 550-103497-4

Date Collected: 05/25/18 16:38

Matrix: Water

Date Received: 05/29/18 06:45

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	230		6.0	mg/L			05/30/18 01:58	1
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L			05/30/18 01:58	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 01:58	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/30/18 01:58	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/30/18 01:58	1
Total Dissolved Solids	2800	D2	40	mg/L			05/29/18 12:17	1
pH	7.5	H5	1.7	SU			05/29/18 09:45	1
Temperature	19.9	H5	0.1	Degrees C			05/29/18 09:45	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148518/2
Matrix: Water
Analysis Batch: 148518

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			05/30/18 13:30	1
Fluoride	ND		0.40	mg/L			05/30/18 13:30	1
Sulfate	ND		2.0	mg/L			05/30/18 13:30	1

Lab Sample ID: LCS 550-148518/5
Matrix: Water
Analysis Batch: 148518

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	21.1		mg/L		106	90 - 110
Fluoride	4.00	4.14		mg/L		103	90 - 110
Sulfate	20.0	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-148518/6
Matrix: Water
Analysis Batch: 148518

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	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-103434-A-19 MS
Matrix: Water
Analysis Batch: 148518

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	34		20.0	53.2		mg/L		97	80 - 120
Fluoride	ND		4.00	4.36		mg/L		106	80 - 120
Sulfate	5.5		20.0	26.7		mg/L		106	80 - 120

Lab Sample ID: 550-103434-A-19 MSD
Matrix: Water
Analysis Batch: 148518

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	34		20.0	53.2		mg/L		97	80 - 120	0	20
Fluoride	ND		4.00	4.22		mg/L		103	80 - 120	3	20
Sulfate	5.5		20.0	26.5		mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-148352/1-A
Matrix: Water
Analysis Batch: 148545

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148352

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		05/29/18 12:11	05/30/18 18:22	1
Calcium	ND		2.0	mg/L		05/29/18 12:11	05/30/18 18:22	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

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

Lab Sample ID: MB 550-148352/1-A
Matrix: Water
Analysis Batch: 148545

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148352

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		2.0	mg/L		05/29/18 12:11	05/30/18 18:22	1
Potassium	ND		0.50	mg/L		05/29/18 12:11	05/30/18 18:22	1
Sodium	ND		0.50	mg/L		05/29/18 12:11	05/30/18 18:22	1

Lab Sample ID: LCS 550-148352/2-A
Matrix: Water
Analysis Batch: 148545

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148352

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.953		mg/L		95	85 - 115
Calcium	21.0	20.7		mg/L		98	85 - 115
Magnesium	21.0	20.2		mg/L		96	85 - 115
Potassium	20.0	19.0		mg/L		95	85 - 115
Sodium	20.0	18.5		mg/L		92	85 - 115

Lab Sample ID: LCSD 550-148352/3-A
Matrix: Water
Analysis Batch: 148545

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148352

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.910		mg/L		91	85 - 115	5	20
Calcium	21.0	20.3		mg/L		96	85 - 115	2	20
Magnesium	21.0	19.8		mg/L		94	85 - 115	2	20
Potassium	20.0	18.6		mg/L		93	85 - 115	2	20
Sodium	20.0	18.4		mg/L		92	85 - 115	1	20

Lab Sample ID: 550-103493-O-1-A MS
Matrix: Water
Analysis Batch: 148545

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 148352

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	0.071		1.00	1.03		mg/L		96	70 - 130
Calcium	88		21.0	107	M3	mg/L		88	70 - 130
Magnesium	18		21.0	37.6		mg/L		94	70 - 130
Potassium	2.5		20.0	21.6		mg/L		95	70 - 130
Sodium	45		20.0	62.4		mg/L		89	70 - 130

Lab Sample ID: 550-103493-O-1-B MSD
Matrix: Water
Analysis Batch: 148545

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 148352

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	0.071		1.00	1.04		mg/L		97	70 - 130	1	20
Calcium	88		21.0	108	M3	mg/L		91	70 - 130	1	20
Magnesium	18		21.0	37.7		mg/L		94	70 - 130	0	20
Potassium	2.5		20.0	21.6		mg/L		95	70 - 130	0	20
Sodium	45		20.0	63.9		mg/L		97	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-148453/35
Matrix: Water
Analysis Batch: 148453

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			05/29/18 23:16	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/29/18 23:16	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/29/18 23:16	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/29/18 23:16	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/29/18 23:16	1

Lab Sample ID: LCS 550-148453/34
Matrix: Water
Analysis Batch: 148453

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	263		mg/L		105	90 - 110

Lab Sample ID: LCSD 550-148453/48
Matrix: Water
Analysis Batch: 148453

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	264		mg/L		106	90 - 110	1	20

Lab Sample ID: 550-103493-N-2 DU
Matrix: Water
Analysis Batch: 148453

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	210		206		mg/L		0.4	20
Bicarbonate Alkalinity as CaCO3	210		206		mg/L		0.4	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 550-148353/1
Matrix: Water
Analysis Batch: 148353

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			05/29/18 12:17	1

Lab Sample ID: LCS 550-148353/2
Matrix: Water
Analysis Batch: 148353

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	980		mg/L		98	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

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

Lab Sample ID: LCSD 550-148353/3
Matrix: Water
Analysis Batch: 148353

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	984		mg/L		98	90 - 110	0	10

Lab Sample ID: 550-103488-D-3 DU
Matrix: Water
Analysis Batch: 148353

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	3180	D2	mg/L		0.8	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-148327/13
Matrix: Water
Analysis Batch: 148327

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

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH	7.00	7.1		SU		101.0	98.5 - 101.5		

Lab Sample ID: LCSSRM 550-148327/19
Matrix: Water
Analysis Batch: 148327

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

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH	7.00	7.1		SU		101.0	98.5 - 101.5		

Lab Sample ID: 550-103497-1 DU
Matrix: Water
Analysis Batch: 148327

Client Sample ID: CH-CCR-M-54-52518
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		0.1	5
Temperature	19.8	H5	19.6	H5	Degrees C		1	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

HPLC/IC

Analysis Batch: 148518

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	300.0	
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	300.0	
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	300.0	
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	300.0	
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	300.0	
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	300.0	
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	300.0	
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	300.0	
MB 550-148518/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148518/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148518/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103434-A-19 MS	Matrix Spike	Total/NA	Water	300.0	
550-103434-A-19 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 148352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	200.7	
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	200.7	
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	200.7	
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	200.7	
MB 550-148352/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-148352/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-148352/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103493-O-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-103493-O-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 148545

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	200.7 Rev 4.4	148352
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	200.7 Rev 4.4	148352
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	200.7 Rev 4.4	148352
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	200.7 Rev 4.4	148352
MB 550-148352/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148352
LCS 550-148352/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148352
LCSD 550-148352/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148352
550-103493-O-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	148352
550-103493-O-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	148352

General Chemistry

Analysis Batch: 148327

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	SM 4500 H+ B	
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	SM 4500 H+ B	
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	SM 4500 H+ B	
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-148327/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-148327/19	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

General Chemistry (Continued)

Analysis Batch: 148327 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1 DU	CH-CCR-M-54-52518	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 148353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	SM 2540C	
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	SM 2540C	
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	SM 2540C	
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	SM 2540C	
MB 550-148353/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-148353/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-148353/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103488-D-3 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 148453

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103497-1	CH-CCR-M-54-52518	Total/NA	Water	SM 2320B	
550-103497-2	CH-CCR-M-59-52518	Total/NA	Water	SM 2320B	
550-103497-3	CH-CCR-M-60-52518	Total/NA	Water	SM 2320B	
550-103497-4	CH-CCR-M-61-52518	Total/NA	Water	SM 2320B	
MB 550-148453/35	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-148453/34	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-148453/48	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103493-N-2 DU	Duplicate	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Client Sample ID: CH-CCR-M-54-52518

Lab Sample ID: 550-103497-1

Date Collected: 05/25/18 18:19

Matrix: Water

Date Received: 05/29/18 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148518	05/30/18 22:24	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148518	05/30/18 22:43	NBL	TAL PHX
Total/NA	Prep	200.7			148352	05/29/18 12:11	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148545	05/30/18 18:48	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148453	05/30/18 02:17	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	148353	(Start) 05/29/18 12:17 (End) 05/30/18 10:10	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148327	05/29/18 09:45	BDN	TAL PHX

Client Sample ID: CH-CCR-M-59-52518

Lab Sample ID: 550-103497-2

Date Collected: 05/25/18 15:53

Matrix: Water

Date Received: 05/29/18 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148518	05/30/18 23:01	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148518	05/30/18 23:19	NBL	TAL PHX
Total/NA	Prep	200.7			148352	05/29/18 12:11	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148545	05/30/18 18:54	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148453	05/30/18 01:40	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	148353	(Start) 05/29/18 12:17 (End) 05/30/18 10:10	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148327	05/29/18 09:45	BDN	TAL PHX

Client Sample ID: CH-CCR-M-60-52518

Lab Sample ID: 550-103497-3

Date Collected: 05/25/18 17:35

Matrix: Water

Date Received: 05/29/18 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148518	05/30/18 23:38	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148518	05/30/18 23:56	NBL	TAL PHX
Total/NA	Prep	200.7			148352	05/29/18 12:11	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148545	05/30/18 18:59	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148453	05/30/18 01:49	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	148353	(Start) 05/29/18 12:17 (End) 05/30/18 10:10	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148327	05/29/18 09:45	BDN	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
SDG: Cholla

Client Sample ID: CH-CCR-M-61-52518

Lab Sample ID: 550-103497-4

Date Collected: 05/25/18 16:38

Matrix: Water

Date Received: 05/29/18 06:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148518	05/31/18 00:15	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148518	05/31/18 00:33	NBL	TAL PHX
Total/NA	Prep	200.7			148352	05/29/18 12:11	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148545	05/30/18 19:05	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148453	05/30/18 01:58	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	148353	(Start) 05/29/18 12:17 (End) 05/30/18 10:10	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	148327	05/29/18 09:45	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: 550-103497-1
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	06-09-18 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103497-1
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

103497

4625 E Cotton Center Blvd
Suite 189

Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact

Doug Lavarway

Doug Lavarway

Carrier:

5/26/2018

COC No: 1 of 1 COCs

4801 Cholla Lake Road

Analysis Turnaround Time

Lab Contact:

Sampler: _____

Joseph City, AZ 86032

TAT if different from Below _____

For Lab Use Only:

(928) 587-0319 Phone

FAX

Walk-in Client: _____

Project Name: CCR

Lab Sampling: _____

Site: Cholla

Job / SDG No.:

P O #

Sample Identification	Sample Date	Sample Type (G-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)	Sample Specific Notes:
CH-CCR-M-54-52518	5/25/2018	1819 G	W	2	N	X	X	X	X	X	X	
CH-CCR-M-59-52518	5/25/2018	1553 G	W	2	N	X	X	X	X	X	X	
CH-CCR-M-60-52518	5/25/2018	1735 G	W	2	N	X	X	X	X	X	X	
CH-CCR-M-61-52518	5/25/2018	1638 G	W	2	N	X	X	X	X	X	X	



Preservation Used: In Ice, In HCl, In H2SO4, In HNO3, In H2O2, In H2O, In H2S, In H2S2, In H2S4, In H2S8, In H2S12, In H2S16, In H2S20, In H2S24, In H2S28, In H2S32, In H2S36, In H2S40, In H2S44, In H2S48, In H2S52, In H2S56, In H2S60, In H2S64, In H2S68, In H2S72, In H2S76, In H2S80, In H2S84, In H2S88, In H2S92, In H2S96, In H2S100

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:

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

Custody Seals Intact:

Custody Seal No.:

Cooler Temp. (°C): Obs'd:

Corrd:

Therm ID No.:

Relinquished by:

Company: APS

Date/Time: 5/26/2018

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received in Laboratory by:

Company:

Date/Time:

4/10c

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103497-1

SDG Number: Cholla

Login Number: 103497

List Number: 1

Creator: Stehlin, Marc

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: 550-112464-1

Client Project/Site: Cholla

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/12/2018 4:53:35 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: Cholla

TestAmerica Job ID: 550-112464-1

Qualifiers

HPLC/IC

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.
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: Cholla

TestAmerica Job ID: 550-112464-1

Job ID: 550-112464-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-112464-1**

Comments

No additional comments.

Receipt

The samples were received on 10/27/2018 7:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.5° 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: Cholla

TestAmerica Job ID: 550-112464-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-112464-1	CH-CCR-M-54-102618	Water	10/26/18 14:46	10/27/18 07:50
550-112464-2	CH-CCR-M-59-102618	Water	10/26/18 12:46	10/27/18 07:50
550-112464-3	CH-CCR-M-60-102618	Water	10/26/18 13:43	10/27/18 07:50
550-112464-4	CH-CCR-M-61-102618	Water	10/26/18 13:14	10/27/18 07:50

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Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Client Sample ID: CH-CCR-M-54-102618

Lab Sample ID: 550-112464-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1500	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.4		0.40	mg/L	1		300.0	Total/NA
Sulfate	360	D2	100	mg/L	50		300.0	Total/NA
Boron	0.50		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	100		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	2900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-59-102618

Lab Sample ID: 550-112464-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.4		0.40	mg/L	1		300.0	Total/NA
Sulfate	360	D2	100	mg/L	50		300.0	Total/NA
Boron	0.48		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	2500	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.6	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-60-102618

Lab Sample ID: 550-112464-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	100	mg/L	50		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	0.49		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	2600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-61-102618

Lab Sample ID: 550-112464-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1400	D2	100	mg/L	50		300.0	Total/NA
Fluoride	1.4		0.40	mg/L	1		300.0	Total/NA
Sulfate	360	D2	100	mg/L	50		300.0	Total/NA
Boron	0.48		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	91		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	2600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	13.1	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: Cholla

TestAmerica Job ID: 550-112464-1

Client Sample ID: CH-CCR-M-54-102618

Lab Sample ID: 550-112464-1

Date Collected: 10/26/18 14:46

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1500	D2	100	mg/L			11/10/18 01:47	50
Fluoride	1.4		0.40	mg/L			11/07/18 10:19	1
Sulfate	360	D2	100	mg/L			11/10/18 01:47	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.50		0.050	mg/L		10/30/18 08:35	11/01/18 00:22	1
Calcium	100		2.0	mg/L		10/30/18 08:35	11/01/18 00:22	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2900	D2	100	mg/L			11/01/18 09:47	1
pH	7.5	H5	1.7	SU			11/05/18 15:27	1
Temperature	11.4	H5	0.1	Degrees C			11/05/18 15:27	1

Client Sample ID: CH-CCR-M-59-102618

Lab Sample ID: 550-112464-2

Date Collected: 10/26/18 12:46

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	100	mg/L			11/10/18 02:15	50
Fluoride	1.4		0.40	mg/L			11/07/18 10:56	1
Sulfate	360	D2	100	mg/L			11/10/18 02:15	50

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		10/30/18 08:35	11/01/18 00:28	1
Calcium	88		2.0	mg/L		10/30/18 08:35	11/01/18 00:28	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2500	D2	100	mg/L			11/01/18 09:47	1
pH	7.6	H5	1.7	SU			11/05/18 15:27	1
Temperature	12.0	H5	0.1	Degrees C			11/05/18 15:27	1

Client Sample ID: CH-CCR-M-60-102618

Lab Sample ID: 550-112464-3

Date Collected: 10/26/18 13:43

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	100	mg/L			11/10/18 02:42	50
Fluoride	1.4		0.40	mg/L			11/07/18 11:33	1
Sulfate	350	D2	100	mg/L			11/10/18 02:42	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.49		0.050	mg/L		10/30/18 08:35	11/01/18 00:34	1
Calcium	88		2.0	mg/L		10/30/18 08:35	11/01/18 00:34	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Client Sample ID: CH-CCR-M-60-102618

Lab Sample ID: 550-112464-3

Date Collected: 10/26/18 13:43

Matrix: Water

Date Received: 10/27/18 07:50

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2600	D2	100	mg/L			11/01/18 09:47	1
pH	7.7	H5	1.7	SU			11/05/18 15:27	1
Temperature	13.1	H5	0.1	Degrees C			11/05/18 15:27	1

Client Sample ID: CH-CCR-M-61-102618

Lab Sample ID: 550-112464-4

Date Collected: 10/26/18 13:14

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1400	D2	100	mg/L			11/10/18 03:09	50
Fluoride	1.4		0.40	mg/L			11/07/18 12:09	1
Sulfate	360	D2	100	mg/L			11/10/18 03:09	50

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		10/30/18 08:35	11/01/18 00:16	1
Calcium	91		2.0	mg/L		10/30/18 08:35	11/01/18 00:16	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2600	D2	100	mg/L			11/01/18 09:47	1
pH	7.5	H5	1.7	SU			11/05/18 15:27	1
Temperature	13.1	H5	0.1	Degrees C			11/05/18 15:27	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-160895/1041
Matrix: Water
Analysis Batch: 160895

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			11/01/18 03:44	1
Fluoride	ND		0.40	mg/L			11/01/18 03:44	1
Sulfate	ND		2.0	mg/L			11/01/18 03:44	1

Lab Sample ID: LCS 550-160895/70
Matrix: Water
Analysis Batch: 160895

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	4.17		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-160895/71
Matrix: Water
Analysis Batch: 160895

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	4.17		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.6		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-112464-2 MS
Matrix: Water
Analysis Batch: 160895

Client Sample ID: CH-CCR-M-59-102618
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	9.78	D1	mg/L		106	80 - 120

Lab Sample ID: 550-112464-2 MS
Matrix: Water
Analysis Batch: 160895

Client Sample ID: CH-CCR-M-59-102618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1200	D2	2000	3580		mg/L		120	80 - 120
Sulfate	310	D2	2000	2450	D2	mg/L		107	80 - 120

Lab Sample ID: 550-112464-2 MSD
Matrix: Water
Analysis Batch: 160895

Client Sample ID: CH-CCR-M-59-102618
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	9.90	D1	mg/L		107	80 - 120	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-112464-2 MSD

Matrix: Water

Analysis Batch: 160895

Client Sample ID: CH-CCR-M-59-102618

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1200	D2	2000	3580		mg/L		120	80 - 120	0	20
Sulfate	310	D2	2000	2440	D2	mg/L		107	80 - 120	0	20

Lab Sample ID: MB 550-161412/1041

Matrix: Water

Analysis Batch: 161412

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			11/07/18 05:43	1
Fluoride	ND		0.40	mg/L			11/07/18 05:43	1
Sulfate	ND		2.0	mg/L			11/07/18 05:43	1

Lab Sample ID: LCS 550-161412/73

Matrix: Water

Analysis Batch: 161412

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	4.15		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-161412/74

Matrix: Water

Analysis Batch: 161412

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	21.6		mg/L		108	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: 550-112724-A-1 MS

Matrix: Water

Analysis Batch: 161412

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	67	M2	20.0	82.8	M2	mg/L		79	80 - 120
Fluoride	3.0		4.00	7.26		mg/L		107	80 - 120

Lab Sample ID: 550-112724-A-1 MS ^10

Matrix: Water

Analysis Batch: 161412

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	100	M1 D2	200	352	D2 M1	mg/L		126	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-112724-A-1 MSD
Matrix: Water
Analysis Batch: 161412

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	67	M2	20.0	83.0		mg/L		80	80 - 120	0	20
Fluoride	3.0		4.00	7.34		mg/L		109	80 - 120	1	20

Lab Sample ID: 550-112724-A-1 MSD ^10
Matrix: Water
Analysis Batch: 161412

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	100	M1 D2	200	353	D2 M1	mg/L		127	80 - 120	0	20

Lab Sample ID: MB 550-161622/2
Matrix: Water
Analysis Batch: 161622

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			11/09/18 18:01	1
Fluoride	ND		0.40	mg/L			11/09/18 18:01	1
Sulfate	ND		2.0	mg/L			11/09/18 18:01	1

Lab Sample ID: LCS 550-161622/5
Matrix: Water
Analysis Batch: 161622

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	21.1		mg/L		105	90 - 110
Fluoride	4.00	4.13		mg/L		103	90 - 110
Sulfate	20.0	21.2		mg/L		106	90 - 110

Lab Sample ID: LCSD 550-161622/6
Matrix: Water
Analysis Batch: 161622

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	20.8		mg/L		104	90 - 110	1	20
Fluoride	4.00	4.14		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.7		mg/L		103	90 - 110	3	20

Lab Sample ID: 550-113243-A-5 MS
Matrix: Water
Analysis Batch: 161622

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	5.8		20.0	27.9		mg/L		110	80 - 120
Fluoride	ND		4.00	4.14		mg/L		103	80 - 120
Sulfate	ND		20.0	21.2		mg/L		106	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113243-A-5 MSD
Matrix: Water
Analysis Batch: 161622

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	5.8		20.0	28.1		mg/L		111	80 - 120	1	20
Fluoride	ND		4.00	4.20		mg/L		105	80 - 120	2	20
Sulfate	ND		20.0	21.1		mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-160568/1-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160568

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		10/30/18 08:35	10/31/18 22:58	1
Calcium	ND		2.0	mg/L		10/30/18 08:35	10/31/18 22:58	1

Lab Sample ID: LCS 550-160568/2-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.954		mg/L		95	85 - 115
Calcium	21.0	21.2		mg/L		101	85 - 115

Lab Sample ID: LCSD 550-160568/3-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.00	0.942		mg/L		94	85 - 115	1	20
Calcium	21.0	21.2		mg/L		101	85 - 115	0	20

Lab Sample ID: 550-112461-D-1-A MS
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.32		1.00	1.31		mg/L		99	70 - 130
Calcium	710	M3	21.0	700	M3	mg/L		-63	70 - 130

Lab Sample ID: 550-112461-D-1-B MSD
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	0.32		1.00	1.33		mg/L		101	70 - 130	2	20
Calcium	710	M3	21.0	709	M3	mg/L		-17	70 - 130	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

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

Lab Sample ID: MB 550-160761/1
Matrix: Water
Analysis Batch: 160761

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			11/01/18 09:47	1

Lab Sample ID: LCS 550-160761/2
Matrix: Water
Analysis Batch: 160761

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	958		mg/L		96	90 - 110

Lab Sample ID: LCSD 550-160761/3
Matrix: Water
Analysis Batch: 160761

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	964		mg/L		96	90 - 110	1	10

Lab Sample ID: 550-112419-A-2 DU
Matrix: Water
Analysis Batch: 160761

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	1500		1550		mg/L		5	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-161037/1
Matrix: Water
Analysis Batch: 161037

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		99.3	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161037/13
Matrix: Water
Analysis Batch: 161037

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: 550-112464-4 DU
Matrix: Water
Analysis Batch: 161037

Client Sample ID: CH-CCR-M-61-102618
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	13.1	H5	13.6	H5	Degrees C		4	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

HPLC/IC

Analysis Batch: 160895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-160895/1041	Method Blank	Total/NA	Water	300.0	
LCS 550-160895/70	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-160895/71	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112464-2 MS	CH-CCR-M-59-102618	Total/NA	Water	300.0	
550-112464-2 MS	CH-CCR-M-59-102618	Total/NA	Water	300.0	
550-112464-2 MSD	CH-CCR-M-59-102618	Total/NA	Water	300.0	
550-112464-2 MSD	CH-CCR-M-59-102618	Total/NA	Water	300.0	

Analysis Batch: 161412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112464-1	CH-CCR-M-54-102618	Total/NA	Water	300.0	
550-112464-2	CH-CCR-M-59-102618	Total/NA	Water	300.0	
550-112464-3	CH-CCR-M-60-102618	Total/NA	Water	300.0	
550-112464-4	CH-CCR-M-61-102618	Total/NA	Water	300.0	
MB 550-161412/1041	Method Blank	Total/NA	Water	300.0	
LCS 550-161412/73	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161412/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112724-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-112724-A-1 MS ^10	Matrix Spike	Total/NA	Water	300.0	
550-112724-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-112724-A-1 MSD ^10	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112464-1	CH-CCR-M-54-102618	Total/NA	Water	300.0	
550-112464-2	CH-CCR-M-59-102618	Total/NA	Water	300.0	
550-112464-3	CH-CCR-M-60-102618	Total/NA	Water	300.0	
550-112464-4	CH-CCR-M-61-102618	Total/NA	Water	300.0	
MB 550-161622/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161622/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161622/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113243-A-5 MS	Matrix Spike	Total/NA	Water	300.0	
550-113243-A-5 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 160568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112464-1	CH-CCR-M-54-102618	Total/NA	Water	200.7	
550-112464-2	CH-CCR-M-59-102618	Total/NA	Water	200.7	
550-112464-3	CH-CCR-M-60-102618	Total/NA	Water	200.7	
550-112464-4	CH-CCR-M-61-102618	Total/NA	Water	200.7	
MB 550-160568/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-160568/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-160568/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-112461-D-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-112461-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Metals (Continued)

Analysis Batch: 160783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112464-1	CH-CCR-M-54-102618	Total/NA	Water	200.7 Rev 4.4	160568
550-112464-2	CH-CCR-M-59-102618	Total/NA	Water	200.7 Rev 4.4	160568
550-112464-3	CH-CCR-M-60-102618	Total/NA	Water	200.7 Rev 4.4	160568
550-112464-4	CH-CCR-M-61-102618	Total/NA	Water	200.7 Rev 4.4	160568
MB 550-160568/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	160568
LCS 550-160568/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	160568
LCSD 550-160568/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-D-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	160568

General Chemistry

Analysis Batch: 160761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112464-1	CH-CCR-M-54-102618	Total/NA	Water	SM 2540C	
550-112464-2	CH-CCR-M-59-102618	Total/NA	Water	SM 2540C	
550-112464-3	CH-CCR-M-60-102618	Total/NA	Water	SM 2540C	
550-112464-4	CH-CCR-M-61-102618	Total/NA	Water	SM 2540C	
MB 550-160761/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-160761/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-160761/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-112419-A-2 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 161037

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112464-1	CH-CCR-M-54-102618	Total/NA	Water	SM 4500 H+ B	
550-112464-2	CH-CCR-M-59-102618	Total/NA	Water	SM 4500 H+ B	
550-112464-3	CH-CCR-M-60-102618	Total/NA	Water	SM 4500 H+ B	
550-112464-4	CH-CCR-M-61-102618	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161037/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161037/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-112464-4 DU	CH-CCR-M-61-102618	Total/NA	Water	SM 4500 H+ B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Client Sample ID: CH-CCR-M-54-102618

Lab Sample ID: 550-112464-1

Date Collected: 10/26/18 14:46

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 10:19	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161622	11/10/18 01:47	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:22	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761		YET	TAL PHX
					(Start)	11/01/18 09:47		
					(End)	11/02/18 08:40		
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	TAL PHX

Client Sample ID: CH-CCR-M-59-102618

Lab Sample ID: 550-112464-2

Date Collected: 10/26/18 12:46

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 10:56	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161622	11/10/18 02:15	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:28	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761		YET	TAL PHX
					(Start)	11/01/18 09:47		
					(End)	11/02/18 08:40		
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	TAL PHX

Client Sample ID: CH-CCR-M-60-102618

Lab Sample ID: 550-112464-3

Date Collected: 10/26/18 13:43

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 11:33	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161622	11/10/18 02:42	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:34	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761		YET	TAL PHX
					(Start)	11/01/18 09:47		
					(End)	11/02/18 08:40		
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112464-1

Client Sample ID: CH-CCR-M-61-102618

Lab Sample ID: 550-112464-4

Date Collected: 10/26/18 13:14

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 12:09	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161622	11/10/18 03:09	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:16	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761		YET	TAL PHX
					(Start)	11/01/18 09:47		
					(End)	11/02/18 08:40		
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	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: Cholla

TestAmerica Job ID: 550-112464-1

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: Cholla

TestAmerica Job ID: 550-112464-1

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

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

112464



Regulatory Program: DW NPDES RCRA Other: **CCR**

TestAmerica Laboratories, Inc.

Client Contact		Doug Lavarrway		Doug Lavarrway		Date: 10/26/2018		COC No. _____ of _____ COCs	
4801 Cholla Lake Rd		928-587-0319		Lab Contact:		Carrier:		Sampler: _____	
Joseph City, AZ 86032		Analysis Turnaround Time		Perform MS / MSD (Y / N)		EPA 200.7 (B, Ca)		Walk-in Client: _____	
(928) 587-0319 Phone		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		EPA 300.0 (Cl, F, SO4)		SM 2540C (TDS)		Lab Sampling: _____	
(xxx) xxx-xxxx FAX		TAT if different from Below _____		SM 4500-HB (pH)				Job / SDG No.: _____	
Project Name:		2 weeks						Sample Specific Notes: _____	
Site:		1 week							
P O #		2 days							
		1 day							
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)		
CH-CCR-M-54-102618		10/26/2018	1446	G	W	2	N	X	X
CH-CCR-M-59-102618		10/26/18	1246	G	W	2	N	X	X
CH-CCR-M-60-102618		10/26/18	1343	G	W	2	N	X	X
CH-CCR-M-61-102618		10/26/18	1314	G	W	2	N	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

Special Instructions/QC Requirements & Comments:

Return to Client
 Disposal by Lab
 Archive for _____ Months

Custody Seals Intact: Yes No
 Cooler Temp. (°C): Obs'd: _____ Cor'd: _____ Therm ID No.: _____

Relinquished by: Doug Lavarrway
 Company: APS
 Date/Time: 10/26/18
 Received by: _____
 Company: _____
 Date/Time: _____

Relinquished by: _____
 Company: _____
 Date/Time: _____
 Received in Laboratory by: _____
 Company: APS
 Date/Time: 10-27-18 0750

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-112464-1

Login Number: 112464

List Source: TestAmerica Phoenix

List Number: 1

Creator: Doerr, Bret C

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: 550-98153-1

Client Project/Site: APS - Cholla CCR

Revision: 1

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

3/16/2018 11:26:41 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 - Cholla CCR

TestAmerica Job ID: 550-98153-1

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
D1	Sample required dilution due to matrix.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection 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 - Cholla CCR

TestAmerica Job ID: 550-98153-1

Job ID: 550-98153-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-98153-1

Comments

This report contains the rad chem results.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

HPLC/IC

Method(s) 300.0: The continuing calibration verification (CCV) result for Sulfate associated with analytical batch 550-140030 was above the upper control limit. Sample results were non-detects, and have been reported as qualified data with V1 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 method blank for preparation batch 550-140074 contained Thallium and Antimony above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

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

Narrative

Job Narrative 550-98153-2

Comments

No additional comments.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

RAD

Method(s) PrecSep_0: Radium 228 Prep Batch 160-352309:

Insufficient sample volume was available to perform a sample duplicate (DU). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

CH-CCR-M52A-21518 (550-98153-1), CH-CCR-M53A-21518 (550-98153-2), CH-CCR-W305-21518 (550-98153-3), CH-CCR-W306-21518 (550-98153-4), CH-CCR-W314-21518 (550-98153-5), CH-CCR-M64A-21518 (550-98153-6) and CH-CCR-FD02-21518 (550-98153-7)

Method(s) PrecSep-21: Radium 226 Prep Batch 160-352206:

Insufficient sample volume was available to perform a sample duplicate (DU). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

CH-CCR-M52A-21518 (550-98153-1), CH-CCR-M53A-21518 (550-98153-2), CH-CCR-W305-21518 (550-98153-3), CH-CCR-W306-21518 (550-98153-4), CH-CCR-W314-21518 (550-98153-5), CH-CCR-M64A-21518 (550-98153-6) and CH-CCR-FD02-21518 (550-98153-7)

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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-98153-1	CH-CCR-M52A-21518	Water	02/15/18 12:50	02/16/18 13:01
550-98153-2	CH-CCR-M53A-21518	Water	02/15/18 14:44	02/16/18 13:01
550-98153-3	CH-CCR-W305-21518	Water	02/15/18 14:02	02/16/18 13:01
550-98153-4	CH-CCR-W306-21518	Water	02/15/18 13:24	02/16/18 13:01
550-98153-5	CH-CCR-W314-21518	Water	02/15/18 12:08	02/16/18 13:01
550-98153-6	CH-CCR-M64A-21518	Water	02/15/18 11:00	02/16/18 13:01
550-98153-7	CH-CCR-FD02-21518	Water	02/15/18 13:24	02/16/18 13:01

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Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-M52A-21518

Lab Sample ID: 550-98153-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.1	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.25		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0018		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.017		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0011		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.011		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.052		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0010		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.048		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.00091		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: CH-CCR-M53A-21518

Lab Sample ID: 550-98153-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.4	D1	0.80	mg/L	2		300.0	Total/NA
Arsenic	0.00076		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.018		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0012		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.0010		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.011		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0059		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.00057		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00012		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.21		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.00092		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.017		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.021		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

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	0.69		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0048		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.010		0.00050	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0014		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.028		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0021		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.1	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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-W314-21518 (Continued)

Lab Sample ID: 550-98153-5

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	0.00060		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00019		0.00010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.013		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0085		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.27		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.015	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.0022		0.0010	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0058	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

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	0.70		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0049		0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.011	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Cobalt	0.0015		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.030	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Selenium	0.0022		0.00050	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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-M52A-21518

Lab Sample ID: 550-98153-1

Date Collected: 02/15/18 12:50

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.1	D1	0.80	mg/L			02/21/18 00:19	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 15:41	1
Lithium	0.25		0.20	mg/L		02/20/18 10:47	02/21/18 15:41	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:37	1
Arsenic	0.0018		0.00050	mg/L		02/21/18 05:47	02/22/18 16:37	1
Barium	0.017		0.00050	mg/L		02/21/18 05:47	02/22/18 16:37	1
Cadmium	0.0011		0.00010	mg/L		02/21/18 05:47	02/22/18 16:37	1
Chromium	0.011		0.0010	mg/L		02/21/18 05:47	02/22/18 16:37	1
Cobalt	0.052		0.00050	mg/L		02/21/18 05:47	02/22/18 16:37	1
Lead	0.0010		0.00050	mg/L		02/21/18 05:47	02/22/18 16:37	1
Molybdenum	0.048		0.00050	mg/L		02/21/18 05:47	02/22/18 16:37	1
Selenium	0.00091		0.00050	mg/L		02/21/18 05:47	02/22/18 16:37	1
Thallium	0.00018		0.00010	mg/L		02/21/18 05:47	02/22/18 16:37	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:49	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.206		0.0782	0.0804	1.00	0.0689	pCi/L	02/21/18 09:29	03/15/18 05:55	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	<i>107</i>		<i>40 - 110</i>					<i>02/21/18 09:29</i>	<i>03/15/18 05:55</i>	<i>1</i>

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.691		0.256	0.264	1.00	0.360	pCi/L	02/21/18 10:35	03/06/18 14:28	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	<i>107</i>		<i>40 - 110</i>					<i>02/21/18 10:35</i>	<i>03/06/18 14:28</i>	<i>1</i>
<i>Y Carrier</i>	<i>92.0</i>		<i>40 - 110</i>					<i>02/21/18 10:35</i>	<i>03/06/18 14:28</i>	<i>1</i>

Client Sample ID: CH-CCR-M53A-21518

Lab Sample ID: 550-98153-2

Date Collected: 02/15/18 14:44

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.4	D1	0.80	mg/L			02/21/18 01:14	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-M53A-21518

Lab Sample ID: 550-98153-2

Date Collected: 02/15/18 14:44

Matrix: Water

Date Received: 02/16/18 13:01

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 15:47	1
Lithium	ND		0.20	mg/L		02/20/18 10:47	02/21/18 15:47	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:44	1
Arsenic	0.00076		0.00050	mg/L		02/21/18 05:47	02/22/18 16:44	1
Barium	0.018		0.00050	mg/L		02/21/18 05:47	02/22/18 16:44	1
Cadmium	0.0012		0.00010	mg/L		02/21/18 05:47	02/22/18 16:44	1
Chromium	0.0010		0.0010	mg/L		02/21/18 05:47	02/22/18 16:44	1
Cobalt	0.011		0.00050	mg/L		02/21/18 05:47	02/22/18 16:44	1
Lead	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:44	1
Molybdenum	0.0059		0.00050	mg/L		02/21/18 05:47	02/22/18 16:44	1
Selenium	0.00057		0.00050	mg/L		02/21/18 05:47	02/22/18 16:44	1
Thallium	0.00012		0.00010	mg/L		02/21/18 05:47	02/22/18 16:44	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:51	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.114		0.0654	0.0662	1.00	0.0813	pCi/L	02/21/18 09:29	03/15/18 05:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	107		40 - 110					02/21/18 09:29	03/15/18 05:55	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	0.321	U	0.209	0.211	1.00	0.323	pCi/L	02/21/18 10:35	03/06/18 14:28	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	107		40 - 110					02/21/18 10:35	03/06/18 14:28	1
Y Carrier	93.8		40 - 110					02/21/18 10:35	03/06/18 14:28	1

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

Date Collected: 02/15/18 14:02

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			02/21/18 01:33	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 15:53	1
Lithium	0.21		0.20	mg/L		02/20/18 10:47	02/21/18 15:53	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

Date Collected: 02/15/18 14:02

Matrix: Water

Date Received: 02/16/18 13:01

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:47	1
Arsenic	0.00092		0.00050	mg/L		02/21/18 05:47	02/22/18 16:47	1
Barium	0.012		0.00050	mg/L		02/21/18 05:47	02/22/18 16:47	1
Cadmium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:47	1
Chromium	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:47	1
Cobalt	0.017		0.00050	mg/L		02/21/18 05:47	02/22/18 16:47	1
Lead	0.0020		0.00050	mg/L		02/21/18 05:47	02/22/18 16:47	1
Molybdenum	0.021		0.00050	mg/L		02/21/18 05:47	02/22/18 16:47	1
Selenium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:47	1
Thallium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:47	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:52	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.295		0.0928	0.0965	1.00	0.0743	pCi/L	02/21/18 09:29	03/15/18 05:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					02/21/18 09:29	03/15/18 05:56	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	0.347		0.223	0.226	1.00	0.346	pCi/L	02/21/18 10:35	03/06/18 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	109		40 - 110					02/21/18 10:35	03/06/18 14:29	1
Y Carrier	92.3		40 - 110					02/21/18 10:35	03/06/18 14:29	1

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	D1	0.80	mg/L			02/21/18 01:51	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 15:59	1
Lithium	0.69		0.20	mg/L		02/20/18 10:47	02/21/18 15:59	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:49	1
Arsenic	0.0048		0.00050	mg/L		02/21/18 05:47	02/22/18 16:49	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.010		0.00050	mg/L		02/21/18 05:47	02/22/18 16:49	1
Cadmium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:49	1
Chromium	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:49	1
Cobalt	0.0014		0.00050	mg/L		02/21/18 05:47	02/22/18 16:49	1
Lead	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:49	1
Molybdenum	0.028		0.00050	mg/L		02/21/18 05:47	02/22/18 16:49	1
Selenium	0.0021		0.00050	mg/L		02/21/18 05:47	02/22/18 16:49	1
Thallium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:49	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:54	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0530	U	0.0588	0.0590	1.00	0.0940	pCi/L	02/21/18 09:29	03/15/18 05:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.2		40 - 110					02/21/18 09:29	03/15/18 05:56	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	0.326	U	0.222	0.224	1.00	0.342	pCi/L	02/21/18 10:35	03/06/18 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.2		40 - 110					02/21/18 10:35	03/06/18 14:29	1
Y Carrier	93.8		40 - 110					02/21/18 10:35	03/06/18 14:29	1

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

Date Collected: 02/15/18 12:08

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.1	D1	0.80	mg/L			02/21/18 02:09	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 16:05	1
Lithium	0.32		0.20	mg/L		02/20/18 10:47	02/21/18 16:05	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:52	1
Arsenic	0.00060		0.00050	mg/L		02/21/18 05:47	02/22/18 16:52	1
Barium	0.012		0.00050	mg/L		02/21/18 05:47	02/22/18 16:52	1
Cadmium	0.00019		0.00010	mg/L		02/21/18 05:47	02/22/18 16:52	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

Date Collected: 02/15/18 12:08

Matrix: Water

Date Received: 02/16/18 13:01

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:52	1
Cobalt	0.013		0.00050	mg/L		02/21/18 05:47	02/22/18 16:52	1
Lead	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:52	1
Molybdenum	0.0085		0.00050	mg/L		02/21/18 05:47	02/22/18 16:52	1
Selenium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:52	1
Thallium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:52	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:55	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0761		0.0561	0.0565	1.00	0.0758	pCi/L	02/21/18 09:29	03/15/18 05:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					02/21/18 09:29	03/15/18 05:56	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	0.151	U	0.202	0.203	1.00	0.337	pCi/L	02/21/18 10:35	03/06/18 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	104		40 - 110					02/21/18 10:35	03/06/18 14:29	1
Y Carrier	94.2		40 - 110					02/21/18 10:35	03/06/18 14:29	1

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Date Collected: 02/15/18 11:00

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			02/21/18 03:23	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 16:16	1
Lithium	0.27		0.20	mg/L		02/20/18 10:47	02/21/18 16:16	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		02/21/18 05:47	02/26/18 11:24	2
Arsenic	ND	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:24	2
Barium	0.015	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:24	2
Cadmium	ND	D1	0.00020	mg/L		02/21/18 05:47	02/26/18 11:24	2
Chromium	0.0022		0.0010	mg/L		02/21/18 05:47	02/22/18 16:54	1
Cobalt	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:54	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Date Collected: 02/15/18 11:00

Matrix: Water

Date Received: 02/16/18 13:01

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:24	2
Molybdenum	0.0058	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:24	2
Selenium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:54	1
Thallium	ND	D1	0.00020	mg/L		02/21/18 05:47	02/26/18 11:24	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:57	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.261		0.0925	0.0955	1.00	0.0865	pCi/L	02/21/18 09:29	03/15/18 05:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	105		40 - 110					02/21/18 09:29	03/15/18 05:56	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	0.704		0.234	0.243	1.00	0.309	pCi/L	02/21/18 10:35	03/06/18 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	105		40 - 110					02/21/18 10:35	03/06/18 14:29	1
Y Carrier	93.5		40 - 110					02/21/18 10:35	03/06/18 14:29	1

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	D1	0.80	mg/L			02/21/18 03:41	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 16:22	1
Lithium	0.70		0.20	mg/L		02/20/18 10:47	02/21/18 16:22	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		02/21/18 05:47	02/26/18 11:26	2
Arsenic	0.0049		0.0010	mg/L		02/21/18 05:47	02/26/18 11:26	2
Barium	0.011	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:26	2
Cadmium	ND	D1	0.00020	mg/L		02/21/18 05:47	02/26/18 11:26	2
Chromium	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:57	1
Cobalt	0.0015		0.00050	mg/L		02/21/18 05:47	02/22/18 16:57	1
Lead	ND	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:26	2
Molybdenum	0.030	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:26	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	0.0022		0.00050	mg/L		02/21/18 05:47	02/22/18 16:57	1
Thallium	ND	D1	0.00020	mg/L		02/21/18 05:47	02/26/18 11:26	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:59	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0823		0.0561	0.0566	1.00	0.0725	pCi/L	02/21/18 09:29	03/15/18 05:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	107		40 - 110					02/21/18 09:29	03/15/18 05:58	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	0.234	U	0.203	0.204	1.00	0.325	pCi/L	02/21/18 10:35	03/06/18 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	107		40 - 110					02/21/18 10:35	03/06/18 14:29	1
Y Carrier	93.5		40 - 110					02/21/18 10:35	03/06/18 14:29	1

Tracer/Carrier Summary

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Ba Carrier (40-110)	
550-98153-1	CH-CCR-M52A-21518	107	
550-98153-2	CH-CCR-M53A-21518	107	
550-98153-3	CH-CCR-W305-21518	109	
550-98153-4	CH-CCR-W306-21518	93.2	
550-98153-5	CH-CCR-W314-21518	104	
550-98153-6	CH-CCR-M64A-21518	105	
550-98153-7	CH-CCR-FD02-21518	107	
LCS 160-352206/2-A	Lab Control Sample	101	
LCSD 160-352206/3-A	Lab Control Sample Dup	105	
MB 160-352206/1-A	Method Blank	103	

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	Percent Yield (Acceptance Limits)	
		Ba Carrier (40-110)	Y Carrier (40-110)
550-98153-1	CH-CCR-M52A-21518	107	92.0
550-98153-2	CH-CCR-M53A-21518	107	93.8
550-98153-3	CH-CCR-W305-21518	109	92.3
550-98153-4	CH-CCR-W306-21518	93.2	93.8
550-98153-5	CH-CCR-W314-21518	104	94.2
550-98153-6	CH-CCR-M64A-21518	105	93.5
550-98153-7	CH-CCR-FD02-21518	107	93.5
LCS 160-352309/2-A	Lab Control Sample	101	93.5
LCSD 160-352309/3-A	Lab Control Sample Dup	105	90.8
MB 160-352309/1-A	Method Blank	103	90.8

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-140030/36
Matrix: Water
Analysis Batch: 140030

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			02/20/18 23:24	1

Lab Sample ID: LCS 550-140030/37
Matrix: Water
Analysis Batch: 140030

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	4.25		mg/L		106	90 - 110

Lab Sample ID: LCSD 550-140030/38
Matrix: Water
Analysis Batch: 140030

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	4.24		mg/L		106	90 - 110	0	20

Lab Sample ID: 550-98153-1 MS
Matrix: Water
Analysis Batch: 140030

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.1	D1	8.00	9.47	D1	mg/L		104	80 - 120

Lab Sample ID: 550-98153-1 MSD
Matrix: Water
Analysis Batch: 140030

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.1	D1	8.00	9.27	D1	mg/L		102	80 - 120	2	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-139989/1-A
Matrix: Water
Analysis Batch: 140162

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139989

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 10:47	02/21/18 15:21	1
Lithium	ND		0.20	mg/L		02/20/18 10:47	02/21/18 15:21	1

Lab Sample ID: LCS 550-139989/2-A
Matrix: Water
Analysis Batch: 140162

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139989

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	1.00	0.993		mg/L		99	85 - 115
Lithium	1.00	0.990		mg/L		99	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

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

Lab Sample ID: LCSD 550-139989/3-A
Matrix: Water
Analysis Batch: 140162

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 139989

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	1.00	0.989		mg/L		99	85 - 115	0	20
Lithium	1.00	0.991		mg/L		99	85 - 115	0	20

Lab Sample ID: 550-98153-1 MS
Matrix: Water
Analysis Batch: 140162

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 139989

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	ND		1.00	0.955		mg/L		96	70 - 130		
Lithium	0.25		1.00	1.27		mg/L		102	70 - 130		

Lab Sample ID: 550-98153-1 MSD
Matrix: Water
Analysis Batch: 140162

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 139989

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	ND		1.00	0.967		mg/L		97	70 - 130	1	20
Lithium	0.25		1.00	1.28		mg/L		103	70 - 130	1	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-140074/1-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140074

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Chromium	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:30	1
Cobalt	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Lead	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Molybdenum	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Selenium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1

Lab Sample ID: MB 550-140074/1-A
Matrix: Water
Analysis Batch: 140456

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140074

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/26/18 11:21	1
Arsenic	ND		0.00050	mg/L		02/21/18 05:47	02/26/18 11:21	1
Cadmium	ND		0.00010	mg/L		02/21/18 05:47	02/26/18 11:21	1
Thallium	ND		0.00010	mg/L		02/21/18 05:47	02/26/18 11:21	1

Lab Sample ID: LCS 550-140074/2-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0968		mg/L		97	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

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

Lab Sample ID: LCS 550-140074/2-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.0943		mg/L		94	85 - 115
Barium	0.100	0.0964		mg/L		96	85 - 115
Cadmium	0.100	0.0959		mg/L		96	85 - 115
Chromium	0.100	0.0950		mg/L		95	85 - 115
Cobalt	0.100	0.0952		mg/L		95	85 - 115
Lead	0.100	0.0953		mg/L		95	85 - 115
Molybdenum	0.100	0.0960		mg/L		96	85 - 115
Selenium	0.100	0.0972		mg/L		97	85 - 115
Thallium	0.100	0.0956		mg/L		96	85 - 115

Lab Sample ID: LCSD 550-140074/3-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.100	0.100		mg/L		100	85 - 115	4	20
Arsenic	0.100	0.0985		mg/L		98	85 - 115	4	20
Barium	0.100	0.100		mg/L		100	85 - 115	4	20
Cadmium	0.100	0.0994		mg/L		99	85 - 115	4	20
Chromium	0.100	0.0990		mg/L		99	85 - 115	4	20
Cobalt	0.100	0.0990		mg/L		99	85 - 115	4	20
Lead	0.100	0.0982		mg/L		98	85 - 115	3	20
Molybdenum	0.100	0.0993		mg/L		99	85 - 115	3	20
Selenium	0.100	0.0997		mg/L		100	85 - 115	3	20
Thallium	0.100	0.0982		mg/L		98	85 - 115	3	20

Lab Sample ID: 550-98153-1 MS
Matrix: Water
Analysis Batch: 140294

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND		0.100	0.101		mg/L		100	70 - 130
Arsenic	0.0018		0.100	0.108		mg/L		107	70 - 130
Barium	0.017		0.100	0.115		mg/L		99	70 - 130
Cadmium	0.0011		0.100	0.0899		mg/L		89	70 - 130
Chromium	0.011		0.100	0.109		mg/L		98	70 - 130
Cobalt	0.052		0.100	0.143		mg/L		91	70 - 130
Lead	0.0010		0.100	0.0880		mg/L		87	70 - 130
Molybdenum	0.048		0.100	0.146		mg/L		98	70 - 130
Selenium	0.00091		0.100	0.115		mg/L		114	70 - 130
Thallium	0.00018		0.100	0.0891		mg/L		89	70 - 130

Lab Sample ID: 550-98153-1 MSD
Matrix: Water
Analysis Batch: 140294

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	ND		0.100	0.102		mg/L		101	70 - 130	1	20
Arsenic	0.0018		0.100	0.111		mg/L		109	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

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

Lab Sample ID: 550-98153-1 MSD
Matrix: Water
Analysis Batch: 140294

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Barium	0.017		0.100	0.117		mg/L		100	70 - 130	1	20
Cadmium	0.0011		0.100	0.0898		mg/L		89	70 - 130	0	20
Chromium	0.011		0.100	0.112		mg/L		100	70 - 130	2	20
Cobalt	0.052		0.100	0.145		mg/L		94	70 - 130	2	20
Lead	0.0010		0.100	0.0891		mg/L		88	70 - 130	1	20
Molybdenum	0.048		0.100	0.150		mg/L		102	70 - 130	2	20
Selenium	0.00091		0.100	0.116		mg/L		115	70 - 130	1	20
Thallium	0.00018		0.100	0.0907		mg/L		90	70 - 130	2	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-140064/1-A
Matrix: Water
Analysis Batch: 140209

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140064

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Hg	ND		0.00020	mg/L		02/20/18 21:22	02/21/18 19:42	1

Lab Sample ID: LCS 550-140064/2-A
Matrix: Water
Analysis Batch: 140209

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140064

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits
		Result	Qualifier				
Hg	0.0100	0.00925		mg/L		93	85 - 115

Lab Sample ID: LCSD 550-140064/3-A
Matrix: Water
Analysis Batch: 140209

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 140064

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	Limit
		Result	Qualifier				Limits		
Hg	0.0100	0.00947		mg/L		95	85 - 115	2	20

Lab Sample ID: 550-98153-1 MS
Matrix: Water
Analysis Batch: 140209

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 140064

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier				Limits	
Hg	ND		0.0100	0.00941		mg/L		94	70 - 130	

Lab Sample ID: 550-98153-1 MSD
Matrix: Water
Analysis Batch: 140209

Client Sample ID: CH-CCR-M52A-21518
Prep Type: Total/NA
Prep Batch: 140064

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Hg	ND		0.0100	0.00956		mg/L		96	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-352206/1-A
Matrix: Water
Analysis Batch: 355724

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352206

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0000	U	0.0336	0.0336	1.00	0.0748	pCi/L	02/21/18 09:29	03/15/18 05:53	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110					02/21/18 09:29	03/15/18 05:53	1

Lab Sample ID: LCS 160-352206/2-A
Matrix: Water
Analysis Batch: 355724

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352206

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-226	11.8	11.18		1.15	1.00	0.0972	pCi/L	95	68 - 137
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	101		40 - 110						

Lab Sample ID: LCSD 160-352206/3-A
Matrix: Water
Analysis Batch: 355724

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 352206

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226	11.8	10.94		1.12	1.00	0.0878	pCi/L	93	68 - 137	0.10	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	105		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-352309/1-A
Matrix: Water
Analysis Batch: 354193

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352309

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.02448	U	0.193	0.193	1.00	0.342	pCi/L	02/21/18 10:35	03/06/18 14:26	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110					02/21/18 10:35	03/06/18 14:26	1
Y Carrier	90.8		40 - 110					02/21/18 10:35	03/06/18 14:26	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-352309/2-A
Matrix: Water
Analysis Batch: 354193

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352309

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	8.50	8.568		0.990	1.00	0.333	pCi/L	101	56 - 140

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	101		40 - 110
Y Carrier	93.5		40 - 110

Lab Sample ID: LCSD 160-352309/3-A
Matrix: Water
Analysis Batch: 354193

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 352309

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	8.50	8.348		0.969	1.00	0.369	pCi/L	98	56 - 140	0.11	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	105		40 - 110
Y Carrier	90.8		40 - 110

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

HPLC/IC

Analysis Batch: 140030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	300.0	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	300.0	
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	300.0	
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	300.0	
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	300.0	
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	300.0	
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	300.0	
MB 550-140030/36	Method Blank	Total/NA	Water	300.0	
LCS 550-140030/37	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-140030/38	Lab Control Sample Dup	Total/NA	Water	300.0	
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	300.0	
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	300.0	

Metals

Prep Batch: 139989

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	200.7	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	200.7	
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	200.7	
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	200.7	
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	200.7	
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	200.7	
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	200.7	
MB 550-139989/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-139989/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-139989/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	200.7	
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	200.7	

Prep Batch: 140064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	245.1	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	245.1	
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	245.1	
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	245.1	
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	245.1	
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	245.1	
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	245.1	
MB 550-140064/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-140064/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-140064/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	245.1	
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	245.1	

Prep Batch: 140074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	200.8	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	200.8	
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Metals (Continued)

Prep Batch: 140074 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	200.8	
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	200.8	
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	200.8	
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	200.8	
MB 550-140074/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-140074/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-140074/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	200.8	
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	200.8	

Analysis Batch: 140162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	200.7 Rev 4.4	139989
MB 550-139989/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	139989
LCS 550-139989/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	139989
LCSD 550-139989/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	200.7 Rev 4.4	139989
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	200.7 Rev 4.4	139989

Analysis Batch: 140209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	245.1	140064
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	245.1	140064
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	245.1	140064
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	245.1	140064
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	245.1	140064
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	245.1	140064
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	245.1	140064
MB 550-140064/1-A	Method Blank	Total/NA	Water	245.1	140064
LCS 550-140064/2-A	Lab Control Sample	Total/NA	Water	245.1	140064
LCSD 550-140064/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	140064
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	245.1	140064
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	245.1	140064

Analysis Batch: 140294

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	200.8 LL	140074
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	200.8 LL	140074
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	200.8 LL	140074
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	200.8 LL	140074
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	200.8 LL	140074
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	200.8 LL	140074
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	200.8 LL	140074
MB 550-140074/1-A	Method Blank	Total/NA	Water	200.8 LL	140074
LCS 550-140074/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	140074

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Metals (Continued)

Analysis Batch: 140294 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 550-140074/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	140074
550-98153-1 MS	CH-CCR-M52A-21518	Total/NA	Water	200.8 LL	140074
550-98153-1 MSD	CH-CCR-M52A-21518	Total/NA	Water	200.8 LL	140074

Analysis Batch: 140456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	200.8 LL	140074
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	200.8 LL	140074
MB 550-140074/1-A	Method Blank	Total/NA	Water	200.8 LL	140074

Rad

Prep Batch: 352206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	PrecSep-21	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	PrecSep-21	
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	PrecSep-21	
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	PrecSep-21	
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	PrecSep-21	
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	PrecSep-21	
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	PrecSep-21	
MB 160-352206/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-352206/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-352206/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 352309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	PrecSep_0	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	PrecSep_0	
550-98153-3	CH-CCR-W305-21518	Total/NA	Water	PrecSep_0	
550-98153-4	CH-CCR-W306-21518	Total/NA	Water	PrecSep_0	
550-98153-5	CH-CCR-W314-21518	Total/NA	Water	PrecSep_0	
550-98153-6	CH-CCR-M64A-21518	Total/NA	Water	PrecSep_0	
550-98153-7	CH-CCR-FD02-21518	Total/NA	Water	PrecSep_0	
MB 160-352309/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-352309/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-352309/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-M52A-21518

Date Collected: 02/15/18 12:50

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98153-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 00:19	NBL	TAL PHX
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 15:41	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:37	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:49	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355724	03/15/18 05:55	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:28	CDR	TAL SL

Client Sample ID: CH-CCR-M53A-21518

Date Collected: 02/15/18 14:44

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98153-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 01:14	NBL	TAL PHX
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 15:47	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:44	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:51	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355724	03/15/18 05:55	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:28	CDR	TAL SL

Client Sample ID: CH-CCR-W305-21518

Date Collected: 02/15/18 14:02

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98153-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 01:33	NBL	TAL PHX
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 15:53	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:47	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:52	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355724	03/15/18 05:56	RTM	TAL SL

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

Date Collected: 02/15/18 14:02

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 01:51	NBL	TAL PHX
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 15:59	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:49	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:54	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355724	03/15/18 05:56	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

Date Collected: 02/15/18 12:08

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 02:09	NBL	TAL PHX
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 16:05	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:52	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:55	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355724	03/15/18 05:56	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Date Collected: 02/15/18 11:00

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 03:23	NBL	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Date Collected: 02/15/18 11:00

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 16:16	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:54	TEK	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	140456	02/26/18 11:24	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:57	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355724	03/15/18 05:56	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140030	02/21/18 03:41	NBL	TAL PHX
Total/NA	Prep	200.7			139989	02/20/18 10:47	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140162	02/21/18 16:22	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:57	TEK	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	140456	02/26/18 11:26	TEK	TAL PHX
Total/NA	Prep	245.1			140064	02/20/18 21:22	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140209	02/21/18 19:59	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355725	03/15/18 05:58	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

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

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	03-31-18 *
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
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	03-31-18 *
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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-1

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
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL

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

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

TestAmerica Phoenix

4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

98153

Chain of Custody Record

Regulatory Program: DW NPDES RCRA Other: CCR

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 TestAmerica Laboratories, Inc.

Client Contact		Doug Lavarnway		Doug Lavarnway		Date: 02/16/2018		COC No: _____ of _____ COCs	
Analysis Turnaround Time		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		Lab Contact:		Carrier:		Sampler: _____ For Lab Use Only: Walk-in Client: Lab Sampling: _____ Job / SDG No.: _____	
APS Cholla 4801 Cholla Lake Rd Joseph City, AZ 86032 (928) 587-0319 Phone (xxx) xxx-xxxx FAX Project Name: Site: P O #		TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Filtered Sample (Y / N) Perform MS / MSD (Y / N) EPA 200.7 (Be, Li) 200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti) 932.0 Radium 226 and 228 EPA 245.1 (Hg) EPA 300.0 (F)		Date: 02/16/2018 Carrier:		Sample Specific Notes:	
Sample Identification	Sample Date	Sample Time	Sample Type (G=Comp, G=Grab)	Matrix	# of Cont.	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	Received by:	Date/Time:	Company:
CH-CCR-M52A-21518	2/15/2018	1250 G	G	W	4				
CH-CCR-M53A-21518	2/15/18	1444	G	W	4				
CH-CCR-W305-21518	2/15/18	1402	G	W	4				
CH-CCR-W306-21518	2/15/18	1324	G	W	4				
CH-CCR-W314-21518	2/15/18	1208	G	W	4				
CH-CCR-M64A-21418	2/14/18	1100	G	W	4				
CH-CCR-FD02-21518	2/15/18	1324	G	W	4				



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

Custody Seals Intact: Yes No

Relinquished by: Doug Lavarnway

Relinquished by: _____

Cooler Temp. (°C): Obs'd: _____ Therm ID No.: _____

Received by: _____ Date/Time: _____ Company: _____

Received by: _____ Date/Time: _____ Company: _____



Client Information (Sub Contract Lab)		Sampler: Baker, Ken		Lab PM: Baker, Ken		Carrier Tracking No(s): 550-20242-1	
Client Contact: Shipping/Receiving		Phone: ken.baker@testamericainc.com		E-Mail: ken.baker@testamericainc.com		State of Origin: Arizona	
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Arizona		Job #: 550-98153-1		COC No: 550-20242-1	
Address: 13715 Rider Trail North, Earth City, MO, 63045		Due Date Requested: 2/27/2018		TAT Requested (days):		Analysis Requested	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		PO #:		WO #:		Preservation Codes: M - Hexane N - None O - AsHClO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 L - EDTA Z - other (specify)	
Email:		Project #: 55009651		SSOV#:		Other:	
Site: Arizona Public Service		Sample Date		Sample Time		Sample Type (C=comp, G=grab)	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time		Sample Type (C=comp, G=grab)	
CH-CCR-M52A-21518 (550-98153-1)		2/15/18		12:50 Arizona		Water	
CH-CCR-M53A-21518 (550-98153-2)		2/15/18		14:44 Arizona		Water	
CH-CCR-W305-21518 (550-98153-3)		2/15/18		14:02 Arizona		Water	
CH-CCR-W306-21518 (550-98153-4)		2/15/18		13:24 Arizona		Water	
CH-CCR-W314-21518 (550-98153-5)		2/15/18		12:08 Arizona		Water	
CH-CCR-M64A-21518 (550-98153-6)		2/15/18		11:00 Arizona		Water	
CH-CCR-FD02-21518 (550-98153-7)		2/15/18		13:24 Arizona		Water	
Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		903.0/Precep_21 Standard Target List		904.0/Precep_0 Standard Target List	
Total Number of Containers		2		2		2	
Special Instructions/Note:							

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out 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: _____ Time: _____ Method of Shipment: _____

Relinquished by: *Ken Baker* Date: *2-17-18* Time: *0830* Company: *ASA*

Relinquished by: _____ Date: _____ Time: _____ Company: _____

Relinquished by: _____ Date: _____ Time: _____ Company: _____

Custody Seal Intact: Yes No Delta No

Custody Seal No.:

Special Instructions/QC 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



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-98153-1

Login Number: 98153
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: 550-98153-3

Client Project/Site: APS - Cholla CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

4/19/2018 10:03:23 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

TotalAccess

Have a Question?



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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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	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 - Cholla CCR

TestAmerica Job ID: 550-98153-3

Job ID: 550-98153-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-98153-3

Comments

No additional comments.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

RAD

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.

- 1
- 2
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Sample Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-98153-1	CH-CCR-M52A-21518	Water	02/15/18 12:50	02/16/18 13:01
550-98153-2	CH-CCR-M53A-21518	Water	02/15/18 14:44	02/16/18 13:01
550-98153-3	CH-CCR-W305-21518	Water	02/15/18 14:02	02/16/18 13:01
550-98153-4	CH-CCR-W306-21518	Water	02/15/18 13:24	02/16/18 13:01
550-98153-5	CH-CCR-W314-21518	Water	02/15/18 12:08	02/16/18 13:01
550-98153-6	CH-CCR-M64A-21518	Water	02/15/18 11:00	02/16/18 13:01
550-98153-7	CH-CCR-FD02-21518	Water	02/15/18 13:24	02/16/18 13:01

Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Client Sample ID: CH-CCR-M52A-21518

Lab Sample ID: 550-98153-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0016		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.00056		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M53A-21518

Lab Sample ID: 550-98153-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Molybdenum	0.0053		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

No Detections.

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

No Detections.

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

No Detections.

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

No Detections.

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Client Sample ID: CH-CCR-M52A-21518

Lab Sample ID: 550-98153-1

Date Collected: 02/15/18 12:50

Matrix: Water

Date Received: 02/16/18 13:01

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0016		0.00050	mg/L		04/16/18 09:06	04/17/18 12:07	1
Lead	0.00056		0.00050	mg/L		04/16/18 09:06	04/17/18 12:07	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.897		0.268	0.276	5.00	0.360	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-M53A-21518

Lab Sample ID: 550-98153-2

Date Collected: 02/15/18 14:44

Matrix: Water

Date Received: 02/16/18 13:01

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	0.0053		0.00050	mg/L		04/16/18 09:06	04/17/18 12:09	1

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.435		0.219	0.221	5.00	0.323	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

Date Collected: 02/15/18 14:02

Matrix: Water

Date Received: 02/16/18 13:01

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.643		0.242	0.246	5.00	0.346	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.379		0.230	0.232	5.00	0.342	pCi/L		04/18/18 12:22	1

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

Date Collected: 02/15/18 12:08

Matrix: Water

Date Received: 02/16/18 13:01

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.227	U	0.210	0.211	5.00	0.337	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Date Collected: 02/15/18 11:00

Matrix: Water

Date Received: 02/16/18 13:01

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.966		0.252	0.261	5.00	0.309	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Method: Ra226_Ra228 Pos - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226 and 228	0.316	U	0.211	0.212	5.00	0.325	pCi/L		04/18/18 12:22	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-144571/1-A
Matrix: Water
Analysis Batch: 144749

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144571

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		04/16/18 09:06	04/17/18 11:09	1
Lead	ND		0.00050	mg/L		04/16/18 09:06	04/17/18 11:09	1
Molybdenum	ND		0.00050	mg/L		04/16/18 09:06	04/17/18 11:09	1

Lab Sample ID: LCS 550-144571/2-A
Matrix: Water
Analysis Batch: 144749

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144571

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.0987		mg/L		99	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Molybdenum	0.100	0.100		mg/L		100	85 - 115

Lab Sample ID: LCSD 550-144571/3-A
Matrix: Water
Analysis Batch: 144749

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 144571

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.100	0.0989		mg/L		99	85 - 115	0	20
Lead	0.100	0.100		mg/L		100	85 - 115	2	20
Molybdenum	0.100	0.0995		mg/L		100	85 - 115	1	20

Lab Sample ID: 550-101166-H-3-B MS
Matrix: Water
Analysis Batch: 144749

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144571

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.0055		0.100	0.105		mg/L		100	70 - 130
Lead	ND		0.100	0.0935		mg/L		94	70 - 130
Molybdenum	0.0037		0.100	0.106		mg/L		102	70 - 130

Lab Sample ID: 550-101166-H-3-C MSD
Matrix: Water
Analysis Batch: 144749

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144571

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.0055		0.100	0.107		mg/L		102	70 - 130	2	20
Lead	ND		0.100	0.0930		mg/L		93	70 - 130	1	20
Molybdenum	0.0037		0.100	0.105		mg/L		102	70 - 130	1	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Metals

Prep Batch: 144571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	200.8	
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	200.8	
MB 550-144571/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-144571/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-144571/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-101166-H-3-B MS	Matrix Spike	Total/NA	Water	200.8	
550-101166-H-3-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.8	

Analysis Batch: 144749

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98153-1	CH-CCR-M52A-21518	Total/NA	Water	200.8 LL	144571
550-98153-2	CH-CCR-M53A-21518	Total/NA	Water	200.8 LL	144571
MB 550-144571/1-A	Method Blank	Total/NA	Water	200.8 LL	144571
LCS 550-144571/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	144571
LCSD 550-144571/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	144571
550-101166-H-3-B MS	Matrix Spike	Total/NA	Water	200.8 LL	144571
550-101166-H-3-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.8 LL	144571

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Client Sample ID: CH-CCR-M52A-21518

Lab Sample ID: 550-98153-1

Date Collected: 02/15/18 12:50

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			144571	04/16/18 09:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	144749	04/17/18 12:07	TEK	TAL PHX
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-M53A-21518

Lab Sample ID: 550-98153-2

Date Collected: 02/15/18 14:44

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			144571	04/16/18 09:06	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	144749	04/17/18 12:09	TEK	TAL PHX
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-W305-21518

Lab Sample ID: 550-98153-3

Date Collected: 02/15/18 14:02

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-W306-21518

Lab Sample ID: 550-98153-4

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-W314-21518

Lab Sample ID: 550-98153-5

Date Collected: 02/15/18 12:08

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-M64A-21518

Lab Sample ID: 550-98153-6

Date Collected: 02/15/18 11:00

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Client Sample ID: CH-CCR-FD02-21518

Lab Sample ID: 550-98153-7

Date Collected: 02/15/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
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

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

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	06-09-18

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: APS - Cholla CCR

TestAmerica Job ID: 550-98153-3

Method	Method Description	Protocol	Laboratory
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

- EPA = US Environmental Protection Agency
- 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



TestAmerica Phoenix

4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

98153

Chain of Custody Record

Regulatory Program: DW NPDES RCRA Other: CCR

TestAmerica
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 TestAmerica Laboratories, Inc.

Client Contact		Doug Lavarnway 928-587-0319		Lab Contact:		Doug Lavarnway		Date: 02/16/2018		Carrier:	
Analysis Turnaround Time		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Filtered Sample (Y / N) Perform MS / MSD (Y / N) EPA 200.7 (Be, Li) 200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti) 932.0 Radium 226 and 228 EPA 245.1 (Hg) EPA 300.0 (F)		COC No.:		Sampler: _____ of _____ COCs For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.:	
Sample Identification	Sample Date	Sample Time	Sample Type (G=Comp, G=Grab)	Matrix	# of Cont.						
CH-CCR-M52A-21518	2/15/2018	1250 G	G	W	4	N	X	X	X	X	
CH-CCR-M53A-21518	2/15/18	1444	G	W	4	N	X	X	X	X	
CH-CCR-W305-21518	2/15/18	1402	G	W	4	N	X	X	X	X	
CH-CCR-W306-21518	2/15/18	1324	G	W	4	N	X	X	X	X	
CH-CCR-W314-21518	2/15/18	1208	G	W	4	N	X	X	X	X	
CH-CCR-M64A-21418	2/14/18	1100	G	W	4	N	X	X	X	X	
CH-CCR-FD02-21518	2/15/18	1324	G	W	4	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.

Special Instructions/QC Requirements & Comments: Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab Archive for _____ Months

Method 200.8 with collision cell

Custody Seals Intact: Yes No

Relinquished by: Doug Lavarnway

Relinquished by: APS

Relinquished by: Company: Date/Time: Received by: Received in Laboratory by: Company: Date/Time:

Cooler Temp. (°C): Obs'd: _____
 Cor'd: 26
 Therm ID No.: 13.30

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-98153-3

Login Number: 98153
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.



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-98153-3

Login Number: 98153
List Number: 2
Creator: Taylor, Kristene N

List Source: TestAmerica St. Louis
List Creation: 02/17/18 05:05 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.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	20.0,20.0
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: 550-103238-1

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:

6/13/2018 9:00:20 AM

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: 550-103238-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
M1	Matrix spike recovery was high, the associated blank spike recovery was acceptable.
N1	See case narrative.
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.
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.
D2	Sample required dilution due to high concentration of analyte.
B1	Target analyte detected in method blank at or above the method reporting limit.

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: 550-103238-1

Job ID: 550-103238-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103238-1**

Comments

This report contains additional case narrative documentation.

Receipt

The samples were received on 5/22/2018 9:25 AM; 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 3.1° C.

Receipt Exceptions

The methods going to TA St. Luis are On Hold? In TALs.

CH-CCR-M-52A-52018 (550-103238-1), CH-CCR-M-52A-52018 (550-103238-1[DU]), CH-CCR-M-52A-52018 (550-103238-1[MS]), CH-CCR-M-52A-52018 (550-103238-1[MSD]), CH-CCR-M-53A-52018 (550-103238-2), CH-CCR-FD01-52018 (550-103238-3), CH-CCR-W-305-51918 (550-103238-4), CH-CCR-W-306-51918 (550-103238-5), CH-CCR-W-314-52018 (550-103238-6) and CH-CCR-M-64A-51918 (550-103238-7)

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: CH-CCR-W-305-51918 (550-103238-4) and CH-CCR-M-64A-51918 (550-103238-7). Samples contained high concentrations of Chloride and Sulfate which contributed to a total sum of anions that exceeded the instrument's column capacity. Therefore, dilutions were required to bring anion levels within a working range and Fluoride was not detected in the diluted samples. Elevated reporting limit (RL) have been provided and data have been qualified with D1 and D5 flags.

Method(s) 300.0: Reanalysis of the following sample was performed per client request for confirmation of Fluoride by method Anions EPA 300.0: CH-CCR-FD01-52018 (550-103238-3). The reanalyzed result did not confirm with the original data due to the presence of peak tailing on Fluoride in the initial chromatogram. The Fluoride peak tailing has since been corrected in the initial analysis. The reanalyzed result confirms the reintegrated original Fluoride result within a RPD of 12. The corrected data and the reanalyzed data were comparable to that of the field duplicate. As such, the data has been corrected on the revised report qualified with N1 flags.

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

Metals

Method(s) 200.7 Rev 4.4: The continuing calibration blank (CCB) for analytical batch 550-148212 contained Sodium above the reporting limit (RL). All reported samples associated with this CCB contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

Method(s) 200.7 Rev 4.4: The method blank for preparation batch 550-147956 and analytical batch 550-148212 contained Sodium above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method(s) 200.7 Rev 4.4: The method blank for preparation batch 550-147956 and analytical batch 550-148235 contained Sodium above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method(s) 200.7 Rev 4.4: The method blank for preparation batch 550-147956 and analytical batch 550-149395 contained Sodium above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

No additional analytical or quality issues were noted, other than those described above or 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: 550-103238-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103238-1	CH-CCR-M-52A-52018	Water	05/20/18 14:30	05/22/18 09:25
550-103238-2	CH-CCR-M-53A-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-3	CH-CCR-FD01-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-4	CH-CCR-W-305-51918	Water	05/19/18 12:33	05/22/18 09:25
550-103238-5	CH-CCR-W-306-51918	Water	05/19/18 13:08	05/22/18 09:25
550-103238-6	CH-CCR-W-314-52018	Water	05/20/18 15:30	05/22/18 09:25
550-103238-7	CH-CCR-M-64A-51918	Water	05/19/18 10:34	05/22/18 09:25

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4500	D2 M1	400	mg/L	200		300.0	Total/NA
Fluoride	1.2	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2800	D2	400	mg/L	200		300.0	Total/NA
Boron	3.7		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	850	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	280	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	6.6		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2400	B7 M3	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	230		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	21.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-53A-52018

Lab Sample ID: 550-103238-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2400	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.4	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3400	D2	400	mg/L	200		300.0	Total/NA
Boron	3.3		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	620		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	13		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1600	B7	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	99		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	99		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7800	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2300	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.6	D1 N1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3100	D2	400	mg/L	200		300.0	Total/NA
Boron	3.2		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	600		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	13		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1600	B7	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	99		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	99		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-W-305-51918 (Continued)

Lab Sample ID: 550-103238-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2700	D2	400	mg/L	200		300.0	Total/NA
Sulfate	2800	D2	400	mg/L	200		300.0	Total/NA
Boron	0.34		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	700		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	110		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.0		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1500	B7	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	110		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	110		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.6	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	13000	D2	400	mg/L	200		300.0	Total/NA
Boron	1.0		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
Magnesium	210		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	2.5		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	5900	B7 D2	2.5	mg/L	5		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	140		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	140		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	18000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2900	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.3	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2400	D2	400	mg/L	200		300.0	Total/NA
Boron	1.1		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	790		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	160		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	1.9		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1500	B7	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7500	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-M-64A-51918 (Continued)

Lab Sample ID: 550-103238-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4700	D2	400	mg/L	200		300.0	Total/NA
Sulfate	4600	D2	400	mg/L	200		300.0	Total/NA
Boron	1.4		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	200		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	13		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	4000	B7 D2	1.0	mg/L	2		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	13000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.1	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: 550-103238-1

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

Date Collected: 05/20/18 14:30

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4500	D2 M1	400	mg/L			05/22/18 23:34	200
Fluoride	1.2	D1	0.80	mg/L			05/22/18 23:06	2
Sulfate	2800	D2	400	mg/L			05/22/18 23:34	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.7		0.050	mg/L		05/23/18 08:28	05/24/18 21:22	1
Calcium	850	M3	2.0	mg/L		05/23/18 08:28	05/24/18 21:22	1
Magnesium	280	M3	2.0	mg/L		05/23/18 08:28	05/24/18 21:22	1
Potassium	6.6		0.50	mg/L		05/23/18 08:28	05/24/18 21:22	1
Sodium	2400	B7 M3	1.0	mg/L		05/23/18 08:28	06/12/18 12:14	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	230		6.0	mg/L			05/23/18 11:31	1
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L			05/23/18 11:31	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 11:31	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 11:31	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 11:31	1
Total Dissolved Solids	11000	D2	100	mg/L			05/23/18 08:22	1
pH	6.9	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.0	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-M-53A-52018

Lab Sample ID: 550-103238-2

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2400	D2	400	mg/L			05/23/18 01:23	200
Fluoride	2.4	D1	0.80	mg/L			05/23/18 00:56	2
Sulfate	3400	D2	400	mg/L			05/23/18 01:23	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.3		0.050	mg/L		05/23/18 08:28	05/24/18 22:02	1
Calcium	620		2.0	mg/L		05/23/18 08:28	05/24/18 22:02	1
Magnesium	210		2.0	mg/L		05/23/18 08:28	05/24/18 22:02	1
Potassium	13		0.50	mg/L		05/23/18 08:28	05/24/18 22:02	1
Sodium	1600	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:02	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	99		6.0	mg/L			05/23/18 11:48	1
Bicarbonate Alkalinity as CaCO3	99		6.0	mg/L			05/23/18 11:48	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 11:48	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 11:48	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 11:48	1
Total Dissolved Solids	7800	D2	100	mg/L			05/23/18 08:22	1
pH	7.4	H5	1.7	SU			05/23/18 09:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-M-53A-52018

Lab Sample ID: 550-103238-2

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2300	D2	400	mg/L			05/23/18 03:13	200
Fluoride	2.6	D1 N1	0.80	mg/L			05/23/18 01:51	2
Sulfate	3100	D2	400	mg/L			05/23/18 03:13	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.2		0.050	mg/L		05/23/18 08:28	05/24/18 22:08	1
Calcium	600		2.0	mg/L		05/23/18 08:28	05/24/18 22:08	1
Magnesium	210		2.0	mg/L		05/23/18 08:28	05/24/18 22:08	1
Potassium	13		0.50	mg/L		05/23/18 08:28	05/24/18 22:08	1
Sodium	1600	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:08	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	99		6.0	mg/L			05/23/18 11:57	1
Bicarbonate Alkalinity as CaCO3	99		6.0	mg/L			05/23/18 11:57	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 11:57	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 11:57	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 11:57	1
Total Dissolved Solids	7900	D2	100	mg/L			05/23/18 08:22	1
pH	7.4	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Date Collected: 05/19/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2700	D2	400	mg/L			05/23/18 04:08	200
Fluoride	ND	D1 D5	0.80	mg/L			05/23/18 03:40	2
Sulfate	2800	D2	400	mg/L			05/23/18 04:08	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.34		0.050	mg/L		05/23/18 08:28	05/24/18 22:20	1
Calcium	700		2.0	mg/L		05/23/18 08:28	05/24/18 22:20	1
Magnesium	110		2.0	mg/L		05/23/18 08:28	05/24/18 22:20	1
Potassium	3.0		0.50	mg/L		05/23/18 08:28	05/24/18 22:20	1
Sodium	1500	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:20	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Date Collected: 05/19/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	110		6.0	mg/L			05/23/18 12:05	1
Bicarbonate Alkalinity as CaCO3	110		6.0	mg/L			05/23/18 12:05	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:05	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 12:05	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:05	1
Total Dissolved Solids	7000	D2	100	mg/L			05/23/18 08:22	1
pH	7.3	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Date Collected: 05/19/18 13:08

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000	D2	400	mg/L			05/23/18 05:03	200
Fluoride	1.6	D1	0.80	mg/L			05/23/18 04:35	2
Sulfate	13000	D2	400	mg/L			05/23/18 05:03	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.0		0.050	mg/L		05/23/18 08:28	05/24/18 22:25	1
Calcium	390		2.0	mg/L		05/23/18 08:28	05/24/18 22:25	1
Magnesium	210		2.0	mg/L		05/23/18 08:28	05/24/18 22:25	1
Potassium	2.5		0.50	mg/L		05/23/18 08:28	05/24/18 22:25	1
Sodium	5900	B7 D2	2.5	mg/L		05/23/18 08:28	05/25/18 11:50	5

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	140		6.0	mg/L			05/23/18 12:13	1
Bicarbonate Alkalinity as CaCO3	140		6.0	mg/L			05/23/18 12:13	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:13	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 12:13	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:13	1
Total Dissolved Solids	18000	D2	200	mg/L			05/23/18 08:22	1
pH	7.8	H5	1.7	SU			05/23/18 09:50	1
Temperature	20.9	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

Date Collected: 05/20/18 15:30

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2900	D2	400	mg/L			05/23/18 05:57	200
Fluoride	1.3	D1	0.80	mg/L			05/23/18 05:30	2
Sulfate	2400	D2	400	mg/L			05/23/18 05:57	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.1		0.050	mg/L		05/23/18 08:28	05/24/18 22:31	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

Date Collected: 05/20/18 15:30

Matrix: Water

Date Received: 05/22/18 09:25

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	790		2.0	mg/L		05/23/18 08:28	05/24/18 22:31	1
Magnesium	160		2.0	mg/L		05/23/18 08:28	05/24/18 22:31	1
Potassium	1.9		0.50	mg/L		05/23/18 08:28	05/24/18 22:31	1
Sodium	1500	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:31	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	100		6.0	mg/L			05/23/18 12:21	1
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L			05/23/18 12:21	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:21	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 12:21	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:21	1
Total Dissolved Solids	7500	D2	100	mg/L			05/23/18 08:22	1
pH	7.3	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.0	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

Date Collected: 05/19/18 10:34

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4700	D2	400	mg/L			05/23/18 06:52	200
Fluoride	ND	D1 D5	0.80	mg/L			05/23/18 06:25	2
Sulfate	4600	D2	400	mg/L			05/23/18 06:52	200

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		05/23/18 08:28	05/24/18 22:37	1
Calcium	460		2.0	mg/L		05/23/18 08:28	05/24/18 22:37	1
Magnesium	200		2.0	mg/L		05/23/18 08:28	05/24/18 22:37	1
Potassium	13		0.50	mg/L		05/23/18 08:28	05/24/18 22:37	1
Sodium	4000	B7 D2	1.0	mg/L		05/23/18 08:28	05/25/18 11:55	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	520		6.0	mg/L			05/23/18 12:33	1
Bicarbonate Alkalinity as CaCO3	520		6.0	mg/L			05/23/18 12:33	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:33	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 12:33	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:33	1
Total Dissolved Solids	13000	D2	200	mg/L			05/23/18 08:22	1
pH	7.3	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.1	H5	0.1	Degrees C			05/23/18 09:50	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-147998/2
Matrix: Water
Analysis Batch: 147998

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			05/22/18 20:22	1
Fluoride	ND		0.40	mg/L			05/22/18 20:22	1
Sulfate	ND		2.0	mg/L			05/22/18 20:22	1

Lab Sample ID: LCS 550-147998/5
Matrix: Water
Analysis Batch: 147998

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	4.37		mg/L		109	90 - 110
Sulfate	20.0	21.2		mg/L		106	90 - 110

Lab Sample ID: LCSD 550-147998/6
Matrix: Water
Analysis Batch: 147998

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	4.33		mg/L		108	90 - 110	1	20
Sulfate	20.0	21.2		mg/L		106	90 - 110	0	20

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 147998

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	4500	M1 D2	4000	9460	D2 M1	mg/L		125	80 - 120
Fluoride	ND	D1	800	884	D1	mg/L		111	80 - 120
Sulfate	2800	D2	4000	7240	D2	mg/L		112	80 - 120

Lab Sample ID: 550-103238-1 MSD
Matrix: Water
Analysis Batch: 147998

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	4500	M1 D2	4000	9440	D2 M1	mg/L		124	80 - 120	0	20
Fluoride	ND	D1	800	884	D1	mg/L		111	80 - 120	0	20
Sulfate	2800	D2	4000	7210	D2	mg/L		111	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		05/23/18 08:28	05/24/18 21:02	1
Calcium	ND		2.0	mg/L		05/23/18 08:28	05/24/18 21:02	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

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

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		2.0	mg/L		05/23/18 08:28	05/24/18 21:02	1
Potassium	ND		0.50	mg/L		05/23/18 08:28	05/24/18 21:02	1
Sodium	0.721	B1	0.50	mg/L		05/23/18 08:28	05/24/18 21:02	1

Lab Sample ID: LCS 550-147956/2-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.952		mg/L		95	85 - 115
Calcium	21.0	20.7		mg/L		99	85 - 115
Magnesium	21.0	20.7		mg/L		99	85 - 115
Potassium	20.0	19.2		mg/L		96	85 - 115
Sodium	20.0	19.6		mg/L		98	85 - 115

Lab Sample ID: LCSD 550-147956/3-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.966		mg/L		97	85 - 115	2	20
Calcium	21.0	20.9		mg/L		100	85 - 115	1	20
Magnesium	21.0	20.8		mg/L		99	85 - 115	1	20
Potassium	20.0	19.3		mg/L		96	85 - 115	0	20
Sodium	20.0	19.4		mg/L		97	85 - 115	1	20

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	3.7		1.00	4.56		mg/L		83	70 - 130
Calcium	850	M3	21.0	840	M3	mg/L		-65	70 - 130
Magnesium	280	M3	21.0	285	M3	mg/L		44	70 - 130
Potassium	6.6		20.0	26.8		mg/L		101	70 - 130

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 148235

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Sodium	1800	M3 D2 B7	20.0	2500	M3	mg/L		3288	70 - 130

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 149395

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Sodium	2400	M3 B7	20.0	2400	M3	mg/L		-206	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

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

Lab Sample ID: 550-103238-1 MSD

Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-52A-52018

Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Boron	3.7		1.00	4.62		mg/L		88		70 - 130	1	20
Calcium	850	M3	21.0	856	M3	mg/L		13		70 - 130	2	20
Magnesium	280	M3	21.0	287	M3	mg/L		54		70 - 130	1	20
Potassium	6.6		20.0	26.7		mg/L		101		70 - 130	0	20

Lab Sample ID: 550-103238-1 MSD

Matrix: Water
Analysis Batch: 148235

Client Sample ID: CH-CCR-M-52A-52018

Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Sodium	1800	M3 D2 B7	20.0	2600	M3	mg/L		3787		70 - 130	4	20

Lab Sample ID: 550-103238-1 MSD

Matrix: Water
Analysis Batch: 149395

Client Sample ID: CH-CCR-M-52A-52018

Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Sodium	2400	M3 B7	20.0	2510	M3	mg/L		341		70 - 130	4	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-148038/5

Matrix: Water
Analysis Batch: 148038

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			05/23/18 10:42	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 10:42	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1

Lab Sample ID: LCS 550-148038/4

Matrix: Water
Analysis Batch: 148038

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.	Limits
		Result	Qualifier					
Alkalinity as CaCO3	250	254		mg/L		101		90 - 110

Lab Sample ID: LCSD 550-148038/17

Matrix: Water
Analysis Batch: 148038

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
		Result	Qualifier							
Alkalinity as CaCO3	250	260		mg/L		104		90 - 110	3	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 550-103238-1 DU

Matrix: Water

Analysis Batch: 148038

Client Sample ID: CH-CCR-M-52A-52018

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	Limit
			Result	Qualifier				
Alkalinity as CaCO3	230		227		mg/L		0.3	20
Bicarbonate Alkalinity as CaCO3	230		227		mg/L		0.3	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 550-147955/1

Matrix: Water

Analysis Batch: 147955

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Dissolved Solids	ND		20	mg/L			05/23/18 08:22	1

Lab Sample ID: LCS 550-147955/2

Matrix: Water

Analysis Batch: 147955

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 550-147955/3

Matrix: Water

Analysis Batch: 147955

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: 550-103238-1 DU

Matrix: Water

Analysis Batch: 147955

Client Sample ID: CH-CCR-M-52A-52018

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	Limit
			Result	Qualifier				
Total Dissolved Solids	11000	D2	10700	D2	mg/L		6	10

Lab Sample ID: 550-103239-A-1 DU

Matrix: Water

Analysis Batch: 147955

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	Limit
			Result	Qualifier				
Total Dissolved Solids	4100	D2	4000	D2	mg/L		1	10

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-147966/1
Matrix: Water
Analysis Batch: 147966

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		100.6	98.5 - 101.5

Lab Sample ID: LCSSRM 550-147966/13
Matrix: Water
Analysis Batch: 147966

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: 550-103238-1 DU
Matrix: Water
Analysis Batch: 147966

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	6.9	H5	6.9	H5	SU		0	5
Temperature	21.0	H5	21.3	H5	Degrees C		1	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

HPLC/IC

Analysis Batch: 147998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	300.0	
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	300.0	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	300.0	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	300.0	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	300.0	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	300.0	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	300.0	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	300.0	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	300.0	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	300.0	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	300.0	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	300.0	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	300.0	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	300.0	
MB 550-147998/2	Method Blank	Total/NA	Water	300.0	
LCS 550-147998/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-147998/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	300.0	
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	300.0	

Metals

Prep Batch: 147956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	200.7	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	200.7	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	200.7	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.7	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	200.7	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.7	
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.7	
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.7	

Analysis Batch: 148212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.7 Rev 4.4	147956
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	147956
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Metals (Continued)

Analysis Batch: 148212 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956

Analysis Batch: 148235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956

Analysis Batch: 149395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956

General Chemistry

Analysis Batch: 147955

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	SM 2540C	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	SM 2540C	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	SM 2540C	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	SM 2540C	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	SM 2540C	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	SM 2540C	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	SM 2540C	
MB 550-147955/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-147955/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-147955/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103238-1 DU	CH-CCR-M-52A-52018	Total/NA	Water	SM 2540C	
550-103239-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 147966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	SM 4500 H+ B	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	SM 4500 H+ B	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	SM 4500 H+ B	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	SM 4500 H+ B	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	SM 4500 H+ B	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	SM 4500 H+ B	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-103238-1 DU	CH-CCR-M-52A-52018	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 148038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	SM 2320B	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	SM 2320B	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	SM 2320B	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

General Chemistry (Continued)

Analysis Batch: 148038 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	SM 2320B	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	SM 2320B	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	SM 2320B	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	SM 2320B	
MB 550-148038/5	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-148038/4	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-148038/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103238-1 DU	CH-CCR-M-52A-52018	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

Date Collected: 05/20/18 14:30

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/22/18 23:06	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/22/18 23:34	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 21:22	ARE	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	149395	06/12/18 12:14	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 11:31	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955		YET	TAL PHX
					(Start)	05/23/18 08:22		
					(End)	05/24/18 10:30		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-M-53A-52018

Lab Sample ID: 550-103238-2

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 00:56	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/23/18 01:23	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:02	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 11:48	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955		YET	TAL PHX
					(Start)	05/23/18 08:22		
					(End)	05/24/18 10:30		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 01:51	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/23/18 03:13	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:08	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 11:57	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955		YET	TAL PHX
					(Start)	05/23/18 08:22		
					(End)	05/24/18 10:30		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Date Collected: 05/19/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 03:40	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/23/18 04:08	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:20	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 12:05	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955	05/23/18 08:22 05/24/18 10:30	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Date Collected: 05/19/18 13:08

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 04:35	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/23/18 05:03	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:25	ARE	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		5	148235	05/25/18 11:50	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 12:13	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955	05/23/18 08:22 05/24/18 10:30	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

Date Collected: 05/20/18 15:30

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 05:30	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/23/18 05:57	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:31	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 12:21	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955	05/23/18 08:22 05/24/18 10:30	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

Date Collected: 05/19/18 10:34

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 06:25	NBL	TAL PHX
Total/NA	Analysis	300.0		200	147998	05/23/18 06:52	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:37	ARE	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	148235	05/25/18 11:55	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 12:33	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955		YET	TAL PHX
					(Start)	05/23/18 08:22		
					(End)	05/24/18 10:30		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	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: 550-103238-1

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

- 1
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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-1

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
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: CCR

Chain of Custody Record

103238-1

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarway
928-587-0319
Analysis Turnaround Time
TAT if different from Below _____
Carrier: Doug Lavarway
5/21/2018
COC No: _____ of _____ COCs

APS Cholla
4801 Cholla Lake Road
Joseph City, AZ 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name: CCR
Site: Cholla
P O #

Sample Identification	Sample Date	Sample Time	Sample Type (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)	Sample Specific Notes:
CH-CCR-M-52A-52018	5/20/2018	1430 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-M-53A-52018	5/20/2018	1255 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-FD01-52018	5/20/2018	1255 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-W-305-51918	5/19/2018	1233 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-W-306-51918	5/19/2018	1308 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-W-314-52018	5/20/2018	1530 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-M-64A-51918	5/19/2018	1034 G	W	W	2	N	X	X	X	X	X	X	

Preservation Used: _____
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: _____

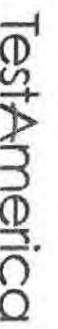
Custody Seals Intact: _____
Custody Seal No.: _____
Cooler Temp. (°C): Obs'd: _____
Therm ID No.: _____

Relinquished by: _____
Company: _____
Date/Time: _____
Received by: _____
Date/Time: _____
Relinquished by: _____
Company: _____
Date/Time: _____

TestAmerica Phoenix

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

Chain of Custody Record



Client Information (Sub Contract Lab)

Company: TestAmerica Laboratories, Inc.
 Address: 13715 Rider Trail North, City: TAT Requested (days): 6/1/2018
 State: Earth City, State: Zfp: MO, 630045
 Phone: 314-298-8566 (Tel) 314-298-8757 (Fax)
 Email: Project Name: AFS - Cholla CCR Project #: 55009651
 Site: SSO#:
 Arizona Public Service

Lab PM: Baker, Ken
 E-Mail: ken.baker@testamericainc.com
 Accreditations Required (See note): State Program - Arizona

Carrier Tracking (No.s)
 State of Origin: Arizona

COC No: 550-21231.1
 Page: Page 1 of 1
 Job #: 550-103238-1

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Soil, Overstall, BT-Tissue, AAHL)	Preservation Code:	Field Filtered Sample (Yes or No)		Analysis Requested	Total Number of containers	Special Instructions/Note:
						Perform MS/MSD (Yes or No)	903.0/PrecSep_21 Radium 226			
CH-CCR-M-52A-52018 (550-103238-1)	5/20/18	14:30	Water	Water		X	X		2	AZ Sample
CH-CCR-M-53A-52018 (550-103238-2)	5/20/18	12:55	Water	Water		X	X		2	AZ Sample
CH-CCR-FD01-52018 (550-103238-3)	5/20/18	12:55	Water	Water		X	X		2	AZ Sample
CH-CCR-W-305-51918 (550-103238-4)	5/19/18	12:33	Water	Water		X	X		2	AZ Sample
CH-CCR-W-306-51918 (550-103238-5)	5/19/18	13:08	Water	Water		X	X		2	AZ Sample
CH-CCR-W-314-52018 (550-103238-6)	5/20/18	15:30	Water	Water		X	X		2	AZ Sample
CH-CCR-M-64A-51918 (550-103238-7)	5/19/18	10:34	Water	Water		X	X		2	AZ Sample

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

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 Reinquisitioned by: _____ Date: _____

Reinquisitioned by: *05-22-18* Date/Time: *05-28 17:43* Company: *LAB* Received by: *Michael Pomer* Date/Time: *05-23-18 0910* Company: *TASPL*

Reinquisitioned by: _____ Date/Time: _____ Company: _____ Received by: _____ Date/Time: _____ Company: _____

Custody Seals Intact: Yes No Custody Seal No. _____ Cooler Temperature(s) °C and Other Remarks: _____

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103238-1

Login Number: 103238

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103238-2

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:

6/13/2018 9:21:31 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
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: 550-103238-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
N1	See case narrative.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.

Metals

Qualifier	Qualifier Description
M2	Matrix spike recovery was low, 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: 550-103238-2

Job ID: 550-103238-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-103238-2

Comments

This is an amended case narrative.

Receipt

The samples were received on 5/22/2018 9:25 AM; 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 3.1° 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: CH-CCR-W-305-51918 (550-103238-4) and CH-CCR-M-64A-51918 (550-103238-7). Samples contained high concentrations of Chloride and Sulfate which contributed to a total sum of anions that exceeded the instrument's column capacity. Therefore, dilutions were required to bring anion levels within a working range and Fluoride was not detected in the diluted samples. Elevated reporting limit (RL) have been provided and data have been qualified with D1 and D5 flags.

Method(s) 300.0: Reanalysis of the following sample was performed per client request for confirmation of Fluoride by method Anions EPA 300.0: CH-CCR-FD01-52018 (550-103238-3). The reanalyzed result did not confirm with the original data due to the presence of peak tailing on Fluoride in the initial chromatogram. The Fluoride peak tailing has since been corrected in the initial analysis. The reanalyzed result confirms the reintegrated original Fluoride result within a RPD of 12. The corrected data and the reanalyzed data were comparable to that of the field duplicate. As such, the data has been corrected on the revised report qualified with N1 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: 550-103238-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103238-1	CH-CCR-M-52A-52018	Water	05/20/18 14:30	05/22/18 09:25
550-103238-2	CH-CCR-M-53A-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-3	CH-CCR-FD01-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-4	CH-CCR-W-305-51918	Water	05/19/18 12:33	05/22/18 09:25
550-103238-5	CH-CCR-W-306-51918	Water	05/19/18 13:08	05/22/18 09:25
550-103238-6	CH-CCR-W-314-52018	Water	05/20/18 15:30	05/22/18 09:25
550-103238-7	CH-CCR-M-64A-51918	Water	05/19/18 10:34	05/22/18 09:25

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

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	0.25		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.010		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.026		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0015		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.051		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.10	M2	0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0027		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.11		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0017		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00017		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-53A-52018

Lab Sample ID: 550-103238-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.4	D1	0.80	mg/L	2		300.0	Total/NA
Arsenic	0.0011		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0091		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0013		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.0015		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.016		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.045		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00015		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.6	D1 N1	0.80	mg/L	2		300.0	Total/NA
Arsenic	0.0011		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0090		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0012		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.0015		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.015		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.044		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.21		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.00099		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.012		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0012		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.017		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0020		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.020		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.6	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: 550-103238-2

Client Sample ID: CH-CCR-W-306-51918 (Continued)

Lab Sample ID: 550-103238-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.68		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0052	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.010	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Cobalt	0.0014	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.031	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Selenium	0.0016	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

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	0.32		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.011	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Cobalt	0.013	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0093	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

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
Arsenic	0.0012	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.012	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0055	D1	0.0010	mg/L	2		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: 550-103238-2

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

Date Collected: 05/20/18 14:30

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.2	D1	0.80	mg/L			05/22/18 23:06	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		05/23/18 08:28	05/24/18 21:22	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 18:04	1
Arsenic	0.010		0.00050	mg/L		05/23/18 06:20	05/25/18 18:04	1
Barium	0.026		0.00050	mg/L		05/23/18 06:20	05/25/18 18:04	1
Cadmium	0.0015		0.00010	mg/L		05/23/18 06:20	05/25/18 18:04	1
Chromium	0.051		0.0010	mg/L		05/23/18 06:20	05/25/18 18:04	1
Cobalt	0.10	M2	0.00050	mg/L		05/23/18 06:20	05/25/18 18:04	1
Lead	0.0027		0.00050	mg/L		05/23/18 06:20	05/25/18 18:04	1
Molybdenum	0.11		0.00050	mg/L		05/23/18 06:20	05/25/18 18:04	1
Selenium	0.0017		0.00050	mg/L		05/23/18 06:20	05/25/18 18:04	1
Thallium	0.00017		0.00010	mg/L		05/23/18 06:20	05/25/18 18:04	1

Client Sample ID: CH-CCR-M-53A-52018

Lab Sample ID: 550-103238-2

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.4	D1	0.80	mg/L			05/23/18 00:56	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		05/23/18 08:28	05/24/18 22:02	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 18:25	1
Arsenic	0.0011		0.00050	mg/L		05/23/18 06:20	05/25/18 18:25	1
Barium	0.0091		0.00050	mg/L		05/23/18 06:20	05/25/18 18:25	1
Cadmium	0.0013		0.00010	mg/L		05/23/18 06:20	05/25/18 18:25	1
Chromium	0.0015		0.0010	mg/L		05/23/18 06:20	05/25/18 18:25	1
Cobalt	0.016		0.00050	mg/L		05/23/18 06:20	05/25/18 18:25	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:25	1
Molybdenum	0.045		0.00050	mg/L		05/23/18 06:20	05/25/18 18:25	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:25	1
Thallium	0.00015		0.00010	mg/L		05/23/18 06:20	05/25/18 18:25	1

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.6	D1 N1	0.80	mg/L			05/23/18 01:51	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 22:08	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 18:28	1
Arsenic	0.0011		0.00050	mg/L		05/23/18 06:20	05/25/18 18:28	1
Barium	0.0090		0.00050	mg/L		05/23/18 06:20	05/25/18 18:28	1
Cadmium	0.0012		0.00010	mg/L		05/23/18 06:20	05/25/18 18:28	1
Chromium	0.0015		0.0010	mg/L		05/23/18 06:20	05/25/18 18:28	1
Cobalt	0.015		0.00050	mg/L		05/23/18 06:20	05/25/18 18:28	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:28	1
Molybdenum	0.044		0.00050	mg/L		05/23/18 06:20	05/25/18 18:28	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:28	1
Thallium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 18:28	1

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Date Collected: 05/19/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			05/23/18 03:40	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.21		0.20	mg/L		05/23/18 08:28	05/24/18 22:20	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 18:30	1
Arsenic	0.00099		0.00050	mg/L		05/23/18 06:20	05/25/18 18:30	1
Barium	0.012		0.00050	mg/L		05/23/18 06:20	05/25/18 18:30	1
Cadmium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 18:30	1
Chromium	0.0012		0.0010	mg/L		05/23/18 06:20	05/25/18 18:30	1
Cobalt	0.017		0.00050	mg/L		05/23/18 06:20	05/25/18 18:30	1
Lead	0.0020		0.00050	mg/L		05/23/18 06:20	05/25/18 18:30	1
Molybdenum	0.020		0.00050	mg/L		05/23/18 06:20	05/25/18 18:30	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:30	1
Thallium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 18:30	1

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Date Collected: 05/19/18 13:08

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.6	D1	0.80	mg/L			05/23/18 04:35	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.68		0.20	mg/L		05/23/18 08:28	05/24/18 22:25	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:37	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Date Collected: 05/19/18 13:08

Matrix: Water

Date Received: 05/22/18 09:25

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0052	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:37	2
Barium	0.010	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:37	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:37	2
Chromium	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:37	2
Cobalt	0.0014	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:37	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:37	2
Molybdenum	0.031	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:37	2
Selenium	0.0016	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:37	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:37	2

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

Date Collected: 05/20/18 15:30

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.3	D1	0.80	mg/L			05/23/18 05:30	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		05/23/18 08:28	05/24/18 22:31	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:41	2
Arsenic	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:41	2
Barium	0.011	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:41	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:41	2
Chromium	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:41	2
Cobalt	0.013	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:41	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:41	2
Molybdenum	0.0093	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:41	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:41	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:41	2

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

Date Collected: 05/19/18 10:34

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			05/23/18 06:25	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		05/23/18 08:28	05/24/18 22:37	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:46	2
Arsenic	0.0012	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:46	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

Date Collected: 05/19/18 10:34

Matrix: Water

Date Received: 05/22/18 09:25

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.012	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:46	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:46	2
Chromium	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:46	2
Cobalt	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:46	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:46	2
Molybdenum	0.0055	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:46	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:46	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:46	2

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-147998/2
Matrix: Water
Analysis Batch: 147998

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			05/22/18 20:22	1

Lab Sample ID: LCS 550-147998/5
Matrix: Water
Analysis Batch: 147998

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	4.37		mg/L		109	90 - 110

Lab Sample ID: LCSD 550-147998/6
Matrix: Water
Analysis Batch: 147998

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	4.33		mg/L		108	90 - 110	1	20

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 147998

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1	800	884	D1	mg/L		111	80 - 120

Lab Sample ID: 550-103238-1 MSD
Matrix: Water
Analysis Batch: 147998

Client Sample ID: CH-CCR-M-52A-52018
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	884	D1	mg/L		111	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 21:02	1

Lab Sample ID: LCS 550-147956/2-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	0.979		mg/L		98	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

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

Lab Sample ID: LCSD 550-147956/3-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	1.00	0.987		mg/L		99	85 - 115	1	20

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lithium	0.25		1.00	1.23		mg/L		98	70 - 130

Lab Sample ID: 550-103238-1 MSD
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	0.25		1.00	1.23		mg/L		98	70 - 130	0	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-147948/1-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147948

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Arsenic	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Barium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Cadmium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Chromium	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Cobalt	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Molybdenum	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Thallium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 17:57	1

Lab Sample ID: LCS 550-147948/2-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0998		mg/L		100	85 - 115
Arsenic	0.100	0.0993		mg/L		99	85 - 115
Barium	0.100	0.0998		mg/L		100	85 - 115
Cadmium	0.100	0.0992		mg/L		99	85 - 115
Chromium	0.100	0.0987		mg/L		99	85 - 115
Cobalt	0.100	0.0990		mg/L		99	85 - 115
Lead	0.100	0.0990		mg/L		99	85 - 115
Molybdenum	0.100	0.0993		mg/L		99	85 - 115
Selenium	0.100	0.0984		mg/L		98	85 - 115
Thallium	0.100	0.0992		mg/L		99	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Lab Sample ID: LCSD 550-147948/3-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.100	0.101		mg/L		101	85 - 115	2	20
Arsenic	0.100	0.0982		mg/L		98	85 - 115	1	20
Barium	0.100	0.101		mg/L		101	85 - 115	1	20
Cadmium	0.100	0.101		mg/L		101	85 - 115	2	20
Chromium	0.100	0.0979		mg/L		98	85 - 115	1	20
Cobalt	0.100	0.0984		mg/L		98	85 - 115	1	20
Lead	0.100	0.0998		mg/L		100	85 - 115	1	20
Molybdenum	0.100	0.101		mg/L		101	85 - 115	1	20
Selenium	0.100	0.0976		mg/L		98	85 - 115	1	20
Thallium	0.100	0.100		mg/L		100	85 - 115	1	20

Lab Sample ID: 550-103238-1 MS
Matrix: Water
Analysis Batch: 148285

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	ND		0.100	0.101		mg/L		101	70 - 130		
Arsenic	0.010		0.100	0.115		mg/L		105	70 - 130		
Barium	0.026		0.100	0.124		mg/L		98	70 - 130		
Cadmium	0.0015		0.100	0.0924		mg/L		91	70 - 130		
Chromium	0.051		0.100	0.148		mg/L		97	70 - 130		
Cobalt	0.10	M2	0.100	0.172	M2	mg/L		69	70 - 130		
Lead	0.0027		0.100	0.0880		mg/L		85	70 - 130		
Molybdenum	0.11		0.100	0.183		mg/L		71	70 - 130		
Selenium	0.0017		0.100	0.117		mg/L		116	70 - 130		
Thallium	0.00017		0.100	0.0881		mg/L		88	70 - 130		

Lab Sample ID: 550-103238-1 MSD
Matrix: Water
Analysis Batch: 148285

Client Sample ID: CH-CCR-M-52A-52018
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	ND		0.100	0.100		mg/L		100	70 - 130	1	20
Arsenic	0.010		0.100	0.115		mg/L		104	70 - 130	0	20
Barium	0.026		0.100	0.124		mg/L		98	70 - 130	0	20
Cadmium	0.0015		0.100	0.0920		mg/L		90	70 - 130	0	20
Chromium	0.051		0.100	0.146		mg/L		95	70 - 130	1	20
Cobalt	0.10	M2	0.100	0.171	M2	mg/L		68	70 - 130	0	20
Lead	0.0027		0.100	0.0877		mg/L		85	70 - 130	0	20
Molybdenum	0.11		0.100	0.182		mg/L		70	70 - 130	0	20
Selenium	0.0017		0.100	0.117		mg/L		115	70 - 130	0	20
Thallium	0.00017		0.100	0.0881		mg/L		88	70 - 130	0	20

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

HPLC/IC

Analysis Batch: 147998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	300.0	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	300.0	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	300.0	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	300.0	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	300.0	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	300.0	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	300.0	
MB 550-147998/2	Method Blank	Total/NA	Water	300.0	
LCS 550-147998/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-147998/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	300.0	
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	300.0	

Metals

Prep Batch: 147948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.8	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	200.8	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	200.8	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	200.8	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.8	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	200.8	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.8	
MB 550-147948/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-147948/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-147948/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.8	
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.8	

Prep Batch: 147956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7	
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	200.7	
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	200.7	
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	200.7	
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.7	
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	200.7	
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.7	
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.7	
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.7	

Analysis Batch: 148212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	200.7 Rev 4.4	147956

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Metals (Continued)

Analysis Batch: 148212 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.7 Rev 4.4	147956
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	147956
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	147956

Analysis Batch: 148285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.8 LL	147948
550-103238-2	CH-CCR-M-53A-52018	Total/NA	Water	200.8 LL	147948
550-103238-3	CH-CCR-FD01-52018	Total/NA	Water	200.8 LL	147948
550-103238-4	CH-CCR-W-305-51918	Total/NA	Water	200.8 LL	147948
MB 550-147948/1-A	Method Blank	Total/NA	Water	200.8 LL	147948
LCS 550-147948/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	147948
LCSD 550-147948/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	147948
550-103238-1 MS	CH-CCR-M-52A-52018	Total/NA	Water	200.8 LL	147948
550-103238-1 MSD	CH-CCR-M-52A-52018	Total/NA	Water	200.8 LL	147948

Analysis Batch: 148580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-5	CH-CCR-W-306-51918	Total/NA	Water	200.8 LL	147948
550-103238-6	CH-CCR-W-314-52018	Total/NA	Water	200.8 LL	147948
550-103238-7	CH-CCR-M-64A-51918	Total/NA	Water	200.8 LL	147948

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Client Sample ID: CH-CCR-M-52A-52018

Date Collected: 05/20/18 14:30

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/22/18 23:06	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 21:22	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	148285	05/25/18 18:04	TEK	TAL PHX

Client Sample ID: CH-CCR-M-53A-52018

Date Collected: 05/20/18 12:55

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 00:56	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:02	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	148285	05/25/18 18:25	TEK	TAL PHX

Client Sample ID: CH-CCR-FD01-52018

Date Collected: 05/20/18 12:55

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 01:51	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:08	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	148285	05/25/18 18:28	TEK	TAL PHX

Client Sample ID: CH-CCR-W-305-51918

Date Collected: 05/19/18 12:33

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 03:40	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:20	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	148285	05/25/18 18:30	TEK	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-2

Client Sample ID: CH-CCR-W-306-51918

Lab Sample ID: 550-103238-5

Date Collected: 05/19/18 13:08

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 04:35	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:25	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 11:37	TEK	TAL PHX

Client Sample ID: CH-CCR-W-314-52018

Lab Sample ID: 550-103238-6

Date Collected: 05/20/18 15:30

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 05:30	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:31	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 11:41	TEK	TAL PHX

Client Sample ID: CH-CCR-M-64A-51918

Lab Sample ID: 550-103238-7

Date Collected: 05/19/18 10:34

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	147998	05/23/18 06:25	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:37	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 11:46	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: CCR

TestAmerica Job ID: 550-103238-2

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: 550-103238-2

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

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103238-2

Login Number: 103238

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103238-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/15/2018 10:57:45 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
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: 550-103238-3

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: 550-103238-3

Job ID: 550-103238-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-103238-3

Comments

No additional comments.

Receipt

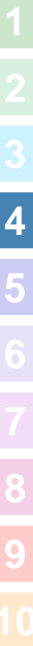
The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.9° C and 3.1° C.

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: 550-103238-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103238-1	CH-CCR-M-52A-52018	Water	05/20/18 14:30	05/22/18 09:25
550-103238-2	CH-CCR-M-53A-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-3	CH-CCR-FD01-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-4	CH-CCR-W-305-51918	Water	05/19/18 12:33	05/22/18 09:25
550-103238-5	CH-CCR-W-306-51918	Water	05/19/18 13:08	05/22/18 09:25
550-103238-6	CH-CCR-W-314-52018	Water	05/20/18 15:30	05/22/18 09:25
550-103238-7	CH-CCR-M-64A-51918	Water	05/19/18 10:34	05/22/18 09:25



Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-3

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 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Phoenix



Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-3

Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

Protocol References:

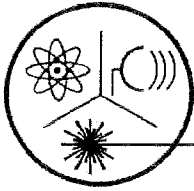
None = None

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) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: May 20, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-52A-52018 (550-103238-1)	< 0.6	< 0.7	< 0.7

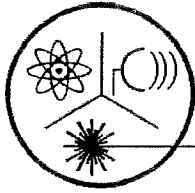
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/14/2018

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: May 20, 2018
Sample Received: June 04, 2018
Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-53A-52018 (550-103238-2)	< 0.6	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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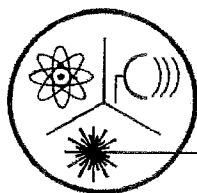

Robert L. Metzger, Ph.D., C.H.P.

6/14/2018

Date

Laboratory License Number AZ0462

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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 20, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD01-52018 (550-103238-3)	< 0.6	< 0.7	< 0.7

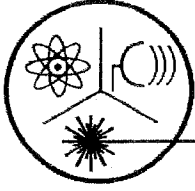
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/14/2018

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: May 19, 2018
Sample Received: June 04, 2018
Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-305-51918 (550-103238-4)	< 0.5	< 0.7	< 0.7

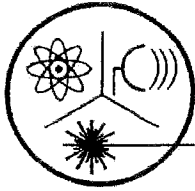
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/14/2018

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Radiochemical Activity in Water (pCi/L)

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

Sampling Date: May 19, 2018
Sample Received: June 04, 2018
Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-306-51918 (550-103238-5)	< 0.5	0.8 ± 0.3	0.8 ± 0.3

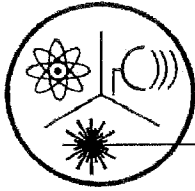
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/14/2018

Robert L. Metzger, Ph.D., C.H.P.

Date

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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: May 20, 2018
Sample Received: June 04, 2018
Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-314-52018 (550-103238-6)	< 0.5	< 0.7	< 0.7

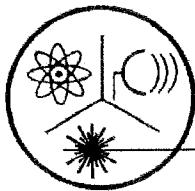
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/14/2018

Robert L. Metzger, Ph.D., C.H.P.

Date

Laboratory License Number AZ0462



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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 19, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 14, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-64A-51918 (550-103238-7)	< 0.5	< 0.7	< 0.7

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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6/14/2018

Robert L. Metzger, Ph.D., C.H.P.

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



Client Information (Sub Contract Lab)		Sampler: Baker, Ken	Lab P/N: Baker, Ken	Carrier Tracking No(s): 550-21275.1	COC No: 550-21275.1					
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 #: 550-103238-3	Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Anchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, Other: M - Hexane, N - None, O - AshtAO2, P - Na2SO4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4.5, Z - other (specify)					
Address: 3245 North Washington Street, City: Chandler, State, Zip: AZ, 85225, Phone: , Email: , Project Name: APS - Cholla CCR, Site: Arizona Public Service		Due Date Requested: 6/1/2018	TAT Requested (days):	PO #:	WO #:	Project #: 55009651	SSOW#:			
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wast/oli, B=BISSUE, A=AIR)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Radium 226/228) / Radium 226/228	Analysis Requested	Total Number of Containers	Special Instructions/Note:
CH-CCR-M-52A-52018 (550-103238-1)	5/20/18	14:30 Arizona	Water	Water	X	X	X		2	W 60499
CH-CCR-M-53A-52018 (550-103238-2)	5/20/18	12:55 Arizona	Water	Water	X	X	X		2	H 60499
CH-CCR-FD01-52018 (550-103238-3)	5/20/18	12:55 Arizona	Water	Water	X	X	X		2	H 60499
CH-CCR-W-305-51918 (550-103238-4)	5/19/18	12:33 Arizona	Water	Water	X	X	X		2	H 60499
CH-CCR-W-306-51918 (550-103238-5)	5/19/18	13:08 Arizona	Water	Water	X	X	X		2	H 60499
CH-CCR-W-314-52018 (550-103238-6)	5/20/18	15:30 Arizona	Water	Water	X	X	X		2	H 60499
CH-CCR-M-64A-51918 (550-103238-7)	5/19/18	10:34 Arizona	Water	Water	X	X	X		2	H 60499

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, 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: Method of Shipment: Months
 Relinquished by: Date/Time: Received by: Date/Time: Company: RSE
 Relinquished by: Date/Time: Received by: Date/Time: Company: Company: Company: Cooler Temperature(s) °C and Other Remarks:





TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

103238-3

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact		Doug Lavatnway		Doug Lavatnway		Carrier:		5/21/2018		COC No: _____ of _____ COCs	
4801 Cholla Lake Road		Analysis Turnaround Time		Lab Contact:						Sampler: _____	
Joseph City, Az 86032										For Lab Use Only:	
(928) 587-0319 Phone		TAT if different from Below _____								Walk-In Client: _____	
(xxx) xxx-xxxx FAX										Lab Sampling: _____	
Project Name: CCR										Job / SDG. No.: _____	
Site: Cholla										Sample Specific Notes:	
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)	932.0 Radium 226 and 228			
CH-CCR-M-52A-52018	5/20/2018	1430 G		W	2	N	X	X			
CH-CCR-M-53A-52018	5/20/2018	1255 G		W	2	N	X	X			
CH-CCR-FD01-52018	5/20/2018	1255 G		W	2	N	X	X			
CH-CCR-W-305-51918	5/19/2018	1233 G		W	2	N	X	X			
CH-CCR-W-306-51918	5/19/2018	1308 G		W	2	N	X	X			
CH-CCR-W-314--52018	5/20/2018	1530 G		W	2	N	X	X			
CH-CCR-M-64A-51918	5/19/2018	1034 G		W	2	N	X	X			
<p>Plaster/Sealant Used: _____</p> <p>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.</p> <p>Special Instructions/QC Requirements & Comments: Radium shall be sent off to Radiation Safety Engineering for analysis.</p>											
Custody Seal Intact:		Custody Seal No.:		Cooler Temp. (°C): Obs'd:		Corrd:		Therm ID No.:		31E/290	
Relinquished by: _____		Company: APS		Date/Time: 5/21/18		Received by: _____		Company: APS		Date/Time: 5/21/18 1500	
Relinquished by: _____		Company: APS		Date/Time: 5/21/18 0805		Received by: _____		Company: APS		Date/Time: 5/22/18 9:25	
Relinquished by: _____		Company: _____		Date/Time: _____		Received in Laboratory by: _____		Company: _____		Date/Time: _____	



TA-PHX

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103238-3

Login Number: 103238

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103238-4

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/13/2018 9:38:55 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: 550-103238-4

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
N1	See case narrative.
D1	Sample required dilution due to matrix.

Metals

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
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: 550-103238-4

Job ID: 550-103238-4

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-103238-4

Comments

No additional comments.

Receipt

The samples were received on 5/22/2018 9:25 AM; 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 3.1° C.

HPLC/IC

Method(s) 300.0: Reanalysis of the following sample was performed per client request for confirmation of Chloride by method Anions EPA 300.0: CH-CCR-M-52A-52018 (550-103238-1). The reanalyzed result confirmed with the original reported data within an acceptable relative percent difference (RPD) of 20. As such, the data for the reanalysis has been reported and qualified with a N1 flag.

Method(s) 300.0: Reanalysis of the following sample was performed per client request for confirmation of Chloride and Sulfate by method Anions EPA 300.0: CH-CCR-W-305-51918 (550-103238-4). The reanalyzed results confirmed with the original reported data within an acceptable relative percent difference (RPD) of 20. As such, the data for the reanalysis have been reported and qualified with N1 flags.

Method(s) 300.0: Reanalysis of the following sample was performed per client request for confirmation of Fluoride by method Anions EPA 300.0: CH-CCR-FD01-52018 (550-103238-3). The reanalyzed result did not confirm with the original data due to the presence of peak tailing on Fluoride in the initial chromatogram. The Fluoride peak tailing has since been corrected in the initial analysis. The reanalyzed result confirms the reintegrated original Fluoride result within a RPD of 12. The corrected data and the reanalyzed data were comparable to that of the field duplicate. As such, the data has been corrected on the revised report qualified with N1 flags.

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

Metals

Method(s) 200.7 Rev 4.4: The following sample required confirmation (CON) due to client request for sodium: CH-CCR-M-52A-52018 (550-103238-1). This sample was redigested in duplicate and results confirm with each other but not with the original results. The original sample was rediluted and the rerun result confirms with the redigested results; therefore the redigested result is reported. It is suspected that the cause of the discrepancy could be due to the preparation of the diluted sample or the sample introduction system on the instrument.

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: 550-103238-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103238-1	CH-CCR-M-52A-52018	Water	05/20/18 14:30	05/22/18 09:25
550-103238-3	CH-CCR-FD01-52018	Water	05/20/18 12:55	05/22/18 09:25
550-103238-4	CH-CCR-W-305-51918	Water	05/19/18 12:33	05/22/18 09:25

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- 13
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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-4

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride - DL	4600	D2 N1	400	mg/L	200		300.0	Total/NA
Sodium	2500	D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride - DL	2.3	D1 N1	0.80	mg/L	2		300.0	Total/NA

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride - DL	2400	D2 N1	400	mg/L	200		300.0	Total/NA
Sulfate - DL	2300	D2 N1	400	mg/L	200		300.0	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: 550-103238-4

Client Sample ID: CH-CCR-M-52A-52018

Lab Sample ID: 550-103238-1

Date Collected: 05/20/18 14:30

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4600	D2 N1	400	mg/L	-		05/31/18 21:41	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	2500	D2	1.0	mg/L	-	05/31/18 08:21	06/05/18 13:56	2

Client Sample ID: CH-CCR-FD01-52018

Lab Sample ID: 550-103238-3

Date Collected: 05/20/18 12:55

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.3	D1 N1	0.80	mg/L	-		05/31/18 22:55	2

Client Sample ID: CH-CCR-W-305-51918

Lab Sample ID: 550-103238-4

Date Collected: 05/19/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2400	D2 N1	400	mg/L	-		05/31/18 22:00	200
Sulfate	2300	D2 N1	400	mg/L	-		05/31/18 22:00	200

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-4

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148627/2
Matrix: Water
Analysis Batch: 148627

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			05/31/18 14:01	1
Fluoride	ND		0.40	mg/L			05/31/18 14:01	1
Sulfate	ND		2.0	mg/L			05/31/18 14:01	1

Lab Sample ID: LCS 550-148627/5
Matrix: Water
Analysis Batch: 148627

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	21.1		mg/L		106	90 - 110
Fluoride	4.00	4.14		mg/L		103	90 - 110
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-148627/6
Matrix: Water
Analysis Batch: 148627

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	21.2		mg/L		106	90 - 110	0	20
Fluoride	4.00	4.13		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-103631-A-1 MS
Matrix: Water
Analysis Batch: 148627

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		20.0	21.5		mg/L		108	80 - 120
Fluoride	ND		4.00	4.19		mg/L		105	80 - 120
Sulfate	ND		20.0	20.8		mg/L		104	80 - 120

Lab Sample ID: 550-103631-A-1 MSD
Matrix: Water
Analysis Batch: 148627

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		20.0	21.7		mg/L		108	80 - 120	1	20
Fluoride	ND		4.00	4.23		mg/L		106	80 - 120	1	20
Sulfate	ND		20.0	20.9		mg/L		105	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-148536/1-A
Matrix: Water
Analysis Batch: 148735

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148536

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	ND		0.50	mg/L		05/31/18 08:21	06/01/18 15:07	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-4

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

Lab Sample ID: LCS 550-148536/2-A
Matrix: Water
Analysis Batch: 148735

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Sodium	20.0	19.4		mg/L		97	85 - 115

Lab Sample ID: LCSD 550-148536/3-A
Matrix: Water
Analysis Batch: 148735

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148536

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Sodium	20.0	19.2		mg/L		96	85 - 115	1	20

Lab Sample ID: 550-103557-I-1-D MS
Matrix: Water
Analysis Batch: 148735

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 148536

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Sodium	100	M3	20.0	116	M3	mg/L		67	70 - 130

Lab Sample ID: 550-103557-I-1-E MSD
Matrix: Water
Analysis Batch: 148735

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 148536

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Sodium	100	M3	20.0	115	M3	mg/L		61	70 - 130	1	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-4

HPLC/IC

Analysis Batch: 148627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1 - DL	CH-CCR-M-52A-52018	Total/NA	Water	300.0	
550-103238-3 - DL	CH-CCR-FD01-52018	Total/NA	Water	300.0	
550-103238-4 - DL	CH-CCR-W-305-51918	Total/NA	Water	300.0	
MB 550-148627/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148627/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148627/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103631-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-103631-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 148536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7	
MB 550-148536/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-148536/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-148536/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103557-I-1-D MS	Matrix Spike	Total/NA	Water	200.7	
550-103557-I-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 148735

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-148536/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	148536
LCS 550-148536/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	148536
LCSD 550-148536/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	148536
550-103557-I-1-D MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	148536
550-103557-I-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	148536

Analysis Batch: 148896

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103238-1	CH-CCR-M-52A-52018	Total/NA	Water	200.7 Rev 4.4	148536

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103238-4

Client Sample ID: CH-CCR-M-52A-52018

Date Collected: 05/20/18 14:30

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0	DL	200	148627	05/31/18 21:41	SMS	TAL PHX
Total/NA	Prep	200.7			148536	05/31/18 08:21	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	148896	06/05/18 13:56	ARE	TAL PHX

Client Sample ID: CH-CCR-FD01-52018

Date Collected: 05/20/18 12:55

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0	DL	2	148627	05/31/18 22:55	SMS	TAL PHX

Client Sample ID: CH-CCR-W-305-51918

Date Collected: 05/19/18 12:33

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103238-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0	DL	200	148627	05/31/18 22:00	SMS	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: 550-103238-4

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: 550-103238-4

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL PHX
200.7 Rev 4.4	Metals (ICP)	40CFR136A	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.

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

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

103238-1

Chain of Custody Record

Client Contact: Doug Lavarway
928-587-0319
Analysis Turnaround Time: Doug Lavarway
Lab Contact: Doug Lavarway
Carrier: 5/21/2018
COC No.: 1 of 1 COCs

APS Cholla
4801 Cholla Lake Road
Joseph City, AZ 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name: CCR
Site: Cholla
P.O.#

Sample Identification	Sample Date	Sample Time	Sample Type (G=Grab, G=Comp)	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)	Sample Specific Notes:
CH-CCR-M-52A-52018	5/20/2018	1430 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-M-53A-52018	5/20/2018	1255 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-FD01-52018	5/20/2018	1255 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-W-305-51918	5/19/2018	1233 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-W-306-51918	5/19/2018	1308 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-W-314-52018	5/20/2018	1530 G	W	W	2	N	X	X	X	X	X	X	
CH-CCR-M-64A-51918	5/19/2018	1034 G	W	W	2	N	X	X	X	X	X	X	

Preservation: 1 hr. Ice, 2 hrs. Dry Ice
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: Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Custody Seal Intact: _____ Cooler Temp. (°C): Obs'd: _____
Relinquished by: _____ Date/Time: _____
Relinquished by: _____ Date/Time: _____

Company: APS
Date/Time: 5/21/2018 15:00
Received by: _____
Date/Time: 5/21/2018 15:00
Company: APS
Date/Time: 5/21/2018 15:00
Received in Laboratory by: _____
Date/Time: 5/21/2018 15:00

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103238-4

Login Number: 103238

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-104209-1

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:

6/30/2018 2:48:44 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

Total Access

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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: 550-104209-1
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.
M1	Matrix spike recovery was high, 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.
E2	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.

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: 550-104209-1
SDG: Cholla

Job ID: 550-104209-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-104209-1

Comments

No additional comments.

Receipt

The samples were received on 6/11/2018 5:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° 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: 550-104209-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-104209-1	CH-CCR-M52A-6718	Water	06/07/18 13:13	06/11/18 17:10

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Detection Summary

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-104209-1
 SDG: Cholla

Client Sample ID: CH-CCR-M52A-6718

Lab Sample ID: 550-104209-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4600	D2 M1	400	mg/L	200		300.0	Total/NA
Fluoride	0.99	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2900	D2	400	mg/L	200		300.0	Total/NA
Boron	3.5		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	810	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	260	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	5.6		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2200	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	220		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	220		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	11000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	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: 550-104209-1
SDG: Cholla

Client Sample ID: CH-CCR-M52A-6718

Lab Sample ID: 550-104209-1

Date Collected: 06/07/18 13:13

Matrix: Water

Date Received: 06/11/18 17:10

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4600	D2 M1	400	mg/L			06/12/18 01:28	200
Fluoride	0.99	D1	0.80	mg/L			06/12/18 01:01	2
Sulfate	2900	D2	400	mg/L			06/12/18 01:28	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.5		0.050	mg/L		06/12/18 05:10	06/13/18 20:13	1
Calcium	810	M3	2.0	mg/L		06/12/18 05:10	06/13/18 20:13	1
Magnesium	260	M3	2.0	mg/L		06/12/18 05:10	06/13/18 20:13	1
Potassium	5.6		0.50	mg/L		06/12/18 05:10	06/13/18 20:13	1
Sodium	2200	M3	0.50	mg/L		06/12/18 05:10	06/13/18 20:13	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	220		6.0	mg/L			06/14/18 07:05	1
Bicarbonate Alkalinity as CaCO3	220		6.0	mg/L			06/14/18 07:05	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/14/18 07:05	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/14/18 07:05	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/14/18 07:05	1
Total Dissolved Solids	11000	D2	100	mg/L			06/12/18 11:53	1
pH	6.8	H5	1.7	SU			06/12/18 09:25	1
Temperature	20.4	H5	0.1	Degrees C			06/12/18 09:25	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-149333/2
Matrix: Water
Analysis Batch: 149333

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			06/11/18 16:20	1
Fluoride	ND		0.40	mg/L			06/11/18 16:20	1
Sulfate	ND		2.0	mg/L			06/11/18 16:20	1

Lab Sample ID: LCS 550-149333/5
Matrix: Water
Analysis Batch: 149333

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	3.99		mg/L		100	90 - 110
Sulfate	20.0	20.0		mg/L		100	90 - 110

Lab Sample ID: LCSD 550-149333/6
Matrix: Water
Analysis Batch: 149333

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	3.98		mg/L		100	90 - 110	0	20
Sulfate	20.0	20.0		mg/L		100	90 - 110	0	20

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 149333

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	4600	M1 D2	4000	9280	D2	mg/L		117	80 - 120	2	20
Fluoride	ND	D1	800	850	D1	mg/L		106	80 - 120	2	20
Sulfate	2900	D2	4000	7250	D2	mg/L		108	80 - 120	2	20

Lab Sample ID: 550-104209-1MS
Matrix: Water
Analysis Batch: 149333

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	4600	M1 D2	4000	9450	D2 M1	mg/L		121	80 - 120
Fluoride	ND	D1	800	869	D1	mg/L		109	80 - 120
Sulfate	2900	D2	4000	7380	D2	mg/L		111	80 - 120

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-149336/1-A
Matrix: Water
Analysis Batch: 149592

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149336

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/12/18 05:10	06/13/18 19:53	1
Calcium	ND		2.0	mg/L		06/12/18 05:10	06/13/18 19:53	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

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

Lab Sample ID: MB 550-149336/1-A
Matrix: Water
Analysis Batch: 149592

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149336

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		2.0	mg/L		06/12/18 05:10	06/13/18 19:53	1
Potassium	ND		0.50	mg/L		06/12/18 05:10	06/13/18 19:53	1
Sodium	ND		0.50	mg/L		06/12/18 05:10	06/13/18 19:53	1

Lab Sample ID: MB 550-149336/1-A
Matrix: Water
Analysis Batch: 150078

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149336

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		06/12/18 05:10	06/20/18 23:36	1
Calcium	ND		2.0	mg/L		06/12/18 05:10	06/20/18 23:36	1
Magnesium	ND		2.0	mg/L		06/12/18 05:10	06/20/18 23:36	1
Potassium	ND		0.50	mg/L		06/12/18 05:10	06/20/18 23:36	1
Sodium	ND		0.50	mg/L		06/12/18 05:10	06/20/18 23:36	1

Lab Sample ID: LCS 550-149336/2-A
Matrix: Water
Analysis Batch: 149592

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.945		mg/L		94	85 - 115
Calcium	21.0	20.1		mg/L		96	85 - 115
Magnesium	21.0	19.6		mg/L		93	85 - 115
Potassium	20.0	18.4		mg/L		92	85 - 115
Sodium	20.0	17.7		mg/L		89	85 - 115

Lab Sample ID: LCS 550-149336/2-A
Matrix: Water
Analysis Batch: 150078

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	1.07		mg/L		107	85 - 115
Calcium	21.0	22.8		mg/L		109	85 - 115
Magnesium	21.0	22.4		mg/L		107	85 - 115
Potassium	20.0	21.6		mg/L		108	85 - 115
Sodium	20.0	21.0		mg/L		105	85 - 115

Lab Sample ID: LCSD 550-149336/3-A
Matrix: Water
Analysis Batch: 149592

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.939		mg/L		94	85 - 115	1	20
Calcium	21.0	20.1		mg/L		96	85 - 115	0	20
Magnesium	21.0	19.7		mg/L		94	85 - 115	0	20
Potassium	20.0	18.5		mg/L		93	85 - 115	1	20
Sodium	20.0	18.0		mg/L		90	85 - 115	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

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

Lab Sample ID: LCSD 550-149336/3-A
Matrix: Water
Analysis Batch: 150078

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	1.07		mg/L		107	85 - 115	0	20
Calcium	21.0	22.6		mg/L		108	85 - 115	1	20
Magnesium	21.0	22.2		mg/L		106	85 - 115	1	20
Potassium	20.0	21.3		mg/L		107	85 - 115	1	20
Sodium	20.0	20.8		mg/L		104	85 - 115	1	20

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 149592

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	3.5		1.00	4.37		mg/L		90	70 - 130	2	20
Calcium	810	M3	21.0	807	M3	mg/L		-10	70 - 130	2	20
Magnesium	260	M3	21.0	269	M3	mg/L		57	70 - 130	2	20
Potassium	5.6		20.0	25.0		mg/L		97	70 - 130	2	20
Sodium	2200	M3	20.0	2200	M3	mg/L		-176	70 - 130	4	20

Lab Sample ID: 550-104209-1MS
Matrix: Water
Analysis Batch: 149592

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	3.5		1.00	4.47		mg/L		100	70 - 130
Calcium	810	M3	21.0	824	M3	mg/L		71	70 - 130
Magnesium	260	M3	21.0	275	M3	mg/L		87	70 - 130
Potassium	5.6		20.0	25.6		mg/L		100	70 - 130
Sodium	2200	M3	20.0	2280	E2 M3	mg/L		240	70 - 130

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-150857/1-A
Matrix: Water
Analysis Batch: 150925

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 150857

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		06/29/18 16:06	06/29/18 19:31	1

Lab Sample ID: LCS 550-150857/2-A
Matrix: Water
Analysis Batch: 150925

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 150857

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Hg	0.0100	0.0100		mg/L		100	85 - 115

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

Method: 245.1 - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 550-150857/3-A
Matrix: Water
Analysis Batch: 150925

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 150857

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	0.0100	0.0101		mg/L		101	85 - 115	1	20

Lab Sample ID: 550-104209-1MS
Matrix: Water
Analysis Batch: 150925

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 150857

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	ND		0.0100	0.00887		mg/L		89	70 - 130

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-149575/6
Matrix: Water
Analysis Batch: 149575

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			06/14/18 06:11	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/14/18 06:11	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			06/14/18 06:11	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			06/14/18 06:11	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			06/14/18 06:11	1

Lab Sample ID: LCS 550-149575/5
Matrix: Water
Analysis Batch: 149575

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 550-149575/18
Matrix: Water
Analysis Batch: 149575

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	1	20

Lab Sample ID: 550-104209-1 DU
Matrix: Water
Analysis Batch: 149575

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	220		218		mg/L		0.9	20
Bicarbonate Alkalinity as CaCO3	220		218		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

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

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

Lab Sample ID: MB 550-149384/1
Matrix: Water
Analysis Batch: 149384

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			06/12/18 11:53	1

Lab Sample ID: LCS 550-149384/2
Matrix: Water
Analysis Batch: 149384

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	976		mg/L		98	90 - 110

Lab Sample ID: LCSD 550-149384/3
Matrix: Water
Analysis Batch: 149384

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: 550-104209-1 DU
Matrix: Water
Analysis Batch: 149384

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	11000	D2	10200	D2	mg/L		5	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-149365/1
Matrix: Water
Analysis Batch: 149365

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: LCSSRM 550-149365/5
Matrix: Water
Analysis Batch: 149365

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: 550-104209-1 DU
Matrix: Water
Analysis Batch: 149365

Client Sample ID: CH-CCR-M52A-6718
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	5
Temperature	20.4	H5	20.5	H5	Degrees C		0.5	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

HPLC/IC

Analysis Batch: 149333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	300.0	
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	300.0	
MB 550-149333/2	Method Blank	Total/NA	Water	300.0	
LCS 550-149333/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-149333/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	300.0	
550-104209-1MS	CH-CCR-M52A-6718	Total/NA	Water	300.0	

Metals

Prep Batch: 149336

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.7	
MB 550-149336/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-149336/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCS 550-149336/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.7	
550-104209-1MS	CH-CCR-M52A-6718	Total/NA	Water	200.7	

Analysis Batch: 149592

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.7 Rev 4.4	149336
MB 550-149336/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	149336
LCS 550-149336/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	149336
LCS 550-149336/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	149336
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.7 Rev 4.4	149336
550-104209-1MS	CH-CCR-M52A-6718	Total/NA	Water	200.7 Rev 4.4	149336

Analysis Batch: 150078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-149336/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	149336
LCS 550-149336/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	149336
LCS 550-149336/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	149336

Prep Batch: 150857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-150857/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-150857/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCS 550-150857/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-104209-1MS	CH-CCR-M52A-6718	Total/NA	Water	245.1	

Analysis Batch: 150925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-150857/1-A	Method Blank	Total/NA	Water	245.1	150857
LCS 550-150857/2-A	Lab Control Sample	Total/NA	Water	245.1	150857
LCS 550-150857/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	150857
550-104209-1MS	CH-CCR-M52A-6718	Total/NA	Water	245.1	150857

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

General Chemistry

Analysis Batch: 149365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-149365/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-149365/5	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-104209-1 DU	CH-CCR-M52A-6718	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 149384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	SM 2540C	
MB 550-149384/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-149384/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-149384/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-104209-1 DU	CH-CCR-M52A-6718	Total/NA	Water	SM 2540C	

Analysis Batch: 149575

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	SM 2320B	
MB 550-149575/6	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-149575/5	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-149575/18	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-104209-1 DU	CH-CCR-M52A-6718	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-1
SDG: Cholla

Client Sample ID: CH-CCR-M52A-6718

Lab Sample ID: 550-104209-1

Date Collected: 06/07/18 13:13

Matrix: Water

Date Received: 06/11/18 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149333	06/12/18 01:01	NBL	TAL PHX
Total/NA	Analysis	300.0		200	149333	06/12/18 01:28	NBL	TAL PHX
Total/NA	Prep	200.7			149336	06/12/18 05:10	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149592	06/13/18 20:13	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	149575	06/14/18 07:05	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	149384	(Start) 06/12/18 11:53 (End) 06/13/18 10:55	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	149365	06/12/18 09:25	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: 550-104209-1
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
- 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: 550-104209-1
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

Chain of Custody Record

4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

104209

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarrway 928-587-0319
 Analysis Turnaround Time: TAT if different from Below _____
 Doug Lavarrway Lab Contact: Doug Lavarrway 928-587-0319
 Carrier: 6/11/2018
 COC No: 1 of 1 COCs

APS Cholla 4801 Cholla Lake Road Joseph City, Az 86032
 (928) 587-0319 Phone
 (xxx) xxx-xxxx FAX
 Project Name: CCR
 Site: Cholla
 P O #
 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 Rev 4.4 (B, Ca, Na, K, Mg)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)	SM 2320B (HCO3)	Sample Specific Notes:
						Y	N	Y	N						
CH-CGR-M-52A-6718 - 01	6/7/2018	1313	G	W	2	N	X	X	X	X	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.
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Special Instructions/QC Requirements & Comments:
 Custody Seals Intact: _____
 Relinquished by: *Dos Lavarrway* Company: APS Date/Time: 6/11/2018 Received by: _____ Received in Laboratory by: _____
 Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Received in Laboratory by: _____
 Cooler Temp. (°C): Obs'd: _____ Corrd: *29* Therm ID No.: _____
 Date/Time: 6/11/2018 8:17:00

TestAmerica Phoenix

Chain of Custody Record

101209

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarney 928-587-0319
Analysis Turnaround Time: TAT if different from Below _____
Carrier: 6/11/2018
COC No: 1 of 1 COCs

APS Cholla	4801 Cholla Lake Road	Joseph City, Az 86032	(928) 587-0319	Phone	FAX	(xxx) xxx-xxxx	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)		
						EPA 200.7 (Li)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)	EPA 200.7 (Li)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)
CH-CCR-M-52A-6718	6/7/2018	1313	G	W	2	N	X	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.

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

Special Instructions/QC Requirements & Comments:

Custody Seal No.: _____
 Cooler Temp. (°C): Obs'd: _____
 Therm ID No.: _____

Relinquished by: Dog Lavarney Company: APS Date/Time: 6/11/2018 Received by: [Signature] Date/Time: _____
 Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Date/Time: _____

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Chain of Custody Record

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

1042209

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarney** 928-587-0319 Analysis Turnaround Time: _____

APS Cholla
4801 Cholla Lake Road
Joseph City, Az 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name: CCR
Site: Cholla
P O #

Sample Identification: **CH-CCR-M-52A-6718 -01**
Sample Date: 6/7/2018
Sample Time: 1313 G
Sample Type (G=Comp, G=grab):
Matrix: W
of Cont.: 2 N x x

Filtered Sample (Y / N)
Perform MS / MSD (Y / N)
932.0 Radium 226 and 228

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

Special Instructions/QC Requirements & Comments: Radium shall be sent off to Radiation Safety Engineering for analysis.

Relinquished by: **Doug Lavarney**
Relinquished by: _____
Relinquished by: _____

Company: **ADS**
Company: _____
Company: _____

Date/Time: **6/11/2018**
Date/Time: _____
Date/Time: _____

Received by: _____
Received by: _____
Received in Laboratory by: _____

Company: **FA**
Company: _____
Company: _____

Date/Time: **6/11/2018 1714**
Date/Time: _____
Date/Time: _____

Therm ID No.: _____
Cooler Temp. (°C): Obsd: _____ Corrd: **29c**

Sample Specific Notes:

For Lab Use Only:
Walk-In Client: _____
Lab Sampling: _____
Job / SDG No.: _____

COC No: _____
1 of 1 COCs

Sampler: _____

TA-PHX Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-104209-1

SDG Number: Cholla

Login Number: 104209

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: 550-104209-2

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:

6/30/2018 2:54:21 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

Total Access

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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: 550-104209-2
SDG: Cholla

Qualifiers

HPLC/IC

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.
▫	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)

Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-104209-1	CH-CCR-M52A-6718	Water	06/07/18 13:13	06/11/18 17:10

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

Client Sample ID: CH-CCR-M52A-6718

Lab Sample ID: 550-104209-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.99	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.24		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	0.018		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00094		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.018		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.062		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0010		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.052		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0013		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00013		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: 550-104209-2
SDG: Cholla

Client Sample ID: CH-CCR-M52A-6718

Lab Sample ID: 550-104209-1

Date Collected: 06/07/18 13:13

Matrix: Water

Date Received: 06/11/18 17:10

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.99	D1	0.80	mg/L			06/12/18 01:01	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.24		0.20	mg/L		06/12/18 05:10	06/13/18 20:13	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		06/12/18 05:36	06/26/18 13:57	1
Arsenic	0.0026		0.00050	mg/L		06/12/18 05:36	06/26/18 13:57	1
Barium	0.018		0.00050	mg/L		06/12/18 05:36	06/26/18 13:57	1
Cadmium	0.00094		0.00010	mg/L		06/12/18 05:36	06/26/18 13:57	1
Chromium	0.018		0.0010	mg/L		06/12/18 05:36	06/26/18 13:57	1
Cobalt	0.062		0.00050	mg/L		06/12/18 05:36	06/26/18 13:57	1
Lead	0.0010		0.00050	mg/L		06/26/18 20:05	06/28/18 01:02	1
Molybdenum	0.052		0.00050	mg/L		06/12/18 05:36	06/26/18 13:57	1
Selenium	0.0013		0.00050	mg/L		06/12/18 05:36	06/26/18 13:57	1
Thallium	0.00013		0.00010	mg/L		06/12/18 05:36	06/26/18 13:57	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-104209-1 MS
Matrix: Water
Analysis Batch: 149333

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1	800	869	D1	mg/L		109	80 - 120

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 149333

Client Sample ID: CH-CCR-M52A-6718
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	850	D1	mg/L		106	80 - 120	2	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: 550-104209-1 MS
Matrix: Water
Analysis Batch: 149592

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.238		1.00	1.22		mg/L		98	70 - 130

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 149592

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149336

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.238		1.00	1.19		mg/L		95	70 - 130	2	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-149340/1-A
Matrix: Water
Analysis Batch: 150456

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 149340

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		06/12/18 05:36	06/26/18 13:50	1
Arsenic	ND		0.00050	mg/L		06/12/18 05:36	06/26/18 13:50	1
Barium	ND		0.00050	mg/L		06/12/18 05:36	06/26/18 13:50	1
Cadmium	ND		0.00010	mg/L		06/12/18 05:36	06/26/18 13:50	1
Chromium	ND		0.0010	mg/L		06/12/18 05:36	06/26/18 13:50	1
Cobalt	ND		0.00050	mg/L		06/12/18 05:36	06/26/18 13:50	1
Molybdenum	ND		0.00050	mg/L		06/12/18 05:36	06/26/18 13:50	1
Selenium	ND		0.00050	mg/L		06/12/18 05:36	06/26/18 13:50	1
Thallium	ND		0.00010	mg/L		06/12/18 05:36	06/26/18 13:50	1

Lab Sample ID: LCS 550-149340/2-A
Matrix: Water
Analysis Batch: 150456

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149340

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.100	0.101		mg/L		101	85 - 115
Arsenic	0.100	0.102		mg/L		102	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

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

Lab Sample ID: LCS 550-149340/2-A
Matrix: Water
Analysis Batch: 150456

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 149340

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	0.100	0.101		mg/L		101	85 - 115
Cadmium	0.100	0.100		mg/L		100	85 - 115
Chromium	0.100	0.102		mg/L		102	85 - 115
Cobalt	0.100	0.102		mg/L		102	85 - 115
Molybdenum	0.100	0.101		mg/L		101	85 - 115
Selenium	0.100	0.101		mg/L		101	85 - 115
Thallium	0.100	0.101		mg/L		101	85 - 115

Lab Sample ID: LCSD 550-149340/3-A
Matrix: Water
Analysis Batch: 150456

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 149340

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.100	0.101		mg/L		101	85 - 115	0	20
Arsenic	0.100	0.103		mg/L		103	85 - 115	1	20
Barium	0.100	0.101		mg/L		101	85 - 115	0	20
Cadmium	0.100	0.101		mg/L		101	85 - 115	1	20
Chromium	0.100	0.102		mg/L		102	85 - 115	1	20
Cobalt	0.100	0.102		mg/L		102	85 - 115	0	20
Molybdenum	0.100	0.101		mg/L		101	85 - 115	0	20
Selenium	0.100	0.101		mg/L		101	85 - 115	0	20
Thallium	0.100	0.101		mg/L		101	85 - 115	0	20

Lab Sample ID: 550-104209-1 MS
Matrix: Water
Analysis Batch: 150456

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149340

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND		0.100	0.0993		mg/L		99	70 - 130
Arsenic	0.0026		0.100	0.114		mg/L		111	70 - 130
Barium	0.018		0.100	0.115		mg/L		98	70 - 130
Cadmium	0.00094		0.100	0.0906		mg/L		90	70 - 130
Chromium	0.018		0.100	0.122		mg/L		104	70 - 130
Cobalt	0.062		0.100	0.153		mg/L		91	70 - 130
Molybdenum	0.052		0.100	0.140		mg/L		88	70 - 130
Selenium	0.0013		0.100	0.126		mg/L		125	70 - 130
Thallium	0.00013		0.100	0.0903		mg/L		90	70 - 130

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 150456

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149340

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	ND		0.100	0.0994		mg/L		99	70 - 130	0	20
Arsenic	0.0026		0.100	0.116		mg/L		113	70 - 130	1	20
Barium	0.018		0.100	0.116		mg/L		98	70 - 130	0	20
Cadmium	0.00094		0.100	0.0904		mg/L		89	70 - 130	0	20
Chromium	0.018		0.100	0.125		mg/L		107	70 - 130	2	20
Cobalt	0.062		0.100	0.160		mg/L		99	70 - 130	5	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

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

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 150456

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 149340

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Molybdenum	0.052		0.100	0.152		mg/L		100	70 - 130	8	20
Selenium	0.0013		0.100	0.129		mg/L		127	70 - 130	2	20
Thallium	0.00013		0.100	0.0901		mg/L		90	70 - 130	0	20

Lab Sample ID: MB 550-150474/1-A
Matrix: Water
Analysis Batch: 150603

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 150474

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.00050	mg/L		06/26/18 20:05	06/28/18 00:55	1

Lab Sample ID: LCS 550-150474/2-A
Matrix: Water
Analysis Batch: 150603

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 150474

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.100	0.0954		mg/L		95	85 - 115

Lab Sample ID: LCSD 550-150474/3-A
Matrix: Water
Analysis Batch: 150603

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 150474

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	0.100	0.0945		mg/L		95	85 - 115	1	20

Lab Sample ID: 550-104209-1 MS
Matrix: Water
Analysis Batch: 150603

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 150474

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.0010		0.100	0.0824		mg/L		81	70 - 130

Lab Sample ID: 550-104209-1 MSD
Matrix: Water
Analysis Batch: 150603

Client Sample ID: CH-CCR-M52A-6718
Prep Type: Total/NA
Prep Batch: 150474

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	0.0010		0.100	0.0829		mg/L		82	70 - 130	1	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

HPLC/IC

Analysis Batch: 149333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	300.0	
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	300.0	
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	300.0	

Metals

Prep Batch: 149336

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.7	
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	200.7	
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.7	

Prep Batch: 149340

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.8	
MB 550-149340/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-149340/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-149340/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	200.8	
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.8	

Analysis Batch: 149592

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.7 Rev 4.4	149336
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	200.7 Rev 4.4	149336
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.7 Rev 4.4	149336

Analysis Batch: 150456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.8 LL	149340
MB 550-149340/1-A	Method Blank	Total/NA	Water	200.8 LL	149340
LCS 550-149340/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	149340
LCSD 550-149340/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	149340
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	200.8 LL	149340
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.8 LL	149340

Prep Batch: 150474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.8	
MB 550-150474/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-150474/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-150474/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	200.8	
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.8	

Analysis Batch: 150603

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-104209-1	CH-CCR-M52A-6718	Total/NA	Water	200.8 LL	150474
MB 550-150474/1-A	Method Blank	Total/NA	Water	200.8 LL	150474
LCS 550-150474/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	150474

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 150603 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 550-150474/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	150474
550-104209-1 MS	CH-CCR-M52A-6718	Total/NA	Water	200.8 LL	150474
550-104209-1 MSD	CH-CCR-M52A-6718	Total/NA	Water	200.8 LL	150474

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Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-2
SDG: Cholla

Client Sample ID: CH-CCR-M52A-6718

Lab Sample ID: 550-104209-1

Date Collected: 06/07/18 13:13

Matrix: Water

Date Received: 06/11/18 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	149333	06/12/18 01:01	NBL	TAL PHX
Total/NA	Prep	200.7			149336	06/12/18 05:10	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	149592	06/13/18 20:13	ARE	TAL PHX
Total/NA	Prep	200.8			149340	06/12/18 05:36	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	150456	06/26/18 13:57	TEK	TAL PHX
Total/NA	Prep	200.8			150474	06/26/18 20:05	EXZ	TAL PHX
Total/NA	Analysis	200.8 LL		1	150603	06/28/18 01:02	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: CCR

TestAmerica Job ID: 550-104209-2
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: 550-104209-2
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

Chain of Custody Record

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: CCR

104209

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarney
928-587-0319

Lab Contact: Doug Lavarney
Carrier: 6/11/2018

COC No: 1 of 1 COCs

APS Cholla
4801 Cholla Lake Road
Joseph City, Az 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name: CCR
Site: Cholla
P O #

Analysis Turnaround Time
TAT if different from Below

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)

Sampler: _____
For Lab Use Only:
Walk-in Client: _____
Lab Sampling: _____
Job / SDG No.: _____

Sample Identification	Sample Date	Sample Time	Sample Type (G=Comp, G=grab)	Matrix	# of Cont.	Sample Specific Notes:														
						550-104209 Chain of Custody														
CH-CCR-M-52A-6718 <u>101</u>	6/7/2018	1313	G	W	2	N	X	X	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.

Special Instructions/QC Requirements & Comments:

Custody Seal Intact: _____ Cooler Temp. (°C): Obs'd: _____ Corrd: 29 Therm ID No.: _____

Relinquished by: Douglas Lavarney Company: APS Date/Time: 6/11/2018 Received by: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____ Received in Laboratory by: _____ Date/Time: 6/11/2018 17:00

TestAmerica Phoenix

4625 E Cotton Center Blvd
Phoenix, AZ 85040
Suite 189
phone 602.437.3340 fax 602.454.9303

101209

Chain of Custody Record

Regulatory Program: CCR

CCR

TestAmerica Laboratories, Inc.

Client Contact

Doug Lavarnway
928-587-0319

Doug Lavarnway

Carrier:

6/1/2018

COC No.:

1 of 1 COCs

Analysis Turnaround Time

4801 Cholla Lake Road
Joseph City, AZ 86032

(928) 587-0319 Phone

(xxx) xxx-xxxx FAX

Project Name: CCR

Site: Cholla

P O #

Sampler:
Walk-in Client:
Lab Sampling:

For Lab Use Only:

Job / SDG No.:

Sample Specific Notes:

Sample Identification

CH-CCR-M-52A-6718

-D1

Sample Date

6/7/2018

Sample Time

1313 G

Sample Type (C=Comp, G=Grab)

W

Matrix

2 N

of Cont.

N

Filtered Sample (Y / N)

Perform MS / MSD (Y / N)

EPA 200.7 (Li)

200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti)

EPA 300.0 (F)

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:

Custody Seals Intact:

Relinquished by: Doug Lavarnway

Relinquished by:

Relinquished by:

Custody Seal No.:

Company:

Company:

Company:

Cooler Temp. (°C): Obs'd:

Received by:

Received by:

Received by:

Corr'd:

Company:

Company:

Company:

Therm ID No.:

Date/Time:

Date/Time:

Date/Time:

TestAmerica Phoenix

4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

Regulatory Program: **104209**

CCR

TestAmerica Laboratories, Inc.

Client Contact

4801 Cholla Lake Road

Joseph City, Az 86032

(928) 587-0319 Phone

(xxx) xxx-xxxx FAX

Project Name: CCR

Site: Cholla

P O #

Doug Lavarnway
 928-587-0319

Analysis Turnaround Time

TAT if different from Below

Sample Identification

CH-CCR-M-52A-6718 -01

Sample Date

6/7/2018

Sample Time

1313 G

Sample Type (G=Comp, G=grab)

W

Matrix

of Cont.

2

Filtered Sample (Y / N)

Perform MS / MSD (Y / N)

932.0 Radium 226 and 228

Doug Lavarnway

Lab Contact:

Carrier:

6/11/2018

COC No:

1 of 1 COCs

Sampler:

For Lab Use Only:

Walk-in Client:

Lab Sampling:

Job / SDG No.:

Sample Specific Notes:

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

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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Custody Seals Intact:

Relinquished by:

Relinquished by:

Relinquished by:

Custody Seal No.:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Received in Laboratory by:

Company:

Date/Time:

Cooler Temp. (°C): Obs'd:

Corrd: 29°

Therm ID No.:

Company:

Date/Time:

Company:

Date/Time:

Company:

Date/Time:

TA-PHX

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-104209-2

SDG Number: Cholla

Login Number: 104209

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

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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: 550-104209-3

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:

6/30/2018 2:41:46 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.

1

2

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Table of Contents

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Certification Summary	6
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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-3
SDG: Cholla

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: 550-104209-3
SDG: Cholla

Job ID: 550-104209-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-104209-3

Comments

No additional comments.

Receipt

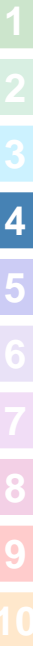
The samples were received on 6/11/2018 5:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

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: 550-104209-3
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-104209-1	CH-CCR-M52A-6718	Water	06/07/18 13:13	06/11/18 17:10

1

2

3

4

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6

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8

9

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-3
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

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-104209-3
SDG: Cholla

Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

Protocol References:

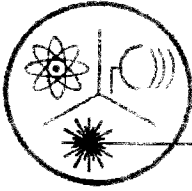
None = None

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) 892-5446


Radiochemical Activity in Water (pCi/L)

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

Sampling Date: June 07, 2018
Sample Received: June 12, 2018
Analysis Completed: June 25, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M52A-6718 (550-104209-1)	< 0.4	0.7 ± 0.3	0.7 ± 0.3

Date of Analysis	6/15/2018	6/15/2018	6/15/2018
------------------	-----------	-----------	-----------


 6/25/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462

TestAmerica Phoenix

1675 East Collins Ch Blvd Suite 139
 Phoenix AZ 85016
 Phone (602) 437-3340 Fax (602) 451-6203

Chain of Custody Record



Client Information (Sub Contract Lab) Client Contact: [Blank] Shipping/Receiving: [Blank] Company: [Blank] Name: Radiation Safety King, Inc. 2245 North Washington Street City: [Blank] State: AZ 85225 Phone: [Blank] Email: [Blank] Project: [Blank] Project #/ID: [Blank] APS - Quality CLR Site: Arizona Public Service		Subject: [Blank] Name: [Blank] Date: 8/26/2018 IAT Requested (day): [Blank]		Ship To: [Blank] Ship From: [Blank] Ship To: [Blank] Ship From: [Blank] State: [Blank] State: [Blank]		Contract #/ID: [Blank] Contract #/ID: [Blank] Contract #/ID: [Blank] Contract #/ID: [Blank]	
Sample Identification - Client ID (Lab ID) Client ID: CHC-COR-MG2A 57 IS (536-104709-11)		Sample Date: 8/27/18 Sample Time: 13:10 Matrix: [Blank]		Sample Type (C=Comp, G=Grab): [Blank] Preservation Container: [Blank]		Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/> No Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/> No Sub (Radionuclide/MSD Radionuclide): [Blank]	
Possible Hazard Identification Unidentified Deliberate Requested: [Blank]		Sample Disposed (A=Aspirated, B=Comminuted, C=Crushed, D=Other): [Blank]		Special Instructions (CC Requirements): [Blank]		Special Instructions (CC Requirements): [Blank]	
Empty Kit Replenished by: [Blank]		Custody Seal No.: [Blank]		Custody Seal No.: [Blank]		Custody Seal No.: [Blank]	



4625 E Cotton Center Blvd

Suite 189

Phoenix, AZ 85040

phone 602.437.3340 fax 602.454.9303

104209

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact

APS Cholla

4801 Cholla Lake Road

Joseph City, Az 86032

(928) 587-0319 Phone

(xxx) xxx-xxxx FAX

Project Name: CCR

Site: Cholla

P O #

Doug Lavarrway

928-587-0319

Analysis Turnaround Time

TAT if different from Below

Doug Lavarrway

Carrier:

6/11/2018

COC No: 1 of 1 COCs

Sampler:

For Lab Use Only:

Walk-in Client:

Lab Sampling:

Job / SDG No.:

Sample Specific Notes:

Sample Identification

CH-CCR-M-52A-6718 - 01

Sample Date

6/7/2018

Sample Time

1313 G

Sample Type (C=Comp, G=grab)

Matrix

W

of Cont.

2

Filtered Sample (Y / N)

Perform MS / MSD (Y / N)

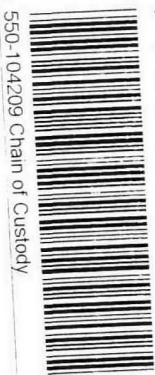
EPA 200.7 Rev 4.4 (B, Ca, Na, K, Mg)

EPA 300.0 (Cl, F, SO4)

SM 2540C (TDS)

SM 4500-HB (pH)

SM 2320B (HCO3)



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:

Custody Seals Intact:

Relinquished by:

Relinquished by:

Relinquished by:

Custody Seal No.:

Company: APS

Company:

Company:

Date/Time:

6/11/2018

Date/Time:

Date/Time:

Received by:

Received in Laboratory by:

Received by:

Received in Laboratory by:

Cooler Temp. (°C): Obs'd:

Corrd: 29

Company:

Company:

Therm ID No.:

Date/Time:

Date/Time:

Date/Time:

101209

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact

Doug Lavarnway
 928-587-0319

Doug Lavarnway
 Lab Contact:

Carrier:

6/11/2018

COC No: 1 of 1 COCs

4801 Cholla Lake Road

Analysis Turnaround Time

Joseph City, Az 86032

(928) 587-0319 Phone

(xxx) xxx-xxxx FAX

Project Name: CCR

Site: Cholla

P O #

TAT if different from Below

Sampler:

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)

200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)

EPA 300.0 (F)

Sample Specific Notes:

CH-CCR-M-52A-6718 -D1

6/7/2018

1313

G

W

2

N

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

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:

Custody Seals Intact:

Custody Seal No.:

Cooler Temp. (°C): Obs'd:

Therm ID No.:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

104209

Regulatory Program:

Doug Lavarnway

CCR

TestAmerica Laboratories, Inc.

Client Contact

Doug Lavarnway
928-587-0319

Doug Lavarnway

Carrier:

6/11/2018

COC No: 1 of 1 COCs

4801 Cholla Lake Road

Joseph City, Az 86032

Phone (928) 587-0319
FAX (xxx) xxx-xxxx

Analysis Turnaround Time

Lab Contact:

Carrier:

6/11/2018

COC No:

1 of 1 COCs

Project Name: CCR

Site: Cholla

P O #

TAT if different from Below

For Lab Use Only:
Walk-in Client:
Lab Sampling:

Job / SDG No.:

Carrier:

6/11/2018

COC No:

1 of 1 COCs

Sample Identification

CH-CCR-M-52A-6718

-01

Sample Date

6/7/2018

Sample Time

1313 G

Sample Type (G=Comp, G=Grab)

Matrix

W

of Cont.

2

Filtered Sample (Y / N)

Perform MS / MSD (Y / N)

932.0 Radium 226 and 228

Sample Specific Notes:

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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Custody Seals Intact:

Custody Seal No.:

Company:

Date/Time:

Received by:

Company:

Cooler Temp. (°C): Obs'd:

Corrd:

Therm ID No.:

Date/Time:

Company:

Relinquished by:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Received in Laboratory by:

Company:

Date/Time:

Company:

Date/Time:

Company:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Received in Laboratory by:

Company:

Date/Time:

Company:

Date/Time:

Company:

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-104209-3

SDG Number: Cholla

Login Number: 104209

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: 550-112460-1

Client Project/Site: Cholla

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/23/2018 11:10:24 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

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Review your project
results through

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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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- 12
- 13
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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
E2	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
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.
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.

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: Cholla

TestAmerica Job ID: 550-112460-1

Job ID: 550-112460-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-112460-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2018 7:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.3° C and 5.3° 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: CH-CCR-W-305-102618 (550-112460-1) and CH-CCR-M-64A-102218 (550-112460-4). 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 sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: CH-CCR-FD-01-102218 (550-112460-5). Fluoride was not detected in the diluted sample. As such, an elevated reporting limit (RL) has been provided and the 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: Cholla

TestAmerica Job ID: 550-112460-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-112460-1	CH-CCR-W-305-102618	Water	10/26/18 11:13	10/27/18 07:50
550-112460-2	CH-CCR-W-306-102618	Water	10/26/18 10:36	10/27/18 07:50
550-112460-3	CH-CCR-W-314-102418	Water	10/24/18 16:06	10/27/18 07:50
550-112460-4	CH-CCR-M-64A-102218	Water	10/22/18 15:39	10/27/18 07:50
550-112460-5	CH-CCR-FD-01-102218	Water	10/22/18 15:39	10/27/18 07:50
550-112460-6	CH-CCR-M-52A-102418	Water	10/24/18 16:50	10/27/18 07:50
550-112460-7	CH-CCR-M-53A-102618	Water	10/26/18 11:46	10/27/18 07:50



Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-W-305-102618

Lab Sample ID: 550-112460-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2300	D2	400	mg/L	200		300.0	Total/NA
Sulfate	2300	D2	400	mg/L	200		300.0	Total/NA
Boron	0.34		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	730		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	7000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-306-102618

Lab Sample ID: 550-112460-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1800	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.4	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	1.0		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
Total Dissolved Solids	18000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.9	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112460-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2600	D2	400	mg/L	200		300.0	Total/NA
Fluoride	0.83	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2200	D2	400	mg/L	200		300.0	Total/NA
Boron	1.1		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	800		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	7400	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-64A-102218

Lab Sample ID: 550-112460-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3900	D2	200	mg/L	100		300.0	Total/NA
Sulfate	3700	D2	200	mg/L	100		300.0	Total/NA
Boron	1.3		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
Total Dissolved Solids	13000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	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: CH-CCR-FD-01-102218

Lab Sample ID: 550-112460-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4100	D2	200	mg/L	100		300.0	Total/NA
Sulfate	4000	D2	200	mg/L	100		300.0	Total/NA
Boron	1.3		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	500		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: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-FD-01-102218 (Continued)

Lab Sample ID: 550-112460-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	12000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-52A-102418

Lab Sample ID: 550-112460-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3900	D2	400	mg/L	200		300.0	Total/NA
Fluoride	0.89	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2700	D2	400	mg/L	200		300.0	Total/NA
Boron	3.5		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	840		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	10000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112460-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2200	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.2	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2900	D2	400	mg/L	200		300.0	Total/NA
Boron	3.2		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	620		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	7500	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	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

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-W-305-102618

Lab Sample ID: 550-112460-1

Date Collected: 10/26/18 11:13

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2300	D2	400	mg/L			11/20/18 19:54	200
Fluoride	ND	D1 D5	0.80	mg/L			11/01/18 00:59	2
Sulfate	2300	D2	400	mg/L			11/20/18 19:54	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.34		0.050	mg/L		10/30/18 08:29	11/01/18 02:04	1
Calcium	730		2.0	mg/L		10/30/18 08:29	11/01/18 02:04	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	7000	D2	100	mg/L			11/01/18 09:47	1
pH	7.3	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.2	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-W-306-102618

Lab Sample ID: 550-112460-2

Date Collected: 10/26/18 10:36

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1800	D2	400	mg/L			11/05/18 19:57	200
Fluoride	1.4	D1	0.80	mg/L			11/07/18 04:11	2
Sulfate	12000	D2	400	mg/L			11/05/18 19:57	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.0		0.050	mg/L		10/30/18 08:29	11/01/18 02:10	1
Calcium	420		2.0	mg/L		10/30/18 08:29	11/01/18 02:10	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	18000	D2	200	mg/L			11/01/18 09:47	1
pH	7.9	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.1	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112460-3

Date Collected: 10/24/18 16:06

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2600	D2	400	mg/L			11/20/18 20:22	200
Fluoride	0.83	D1	0.80	mg/L			11/01/18 02:12	2
Sulfate	2200	D2	400	mg/L			11/20/18 20:22	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.1		0.050	mg/L		10/30/18 08:29	11/01/18 02:16	1
Calcium	800		2.0	mg/L		10/30/18 08:29	11/01/18 02:16	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112460-3

Date Collected: 10/24/18 16:06

Matrix: Water

Date Received: 10/27/18 07:50

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	7400	D2	100	mg/L			10/30/18 11:45	1
pH	7.5	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.0	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-M-64A-102218

Lab Sample ID: 550-112460-4

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3900	D2	200	mg/L			11/01/18 03:08	100
Fluoride	ND	D1 D5	0.80	mg/L			11/01/18 02:49	2
Sulfate	3700	D2	200	mg/L			11/01/18 03:08	100

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		10/30/18 08:29	11/01/18 02:22	1
Calcium	510		2.0	mg/L		10/30/18 08:29	11/01/18 02:22	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	13000	D2	200	mg/L			10/29/18 09:22	1
pH	7.4	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.3	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-FD-01-102218

Lab Sample ID: 550-112460-5

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4100	D2	200	mg/L			11/01/18 04:21	100
Fluoride	ND	D1 D5	2.0	mg/L			11/01/18 04:03	5
Sulfate	4000	D2	200	mg/L			11/01/18 04:21	100

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		10/30/18 08:29	11/01/18 02:28	1
Calcium	500		2.0	mg/L		10/30/18 08:29	11/01/18 02:28	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	12000	D2	200	mg/L			10/29/18 09:22	1
pH	7.3	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.5	H5	0.1	Degrees C			10/31/18 13:14	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-M-52A-102418

Lab Sample ID: 550-112460-6

Date Collected: 10/24/18 16:50

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3900	D2	400	mg/L			11/20/18 20:49	200
Fluoride	0.89	D1	0.80	mg/L			11/01/18 04:40	2
Sulfate	2700	D2	400	mg/L			11/20/18 20:49	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.5		0.050	mg/L		10/30/18 08:29	11/01/18 02:34	1
Calcium	840		2.0	mg/L		10/30/18 08:29	11/01/18 02:34	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	10000	D2	100	mg/L			10/30/18 11:45	1
pH	7.0	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.9	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112460-7

Date Collected: 10/26/18 11:46

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2200	D2	400	mg/L			11/20/18 21:17	200
Fluoride	2.2	D1	0.80	mg/L			11/01/18 05:16	2
Sulfate	2900	D2	400	mg/L			11/20/18 21:17	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.2		0.050	mg/L		10/30/18 08:29	11/01/18 02:40	1
Calcium	620		2.0	mg/L		10/30/18 08:29	11/01/18 02:40	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	7500	D2	100	mg/L			11/01/18 09:47	1
pH	7.5	H5	1.7	SU			10/31/18 13:14	1
Temperature	12.2	H5	0.1	Degrees C			10/31/18 13:14	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-160894/2

Matrix: Water

Analysis Batch: 160894

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			10/31/18 15:47	1
Fluoride	ND		0.40	mg/L			10/31/18 15:47	1
Sulfate	ND		2.0	mg/L			10/31/18 15:47	1

Lab Sample ID: LCS 550-160894/5

Matrix: Water

Analysis Batch: 160894

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	4.09		mg/L		102	90 - 110
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-160894/6

Matrix: Water

Analysis Batch: 160894

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	4.11		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-112451-A-1 MS ^5

Matrix: Water

Analysis Batch: 160894

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	1400	E2 M3	100	1500	E2 M3	mg/L		83	80 - 120
Fluoride	2.2	D1	20.0	23.0	D1	mg/L		104	80 - 120
Sulfate	1800	E2 M3	100	1880	E2 M3	mg/L		72	80 - 120

Lab Sample ID: 550-112451-A-1 MSD ^5

Matrix: Water

Analysis Batch: 160894

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	1400	E2 M3	100	1490	E2 M3	mg/L		70	80 - 120	1	20
Fluoride	2.2	D1	20.0	23.3	D1	mg/L		106	80 - 120	1	20
Sulfate	1800	E2 M3	100	1860	E2 M3	mg/L		59	80 - 120	1	20

Lab Sample ID: MB 550-160895/1041

Matrix: Water

Analysis Batch: 160895

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			11/01/18 03:44	1
Fluoride	ND		0.40	mg/L			11/01/18 03:44	1
Sulfate	ND		2.0	mg/L			11/01/18 03:44	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-160895/70
Matrix: Water
Analysis Batch: 160895

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	4.17		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-160895/71
Matrix: Water
Analysis Batch: 160895

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	4.17		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.6		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-112464-A-2 MS ^100
Matrix: Water
Analysis Batch: 160895

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	1200	D2	2000	3580		mg/L		120	80 - 120
Sulfate	310	D2	2000	2450	D2	mg/L		107	80 - 120

Lab Sample ID: 550-112464-A-2 MS ^2
Matrix: Water
Analysis Batch: 160895

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	9.78	D1	mg/L		106	80 - 120

Lab Sample ID: 550-112464-A-2 MSD ^100
Matrix: Water
Analysis Batch: 160895

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	1200	D2	2000	3580		mg/L		120	80 - 120	0	20
Sulfate	310	D2	2000	2440	D2	mg/L		107	80 - 120	0	20

Lab Sample ID: 550-112464-A-2 MSD ^2
Matrix: Water
Analysis Batch: 160895

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	9.90	D1	mg/L		107	80 - 120	1	20

Lab Sample ID: MB 550-161137/2
Matrix: Water
Analysis Batch: 161137

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			11/05/18 17:49	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 550-161137/2
Matrix: Water
Analysis Batch: 161137

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			11/05/18 17:49	1
Sulfate	ND		2.0	mg/L			11/05/18 17:49	1

Lab Sample ID: LCS 550-161137/5
Matrix: Water
Analysis Batch: 161137

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	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-161137/6
Matrix: Water
Analysis Batch: 161137

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	4.13		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-112460-2 MS
Matrix: Water
Analysis Batch: 161137

Client Sample ID: CH-CCR-W-306-102618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	12000	D2	4000	15900	D2	mg/L		104	80 - 120

Lab Sample ID: 550-112460-2 MSD
Matrix: Water
Analysis Batch: 161137

Client Sample ID: CH-CCR-W-306-102618
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	12000	D2	4000	15800	D2	mg/L		102	80 - 120	1	20

Lab Sample ID: MB 550-161411/2
Matrix: Water
Analysis Batch: 161411

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			11/06/18 17:27	1
Fluoride	ND		0.40	mg/L			11/06/18 17:27	1
Sulfate	ND		2.0	mg/L			11/06/18 17:27	1

Lab Sample ID: LCS 550-161411/5
Matrix: Water
Analysis Batch: 161411

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

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-161411/5
Matrix: Water
Analysis Batch: 161411

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
Sulfate	20.0	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-161411/6
Matrix: Water
Analysis Batch: 161411

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		102	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-112814-F-2 MS
Matrix: Water
Analysis Batch: 161411

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	37		20.0	56.1		mg/L		97	80 - 120
Fluoride	ND		4.00	4.16		mg/L		103	80 - 120
Sulfate	ND		20.0	21.8		mg/L		103	80 - 120

Lab Sample ID: 550-112814-F-2 MSD
Matrix: Water
Analysis Batch: 161411

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	37		20.0	56.5		mg/L		99	80 - 120	1	20
Fluoride	ND		4.00	4.25		mg/L		105	80 - 120	2	20
Sulfate	ND		20.0	22.2		mg/L		105	80 - 120	2	20

Lab Sample ID: MB 550-161414/2
Matrix: Water
Analysis Batch: 161414

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			11/07/18 19:20	1
Fluoride	ND		0.40	mg/L			11/07/18 19:20	1
Sulfate	ND		2.0	mg/L			11/07/18 19:20	1

Lab Sample ID: LCS 550-161414/5
Matrix: Water
Analysis Batch: 161414

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
Sulfate	20.0	20.5		mg/L		103	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 550-161414/6
Matrix: Water
Analysis Batch: 161414

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	4.11		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	1	20

Lab Sample ID: 550-112562-A-5 MS
Matrix: Water
Analysis Batch: 161414

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	2.7		20.0	24.1		mg/L		107	80 - 120
Fluoride	ND		4.00	4.19		mg/L		103	80 - 120
Sulfate	ND		20.0	21.8		mg/L		103	80 - 120

Lab Sample ID: 550-112562-A-5 MSD
Matrix: Water
Analysis Batch: 161414

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	2.7		20.0	24.5		mg/L		109	80 - 120	2	20
Fluoride	ND		4.00	4.26		mg/L		105	80 - 120	2	20
Sulfate	ND		20.0	22.2		mg/L		105	80 - 120	2	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

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

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-113026-A-4 MS ^200

Matrix: Water
Analysis Batch: 162493

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	8460	D2	mg/L		104	80 - 120

Lab Sample ID: 550-113026-A-4 MS ^5

Matrix: Water
Analysis Batch: 162493

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	310	D1	100	416	D1	mg/L		108	80 - 120
Fluoride	ND	D1	20.0	22.2	D1	mg/L		104	80 - 120

Lab Sample ID: 550-113026-A-4 MSD ^200

Matrix: Water
Analysis Batch: 162493

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	8450	D2	mg/L		104	80 - 120	0	20

Lab Sample ID: 550-113026-A-4 MSD ^5

Matrix: Water
Analysis Batch: 162493

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	310	D1	100	415	D1	mg/L		107	80 - 120	0	20
Fluoride	ND	D1	20.0	22.3	D1	mg/L		105	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-160566/1-A

Matrix: Water
Analysis Batch: 160784

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160566

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		10/30/18 08:29	11/01/18 00:51	1
Calcium	ND		2.0	mg/L		10/30/18 08:29	11/01/18 00:51	1

Lab Sample ID: LCS 550-160566/2-A

Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.965		mg/L		96	85 - 115
Calcium	21.0	21.7		mg/L		103	85 - 115

Lab Sample ID: LCSD 550-160566/3-A

Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.00	0.971		mg/L		97	85 - 115	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

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

Lab Sample ID: LCSD 550-160566/3-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Calcium	21.0	21.8		mg/L		104	85 - 115	0	20

Lab Sample ID: 550-112450-B-1-A MS
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	3.1		1.00	3.89		mg/L		84	70 - 130
Calcium	630	M3	21.0	622	M3	mg/L		-41	70 - 130

Lab Sample ID: 550-112450-B-1-B MSD
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	3.1		1.00	3.97		mg/L		92	70 - 130	2	20
Calcium	630	M3	21.0	635	M3	mg/L		23	70 - 130	2	20

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

Lab Sample ID: MB 550-160464/1
Matrix: Water
Analysis Batch: 160464

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			10/29/18 09:22	1

Lab Sample ID: LCS 550-160464/2
Matrix: Water
Analysis Batch: 160464

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	1000	982		mg/L		98	90 - 110

Lab Sample ID: LCSD 550-160464/3
Matrix: Water
Analysis Batch: 160464

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Dissolved Solids	1000	974		mg/L		97	90 - 110	1	10

Lab Sample ID: 550-112460-4 DU
Matrix: Water
Analysis Batch: 160464

Client Sample ID: CH-CCR-M-64A-102218
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	13000	D2	12100	D2	mg/L		6	10

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

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

Lab Sample ID: MB 550-160595/1
Matrix: Water
Analysis Batch: 160595

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			10/30/18 11:45	1

Lab Sample ID: LCS 550-160595/2
Matrix: Water
Analysis Batch: 160595

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	950		mg/L		95	90 - 110

Lab Sample ID: LCSD 550-160595/3
Matrix: Water
Analysis Batch: 160595

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	946		mg/L		95	90 - 110	0	10

Lab Sample ID: 550-112399-B-1 DU
Matrix: Water
Analysis Batch: 160595

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	56		56.0		mg/L		0	10

Lab Sample ID: MB 550-160761/1
Matrix: Water
Analysis Batch: 160761

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			11/01/18 09:47	1

Lab Sample ID: LCS 550-160761/2
Matrix: Water
Analysis Batch: 160761

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	958		mg/L		96	90 - 110

Lab Sample ID: LCSD 550-160761/3
Matrix: Water
Analysis Batch: 160761

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	964		mg/L		96	90 - 110	1	10

Lab Sample ID: 550-112419-A-2 DU
Matrix: Water
Analysis Batch: 160761

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	1500		1550		mg/L		5	10

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-160705/1
 Matrix: Water
 Analysis Batch: 160705

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		99.7	98.5 - 101.5

Lab Sample ID: LCSSRM 550-160705/13
 Matrix: Water
 Analysis Batch: 160705

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: 550-112460-7 DU
 Matrix: Water
 Analysis Batch: 160705

Client Sample ID: CH-CCR-M-53A-102618
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.5	H5	7.4	H5	SU		0.1	5
Temperature	12.2	H5	12.7	H5	Degrees C		4	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

HPLC/IC

Analysis Batch: 160894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-1	CH-CCR-W-305-102618	Total/NA	Water	300.0	
550-112460-3	CH-CCR-W-314-102418	Total/NA	Water	300.0	
550-112460-4	CH-CCR-M-64A-102218	Total/NA	Water	300.0	
550-112460-4	CH-CCR-M-64A-102218	Total/NA	Water	300.0	
MB 550-160894/2	Method Blank	Total/NA	Water	300.0	
LCS 550-160894/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-160894/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112451-A-1 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-112451-A-1 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 160895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-5	CH-CCR-FD-01-102218	Total/NA	Water	300.0	
550-112460-5	CH-CCR-FD-01-102218	Total/NA	Water	300.0	
550-112460-6	CH-CCR-M-52A-102418	Total/NA	Water	300.0	
550-112460-7	CH-CCR-M-53A-102618	Total/NA	Water	300.0	
MB 550-160895/1041	Method Blank	Total/NA	Water	300.0	
LCS 550-160895/70	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-160895/71	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112464-A-2 MS ^100	Matrix Spike	Total/NA	Water	300.0	
550-112464-A-2 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-112464-A-2 MSD ^100	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-112464-A-2 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-2	CH-CCR-W-306-102618	Total/NA	Water	300.0	
MB 550-161137/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161137/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161137/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112460-2 MS	CH-CCR-W-306-102618	Total/NA	Water	300.0	
550-112460-2 MSD	CH-CCR-W-306-102618	Total/NA	Water	300.0	

Analysis Batch: 161411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-2	CH-CCR-W-306-102618	Total/NA	Water	300.0	
MB 550-161411/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161411/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161411/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112814-F-2 MS	Matrix Spike	Total/NA	Water	300.0	
550-112814-F-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-161414/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161414/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161414/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112562-A-5 MS	Matrix Spike	Total/NA	Water	300.0	
550-112562-A-5 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

HPLC/IC (Continued)

Analysis Batch: 162493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-1	CH-CCR-W-305-102618	Total/NA	Water	300.0	
550-112460-3	CH-CCR-W-314-102418	Total/NA	Water	300.0	
550-112460-6	CH-CCR-M-52A-102418	Total/NA	Water	300.0	
550-112460-7	CH-CCR-M-53A-102618	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	
LCSD 550-162493/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-A-4 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113026-A-4 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-113026-A-4 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-A-4 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 160566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-1	CH-CCR-W-305-102618	Total/NA	Water	200.7	
550-112460-2	CH-CCR-W-306-102618	Total/NA	Water	200.7	
550-112460-3	CH-CCR-W-314-102418	Total/NA	Water	200.7	
550-112460-4	CH-CCR-M-64A-102218	Total/NA	Water	200.7	
550-112460-5	CH-CCR-FD-01-102218	Total/NA	Water	200.7	
550-112460-6	CH-CCR-M-52A-102418	Total/NA	Water	200.7	
550-112460-7	CH-CCR-M-53A-102618	Total/NA	Water	200.7	
MB 550-160566/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-160566/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-160566/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-112450-B-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-112450-B-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 160784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-1	CH-CCR-W-305-102618	Total/NA	Water	200.7 Rev 4.4	160566
550-112460-2	CH-CCR-W-306-102618	Total/NA	Water	200.7 Rev 4.4	160566
550-112460-3	CH-CCR-W-314-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112460-4	CH-CCR-M-64A-102218	Total/NA	Water	200.7 Rev 4.4	160566
550-112460-5	CH-CCR-FD-01-102218	Total/NA	Water	200.7 Rev 4.4	160566
550-112460-6	CH-CCR-M-52A-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112460-7	CH-CCR-M-53A-102618	Total/NA	Water	200.7 Rev 4.4	160566
MB 550-160566/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	160566
LCS 550-160566/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	160566
LCSD 550-160566/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-B-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-B-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	160566

General Chemistry

Analysis Batch: 160464

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-4	CH-CCR-M-64A-102218	Total/NA	Water	SM 2540C	
550-112460-5	CH-CCR-FD-01-102218	Total/NA	Water	SM 2540C	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

General Chemistry (Continued)

Analysis Batch: 160464 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-160464/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-160464/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-160464/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-112460-4 DU	CH-CCR-M-64A-102218	Total/NA	Water	SM 2540C	

Analysis Batch: 160595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-3	CH-CCR-W-314-102418	Total/NA	Water	SM 2540C	
550-112460-6	CH-CCR-M-52A-102418	Total/NA	Water	SM 2540C	
MB 550-160595/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-160595/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-160595/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-112399-B-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 160705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-1	CH-CCR-W-305-102618	Total/NA	Water	SM 4500 H+ B	
550-112460-2	CH-CCR-W-306-102618	Total/NA	Water	SM 4500 H+ B	
550-112460-3	CH-CCR-W-314-102418	Total/NA	Water	SM 4500 H+ B	
550-112460-4	CH-CCR-M-64A-102218	Total/NA	Water	SM 4500 H+ B	
550-112460-5	CH-CCR-FD-01-102218	Total/NA	Water	SM 4500 H+ B	
550-112460-6	CH-CCR-M-52A-102418	Total/NA	Water	SM 4500 H+ B	
550-112460-7	CH-CCR-M-53A-102618	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-160705/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-160705/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-112460-7 DU	CH-CCR-M-53A-102618	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 160761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112460-1	CH-CCR-W-305-102618	Total/NA	Water	SM 2540C	
550-112460-2	CH-CCR-W-306-102618	Total/NA	Water	SM 2540C	
550-112460-7	CH-CCR-M-53A-102618	Total/NA	Water	SM 2540C	
MB 550-160761/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-160761/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-160761/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-112419-A-2 DU	Duplicate	Total/NA	Water	SM 2540C	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-W-305-102618

Lab Sample ID: 550-112460-1

Date Collected: 10/26/18 11:13

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	11/01/18 00:59	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 19:54	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:04	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761	11/01/18 09:47 (Start) 11/02/18 08:40 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Client Sample ID: CH-CCR-W-306-102618

Lab Sample ID: 550-112460-2

Date Collected: 10/26/18 10:36

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	161137	11/05/18 19:57	NEL	TAL PHX
Total/NA	Analysis	300.0		2	161411	11/07/18 04:11	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:10	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761	11/01/18 09:47 (Start) 11/02/18 08:40 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112460-3

Date Collected: 10/24/18 16:06

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	11/01/18 02:12	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 20:22	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:16	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160595	10/30/18 11:45 (Start) 10/31/18 10:20 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-M-64A-102218

Lab Sample ID: 550-112460-4

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	11/01/18 02:49	NEL	TAL PHX
Total/NA	Analysis	300.0		100	160894	11/01/18 03:08	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:22	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160464	(Start) 10/29/18 09:22 (End) 10/30/18 10:35	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Client Sample ID: CH-CCR-FD-01-102218

Lab Sample ID: 550-112460-5

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	160895	11/01/18 04:03	NEL	TAL PHX
Total/NA	Analysis	300.0		100	160895	11/01/18 04:21	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:28	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160464	(Start) 10/29/18 09:22 (End) 10/30/18 10:35	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Client Sample ID: CH-CCR-M-52A-102418

Lab Sample ID: 550-112460-6

Date Collected: 10/24/18 16:50

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160895	11/01/18 04:40	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 20:49	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:34	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160595	(Start) 10/30/18 11:45 (End) 10/31/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112460-7

Date Collected: 10/26/18 11:46

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160895	11/01/18 05:16	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 21:17	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 02:40	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160761	(Start) 11/01/18 09:47 (End) 11/02/18 08:40	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	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: Cholla

TestAmerica Job ID: 550-112460-1

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

- 1
- 2
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Method Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112460-1

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

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

Regulatory Program: DW NPDES RCRA Other: **CCR**

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

112460

Client Contact: **Doug Lavarney** 928-587-0319
Analysis Turnaround Time: CALENDAR DAYS WORKING DAYS

APS Cholla
4801 Cholla Lake Rd
Joseph City, AZ 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name:
Site:
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)	EPA 200.7 (B, Ca)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)
CH-CCR-W-305-102618	10/26/18	G	W	2	N	X	X	X	X	X
CH-CCR-W-306-102618	10/26/18	G	W	2	N	X	X	X	X	X
CH-CCR-W-314-102418	10/24/18	G	W	2	N	X	X	X	X	X
CH-CCR-M-54A-102218	10/22/18	G	W	2	N	X	X	X	X	X
CH-CCR-FD-01-102218	10/22/18	G	W	2	N	X	X	X	X	X
CH-CCR-M-52A-102418	10/24/2018	G	W	2	N	X	X	X	X	X
CH-CCR-M-53A-102618	10/26/18	G	W	2	N	X	X	X	X	X

Sample Specific Notes:
-01
-02
-03
-04
-05
-06
-07

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:
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: **2.30°C, 5.3°C** Corrd: **DIR**
Therm ID No.:

Relinquished by: **Doug Lavarney** Company: **APS** Date/Time: **10/26/18** Received by: **[Signature]** Company: **APS** Date/Time: **10/22/18 0750**

Relinquished by: Company: Date/Time: Received in Laboratory by: Company: Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-112460-1

Login Number: 112460

List Source: TestAmerica Phoenix

List Number: 1

Creator: Doerr, Bret C

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: 550-112461-1

Client Project/Site: Cholla

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/21/2018 4:29:33 PM

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: Cholla

TestAmerica Job ID: 550-112461-1

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.

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: Cholla

TestAmerica Job ID: 550-112461-1

Job ID: 550-112461-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-112461-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2018 7:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.3° C and 5.3° 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: CH-CCR-W-305-102618 (550-112461-1) and CH-CCR-FD-01-102218 (550-112461-5). 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 sample was diluted for Fluoride by method EPA 300.0 due to the nature of the sample matrix: CH-CCR-M-64A-102218 (550-112461-4). Fluoride was not detected in the diluted sample. As such, an elevated reporting limit (RL) has been provided and the data has 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: Cholla

TestAmerica Job ID: 550-112461-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-112461-1	CH-CCR-W-305-102618	Water	10/26/18 11:13	10/27/18 07:50
550-112461-2	CH-CCR-W-306-102618	Water	10/26/18 10:36	10/27/18 07:50
550-112461-3	CH-CCR-W-314-102418	Water	10/24/18 16:06	10/27/18 07:50
550-112461-4	CH-CCR-M-64A-102218	Water	10/22/18 15:39	10/27/18 07:50
550-112461-5	CH-CCR-FD-01-102218	Water	10/22/18 15:39	10/27/18 07:50
550-112461-6	CH-CCR-M-52A-102418	Water	10/24/18 16:50	10/27/18 07:50
550-112461-7	CH-CCR-M-53A-102618	Water	10/26/18 11:46	10/27/18 07:50



Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-W-305-102618

Lab Sample ID: 550-112461-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.20		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.00092		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.011		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0012		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.018		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0019		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.021		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.00053		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-306-102618

Lab Sample ID: 550-112461-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.4	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.68		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0052		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.010		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00011		0.00010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0012		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.032		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0021		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112461-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.83	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
Arsenic	0.00073		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.011		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00019		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.0013		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.015		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0087		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-64A-102218

Lab Sample ID: 550-112461-4

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	0.0013		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.011		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0052		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD-01-102218

Lab Sample ID: 550-112461-5

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	0.0011		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.011		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0050		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-52A-102418

Lab Sample ID: 550-112461-6

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-M-52A-102418 (Continued)

Lab Sample ID: 550-112461-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.87	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.24		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0025		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.016		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0011		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.059		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.055		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.00057		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.061		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.00063		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112461-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.1	D1	0.80	mg/L	2		300.0	Total/NA
Arsenic	0.0012		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0081		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.0013		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.0019		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.013		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.042		0.00050	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: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-W-305-102618

Lab Sample ID: 550-112461-1

Date Collected: 10/26/18 11:13

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			10/31/18 19:09	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.20		0.20	mg/L		10/30/18 08:35	10/31/18 23:18	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00092		0.00050	mg/L		10/31/18 18:15	11/19/18 22:47	1
Barium	0.011		0.00050	mg/L		10/31/18 18:15	11/19/18 22:47	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:47	1
Chromium	0.0012		0.0010	mg/L		10/31/18 18:15	11/19/18 22:47	1
Cobalt	0.018		0.00050	mg/L		10/31/18 18:15	11/19/18 22:47	1
Lead	0.0019		0.00050	mg/L		10/31/18 18:15	11/19/18 22:47	1
Molybdenum	0.021		0.00050	mg/L		10/31/18 18:15	11/19/18 22:47	1
Selenium	0.00053		0.00050	mg/L		10/31/18 18:15	11/19/18 22:47	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:47	1

Client Sample ID: CH-CCR-W-306-102618

Lab Sample ID: 550-112461-2

Date Collected: 10/26/18 10:36

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.4	D1	0.80	mg/L			11/07/18 06:01	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.68		0.20	mg/L		10/30/18 08:35	10/31/18 23:24	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0052		0.00050	mg/L		10/31/18 18:15	11/19/18 22:49	1
Barium	0.010		0.00050	mg/L		10/31/18 18:15	11/19/18 22:49	1
Cadmium	0.00011		0.00010	mg/L		10/31/18 18:15	11/19/18 22:49	1
Chromium	ND		0.0010	mg/L		10/31/18 18:15	11/19/18 22:49	1
Cobalt	0.0012		0.00050	mg/L		10/31/18 18:15	11/19/18 22:49	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:49	1
Molybdenum	0.032		0.00050	mg/L		10/31/18 18:15	11/19/18 22:49	1
Selenium	0.0021		0.00050	mg/L		10/31/18 18:15	11/19/18 22:49	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:49	1

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112461-3

Date Collected: 10/24/18 16:06

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.83	D1	0.80	mg/L			10/31/18 19:46	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112461-3

Date Collected: 10/24/18 16:06

Matrix: Water

Date Received: 10/27/18 07:50

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		10/30/18 08:35	10/31/18 23:30	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00073		0.00050	mg/L		10/31/18 18:15	11/19/18 22:52	1
Barium	0.011		0.00050	mg/L		10/31/18 18:15	11/19/18 22:52	1
Cadmium	0.00019		0.00010	mg/L		10/31/18 18:15	11/19/18 22:52	1
Chromium	0.0013		0.0010	mg/L		10/31/18 18:15	11/19/18 22:52	1
Cobalt	0.015		0.00050	mg/L		10/31/18 18:15	11/19/18 22:52	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:52	1
Molybdenum	0.0087		0.00050	mg/L		10/31/18 18:15	11/19/18 22:52	1
Selenium	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:52	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:52	1

Client Sample ID: CH-CCR-M-64A-102218

Lab Sample ID: 550-112461-4

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			11/07/18 06:38	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		10/30/18 08:35	10/31/18 23:36	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.00050	mg/L		10/31/18 18:15	11/19/18 22:54	1
Barium	0.011		0.00050	mg/L		10/31/18 18:15	11/19/18 22:54	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:54	1
Chromium	ND		0.0010	mg/L		10/31/18 18:15	11/19/18 22:54	1
Cobalt	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:54	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:54	1
Molybdenum	0.0052		0.00050	mg/L		10/31/18 18:15	11/19/18 22:54	1
Selenium	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:54	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:54	1

Client Sample ID: CH-CCR-FD-01-102218

Lab Sample ID: 550-112461-5

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	2.0	mg/L			10/31/18 20:59	5

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		10/30/18 08:35	10/31/18 23:41	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-FD-01-102218

Lab Sample ID: 550-112461-5

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0011		0.00050	mg/L		10/31/18 18:15	11/19/18 22:56	1
Barium	0.011		0.00050	mg/L		10/31/18 18:15	11/19/18 22:56	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:56	1
Chromium	ND		0.0010	mg/L		10/31/18 18:15	11/19/18 22:56	1
Cobalt	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:56	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:56	1
Molybdenum	0.0050		0.00050	mg/L		10/31/18 18:15	11/19/18 22:56	1
Selenium	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:56	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:56	1

Client Sample ID: CH-CCR-M-52A-102418

Lab Sample ID: 550-112461-6

Date Collected: 10/24/18 16:50

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.87	D1	0.80	mg/L			10/31/18 21:18	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.24		0.20	mg/L		10/30/18 08:35	11/01/18 22:50	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0025		0.00050	mg/L		10/31/18 18:15	11/19/18 22:59	1
Barium	0.016		0.00050	mg/L		10/31/18 18:15	11/19/18 22:59	1
Cadmium	0.0011		0.00010	mg/L		10/31/18 18:15	11/19/18 22:59	1
Chromium	0.059		0.0010	mg/L		10/31/18 18:15	11/19/18 22:59	1
Cobalt	0.055		0.00050	mg/L		10/31/18 18:15	11/19/18 22:59	1
Lead	0.00057		0.00050	mg/L		10/31/18 18:15	11/19/18 22:59	1
Molybdenum	0.061		0.00050	mg/L		10/31/18 18:15	11/19/18 22:59	1
Selenium	0.00063		0.00050	mg/L		10/31/18 18:15	11/19/18 22:59	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:59	1

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112461-7

Date Collected: 10/26/18 11:46

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.1	D1	0.80	mg/L			10/31/18 21:36	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		10/30/18 08:35	11/01/18 22:56	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		10/31/18 18:15	11/19/18 23:01	1
Barium	0.0081		0.00050	mg/L		10/31/18 18:15	11/19/18 23:01	1
Cadmium	0.0013		0.00010	mg/L		10/31/18 18:15	11/19/18 23:01	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112461-7

Date Collected: 10/26/18 11:46

Matrix: Water

Date Received: 10/27/18 07:50

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.0019		0.0010	mg/L		10/31/18 18:15	11/19/18 23:01	1
Cobalt	0.013		0.00050	mg/L		10/31/18 18:15	11/19/18 23:01	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 23:01	1
Molybdenum	0.042		0.00050	mg/L		10/31/18 18:15	11/19/18 23:01	1
Selenium	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 23:01	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 23:01	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-160894/2
Matrix: Water
Analysis Batch: 160894

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			10/31/18 15:47	1

Lab Sample ID: LCS 550-160894/5
Matrix: Water
Analysis Batch: 160894

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 550-160894/6
Matrix: Water
Analysis Batch: 160894

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	4.11		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-112451-A-1 MS ^5
Matrix: Water
Analysis Batch: 160894

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	D1	20.0	23.0	D1	mg/L		104	80 - 120

Lab Sample ID: 550-112451-A-1 MSD ^5
Matrix: Water
Analysis Batch: 160894

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	D1	20.0	23.3	D1	mg/L		106	80 - 120	1	20

Lab Sample ID: MB 550-161411/2
Matrix: Water
Analysis Batch: 161411

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			11/06/18 17:27	1

Lab Sample ID: LCS 550-161411/5
Matrix: Water
Analysis Batch: 161411

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 550-161411/6
Matrix: Water
Analysis Batch: 161411

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: Cholla

TestAmerica Job ID: 550-112461-1

Lab Sample ID: 550-112814-F-2 MS
Matrix: Water
Analysis Batch: 161411

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		4.00	4.16		mg/L		103	80 - 120

Lab Sample ID: 550-112814-F-2 MSD
Matrix: Water
Analysis Batch: 161411

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		4.00	4.25		mg/L		105	80 - 120	2	20

Lab Sample ID: MB 550-161412/1041
Matrix: Water
Analysis Batch: 161412

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			11/07/18 05:43	1

Lab Sample ID: LCS 550-161412/73
Matrix: Water
Analysis Batch: 161412

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	4.15		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-161412/74
Matrix: Water
Analysis Batch: 161412

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	4.15		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-112724-A-1 MS
Matrix: Water
Analysis Batch: 161412

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	3.0		4.00	7.26		mg/L		107	80 - 120

Lab Sample ID: 550-112724-A-1 MSD
Matrix: Water
Analysis Batch: 161412

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	3.0		4.00	7.34		mg/L		109	80 - 120	1	20

Lab Sample ID: MB 550-161414/2
Matrix: Water
Analysis Batch: 161414

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			11/07/18 19:20	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-161414/5
Matrix: Water
Analysis Batch: 161414

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 550-161414/6
Matrix: Water
Analysis Batch: 161414

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	4.11		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-112562-A-5 MS
Matrix: Water
Analysis Batch: 161414

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		4.00	4.19		mg/L		103	80 - 120

Lab Sample ID: 550-112562-A-5 MSD
Matrix: Water
Analysis Batch: 161414

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		4.00	4.26		mg/L		105	80 - 120	2	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-160568/1-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160568

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		10/30/18 08:35	10/31/18 22:58	1

Lab Sample ID: LCS 550-160568/2-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	0.997		mg/L		100	85 - 115

Lab Sample ID: LCSD 550-160568/3-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	1.00	0.996		mg/L		100	85 - 115	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

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

Lab Sample ID: 550-112461-1 MS

Matrix: Water

Analysis Batch: 160783

Client Sample ID: CH-CCR-W-305-102618

Prep Type: Total/NA

Prep Batch: 160568

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Lithium	0.20		1.00	1.15		mg/L		95	70 - 130

Lab Sample ID: 550-112461-1 MSD

Matrix: Water

Analysis Batch: 160783

Client Sample ID: CH-CCR-W-305-102618

Prep Type: Total/NA

Prep Batch: 160568

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Lithium	0.20		1.00	1.16		mg/L		96	70 - 130	1	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-160737/1-A

Matrix: Water

Analysis Batch: 161580

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 160737

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Barium	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/09/18 22:24	1
Chromium	ND		0.0010	mg/L		10/31/18 18:15	11/09/18 22:24	1
Cobalt	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Molybdenum	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Selenium	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Thallium	ND		0.00010	mg/L		10/31/18 18:15	11/09/18 22:24	1

Lab Sample ID: LCS 550-160737/2-A

Matrix: Water

Analysis Batch: 161580

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 160737

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.106		mg/L		106	85 - 115
Barium	0.100	0.102		mg/L		102	85 - 115
Cadmium	0.100	0.101		mg/L		101	85 - 115
Chromium	0.100	0.102		mg/L		102	85 - 115
Cobalt	0.100	0.101		mg/L		101	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Molybdenum	0.100	0.102		mg/L		102	85 - 115
Selenium	0.100	0.101		mg/L		101	85 - 115
Thallium	0.100	0.101		mg/L		101	85 - 115

Lab Sample ID: LCSD 550-160737/3-A

Matrix: Water

Analysis Batch: 161580

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 160737

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.100	0.113		mg/L		113	85 - 115	6	20
Barium	0.100	0.109		mg/L		109	85 - 115	7	20
Cadmium	0.100	0.109		mg/L		109	85 - 115	8	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

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

Lab Sample ID: LCSD 550-160737/3-A
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160737

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.		RPD	Limit
							Limits	RPD		
Chromium	0.100	0.108		mg/L		108	85 - 115	6	20	
Cobalt	0.100	0.107		mg/L		107	85 - 115	6	20	
Lead	0.100	0.109		mg/L		109	85 - 115	7	20	
Molybdenum	0.100	0.110		mg/L		110	85 - 115	7	20	
Selenium	0.100	0.108		mg/L		108	85 - 115	7	20	
Thallium	0.100	0.109		mg/L		109	85 - 115	7	20	

Lab Sample ID: 550-112504-A-14-B MS
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160737

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec.		RPD	Limit
									Limits	RPD		
Arsenic	ND		0.100	0.105		mg/L		105	70 - 130			
Barium	0.18		0.100	0.285		mg/L		104	70 - 130			
Cadmium	ND		0.100	0.0972		mg/L		97	70 - 130			
Chromium	ND		0.100	0.0973		mg/L		96	70 - 130			
Cobalt	ND		0.100	0.0935		mg/L		93	70 - 130			
Lead	ND		0.100	0.0955		mg/L		96	70 - 130			
Molybdenum	ND		0.100	0.104		mg/L		104	70 - 130			
Selenium	ND		0.100	0.0943		mg/L		94	70 - 130			
Thallium	ND		0.100	0.0958		mg/L		96	70 - 130			

Lab Sample ID: 550-112504-A-14-C MSD
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 160737

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec.		RPD	Limit
									Limits	RPD		
Arsenic	ND		0.100	0.105		mg/L		105	70 - 130	0	20	
Barium	0.18		0.100	0.288		mg/L		106	70 - 130	1	20	
Cadmium	ND		0.100	0.0984		mg/L		98	70 - 130	1	20	
Chromium	ND		0.100	0.0988		mg/L		98	70 - 130	2	20	
Cobalt	ND		0.100	0.0947		mg/L		95	70 - 130	1	20	
Lead	ND		0.100	0.0968		mg/L		97	70 - 130	1	20	
Molybdenum	ND		0.100	0.105		mg/L		105	70 - 130	1	20	
Selenium	ND		0.100	0.0963		mg/L		96	70 - 130	2	20	
Thallium	ND		0.100	0.0974		mg/L		97	70 - 130	2	20	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

HPLC/IC

Analysis Batch: 160894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-1	CH-CCR-W-305-102618	Total/NA	Water	300.0	
550-112461-3	CH-CCR-W-314-102418	Total/NA	Water	300.0	
550-112461-5	CH-CCR-FD-01-102218	Total/NA	Water	300.0	
550-112461-6	CH-CCR-M-52A-102418	Total/NA	Water	300.0	
550-112461-7	CH-CCR-M-53A-102618	Total/NA	Water	300.0	
MB 550-160894/2	Method Blank	Total/NA	Water	300.0	
LCS 550-160894/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-160894/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112451-A-1 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-112451-A-1 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-161411/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161411/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-161411/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112814-F-2 MS	Matrix Spike	Total/NA	Water	300.0	
550-112814-F-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-2	CH-CCR-W-306-102618	Total/NA	Water	300.0	
550-112461-4	CH-CCR-M-64A-102218	Total/NA	Water	300.0	
MB 550-161412/1041	Method Blank	Total/NA	Water	300.0	
LCS 550-161412/73	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-161412/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112724-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-112724-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-161414/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161414/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-161414/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112562-A-5 MS	Matrix Spike	Total/NA	Water	300.0	
550-112562-A-5 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 160568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-1	CH-CCR-W-305-102618	Total/NA	Water	200.7	
550-112461-2	CH-CCR-W-306-102618	Total/NA	Water	200.7	
550-112461-3	CH-CCR-W-314-102418	Total/NA	Water	200.7	
550-112461-4	CH-CCR-M-64A-102218	Total/NA	Water	200.7	
550-112461-5	CH-CCR-FD-01-102218	Total/NA	Water	200.7	
550-112461-6	CH-CCR-M-52A-102418	Total/NA	Water	200.7	
550-112461-7	CH-CCR-M-53A-102618	Total/NA	Water	200.7	
MB 550-160568/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-160568/2-A	Lab Control Sample	Total/NA	Water	200.7	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Metals (Continued)

Prep Batch: 160568 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 550-160568/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-112461-1 MS	CH-CCR-W-305-102618	Total/NA	Water	200.7	
550-112461-1 MSD	CH-CCR-W-305-102618	Total/NA	Water	200.7	

Prep Batch: 160737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-1	CH-CCR-W-305-102618	Total/NA	Water	200.8	
550-112461-2	CH-CCR-W-306-102618	Total/NA	Water	200.8	
550-112461-3	CH-CCR-W-314-102418	Total/NA	Water	200.8	
550-112461-4	CH-CCR-M-64A-102218	Total/NA	Water	200.8	
550-112461-5	CH-CCR-FD-01-102218	Total/NA	Water	200.8	
550-112461-6	CH-CCR-M-52A-102418	Total/NA	Water	200.8	
550-112461-7	CH-CCR-M-53A-102618	Total/NA	Water	200.8	
MB 550-160737/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-160737/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-160737/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-112504-A-14-B MS	Matrix Spike	Total/NA	Water	200.8	
550-112504-A-14-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.8	

Analysis Batch: 160783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-1	CH-CCR-W-305-102618	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-2	CH-CCR-W-306-102618	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-3	CH-CCR-W-314-102418	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-4	CH-CCR-M-64A-102218	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-5	CH-CCR-FD-01-102218	Total/NA	Water	200.7 Rev 4.4	160568
MB 550-160568/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	160568
LCS 550-160568/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	160568
LCSD 550-160568/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-1 MS	CH-CCR-W-305-102618	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-1 MSD	CH-CCR-W-305-102618	Total/NA	Water	200.7 Rev 4.4	160568

Analysis Batch: 160853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-6	CH-CCR-M-52A-102418	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-7	CH-CCR-M-53A-102618	Total/NA	Water	200.7 Rev 4.4	160568

Analysis Batch: 161580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-160737/1-A	Method Blank	Total/NA	Water	200.8 LL	160737
LCS 550-160737/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	160737
LCSD 550-160737/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	160737
550-112504-A-14-B MS	Matrix Spike	Total/NA	Water	200.8 LL	160737
550-112504-A-14-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.8 LL	160737

Analysis Batch: 162387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-1	CH-CCR-W-305-102618	Total/NA	Water	200.8 LL	160737
550-112461-2	CH-CCR-W-306-102618	Total/NA	Water	200.8 LL	160737
550-112461-3	CH-CCR-W-314-102418	Total/NA	Water	200.8 LL	160737
550-112461-4	CH-CCR-M-64A-102218	Total/NA	Water	200.8 LL	160737

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Metals (Continued)

Analysis Batch: 162387 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112461-5	CH-CCR-FD-01-102218	Total/NA	Water	200.8 LL	160737
550-112461-6	CH-CCR-M-52A-102418	Total/NA	Water	200.8 LL	160737
550-112461-7	CH-CCR-M-53A-102618	Total/NA	Water	200.8 LL	160737

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Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-W-305-102618

Lab Sample ID: 550-112461-1

Date Collected: 10/26/18 11:13

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	10/31/18 19:09	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	10/31/18 23:18	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:47	TEK	TAL PHX

Client Sample ID: CH-CCR-W-306-102618

Lab Sample ID: 550-112461-2

Date Collected: 10/26/18 10:36

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161412	11/07/18 06:01	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	10/31/18 23:24	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:49	TEK	TAL PHX

Client Sample ID: CH-CCR-W-314-102418

Lab Sample ID: 550-112461-3

Date Collected: 10/24/18 16:06

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	10/31/18 19:46	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	10/31/18 23:30	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:52	TEK	TAL PHX

Client Sample ID: CH-CCR-M-64A-102218

Lab Sample ID: 550-112461-4

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161412	11/07/18 06:38	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	10/31/18 23:36	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:54	TEK	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112461-1

Client Sample ID: CH-CCR-FD-01-102218

Lab Sample ID: 550-112461-5

Date Collected: 10/22/18 15:39

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	160894	10/31/18 20:59	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	10/31/18 23:41	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:56	TEK	TAL PHX

Client Sample ID: CH-CCR-M-52A-102418

Lab Sample ID: 550-112461-6

Date Collected: 10/24/18 16:50

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	10/31/18 21:18	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160853	11/01/18 22:50	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:59	TEK	TAL PHX

Client Sample ID: CH-CCR-M-53A-102618

Lab Sample ID: 550-112461-7

Date Collected: 10/26/18 11:46

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	10/31/18 21:36	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160853	11/01/18 22:56	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 23:01	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: Cholla

TestAmerica Job ID: 550-112461-1

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: Cholla

TestAmerica Job ID: 550-112461-1

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
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

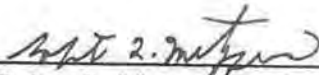
(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 26, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-305-102618 (550-112461-1)	< 0.6	< 0.7	< 0.7
Date of Analysis	11/2/2018	11/2/2018	11/2/2018


Robert L. Metzger, Ph.D., C.H.P.

11/12/2018

Date

Laboratory License Number AZ0462



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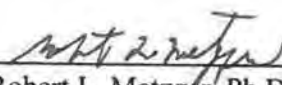
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 26, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-306-102618 (550-112461-2)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
Date
Laboratory License Number AZ0462



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FAX (480) 892-5446

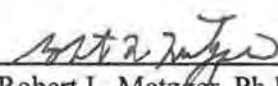
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 24, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-314-102418 (550-112461-3)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
 Date
 Laboratory License Number AZ0462





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FAX (480) 892-5446

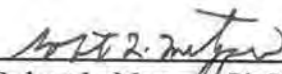
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 22, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-64A-102218 (550-112461-4)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
Date

Laboratory License Number AZ0462



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Website: www.radsafe.com

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

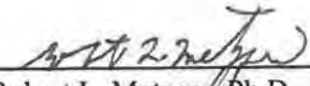
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 22, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD-01-102218 (550-112461-5)	< 0.5	< 0.6	< 0.6

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P.

11/12/2018

Date

Laboratory License Number AZ0462



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Website: www.radsafe.com

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FAX (480) 892-5446

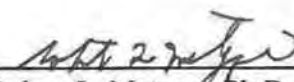
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 24, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-52A-102218 (550-112461-6)	< 0.5	< 0.7	< 0.7

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
 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

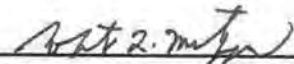
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 26, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-53A-102218 (550-112461-7)	< 0.5	< 0.7	< 0.7

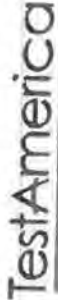
Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
Date
Laboratory License Number AZ0462

TestAmerica Phoenix

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

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler: Lab PM: Baker, Ken		Centrif Tracking Note(s)	
Shipping/Receiving Company: Radiation Safety Eng., Inc.		E-Mail: ken.baker@testamericainc.com		State of Origin: Arizona	
Address: 3245 North Washington Street, Chandler, AZ, 85225		Accreditations Required (See note): State Program - Arizona		COC No: 550-22663.1	
City: Chandler		Due Date Requested: 11/5/2018		Page: Page 1 of 1	
State: AZ		TAT Requested (days):		Job #: 550-112461-1	
Phone: 85225		PO #:		Preservation Codes:	
Email:		WO #:		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NiHSDA F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Project Name: Cholla		Project #: 55002281		Other:	
Site: S50WF		SSOWF:			

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=Water, O=Other, G=Grab)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Radium 226/228) Radium 226/228	Total Number of Containers	Special Instructions/Note
CH-CCR-W-305-102618 (550-112461-1) 61212	10/26/18	11:13 Arizona	Water	Water	X	X	X	2	
CH-CCR-W-306-102618 (550-112461-2) 61213	10/26/18	10:36 Arizona	Water	Water	X	X	X	2	
CH-CCR-W-314-102418 (550-112461-3) 61214	10/24/18	16:06 Arizona	Water	Water	X	X	X	2	
CH-CCR-M-64A-102218 (550-112461-4) 61215	10/22/18	15:39 Arizona	Water	Water	X	X	X	2	
CH-CCR-FD-01-102218 (550-112461-5) 61216	10/22/18	15:39 Arizona	Water	Water	X	X	X	2	
CH-CCR-M-52A-102218 (550-112461-6) 61217	10/24/18	16:50 Arizona	Water	Water	X	X	X	2	
CH-CCR-M-53A-102218 (550-112461-7) 61218	10/26/18	11:46 Arizona	Water	Water	X	X	X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. policies 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

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/OC Requirements:

Empty Kit Relinquished by: _____ Date: _____ Method of Shipment: _____

Relinquished by: *L. D. BERTAN DCS* Date/Time: 10/29/18 Company: _____
 Relinquished by: *Amig Hilde* Date/Time: 10/29/18 19:25 Company: P.S.R.
 Relinquished by: _____ Date/Time: _____ Company: _____

Custody Seals Intact: _____ Cooler Temperature(s) °C and Other Remarks: _____
 Yes No

Regulatory Program: DW NPDES RCRA Other: CCR

Client Contact: Doug Lavarnway 928-587-0319
 Analysis Turnaround Time: CALENDAR DAYS WORKING DAYS
 TAT if different from Below: 2 weeks 1 week 2 days 1 day
 Project Name: _____
 Site: _____
 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)	EPA 200.7 (Li)	200.8 (As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti)	EPA 300.0 (F)	Ra 226 + 228 combined	Carrier:	Date: 10/26/2018	COC No.:	Sampler:	For Lab Use Only:	Walk-in Client:	Lab Sampling:	Job / SDG No.:	Sample Specific Notes:	
CH-CGR-W-305-102618	10/26/18	1113	G	W	4	N	N	X	X	X	X										
CH-CGR-W-306-102618	10/26/18	1036	G	W	4	N	N	X	X	X	X										
CH-CGR-W-314-102418	10/24/18	1606	G	W	4	N	N	X	X	X	X										
CH-CGR-M-64A-102218	10/22/18	1539	G	W	4	N	X	X	X	X	X										
CH-CGR-FD-01-102218	10/22/18	1539	G	W	4	N	N	X	X	X	X										
CH-CGR-M-52A-102418	10/24/2018	1650	G	W	4	N	N	X	X	X	X										
CH-CGR-M-53A-102618	10/26/18	1146	G	W	4	N	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

Special Instructions/QC Requirements & Comments: _____
 Return to Client Disposal by Lab Archive for _____ Months

Method 200.8 with collision cell
 Radium to be analyzed by Radiation Safety
 Custody Seals Intact: Yes No
 Cooler Temp. (°C): Obs'd: _____
 Term ID No.: _____

Relinquished by: *Dos Luccarelli*
 Company: *ADS*
 Date/Time: *10/26/18*
 Received by: _____
 Received in Laboratory by: _____
 Company: *ADP*
 Date/Time: *10/22-18*

Relinquished by: _____
 Company: _____
 Date/Time: _____
 Received in Laboratory by: _____
 Company: _____
 Date/Time: _____

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-112461-1

Login Number: 112461

List Source: TestAmerica Phoenix

List Number: 1

Creator: Doerr, Bret C

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	No volume available, unable to check residual chlorine.



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: 550-114628-1

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:

1/14/2019 3:23:17 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: 550-114628-1
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.
B3	Target analyte detected in calibration blank at or above the method reporting limit.

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: 550-114628-1
SDG: Cholla

Job ID: 550-114628-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-114628-1

Comments

No additional comments.

Receipt

The samples were received on 12/10/2018 11:16 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.6° C, 1.8° C, 2.0° C and 2.2° C.

Receipt Exceptions

Several of the sample sites were missing from the pick list.

CH-CCR-W301-12718 (550-114628-1), CH-CCR-W301-12718 (550-114628-1[DUJ]), CH-CCR-W301-12718 (550-114628-1[MS]), CH-CCR-W301-12718 (550-114628-1[MSD]), CH-CCR-W302-12718 (550-114628-2), CH-CCR-W304-12718 (550-114628-3), CH-CCR-W305-12718 (550-114628-4), CH-CCR-W306-12718 (550-114628-5), CH-CCR-W307-12818 (550-114628-6), CH-CCR-W308-12818 (550-114628-7), CH-CCR-W309-12818 (550-114628-8), CH-CCR-M52A-12818 (550-114628-9), CH-CCR-M53A-12718 (550-114628-10), CH-CCR-FD02-12718 (550-114628-11), CH-CCR-M55A-12818 (550-114628-12) and CH-CCR-W314-12818 (550-114628-13)

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride my method EPA 300.0 due to the nature of the sample matrix: CH-CCR-W301-12718 (550-114628-1), CH-CCR-W305-12718 (550-114628-4) and CH-CCR-M55A-12818 (550-114628-12). 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 my method EPA 300.0 due to the nature of the sample matrix: CH-CCR-W304-12718 (550-114628-3), CH-CCR-W307-12818 (550-114628-6) and CH-CCR-W308-12818 (550-114628-7). 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) 200.7 Rev 4.4: The continuing calibration blank (CCB) for analytical batch 550-164399 contained sodium above the reporting limit (RL). All reported samples associated with this CCB were either ND for this analyte or contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or 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: 550-114628-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-114628-1	CH-CCR-W301-12718	Water	12/07/18 14:19	12/10/18 11:16
550-114628-2	CH-CCR-W302-12718	Water	12/07/18 15:05	12/10/18 11:16
550-114628-3	CH-CCR-W304-12718	Water	12/07/18 15:59	12/10/18 11:16
550-114628-4	CH-CCR-W305-12718	Water	12/07/18 13:06	12/10/18 11:16
550-114628-5	CH-CCR-W306-12718	Water	12/07/18 12:28	12/10/18 11:16
550-114628-6	CH-CCR-W307-12818	Water	12/08/18 13:58	12/10/18 11:16
550-114628-7	CH-CCR-W308-12818	Water	12/08/18 12:42	12/10/18 11:16
550-114628-8	CH-CCR-W309-12818	Water	12/08/18 11:25	12/10/18 11:16
550-114628-9	CH-CCR-M52A-12818	Water	12/08/18 14:54	12/10/18 11:16
550-114628-10	CH-CCR-M53A-12718	Water	12/07/18 11:14	12/10/18 11:16
550-114628-11	CH-CCR-FD02-12718	Water	12/07/18 11:14	12/10/18 11:16
550-114628-12	CH-CCR-M55A-12818	Water	12/08/18 16:50	12/10/18 11:16
550-114628-13	CH-CCR-W314-12818	Water	12/08/18 15:27	12/10/18 11:16

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W301-12718

Lab Sample ID: 550-114628-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4000	D2	100	mg/L	50		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	760	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	170	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	4.6		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2600	D2 M3	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	180		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	180		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	10000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2600	D2	400	mg/L	200		300.0	Total/NA
Fluoride	0.98	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2400	D2	400	mg/L	200		300.0	Total/NA
Boron	0.64		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	560		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	5.5		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1800		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	140		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	140		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7200	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	15.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W304-12718

Lab Sample ID: 550-114628-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2900	D2	400	mg/L	200		300.0	Total/NA
Sulfate	2900	D2	400	mg/L	200		300.0	Total/NA
Boron	0.50		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	590		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	100		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	5.8		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	140		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	140		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	8100	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.5	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2400	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: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W305-12718 (Continued)

Lab Sample ID: 550-114628-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	2300	D2	400	mg/L	200		300.0	Total/NA
Boron	0.35		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	710		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	110		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.0		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1500		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	99		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	99		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	15.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W306-12718

Lab Sample ID: 550-114628-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1900	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.4	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	12000	D2	400	mg/L	200		300.0	Total/NA
Boron	1.1		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	230		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	2.6		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	5700	D2	2.0	mg/L	4		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	19000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.9	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2700	D2	400	mg/L	200		300.0	Total/NA
Sulfate	2600	D2	400	mg/L	200		300.0	Total/NA
Boron	2.4		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	790		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	150		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	1700		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7800	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W308-12818

Lab Sample ID: 550-114628-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2900	D2	400	mg/L	200		300.0	Total/NA
Sulfate	3000	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: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W308-12818 (Continued)

Lab Sample ID: 550-114628-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.45		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	730		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	7.7		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1900		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	160		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	160		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	8300	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W309-12818

Lab Sample ID: 550-114628-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1300	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.0	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2900	D2	400	mg/L	200		300.0	Total/NA
Boron	0.42		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	280		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	12		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1700		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	55		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	55		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	6500	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4900	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.0	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2700	D2	400	mg/L	200		300.0	Total/NA
Boron	4.3		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	920		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	300		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	7.1		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2600	D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	11000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	6.8	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	16.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M53A-12718

Lab Sample ID: 550-114628-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2300	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.3	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: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-M53A-12718 (Continued)

Lab Sample ID: 550-114628-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3000	D2	400	mg/L	200		300.0	Total/NA
Boron	3.4		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	620		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	220		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	13		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1600	B3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	92		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	92		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7600	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	17.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2300	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.3	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3100	D2	400	mg/L	200		300.0	Total/NA
Boron	3.3		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	600		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	13		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1500	B3	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	8000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	17.6	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M55A-12818

Lab Sample ID: 550-114628-12

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4300	D2	400	mg/L	200		300.0	Total/NA
Sulfate	3400	D2	400	mg/L	200		300.0	Total/NA
Boron	0.43		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	700		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	160		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	3.0		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2900	D2	1.0	mg/L	2		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	11000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	17.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2700	D2	400	mg/L	200		300.0	Total/NA
Fluoride	0.89	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: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W314-12818 (Continued)

Lab Sample ID: 550-114628-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	2100	D2	400	mg/L	200		300.0	Total/NA
Boron	1.1		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	800		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	160		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	1.8		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1500	B3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	94		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	94		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7700	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	18.9	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: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W301-12718

Lab Sample ID: 550-114628-1

Date Collected: 12/07/18 14:19

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4000	D2	100	mg/L			12/10/18 23:26	50
Fluoride	ND	D1 D5	0.80	mg/L			12/10/18 23:07	2
Sulfate	3300	D2	100	mg/L			12/10/18 23:26	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		12/11/18 07:22	12/12/18 15:38	1
Calcium	760	M3	2.0	mg/L		12/11/18 07:22	12/12/18 15:38	1
Magnesium	170	M3	2.0	mg/L		12/11/18 07:22	12/12/18 15:38	1
Potassium	4.6		0.50	mg/L		12/11/18 07:22	12/12/18 15:38	1
Sodium	2600	D2 M3	1.0	mg/L		12/11/18 07:22	12/13/18 20:55	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	180		6.0	mg/L			12/11/18 11:20	1
Bicarbonate Alkalinity as CaCO3	180		6.0	mg/L			12/11/18 11:20	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 11:20	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 11:20	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 11:20	1
Total Dissolved Solids	10000	D2	100	mg/L			12/11/18 10:42	1
pH	7.2	H5	1.7	SU			12/10/18 19:35	1
Temperature	16.0	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Date Collected: 12/07/18 15:05

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2600	D2	400	mg/L			12/11/18 07:06	200
Fluoride	0.98	D1	0.80	mg/L			12/14/18 00:13	2
Sulfate	2400	D2	400	mg/L			12/11/18 07:06	200

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		12/11/18 07:22	12/12/18 16:02	1
Calcium	560		2.0	mg/L		12/11/18 07:22	12/12/18 16:02	1
Magnesium	120		2.0	mg/L		12/11/18 07:22	12/12/18 16:02	1
Potassium	5.5		0.50	mg/L		12/11/18 07:22	12/12/18 16:02	1
Sodium	1800		0.50	mg/L		12/11/18 07:22	12/12/18 16:02	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	140		6.0	mg/L			12/11/18 12:44	1
Bicarbonate Alkalinity as CaCO3	140		6.0	mg/L			12/11/18 12:44	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 12:44	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 12:44	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 12:44	1
Total Dissolved Solids	7200	D2	100	mg/L			12/11/18 10:42	1
pH	7.3	H5	1.7	SU			12/10/18 19:35	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Date Collected: 12/07/18 15:05

Matrix: Water

Date Received: 12/10/18 11:16

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	15.2	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W304-12718

Lab Sample ID: 550-114628-3

Date Collected: 12/07/18 15:59

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2900	D2	400	mg/L			12/11/18 06:29	200
Fluoride	ND	D1 D5	0.80	mg/L			12/14/18 00:32	2
Sulfate	2900	D2	400	mg/L			12/11/18 06:29	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.50		0.050	mg/L		12/11/18 07:22	12/12/18 16:08	1
Calcium	590		2.0	mg/L		12/11/18 07:22	12/12/18 16:08	1
Magnesium	100		2.0	mg/L		12/11/18 07:22	12/12/18 16:08	1
Potassium	5.8		0.50	mg/L		12/11/18 07:22	12/12/18 16:08	1
Sodium	2100		0.50	mg/L		12/11/18 07:22	12/12/18 16:08	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	140		6.0	mg/L			12/11/18 12:53	1
Bicarbonate Alkalinity as CaCO3	140		6.0	mg/L			12/11/18 12:53	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 12:53	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 12:53	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 12:53	1
Total Dissolved Solids	8100	D2	100	mg/L			12/11/18 10:42	1
pH	7.3	H5	1.7	SU			12/10/18 19:35	1
Temperature	16.5	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Date Collected: 12/07/18 13:06

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2400	D2	400	mg/L			12/10/18 22:49	200
Fluoride	ND	D1 D5	0.80	mg/L			12/10/18 22:30	2
Sulfate	2300	D2	400	mg/L			12/10/18 22:49	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.35		0.050	mg/L		12/11/18 07:22	12/12/18 16:14	1
Calcium	710		2.0	mg/L		12/11/18 07:22	12/12/18 16:14	1
Magnesium	110		2.0	mg/L		12/11/18 07:22	12/12/18 16:14	1
Potassium	3.0		0.50	mg/L		12/11/18 07:22	12/12/18 16:14	1
Sodium	1500		0.50	mg/L		12/11/18 07:22	12/12/18 16:14	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Date Collected: 12/07/18 13:06

Matrix: Water

Date Received: 12/10/18 11:16

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	99		6.0	mg/L			12/11/18 13:17	1
Bicarbonate Alkalinity as CaCO3	99		6.0	mg/L			12/11/18 13:17	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:17	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 13:17	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:17	1
Total Dissolved Solids	7000	D2	100	mg/L			12/11/18 10:42	1
pH	7.3	H5	1.7	SU			12/10/18 19:35	1
Temperature	15.8	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W306-12718

Lab Sample ID: 550-114628-5

Date Collected: 12/07/18 12:28

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1900	D2	400	mg/L			12/10/18 22:12	200
Fluoride	1.4	D1	0.80	mg/L			12/10/18 21:54	2
Sulfate	12000	D2	400	mg/L			12/10/18 22:12	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.1		0.050	mg/L		12/11/18 07:22	12/12/18 16:20	1
Calcium	410		2.0	mg/L		12/11/18 07:22	12/12/18 16:20	1
Magnesium	230		2.0	mg/L		12/11/18 07:22	12/12/18 16:20	1
Potassium	2.6		0.50	mg/L		12/11/18 07:22	12/12/18 16:20	1
Sodium	5700	D2	2.0	mg/L		12/11/18 07:22	12/13/18 21:18	4

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	130		6.0	mg/L			12/11/18 13:36	1
Bicarbonate Alkalinity as CaCO3	130		6.0	mg/L			12/11/18 13:36	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:36	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 13:36	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:36	1
Total Dissolved Solids	19000	D2	200	mg/L			12/11/18 10:42	1
pH	7.9	H5	1.7	SU			12/10/18 19:35	1
Temperature	16.0	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Date Collected: 12/08/18 13:58

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2700	D2	400	mg/L			12/11/18 19:16	200
Fluoride	ND	D1 D5	0.80	mg/L			12/14/18 01:08	2
Sulfate	2600	D2	400	mg/L			12/11/18 19:16	200

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Date Collected: 12/08/18 13:58

Matrix: Water

Date Received: 12/10/18 11:16

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		12/11/18 07:22	12/12/18 16:25	1
Calcium	790		2.0	mg/L		12/11/18 07:22	12/12/18 16:25	1
Magnesium	150		2.0	mg/L		12/11/18 07:22	12/12/18 16:25	1
Potassium	5.4		0.50	mg/L		12/11/18 07:22	12/12/18 16:25	1
Sodium	1700		0.50	mg/L		12/11/18 07:22	12/12/18 16:25	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	100		6.0	mg/L			12/11/18 13:44	1
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L			12/11/18 13:44	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:44	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 13:44	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:44	1
Total Dissolved Solids	7800	D2	100	mg/L			12/11/18 10:42	1
pH	7.2	H5	1.7	SU			12/10/18 19:35	1
Temperature	16.1	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W308-12818

Lab Sample ID: 550-114628-7

Date Collected: 12/08/18 12:42

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2900	D2	400	mg/L			12/11/18 05:34	200
Fluoride	ND	D1 D5	0.80	mg/L			12/14/18 01:27	2
Sulfate	3000	D2	400	mg/L			12/11/18 05:34	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.45		0.050	mg/L		12/11/18 07:22	12/12/18 16:31	1
Calcium	730		2.0	mg/L		12/11/18 07:22	12/12/18 16:31	1
Magnesium	120		2.0	mg/L		12/11/18 07:22	12/12/18 16:31	1
Potassium	7.7		0.50	mg/L		12/11/18 07:22	12/12/18 16:31	1
Sodium	1900		0.50	mg/L		12/11/18 07:22	12/12/18 16:31	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	160		6.0	mg/L			12/11/18 13:53	1
Bicarbonate Alkalinity as CaCO3	160		6.0	mg/L			12/11/18 13:53	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:53	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 13:53	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 13:53	1
Total Dissolved Solids	8300	D2	100	mg/L			12/11/18 10:42	1
pH	7.1	H5	1.7	SU			12/10/18 19:35	1
Temperature	16.4	H5	0.1	Degrees C			12/10/18 19:35	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W309-12818

Lab Sample ID: 550-114628-8

Date Collected: 12/08/18 11:25

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1300	D2	400	mg/L			12/10/18 21:35	200
Fluoride	1.0	D1	0.80	mg/L			12/10/18 21:17	2
Sulfate	2900	D2	400	mg/L			12/10/18 21:35	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.42		0.050	mg/L		12/11/18 07:22	12/12/18 16:37	1
Calcium	280		2.0	mg/L		12/11/18 07:22	12/12/18 16:37	1
Magnesium	34		2.0	mg/L		12/11/18 07:22	12/12/18 16:37	1
Potassium	12		0.50	mg/L		12/11/18 07:22	12/12/18 16:37	1
Sodium	1700		0.50	mg/L		12/11/18 07:22	12/12/18 16:37	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	55		6.0	mg/L			12/11/18 14:01	1
Bicarbonate Alkalinity as CaCO3	55		6.0	mg/L			12/11/18 14:01	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:01	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 14:01	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:01	1
Total Dissolved Solids	6500	D2	100	mg/L			12/11/18 10:42	1
pH	8.1	H5	1.7	SU			12/10/18 19:35	1
Temperature	16.2	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Date Collected: 12/08/18 14:54

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4900	D2	400	mg/L			12/10/18 20:22	200
Fluoride	1.0	D1	0.80	mg/L			12/10/18 20:03	2
Sulfate	2700	D2	400	mg/L			12/10/18 20:22	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	4.3		0.050	mg/L		12/11/18 07:22	12/12/18 16:49	1
Calcium	920		2.0	mg/L		12/11/18 07:22	12/12/18 16:49	1
Magnesium	300		2.0	mg/L		12/11/18 07:22	12/12/18 16:49	1
Potassium	7.1		0.50	mg/L		12/11/18 07:22	12/12/18 16:49	1
Sodium	2600	D2	1.0	mg/L		12/11/18 07:22	12/13/18 21:24	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	230		6.0	mg/L			12/11/18 14:09	1
Bicarbonate Alkalinity as CaCO3	230		6.0	mg/L			12/11/18 14:09	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:09	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 14:09	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:09	1
Total Dissolved Solids	11000	D2	200	mg/L			12/11/18 10:42	1
pH	6.8	H5	1.7	SU			12/10/18 19:35	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Date Collected: 12/08/18 14:54

Matrix: Water

Date Received: 12/10/18 11:16

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	16.6	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-M53A-12718

Lab Sample ID: 550-114628-10

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2300	D2	400	mg/L			12/10/18 19:45	200
Fluoride	2.3	D1	0.80	mg/L			12/10/18 19:26	2
Sulfate	3000	D2	400	mg/L			12/10/18 19:45	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.4		0.050	mg/L		12/11/18 07:22	12/12/18 16:55	1
Calcium	620		2.0	mg/L		12/11/18 07:22	12/12/18 16:55	1
Magnesium	220		2.0	mg/L		12/11/18 07:22	12/12/18 16:55	1
Potassium	13		0.50	mg/L		12/11/18 07:22	12/12/18 16:55	1
Sodium	1600	B3	0.50	mg/L		12/11/18 07:22	12/12/18 16:55	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	92		6.0	mg/L			12/11/18 14:18	1
Bicarbonate Alkalinity as CaCO3	92		6.0	mg/L			12/11/18 14:18	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:18	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 14:18	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:18	1
Total Dissolved Solids	7600	D2	100	mg/L			12/11/18 10:42	1
pH	7.4	H5	1.7	SU			12/10/18 19:35	1
Temperature	17.9	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2300	D2	400	mg/L			12/11/18 04:57	200
Fluoride	2.3	D1	0.80	mg/L			12/14/18 01:45	2
Sulfate	3100	D2	400	mg/L			12/11/18 04:57	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.3		0.050	mg/L		12/11/18 07:22	12/12/18 17:01	1
Calcium	600		2.0	mg/L		12/11/18 07:22	12/12/18 17:01	1
Magnesium	210		2.0	mg/L		12/11/18 07:22	12/12/18 17:01	1
Potassium	13		0.50	mg/L		12/11/18 07:22	12/12/18 17:01	1
Sodium	1500	B3	0.50	mg/L		12/11/18 07:22	12/12/18 17:01	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	91		6.0	mg/L			12/11/18 14:27	1
Bicarbonate Alkalinity as CaCO3	91		6.0	mg/L			12/11/18 14:27	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:27	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 14:27	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:27	1
Total Dissolved Solids	8000	D2	100	mg/L			12/11/18 10:42	1
pH	7.4	H5	1.7	SU			12/10/18 19:35	1
Temperature	17.6	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-M55A-12818

Lab Sample ID: 550-114628-12

Date Collected: 12/08/18 16:50

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4300	D2	400	mg/L			12/10/18 19:08	200
Fluoride	ND	D1 D5	0.80	mg/L			12/10/18 18:50	2
Sulfate	3400	D2	400	mg/L			12/10/18 19:08	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.43		0.050	mg/L		12/11/18 07:22	12/12/18 17:07	1
Calcium	700		2.0	mg/L		12/11/18 07:22	12/12/18 17:07	1
Magnesium	160		2.0	mg/L		12/11/18 07:22	12/12/18 17:07	1
Potassium	3.0		0.50	mg/L		12/11/18 07:22	12/12/18 17:07	1
Sodium	2900	D2	1.0	mg/L		12/11/18 07:22	12/13/18 21:47	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	190		6.0	mg/L			12/11/18 14:37	1
Bicarbonate Alkalinity as CaCO3	190		6.0	mg/L			12/11/18 14:37	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:37	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 14:37	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:37	1
Total Dissolved Solids	11000	D2	100	mg/L			12/11/18 10:42	1
pH	7.3	H5	1.7	SU			12/10/18 19:35	1
Temperature	17.2	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Date Collected: 12/08/18 15:27

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2700	D2	400	mg/L			12/10/18 18:31	200
Fluoride	0.89	D1	0.80	mg/L			12/10/18 18:13	2
Sulfate	2100	D2	400	mg/L			12/10/18 18:31	200

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Date Collected: 12/08/18 15:27

Matrix: Water

Date Received: 12/10/18 11:16

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.1		0.050	mg/L		12/11/18 07:22	12/12/18 17:13	1
Calcium	800		2.0	mg/L		12/11/18 07:22	12/12/18 17:13	1
Magnesium	160		2.0	mg/L		12/11/18 07:22	12/12/18 17:13	1
Potassium	1.8		0.50	mg/L		12/11/18 07:22	12/12/18 17:13	1
Sodium	1500	B3	0.50	mg/L		12/11/18 07:22	12/12/18 17:13	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	94		6.0	mg/L			12/11/18 14:45	1
Bicarbonate Alkalinity as CaCO3	94		6.0	mg/L			12/11/18 14:45	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:45	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 14:45	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 14:45	1
Total Dissolved Solids	7700	D2	100	mg/L			12/11/18 10:42	1
pH	7.3	H5	1.7	SU			12/10/18 19:35	1
Temperature	18.9	H5	0.1	Degrees C			12/10/18 19:35	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-164154/2
Matrix: Water
Analysis Batch: 164154

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			12/10/18 16:04	1
Fluoride	ND		0.40	mg/L			12/10/18 16:04	1
Sulfate	ND		2.0	mg/L			12/10/18 16:04	1

Lab Sample ID: LCS 550-164154/5
Matrix: Water
Analysis Batch: 164154

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	4.15		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-164154/6
Matrix: Water
Analysis Batch: 164154

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	4.04		mg/L		101	90 - 110	3	20
Sulfate	20.0	20.5		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-114628-1 MS
Matrix: Water
Analysis Batch: 164154

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	4000	D2	1000	4770	D2	mg/L		81	80 - 120
Sulfate	3300	D2	1000	4190	D2	mg/L		91	80 - 120

Lab Sample ID: 550-114628-1 MS
Matrix: Water
Analysis Batch: 164154

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	8.00	8.64	D1	mg/L		101	80 - 120

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 164154

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	4000	D2	1000	4850	D2	mg/L		89	80 - 120	2	20
Sulfate	3300	D2	1000	4270	D2	mg/L		99	80 - 120	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 164154

Client Sample ID: CH-CCR-W301-12718
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	8.00	8.69	D1	mg/L		101	80 - 120	1	20

Lab Sample ID: MB 550-164284/2
Matrix: Water
Analysis Batch: 164284

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			12/11/18 15:16	1
Fluoride	ND		0.40	mg/L			12/11/18 15:16	1
Sulfate	ND		2.0	mg/L			12/11/18 15:16	1

Lab Sample ID: LCS 550-164284/5
Matrix: Water
Analysis Batch: 164284

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	4.10		mg/L		103	90 - 110
Sulfate	20.0	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-164284/6
Matrix: Water
Analysis Batch: 164284

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	4.11		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-114686-A-1 MS
Matrix: Water
Analysis Batch: 164284

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		4.00	4.18		mg/L		102	80 - 120
Sulfate	72		20.0	88.7		mg/L		81	80 - 120

Lab Sample ID: 550-114686-A-1 MS ^10
Matrix: Water
Analysis Batch: 164284

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	250	D2	200	478	D2	mg/L		113	80 - 120

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114686-A-1 MSD
Matrix: Water
Analysis Batch: 164284

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		4.00	4.24		mg/L		104	80 - 120	2	20
Sulfate	72		20.0	88.9		mg/L		82	80 - 120	0	20

Lab Sample ID: 550-114686-A-1 MSD ^10
Matrix: Water
Analysis Batch: 164284

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	250	D2	200	475	D2	mg/L		111	80 - 120	1	20

Lab Sample ID: MB 550-164511/2
Matrix: Water
Analysis Batch: 164511

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			12/13/18 18:23	1
Fluoride	ND		0.40	mg/L			12/13/18 18:23	1
Sulfate	ND		2.0	mg/L			12/13/18 18:23	1

Lab Sample ID: LCS 550-164511/5
Matrix: Water
Analysis Batch: 164511

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	4.07		mg/L		102	90 - 110
Sulfate	20.0	20.3		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-164511/6
Matrix: Water
Analysis Batch: 164511

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	21.2		mg/L		106	90 - 110	0	20
Fluoride	4.00	4.08		mg/L		102	90 - 110	0	20
Sulfate	20.0	20.3		mg/L		101	90 - 110	0	20

Lab Sample ID: 550-114843-A-1 MS
Matrix: Water
Analysis Batch: 164511

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	59		20.0	76.8		mg/L		87	80 - 120
Fluoride	ND		4.00	4.39		mg/L		102	80 - 120
Sulfate	33		20.0	52.7		mg/L		100	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114843-A-1 MSD
Matrix: Water
Analysis Batch: 164511

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

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits			
Chloride	59		20.0	77.1		mg/L		88	80 - 120	0		20
Fluoride	ND		4.00	4.47		mg/L		104	80 - 120	2		20
Sulfate	33		20.0	53.1		mg/L		102	80 - 120	1		20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164126/1-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164126

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Boron	ND		0.050	mg/L		12/11/18 07:22	12/12/18 15:18	1
Calcium	ND		2.0	mg/L		12/11/18 07:22	12/12/18 15:18	1
Magnesium	ND		2.0	mg/L		12/11/18 07:22	12/12/18 15:18	1
Potassium	ND		0.50	mg/L		12/11/18 07:22	12/12/18 15:18	1
Sodium	ND		0.50	mg/L		12/11/18 07:22	12/12/18 15:18	1

Lab Sample ID: LCS 550-164126/2-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				Limits
Boron	1.00	0.950		mg/L		95	85 - 115
Calcium	21.0	20.7		mg/L		99	85 - 115
Magnesium	21.0	21.1		mg/L		100	85 - 115
Potassium	20.0	20.2		mg/L		101	85 - 115
Sodium	20.0	19.7		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-164126/3-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	Limit
		Result	Qualifier				Limits		
Boron	1.00	0.933		mg/L		93	85 - 115	2	20
Calcium	21.0	20.5		mg/L		98	85 - 115	1	20
Magnesium	21.0	20.9		mg/L		99	85 - 115	1	20
Potassium	20.0	19.9		mg/L		100	85 - 115	1	20
Sodium	20.0	19.5		mg/L		97	85 - 115	1	20

Lab Sample ID: 550-114628-1 MS
Matrix: Water
Analysis Batch: 164399

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				Limits
Boron	2.4		1.00	3.34		mg/L		93	70 - 130
Calcium	760	M3	21.0	743	M3	mg/L		-87	70 - 130
Magnesium	170	M3	21.0	185	M3	mg/L		56	70 - 130
Potassium	4.6		20.0	26.0		mg/L		107	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

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

Lab Sample ID: 550-114628-1 MS
Matrix: Water
Analysis Batch: 164498

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Sodium	2600	M3 D2	20.0	2490	M3	mg/L		-313	70 - 130

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 164399

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	2.4		1.00	3.40		mg/L		98	70 - 130	2	20
Calcium	760	M3	21.0	740	M3	mg/L		-102	70 - 130	0	20
Magnesium	170	M3	21.0	183	M3	mg/L		47	70 - 130	1	20
Potassium	4.6		20.0	25.8		mg/L		106	70 - 130	1	20

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 164498

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Sodium	2600	M3 D2	20.0	2500	M3	mg/L		-269	70 - 130	0	20

Lab Sample ID: 550-114629-C-1-A MS ^2
Matrix: Water
Analysis Batch: 164498

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Sodium	4000	M3 D2	20.0	3990	M3	mg/L		-37	70 - 130

Lab Sample ID: 550-114629-C-1-B MSD ^2
Matrix: Water
Analysis Batch: 164498

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Sodium	4000	M3 D2	20.0	3920	M3	mg/L		-366	70 - 130	2	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-164215/6
Matrix: Water
Analysis Batch: 164215

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			12/11/18 11:12	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 11:12	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 11:12	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 11:12	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 11:12	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 550-164215/5
Matrix: Water
Analysis Batch: 164215

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 550-164215/18
Matrix: Water
Analysis Batch: 164215

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	247		mg/L		99	90 - 110	1	20

Lab Sample ID: 550-114628-1 DU
Matrix: Water
Analysis Batch: 164215

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	180		181		mg/L		1	20
Bicarbonate Alkalinity as CaCO3	180		181		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

Lab Sample ID: 550-114628-4 DU
Matrix: Water
Analysis Batch: 164215

Client Sample ID: CH-CCR-W305-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	99		101		mg/L		2	20
Bicarbonate Alkalinity as CaCO3	99		101		mg/L		2	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 550-164156/1
Matrix: Water
Analysis Batch: 164156

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			12/11/18 10:42	1

Lab Sample ID: LCS 550-164156/2
Matrix: Water
Analysis Batch: 164156

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	970		mg/L		97	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

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

Lab Sample ID: LCSD 550-164156/3
Matrix: Water
Analysis Batch: 164156

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	940		mg/L		94	90 - 110	3	10

Lab Sample ID: 550-114628-1 DU
Matrix: Water
Analysis Batch: 164156

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	10000	D2	10200	D2	mg/L		0	10

Lab Sample ID: 550-114629-A-1 DU
Matrix: Water
Analysis Batch: 164156

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	17000	D2	15300	D2	mg/L		8	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-164118/13
Matrix: Water
Analysis Batch: 164118

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: LCSSRM 550-164118/24
Matrix: Water
Analysis Batch: 164118

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 550-164118/36
Matrix: Water
Analysis Batch: 164118

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 550-164118/47
Matrix: Water
Analysis Batch: 164118

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: 550-114628-1
 SDG: Cholla

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

Lab Sample ID: 550-114628-1 DU
Matrix: Water
Analysis Batch: 164118

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.2	H5	7.2	H5	SU		0.1	5
Temperature	16.0	H5	15.9	H5	Degrees C		0.6	

Lab Sample ID: 550-114628-12 DU
Matrix: Water
Analysis Batch: 164118

Client Sample ID: CH-CCR-M55A-12818
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	17.2	H5	17.4	H5	Degrees C		1	

Lab Sample ID: 550-114629-A-1 DU
Matrix: Water
Analysis Batch: 164118

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	RPD Limit
			Result	Qualifier				
pH	7.4	H5	7.4	H5	SU		0.1	5
Temperature	19.2	H5	19.4	H5	Degrees C		1	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

HPLC/IC

Analysis Batch: 164154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	300.0	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	300.0	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	300.0	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	300.0	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	300.0	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	300.0	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	300.0	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	300.0	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	300.0	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	300.0	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	300.0	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	300.0	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	300.0	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	300.0	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	300.0	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	300.0	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	300.0	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	300.0	
MB 550-164154/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164154/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-164154/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	300.0	

Analysis Batch: 164284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	300.0	
MB 550-164284/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164284/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-164284/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114686-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-114686-A-1 MS ^10	Matrix Spike	Total/NA	Water	300.0	
550-114686-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-114686-A-1 MSD ^10	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 164511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	300.0	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	300.0	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	300.0	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	300.0	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	300.0	
MB 550-164511/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164511/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-164511/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114843-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-114843-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Metals

Prep Batch: 164126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	200.7	
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	200.7	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	200.7	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	200.7	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	200.7	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	200.7	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	200.7	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	200.7	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	200.7	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	200.7	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	200.7	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	200.7	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	200.7	
MB 550-164126/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164126/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164126/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	200.7	
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	200.7	
550-114629-C-1-A MS ^2	Matrix Spike	Total/NA	Water	200.7	
550-114629-C-1-B MSD ^2	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 164399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	200.7 Rev 4.4	164126
MB 550-164126/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164126
LCS 550-164126/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164126
LCSD 550-164126/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126

Analysis Batch: 164498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-C-1-A MS ^2	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	164126

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Metals (Continued)

Analysis Batch: 164498 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-C-1-B MSD ^2	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	164126

General Chemistry

Analysis Batch: 164118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	SM 4500 H+ B	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	SM 4500 H+ B	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	SM 4500 H+ B	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	SM 4500 H+ B	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	SM 4500 H+ B	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-164118/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-164118/24	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-164118/36	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-164118/47	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-114628-1 DU	CH-CCR-W301-12718	Total/NA	Water	SM 4500 H+ B	
550-114628-12 DU	CH-CCR-M55A-12818	Total/NA	Water	SM 4500 H+ B	
550-114629-A-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 164156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	SM 2540C	
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	SM 2540C	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	SM 2540C	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	SM 2540C	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	SM 2540C	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	SM 2540C	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	SM 2540C	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	SM 2540C	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	SM 2540C	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	SM 2540C	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	SM 2540C	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	SM 2540C	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	SM 2540C	
MB 550-164156/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-164156/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-164156/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-114628-1 DU	CH-CCR-W301-12718	Total/NA	Water	SM 2540C	
550-114629-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

QC Association Summary

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-114628-1
 SDG: Cholla

General Chemistry (Continued)

Analysis Batch: 164215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	SM 2320B	
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	SM 2320B	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	SM 2320B	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	SM 2320B	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	SM 2320B	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	SM 2320B	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	SM 2320B	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	SM 2320B	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	SM 2320B	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	SM 2320B	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	SM 2320B	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	SM 2320B	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	SM 2320B	
MB 550-164215/6	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-164215/5	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-164215/18	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-114628-1 DU	CH-CCR-W301-12718	Total/NA	Water	SM 2320B	
550-114628-4 DU	CH-CCR-W305-12718	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W301-12718

Lab Sample ID: 550-114628-1

Date Collected: 12/07/18 14:19

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 23:07	NEL	TAL PHX
Total/NA	Analysis	300.0		50	164154	12/10/18 23:26	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 15:38	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	164498	12/13/18 20:55	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 11:20	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 (Start) 12/12/18 11:45 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Date Collected: 12/07/18 15:05

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 07:06	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/14/18 00:13	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:02	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 12:44	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 (Start) 12/12/18 11:45 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-W304-12718

Lab Sample ID: 550-114628-3

Date Collected: 12/07/18 15:59

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 06:29	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/14/18 00:32	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:08	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 12:53	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 (Start) 12/12/18 11:45 (End)	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Date Collected: 12/07/18 13:06

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 22:30	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 22:49	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:14	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 13:17	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-W306-12718

Lab Sample ID: 550-114628-5

Date Collected: 12/07/18 12:28

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 21:54	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 22:12	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:20	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		4	164498	12/13/18 21:18	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 13:36	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Date Collected: 12/08/18 13:58

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164284	12/11/18 19:16	KJS	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/14/18 01:08	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:25	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 13:44	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W308-12818

Lab Sample ID: 550-114628-7

Date Collected: 12/08/18 12:42

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 05:34	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/14/18 01:27	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:31	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 13:53	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-W309-12818

Lab Sample ID: 550-114628-8

Date Collected: 12/08/18 11:25

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 21:17	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 21:35	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:37	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 14:01	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Date Collected: 12/08/18 14:54

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 20:03	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 20:22	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:49	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	164498	12/13/18 21:24	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 14:09	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-M53A-12718

Lab Sample ID: 550-114628-10

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 19:26	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 19:45	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:55	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 14:18	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156		YET	TAL PHX
					(Start)	12/11/18 10:42		
					(End)	12/12/18 11:45		
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 04:57	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/14/18 01:45	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:01	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 14:27	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156		YET	TAL PHX
					(Start)	12/11/18 10:42		
					(End)	12/12/18 11:45		
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-M55A-12818

Lab Sample ID: 550-114628-12

Date Collected: 12/08/18 16:50

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 18:50	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 19:08	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:07	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	164498	12/13/18 21:47	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 14:37	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156		YET	TAL PHX
					(Start)	12/11/18 10:42		
					(End)	12/12/18 11:45		
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-1
SDG: Cholla

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Date Collected: 12/08/18 15:27

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 18:13	NEL	TAL PHX
Total/NA	Analysis	300.0		200	164154	12/10/18 18:31	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:13	SRA	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 14:45	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156		YET	TAL PHX
					(Start)	12/11/18 10:42		
					(End)	12/12/18 11:45		
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	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: 550-114628-1
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: 550-114628-1
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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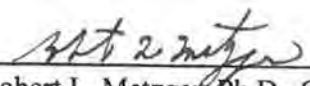
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W301-12718 (550-114628-1)	< 0.6	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P.

12/26/2018

Date

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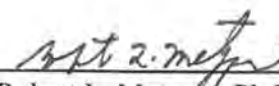
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W302-12718 (550-114628-2)	< 0.6	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018 Date
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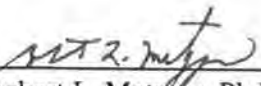
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W304-12718 (550-114628-3)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P.

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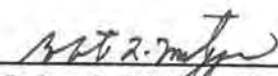
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W305-12718 (550-114628-4)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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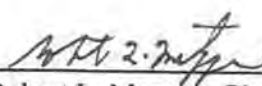
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W306-12718 (550-114628-5)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W307-12818 (550-114628-6)	< 0.5	< 0.7	< 0.7
Date of Analysis	12/14/2018	12/14/2018	12/14/2018


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12/26/2018
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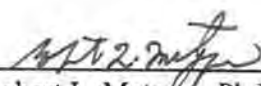
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W308-12818 (550-114628-7)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
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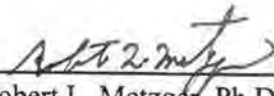
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W309-12818 (550-114628-8)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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12/26/2018

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Laboratory License Number AZ0462

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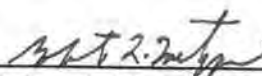
Radiochemical Activity in Water (pCi/L)

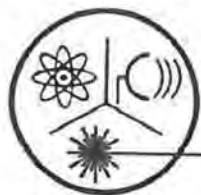
TestAmerica
 4625 E. Cotton Center Blvd., Suite #189
 Phoenix, AZ 85040

Sampling Date: December 08, 2018
 Sample Received: December 11, 2018
 Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M52A-12818 (550-114628-9)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
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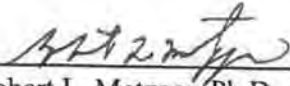
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FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M53A-12718 (550-114628-10)	< 0.5	1.1 ± 0.3	1.1 ± 0.3
Date of Analysis	12/14/2018	12/14/2018	12/14/2018


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12/26/2018

Date

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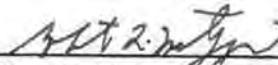
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD02-12718 (550-114628-11)	< 0.5	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018


 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
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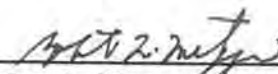
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M55A-12818 (550-114628-12)	< 0.5	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P. 12/26/2018 Date
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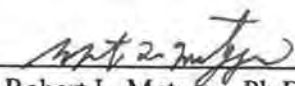
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W314-12818 (550-114628-13)	< 0.5	0.7 ± 0.3	0.7 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 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



Client Information (Sub Contract Lab)		Sampler	Lab PM	Carrier Tracking No(s)	COC No:			
Client Contact: Shipping/Receiving		Phone	Baker, Ken		550-23057-1			
Company: Radiation Safety Eng., Inc.		E-Mail	ken.baker@testamericainc.com	State of Origin	Page 1 of 2			
Address: 3245 North Washington Street, Chandler State, Zip AZ, 85225		Accreditations Required (See note) State Program - Arizona		Job #	550-114628-1			
City		Due Date Requested: 12/19/2016		Preservation Codes:	M - Hexane N - None O - Acetic Acid P - Nitrocellulose Q - Nitrocellulose R - Nitrocellulose S - H2SO4 T - TSP Dodecaldehyde U - Acetone V - MCAA W - pH 4.5 Z - other (specify)			
Chandler		TAT Requested (days):		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA	Other:			
State, Zip AZ, 85225		Project # 55009651		Analysis Requested				
Phone		SSOW#		Total Number of Containers				
Email		Site Arizona Public Service		Special Instructions/Note:				
Sample ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Soil, Dredge, etc.)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Radium 226/228) Radium 226/228	Job #
CH-CCR-W301-12718 (550-114628-1) <i>661418</i>	12/7/18	14:19	Water	Water	X	X	X	Job 3
CH-CCR-W302-12718 (550-114628-2) <i>661419</i>	12/7/18	15:05	Water	Water	X	X	X	Job 3
CH-CCR-W304-12718 (550-114628-3) <i>661420</i>	12/7/18	15:59	Water	Water	X	X	X	Job 3
CH-CCR-W305-12718 (550-114628-4) <i>661421</i>	12/7/18	13:06	Water	Water	X	X	X	Job 3
CH-CCR-W306-12718 (550-114628-5) <i>661422</i>	12/7/18	12:28	Water	Water	X	X	X	Job 3
CH-CCR-W307-12818 (550-114628-6) <i>661423</i>	12/8/18	13:58	Water	Water	X	X	X	Job 3
CH-CCR-W308-12818 (550-114628-7) <i>661424</i>	12/8/18	12:42	Water	Water	X	X	X	Job 3
CH-CCR-W309-12818 (550-114628-8) <i>661425</i>	12/8/18	11:25	Water	Water	X	X	X	Job 3
CH-CCR-M52A-12818 (550-114628-9) <i>661426</i>	12/8/18	14:54	Water	Water	X	X	X	Job 3

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon 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/determination 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: *BATEMAN DCS* Date Time: *12/11/18* Company: *Company*
 Relinquished by: *AMC/HADL* Date Time: *12-11-18* Company: *L.S.E*
 Relinquished by: _____ Date Time: _____ Company: _____
 Relinquished by: _____ Date Time: _____ Company: _____
 Custody Seals Intact: _____ Custody Seal No.: _____
 Cooler Temperature(s) °C and Other Remarks: _____



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 Phoenix, AZ 85040
 Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record

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Client Information (Sub Contract Lab)		Sample:	Lab PM	Carrier Tracking No(s)	
Client Contact: Baker, Ken		Phone:	E-Mail: ken.baker@testamericainc.com	State of Origin: Arizona	
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona		Job #:	
Address: 3245 North Washington Street.		Due Date Requested: 12/19/2018		Preservation Codes:	
City: Chandler		TAT Requested (days):		A - HCL B - Hexane C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Antchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - None N - None O - AshNaO2 P - Na2OAS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)	
State, Zip: AZ, 85225		PO #:	Project #:	Other:	
Phone: 55009651		WO #:	SSOWN#:		
Email:		Project Name: APS - Cholla CCR			
Site: Arizona Public Service					

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Wood, Brick, Gravel, Asphalt, etc.)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Sub (Radium 226/228) Radium 226/228	Total Number of Containers	Special Instructions/Note:
CH-CCR-M53A-12718 (550-114628-10) <i>61427</i>	12/7/18	11-14 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-FD02-12718 (550-114628-11) <i>61428</i>	12/7/18	11-14 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-M55A-12818 (550-114628-12) <i>61429</i>	12/8/18	16:50 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-W314-12818 (550-114628-13) <i>61430</i>	12/8/18	15:27 Arizona	Water	Water	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 subcontract laboratories. This sample shipment is forwarded under chain-of-custody.

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
 Special Instructions/QC Requirements:

Relinquished by	Date/Time	Company	Method of Shipment
<i>BATEMAN DCS</i>	<i>12-11-18</i>	<i>DCS</i>	<i>12-11-18</i>
<i>AMR HREC</i>	<i>14:15</i>	<i>AMR HREC</i>	<i>14:15</i>
Relinquished by	Date/Time	Company	Date/Time
Relinquished by	Date/Time	Company	Date/Time
Relinquished by	Date/Time	Company	Date/Time

Custody Seal Intact: Yes No No
 Cooler Temperature(s) °C and Other Remarks:

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Chain of Custody Record

114628

Regulatory Program:

CCR

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarway** 928-587-0319
 Analysis Turnaround Time
 TAT if different from Below

Lab Contact: **Doug Lavarway** 12/9/2018
 Carrier: 12/9/2018

COC No: 1 of 2 COCs

Sampler: _____
 For Lab Use Only:
 Walk-in Client: _____
 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 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						
CH-CGR-W301-127718	12/7/2018	1419	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W302-127718	12/7/2018	1505	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W304-127718	12/7/2018	1559	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W305-127718	12/7/2018	1306	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W306-127718	12/7/2018	1228	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W307-12818	12/8/2018	1356	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W308-12818	12/8/2018	1242	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-W309-12818	12/8/2018	1124	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-M52A-12818	12/8/2018	1454	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-M53A-127718	12/7/2018	1114	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-FD02-127718	12/7/2018	1114	G	W	2	N	X	X	X	X	X	X	X	X	X	X	X	X	X
CH-CGR-M55A-12818	12/8/2018	1650	G	W	2	N	X	X	X	X	X	X	X	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.

Special Instructions/QC Requirements & Comments: 2.0-c, 2-2-c, 1-8-c, 1-6-c

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: *12/11/18* Received by: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____ Received in Laboratory by: *TA PHX* Company: *TA PHX* Date/Time: *12-10-18*

Relinquished by: _____ Company: _____ Date/Time: _____

Therm ID No: _____

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

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4625 E Cotton Center Blvd
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Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114628

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarney 928-587-0319
 Analysis Turnaround Time
 TAT if different from Below
 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)	EPA 200.7 (Li, Mg, SiO2)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)	Carrier:	12/9/2018	COC No:	1 of 2 COCs
CH-CCR-W301-12718	12/7/2018	1419	G	W	2	N	X	X	X	X				
CH-CCR-W302-12718	12/7/2018	1505	G	W	2	N	X	X	X	X				
CH-CCR-W304-12718	12/7/2018	1559	G	W	2	N	X	X	X	X				
CH-CCR-W305-12718	12/7/2018	1306	G	W	2	N	X	X	X	X				
CH-CCR-W306-12718	12/7/2018	1228	G	W	2	N	X	X	X	X				
CH-CCR-W307-12818	12/8/2018	1358	G	W	2	N	X	X	X	X				
CH-CCR-W308-12818	12/8/2018	1242	G	W	2	N	X	X	X	X				
CH-CCR-W309-12818	12/8/2018	1124	G	W	2	N	X	X	X	X				
CH-CCR-M52A-12818	12/8/2018	1454	G	W	2	N	X	X	X	X				
CH-CCR-M53A-12718	12/7/2018	1114	G	W	2	N	X	X	X	X				
CH-CCR-FD02-12718	12/7/2018	1114	G	W	2	N	X	X	X	X				
CH-CCR-M55A-12818	12/8/2018	1650	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

Special Instructions/QC Requirements & Comments:
 Return to Client Disposal by Lab Archive for _____ Months

Cooler Temp. (°C): Obs'd: 2-8°C, 2-2°C, 1-8°C, 1-6°C
 Corrd: _____ Therm ID No: _____

Relinquished by: Doug Lavarney
 Company: APS
 Date/Time: 12/12/18

Relinquished by: _____
 Company: _____
 Date/Time: _____

Relinquished by: _____
 Company: _____
 Date/Time: _____

Received by: _____
 Company: _____
 Date/Time: _____

Received in Laboratory: _____
 Company: _____
 Date/Time: _____

TestAmerica Phoenix

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114628

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.



Client Contact: Doug Lavarnway 928-587-0319
 Analysis Turnaround Time
 TAT if different from Below
 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)	932.0 Radium 226 and 228	Lab Contact:	Carrier:	12/9/2018	COC No.:	1 of 2 COCs
CH-CCR-W301-12718	12/7/2018	1419	G	W	2	N	X						
CH-CCR-W302-12718	12/7/2018	1505	G	W	2	N	X						
CH-CCR-W304-12718	12/7/2018	1559	G	W	2	N	X						
CH-CCR-W305-12718	12/7/2018	1306	G	W	2	N	X						
CH-CCR-W306-12718	12/7/2018	1228	G	W	2	N	X						
CH-CCR-W307-12818	12/8/2018	1358	G	W	2	N	X						
CH-CCR-W308-12818	12/8/2018	1242	G	W	2	N	X						
CH-CCR-W309-12818	12/8/2018	1124	G	W	2	N	X						
CH-CCR-M52A-12818	12/8/2018	1454	G	W	2	N	X						
CH-CCR-M53A-12718	12/7/2018	1114	G	W	2	N	X						
CH-CCR-FD02-12718	12/7/2018	1114	G	W	2	N	X						
CH-CCR-M55A-12818	12/8/2018	1650	G	W	2	N	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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Cooler Temp (C): 1.6-2.2-2.0-2.2-1.8-2.2
 Therm ID No.:

Custody Seals Intact: Yes No
 Relinquished by: *David Calverney* Company: *APDS* Date/Time: *12/6/18*
 Relinquished by: _____ Company: _____ Date/Time: _____

Received by: _____ Company: _____ Date/Time: _____
 Received in Laboratory: _____ Company: _____ Date/Time: *12-10-18*

TestAmerica Phoenix

Chain of Custody Record

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phone 602.437.3340 fax 602.454.9303

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Regulatory Program:

CCR

TestAmerica Laboratories, Inc.
THE LEADER IN ENVIRONMENTAL TESTING

1/14/2019

Client Contact		Doug Lavarnway		Doug Lavarnway		Carrier:		12/9/2018		COC No: 2 of 2 COCs											
4801 Cholla Lake Road		928-587-0319		Lab Contact:						Sampler:											
Joseph City, Az 86032		Analysis Turnaround Time								For Lab Use Only:											
(928) 587-0319		TAT if different from Below								Walk-in Client:											
(xxx) xxx-xxxx										Lab Sampling:											
Project Name: CCR										Job / SDG No.:											
Site: Cholla										Sample Specific Notes:											
P O #																					
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grav)	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					
CH-CCR-W314-12818		12/8/2018	1527 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.		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months																			
Special Instructions/QC Requirements & Comments:		Yield 2.0-e, 2.2-e, 1.8-e, 1.6-e TAPHX TAPHX TAPHX																			
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd:		Cor'd:		Therm ID No.:		Received by:		Company:		Date/Time:		Received in Laboratory by:		Company:		Date/Time:	
Relinquished by: Doug Lavarnway		Company: APS		Date/Time: 12/8/18		Company: APS		Date/Time: 12/10/18		Received by: [Signature]		Company: TAPHX		Date/Time: 12-10-18		Received in Laboratory by: [Signature]		Company: TAPHX		Date/Time: 12-10-18	
Relinquished by: [Signature]		Company:		Date/Time:		Company:		Date/Time:		Received by:		Company:		Date/Time:		Received in Laboratory by:		Company:		Date/Time:	

Chain of Custody Record

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114628
 Regulatory Program: CCR

TestAmerica Laboratories, Inc.
 1/14/2019

Client Contact		Doug Lavarway	928-587-0319		Doug Lavarway		12/9/2018	Carrier:	COC No.:	2 of 2 COCs	
Analysis Turnaround Time		TAT if different from Below		Lab Contact:				Sampler:			
APs Cholla 4801 Cholla Lake Road Joseph City, Az 86032		Phone (928) 587-0319 FAX (xxx) xxx-xxxx		EPA 200.7 (Li, Mg, SiO2)		EPA 200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti)		EPA 300.0 (F)			
Project Name: CCR		Site: Cholla		P O #		Return to Client		Disposal by Lab		Archive for	
Sample Identification		Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)		Perform MS / MSD (Y / N)		
CH-CCR-W314-12818		12/8/2018	1527 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.											
Special Instructions/QC Requirements & Comments:											
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd:		Corrd:		Therm ID No.:			
Relinquished by: <i>Dave Lavarway</i>		Company: <i>APS</i>		Date/Time: <i>12/10/18</i>		Received by:		Company:		Date/Time:	
Relinquished by:		Company:		Date/Time:		Received in Laboratory by: <i>IA-PHX</i>		Company: <i>IA-PS</i>		Date/Time: <i>12-10-18 11:16</i>	

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Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarney** 928-587-0319
Analysis Turnaround Time

4801 Cholla Lake Road
Joseph City, Az 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name: CCR
Site: Cholla
P O #

TAT if different from Below
Lab Contact: **Doug Lavarney**
Carrier: **12/9/2018**
COC No.: **2** of **2** COGS
Sampler: _____
For Lab Use Only:
Walk-in Client: _____
Lab Sampling: _____
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)	
						Y	N	Y	N
CH-CCR-W314-12818		<i>-13</i>		W	2	N	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: Radium shall be sent off to Radiation Safety Engineering for analysis.
Cooler Temp. (C): Obs'd: *1.6°C* 2.0-2.2°C 1.8°C
Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No
Custody Seal No.: _____
Therm ID No.: _____

Relinquished by: *Doug Lavarney* Company: *APS* Date/Time: *12/11/18*
Received by: _____ Company: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____
Received in Laboratory by: *JAPHX* Company: *THAS* Date/Time: *12/10/18*

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114628-1

SDG Number: Cholla

Login Number: 114628

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: 550-114628-2

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:

1/29/2019 9:05:59 AM

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: 550-114628-2
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.

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: 550-114628-2
SDG: Cholla

Job ID: 550-114628-2

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-114628-2

Comments

No additional comments.

Receipt

The samples were received on 12/10/2018 11:16 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.6° C, 1.8° C, 2.0° C and 2.2° C.

Receipt Exceptions

Several of the sample sites were missing from the pick list.

CH-CCR-W301-12718 (550-114628-1), CH-CCR-W301-12718 (550-114628-1[DU]), CH-CCR-W301-12718 (550-114628-1[MS]), CH-CCR-W301-12718 (550-114628-1[MSD]), CH-CCR-W302-12718 (550-114628-2), CH-CCR-W304-12718 (550-114628-3), CH-CCR-W305-12718 (550-114628-4), CH-CCR-W306-12718 (550-114628-5), CH-CCR-W307-12818 (550-114628-6), CH-CCR-W308-12818 (550-114628-7), CH-CCR-W309-12818 (550-114628-8), CH-CCR-M52A-12818 (550-114628-9), CH-CCR-M53A-12718 (550-114628-10), CH-CCR-FD02-12718 (550-114628-11), CH-CCR-M55A-12818 (550-114628-12) and CH-CCR-W314-12818 (550-114628-13)

HPLC/IC

Method(s) 300.0: The following samples were diluted for Fluoride my method EPA 300.0 due to the nature of the sample matrix: CH-CCR-W301-12718 (550-114628-1), CH-CCR-W305-12718 (550-114628-4) and CH-CCR-M55A-12818 (550-114628-12). 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 my method EPA 300.0 due to the nature of the sample matrix: CH-CCR-W304-12718 (550-114628-3), CH-CCR-W307-12818 (550-114628-6) and CH-CCR-W308-12818 (550-114628-7). 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: CH-CCR-W301-12718 (550-114628-1), CH-CCR-W302-12718 (550-114628-2), CH-CCR-W304-12718 (550-114628-3), CH-CCR-W305-12718 (550-114628-4), CH-CCR-W306-12718 (550-114628-5), CH-CCR-W307-12818 (550-114628-6), CH-CCR-W308-12818 (550-114628-7), CH-CCR-W309-12818 (550-114628-8), CH-CCR-M52A-12818 (550-114628-9), CH-CCR-M53A-12718 (550-114628-10), CH-CCR-FD02-12718 (550-114628-11), CH-CCR-M55A-12818 (550-114628-12) and CH-CCR-W314-12818 (550-114628-13). 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: 550-114628-2
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-114628-1	CH-CCR-W301-12718	Water	12/07/18 14:19	12/10/18 11:16
550-114628-2	CH-CCR-W302-12718	Water	12/07/18 15:05	12/10/18 11:16
550-114628-3	CH-CCR-W304-12718	Water	12/07/18 15:59	12/10/18 11:16
550-114628-4	CH-CCR-W305-12718	Water	12/07/18 13:06	12/10/18 11:16
550-114628-5	CH-CCR-W306-12718	Water	12/07/18 12:28	12/10/18 11:16
550-114628-6	CH-CCR-W307-12818	Water	12/08/18 13:58	12/10/18 11:16
550-114628-7	CH-CCR-W308-12818	Water	12/08/18 12:42	12/10/18 11:16
550-114628-8	CH-CCR-W309-12818	Water	12/08/18 11:25	12/10/18 11:16
550-114628-9	CH-CCR-M52A-12818	Water	12/08/18 14:54	12/10/18 11:16
550-114628-10	CH-CCR-M53A-12718	Water	12/07/18 11:14	12/10/18 11:16
550-114628-11	CH-CCR-FD02-12718	Water	12/07/18 11:14	12/10/18 11:16
550-114628-12	CH-CCR-M55A-12818	Water	12/08/18 16:50	12/10/18 11:16
550-114628-13	CH-CCR-W314-12818	Water	12/08/18 15:27	12/10/18 11:16

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W301-12718

Lab Sample ID: 550-114628-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.43		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	170		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	0.013		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.017		0.0020	mg/L	10		200.8 LL	Total Recoverable
Lead	0.0012		0.0010	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.080		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.98	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
Magnesium	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	12		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.014		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.0049		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.068		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W304-12718

Lab Sample ID: 550-114628-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.40		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	100		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	9.6		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.0083		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.0034		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.026		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.21		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	110		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	11		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.012		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.018		0.0020	mg/L	10		200.8 LL	Total Recoverable
Lead	0.0030		0.0010	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.021		0.0020	mg/L	10		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: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W306-12718

Lab Sample ID: 550-114628-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.4	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.73		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	230		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	12		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0041		0.0020	mg/L	10		200.8 LL	Total Recoverable
Barium	0.010		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.028		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.24		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	150		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	13		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.012		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.076		0.0020	mg/L	10		200.8 LL	Total Recoverable
Lead	0.0020		0.0010	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.0044		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W308-12818

Lab Sample ID: 550-114628-7

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
Magnesium	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	12		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0023		0.0020	mg/L	10		200.8 LL	Total Recoverable
Barium	0.0082		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.0033		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.032		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W309-12818

Lab Sample ID: 550-114628-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.0	D1	0.80	mg/L	2		300.0	Total/NA
Magnesium	34		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	22		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0044		0.0020	mg/L	10		200.8 LL	Total Recoverable
Barium	0.011		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.024		0.0020	mg/L	10		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: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.0	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.29		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	300		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
Arsenic	0.0022		0.0020	mg/L	10		200.8 LL	Total Recoverable
Barium	0.019		0.0020	mg/L	10		200.8 LL	Total Recoverable
Chromium	0.043		0.0050	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.036		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.031		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-M53A-12718

Lab Sample ID: 550-114628-10

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.3	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.20		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	9.4		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.0085		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cadmium	0.0014		0.0010	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.014		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.042		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.3	D1	0.80	mg/L	2		300.0	Total/NA
Magnesium	210		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	8.9		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.0087		0.0020	mg/L	10		200.8 LL	Total Recoverable
Cadmium	0.0012		0.0010	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.013		0.0020	mg/L	10		200.8 LL	Total Recoverable
Lead	0.0014		0.0010	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.039		0.0020	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-M55A-12818

Lab Sample ID: 550-114628-12

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
Magnesium	160		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO2, Silica	12		0.21	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: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-M55A-12818 (Continued)

Lab Sample ID: 550-114628-12

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.014		0.0020	mg/L	10		200.8 LL	Total Recoverable
Chromium	0.17		0.0050	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.020		0.0020	mg/L	10		200.8 LL	Total Recoverable
Selenium	0.083		0.0060	mg/L	10		200.8 LL	Total Recoverable

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.89	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
Magnesium	160		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
SiO ₂ , Silica	8.9		0.21	mg/L	1		200.7 Rev 4.4	Total/NA
Barium	0.013		0.0020	mg/L	10		200.8 LL	Total Recoverable
Chromium	0.014		0.0050	mg/L	10		200.8 LL	Total Recoverable
Cobalt	0.014		0.0020	mg/L	10		200.8 LL	Total Recoverable
Molybdenum	0.0087		0.0020	mg/L	10		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: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W301-12718

Lab Sample ID: 550-114628-1

Date Collected: 12/07/18 14:19

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/10/18 23:07	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.43		0.20	mg/L		12/11/18 07:22	12/12/18 15:38	1
Magnesium	170		2.0	mg/L		12/11/18 07:22	12/12/18 15:38	1
SiO2, Silica	14		0.21	mg/L		12/11/18 07:22	12/12/18 15:38	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 17:44	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 17:44	10
Barium	0.013		0.0020	mg/L		01/18/19 09:43	01/20/19 17:44	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:44	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 17:44	10
Cobalt	0.017		0.0020	mg/L		01/18/19 09:43	01/20/19 17:44	10
Lead	0.0012		0.0010	mg/L		01/18/19 09:43	01/20/19 17:44	10
Molybdenum	0.080		0.0020	mg/L		01/18/19 09:43	01/20/19 17:44	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 17:44	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:44	10

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Date Collected: 12/07/18 15:05

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.98	D1	0.80	mg/L			12/14/18 00:13	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		12/11/18 07:22	12/12/18 16:02	1
Magnesium	120		2.0	mg/L		12/11/18 07:22	12/12/18 16:02	1
SiO2, Silica	12		0.21	mg/L		12/11/18 07:22	12/12/18 16:02	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 17:50	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 17:50	10
Barium	0.014		0.0020	mg/L		01/18/19 09:43	01/20/19 17:50	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:50	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 17:50	10
Cobalt	0.0049		0.0020	mg/L		01/18/19 09:43	01/20/19 17:50	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:50	10
Molybdenum	0.068		0.0020	mg/L		01/18/19 09:43	01/20/19 17:50	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 17:50	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:50	10

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W304-12718

Lab Sample ID: 550-114628-3

Date Collected: 12/07/18 15:59

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/14/18 00:32	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		12/11/18 07:22	12/12/18 16:08	1
Magnesium	100		2.0	mg/L		12/11/18 07:22	12/12/18 16:08	1
SiO2, Silica	9.6		0.21	mg/L		12/11/18 07:22	12/12/18 16:08	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 17:52	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 17:52	10
Barium	0.0083		0.0020	mg/L		01/18/19 09:43	01/20/19 17:52	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:52	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 17:52	10
Cobalt	0.0034		0.0020	mg/L		01/18/19 09:43	01/20/19 17:52	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:52	10
Molybdenum	0.026		0.0020	mg/L		01/18/19 09:43	01/20/19 17:52	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 17:52	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 17:52	10

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Date Collected: 12/07/18 13:06

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/10/18 22:30	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.21		0.20	mg/L		12/11/18 07:22	12/12/18 16:14	1
Magnesium	110		2.0	mg/L		12/11/18 07:22	12/12/18 16:14	1
SiO2, Silica	11		0.21	mg/L		12/11/18 07:22	12/12/18 16:14	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:21	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:21	10
Barium	0.012		0.0020	mg/L		01/18/19 09:43	01/20/19 18:21	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:21	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:21	10
Cobalt	0.018		0.0020	mg/L		01/18/19 09:43	01/20/19 18:21	10
Lead	0.0030		0.0010	mg/L		01/18/19 09:43	01/20/19 18:21	10
Molybdenum	0.021		0.0020	mg/L		01/18/19 09:43	01/20/19 18:21	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:21	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:21	10

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W306-12718

Lab Sample ID: 550-114628-5

Date Collected: 12/07/18 12:28

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.4	D1	0.80	mg/L			12/10/18 21:54	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.73		0.20	mg/L		12/11/18 07:22	12/12/18 16:20	1
Magnesium	230		2.0	mg/L		12/11/18 07:22	12/12/18 16:20	1
SiO2, Silica	12		0.21	mg/L		12/11/18 07:22	12/12/18 16:20	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:23	10
Arsenic	0.0041		0.0020	mg/L		01/18/19 09:43	01/20/19 18:23	10
Barium	0.010		0.0020	mg/L		01/18/19 09:43	01/20/19 18:23	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:23	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:23	10
Cobalt	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:23	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:23	10
Molybdenum	0.028		0.0020	mg/L		01/18/19 09:43	01/20/19 18:23	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:23	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:23	10

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Date Collected: 12/08/18 13:58

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/14/18 01:08	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.24		0.20	mg/L		12/11/18 07:22	12/12/18 16:25	1
Magnesium	150		2.0	mg/L		12/11/18 07:22	12/12/18 16:25	1
SiO2, Silica	13		0.21	mg/L		12/11/18 07:22	12/12/18 16:25	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:25	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:25	10
Barium	0.012		0.0020	mg/L		01/18/19 09:43	01/20/19 18:25	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:25	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:25	10
Cobalt	0.076		0.0020	mg/L		01/18/19 09:43	01/20/19 18:25	10
Lead	0.0020		0.0010	mg/L		01/18/19 09:43	01/20/19 18:25	10
Molybdenum	0.0044		0.0020	mg/L		01/18/19 09:43	01/20/19 18:25	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:25	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:25	10

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W308-12818

Lab Sample ID: 550-114628-7

Date Collected: 12/08/18 12:42

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/14/18 01:27	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		12/11/18 07:22	12/12/18 16:31	1
Magnesium	120		2.0	mg/L		12/11/18 07:22	12/12/18 16:31	1
SiO2, Silica	12		0.21	mg/L		12/11/18 07:22	12/12/18 16:31	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:27	10
Arsenic	0.0023		0.0020	mg/L		01/18/19 09:43	01/20/19 18:27	10
Barium	0.0082		0.0020	mg/L		01/18/19 09:43	01/20/19 18:27	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:27	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:27	10
Cobalt	0.0033		0.0020	mg/L		01/18/19 09:43	01/20/19 18:27	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:27	10
Molybdenum	0.032		0.0020	mg/L		01/18/19 09:43	01/20/19 18:27	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:27	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:27	10

Client Sample ID: CH-CCR-W309-12818

Lab Sample ID: 550-114628-8

Date Collected: 12/08/18 11:25

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.0	D1	0.80	mg/L			12/10/18 21:17	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		12/11/18 07:22	12/12/18 16:37	1
Magnesium	34		2.0	mg/L		12/11/18 07:22	12/12/18 16:37	1
SiO2, Silica	22		0.21	mg/L		12/11/18 07:22	12/12/18 16:37	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:29	10
Arsenic	0.0044		0.0020	mg/L		01/18/19 09:43	01/20/19 18:29	10
Barium	0.011		0.0020	mg/L		01/18/19 09:43	01/20/19 18:29	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:29	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:29	10
Cobalt	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:29	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:29	10
Molybdenum	0.024		0.0020	mg/L		01/18/19 09:43	01/20/19 18:29	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:29	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:29	10

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Date Collected: 12/08/18 14:54

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.0	D1	0.80	mg/L			12/10/18 20:03	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.29		0.20	mg/L		12/11/18 07:22	12/12/18 16:49	1
Magnesium	300		2.0	mg/L		12/11/18 07:22	12/12/18 16:49	1
SiO2, Silica	14		0.21	mg/L		12/11/18 07:22	12/12/18 16:49	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:31	10
Arsenic	0.0022		0.0020	mg/L		01/18/19 09:43	01/20/19 18:31	10
Barium	0.019		0.0020	mg/L		01/18/19 09:43	01/20/19 18:31	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:31	10
Chromium	0.043		0.0050	mg/L		01/18/19 09:43	01/20/19 18:31	10
Cobalt	0.036		0.0020	mg/L		01/18/19 09:43	01/20/19 18:31	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:31	10
Molybdenum	0.031		0.0020	mg/L		01/18/19 09:43	01/20/19 18:31	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:31	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:31	10

Client Sample ID: CH-CCR-M53A-12718

Lab Sample ID: 550-114628-10

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.3	D1	0.80	mg/L			12/10/18 19:26	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.20		0.20	mg/L		12/11/18 07:22	12/12/18 16:55	1
Magnesium	220		2.0	mg/L		12/11/18 07:22	12/12/18 16:55	1
SiO2, Silica	9.4		0.21	mg/L		12/11/18 07:22	12/12/18 16:55	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:33	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:33	10
Barium	0.0085		0.0020	mg/L		01/18/19 09:43	01/20/19 18:33	10
Cadmium	0.0014		0.0010	mg/L		01/18/19 09:43	01/20/19 18:33	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:33	10
Cobalt	0.014		0.0020	mg/L		01/18/19 09:43	01/20/19 18:33	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:33	10
Molybdenum	0.042		0.0020	mg/L		01/18/19 09:43	01/20/19 18:33	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:33	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:33	10

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.3	D1	0.80	mg/L			12/14/18 01:45	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		12/11/18 07:22	12/12/18 17:01	1
Magnesium	210		2.0	mg/L		12/11/18 07:22	12/12/18 17:01	1
SiO2, Silica	8.9		0.21	mg/L		12/11/18 07:22	12/12/18 17:01	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:46	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:46	10
Barium	0.0087		0.0020	mg/L		01/18/19 09:43	01/20/19 18:46	10
Cadmium	0.0012		0.0010	mg/L		01/18/19 09:43	01/20/19 18:46	10
Chromium	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:46	10
Cobalt	0.013		0.0020	mg/L		01/18/19 09:43	01/20/19 18:46	10
Lead	0.0014		0.0010	mg/L		01/18/19 09:43	01/20/19 18:46	10
Molybdenum	0.039		0.0020	mg/L		01/18/19 09:43	01/20/19 18:46	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:46	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:46	10

Client Sample ID: CH-CCR-M55A-12818

Lab Sample ID: 550-114628-12

Date Collected: 12/08/18 16:50

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			12/10/18 18:50	2

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		12/11/18 07:22	12/12/18 17:07	1
Magnesium	160		2.0	mg/L		12/11/18 07:22	12/12/18 17:07	1
SiO2, Silica	12		0.21	mg/L		12/11/18 07:22	12/12/18 17:07	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:48	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:48	10
Barium	0.014		0.0020	mg/L		01/18/19 09:43	01/20/19 18:48	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:48	10
Chromium	0.17		0.0050	mg/L		01/18/19 09:43	01/20/19 18:48	10
Cobalt	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:48	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:48	10
Molybdenum	0.020		0.0020	mg/L		01/18/19 09:43	01/20/19 18:48	10
Selenium	0.083		0.0060	mg/L		01/18/19 09:43	01/20/19 18:48	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:48	10

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Date Collected: 12/08/18 15:27

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.89	D1	0.80	mg/L			12/10/18 18:13	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		12/11/18 07:22	12/12/18 17:13	1
Magnesium	160		2.0	mg/L		12/11/18 07:22	12/12/18 17:13	1
SiO ₂ , Silica	8.9		0.21	mg/L		12/11/18 07:22	12/12/18 17:13	1

Method: 200.8 LL - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0050	mg/L		01/18/19 09:43	01/20/19 18:50	10
Arsenic	ND		0.0020	mg/L		01/18/19 09:43	01/20/19 18:50	10
Barium	0.013		0.0020	mg/L		01/18/19 09:43	01/20/19 18:50	10
Cadmium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:50	10
Chromium	0.014		0.0050	mg/L		01/18/19 09:43	01/20/19 18:50	10
Cobalt	0.014		0.0020	mg/L		01/18/19 09:43	01/20/19 18:50	10
Lead	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:50	10
Molybdenum	0.0087		0.0020	mg/L		01/18/19 09:43	01/20/19 18:50	10
Selenium	ND		0.0060	mg/L		01/18/19 09:43	01/20/19 18:50	10
Thallium	ND		0.0010	mg/L		01/18/19 09:43	01/20/19 18:50	10

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: 550-114628-1 MS
Matrix: Water
Analysis Batch: 164154

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	8.00	8.64	D1	mg/L		101	80 - 120

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 164154

Client Sample ID: CH-CCR-W301-12718
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	8.00	8.69	D1	mg/L		101	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164126/1-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164126

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		12/11/18 07:22	12/12/18 15:18	1
Magnesium	ND		2.0	mg/L		12/11/18 07:22	12/12/18 15:18	1
SiO2, Silica	ND		0.21	mg/L		12/11/18 07:22	12/12/18 15:18	1

Lab Sample ID: LCS 550-164126/2-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	1.02		mg/L		102	85 - 115
Magnesium	21.0	21.1		mg/L		100	85 - 115
SiO2, Silica	10.7	9.78		mg/L		91	85 - 115

Lab Sample ID: LCSD 550-164126/3-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	1.00	1.00		mg/L		100	85 - 115	1	20
Magnesium	21.0	20.9		mg/L		99	85 - 115	1	20
SiO2, Silica	10.7	9.63		mg/L		90	85 - 115	2	20

Lab Sample ID: 550-114628-1 MS
Matrix: Water
Analysis Batch: 164399

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.433		1.00	1.42		mg/L		99	70 - 130
Magnesium	174		21.0	185	M3	mg/L		56	70 - 130
SiO2, Silica	13.6		10.7	23.5		mg/L		92	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

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

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 164399

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Lithium	0.433		1.00	1.41		mg/L		98	70 - 130	1	20
Magnesium	174		21.0	183	M3	mg/L		47	70 - 130	1	20
SiO2, Silica	13.6		10.7	23.8		mg/L		94	70 - 130	1	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
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	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	Limits	RPD	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

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

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

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	RPD Limit
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: 550-114628-1 MS
Matrix: Water
Analysis Batch: 523766

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	ND		0.0800	0.0887		mg/L		111	70 - 130		
Arsenic	ND		0.0800	0.0791		mg/L		97	70 - 130		
Barium	0.013		0.0800	0.0871		mg/L		93	70 - 130		
Cadmium	ND		0.0800	0.0770		mg/L		96	70 - 130		
Chromium	ND		0.0800	0.0754		mg/L		94	70 - 130		
Cobalt	0.017		0.0800	0.0911		mg/L		93	70 - 130		
Lead	0.0012		0.0800	0.0753		mg/L		93	70 - 130		
Molybdenum	0.080		0.0800	0.160		mg/L		99	70 - 130		
Selenium	ND		0.0800	0.0739		mg/L		92	70 - 130		
Thallium	ND		0.0800	0.0742		mg/L		93	70 - 130		

Lab Sample ID: 550-114628-1 MSD
Matrix: Water
Analysis Batch: 523766

Client Sample ID: CH-CCR-W301-12718
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	ND		0.0800	0.0882		mg/L		110	70 - 130	1	20
Arsenic	ND		0.0800	0.0771		mg/L		95	70 - 130	3	20
Barium	0.013		0.0800	0.0839		mg/L		88	70 - 130	4	20
Cadmium	ND		0.0800	0.0751		mg/L		94	70 - 130	2	20
Chromium	ND		0.0800	0.0744		mg/L		93	70 - 130	1	20
Cobalt	0.017		0.0800	0.0887		mg/L		90	70 - 130	3	20
Lead	0.0012		0.0800	0.0733		mg/L		90	70 - 130	3	20
Molybdenum	0.080		0.0800	0.154		mg/L		92	70 - 130	4	20
Selenium	ND		0.0800	0.0728		mg/L		91	70 - 130	1	20
Thallium	ND		0.0800	0.0717		mg/L		90	70 - 130	3	20

Lab Sample ID: 550-114628-10 MS
Matrix: Water
Analysis Batch: 523766

Client Sample ID: CH-CCR-M53A-12718
Prep Type: Total Recoverable
Prep Batch: 523365

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
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		
Chromium	ND		0.0800	0.0776		mg/L		97	70 - 130		
Cobalt	0.014		0.0800	0.0904		mg/L		96	70 - 130		

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

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

Lab Sample ID: 550-114628-10 MS

Matrix: Water

Analysis Batch: 523766

Client Sample ID: CH-CCR-M53A-12718

Prep Type: Total Recoverable

Prep Batch: 523365

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	RPD
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: 550-114628-10 MSD

Matrix: Water

Analysis Batch: 523766

Client Sample ID: CH-CCR-M53A-12718

Prep Type: Total Recoverable

Prep Batch: 523365

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.		RPD	Limit
	Result	Qualifier		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: 550-114628-2
SDG: Cholla

HPLC/IC

Analysis Batch: 164154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	300.0	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	300.0	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	300.0	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	300.0	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	300.0	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	300.0	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	300.0	
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	300.0	
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	300.0	

Analysis Batch: 164511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	300.0	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	300.0	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	300.0	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	300.0	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	300.0	

Metals

Prep Batch: 164126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	200.7	
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	200.7	
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	200.7	
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	200.7	
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	200.7	
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	200.7	
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	200.7	
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	200.7	
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	200.7	
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	200.7	
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	200.7	
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	200.7	
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	200.7	
MB 550-164126/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164126/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164126/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	200.7	
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	200.7	

Analysis Batch: 164399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-2	CH-CCR-W302-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-3	CH-CCR-W304-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-4	CH-CCR-W305-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-5	CH-CCR-W306-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-6	CH-CCR-W307-12818	Total/NA	Water	200.7 Rev 4.4	164126

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 164399 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-7	CH-CCR-W308-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-8	CH-CCR-W309-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-9	CH-CCR-M52A-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-10	CH-CCR-M53A-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-11	CH-CCR-FD02-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-12	CH-CCR-M55A-12818	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-13	CH-CCR-W314-12818	Total/NA	Water	200.7 Rev 4.4	164126
MB 550-164126/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164126
LCS 550-164126/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164126
LCS 550-164126/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-1 MS	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126
550-114628-1 MSD	CH-CCR-W301-12718	Total/NA	Water	200.7 Rev 4.4	164126

Prep Batch: 523365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total Recoverable	Water	200.2	
550-114628-2	CH-CCR-W302-12718	Total Recoverable	Water	200.2	
550-114628-3	CH-CCR-W304-12718	Total Recoverable	Water	200.2	
550-114628-4	CH-CCR-W305-12718	Total Recoverable	Water	200.2	
550-114628-5	CH-CCR-W306-12718	Total Recoverable	Water	200.2	
550-114628-6	CH-CCR-W307-12818	Total Recoverable	Water	200.2	
550-114628-7	CH-CCR-W308-12818	Total Recoverable	Water	200.2	
550-114628-8	CH-CCR-W309-12818	Total Recoverable	Water	200.2	
550-114628-9	CH-CCR-M52A-12818	Total Recoverable	Water	200.2	
550-114628-10	CH-CCR-M53A-12718	Total Recoverable	Water	200.2	
550-114628-11	CH-CCR-FD02-12718	Total Recoverable	Water	200.2	
550-114628-12	CH-CCR-M55A-12818	Total Recoverable	Water	200.2	
550-114628-13	CH-CCR-W314-12818	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	
LCS 440-523365/3-A	Lab Control Sample Dup	Total Recoverable	Water	200.2	
550-114628-1 MS	CH-CCR-W301-12718	Total Recoverable	Water	200.2	
550-114628-1 MSD	CH-CCR-W301-12718	Total Recoverable	Water	200.2	
550-114628-10 MS	CH-CCR-M53A-12718	Total Recoverable	Water	200.2	
550-114628-10 MSD	CH-CCR-M53A-12718	Total Recoverable	Water	200.2	

Analysis Batch: 523766

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114628-1	CH-CCR-W301-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-2	CH-CCR-W302-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-3	CH-CCR-W304-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-4	CH-CCR-W305-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-5	CH-CCR-W306-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-6	CH-CCR-W307-12818	Total Recoverable	Water	200.8 LL	523365
550-114628-7	CH-CCR-W308-12818	Total Recoverable	Water	200.8 LL	523365
550-114628-8	CH-CCR-W309-12818	Total Recoverable	Water	200.8 LL	523365
550-114628-9	CH-CCR-M52A-12818	Total Recoverable	Water	200.8 LL	523365
550-114628-10	CH-CCR-M53A-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-11	CH-CCR-FD02-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-12	CH-CCR-M55A-12818	Total Recoverable	Water	200.8 LL	523365
550-114628-13	CH-CCR-W314-12818	Total Recoverable	Water	200.8 LL	523365

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Metals (Continued)

Analysis Batch: 523766 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
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
550-114628-1 MS	CH-CCR-W301-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-1 MSD	CH-CCR-W301-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-10 MS	CH-CCR-M53A-12718	Total Recoverable	Water	200.8 LL	523365
550-114628-10 MSD	CH-CCR-M53A-12718	Total Recoverable	Water	200.8 LL	523365



Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W301-12718

Lab Sample ID: 550-114628-1

Date Collected: 12/07/18 14:19

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 23:07	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 15:38	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 17:44	MQP	TAL IRV

Client Sample ID: CH-CCR-W302-12718

Lab Sample ID: 550-114628-2

Date Collected: 12/07/18 15:05

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164511	12/14/18 00:13	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:02	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 17:50	MQP	TAL IRV

Client Sample ID: CH-CCR-W304-12718

Lab Sample ID: 550-114628-3

Date Collected: 12/07/18 15:59

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164511	12/14/18 00:32	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:08	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 17:52	MQP	TAL IRV

Client Sample ID: CH-CCR-W305-12718

Lab Sample ID: 550-114628-4

Date Collected: 12/07/18 13:06

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 22:30	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:14	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:21	MQP	TAL IRV

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W306-12718

Lab Sample ID: 550-114628-5

Date Collected: 12/07/18 12:28

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 21:54	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:20	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:23	MQP	TAL IRV

Client Sample ID: CH-CCR-W307-12818

Lab Sample ID: 550-114628-6

Date Collected: 12/08/18 13:58

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164511	12/14/18 01:08	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:25	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:25	MQP	TAL IRV

Client Sample ID: CH-CCR-W308-12818

Lab Sample ID: 550-114628-7

Date Collected: 12/08/18 12:42

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164511	12/14/18 01:27	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:31	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:27	MQP	TAL IRV

Client Sample ID: CH-CCR-W309-12818

Lab Sample ID: 550-114628-8

Date Collected: 12/08/18 11:25

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 21:17	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:37	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:29	MQP	TAL IRV

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-M52A-12818

Lab Sample ID: 550-114628-9

Date Collected: 12/08/18 14:54

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 20:03	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:49	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:31	MQP	TAL IRV

Client Sample ID: CH-CCR-M53A-12718

Lab Sample ID: 550-114628-10

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 19:26	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 16:55	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:33	MQP	TAL IRV

Client Sample ID: CH-CCR-FD02-12718

Lab Sample ID: 550-114628-11

Date Collected: 12/07/18 11:14

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164511	12/14/18 01:45	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:01	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:46	MQP	TAL IRV

Client Sample ID: CH-CCR-M55A-12818

Lab Sample ID: 550-114628-12

Date Collected: 12/08/18 16:50

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 18:50	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:07	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:48	MQP	TAL IRV

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-2
SDG: Cholla

Client Sample ID: CH-CCR-W314-12818

Lab Sample ID: 550-114628-13

Date Collected: 12/08/18 15:27

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 18:13	NEL	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:13	SRA	TAL PHX
Total Recoverable	Prep	200.2			523365	01/18/19 09:43	BV	TAL IRV
Total Recoverable	Analysis	200.8 LL		10	523766	01/20/19 18:50	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: 550-114628-2
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: 550-114628-2
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

Chain of Custody Record

114628

Regulatory Program:

CCR

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarway	Lab Contact:	Doug Lavarway	Carrier:	12/9/2018	COC No:	1 of 2 COCs
4801 Cholla Lake Road	928-587-0319	Analysis Turnaround Time				Sampler:	
Joseph City, Az 86032		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							
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)	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
CH-CCR-W301-12718	12/7/2018	1419 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W302-12718	12/7/2018	1505 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W304-12718	12/7/2018	1559 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W305-12718	12/7/2018	1306 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W306-12718	12/7/2018	1228 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W307-12818	12/8/2018	1356 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W308-12818	12/8/2018	1242 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-W309-12818	12/8/2018	1124 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-M52A-12818	12/8/2018	1454 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-M53A-12718	12/7/2018	1114 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-FD02-12718	12/7/2018	1114 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-M55A-12818	12/8/2018	1650 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

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:

Non-Hazard Flammable Skin Irritant Poison B Unknown

Return to Client Disposal by Lab Archive for _____ Months

2.0-C, 2.2-C, 1.8-E, 1.6-E

Custody Seals Intact:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:		Cooler Temp. (°C):	Obs'd:	Cor'd:	Therm ID No.:
Relinquished by:		Company:	APS	Received by:		Company:	
Relinquished by:		Company:		Received by:		Company:	
Relinquished by:		Company:		Received in Laboratory by:	TA PHX	Company:	
				Date/Time:	12-10-18		

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program:
114628

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarney 928-587-0319
 Analysis Turnaround Time
 TAT if different from Below _____
 Lab Contact: Doug Lavarney
 Carrier: 12/9/2018
 COC No: 1 of 2 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)
CH-CCR-W301-12718	12/7/2018	1419	G	W	2	N	X	X	X	X
CH-CCR-W302-12718	12/7/2018	1505	G	W	2	N	X	X	X	X
CH-CCR-W304-12718	12/7/2018	1559	G	W	2	N	X	X	X	X
CH-CCR-W305-12718	12/7/2018	1306	G	W	2	N	X	X	X	X
CH-CCR-W306-12718	12/7/2018	1228	G	W	2	N	X	X	X	X
CH-CCR-W307-12818	12/8/2018	1358	G	W	2	N	X	X	X	X
CH-CCR-W308-12818	12/8/2018	1242	G	W	2	N	X	X	X	X
CH-CCR-W309-12818	12/8/2018	1124	G	W	2	N	X	X	X	X
CH-CCR-M52A-12818	12/8/2018	1454	G	W	2	N	X	X	X	X
CH-CCR-M53A-12718	12/7/2018	1114	G	W	2	N	X	X	X	X
CH-CCR-FD02-12718	12/7/2018	1114	G	W	2	N	X	X	X	X
CH-CCR-M55A-12818	12/8/2018	1650	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.

Special Instructions/QC Requirements & Comments:
 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)
 Cooler Temp. (°C): Obs'd: 2-8°C, 2-2°C, 1-8°C, 1-6°C
 Corrd: _____ Therm ID No: _____

Custody Seal Intact: Yes No
 Relinquished by: Doug Lavarney Company: APS Date/Time: 12/12/18
 Relinquished by: _____ Company: _____ Date/Time: _____
 Relinquished by: _____ Company: _____ Date/Time: _____
 Received by: _____ Company: _____ Date/Time: _____
 Received in Laboratory: PHHX Company: PHHX Date/Time: 12-10-18

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

114628

Client Contact: Doug Lavarnway 928-587-0319

Lab Contact: Doug Lavarnway

Carrier:

12/9/2018

COC No. 1 of 2 COCs

4801 Cholla Lake Road

Analysis Turnaround Time

Joseph City, Az 86032

TAT if different from Below

(928) 587-0319 Phone

Project Name: CCR

(xxx) xxx-xxxx FAX

Site: Cholla

Job / SDG No.:

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)	932.0 Radium 226 and 228
CH-CCR-W301-12718	12/7/2018	1419	G	W	2	N	X	
CH-CCR-W302-12718	12/7/2018	1505	G	W	2	N	X	
CH-CCR-W304-12718	12/7/2018	1559	G	W	2	N	X	
CH-CCR-W305-12718	12/7/2018	1306	G	W	2	N	X	
CH-CCR-W306-12718	12/7/2018	1228	G	W	2	N	X	
CH-CCR-W307-12818	12/8/2018	1358	G	W	2	N	X	
CH-CCR-W308-12818	12/8/2018	1242	G	W	2	N	X	
CH-CCR-W309-12818	12/8/2018	1124	G	W	2	N	X	
CH-CCR-M52A-12818	12/8/2018	1454	G	W	2	N	X	
CH-CCR-M53A-12718	12/7/2018	1114	G	W	2	N	X	
CH-CCR-FD02-12718	12/7/2018	1114	G	W	2	N	X	
CH-CCR-M55A-12818	12/8/2018	1650	G	W	2	N	X	

Sample Specific Notes:

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.

Special Instructions/QC Requirements & Comments: Radium shall be sent off to Radiation Safety Engineering for analysis.

1-6-2018, 2-20-2018, 2-22-2018, 1-8-2018

Relinquished by: *David Calverney* Company: *APDS* Date/Time: *12/6/18*

Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *[Signature]*

Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *[Signature]*

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Phoenix

4625 E Cotton Center Blvd
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Phoenix, AZ 85040
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Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

114623
Regulatory Program:

CCR

Client Contact: **Doug Lavarway** 928-587-0319 Analysis Turnaround Time: _____
 Lab Contact: **Doug Lavarway** Carrier: _____ 12/9/2018
 COC No.: 2 of 2 COCs

APS Cholla
 4801 Cholla Lake Road
 Joseph City, Az 86032
 (928) 587-0319 Phone
 (xxx) xxx-xxxx FAX
 Project Name: CCR
 Site: Cholla
 P O #

TAT if different from Below

Sample Identification
 Sample Date: CH-CCR-W314-12818 -13
 Sample Time: 12/8/2018
 Sample Type: (C=Comp, G=Grav)
 Matrix: W
 # of Cont.: 2

Sample Date	Sample Time	Sample Type	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
					N	X	X	X	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.
 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)
 Received by: **Yard**
 Received in Laboratory by: **TA-PHX**
 Date/Time: 12-10-18

Custody Seats Intact: Yes No
 Relinquished by: **Doug Lavarway**
 Relinquished by: _____
 Date/Time: 12/11/18

Company: **APS**
 Cooler Temp (°C): Obsd: _____
 Cor'd: _____
 Therm ID No.: _____
 Date/Time: 12-10-18
 Date/Time: 12-10-18

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:
 114628

CCR

1/29/2019

Client Contact		Doug Lavarnway		Doug Lavarnway		Carrier:		12/9/2018		COC No: 2 of 2 COCs	
Analysis Turnaround Time		TAT if different from Below		Lab Contact:		Sampler:		For Lab Use Only:		Walk-In Client: <input type="checkbox"/>	
APs Cholla		4801 Cholla Lake Road		Joseph City, Az 86032		(928) 587-0319		Phone		FAX	
Project Name: CCR		Site: Cholla		P O #		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)
CH-CCR-W314-12818		12/8/2018	1527	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. <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown Special Instructions/QC Requirements & Comments: Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months Cooler Temp. (°C): Obs'd: _____ Cor'd: _____ Therm ID No.: _____ 2-0-2, 2-2-2, 1-8-5, 1-6-2											
Relinquished by:		Company:		Date/Time:		Received by:		Company:		Date/Time:	
Doug Lavarnway		APs		12/10/18		Received in Laboratory by:		IA-PHX		12-10-18	
Relinquished by:		Company:		Date/Time:		Received in Laboratory by:		Company:		Date/Time:	

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

114628

Client Contact			Doug Lavarway 928-587-0319			Analysis Turnaround Time		Doug Lavarway Lab Contact:			12/9/2018		COC No: 2 of 2 COGS	
4801 Cholla Lake Road			Joseph City, Az 86032			TAT if different from Below			Carrier:			Sampler:		
(928) 587-0319			Phone									For Lab Use Only:		
(xxx) xxx-xxxx			FAX									Walk-in Client:		
Project Name: CCR												Lab Sampling:		
Site: Cholla												Job / SDG No.:		
PO #														
Sample Identification			Sample Date	Sample Time	Sample Type (G-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)			Sample Specific Notes:			
CH-CCR-W314-12818 -13			12/8/2018	1527 G		W	2	N	X	X	Perform MS / MSD (Y / N)			
											932.0 Radium 226 and 228			

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

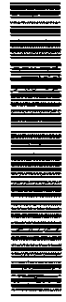
Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab Archive for _____ Months

Special Instructions/QC Requirements & Comments: Radium shall be sent off to Radiation Safety Engineering for analysis.
1-6-C, 2.0-e, 2.2-g, 1-8-c

Relinquished by:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temp. (°C):	Obs'd:	Therm ID No.:
Relinquished by: <i>Doug Lavarway</i>		Company: <i>APS</i>			
Relinquished by: <i>Doug Lavarway</i>		Company: <i>APS</i>			
Relinquished by: <i>Doug Lavarway</i>		Company: <i>APS</i>			
Received by:		Received in Laboratory by:			
Date/Time: <i>12/11/18</i>		Date/Time: <i>12/10/18</i>			
Company: <i>APS</i>		Company: <i>APS</i>			

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler	Lab PM	Carrier Tracking No(s)	COC No
Company TestAmerica Laboratories, Inc		Baker, Ken	Baker, Ken	1296 9530 9150	550-23338 1
Address 17461 Derian Ave, Suite 100, Irvine State, Zip CA, 92614-5817		E-Mail ken.baker@testamericainc.com	State of Origin Arizona	Page Page 1 of 2	Job # 550-114628-1
Phone 949-261-1022(Tel) 949-260-3297(Fax)		Accreditations Required (See note) State Program - Arizona	Analysis Requested	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - lca J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	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! 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!
Email		Due Date Requested: 12/17/2018	Field Filtered Sample (Yes or No)	Total Number of Containers	
Project Name CCR		TAT Requested (days):	200.8_CWA_LL/200.2_200.8_Metals		
Site Arizona Public Service		PO #			
		WO #			
		Project # 55009651			
		ISSOW#			
		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (Water, Br-solid, On-metal, etc)
		12/7/18	14:19 Arizona	Water	Water
		12/7/18	14:19 Arizona	MS	Water
		12/7/18	14:19 Arizona	MSD	Water
		12/7/18	15:05 Arizona	Water	Water
		12/7/18	15:59 Arizona	Water	Water
		12/7/18	13:06 Arizona	Water	Water
		12/7/18	12:28 Arizona	Water	Water
		12/8/18	13:58 Arizona	Water	Water
		12/8/18	12:42 Arizona	Water	Water
		12/8/18	Arizona	Water	Water
Sample Identification - Client ID (Lab ID)		Field Filtered Sample (Yes or No)			
CH-CCR-W301-12718 (550-114628-1)	X				
CH-CCR-W301-12718 (550-114628-1MS)	X				
CH-CCR-W301-12718 (550-114628-1MSD)	X				
CH-CCR-W302-12718 (550-114628-2)	X				
CH-CCR-W304-12718 (550-114628-3)	X				
CH-CCR-W305-12718 (550-114628-4)	X				
CH-CCR-W306-12718 (550-114628-5)	X				
CH-CCR-W307-12818 (550-114628-6)	X				
CH-CCR-W308-12818 (550-114628-7)	X				

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
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements:

Unconfirmed
 Deliverable Requested I, II, III, IV, Other (specify) _____
 Primary Deliverable Rank 2

Empty Kit Relinquished by _____ Date: _____
 Relinquished by _____ Date/Time _____ Company _____
 Relinquished by _____ Date/Time _____ Company _____
 Relinquished by _____ Date/Time _____ Company _____

Custody Seals Intact: _____
 Yes Δ No

Received by _____ Date/Time _____ Company _____
 Relinquished by _____ Date/Time _____ Company _____
 Relinquished by _____ Date/Time _____ Company _____

Cooler Temperature(s) °C and Other Remarks
 11/5/19 1000 11/11/19
 170/17.2 IR-9id
 No. ICE

Ver 09/20/2016



Chain of Custody Record

Client Information (Sub Contract Lab) Shipping/Receiving Company TestAmerica Laboratories, Inc Address 17461 Dentan Ave, Suite 100, Irvine State, Zip CA, 92614-5817 Phone 949-261-1022(Tel) 949-260-3297(Fax) Email Project Name CCR Site Arizona Public Service		Lab PM Baker, Ken E-Mail ken_baker@testamericainc.com Accreditations Required (See note) State Program - Arizona		Camer Tracking No(s) 4296 9530 9150 State of Origin Arizona Job # 550-114628-1		COC No 550-23338 2 Page Page 2 of 2	
Due Date Requested: 12/17/2018 TAT Requested (days): PO # WO # Project # 55009651 SSOV#		Analysis Requested 200.8.CWA.LL/200.2.200.8 Metals		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHCO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)		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!	
Sample Identification - Client ID (Lab ID) CH-CCR-W309-12818 (550-114628-8) CH-CCR-M52A-12818 (550-114628-9) CH-CCR-M53A-12718 (550-114628-10) CH-CCR-FD02-12718 (550-114628-11) CH-CCR-M55A-12818 (550-114628-12) CH-CCR-W314-12818 (550-114628-13)		Field Filtered Sample (Yes or No) X X X X X X		Total Number of Containers X X X X X X		Matrix (Waters, Excel, One-wat, etc) Water Water Water Water Water Water	
Sample Date 12/8/18 12/8/18 12/7/18 12/7/18 12/8/18 12/8/18		Sample Time 11:25 14:54 11:14 11:14 16:50 15:27		Sample Date 12/8/18 12/8/18 12/7/18 12/7/18 12/8/18 12/8/18		Sample Type (C=Comp, G=grab) Water Water Water Water Water Water	
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) Primary Deliverable Rank: 2							
Empty Kit Relinquished by Date Relinquished by Date/Time Relinquished by Date/Time Custody Seals Intact Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Custody Seal No 11519 1000 THXU							



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114628-2

SDG Number: Cholla

Login Number: 114628

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.



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114628-2

SDG Number: Cholla

Login Number: 114628

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 \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.	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 <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.	N/A	



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114628-2

SDG Number: Cholla

Login Number: 114628

List Number: 3

Creator: Escalante, Maria I

List Source: TestAmerica Irvine

List Creation: 01/18/19 03:35 PM

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.	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	
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 <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.	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: 550-114628-3

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:

1/14/2019 3:49:14 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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Table of Contents

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-3
SDG: Cholla

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: 550-114628-3
SDG: Cholla

Job ID: 550-114628-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-114628-3

Comments

No additional comments.

Receipt

The samples were received on 12/10/2018 11:16 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.6° C, 1.8° C, 2.0° C and 2.2° C.

Receipt Exceptions

Several of the sample sites were missing from the pick list.

CH-CCR-W301-12718 (550-114628-1), CH-CCR-W301-12718 (550-114628-1[DUJ]), CH-CCR-W301-12718 (550-114628-1[MS]), CH-CCR-W301-12718 (550-114628-1[MSD]), CH-CCR-W302-12718 (550-114628-2), CH-CCR-W304-12718 (550-114628-3), CH-CCR-W305-12718 (550-114628-4), CH-CCR-W306-12718 (550-114628-5), CH-CCR-W307-12818 (550-114628-6), CH-CCR-W308-12818 (550-114628-7), CH-CCR-W309-12818 (550-114628-8), CH-CCR-M52A-12818 (550-114628-9), CH-CCR-M53A-12718 (550-114628-10), CH-CCR-FD02-12718 (550-114628-11), CH-CCR-M55A-12818 (550-114628-12) and CH-CCR-W314-12818 (550-114628-13)

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: 550-114628-3
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-114628-1	CH-CCR-W301-12718	Water	12/07/18 14:19	12/10/18 11:16
550-114628-2	CH-CCR-W302-12718	Water	12/07/18 15:05	12/10/18 11:16
550-114628-3	CH-CCR-W304-12718	Water	12/07/18 15:59	12/10/18 11:16
550-114628-4	CH-CCR-W305-12718	Water	12/07/18 13:06	12/10/18 11:16
550-114628-5	CH-CCR-W306-12718	Water	12/07/18 12:28	12/10/18 11:16
550-114628-6	CH-CCR-W307-12818	Water	12/08/18 13:58	12/10/18 11:16
550-114628-7	CH-CCR-W308-12818	Water	12/08/18 12:42	12/10/18 11:16
550-114628-8	CH-CCR-W309-12818	Water	12/08/18 11:25	12/10/18 11:16
550-114628-9	CH-CCR-M52A-12818	Water	12/08/18 14:54	12/10/18 11:16
550-114628-10	CH-CCR-M53A-12718	Water	12/07/18 11:14	12/10/18 11:16
550-114628-11	CH-CCR-FD02-12718	Water	12/07/18 11:14	12/10/18 11:16
550-114628-12	CH-CCR-M55A-12818	Water	12/08/18 16:50	12/10/18 11:16
550-114628-13	CH-CCR-W314-12818	Water	12/08/18 15:27	12/10/18 11:16

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114628-3
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: 550-114628-3
SDG: Cholla

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

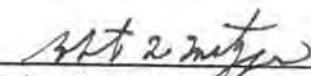
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W301-12718 (550-114628-1)	< 0.6	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P. 12/26/2018 Date
Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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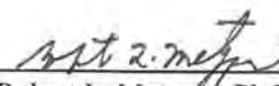
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W302-12718 (550-114628-2)	< 0.6	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
------------------	------------	------------	------------


 _____ 12/26/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462



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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: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W304-12718 (550-114628-3)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P.

12/26/2018

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: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W305-12718 (550-114628-4)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P.

12/26/2018

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

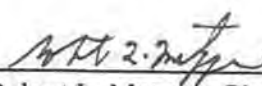
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W306-12718 (550-114628-5)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
------------------	------------	------------	------------


Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
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

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

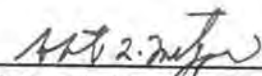
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W307-12818 (550-114628-6)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462



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Website: www.radSAFE.com

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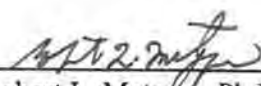
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W308-12818 (550-114628-7)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462



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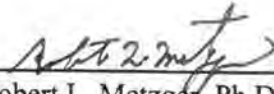
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W309-12818 (550-114628-8)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462

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 Website: www.radSAFE.com

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 FAX (480) 892-5446

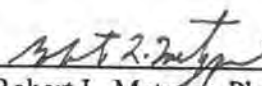
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
 Sample Received: December 11, 2018
 Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M52A-12818 (550-114628-9)	< 0.5	< 0.7	< 0.7

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462



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Website: www.radsafe.com

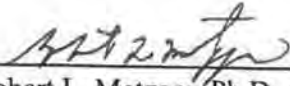
(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

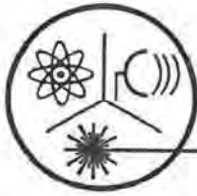
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M53A-12718 (550-114628-10)	< 0.5	1.1 ± 0.3	1.1 ± 0.3
Date of Analysis	12/14/2018	12/14/2018	12/14/2018


Robert L. Metzger, Ph.D., C.H.P.

12/26/2018

Date

Laboratory License Number AZ0462



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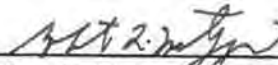
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 07, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD02-12718 (550-114628-11)	< 0.5	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P.

12/26/2018
Date

Laboratory License Number AZ0462



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FAX (480) 892-5446

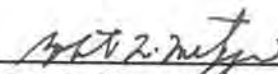
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M55A-12818 (550-114628-12)	< 0.5	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P. 12/26/2018 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

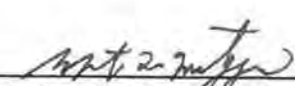
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 08, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W314-12818 (550-114628-13)	< 0.5	0.7 ± 0.3	0.7 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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Robert L. Metzger, Ph.D., C.H.P.

12/26/2018

Date

Laboratory License Number AZ0462

TestAmerica Phoenix

4625 East Colton Cir Blvd Suite 189
Phoenix, AZ 85040

Phone (602) 437-3340 Fax (602) 454-9303

Chain of Custody Record



Client Information (Sub Contract Lab)		Sample:	Lab PM	Carrier Tracking No(s)	COC No.	
Client Contact Shipping/Receiving		Phone	Baker, Ken		550-23057.2	
Company Radiation Safety Eng., Inc.		E-Mail ken.baker@testamericainc.com		State of Origin Arizona	Page Page 2 of 2	
Address 3245 North Washington Street.		Accreditations Required (See note) State Program - Arizona		Job # 550-114628-1	Preservation Codes: M - Hexane N - None O - AshNaO2 P - Na2OMS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH4.5 X - EDTA Z - other (specify)	
City AZ, 85225		Due Date Requested: 12/19/2018		Analysis Requested		
State, Zip AZ, 85225		TAT Requested (days):		Total Number of Containers		
Phone		PO #:		Perform MS/MSD (Yes or No)		
Email:		WO #:		SUB (Radium 226/228) Radium 226/228		
Project Name: APS - Cholla CCR		Project # 55009651		Field Filtered Sample (Yes or No)		
Site Arizona Public Service		SSOW#:		Field Filtered Sample (Yes or No)		
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Wood, Brick, Concrete, Asphalt, etc.)	Preservation Code:	Special Instructions/Note:
CH-CCR-M53A-12718 (550-114628-10)	12/7/18	11:14 Arizona	Water	Water	X	2 Job 3
CH-CCR-FD02-12718 (550-114628-11)	12/7/18	11:14 Arizona	Water	Water	X	2 Job 3
CH-CCR-M55A-12818 (550-114628-12)	12/8/18	16:50 Arizona	Water	Water	X	2 Job 3
CH-CCR-W314-12818 (550-114628-13)	12/8/18	15:27 Arizona	Water	Water	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 subcontract laboratories. This sample shipment is forwarded under chain-of-custody.

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 Kil Relinquished by: _____ Date: _____ Time: _____
Relinquished by: *BATEMAN DCS* Date: *12-11-18* Time: _____ Company: _____
Relinquished by: *AMR HREC* Date: *12-11-18* Time: *14:15* Company: *R.S.E*

Custody Seals Intact: _____ Custody Seal No.: _____
A Yes Δ No



TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

114628

Client Contact

Doug Lavarway
928-587-0319

Doug Lavarway

Carrier:

12/9/2018

COC No: 1 of 2 COCs

4801 Cholla Lake Road

Analysis Turnaround Time

Lab Contact:

Carrier:

Sampler: 1 of 2 COCs

Joseph City, Az 86032

Phone
TAT if different from Below

Carrier:

Carrier:

For Lab Use Only:
Walk-in Client:
Lab Sampling:

(928) 587-0319

FAX

Carrier:

Carrier:

Job / SDG No.:

Project Name: CCR

Site: Cholla

Carrier:

Carrier:

Sample Specific Notes:

P O #

Sample Identification

Carrier:

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	Carrier	12/9/2018	COC No:	1 of 2 COCs
CH-CCR-W301-12718	12/7/2018	1419 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W302-12718	12/7/2018	1505 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W304-12718	12/7/2018	1559 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W305-12718	12/7/2018	1306 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W306-12718	12/7/2018	1228 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W307-12818	12/8/2018	1356 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W308-12818	12/8/2018	1242 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-W309-12818	12/8/2018	1124 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-M52A-12818	12/8/2018	1454 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-M53A-12718	12/7/2018	1114 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-FD02-12718	12/7/2018	1114 G	W	W	2	N	X	X	X	X	X	X	X	X	X				
CH-CCR-M55A-12818	12/8/2018	1650 G	W	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

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: 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: 12/11/18 Received by: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____ Received in Laboratory by: TA PHX Company: TA PHX Date/Time: 12-10-18

Relinquished by: _____ Company: _____ Date/Time: _____

Chain of Custody Record

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114628

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.



Client Contact	Doug Lavarway	928-587-0319	Analysis Turnaround Time	
Site: Cholla	TAT if different from Below _____			
Project Name: CCR				
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 (Li, Mg, SiO2)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)
CH-CCR-W301-12718	12/7/2018	1419	G	W	2	N	X	X	X	X
CH-CCR-W302-12718	12/7/2018	1505	G	W	2	N	X	X	X	X
CH-CCR-W304-12718	12/7/2018	1559	G	W	2	N	X	X	X	X
CH-CCR-W305-12718	12/7/2018	1306	G	W	2	N	X	X	X	X
CH-CCR-W306-12718	12/7/2018	1228	G	W	2	N	X	X	X	X
CH-CCR-W307-12818	12/8/2018	1358	G	W	2	N	X	X	X	X
CH-CCR-W308-12818	12/8/2018	1242	G	W	2	N	X	X	X	X
CH-CCR-W309-12818	12/8/2018	1124	G	W	2	N	X	X	X	X
CH-CCR-M52A-12818	12/8/2018	1454	G	W	2	N	X	X	X	X
CH-CCR-M53A-12718	12/7/2018	1114	G	W	2	N	X	X	X	X
CH-CCR-FD02-12718	12/7/2018	1114	G	W	2	N	X	X	X	X
CH-CCR-M55A-12818	12/8/2018	1650	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

Special Instructions/QC Requirements & Comments:
2-0-C, 2-2-C, 1-8-C, 1-6-C

Return to Client Disposal by Lab Archive for _____ Months

Custody Seal Intact: Yes No

Cooler Temp. (°C): Obs'd: _____ Corrd: _____ Therm ID No: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Dave Lavarway	APS	12/12/18	Received in Laboratory	Company: AS	12/10/18
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 Phone 602.437.3340 fax 602.454.9303

114628

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarnway 928-587-0319
 Analysis Turnaround Time
 Lab Contact: Doug Lavarnway 12/9/2018
 Carrier: COC No. 1 of 2 COCs

4801 Cholla Lake Road
 Joseph City, Az 86032
 (928) 587-0319 Phone
 (xxx) xxx-xxxx FAX
 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)
 932.0 Radium 226 and 228

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	932.0 Radium 226 and 228
CH-CCR-W301-12718	12/7/2018	1419 G		W	2	N	X	X
CH-CCR-W302-12718	12/7/2018	1505 G		W	2	N	X	X
CH-CCR-W304-12718	12/7/2018	1559 G		W	2	N	X	X
CH-CCR-W305-12718	12/7/2018	1306 G		W	2	N	X	X
CH-CCR-W306-12718	12/7/2018	1228 G		W	2	N	X	X
CH-CCR-W307-12818	12/8/2018	1358 G		W	2	N	X	X
CH-CCR-W308-12818	12/8/2018	1242 G		W	2	N	X	X
CH-CCR-W309-12818	12/8/2018	1124 G		W	2	N	X	X
CH-CCR-M52A-12818	12/8/2018	1454 G		W	2	N	X	X
CH-CCR-M53A-12718	12/7/2018	1114 G		W	2	N	X	X
CH-CCR-FD02-12718	12/7/2018	1114 G		W	2	N	X	X
CH-CCR-M55A-12818	12/8/2018	1650 G		W	2	N	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.

Special Instructions/QC Requirements & Comments: Radium shall be sent off to Radiation Safety Engineering for analysis.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No
 Cooler Temp (C): Obs'd: _____ Therm ID No.: _____
 1-6-22, 2-20-22, 2-22-22, 1-8-22

Relinquished by: *Dave Calverney* Company: *APDS* Date/Time: *12/6/18*
 Received by: _____ Company: _____ Date/Time: _____
 Relinquished by: _____ Company: _____ Date/Time: _____

Received in Laboratory: *MA* Company: *MA* Date/Time: *12-10-18*
 Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Chain of Custody Record

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114628

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.
THE LEADER IN ENVIRONMENTAL TESTING

1/14/2019

Client Contact		Doug Lavarway		Doug Lavarway		12/9/2018		COC No: 2 of 2 COCs								
4801 Cholla Lake Road		928-587-0319		Lab Contact:		Carrier:		Sampler:								
Joseph City, Az 86032		Analysis Turnaround Time		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								Sample Specific Notes:								
P O #																
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grav)	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
CH-CCR-W314-12818		12/8/2018	1527 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 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. <input checked="" type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months																
Special Instructions/OC Requirements & Comments: Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Yield 2.0-c, 2.2-c, 1.8-c, 1.6-c																
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obsd:		Cor'd:		Therm ID No.:								
Relinquished by: Doug Lavarway		Company: APS		Received by: [Signature]		Company: TAPHX		Date/Time: 12-10-18								
Relinquished by: [Signature]		Company:		Received in Laboratory by: [Signature]		Company: TAPHX		Date/Time: 12-10-18								

Chain of Custody Record

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: *114628*

CCR

Client Contact	Analysis Turnaround Time	Lab Contact:	Carrier:	COC No.	Sample Specific Notes:																	
APS Cholla 4801 Cholla Lake Road Joseph City, Az 86032 (928) 587-0319 Phone FAX (xxx) xxx-xxxx Project Name: CCR Site: Cholla P O #	<i>928-587-0319</i> TAT if different from Below	<i>Doug Lavarnway</i>	<i>12/9/2018</i>	<i>2</i> of <i>2</i> COCs																		
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, Ti)	EPA 300.0 (F)												
	CH-CCR-W314-12818	<i>-17</i>		12/8/2018	1527 G	W	2	N	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.																						
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months																						
Special Instructions/QC Requirements & Comments: <i>20-2-2-2, 18.5, 1.6</i>																						
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temp. (°C):	Obs'd:	Corrd:	Therm ID No.:																	
Relinquished by: <i>Dave Lavarnway</i>	Company: <i>APS</i>	Date/Time: <i>12/10/18</i>	Received by:	Company:	Date/Time:	Received in Laboratory by: <i>TAPHX</i>	Company: <i>APS</i>	Date/Time: <i>12-10-18</i>														
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:														

Chain of Custody Record

TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114628

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarnway
928-587-0319
Analysis Turnaround Time: TAT if different from Below

APs Cholla
4801 Cholla Lake Road
Joseph City, Az 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name: CCR
Site: Cholla
P O #

Doug Lavarnway
Lab Contact:
Carrier: 12/9/2018
COC No.: 2 of 2 COCS

Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
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)	
						Y	N	Y	N
CH-CCR-W314-12818 -13	12/8/2018	1527 G		W	2	N	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

Special Instructions/QC Requirements & Comments: Radium shall be sent off to Radiation Safety Engineering for analysis.

Return to Client Disposal by Lab Archive for _____ Months

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

Cooler Temp. (°C): Obs'd: 1-6.2, 2.0-2.2-2.5-1.8-2

Custody Seals Intact: Yes No

Custody Seal No.:

Relinquished by: Doug Lavarnway

Relinquished by: Company: APs

Date/Time: 5/20/16

Received by: Received in Laboratory by: JAPHX

Company: Company: AAS

Date/Time: 12/10/18

Relinquished by: Company: [Signature]

Date/Time: [Signature]

Received in Laboratory by: JAPHX

Company: AAS

Date/Time: 12/10/18

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114628-3

SDG Number: Cholla

Login Number: 114628

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: 550-98155-1

Client Project/Site: APS - Cholla CCR

Revision: 2

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

9/18/2018 1:41:23 PM

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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.

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.
D1	Sample required dilution due to matrix.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection 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 - Cholla CCR

TestAmerica Job ID: 550-98155-1

Job ID: 550-98155-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-98155-1

Comments

This report contains radchem results with the E8 data qualifiers removed.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

HPLC/IC

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

Metals

Method(s) 200.8 LL: The method blank for preparation batch 550-140074 contained Thallium, Cadmium and Antimony above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

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

Narrative

Job Narrative 550-98155-2

Comments

This report has the E8 Data qualifiers removed.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

RAD

Method(s) PrecSep_0: Radium 228 Prep Batch 160-352309:

Insufficient sample volume was available to perform a sample duplicate (DU). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

CH-CCR-M50A-21418 (550-98155-1), CH-CCR-M51A-21418 (550-98155-2), CH-CCR-W123-21418 (550-98155-3) and CH-CCR-FD01-21418 (550-98155-4)

Method(s) PrecSep-21: Radium 226 Prep Batch 160-352206:

Insufficient sample volume was available to perform a sample duplicate (DU). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

CH-CCR-M50A-21418 (550-98155-1), CH-CCR-M51A-21418 (550-98155-2), CH-CCR-W123-21418 (550-98155-3) and CH-CCR-FD01-21418 (550-98155-4)

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

Narrative

Job Narrative 550-98155-3

Comments

No additional comments.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice.

Case Narrative

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Job ID: 550-98155-1 (Continued)

Laboratory: TestAmerica Phoenix (Continued)

The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

RAD

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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-98155-1	CH-CCR-M50A-21418	Water	02/14/18 13:57	02/16/18 13:01
550-98155-2	CH-CCR-M51A-21418	Water	02/14/18 13:24	02/16/18 13:01
550-98155-3	CH-CCR-W123-21418	Water	02/14/18 14:45	02/16/18 13:01
550-98155-4	CH-CCR-FD01-21418	Water	02/14/18 13:57	02/16/18 13:01

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Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Client Sample ID: CH-CCR-M50A-21418

Lab Sample ID: 550-98155-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.6	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.44		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0027		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0087		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0010		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.00055		0.00050	mg/L	1		200.8 LL	Total/NA
Lead	0.0012		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0085		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0029		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M51A-21418

Lab Sample ID: 550-98155-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	5.4	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
Arsenic	0.015	B7	0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0089	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.0034		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0010		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.046	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W123-21418

Lab Sample ID: 550-98155-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	4.2	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.63		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0018		0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.010		0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.12		0.0020	mg/L	2		200.8 LL	Total/NA
Cobalt	0.0021		0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.37		0.0010	mg/L	2		200.8 LL	Total/NA
Selenium	0.0035		0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD01-21418

Lab Sample ID: 550-98155-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.4	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.43		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0026		0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.0095		0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0088		0.0010	mg/L	2		200.8 LL	Total/NA
Selenium	0.0034		0.0010	mg/L	2		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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Client Sample ID: CH-CCR-M50A-21418

Lab Sample ID: 550-98155-1

Date Collected: 02/14/18 13:57

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.6	D1	0.80	mg/L			02/20/18 20:01	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 11:15	02/21/18 17:09	1
Lithium	0.44		0.20	mg/L		02/20/18 11:15	02/21/18 17:09	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:59	1
Arsenic	0.0027		0.00050	mg/L		02/21/18 05:47	02/22/18 16:59	1
Barium	0.0087		0.00050	mg/L		02/21/18 05:47	02/22/18 16:59	1
Cadmium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:59	1
Chromium	0.0010		0.0010	mg/L		02/21/18 05:47	02/22/18 16:59	1
Cobalt	0.00055		0.00050	mg/L		02/21/18 05:47	02/22/18 16:59	1
Lead	0.0012		0.00050	mg/L		02/21/18 05:47	02/22/18 16:59	1
Molybdenum	0.0085		0.00050	mg/L		02/21/18 05:47	02/22/18 16:59	1
Selenium	0.0029		0.00050	mg/L		02/21/18 05:47	02/22/18 16:59	1
Thallium	ND		0.00010	mg/L		02/21/18 05:47	02/22/18 16:59	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:26	02/21/18 19:04	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.123		0.0716	0.0724	1.00	0.0916	pCi/L	02/21/18 09:29	03/15/18 05:58	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	105		40 - 110					02/21/18 09:29	03/15/18 05:58	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	0.389		0.207	0.210	1.00	0.306	pCi/L	02/21/18 10:35	03/06/18 14:29	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	105		40 - 110					02/21/18 10:35	03/06/18 14:29	1
<i>Y Carrier</i>	90.5		40 - 110					02/21/18 10:35	03/06/18 14:29	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	0.512		0.219	0.222	5.00	0.306	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Client Sample ID: CH-CCR-M51A-21418

Lab Sample ID: 550-98155-2

Date Collected: 02/14/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	5.4	D1	0.80	mg/L			02/20/18 21:52	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 11:15	02/21/18 17:15	1
Lithium	0.49		0.20	mg/L		02/20/18 11:15	02/21/18 17:15	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		02/21/18 05:47	02/26/18 11:33	2
Arsenic	0.015	B7	0.00050	mg/L		02/21/18 05:47	02/22/18 17:11	1
Barium	0.0089	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:33	2
Cadmium	ND	D1	0.00020	mg/L		02/21/18 05:47	02/26/18 11:33	2
Chromium	0.0034		0.0010	mg/L		02/21/18 05:47	02/22/18 17:11	1
Cobalt	0.0010		0.00050	mg/L		02/21/18 05:47	02/22/18 17:11	1
Lead	ND	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:33	2
Molybdenum	0.046	D1	0.0010	mg/L		02/21/18 05:47	02/26/18 11:33	2
Selenium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 17:11	1
Thallium	ND	D1	0.00020	mg/L		02/21/18 05:47	02/26/18 11:33	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:26	02/21/18 19:06	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.108		0.0616	0.0624	1.00	0.0726	pCi/L	02/21/18 09:29	03/15/18 05:58	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	109		40 - 110					02/21/18 09:29	03/15/18 05:58	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	0.0639	U	0.177	0.177	1.00	0.307	pCi/L	02/21/18 10:35	03/06/18 14:29	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	109		40 - 110					02/21/18 10:35	03/06/18 14:29	1
<i>Y Carrier</i>	93.5		40 - 110					02/21/18 10:35	03/06/18 14:29	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	0.172	U	0.187	0.188	5.00	0.307	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Client Sample ID: CH-CCR-W123-21418

Lab Sample ID: 550-98155-3

Date Collected: 02/14/18 14:45

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	4.2	D1	2.0	mg/L			02/20/18 22:10	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		02/20/18 11:15	02/21/18 17:21	1
Lithium	0.63		0.20	mg/L		02/20/18 11:15	02/21/18 17:21	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0020	mg/L		02/21/18 05:47	02/26/18 11:41	2
Arsenic	0.0018		0.0010	mg/L		02/21/18 05:47	02/26/18 11:41	2
Barium	0.010		0.0010	mg/L		02/21/18 05:47	02/26/18 11:41	2
Cadmium	ND		0.00020	mg/L		02/21/18 05:47	02/26/18 11:41	2
Chromium	0.12		0.0020	mg/L		02/21/18 05:47	02/26/18 11:41	2
Cobalt	0.0021		0.0010	mg/L		02/21/18 05:47	02/26/18 11:41	2
Lead	ND		0.0010	mg/L		02/21/18 05:47	02/26/18 11:41	2
Molybdenum	0.37		0.0010	mg/L		02/21/18 05:47	02/26/18 11:41	2
Selenium	0.0035		0.0010	mg/L		02/21/18 05:47	02/26/18 11:41	2
Thallium	ND		0.00020	mg/L		02/21/18 05:47	02/26/18 11:41	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:26	02/21/18 19:07	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0680		0.0490	0.0494	1.00	0.0623	pCi/L	02/21/18 09:29	03/15/18 05:58	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	109		40 - 110					02/21/18 09:29	03/15/18 05:58	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	0.396		0.206	0.209	1.00	0.303	pCi/L	02/21/18 10:35	03/06/18 14:29	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	109		40 - 110					02/21/18 10:35	03/06/18 14:29	1
<i>Y Carrier</i>	92.0		40 - 110					02/21/18 10:35	03/06/18 14:29	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	0.464		0.212	0.215	5.00	0.303	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Client Sample ID: CH-CCR-FD01-21418

Lab Sample ID: 550-98155-4

Date Collected: 02/14/18 13:57

Matrix: Water

Date Received: 02/16/18 13:01

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.4	D1	2.0	mg/L			02/20/18 22:29	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		02/20/18 11:15	02/21/18 17:27	1
Lithium	0.43		0.20	mg/L		02/20/18 11:15	02/21/18 17:27	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0020	mg/L		02/21/18 05:47	02/26/18 11:48	2
Arsenic	0.0026		0.0010	mg/L		02/21/18 05:47	02/26/18 11:48	2
Barium	0.0095		0.0010	mg/L		02/21/18 05:47	02/26/18 11:48	2
Cadmium	ND		0.00020	mg/L		02/21/18 05:47	02/26/18 11:48	2
Chromium	ND		0.0020	mg/L		02/21/18 05:47	02/26/18 11:48	2
Cobalt	ND		0.0010	mg/L		02/21/18 05:47	02/26/18 11:48	2
Lead	ND		0.0010	mg/L		02/21/18 05:47	02/26/18 11:48	2
Molybdenum	0.0088		0.0010	mg/L		02/21/18 05:47	02/26/18 11:48	2
Selenium	0.0034		0.0010	mg/L		02/21/18 05:47	02/26/18 11:48	2
Thallium	ND		0.00020	mg/L		02/21/18 05:47	02/26/18 11:48	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		02/20/18 21:26	02/21/18 19:09	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.159		0.0699	0.0713	1.00	0.0654	pCi/L	02/21/18 09:29	03/15/18 05:58	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	108		40 - 110					02/21/18 09:29	03/15/18 05:58	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	0.0575	U	0.181	0.181	1.00	0.316	pCi/L	02/21/18 10:35	03/06/18 14:20	1
<i>Carrier</i>	<i>%Yield</i>	<i>Qualifier</i>	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>Ba Carrier</i>	108		40 - 110					02/21/18 10:35	03/06/18 14:20	1
<i>Y Carrier</i>	92.3		40 - 110					02/21/18 10:35	03/06/18 14:20	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	0.217	U	0.194	0.195	5.00	0.316	pCi/L		04/18/18 12:22	1

TestAmerica Phoenix

Tracer/Carrier Summary

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

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)			
550-98155-1	CH-CCR-M50A-21418	105				
550-98155-2	CH-CCR-M51A-21418	109				
550-98155-3	CH-CCR-W123-21418	109				
550-98155-4	CH-CCR-FD01-21418	108				
LCS 160-352206/2-A	Lab Control Sample	101				
LCSD 160-352206/3-A	Lab Control Sample Dup	105				
MB 160-352206/1-A	Method Blank	103				

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)			
550-98155-1	CH-CCR-M50A-21418	105	90.5				
550-98155-2	CH-CCR-M51A-21418	109	93.5				
550-98155-3	CH-CCR-W123-21418	109	92.0				
550-98155-4	CH-CCR-FD01-21418	108	92.3				
LCS 160-352309/2-A	Lab Control Sample	101	93.5				
LCSD 160-352309/3-A	Lab Control Sample Dup	105	90.8				
MB 160-352309/1-A	Method Blank	103	90.8				

Tracer/Carrier Legend
 Ba Carrier = Ba Carrier
 Y Carrier = Y Carrier

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-140029/2
Matrix: Water
Analysis Batch: 140029

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			02/20/18 12:58	1

Lab Sample ID: LCS 550-140029/5
Matrix: Water
Analysis Batch: 140029

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	4.17		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-140029/6
Matrix: Water
Analysis Batch: 140029

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	4.19		mg/L		105	90 - 110	0	20

Lab Sample ID: 550-98155-1 MS
Matrix: Water
Analysis Batch: 140029

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	2.6	D1	8.00	11.4	D1	mg/L		109	80 - 120

Lab Sample ID: 550-98155-1 MSD
Matrix: Water
Analysis Batch: 140029

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	2.6	D1	8.00	11.2	D1	mg/L		106	80 - 120	2	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-140005/1-A
Matrix: Water
Analysis Batch: 140210

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140005

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		02/20/18 11:15	02/21/18 16:49	1
Lithium	ND		0.20	mg/L		02/20/18 11:15	02/21/18 16:49	1

Lab Sample ID: LCS 550-140005/2-A
Matrix: Water
Analysis Batch: 140210

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140005

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	1.00	1.00		mg/L		100	85 - 115
Lithium	1.00	0.967		mg/L		97	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

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

Lab Sample ID: LCSD 550-140005/3-A
Matrix: Water
Analysis Batch: 140210

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 140005

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	1.00	0.997		mg/L		100	85 - 115	0	20
Lithium	1.00	0.979		mg/L		98	85 - 115	1	20

Lab Sample ID: 550-98155-1 MS
Matrix: Water
Analysis Batch: 140210

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA
Prep Batch: 140005

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	ND		1.00	0.956		mg/L		96	70 - 130		
Lithium	0.44		1.00	1.47		mg/L		103	70 - 130		

Lab Sample ID: 550-98155-1 MSD
Matrix: Water
Analysis Batch: 140210

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA
Prep Batch: 140005

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Beryllium	ND		1.00	0.960		mg/L		96	70 - 130	0	20
Lithium	0.44		1.00	1.45		mg/L		101	70 - 130	1	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-140074/1-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140074

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Chromium	ND		0.0010	mg/L		02/21/18 05:47	02/22/18 16:30	1
Cobalt	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Lead	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Molybdenum	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1
Selenium	ND		0.00050	mg/L		02/21/18 05:47	02/22/18 16:30	1

Lab Sample ID: MB 550-140074/1-A
Matrix: Water
Analysis Batch: 140456

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140074

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		02/21/18 05:47	02/26/18 11:21	1
Arsenic	ND		0.00050	mg/L		02/21/18 05:47	02/26/18 11:21	1
Cadmium	ND		0.00010	mg/L		02/21/18 05:47	02/26/18 11:21	1
Thallium	ND		0.00010	mg/L		02/21/18 05:47	02/26/18 11:21	1

Lab Sample ID: LCS 550-140074/2-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0968		mg/L		97	85 - 115

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

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

Lab Sample ID: LCS 550-140074/2-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.0943		mg/L		94	85 - 115
Barium	0.100	0.0964		mg/L		96	85 - 115
Cadmium	0.100	0.0959		mg/L		96	85 - 115
Chromium	0.100	0.0950		mg/L		95	85 - 115
Cobalt	0.100	0.0952		mg/L		95	85 - 115
Lead	0.100	0.0953		mg/L		95	85 - 115
Molybdenum	0.100	0.0960		mg/L		96	85 - 115
Selenium	0.100	0.0972		mg/L		97	85 - 115
Thallium	0.100	0.0956		mg/L		96	85 - 115

Lab Sample ID: LCSD 550-140074/3-A
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.100	0.100		mg/L		100	85 - 115	4	20
Arsenic	0.100	0.0985		mg/L		98	85 - 115	4	20
Barium	0.100	0.100		mg/L		100	85 - 115	4	20
Cadmium	0.100	0.0994		mg/L		99	85 - 115	4	20
Chromium	0.100	0.0990		mg/L		99	85 - 115	4	20
Cobalt	0.100	0.0990		mg/L		99	85 - 115	4	20
Lead	0.100	0.0982		mg/L		98	85 - 115	3	20
Molybdenum	0.100	0.0993		mg/L		99	85 - 115	3	20
Selenium	0.100	0.0997		mg/L		100	85 - 115	3	20
Thallium	0.100	0.0982		mg/L		98	85 - 115	3	20

Lab Sample ID: 550-98153-B-1-E MS
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND		0.100	0.101		mg/L		100	70 - 130
Arsenic	0.0018		0.100	0.108		mg/L		107	70 - 130
Barium	0.017		0.100	0.115		mg/L		99	70 - 130
Cadmium	0.0011		0.100	0.0899		mg/L		89	70 - 130
Chromium	0.011		0.100	0.109		mg/L		98	70 - 130
Cobalt	0.052		0.100	0.143		mg/L		91	70 - 130
Lead	0.0010		0.100	0.0880		mg/L		87	70 - 130
Molybdenum	0.048		0.100	0.146		mg/L		98	70 - 130
Selenium	0.00091		0.100	0.115		mg/L		114	70 - 130
Thallium	0.00018		0.100	0.0891		mg/L		89	70 - 130

Lab Sample ID: 550-98153-B-1-F MSD
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	ND		0.100	0.102		mg/L		101	70 - 130	1	20
Arsenic	0.0018		0.100	0.111		mg/L		109	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

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

Lab Sample ID: 550-98153-B-1-F MSD
Matrix: Water
Analysis Batch: 140294

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Barium	0.017		0.100	0.117		mg/L		100	70 - 130	1	20
Cadmium	0.0011		0.100	0.0898		mg/L		89	70 - 130	0	20
Chromium	0.011		0.100	0.112		mg/L		100	70 - 130	2	20
Cobalt	0.052		0.100	0.145		mg/L		94	70 - 130	2	20
Lead	0.0010		0.100	0.0891		mg/L		88	70 - 130	1	20
Molybdenum	0.048		0.100	0.150		mg/L		102	70 - 130	2	20
Selenium	0.00091		0.100	0.116		mg/L		115	70 - 130	1	20
Thallium	0.00018		0.100	0.0907		mg/L		90	70 - 130	2	20

Lab Sample ID: 550-98155-1 MS
Matrix: Water
Analysis Batch: 140602

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Antimony	ND		0.100	0.104		mg/L		104	70 - 130		
Arsenic	0.0025	B1	0.100	0.107		mg/L		104	70 - 130		
Barium	0.0088		0.100	0.110		mg/L		102	70 - 130		
Cadmium	ND		0.100	0.0973		mg/L		97	70 - 130		
Chromium	ND		0.100	0.0997		mg/L		100	70 - 130		
Cobalt	ND		0.100	0.0969		mg/L		97	70 - 130		
Lead	ND		0.100	0.0922		mg/L		92	70 - 130		
Molybdenum	0.0085		0.100	0.112		mg/L		103	70 - 130		
Selenium	0.0030		0.100	0.108		mg/L		105	70 - 130		
Thallium	ND		0.100	0.0942		mg/L		94	70 - 130		

Lab Sample ID: 550-98155-1 MSD
Matrix: Water
Analysis Batch: 140602

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA
Prep Batch: 140074

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Antimony	ND		0.100	0.114		mg/L		114	70 - 130	9	20
Arsenic	0.0025	B1	0.100	0.118		mg/L		116	70 - 130	10	20
Barium	0.0088		0.100	0.121		mg/L		112	70 - 130	9	20
Cadmium	ND		0.100	0.106		mg/L		106	70 - 130	8	20
Chromium	ND		0.100	0.110		mg/L		110	70 - 130	10	20
Cobalt	ND		0.100	0.107		mg/L		106	70 - 130	10	20
Lead	ND		0.100	0.101		mg/L		101	70 - 130	9	20
Molybdenum	0.0085		0.100	0.122		mg/L		114	70 - 130	9	20
Selenium	0.0030		0.100	0.121		mg/L		118	70 - 130	12	20
Thallium	ND		0.100	0.104		mg/L		104	70 - 130	10	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-140065/1-A
Matrix: Water
Analysis Batch: 140208

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140065

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Hg	ND		0.00020	mg/L		02/20/18 21:26	02/21/18 18:56	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Lab Sample ID: LCS 550-140065/2-A
Matrix: Water
Analysis Batch: 140208

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140065
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Hg	0.0100	0.00906		mg/L		91	85 - 115

Lab Sample ID: LCSD 550-140065/3-A
Matrix: Water
Analysis Batch: 140208

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 140065
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	0.0100	0.00960		mg/L		96	85 - 115	6	20

Lab Sample ID: 550-98155-1 MS
Matrix: Water
Analysis Batch: 140208

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA
Prep Batch: 140065
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Hg	ND		0.0100	0.00857		mg/L		86	70 - 130

Lab Sample ID: 550-98155-1 MSD
Matrix: Water
Analysis Batch: 140208

Client Sample ID: CH-CCR-M50A-21418
Prep Type: Total/NA
Prep Batch: 140065
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	ND		0.0100	0.00831		mg/L		83	70 - 130	3	20

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-352206/1-A
Matrix: Water
Analysis Batch: 355724

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352206

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0000	U	0.0336	0.0336	1.00	0.0748	pCi/L	02/21/18 09:29	03/15/18 05:53	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	103		40 - 110					02/21/18 09:29	03/15/18 05:53	1

Lab Sample ID: LCS 160-352206/2-A
Matrix: Water
Analysis Batch: 355724

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352206
%Rec.

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	Limits
Radium-226	11.8	11.18		1.15	1.00	0.0972	pCi/L	95	68 - 137
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	101		40 - 110						

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCSD 160-352206/3-A
Matrix: Water
Analysis Batch: 355724

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 352206

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226	11.8	10.94		1.12	1.00	0.0878	pCi/L	93	68 - 137	0.10	1
Carrier	%Yield	LCSD Qualifier	Limits								
Ba Carrier	105		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-352309/1-A
Matrix: Water
Analysis Batch: 354193

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352309

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.02448	U	0.193	0.193	1.00	0.342	pCi/L	02/21/18 10:35	03/06/18 14:26	1
Carrier	%Yield	MB Qualifier	Limits							
Ba Carrier	103		40 - 110							
Y Carrier	90.8		40 - 110							
								Prepared	Analyzed	Dil Fac
								02/21/18 10:35	03/06/18 14:26	1
								02/21/18 10:35	03/06/18 14:26	1

Lab Sample ID: LCS 160-352309/2-A
Matrix: Water
Analysis Batch: 354193

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352309

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	8.50	8.568		0.990	1.00	0.333	pCi/L	101	56 - 140
Carrier	%Yield	LCS Qualifier	Limits						
Ba Carrier	101		40 - 110						
Y Carrier	93.5		40 - 110						

Lab Sample ID: LCSD 160-352309/3-A
Matrix: Water
Analysis Batch: 354193

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 352309

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	8.50	8.348		0.969	1.00	0.369	pCi/L	98	56 - 140	0.11	1
Carrier	%Yield	LCSD Qualifier	Limits								
Ba Carrier	105		40 - 110								
Y Carrier	90.8		40 - 110								

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

HPLC/IC

Analysis Batch: 140029

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	300.0	
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	300.0	
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	300.0	
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	300.0	
MB 550-140029/2	Method Blank	Total/NA	Water	300.0	
LCS 550-140029/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-140029/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	300.0	
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	300.0	

Metals

Prep Batch: 140005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	200.7	
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	200.7	
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	200.7	
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	200.7	
MB 550-140005/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-140005/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-140005/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	200.7	
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	200.7	

Prep Batch: 140065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	245.1	
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	245.1	
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	245.1	
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	245.1	
MB 550-140065/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-140065/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-140065/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	245.1	
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	245.1	

Prep Batch: 140074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	200.8	
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	200.8	
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	200.8	
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	200.8	
MB 550-140074/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-140074/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-140074/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-98153-B-1-E MS	Matrix Spike	Total/NA	Water	200.8	
550-98153-B-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	200.8	
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	200.8	
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	200.8	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Metals (Continued)

Analysis Batch: 140208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	245.1	140065
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	245.1	140065
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	245.1	140065
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	245.1	140065
MB 550-140065/1-A	Method Blank	Total/NA	Water	245.1	140065
LCS 550-140065/2-A	Lab Control Sample	Total/NA	Water	245.1	140065
LCSD 550-140065/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	140065
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	245.1	140065
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	245.1	140065

Analysis Batch: 140210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	200.7 Rev 4.4	140005
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	200.7 Rev 4.4	140005
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	200.7 Rev 4.4	140005
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	200.7 Rev 4.4	140005
MB 550-140005/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	140005
LCS 550-140005/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	140005
LCSD 550-140005/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	140005
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	200.7 Rev 4.4	140005
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	200.7 Rev 4.4	140005

Analysis Batch: 140294

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	200.8 LL	140074
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	200.8 LL	140074
MB 550-140074/1-A	Method Blank	Total/NA	Water	200.8 LL	140074
LCS 550-140074/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	140074
LCSD 550-140074/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	140074
550-98153-B-1-E MS	Matrix Spike	Total/NA	Water	200.8 LL	140074
550-98153-B-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	200.8 LL	140074

Analysis Batch: 140456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	200.8 LL	140074
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	200.8 LL	140074
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	200.8 LL	140074
MB 550-140074/1-A	Method Blank	Total/NA	Water	200.8 LL	140074

Analysis Batch: 140602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1 MS	CH-CCR-M50A-21418	Total/NA	Water	200.8 LL	140074
550-98155-1 MSD	CH-CCR-M50A-21418	Total/NA	Water	200.8 LL	140074

Rad

Prep Batch: 352206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	PrecSep-21	
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	PrecSep-21	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Rad (Continued)

Prep Batch: 352206 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	PrecSep-21	
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	PrecSep-21	
MB 160-352206/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-352206/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-352206/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 352309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-98155-1	CH-CCR-M50A-21418	Total/NA	Water	PrecSep_0	
550-98155-2	CH-CCR-M51A-21418	Total/NA	Water	PrecSep_0	
550-98155-3	CH-CCR-W123-21418	Total/NA	Water	PrecSep_0	
550-98155-4	CH-CCR-FD01-21418	Total/NA	Water	PrecSep_0	
MB 160-352309/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-352309/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-352309/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Client Sample ID: CH-CCR-M50A-21418

Date Collected: 02/14/18 13:57

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140029	02/20/18 20:01	NBL	TAL PHX
Total/NA	Prep	200.7			140005	02/20/18 11:15	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140210	02/21/18 17:09	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 16:59	TEK	TAL PHX
Total/NA	Prep	245.1			140065	02/20/18 21:26	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140208	02/21/18 19:04	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355725	03/15/18 05:58	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-M51A-21418

Date Collected: 02/14/18 13:24

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	140029	02/20/18 21:52	NBL	TAL PHX
Total/NA	Prep	200.7			140005	02/20/18 11:15	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140210	02/21/18 17:15	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	140294	02/22/18 17:11	TEK	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	140456	02/26/18 11:33	TEK	TAL PHX
Total/NA	Prep	245.1			140065	02/20/18 21:26	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140208	02/21/18 19:06	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355725	03/15/18 05:58	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-W123-21418

Date Collected: 02/14/18 14:45

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	140029	02/20/18 22:10	NBL	TAL PHX
Total/NA	Prep	200.7			140005	02/20/18 11:15	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140210	02/21/18 17:21	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	140456	02/26/18 11:41	TEK	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	245.1			140065	02/20/18 21:26	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140208	02/21/18 19:07	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355725	03/15/18 05:58	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354193	03/06/18 14:29	CDR	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-FD01-21418

Lab Sample ID: 550-98155-4

Date Collected: 02/14/18 13:57

Matrix: Water

Date Received: 02/16/18 13:01

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	140029	02/20/18 22:29	NBL	TAL PHX
Total/NA	Prep	200.7			140005	02/20/18 11:15	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	140210	02/21/18 17:27	ARE	TAL PHX
Total/NA	Prep	200.8			140074	02/21/18 05:47	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	140456	02/26/18 11:48	TEK	TAL PHX
Total/NA	Prep	245.1			140065	02/20/18 21:26	EXZ	TAL PHX
Total/NA	Analysis	245.1		1	140208	02/21/18 19:09	EXZ	TAL PHX
Total/NA	Prep	PrecSep-21			352206	02/21/18 09:29	TJT	TAL SL
Total/NA	Analysis	903.0		1	355725	03/15/18 05:58	RTM	TAL SL
Total/NA	Prep	PrecSep_0			352309	02/21/18 10:35	TJT	TAL SL
Total/NA	Analysis	904.0		1	354192	03/06/18 14:20	CDR	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

Accreditation/Certification Summary

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

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

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	06-30-19
ANAB	DoD ELAP		L2305	04-06-19
Arizona	State Program	9	AZ0813	12-08-18
California	State Program	9	2886	06-30-19
Connecticut	State Program	1	PH-0241	03-31-19
Florida	NELAP	4	E87689	06-30-19
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
Louisiana	NELAP	6	04080	06-30-19
Louisiana (DW)	NELAP	6	LA180017	12-31-18
Maryland	State Program	3	310	09-30-19
Michigan	State Program	5	9005	06-30-18 *
Missouri	State Program	7	780	06-30-18 *
Nevada	State Program	9	MO000542018-1	07-31-19
New Jersey	NELAP	2	MO002	06-30-19
New York	NELAP	2	11616	03-31-19
North Dakota	State Program	8	R207	06-30-19
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-19
Pennsylvania	NELAP	3	68-00540	02-28-19
South Carolina	State Program	4	85002001	06-30-19
Texas	NELAP	6	T104704193-18-12	07-31-19
US Fish & Wildlife	Federal		058448	07-31-19
USDA	Federal		P330-17-0028	02-02-20
Utah	NELAP	8	MO000542016-8	07-31-18 *
Virginia	NELAP	3	460230	06-14-19
Washington	State Program	10	C592	08-30-18 *
West Virginia DEP	State Program	3	381	10-31-18 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-1

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
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.

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

98155



THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: DW NPDES RCRA Other: CCR

Client Contact: Doug Lavarnway 928-587-0319
Analysis Turnaround Time: CALENDAR DAYS WORKING DAYS

APS Cholla
4801 Cholla Lake Rd
Joseph City, AZ 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
Project Name:
Site:
P O #

Sample Identification: Sample Date, Sample Time, Sample Type (G=Comp, G=Grab), Matrix, # of Cont.

Table with columns for Sample Identification, Sample Date, Sample Time, Sample Type, Matrix, # of Cont., Filtered Sample (Y/N), 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)



550-98155 Chain of Custody

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/OC Requirements & Comments: Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab Archive for Months

Method 200.8 with collision cell

Custody Seal Intact: Yes No
Cooler Temp. (°C): Obs'd:
Therm ID No.: 26/332

Relinquished by: [Signature] Company: [Signature] Date/Time: 2/16/13 15:01

Relinquished by: [Signature] Company: [Signature] Date/Time: 2/16/13 15:01

Relinquished by: [Signature] Company: [Signature] Date/Time: 2/16/13 15:01

Chain of Custody Record

Client Information (Sub Contract Lab) Client Contact: Baker, Ken Shipping/Receiving: ken.baker@testamericainc.com Company: TestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, Earth City, MO, 63045 Phone: 314-298-8566(Tel) 314-298-8757(Fax) Email: APS - Cholla CCR Site: Arizona Public Service		Lab PM: Baker, Ken E-Mail: ken.baker@testamericainc.com State of Origin: Arizona State Program: Arizona							
Due Date Requested: 2/27/2018 TAT Requested (days):		Carrier Tracking No(s): 550-20243.1 Page: 1 of 1 Job #: 550-98155-1							
Project #: 55009651 SSOW#:		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - Nitric Acid F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:							
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	903.0/PreSep_21 Standard Target List	904.0/PreSep_0 Standard Target List	Total Number of Containers	Special Instructions/Note:
CH-CCR-M50A-21418 (550-98155-1)	2/14/18	13:57 Arizona	Water	Water		X	X	2	
CH-CCR-M51A-21418 (550-98155-2)	2/14/18	13:24 Arizona	Water	Water		X	X	2	
CH-CCR-W123-21418 (550-98155-3)	2/14/18	14:45 Arizona	Water	Water		X	X	2	
CH-CCR-FD01-21418 (550-98155-4)	2/14/18	13:57 Arizona	Water	Water		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/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 Date:									
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/QC Requirements:									
Empty Kit Relinquished by: Relinquished by: [Signature] Date/Time: 2-17-18 0830 Relinquished by: [Signature] Date/Time: Relinquished by: [Signature] Date/Time:									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temperature(s) °C and Other Remarks:									

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-98155-1

Login Number: 98155
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: 550-98155-3

Client Project/Site: APS - Cholla CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

4/19/2018 10:09:13 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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

Qualifiers

Rad

Qualifier	Qualifier Description
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.
▫	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 - Cholla CCR

TestAmerica Job ID: 550-98155-3

Job ID: 550-98155-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-98155-3

Comments

No additional comments.

Receipt

The samples were received on 2/16/2018 1:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.6° C and 3.3° C.

RAD

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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-98155-1	CH-CCR-M50A-21418	Water	02/14/18 13:57	02/16/18 13:01
550-98155-2	CH-CCR-M51A-21418	Water	02/14/18 13:24	02/16/18 13:01
550-98155-3	CH-CCR-W123-21418	Water	02/14/18 14:45	02/16/18 13:01
550-98155-4	CH-CCR-FD01-21418	Water	02/14/18 13:57	02/16/18 13:01

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Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

Client Sample ID: CH-CCR-M50A-21418

Lab Sample ID: 550-98155-1

No Detections.

Client Sample ID: CH-CCR-M51A-21418

Lab Sample ID: 550-98155-2

No Detections.

Client Sample ID: CH-CCR-W123-21418

Lab Sample ID: 550-98155-3

No Detections.

Client Sample ID: CH-CCR-FD01-21418

Lab Sample ID: 550-98155-4

No Detections.

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

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

Client Sample ID: CH-CCR-M50A-21418

Lab Sample ID: 550-98155-1

Date Collected: 02/14/18 13:57

Matrix: Water

Date Received: 02/16/18 13:01

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	0.512		0.219	0.222	5.00	0.306	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-M51A-21418

Lab Sample ID: 550-98155-2

Date Collected: 02/14/18 13:24

Matrix: Water

Date Received: 02/16/18 13:01

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	0.172	E8	0.187	0.188	5.00	0.307	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-W123-21418

Lab Sample ID: 550-98155-3

Date Collected: 02/14/18 14:45

Matrix: Water

Date Received: 02/16/18 13:01

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	0.464		0.212	0.215	5.00	0.303	pCi/L		04/18/18 12:22	1

Client Sample ID: CH-CCR-FD01-21418

Lab Sample ID: 550-98155-4

Date Collected: 02/14/18 13:57

Matrix: Water

Date Received: 02/16/18 13:01

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	0.217	E8	0.194	0.195	5.00	0.316	pCi/L		04/18/18 12:22	1

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

Client Sample ID: CH-CCR-M50A-21418

Date Collected: 02/14/18 13:57

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-M51A-21418

Date Collected: 02/14/18 13:24

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-W123-21418

Date Collected: 02/14/18 14:45

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Ra226_Ra228 Pos		1	361565	04/18/18 12:22	RTM	TAL SL

Client Sample ID: CH-CCR-FD01-21418

Date Collected: 02/14/18 13:57

Date Received: 02/16/18 13:01

Lab Sample ID: 550-98155-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

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	06-09-18

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: APS - Cholla CCR

TestAmerica Job ID: 550-98155-3

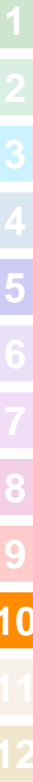
Method	Method Description	Protocol	Laboratory
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	TAL SL

Protocol References:

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



Chain of Custody Record

98155

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: DW NPDES RCRA Other: CCR

TestAmerica Laboratories, Inc.

Client Contact		Doug Lavarnway 928-587-0319		Doug Lavarnway		Date: 02/16/2018		COC No. _____ of _____ COCs									
Analysis Turnaround Time		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below: _____		Lab Contact:		Carrier:		Sampler: _____ For Lab Use Only: Walk-in Client: _____ Lab Sampling: _____ Job / SDG No.: _____									
APS Cholla 4801 Cholla Lake Rd Joseph City, AZ 86032 (928) 587-0319 Phone (xxx) xxx-xxxx FAX Project Name: Site: P O #		Sample Identification CH-CCR-M50A-21418 CH-CCR-M51A-21418 CH-CCR-W123-21418 CH-CCR-FD01-21418		Sample Date 2/14/2018 2/14/18 2/14/18 2/14/18		Sample Time 1357 G 1324 1445 1357		Sample Type (G=Comp, G=Grab) G G G G		Matrix W W W W		# of Cont. 4 4 4 4		Filtered Sample (Y / N) 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)		Sample Specific Notes: _____ _____ _____	
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. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months																	
Special Instructions/OC Requirements & Comments: Method 200.8 with collision cell																	
Custody Seats Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____		Corr'd: _____		Therm ID No.:									
Relinquished by: _____		Company: _____		Date/Time: _____		Received by: _____		Company: _____									
Relinquished by: _____		Company: _____		Date/Time: _____		Received in Laboratory by: _____		Company: _____									
Relinquished by: _____		Company: _____		Date/Time: _____		Received in Laboratory by: _____		Company: _____									



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-98155-3

Login Number: 98155
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.



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-98155-3

Login Number: 98155
List Number: 2
Creator: Taylor, Kristene N

List Source: TestAmerica St. Louis
List Creation: 02/17/18 05:05 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.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	20.0,20.0
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: 550-103240-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

5/31/2018 2:39:20 PM

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: 550-103240-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
E2	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
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.

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.
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.
D2	Sample required dilution due to high concentration of analyte.
B1	Target analyte detected in method blank at or above the method reporting limit.

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: 550-103240-1

Job ID: 550-103240-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103240-1**

Comments

No additional comments.

Receipt

The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

HPLC/IC

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

Metals

Method(s) 200.7 Rev 4.4: The continuing calibration blank (CCB) for analytical batch 550-148212 contained Sodium above the reporting limit (RL). All reported samples associated with this CCB contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

Method(s) 200.7 Rev 4.4: The method blank for preparation batch 550-147956 and analytical batch 550-148212 contained Sodium above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method(s) 200.7 Rev 4.4: The method blank for preparation batch 550-147956 and analytical batch 550-148235 contained Sodium above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

No additional analytical or quality issues were noted, other than those described above or 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: 550-103240-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103240-1	CH-CCR-M-50A-52118	Water	05/21/18 10:06	05/22/18 09:25
550-103240-2	CH-CCR-M-51A-52118	Water	05/21/18 09:21	05/22/18 09:25
550-103240-3	CH-CCR-W-123-52118	Water	05/21/18 10:41	05/22/18 09:25

- 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: 550-103240-1

Client Sample ID: CH-CCR-M-50A-52118

Lab Sample ID: 550-103240-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2400	D2	400	mg/L	200		300.0	Total/NA
Fluoride	2.4	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3100	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	610	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	210	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	7.5		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1700	B7 M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	180		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	180		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	7900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.2	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5800	D2	400	mg/L	200		300.0	Total/NA
Fluoride	5.7	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3100	D2	400	mg/L	200		300.0	Total/NA
Boron	34		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	820		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	290		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	31		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	3800	B7 D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	95		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	95		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	12000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6400	D2	400	mg/L	200		300.0	Total/NA
Fluoride	4.3	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	3600	D2	400	mg/L	200		300.0	Total/NA
Boron	35		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	790		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	290		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	45		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	4500	B7 D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	74		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	74		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	15000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	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: 550-103240-1

Client Sample ID: CH-CCR-M-50A-52118

Lab Sample ID: 550-103240-1

Date Collected: 05/21/18 10:06

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2400	D2	400	mg/L			05/25/18 06:36	200
Fluoride	2.4	D1	0.80	mg/L			05/23/18 06:33	2
Sulfate	3100	D2	400	mg/L			05/25/18 06:36	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		05/23/18 08:28	05/24/18 21:57	1
Calcium	610	M3	2.0	mg/L		05/23/18 08:28	05/24/18 21:57	1
Magnesium	210	M3	2.0	mg/L		05/23/18 08:28	05/24/18 21:57	1
Potassium	7.5		0.50	mg/L		05/23/18 08:28	05/24/18 21:57	1
Sodium	1700	B7 M3	0.50	mg/L		05/23/18 08:28	05/24/18 21:57	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	180		6.0	mg/L			05/23/18 13:52	1
Bicarbonate Alkalinity as CaCO3	180		6.0	mg/L			05/23/18 13:52	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:52	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 13:52	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:52	1
Total Dissolved Solids	7900	D2	100	mg/L			05/23/18 11:24	1
pH	7.2	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Date Collected: 05/21/18 09:21

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5800	D2	400	mg/L			05/23/18 05:11	200
Fluoride	5.7	D1	0.80	mg/L			05/23/18 04:43	2
Sulfate	3100	D2	400	mg/L			05/23/18 05:11	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	34		0.050	mg/L		05/23/18 08:28	05/24/18 23:07	1
Calcium	820		2.0	mg/L		05/23/18 08:28	05/24/18 23:07	1
Magnesium	290		2.0	mg/L		05/23/18 08:28	05/24/18 23:07	1
Potassium	31		0.50	mg/L		05/23/18 08:28	05/24/18 23:07	1
Sodium	3800	B7 D2	1.0	mg/L		05/23/18 08:28	05/25/18 12:01	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	95		6.0	mg/L			05/23/18 14:09	1
Bicarbonate Alkalinity as CaCO3	95		6.0	mg/L			05/23/18 14:09	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 14:09	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 14:09	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 14:09	1
Total Dissolved Solids	12000	D2	200	mg/L			05/23/18 11:24	1
pH	7.1	H5	1.7	SU			05/23/18 09:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Date Collected: 05/21/18 09:21

Matrix: Water

Date Received: 05/22/18 09:25

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	21.1	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Date Collected: 05/21/18 10:41

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6400	D2	400	mg/L			05/23/18 06:05	200
Fluoride	4.3	D1	2.0	mg/L			05/23/18 05:38	5
Sulfate	3600	D2	400	mg/L			05/23/18 06:05	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	35		0.050	mg/L		05/23/18 08:28	05/24/18 23:13	1
Calcium	790		2.0	mg/L		05/23/18 08:28	05/24/18 23:13	1
Magnesium	290		2.0	mg/L		05/23/18 08:28	05/24/18 23:13	1
Potassium	45		0.50	mg/L		05/23/18 08:28	05/24/18 23:13	1
Sodium	4500	B7 D2	1.0	mg/L		05/23/18 08:28	05/25/18 12:07	2

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	74		6.0	mg/L			05/23/18 14:17	1
Bicarbonate Alkalinity as CaCO3	74		6.0	mg/L			05/23/18 14:17	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 14:17	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 14:17	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 14:17	1
Total Dissolved Solids	15000	D2	200	mg/L			05/23/18 11:24	1
pH	7.5	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148001/2

Matrix: Water

Analysis Batch: 148001

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			05/22/18 16:23	1
Fluoride	ND		0.40	mg/L			05/22/18 16:23	1
Sulfate	ND		2.0	mg/L			05/22/18 16:23	1

Lab Sample ID: LCS 550-148001/5

Matrix: Water

Analysis Batch: 148001

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	20.5		mg/L		102	90 - 110
Fluoride	4.00	4.19		mg/L		105	90 - 110
Sulfate	20.0	20.7		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148001/6

Matrix: Water

Analysis Batch: 148001

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	20.5		mg/L		102	90 - 110	0	20
Fluoride	4.00	4.19		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.8		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103234-G-6 MSD ^20

Matrix: Water

Analysis Batch: 148001

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	14000	E2 M3 D1	400	13600	D1 E2 M3	mg/L		15	80 - 120	0	20
Fluoride	ND	D1	80.0	82.2	D1	mg/L		103	80 - 120	2	20
Sulfate	280	D1	400	703	D1	mg/L		105	80 - 120	1	20

Lab Sample ID: 550-103234-J-6 MS ^20

Matrix: Water

Analysis Batch: 148001

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	14000	E2 M3 D1	400	13500	D1 E2 M3	mg/L		7	80 - 120
Fluoride	ND	D1	80.0	84.2	D1	mg/L		105	80 - 120
Sulfate	280	D1	400	713	D1	mg/L		107	80 - 120

Lab Sample ID: MB 550-148169/2

Matrix: Water

Analysis Batch: 148169

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			05/24/18 18:44	1
Fluoride	ND		0.40	mg/L			05/24/18 18:44	1
Sulfate	ND		2.0	mg/L			05/24/18 18:44	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-148169/5
Matrix: Water
Analysis Batch: 148169

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	4.37		mg/L		109	90 - 110
Sulfate	20.0	21.3		mg/L		106	90 - 110

Lab Sample ID: LCSD 550-148169/6
Matrix: Water
Analysis Batch: 148169

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	4.38		mg/L		109	90 - 110	0	20
Sulfate	20.0	21.3		mg/L		107	90 - 110	0	20

Lab Sample ID: 550-103240-1 MS
Matrix: Water
Analysis Batch: 148169

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2400	D2	4000	7150	D2	mg/L		120	80 - 120
Fluoride	ND	D1 D5	800	889	D1	mg/L		111	80 - 120
Sulfate	3100	D2	4000	7580	D2	mg/L		112	80 - 120

Lab Sample ID: 550-103240-1 MSD
Matrix: Water
Analysis Batch: 148169

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2400	D2	4000	7050	D2	mg/L		117	80 - 120	1	20
Fluoride	ND	D1 D5	800	888	D1	mg/L		111	80 - 120	0	20
Sulfate	3100	D2	4000	7470	D2	mg/L		109	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		05/23/18 08:28	05/24/18 21:02	1
Calcium	ND		2.0	mg/L		05/23/18 08:28	05/24/18 21:02	1
Magnesium	ND		2.0	mg/L		05/23/18 08:28	05/24/18 21:02	1
Potassium	ND		0.50	mg/L		05/23/18 08:28	05/24/18 21:02	1
Sodium	0.721	B1	0.50	mg/L		05/23/18 08:28	05/24/18 21:02	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

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

Lab Sample ID: LCS 550-147956/2-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.952		mg/L		95	85 - 115
Calcium	21.0	20.7		mg/L		99	85 - 115
Magnesium	21.0	20.7		mg/L		99	85 - 115
Potassium	20.0	19.2		mg/L		96	85 - 115
Sodium	20.0	19.6		mg/L		98	85 - 115

Lab Sample ID: LCSD 550-147956/3-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.966		mg/L		97	85 - 115	2	20
Calcium	21.0	20.9		mg/L		100	85 - 115	1	20
Magnesium	21.0	20.8		mg/L		99	85 - 115	1	20
Potassium	20.0	19.3		mg/L		96	85 - 115	0	20
Sodium	20.0	19.4		mg/L		97	85 - 115	1	20

Lab Sample ID: 550-103240-1 MS
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	3.0		1.00	3.94		mg/L		95	70 - 130
Calcium	610	M3	21.0	612	M3	mg/L		-6	70 - 130
Magnesium	210	M3	21.0	229	M3	mg/L		69	70 - 130
Potassium	7.5		20.0	28.0		mg/L		102	70 - 130
Sodium	1700	M3 B7	20.0	1650	M3	mg/L		-65	70 - 130

Lab Sample ID: 550-103240-1 MSD
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	3.0		1.00	3.98		mg/L		99	70 - 130	1	20
Calcium	610	M3	21.0	621	M3	mg/L		36	70 - 130	1	20
Magnesium	210	M3	21.0	231	M3	mg/L		78	70 - 130	1	20
Potassium	7.5		20.0	28.0		mg/L		102	70 - 130	0	20
Sodium	1700	M3 B7	20.0	1660	M3	mg/L		-20	70 - 130	1	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-148038/5
Matrix: Water
Analysis Batch: 148038

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			05/23/18 10:42	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: MB 550-148038/5
Matrix: Water
Analysis Batch: 148038

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 10:42	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1

Lab Sample ID: LCSD 550-148038/17
Matrix: Water
Analysis Batch: 148038

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	260		mg/L		104	90 - 110	3	20

Lab Sample ID: 550-103239-A-1 DU
Matrix: Water
Analysis Batch: 148038

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	200		204		mg/L		0.6	20
Bicarbonate Alkalinity as CaCO3	200		204		mg/L		0.6	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: 550-103240-1 DU
Matrix: Water
Analysis Batch: 148038

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	180		180		mg/L		0.3	20
Bicarbonate Alkalinity as CaCO3	180		180		mg/L		0.3	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 550-147986/1
Matrix: Water
Analysis Batch: 147986

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			05/23/18 11:24	1

Lab Sample ID: LCS 550-147986/2
Matrix: Water
Analysis Batch: 147986

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

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

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

Lab Sample ID: LCSD 550-147986/3
Matrix: Water
Analysis Batch: 147986

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	972		mg/L		97	90 - 110	1	10

Lab Sample ID: 550-103240-1 DU
Matrix: Water
Analysis Batch: 147986

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	7900	D2	7920	D2	mg/L		0.1	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-147966/13
Matrix: Water
Analysis Batch: 147966

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

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

Lab Sample ID: LCSSRM 550-147966/25
Matrix: Water
Analysis Batch: 147966

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

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

Lab Sample ID: LCSSRM 550-147966/29
Matrix: Water
Analysis Batch: 147966

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

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
pH	7.00	7.1		SU		100.9	98.5 - 101.5		

Lab Sample ID: 550-103240-1 DU
Matrix: Water
Analysis Batch: 147966

Client Sample ID: CH-CCR-M-50A-52118
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	21.2	H5	21.3	H5	Degrees C		0.5	

Lab Sample ID: 550-103240-3 DU
Matrix: Water
Analysis Batch: 147966

Client Sample ID: CH-CCR-W-123-52118
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	21.2	H5	21.2	H5	Degrees C		0	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

HPLC/IC

Analysis Batch: 148001

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	300.0	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	300.0	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	300.0	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	300.0	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	300.0	
MB 550-148001/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148001/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-148001/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103234-G-6 MSD ^20	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-103234-J-6 MS ^20	Matrix Spike	Total/NA	Water	300.0	

Analysis Batch: 148169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	300.0	
MB 550-148169/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148169/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-148169/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103240-1 MS	CH-CCR-M-50A-52118	Total/NA	Water	300.0	
550-103240-1 MSD	CH-CCR-M-50A-52118	Total/NA	Water	300.0	

Metals

Prep Batch: 147956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	200.7	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.7	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.7	
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCS 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103240-1 MS	CH-CCR-M-50A-52118	Total/NA	Water	200.7	
550-103240-1 MSD	CH-CCR-M-50A-52118	Total/NA	Water	200.7	

Analysis Batch: 148212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.7 Rev 4.4	147956
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-1 MS	CH-CCR-M-50A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-1 MSD	CH-CCR-M-50A-52118	Total/NA	Water	200.7 Rev 4.4	147956

Analysis Batch: 148235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.7 Rev 4.4	147956

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

General Chemistry

Analysis Batch: 147966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	SM 4500 H+ B	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	SM 4500 H+ B	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/25	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/29	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-103240-1 DU	CH-CCR-M-50A-52118	Total/NA	Water	SM 4500 H+ B	
550-103240-3 DU	CH-CCR-W-123-52118	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 147986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	SM 2540C	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	SM 2540C	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	SM 2540C	
MB 550-147986/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-147986/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-147986/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103240-1 DU	CH-CCR-M-50A-52118	Total/NA	Water	SM 2540C	

Analysis Batch: 148038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	SM 2320B	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	SM 2320B	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	SM 2320B	
MB 550-148038/5	Method Blank	Total/NA	Water	SM 2320B	
LCSD 550-148038/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103239-A-1 DU	Duplicate	Total/NA	Water	SM 2320B	
550-103240-1 DU	CH-CCR-M-50A-52118	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

Client Sample ID: CH-CCR-M-50A-52118

Lab Sample ID: 550-103240-1

Date Collected: 05/21/18 10:06

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	148169	05/25/18 06:36	NEL	TAL PHX
Total/NA	Analysis	300.0		2	148001	05/23/18 06:33	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 21:57	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 13:52	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147986		YET	TAL PHX
						(Start) 05/23/18 11:24		
						(End) 05/24/18 11:05		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Date Collected: 05/21/18 09:21

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148001	05/23/18 04:43	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148001	05/23/18 05:11	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 23:07	ARE	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	148235	05/25/18 12:01	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 14:09	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147986		YET	TAL PHX
						(Start) 05/23/18 11:24		
						(End) 05/24/18 11:05		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Date Collected: 05/21/18 10:41

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	148001	05/23/18 05:38	NBL	TAL PHX
Total/NA	Analysis	300.0		200	148001	05/23/18 06:05	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 23:13	ARE	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	148235	05/25/18 12:07	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 14:17	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147986		YET	TAL PHX
						(Start) 05/23/18 11:24		
						(End) 05/24/18 11:05		

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Date Collected: 05/21/18 10:41

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	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: 550-103240-1

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 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-1

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
 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 Fw:	Carrier Tracking No(s)	COC No:				
Client Contact:	Phone:	Baker, Ken	550-21231.1						
Shipping/Receiving:	E-Mail:	ken.baker@testamericainc.com	Page:	550-21231.1					
Company:	Accreditations Required (See note):	State of Origin:	Page 1 of 1						
TestAmerica Laboratories, Inc.	State Program - Arizona	Arizona							
Address:	Due Date Requested:		Job #:	550-103240-1	Preservation Codes:				
13715 Rider Trail North	6/1/2018				A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amnitor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA 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)				
City:	TAT Requested (days):	Analysis Requested							
Earth City									
State, zip:									
MO, 63045									
Phone:	PO #:								
314-298-8566 (Tel) 314-298-8757 (Fax)									
Email:	MO #:								
Project Name:	Project #:								
APS - Cholra CCR	55009651								
Site:	SSOW#:								
Arizona Public Service									
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=C omp, G=grab)	Matrix (Water, Soil, Overstool, RT-Tissue, Aq/Al)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Total Number of containers	Special Instructions/Note:
CH-CCR-M50A-52118 (550-103240-1)	5/21/18	10:06	Arizona	Water	Water	X	X	2	AZ Sample
CH-CCR-M51A-52118 (550-103240-2)	5/21/18	09:21	Arizona	Water	Water	X	X	2	AZ Sample
CH-CCR-W123-52118 (550-103240-3)	5/21/18	10:41	Arizona	Water	Water	X	X	2	AZ Sample
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out 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, 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)		Primary Deliverable Rank: 2		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			
Empty Kit Relinquished by:		Date:	Time:						
Relinquished by:		Date/Time:	Company:						
Relinquished by:		Date/Time:	Company:						
Relinquished by:		Date/Time:	Company:						
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks					

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103240-1

Login Number: 103240

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103240-2

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

5/31/2018 2:51:03 PM

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: 550-103240-2

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.

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: 550-103240-2

Job ID: 550-103240-2

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103240-2**

Comments

No additional comments.

Receipt

The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° 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: 550-103240-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103240-1	CH-CCR-M-50A-52118	Water	05/21/18 10:06	05/22/18 09:25
550-103240-2	CH-CCR-M-51A-52118	Water	05/21/18 09:21	05/22/18 09:25
550-103240-3	CH-CCR-W-123-52118	Water	05/21/18 10:41	05/22/18 09:25

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Client Sample ID: CH-CCR-M-50A-52118

Lab Sample ID: 550-103240-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.4	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.43		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0025		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0086		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0012		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.00079		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0070		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0027		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	5.7	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.48		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.022	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.010	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.040	D1	0.0020	mg/L	2		200.8 LL	Total/NA
Cobalt	0.0018	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.057	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	4.3	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.63		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0030	D1	0.0020	mg/L	4		200.8 LL	Total/NA
Barium	0.011		0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.084	D1	0.0040	mg/L	4		200.8 LL	Total/NA
Molybdenum	0.38		0.0010	mg/L	2		200.8 LL	Total/NA
Selenium	0.0058	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: 550-103240-2

Client Sample ID: CH-CCR-M-50A-52118

Lab Sample ID: 550-103240-1

Date Collected: 05/21/18 10:06

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.4	D1	0.80	mg/L			05/23/18 06:33	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.43		0.20	mg/L		05/23/18 08:28	05/24/18 21:57	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0025		0.00050	mg/L		05/23/18 06:20	05/25/18 18:18	1
Barium	0.0086		0.00050	mg/L		05/23/18 06:20	05/25/18 18:18	1
Cadmium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 18:18	1
Chromium	0.0012		0.0010	mg/L		05/23/18 06:20	05/25/18 18:18	1
Cobalt	0.00079		0.00050	mg/L		05/23/18 06:20	05/25/18 18:18	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:18	1
Molybdenum	0.0070		0.00050	mg/L		05/23/18 06:20	05/25/18 18:18	1
Selenium	0.0027		0.00050	mg/L		05/23/18 06:20	05/25/18 18:18	1

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Date Collected: 05/21/18 09:21

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	5.7	D1	0.80	mg/L			05/23/18 04:43	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.48		0.20	mg/L		05/23/18 08:28	05/24/18 23:07	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.022	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:18	2
Barium	0.010	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:18	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:18	2
Chromium	0.040	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:18	2
Cobalt	0.0018	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:18	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:18	2
Molybdenum	0.057	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:18	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:18	2

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Date Collected: 05/21/18 10:41

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	4.3	D1	2.0	mg/L			05/23/18 05:38	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.63		0.20	mg/L		05/23/18 08:28	05/24/18 23:13	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0030	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:25	4
Barium	0.011		0.0010	mg/L		05/23/18 06:20	05/31/18 12:23	2
Cadmium	ND		0.00020	mg/L		05/23/18 06:20	05/31/18 12:23	2
Chromium	0.084	D1	0.0040	mg/L		05/23/18 06:20	05/31/18 12:25	4
Cobalt	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:25	4
Lead	ND		0.0010	mg/L		05/23/18 06:20	05/31/18 12:23	2
Molybdenum	0.38		0.0010	mg/L		05/23/18 06:20	05/31/18 12:23	2
Selenium	0.0058	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:25	4

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QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148001/2
Matrix: Water
Analysis Batch: 148001

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			05/22/18 16:23	1

Lab Sample ID: LCS 550-148001/5
Matrix: Water
Analysis Batch: 148001

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	4.19		mg/L		105	90 - 110

Lab Sample ID: LCSD 550-148001/6
Matrix: Water
Analysis Batch: 148001

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	4.19		mg/L		105	90 - 110	0	20

Lab Sample ID: 550-103234-G-6 MSD ^20
Matrix: Water
Analysis Batch: 148001

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	80.0	82.2	D1	mg/L		103	80 - 120	2	20

Lab Sample ID: 550-103234-J-6 MS ^20
Matrix: Water
Analysis Batch: 148001

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	80.0	84.2	D1	mg/L		105	80 - 120

Lab Sample ID: MB 550-148169/2
Matrix: Water
Analysis Batch: 148169

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			05/24/18 18:44	1

Lab Sample ID: LCS 550-148169/5
Matrix: Water
Analysis Batch: 148169

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	4.37		mg/L		109	90 - 110

Lab Sample ID: LCSD 550-148169/6
Matrix: Water
Analysis Batch: 148169

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	4.38		mg/L		109	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Lab Sample ID: 550-103240-1MS
Matrix: Water
Analysis Batch: 148169

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	800	889	D1	mg/L		111	80 - 120

Lab Sample ID: 550-103240-1MSD
Matrix: Water
Analysis Batch: 148169

Client Sample ID: CH-CCR-M-50A-52118
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	800	888	D1	mg/L		111	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 21:02	1

Lab Sample ID: LCS 550-147956/2-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	0.979		mg/L		98	85 - 115

Lab Sample ID: LCSD 550-147956/3-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	1.00	0.987		mg/L		99	85 - 115	1	20

Lab Sample ID: 550-103240-1MS
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.43		1.00	1.43		mg/L		100	70 - 130

Lab Sample ID: 550-103240-1MSD
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.43		1.00	1.43		mg/L		100	70 - 130	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-147948/1-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147948

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Arsenic	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Barium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Cadmium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Chromium	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Cobalt	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Molybdenum	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Thallium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 17:57	1

Lab Sample ID: LCS 550-147948/2-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0998		mg/L		100	85 - 115
Arsenic	0.100	0.0993		mg/L		99	85 - 115
Barium	0.100	0.0998		mg/L		100	85 - 115
Cadmium	0.100	0.0992		mg/L		99	85 - 115
Chromium	0.100	0.0987		mg/L		99	85 - 115
Cobalt	0.100	0.0990		mg/L		99	85 - 115
Lead	0.100	0.0990		mg/L		99	85 - 115
Molybdenum	0.100	0.0993		mg/L		99	85 - 115
Selenium	0.100	0.0984		mg/L		98	85 - 115
Thallium	0.100	0.0992		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-147948/3-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.101		mg/L		101	85 - 115	2	20
Arsenic	0.100	0.0982		mg/L		98	85 - 115	1	20
Barium	0.100	0.101		mg/L		101	85 - 115	1	20
Cadmium	0.100	0.101		mg/L		101	85 - 115	2	20
Chromium	0.100	0.0979		mg/L		98	85 - 115	1	20
Cobalt	0.100	0.0984		mg/L		98	85 - 115	1	20
Lead	0.100	0.0998		mg/L		100	85 - 115	1	20
Molybdenum	0.100	0.101		mg/L		101	85 - 115	1	20
Selenium	0.100	0.0976		mg/L		98	85 - 115	1	20
Thallium	0.100	0.100		mg/L		100	85 - 115	1	20

Lab Sample ID: 550-103240-1MS
Matrix: Water
Analysis Batch: 148285

Client Sample ID: CH-CCR-M-50A-52118
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.0992		mg/L		99	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

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

Lab Sample ID: 550-103240-1MS

Matrix: Water

Analysis Batch: 148285

Client Sample ID: CH-CCR-M-50A-52118

Prep Type: Total/NA

Prep Batch: 147948

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier					
Arsenic	0.0025		0.100	0.108		mg/L		106		70 - 130
Barium	0.0086		0.100	0.107		mg/L		99		70 - 130
Cadmium	ND		0.100	0.0895		mg/L		89		70 - 130
Chromium	0.0012		0.100	0.0996		mg/L		98		70 - 130
Cobalt	0.00079		0.100	0.0940		mg/L		93		70 - 130
Lead	ND		0.100	0.0863		mg/L		86		70 - 130
Molybdenum	0.0070		0.100	0.110		mg/L		103		70 - 130
Selenium	0.0027		0.100	0.121		mg/L		118		70 - 130
Thallium	0.00015		0.100	0.0887		mg/L		89		70 - 130

Lab Sample ID: 550-103240-1MSD

Matrix: Water

Analysis Batch: 148285

Client Sample ID: CH-CCR-M-50A-52118

Prep Type: Total/NA

Prep Batch: 147948

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Antimony	ND		0.100	0.101		mg/L		101		70 - 130	2	20
Arsenic	0.0025		0.100	0.111		mg/L		108		70 - 130	2	20
Barium	0.0086		0.100	0.110		mg/L		101		70 - 130	2	20
Cadmium	ND		0.100	0.0913		mg/L		91		70 - 130	2	20
Chromium	0.0012		0.100	0.103		mg/L		101		70 - 130	3	20
Cobalt	0.00079		0.100	0.0968		mg/L		96		70 - 130	3	20
Lead	ND		0.100	0.0881		mg/L		88		70 - 130	2	20
Molybdenum	0.0070		0.100	0.112		mg/L		105		70 - 130	2	20
Selenium	0.0027		0.100	0.125		mg/L		122		70 - 130	3	20
Thallium	0.00015		0.100	0.0905		mg/L		90		70 - 130	2	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

HPLC/IC

Analysis Batch: 148001

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	300.0	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	300.0	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	300.0	
MB 550-148001/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148001/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148001/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103234-G-6 MSD ^20	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-103234-J-6 MS ^20	Matrix Spike	Total/NA	Water	300.0	

Analysis Batch: 148169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-148169/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148169/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148169/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103240-1MS	CH-CCR-M-50A-52118	Total/NA	Water	300.0	
550-103240-1MSD	CH-CCR-M-50A-52118	Total/NA	Water	300.0	

Metals

Prep Batch: 147948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	200.8	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.8	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.8	
MB 550-147948/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-147948/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-147948/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-103240-1MS	CH-CCR-M-50A-52118	Total/NA	Water	200.8	
550-103240-1MSD	CH-CCR-M-50A-52118	Total/NA	Water	200.8	

Prep Batch: 147956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	200.7	
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.7	
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.7	
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103240-1MS	CH-CCR-M-50A-52118	Total/NA	Water	200.7	
550-103240-1MSD	CH-CCR-M-50A-52118	Total/NA	Water	200.7	

Analysis Batch: 148212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.7 Rev 4.4	147956
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	147956
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	147956
550-103240-1MS	CH-CCR-M-50A-52118	Total/NA	Water	200.7 Rev 4.4	147956

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Metals (Continued)

Analysis Batch: 148212 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1MSD	CH-CCR-M-50A-52118	Total/NA	Water	200.7 Rev 4.4	147956

Analysis Batch: 148285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-1	CH-CCR-M-50A-52118	Total/NA	Water	200.8 LL	147948
MB 550-147948/1-A	Method Blank	Total/NA	Water	200.8 LL	147948
LCS 550-147948/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	147948
LCSD 550-147948/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	147948
550-103240-1MS	CH-CCR-M-50A-52118	Total/NA	Water	200.8 LL	147948
550-103240-1MSD	CH-CCR-M-50A-52118	Total/NA	Water	200.8 LL	147948

Analysis Batch: 148580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103240-2	CH-CCR-M-51A-52118	Total/NA	Water	200.8 LL	147948
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.8 LL	147948
550-103240-3	CH-CCR-W-123-52118	Total/NA	Water	200.8 LL	147948

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

Client Sample ID: CH-CCR-M-50A-52118

Lab Sample ID: 550-103240-1

Date Collected: 05/21/18 10:06

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148001	05/23/18 06:33	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 21:57	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	148285	05/25/18 18:18	TEK	TAL PHX

Client Sample ID: CH-CCR-M-51A-52118

Lab Sample ID: 550-103240-2

Date Collected: 05/21/18 09:21

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148001	05/23/18 04:43	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 23:07	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 12:18	TEK	TAL PHX

Client Sample ID: CH-CCR-W-123-52118

Lab Sample ID: 550-103240-3

Date Collected: 05/21/18 10:41

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	148001	05/23/18 05:38	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 23:13	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 12:23	TEK	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		4	148580	05/31/18 12:25	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: CCR

TestAmerica Job ID: 550-103240-2

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 *

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

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-2

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



TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

103240-2

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarnway
 928-587-0319
 Analysis Turnaround Time: TAT if different from Below _____
 Doug Lavarnway
 Lab Contact: _____
 Carrier: _____
 5/21/2018
 COC No.: _____ of _____ COCs
 Sampler: _____
 For Lab Use Only:
 Walk-In Client: _____
 Lab Sampling: _____
 Job / SDG No.: _____
 Sample Specific Notes:

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, Cd, Cr, Co, Pb, Mo, Se)	EPA 300.0 (F)
CH-CCR-M-50A-52118	5/21/2018	1006 G	W	W	2	N	X	X	X	X
CH-CCR-M-51A-52118	5/21/2018	921 G	W	W	2	N	X	X	X	X
CH-CCR-W-123-52118	5/21/2018	1041 G	W	W	2	N	X	X	X	X

Special Instructions/QC Requirements & Comments:
 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)

Custody Seals Intact: _____ Cooler Temp. (°C): _____ Obs'd: _____ Corrd: _____ Therm ID No.: _____
 Relinquished by: *[Signature]* Date/Time: 5/18/18
 Relinquished by: *[Signature]* Date/Time: 5/21/18
 Relinquished by: _____ Date/Time: _____
 Received by: *[Signature]* Date/Time: 5/21/18 5:20
 Received by: *[Signature]* Date/Time: 5/22/18 9:25
 Company: *[Signature]* Company: *[Signature]*
 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

103240

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

5/31/2018

Client Contact

Doug Lavarway

Doug Lavarway

Carrier:

5/21/2018

COC No: 1 of 1 COCs

APS Cholla
4801 Cholla Lake Road
Joseph City, Az 86032
(928) 587-0319
Phone
FAX
Project Name: CCR
Site: Cholla
P O #

Analysis Turnaround Time

Phone

FAX

Project Name: CCR

Site: Cholla

P O #

TAT if different from Below

Sample Identification

CH-CCR-M-50A-52118
CH-CCR-M-51A-52118
CH-CCR-W-123-52118

Sample Date

Sample Time

Sample Type (G-Comp, G-grab)

Matrix

of Cont.

Filtered Sample (Y/N)

Perform MS / MSD (Y / N)

932.0 Radium 226 and 228

Sample Specific Notes:

5/21/2018 1006 G W 2 N X X
5/21/2018 921 G W 2 N X X
5/21/2018 1041 G W 2 N X X



Preservation Used: 1- Ice, 2- HCl, 3- HNO₃, 4- H₂O₂, 5- Ascorbic Acid, 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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Custody Seats Intact:

Custody Seal No.:

Cooler Temp. (°C): Obs'd:

Corrd: 29°C

Therm ID No.:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received In Laboratory by:

Company:

Date/Time:

TAPPA

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Phoenix

Chain of Custody Record

4625 E Cotton Center Blvd Suite 189

Phoenix, AZ 85040 phone 602.437.3340 fax 602.454.9303

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

5/31/2018

Client Contact

Doug Lavarnway

Doug Lavarnway

Carrier:

5/21/2018

COC No: 1 of 1 COCs

APs Cholla 4801 Cholla Lake Road Joseph City, Az 86032 (928) 587-0319 (xxx) xxx-xxxx

Phone FAX

Project Name: CCR

Site: Cholla

P O #

Analysis Turnaround Time

TAT if different from Below

Sample Identification

Sample Date	Sample Time	Sample Type (G-Comp, G-Grab)	Matrix	# of Cont.
CH-CCR-M-50A-52118	5/21/2018	1006 G	W	2
CH-CCR-M-51A-52118	5/21/2018	921 G	W	2
CH-CCR-W-123-52118	5/21/2018	1041 G	W	2

Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	EPA 200.7 (Li)	200.8 (As, Ba, Cd, Cr, Co, Pb, Mo, Se)	EPA 300.0 (F)
N	X	X	X	X
N	X	X	X	X
N	X	X	X	X

Sample Specific Notes:

Sample ID	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Perform MS/MSD	EPA 200.7	200.8	EPA 300.0
CH-CCR-M-50A-52118	5/21/2018	1006	G	W	2	N	X	X	X	X
CH-CCR-M-51A-52118	5/21/2018	921	G	W	2	N	X	X	X	X
CH-CCR-W-123-52118	5/21/2018	1041	G	W	2	N	X	X	X	X

Preservation Used: 1-10g, 2-100g, 3-1000g, 4-1000g, 5-1000g, 6-1000g, 7-1000g, 8-1000g, 9-1000g, 10-1000g, 11-1000g, 12-1000g, 13-1000g, 14-1000g

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:

Custody Seals Intact: _____

Relinquished by: APs Company: APs Date/Time: 5/18/18 5:00 Received by: [Signature] Company: APs Date/Time: 5/21/18 9:25

Relinquished by: [Signature] Company: APs Date/Time: 5/21/18 9:25 Received by: [Signature] Company: APs Date/Time: 5/22/18 9:25

Cooler Temp. (°C): Obs'd: _____ Cor'd: 29 Therm ID No.: _____

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: CCR

CCR

TestAmerica Laboratories, Inc.

Client Contact

Doug Lavarnway

Doug Lavarnway

Carrier:

5/21/2018

COG No: 1 of 1 COCs

APS Cholla
4801 Cholla Lake Road
Joseph City, AZ 86032
(928) 587-0319
(xxx) xxx-xxxx
Project Name: CCR
Site: Cholla
P O #

Analysis Turnaround Time

Lab Contact:

Sampler:

Phone

TAT if different from Below

For Lab Use Only:

FAX

Walk-In Client:

Project Name: CCR

Lab Sampling:

Site: Cholla

Job / SDG No.:

P O #

Sample Identification

Sample Date

Sample Time

Sample Type (e-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)

Sample Specific Notes:

CH-CCR-M-50A-52118
CH-CCR-M-51A-52118
CH-CCR-W-123-52118

5/21/2018
5/21/2018
5/21/2018

1006 G
921 G
1041 G

W
W
W

2
2
2

N
N
N

X
X
X

X
X
X

X
X
X

X
X
X

X
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X
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X
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X
X
X

Preservation Used: 1- Ice, 2- HCl; 3- H2SO4; 4- HNO3; 5- HClO4; 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:

Custody Seal Intact:

Custody Seal No.:

Cooler Temp. (C): Obs'd:

Corrd:

Therm ID No.:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

Company:

Date/Time:

TAPMIX

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103240-2

Login Number: 103240

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103240-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/21/2018 7:31:08 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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Table of Contents

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-3

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: 550-103240-3

Job ID: 550-103240-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-103240-3

Comments

No additional comments.

Receipt

The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° 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.

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Sample Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103240-1	CH-CCR-M-50A-52118	Water	05/21/18 10:06	05/22/18 09:25
550-103240-2	CH-CCR-M-51A-52118	Water	05/21/18 09:21	05/22/18 09:25
550-103240-3	CH-CCR-W-123-52118	Water	05/21/18 10:41	05/22/18 09:25

1

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-3

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

1

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Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103240-3

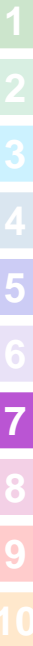
Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

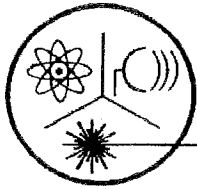
Protocol References:

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: May 21, 2018
Sample Received: June 04, 2018
Analysis Completed: June 15, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-50A-52118 (550-103240-1)	0.4 ± 0.2	< 0.6	0.4 ± 0.2

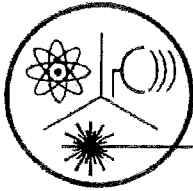
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
------------------	----------	----------	----------

6/15/2018

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: May 21, 2018
Sample Received: June 04, 2018
Analysis Completed: June 15, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-51A-52118 (550-103240-2)	< 0.4	< 0.6	< 0.6

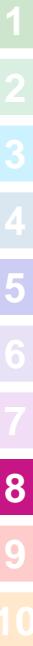
Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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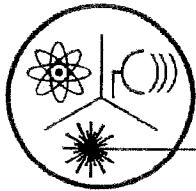
6/15/2018

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: May 21, 2018
 Sample Received: June 04, 2018
 Analysis Completed: June 15, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-123-52118 (550-103240-3)	< 0.4	0.8 ± 0.3	0.8 ± 0.3

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
------------------	----------	----------	----------

Robert L. Metzger, Ph.D., C.H.P.

6/15/2018

Date

Laboratory License Number AZ0462

Chain of Custody Record



Client Information (Sub Contract Lab) Client Contact: Baker, Ken Phone: ken.baker@testamericainc.com E-Mail: ken.baker@testamericainc.com Company: State Program - Arizona Shipping/Receiving Radiation Safety Eng., Inc. Address: 3245 North Washington Street City: Phoenix, AZ State, Zip: AZ, 85225 Phone: [Blank] Email: [Blank] Project #: 55009651 Site: Arizona Public Service		Lab P/N: Baker, Ken E-Mail: ken.baker@testamericainc.com Carrier Tracking No(s): 550-21270.1 State of Origin: Arizona Accreditation(s) Required (See note): State Program - Arizona	
Analysis Requested Duo Date Requested: 6/1/2018 TAT Requested (days): [Blank]		Preservation Codes: M - Hexane N - None O - AsH ₂ O P - Na2SO4 Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Ice V - MCAA W - pH 4.5 X - EDTA Y - EDA Z - other (specify)	
Sample Date: 5/21/18 Sample Time: 10:06 Arizona Sample Type: (C=Comp, G=grab) [Blank]		Matrix: (W=water, S=swill, O=wash/dil, BT=Tissue, A=Air) Water	
Sample Identification - Client ID (Lab ID) CH-COR-M-50A-52118 (550-103240-1) CH-COR-M-51A-52118 (550-103240-2) CH-COR-W-123-52118 (550-103240-3)		Field Filtered Sample (Yes or No) [X] Perform MS/MSD (Yes or No) [X] SUB (Radium 226/228/ Radium 226/228) [X]	
Total Number of Containers: 2 Special Instructions/Note: 160465		Job 3 Job 3 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/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 to TestAmerica Laboratories, Inc.

Possible Hazard Identification
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2
 Special Instructions/QC Requirements: [Blank]

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: [Signature]	Date: 6/4/18	Company: [Blank]
Relinquished by: [Signature]	Date: 6/4/18	Company: [Blank]
Relinquished by: [Signature]	Date: [Blank]	Company: [Blank]
Relinquished by: [Signature]	Date: [Blank]	Company: [Blank]

Cooler Temperature(s) °C and Other Remarks: [Blank]



TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

103240-3

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact				Doug Lavarnway				Doug Lavarnway				Carrier:				5/21/2018				COC No:			
4801 Cholla Lake Road				928-587-0319				Analysis Turnaround Time				Lab Contact:				1 ___ of ___ COCs				Sampler:			
Joseph City, AZ 86032				TAT if different from Below																For Lab Use Only:			
(928) 587-0319				Phone																Walk-in Client:			
Project Name: CCR				FAX																Lab Sampling:			
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)														
CH-CCR-M-50A-52118		5/21/2018	1006 G		W	2	N	X	X	932.0 Radium 226 and 228													
CH-CCR-M-51A-52118		5/21/2018	921 G		W	2	N	X	X														
CH-CCR-W-123-52118		5/21/2018	1041 G		W	2	N	X	X														



Preservation Used: 1. Ice 2. HCl 3. ...
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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Custody Seal Intact: _____ **Cooler Temp. (°C):** Obs'd: _____ Cor'd: 29°C **Therm ID No.:** _____

Relinquished by: *[Signature]* **Company:** APS **Date/Time:** 5/21/18 5:25 **Received by:** *[Signature]* **Company:** APS **Date/Time:** 5/21/18 5:25

Relinquished by: *[Signature]* **Company:** APS **Date/Time:** 5/21/18 5:25 **Received by:** *[Signature]* **Company:** APS **Date/Time:** 5/21/18 5:25

TAPMIX

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103240-3

Login Number: 103240

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-112450-1

Client Project/Site: Cholla

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/23/2018 10:55:22 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: Cholla

TestAmerica Job ID: 550-112450-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of analyte.
E2	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
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.

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: Cholla

TestAmerica Job ID: 550-112450-1

Job ID: 550-112450-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-112450-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.3° C and 4.5° 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: Cholla

TestAmerica Job ID: 550-112450-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-112450-1	CH-CCR-M-50A-102418	Water	10/24/18 10:47	10/27/18 09:00
550-112450-2	CH-CCR-M-51A-102418	Water	10/24/18 10:16	10/27/18 09:00
550-112450-3	CH-CCR-W-123-102418	Water	10/24/18 11:26	10/27/18 09:00
550-112450-4	CH-CCR-FD-02-102418	Water	10/24/18 11:26	10/27/18 09:00

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Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Client Sample ID: CH-CCR-M-50A-102418

Lab Sample ID: 550-112450-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2200	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.9	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	3100	D2	400	mg/L	200		300.0	Total/NA
Boron	3.1		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	630	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	8100	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	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: CH-CCR-M-51A-102418

Lab Sample ID: 550-112450-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5400	D2	400	mg/L	200		300.0	Total/NA
Fluoride	5.0	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2900	D2	400	mg/L	200		300.0	Total/NA
Boron	30		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	870		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	12000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	11.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112450-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6600	D2	400	mg/L	200		300.0	Total/NA
Fluoride	3.7	D1	2.0	mg/L	5		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	850		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	14000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	10.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-FD-02-102418

Lab Sample ID: 550-112450-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6700	D2	400	mg/L	200		300.0	Total/NA
Fluoride	3.9	D1	2.0	mg/L	5		300.0	Total/NA
Sulfate	3600	D2	400	mg/L	200		300.0	Total/NA
Boron	36		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	850		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	7.7	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	10.3	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: Cholla

TestAmerica Job ID: 550-112450-1

Client Sample ID: CH-CCR-M-50A-102418

Lab Sample ID: 550-112450-1

Date Collected: 10/24/18 10:47

Matrix: Water

Date Received: 10/27/18 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2200	D2	400	mg/L			11/20/18 22:11	200
Fluoride	1.9	D1	0.80	mg/L			10/31/18 21:55	2
Sulfate	3100	D2	400	mg/L			11/20/18 22:11	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	3.1		0.050	mg/L		10/30/18 08:29	11/01/18 01:11	1
Calcium	630	M3	2.0	mg/L		10/30/18 08:29	11/01/18 01:11	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	8100	D2	100	mg/L			10/30/18 11:45	1
pH	7.4	H5	1.7	SU			10/30/18 14:24	1
Temperature	14.8	H5	0.1	Degrees C			10/30/18 14:24	1

Client Sample ID: CH-CCR-M-51A-102418

Lab Sample ID: 550-112450-2

Date Collected: 10/24/18 10:16

Matrix: Water

Date Received: 10/27/18 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5400	D2	400	mg/L			11/20/18 22:39	200
Fluoride	5.0	D1	0.80	mg/L			11/07/18 02:20	2
Sulfate	2900	D2	400	mg/L			11/20/18 22:39	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		10/30/18 08:29	11/01/18 01:17	1
Calcium	870		2.0	mg/L		10/30/18 08:29	11/01/18 01:17	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	12000	D2	200	mg/L			10/30/18 11:45	1
pH	7.3	H5	1.7	SU			10/31/18 13:14	1
Temperature	11.4	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112450-3

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6600	D2	400	mg/L			11/20/18 23:06	200
Fluoride	3.7	D1	2.0	mg/L			10/31/18 22:31	5
Sulfate	3600	D2	400	mg/L			11/20/18 23:06	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		10/30/18 08:29	11/01/18 01:23	1
Calcium	850		2.0	mg/L		10/30/18 08:29	11/01/18 01:23	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112450-3

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 09:00

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	14000	D2	200	mg/L			10/30/18 11:45	1
pH	7.7	H5	1.7	SU			10/31/18 13:14	1
Temperature	10.9	H5	0.1	Degrees C			10/31/18 13:14	1

Client Sample ID: CH-CCR-FD-02-102418

Lab Sample ID: 550-112450-4

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6700	D2	400	mg/L			11/20/18 23:34	200
Fluoride	3.9	D1	2.0	mg/L			10/31/18 22:50	5
Sulfate	3600	D2	400	mg/L			11/20/18 23:34	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	36		0.050	mg/L		10/30/18 08:29	11/01/18 01:29	1
Calcium	850		2.0	mg/L		10/30/18 08:29	11/01/18 01:29	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	15000	D2	200	mg/L			10/30/18 11:45	1
pH	7.7	H5	1.7	SU			10/31/18 13:14	1
Temperature	10.3	H5	0.1	Degrees C			10/31/18 13:14	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-160894/2

Matrix: Water

Analysis Batch: 160894

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			10/31/18 15:47	1
Fluoride	ND		0.40	mg/L			10/31/18 15:47	1
Sulfate	ND		2.0	mg/L			10/31/18 15:47	1

Lab Sample ID: LCS 550-160894/5

Matrix: Water

Analysis Batch: 160894

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	4.09		mg/L		102	90 - 110
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-160894/6

Matrix: Water

Analysis Batch: 160894

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	4.11		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-112451-A-1 MS ^5

Matrix: Water

Analysis Batch: 160894

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	1400	E2 M3	100	1500	E2 M3	mg/L		83	80 - 120
Fluoride	2.2	D1	20.0	23.0	D1	mg/L		104	80 - 120
Sulfate	1800	E2 M3	100	1880	E2 M3	mg/L		72	80 - 120

Lab Sample ID: 550-112451-A-1 MSD ^5

Matrix: Water

Analysis Batch: 160894

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	1400	E2 M3	100	1490	E2 M3	mg/L		70	80 - 120	1	20
Fluoride	2.2	D1	20.0	23.3	D1	mg/L		106	80 - 120	1	20
Sulfate	1800	E2 M3	100	1860	E2 M3	mg/L		59	80 - 120	1	20

Lab Sample ID: MB 550-161411/2

Matrix: Water

Analysis Batch: 161411

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			11/06/18 17:27	1
Fluoride	ND		0.40	mg/L			11/06/18 17:27	1
Sulfate	ND		2.0	mg/L			11/06/18 17:27	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-161411/5
Matrix: Water
Analysis Batch: 161411

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	4.09		mg/L		102	90 - 110
Sulfate	20.0	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-161411/6
Matrix: Water
Analysis Batch: 161411

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		102	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-112814-F-2 MS
Matrix: Water
Analysis Batch: 161411

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	37		20.0	56.1		mg/L		97	80 - 120
Fluoride	ND		4.00	4.16		mg/L		103	80 - 120
Sulfate	ND		20.0	21.8		mg/L		103	80 - 120

Lab Sample ID: 550-112814-F-2 MSD
Matrix: Water
Analysis Batch: 161411

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	37		20.0	56.5		mg/L		99	80 - 120	1	20
Fluoride	ND		4.00	4.25		mg/L		105	80 - 120	2	20
Sulfate	ND		20.0	22.2		mg/L		105	80 - 120	2	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

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

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

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-A-4 MS ^200
Matrix: Water
Analysis Batch: 162493

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	8460	D2	mg/L		104	80 - 120

Lab Sample ID: 550-113026-A-4 MS ^5
Matrix: Water
Analysis Batch: 162493

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	310	D1	100	416	D1	mg/L		108	80 - 120
Fluoride	ND	D1	20.0	22.2	D1	mg/L		104	80 - 120

Lab Sample ID: 550-113026-A-4 MSD ^200
Matrix: Water
Analysis Batch: 162493

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	8450	D2	mg/L		104	80 - 120	0	20

Lab Sample ID: 550-113026-A-4 MSD ^5
Matrix: Water
Analysis Batch: 162493

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	310	D1	100	415	D1	mg/L		107	80 - 120	0	20
Fluoride	ND	D1	20.0	22.3	D1	mg/L		105	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-160566/1-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160566

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		10/30/18 08:29	11/01/18 00:51	1
Calcium	ND		2.0	mg/L		10/30/18 08:29	11/01/18 00:51	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

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

Lab Sample ID: LCS 550-160566/2-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	
Boron	1.00	0.965		mg/L		96	85 - 115	
Calcium	21.0	21.7		mg/L		103	85 - 115	

Lab Sample ID: LCSD 550-160566/3-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits		RPD	Limit
Boron	1.00	0.971		mg/L		97	85 - 115		1	20
Calcium	21.0	21.8		mg/L		104	85 - 115		0	20

Lab Sample ID: 550-112450-1 MS
Matrix: Water
Analysis Batch: 160784

Client Sample ID: CH-CCR-M-50A-102418
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	
Boron	3.1		1.00	3.89		mg/L		84	70 - 130	
Calcium	630	M3	21.0	622	M3	mg/L		-41	70 - 130	

Lab Sample ID: 550-112450-1 MSD
Matrix: Water
Analysis Batch: 160784

Client Sample ID: CH-CCR-M-50A-102418
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits		RPD	Limit
Boron	3.1		1.00	3.97		mg/L		92	70 - 130		2	20
Calcium	630	M3	21.0	635	M3	mg/L		23	70 - 130		2	20

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

Lab Sample ID: MB 550-160595/1
Matrix: Water
Analysis Batch: 160595

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			10/30/18 11:45	1

Lab Sample ID: LCS 550-160595/2
Matrix: Water
Analysis Batch: 160595

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	950		mg/L		95	90 - 110	

Lab Sample ID: LCSD 550-160595/3
Matrix: Water
Analysis Batch: 160595

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	946		mg/L		95	90 - 110		0	10

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

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

Lab Sample ID: 550-112399-B-1 DU
Matrix: Water
Analysis Batch: 160595

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	56		56.0		mg/L		0	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-160622/1
Matrix: Water
Analysis Batch: 160622

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	6.9		SU		99.1	98.5 - 101.5

Lab Sample ID: LCSSRM 550-160622/11
Matrix: Water
Analysis Batch: 160622

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: 550-112430-D-1 DU
Matrix: Water
Analysis Batch: 160622

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.1	H5	7.2	H5	SU		0.7	5
Temperature	9.6	H5	10.4	H5	Degrees C		8	

Lab Sample ID: LCSSRM 550-160705/1
Matrix: Water
Analysis Batch: 160705

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		99.7	98.5 - 101.5

Lab Sample ID: LCSSRM 550-160705/13
Matrix: Water
Analysis Batch: 160705

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: 550-112460-A-7 DU
Matrix: Water
Analysis Batch: 160705

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	7.4	H5	SU		0.1	5

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

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

Lab Sample ID: 550-112460-A-7 DU
Matrix: Water
Analysis Batch: 160705

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Temperature	12.2	H5	12.7	H5	Degrees C		4	

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

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

HPLC/IC

Analysis Batch: 160894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-1	CH-CCR-M-50A-102418	Total/NA	Water	300.0	
550-112450-3	CH-CCR-W-123-102418	Total/NA	Water	300.0	
550-112450-4	CH-CCR-FD-02-102418	Total/NA	Water	300.0	
MB 550-160894/2	Method Blank	Total/NA	Water	300.0	
LCS 550-160894/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-160894/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112451-A-1 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-112451-A-1 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-2	CH-CCR-M-51A-102418	Total/NA	Water	300.0	
MB 550-161411/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161411/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161411/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112814-F-2 MS	Matrix Spike	Total/NA	Water	300.0	
550-112814-F-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 162493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-1	CH-CCR-M-50A-102418	Total/NA	Water	300.0	
550-112450-2	CH-CCR-M-51A-102418	Total/NA	Water	300.0	
550-112450-3	CH-CCR-W-123-102418	Total/NA	Water	300.0	
550-112450-4	CH-CCR-FD-02-102418	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	
LCSD 550-162493/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-113026-A-4 MS ^200	Matrix Spike	Total/NA	Water	300.0	
550-113026-A-4 MS ^5	Matrix Spike	Total/NA	Water	300.0	
550-113026-A-4 MSD ^200	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-113026-A-4 MSD ^5	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 160566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-1	CH-CCR-M-50A-102418	Total/NA	Water	200.7	
550-112450-2	CH-CCR-M-51A-102418	Total/NA	Water	200.7	
550-112450-3	CH-CCR-W-123-102418	Total/NA	Water	200.7	
550-112450-4	CH-CCR-FD-02-102418	Total/NA	Water	200.7	
MB 550-160566/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-160566/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-160566/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-112450-1 MS	CH-CCR-M-50A-102418	Total/NA	Water	200.7	
550-112450-1 MSD	CH-CCR-M-50A-102418	Total/NA	Water	200.7	

Analysis Batch: 160784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-1	CH-CCR-M-50A-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-2	CH-CCR-M-51A-102418	Total/NA	Water	200.7 Rev 4.4	160566

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Metals (Continued)

Analysis Batch: 160784 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-3	CH-CCR-W-123-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-4	CH-CCR-FD-02-102418	Total/NA	Water	200.7 Rev 4.4	160566
MB 550-160566/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	160566
LCS 550-160566/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	160566
LCS 550-160566/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-1 MS	CH-CCR-M-50A-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-1 MSD	CH-CCR-M-50A-102418	Total/NA	Water	200.7 Rev 4.4	160566

General Chemistry

Analysis Batch: 160595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-1	CH-CCR-M-50A-102418	Total/NA	Water	SM 2540C	
550-112450-2	CH-CCR-M-51A-102418	Total/NA	Water	SM 2540C	
550-112450-3	CH-CCR-W-123-102418	Total/NA	Water	SM 2540C	
550-112450-4	CH-CCR-FD-02-102418	Total/NA	Water	SM 2540C	
MB 550-160595/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-160595/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCS 550-160595/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-112399-B-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 160622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-1	CH-CCR-M-50A-102418	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-160622/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-160622/11	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-112430-D-1 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 160705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112450-2	CH-CCR-M-51A-102418	Total/NA	Water	SM 4500 H+ B	
550-112450-3	CH-CCR-W-123-102418	Total/NA	Water	SM 4500 H+ B	
550-112450-4	CH-CCR-FD-02-102418	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-160705/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-160705/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-112460-A-7 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Client Sample ID: CH-CCR-M-50A-102418

Lab Sample ID: 550-112450-1

Date Collected: 10/24/18 10:47

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	160894	10/31/18 21:55	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 22:11	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:11	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160595	(Start) 10/30/18 11:45 (End) 10/31/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160622	10/30/18 14:24	MRR	TAL PHX

Client Sample ID: CH-CCR-M-51A-102418

Lab Sample ID: 550-112450-2

Date Collected: 10/24/18 10:16

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161411	11/07/18 02:20	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 22:39	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:17	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160595	(Start) 10/30/18 11:45 (End) 10/31/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112450-3

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	160894	10/31/18 22:31	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 23:06	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:23	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160595	(Start) 10/30/18 11:45 (End) 10/31/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

Client Sample ID: CH-CCR-FD-02-102418

Lab Sample ID: 550-112450-4

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	160894	10/31/18 22:50	NEL	TAL PHX
Total/NA	Analysis	300.0		200	162493	11/20/18 23:34	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:29	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160595	(Start) 10/30/18 11:45 (End) 10/31/18 10:20	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	160705	10/31/18 13:14	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: Cholla

TestAmerica Job ID: 550-112450-1

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

- 1
- 2
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Method Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112450-1

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

112450

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: DW NPDES RCRA Other: CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarnway 928-587-4319 Date: 10/26/2018

Analysis Turnaround Time: CALENDAR DAYS WORKING DAYS

Carrier: CCO No. of CCOs

Sampler: For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.:

APs Cholla 4801 Cholla Lake Rd Joseph City, AZ 86032 (928) 587-0319 Phone (xxx) xxx-xxxx FAX Project Name: Site: 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) EPA 200.7 (B, Ca) EPA 300.0 (Cl, F, SO4) SM 2540C (TDS) SM 4500-HB (pH)

CH-CCR-M-50A-102418 10/24/2018 1047 G W 2 N X X X X X

CH-CCR-M-51A-102418 10/24/18 1016 G W 2 N X X X X X

CH-CCR-W-123-102418 10/24/18 1126 G W 2 N X X X X X

CH-CCR-FD-02-102418 10/24/18 1126 G W 2 N X X X X X

Sample Specific Notes: -01 -02 -03 -04

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: Non-Hazard Flammable Skin Irritant Poison B Unknown Return to Client Disposal by Lab Archive for Months

Custody Seals Intact: Yes No

Relinquished by: Pat Lavarnway Company: APS Date/Time: 10/26/2010 Received by: Received in Laboratory by: Company: HAWK Date/Time: 10/27-11/07/50

Relinquished by: Company: Date/Time: Cooler Temp. (°C): Obs'd: 21.3°C 41.5°C DB

Therm ID No.: Corrd: 1077-118 0750



Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-112450-1

Login Number: 112450

List Source: TestAmerica Phoenix

List Number: 1

Creator: Doerr, Bret C

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: 550-112451-1

Client Project/Site: Cholla

Revision: 1

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

12/13/2018 7:17:15 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: Cholla

TestAmerica Job ID: 550-112451-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.

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: Cholla

TestAmerica Job ID: 550-112451-1

Job ID: 550-112451-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-112451-1

Comments

This report contains the re-digested/re-analysis results for Molybdenum by Method 200.8. The original result is confirmed.

Receipt

The samples were received on 10/27/2018 7:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.3° C and 4.5° C.

HPLC/IC

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

Metals

Method(s) 200.8 LL: The following sample was diluted due to the nature of the sample matrix: CH-CCR-M-51A-102418 (550-112451-2). It appears that Germanium is present in the matrix, and therefore a dilution was required. 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.

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: Cholla

TestAmerica Job ID: 550-112451-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-112451-1	CH-CCR-M-50A-102418	Water	10/24/18 10:47	10/27/18 07:50
550-112451-2	CH-CCR-M-51A-102418	Water	10/24/18 10:16	10/27/18 07:50
550-112451-3	CH-CCR-W-123-102418	Water	10/24/18 11:26	10/27/18 07:50
550-112451-4	CH-CCR-FD-02-102418	Water	10/24/18 11:26	10/27/18 07:50

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Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

Client Sample ID: CH-CCR-M-50A-102418

Lab Sample ID: 550-112451-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	2.3	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.43		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0028		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0092		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0046		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.00063		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0071		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0026		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-51A-102418

Lab Sample ID: 550-112451-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	5.5	D1	0.80	mg/L	2		300.0	Total/NA
Lithium	0.46		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.032	D1	0.0050	mg/L	10		200.8 LL	Total/NA
Barium	0.0074		0.00050	mg/L	1		200.8 LL	Total/NA
Cadmium	0.00010		0.00010	mg/L	1		200.8 LL	Total/NA
Chromium	0.021	D1	0.010	mg/L	10		200.8 LL	Total/NA
Molybdenum	0.090		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.092		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112451-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	4.0	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.65		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	0.0092		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.043		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0016		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.37		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0059		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD-02-102418

Lab Sample ID: 550-112451-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	3.9	D1	2.0	mg/L	5		300.0	Total/NA
Lithium	0.65		0.20	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.0027		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.0092		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.045		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0015		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.36		0.00050	mg/L	1		200.8 LL	Total/NA
Selenium	0.0056		0.00050	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: Cholla

TestAmerica Job ID: 550-112451-1

Client Sample ID: CH-CCR-M-50A-102418

Lab Sample ID: 550-112451-1

Date Collected: 10/24/18 10:47

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	2.3	D1	0.80	mg/L			11/07/18 02:57	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.43		0.20	mg/L		10/30/18 08:29	11/01/18 01:35	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0028		0.00050	mg/L		10/31/18 18:15	11/09/18 22:45	1
Barium	0.0092		0.00050	mg/L		10/31/18 18:15	11/09/18 22:45	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/09/18 22:45	1
Chromium	0.0046		0.0010	mg/L		10/31/18 18:15	11/09/18 22:45	1
Cobalt	0.00063		0.00050	mg/L		10/31/18 18:15	11/09/18 22:45	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:45	1
Molybdenum	0.0071		0.00050	mg/L		10/31/18 18:15	11/09/18 22:45	1
Selenium	0.0026		0.00050	mg/L		10/31/18 18:15	11/09/18 22:45	1

Client Sample ID: CH-CCR-M-51A-102418

Lab Sample ID: 550-112451-2

Date Collected: 10/24/18 10:16

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	5.5	D1	0.80	mg/L			11/07/18 03:34	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.46		0.20	mg/L		10/30/18 08:29	11/01/18 01:40	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.032	D1	0.0050	mg/L		10/31/18 18:15	11/27/18 16:07	10
Barium	0.0074		0.00050	mg/L		10/31/18 18:15	11/19/18 22:40	1
Cadmium	0.00010		0.00010	mg/L		10/31/18 18:15	11/19/18 22:40	1
Chromium	0.021	D1	0.010	mg/L		10/31/18 18:15	11/27/18 16:07	10
Cobalt	ND	D1	0.0050	mg/L		10/31/18 18:15	11/27/18 16:07	10
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:40	1
Molybdenum	0.090		0.00050	mg/L		10/31/18 18:15	11/19/18 22:40	1
Molybdenum	0.092		0.00050	mg/L		12/03/18 05:12	12/04/18 14:29	1
Selenium	ND	D1	0.0050	mg/L		10/31/18 18:15	11/27/18 16:07	10

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112451-3

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	4.0	D1	2.0	mg/L			10/31/18 18:32	5

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112451-3

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 07:50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.65		0.20	mg/L		10/30/18 08:29	11/01/18 01:46	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		10/31/18 18:15	11/19/18 22:42	1
Barium	0.0092		0.00050	mg/L		10/31/18 18:15	11/19/18 22:42	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:42	1
Chromium	0.043		0.0010	mg/L		10/31/18 18:15	11/19/18 22:42	1
Cobalt	0.0016		0.00050	mg/L		10/31/18 18:15	11/19/18 22:42	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:42	1
Molybdenum	0.37		0.00050	mg/L		10/31/18 18:15	11/19/18 22:42	1
Selenium	0.0059		0.00050	mg/L		10/31/18 18:15	11/19/18 22:42	1

Client Sample ID: CH-CCR-FD-02-102418

Lab Sample ID: 550-112451-4

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	3.9	D1	2.0	mg/L			10/31/18 18:51	5

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.65		0.20	mg/L		10/30/18 08:29	11/01/18 01:52	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0027		0.00050	mg/L		10/31/18 18:15	11/19/18 22:45	1
Barium	0.0092		0.00050	mg/L		10/31/18 18:15	11/19/18 22:45	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/19/18 22:45	1
Chromium	0.045		0.0010	mg/L		10/31/18 18:15	11/19/18 22:45	1
Cobalt	0.0015		0.00050	mg/L		10/31/18 18:15	11/19/18 22:45	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/19/18 22:45	1
Molybdenum	0.36		0.00050	mg/L		10/31/18 18:15	11/19/18 22:45	1
Selenium	0.0056		0.00050	mg/L		10/31/18 18:15	11/19/18 22:45	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-160894/2
Matrix: Water
Analysis Batch: 160894

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			10/31/18 15:47	1

Lab Sample ID: LCS 550-160894/5
Matrix: Water
Analysis Batch: 160894

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 550-160894/6
Matrix: Water
Analysis Batch: 160894

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	4.11		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-112451-1 MS
Matrix: Water
Analysis Batch: 160894

Client Sample ID: CH-CCR-M-50A-102418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	2.2	D1	20.0	23.0	D1	mg/L		104	80 - 120

Lab Sample ID: 550-112451-1 MSD
Matrix: Water
Analysis Batch: 160894

Client Sample ID: CH-CCR-M-50A-102418
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	D1	20.0	23.3	D1	mg/L		106	80 - 120	1	20

Lab Sample ID: MB 550-161411/2
Matrix: Water
Analysis Batch: 161411

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			11/06/18 17:27	1

Lab Sample ID: LCS 550-161411/5
Matrix: Water
Analysis Batch: 161411

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 550-161411/6
Matrix: Water
Analysis Batch: 161411

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: Cholla

TestAmerica Job ID: 550-112451-1

Lab Sample ID: 550-112814-F-2 MS
Matrix: Water
Analysis Batch: 161411

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		4.00	4.16		mg/L		103	80 - 120

Lab Sample ID: 550-112814-F-2 MSD
Matrix: Water
Analysis Batch: 161411

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	Limit
Fluoride	ND		4.00	4.25		mg/L		105	80 - 120	2	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-160566/1-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160566

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.20	mg/L		10/30/18 08:29	11/01/18 00:51	1

Lab Sample ID: LCS 550-160566/2-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	1.00	1.00		mg/L		100	85 - 115

Lab Sample ID: LCSD 550-160566/3-A
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Lithium	1.00	0.999		mg/L		100	85 - 115	0	20

Lab Sample ID: 550-112450-B-1-A MS
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.43		1.00	1.39		mg/L		97	70 - 130

Lab Sample ID: 550-112450-B-1-B MSD
Matrix: Water
Analysis Batch: 160784

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 160566

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Lithium	0.43		1.00	1.41		mg/L		98	70 - 130	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-160737/1-A
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160737

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Barium	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Cadmium	ND		0.00010	mg/L		10/31/18 18:15	11/09/18 22:24	1
Chromium	ND		0.0010	mg/L		10/31/18 18:15	11/09/18 22:24	1
Cobalt	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Lead	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Molybdenum	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1
Selenium	ND		0.00050	mg/L		10/31/18 18:15	11/09/18 22:24	1

Lab Sample ID: LCS 550-160737/2-A
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160737

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.106		mg/L		106	85 - 115
Barium	0.100	0.102		mg/L		102	85 - 115
Cadmium	0.100	0.101		mg/L		101	85 - 115
Chromium	0.100	0.102		mg/L		102	85 - 115
Cobalt	0.100	0.101		mg/L		101	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Molybdenum	0.100	0.102		mg/L		102	85 - 115
Selenium	0.100	0.101		mg/L		101	85 - 115

Lab Sample ID: LCSD 550-160737/3-A
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160737

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Arsenic	0.100	0.113		mg/L		113	85 - 115	6	20
Barium	0.100	0.109		mg/L		109	85 - 115	7	20
Cadmium	0.100	0.109		mg/L		109	85 - 115	8	20
Chromium	0.100	0.108		mg/L		108	85 - 115	6	20
Cobalt	0.100	0.107		mg/L		107	85 - 115	6	20
Lead	0.100	0.109		mg/L		109	85 - 115	7	20
Molybdenum	0.100	0.110		mg/L		110	85 - 115	7	20
Selenium	0.100	0.108		mg/L		108	85 - 115	7	20

Lab Sample ID: 550-112504-A-14-B MS
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160737

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	ND		0.100	0.105		mg/L		105	70 - 130
Barium	0.18		0.100	0.285		mg/L		104	70 - 130
Cadmium	ND		0.100	0.0972		mg/L		97	70 - 130
Chromium	ND		0.100	0.0973		mg/L		96	70 - 130
Cobalt	ND		0.100	0.0935		mg/L		93	70 - 130
Lead	ND		0.100	0.0955		mg/L		96	70 - 130
Molybdenum	ND		0.100	0.104		mg/L		104	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

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

Lab Sample ID: 550-112504-A-14-B MS
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160737
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Selenium	ND		0.100	0.0943		mg/L		94	70 - 130

Lab Sample ID: 550-112504-A-14-C MSD
Matrix: Water
Analysis Batch: 161580

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 160737
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	ND		0.100	0.105		mg/L		105	70 - 130	0	20
Barium	0.18		0.100	0.288		mg/L		106	70 - 130	1	20
Cadmium	ND		0.100	0.0984		mg/L		98	70 - 130	1	20
Chromium	ND		0.100	0.0988		mg/L		98	70 - 130	2	20
Cobalt	ND		0.100	0.0947		mg/L		95	70 - 130	1	20
Lead	ND		0.100	0.0968		mg/L		97	70 - 130	1	20
Molybdenum	ND		0.100	0.105		mg/L		105	70 - 130	1	20
Selenium	ND		0.100	0.0963		mg/L		96	70 - 130	2	20

Lab Sample ID: MB 550-163433/1-A
Matrix: Water
Analysis Batch: 163621

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 163433

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		0.00050	mg/L		12/03/18 05:12	12/04/18 13:24	1

Lab Sample ID: LCS 550-163433/2-A
Matrix: Water
Analysis Batch: 163621

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 163433
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Molybdenum	0.100	0.102		mg/L		102	85 - 115

Lab Sample ID: LCSD 550-163433/3-A
Matrix: Water
Analysis Batch: 163621

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 163433
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Molybdenum	0.100	0.101		mg/L		101	85 - 115	0	20

Lab Sample ID: 550-114035-H-1-E MS
Matrix: Water
Analysis Batch: 163621

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 163433
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Molybdenum	0.0037		0.100	0.108		mg/L		105	70 - 130

Lab Sample ID: 550-114035-H-1-F MSD
Matrix: Water
Analysis Batch: 163621

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 163433
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Molybdenum	0.0037		0.100	0.108		mg/L		104	70 - 130	1	20

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

HPLC/IC

Analysis Batch: 160894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-3	CH-CCR-W-123-102418	Total/NA	Water	300.0	
550-112451-4	CH-CCR-FD-02-102418	Total/NA	Water	300.0	
MB 550-160894/2	Method Blank	Total/NA	Water	300.0	
LCS 550-160894/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-160894/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112451-1 MS	CH-CCR-M-50A-102418	Total/NA	Water	300.0	
550-112451-1 MSD	CH-CCR-M-50A-102418	Total/NA	Water	300.0	

Analysis Batch: 161411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-1	CH-CCR-M-50A-102418	Total/NA	Water	300.0	
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	300.0	
MB 550-161411/2	Method Blank	Total/NA	Water	300.0	
LCS 550-161411/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161411/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112814-F-2 MS	Matrix Spike	Total/NA	Water	300.0	
550-112814-F-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 160566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-1	CH-CCR-M-50A-102418	Total/NA	Water	200.7	
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.7	
550-112451-3	CH-CCR-W-123-102418	Total/NA	Water	200.7	
550-112451-4	CH-CCR-FD-02-102418	Total/NA	Water	200.7	
MB 550-160566/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-160566/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-160566/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-112450-B-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-112450-B-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Prep Batch: 160737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-1	CH-CCR-M-50A-102418	Total/NA	Water	200.8	
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.8	
550-112451-3	CH-CCR-W-123-102418	Total/NA	Water	200.8	
550-112451-4	CH-CCR-FD-02-102418	Total/NA	Water	200.8	
MB 550-160737/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-160737/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-160737/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-112504-A-14-B MS	Matrix Spike	Total/NA	Water	200.8	
550-112504-A-14-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.8	

Analysis Batch: 160784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-1	CH-CCR-M-50A-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112451-3	CH-CCR-W-123-102418	Total/NA	Water	200.7 Rev 4.4	160566
550-112451-4	CH-CCR-FD-02-102418	Total/NA	Water	200.7 Rev 4.4	160566

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

Metals (Continued)

Analysis Batch: 160784 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-160566/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	160566
LCS 550-160566/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	160566
LCSD 550-160566/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-B-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	160566
550-112450-B-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	160566

Analysis Batch: 161580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-1	CH-CCR-M-50A-102418	Total/NA	Water	200.8 LL	160737
MB 550-160737/1-A	Method Blank	Total/NA	Water	200.8 LL	160737
LCS 550-160737/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	160737
LCSD 550-160737/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	160737
550-112504-A-14-B MS	Matrix Spike	Total/NA	Water	200.8 LL	160737
550-112504-A-14-C MSD	Matrix Spike Duplicate	Total/NA	Water	200.8 LL	160737

Analysis Batch: 162387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.8 LL	160737
550-112451-3	CH-CCR-W-123-102418	Total/NA	Water	200.8 LL	160737
550-112451-4	CH-CCR-FD-02-102418	Total/NA	Water	200.8 LL	160737

Analysis Batch: 163186

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.8 LL	160737

Prep Batch: 163433

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.8	
MB 550-163433/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-163433/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-163433/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-114035-H-1-E MS	Matrix Spike	Total/NA	Water	200.8	
550-114035-H-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	200.8	

Analysis Batch: 163621

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-163433/1-A	Method Blank	Total/NA	Water	200.8 LL	163433
LCS 550-163433/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	163433
LCSD 550-163433/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	163433
550-114035-H-1-E MS	Matrix Spike	Total/NA	Water	200.8 LL	163433
550-114035-H-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	200.8 LL	163433

Analysis Batch: 163624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112451-2	CH-CCR-M-51A-102418	Total/NA	Water	200.8 LL	163433

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

Client Sample ID: CH-CCR-M-50A-102418

Lab Sample ID: 550-112451-1

Date Collected: 10/24/18 10:47

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161411	11/07/18 02:57	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:35	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	161580	11/09/18 22:45	TEK	TAL PHX

Client Sample ID: CH-CCR-M-51A-102418

Lab Sample ID: 550-112451-2

Date Collected: 10/24/18 10:16

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	161411	11/07/18 03:34	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:40	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:40	TEK	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		10	163186	11/27/18 16:07	TEK	TAL PHX
Total/NA	Prep	200.8			163433	12/03/18 05:12	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	163624	12/04/18 14:29	TEK	TAL PHX

Client Sample ID: CH-CCR-W-123-102418

Lab Sample ID: 550-112451-3

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	160894	10/31/18 18:32	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:46	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:42	TEK	TAL PHX

Client Sample ID: CH-CCR-FD-02-102418

Lab Sample ID: 550-112451-4

Date Collected: 10/24/18 11:26

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	160894	10/31/18 18:51	NEL	TAL PHX
Total/NA	Prep	200.7			160566	10/30/18 08:29	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160784	11/01/18 01:52	SRA	TAL PHX
Total/NA	Prep	200.8			160737	10/31/18 18:15	SRA	TAL PHX
Total/NA	Analysis	200.8 LL		1	162387	11/19/18 22:45	TEK	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112451-1

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: Cholla

TestAmerica Job ID: 550-112451-1

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: Cholla

TestAmerica Job ID: 550-112451-1

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
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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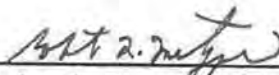
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 24, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-50A-102418 (550-112451-1)	< 0.4	< 0.6	< 0.6

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P.

11/12/2018

Date

Laboratory License Number AZ0462

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Radiation Safety Engineering, Inc.

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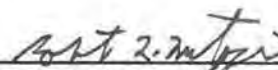
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 24, 2018
 Sample Received: October 29, 2018
 Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-51A-102418 (550-112451-2)	< 0.4	< 0.6	< 0.6

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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 Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
 Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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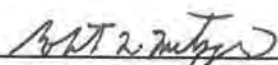
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 24, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-123-102418 (550-112451-3)	< 0.4	< 0.6	< 0.6

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
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

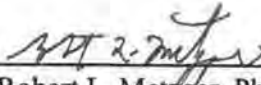
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: October 24, 2018
Sample Received: October 29, 2018
Analysis Completed: November 12, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD-02-102418 (550-112451-4)	< 0.4	< 0.6	< 0.6

Date of Analysis	11/2/2018	11/2/2018	11/2/2018
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Robert L. Metzger, Ph.D., C.H.P. 11/12/2018
Date

Laboratory License Number AZ0462

TestAmerica Phoenix

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

Chain of Custody Record

TestAmerica

HP-11002-AMPH-00000001-1-0100

Client Information (Sub Contract Lab)		Sampler:		Lab PI:		Carrier Tracking No(s):	
Company: Radiation Safety Eng., Inc.		Phone: 3245 North Washington Street, Chandler, AZ, 85225		Baker, Ken		550-22663-1	
Address: 3245 North Washington Street, Chandler, AZ, 85225		City: Chandler		E-Mail: ken.baker@testamericainc.com		State of Origin: Arizona	
City: Chandler		State: AZ		Accreditations Required (See note): State Program - Arizona		Page 1 of 1	
State: AZ		Zip: 85225		Due Date Requested: 11/5/2018		Job #: 550-112451-1	
Phone: 3245 North Washington Street, Chandler, AZ, 85225		TAT Requested (days):		GOC No: 550-22663-1		Preservation Codes:	
Email:		PO #:		Project #:		A - HCL	
Project Name: Cholla		WO #:		SSOW#:		B - NaOH	
Site:		Sample Date		Sample Time		C - Zn Acetate	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time		D - Nitric Acid	
CH-CCR-M-50A-102418 (550-112451-1)	10/24/18	10:47	Arizona			E - NaHSO4	
CH-CCR-M-51A-102418 (550-112451-2)	10/24/18	10:16	Arizona			F - MeOH	
CH-CCR-W-123-102418 (550-112451-3)	10/24/18	11:26	Arizona			G - Amchlor	
CH-CCR-FD-02-102418 (550-112451-4)	10/24/18	11:26	Arizona			H - Ascorbic Acid	
						I - Ice	
						J - DI Water	
						K - EDTA	
						L - EDA	
						Other:	
						M - Hexane	
						N - Nonyl	
						O - AsNaO2	
						P - Na2OAS	
						Q - Na2SO3	
						R - Na2S2O3	
						S - H2SO4	
						T - TSP Dodecylhydrate	
						U - Acetone	
						V - MCAA	
						W - pH 4.5	
						Z - other (specify)	
						Total Number of containers	
						Special Instructions/Note:	
CH-CCR-M-50A-102418 (550-112451-1)	10/24/18	10:47	Arizona			X	2
CH-CCR-M-51A-102418 (550-112451-2)	10/24/18	10:16	Arizona			X	2
CH-CCR-W-123-102418 (550-112451-3)	10/24/18	11:26	Arizona			X	2
CH-CCR-FD-02-102418 (550-112451-4)	10/24/18	11:26	Arizona			X	2

Analysis Requested

Sub (Radium 226/228)/ Radium 226/228

Perform MS/MSD (Yes or No)

Field Filtered Sample (Yes or No)

Matrix (Water, Sealed, Open-air, AsAB)

Preservation Code: Water

Sample Type (C=Comp, G=grab) Preservation Code: Water

Sample Date: 10/24/18

Sample Time: 10:47

Arizona

Sample Date: 10/24/18

Sample Time: 10:16

Arizona

Sample Date: 10/24/18

Sample Time: 11:26

Arizona

Sample Date: 10/24/18

Sample Time: 11:26

Arizona

Special Instructions/Note:

Return To Client Disposal By Lab Archive For Months

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

Special Instructions/QC Requirements:

Received by: *W.A. HARR*

Date/Time: 10/29/18

Company: *BAZEMAN D.C.S*

Received by: *W.A. HARR*

Date/Time: 10/29/17

Company: *K.S.F*

Received by:

Date/Time:

Company:

Cooler Temperature(s) °C and Other Remarks:

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 tests/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: *BAZEMAN D.C.S*

Date/Time: 10/29/18

Company: *BAZEMAN D.C.S*

Relinquished by: *W.A. HARR*

Date/Time: 10/29/17

Company: *K.S.F*

Custody Seal No.:

Δ Yes Δ No



Regulatory Program: DW NPDES RCRA Other: CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarnway
928-587-0319
Date: 10/26/2018

Lab Contact: Doug Lavarnway
Carrier:

Analysis Turnaround Time
 CALENDAR DAYS
 WORKING DAYS
 TAT if different from Below: _____
 2 weeks
 1 week
 2 days
 1 day

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)	200.8 (As, Ba, Cd, Cr, Co, Pb, Mo, Se)	EPA 300.0 (F)	Ra 226 + 228 combined
CH-CCR-M-50A-102418	10/24/2018	1047 G	W	4	N	X	X	X	X	X
CH-CCR-M-51A-102418	10/24/18	1016 G	W	4	N	X	X	X	X	X
CH-CCR-W-123-102418	10/24/18	1126 G	W	4	N	X	X	X	X	X
CH-CCR-FD-02-102418	10/24/18	1126 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:
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:
 Non-Hazard
 Flammable
 Skin Irritant
 Poison B
 Unknown
 Return to Client
 Disposal by Lab
 Archive for _____ Months

Method 200.8 with collision cell
Radium to be analyzed by Radiation Safety

Custody Seal Intact: Yes No

Custody Seal No.:

Relinquished by: *Doug Lavarnway* Company: *APS* Date/Time: *10/26/2018* Received by: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____ Received in Laboratory by: _____ Date/Time: _____

Cooler Temp: *2.3°C* Obs'd: _____

Therm ID No.:

Company: *APS* Date/Time: _____

Company: *APR* Date/Time: *10-27-18*

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-112451-1

Login Number: 112451

List Source: TestAmerica Phoenix

List Number: 1

Creator: Doerr, Bret C

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: 550-114629-1

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:

1/15/2019 4:27:16 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: 550-114629-1
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.
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.
D2	Sample required dilution due to high concentration of analyte.
B3	Target analyte detected in calibration blank at or above the method reporting limit.

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: 550-114629-1
SDG: Cholla

Job ID: 550-114629-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-114629-1

Comments

No additional comments.

Receipt

The samples were received on 12/10/2018 11:16 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.6° C, 1.8° C, 2.0° C and 2.2° C.

Receipt Exceptions

Several of the sample sites were missing from the pick list.

CH-CCR-W-126-125128 (550-114629-1), CH-CCR-W-126-125128 (550-114629-1[DU]), CH-CCR-W-126-125128 (550-114629-1[MS]), CH-CCR-W-126-125128 (550-114629-1[MSD]), CH-CCR-MW65A-2518 (550-114629-2), CH-CCR-MW66A-2518 (550-114629-3), CH-CCR-MW67A-2518 (550-114629-4) and CH-CCR-FD01-12518 (550-114629-5)

HPLC/IC

Method(s) 300.0: The following sample was diluted for Fluoride my method EPA 300.0 due to the nature of the sample matrix: (550-114628-C-1 ^2). 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 matrix spike / matrix spike duplicate (MS/MSD) recoveries for Fluoride associated with analytical batch 550-164796 were outside control limits. Sample matrix interference was suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) recoveries were within acceptance limits.

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

Metals

Method(s) 200.7 Rev 4.4: The continuing calibration blank (CCB) for analytical batch 550-164399 contained sodium above the reporting limit (RL). All reported samples associated with this CCB were either ND for this analyte or contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or 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: 550-114629-1
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-114629-1	CH-CCR-W-126-125128	Water	12/05/18 13:49	12/10/18 11:16
550-114629-2	CH-CCR-MW65A-2518	Water	12/05/18 16:42	12/10/18 11:16
550-114629-3	CH-CCR-MW66A-2518	Water	12/05/18 14:58	12/10/18 11:16
550-114629-4	CH-CCR-MW67A-2518	Water	12/05/18 14:58	12/10/18 11:16
550-114629-5	CH-CCR-FD01-12518	Water	12/05/18 13:49	12/10/18 11:16

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-W-126-125128

Lab Sample ID: 550-114629-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7400	D2	400	mg/L	200		300.0	Total/NA
Fluoride	3.5	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	4200	D2	400	mg/L	200		300.0	Total/NA
Boron	43	M3	0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	760	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	91	M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	4000	D2 M3	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	17000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-MW65A-2518

Lab Sample ID: 550-114629-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3900	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.9	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2700	D2	400	mg/L	200		300.0	Total/NA
Boron	12		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	780		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	290		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	28		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2000	B3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	160		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	160		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	9900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.3	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.4	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-MW66A-2518

Lab Sample ID: 550-114629-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4600	D2	400	mg/L	200		300.0	Total/NA
Fluoride	0.93	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	2900	D2	400	mg/L	200		300.0	Total/NA
Boron	1.2		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	830		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	280		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	11		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	2500	D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	80		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	80		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	11000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	8.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-MW67A-2518

Lab Sample ID: 550-114629-4

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-MW67A-2518 (Continued)

Lab Sample ID: 550-114629-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5000	D2	400	mg/L	200		300.0	Total/NA
Fluoride	1.0	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	1500	D2	400	mg/L	200		300.0	Total/NA
Boron	0.38		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	1500		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	270		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	12		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1400	B3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	180		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	180		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	9300	D2	100	mg/L	1		SM 2540C	Total/NA
pH	6.9	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	19.0	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-FD01-12518

Lab Sample ID: 550-114629-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6900	D2	200	mg/L	100		300.0	Total/NA
Fluoride	3.6	D1	0.80	mg/L	2		300.0	Total/NA
Sulfate	4100	D2	200	mg/L	100		300.0	Total/NA
Boron	43		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	760		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	470		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	89		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	4000	D2	1.0	mg/L	2		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	16000	D2	200	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	18.4	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: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-W-126-125128

Lab Sample ID: 550-114629-1

Date Collected: 12/05/18 13:49

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7400	D2	400	mg/L			12/11/18 03:43	200
Fluoride	3.5	D1	0.80	mg/L			12/13/18 21:09	2
Sulfate	4200	D2	400	mg/L			12/11/18 03:43	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	43	M3	0.050	mg/L		12/11/18 07:22	12/12/18 15:56	1
Calcium	760	M3	2.0	mg/L		12/11/18 07:22	12/12/18 15:56	1
Magnesium	470	M3	2.0	mg/L		12/11/18 07:22	12/12/18 15:56	1
Potassium	91	M3	0.50	mg/L		12/11/18 07:22	12/12/18 15:56	1
Sodium	4000	D2 M3	1.0	mg/L		12/11/18 07:22	12/13/18 21:12	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		12/14/18 16:37	12/17/18 16:18	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	100		6.0	mg/L			12/11/18 15:09	1
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L			12/11/18 15:09	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:09	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 15:09	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:09	1
Total Dissolved Solids	17000	D2	200	mg/L			12/11/18 10:42	1
pH	7.4	H5	1.7	SU			12/10/18 19:35	1
Temperature	19.2	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-MW65A-2518

Lab Sample ID: 550-114629-2

Date Collected: 12/05/18 16:42

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3900	D2	400	mg/L			12/11/18 03:06	200
Fluoride	1.9	D1	0.80	mg/L			12/13/18 21:27	2
Sulfate	2700	D2	400	mg/L			12/11/18 03:06	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	12		0.050	mg/L		12/11/18 07:22	12/12/18 17:19	1
Calcium	780		2.0	mg/L		12/11/18 07:22	12/12/18 17:19	1
Magnesium	290		2.0	mg/L		12/11/18 07:22	12/12/18 17:19	1
Potassium	28		0.50	mg/L		12/11/18 07:22	12/12/18 17:19	1
Sodium	2000	B3	0.50	mg/L		12/11/18 07:22	12/12/18 17:19	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		12/14/18 16:37	12/17/18 16:19	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-MW65A-2518

Lab Sample ID: 550-114629-2

Date Collected: 12/05/18 16:42

Matrix: Water

Date Received: 12/10/18 11:16

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	160		6.0	mg/L			12/11/18 15:26	1
Bicarbonate Alkalinity as CaCO3	160		6.0	mg/L			12/11/18 15:26	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:26	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 15:26	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:26	1
Total Dissolved Solids	9900	D2	100	mg/L			12/11/18 10:42	1
pH	7.3	H5	1.7	SU			12/10/18 19:35	1
Temperature	19.4	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-MW66A-2518

Lab Sample ID: 550-114629-3

Date Collected: 12/05/18 14:58

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4600	D2	400	mg/L			12/11/18 02:30	200
Fluoride	0.93	D1	0.80	mg/L			12/13/18 21:46	2
Sulfate	2900	D2	400	mg/L			12/11/18 02:30	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.2		0.050	mg/L		12/11/18 07:22	12/12/18 17:25	1
Calcium	830		2.0	mg/L		12/11/18 07:22	12/12/18 17:25	1
Magnesium	280		2.0	mg/L		12/11/18 07:22	12/12/18 17:25	1
Potassium	11		0.50	mg/L		12/11/18 07:22	12/12/18 17:25	1
Sodium	2500	D2	1.0	mg/L		12/11/18 07:22	12/13/18 22:05	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		12/14/18 16:37	12/17/18 16:21	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	80		6.0	mg/L			12/11/18 15:34	1
Bicarbonate Alkalinity as CaCO3	80		6.0	mg/L			12/11/18 15:34	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:34	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 15:34	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:34	1
Total Dissolved Solids	11000	D2	100	mg/L			12/11/18 10:42	1
pH	8.1	H5	1.7	SU			12/10/18 19:35	1
Temperature	19.1	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-MW67A-2518

Lab Sample ID: 550-114629-4

Date Collected: 12/05/18 14:58

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5000	D2	400	mg/L			12/11/18 01:53	200
Fluoride	1.0	D1	0.80	mg/L			12/13/18 23:55	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-MW67A-2518

Lab Sample ID: 550-114629-4

Date Collected: 12/05/18 14:58

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1500	D2	400	mg/L			12/11/18 01:53	200

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.38		0.050	mg/L		12/11/18 07:22	12/12/18 17:31	1
Calcium	1500		2.0	mg/L		12/11/18 07:22	12/12/18 17:31	1
Magnesium	270		2.0	mg/L		12/11/18 07:22	12/12/18 17:31	1
Potassium	12		0.50	mg/L		12/11/18 07:22	12/12/18 17:31	1
Sodium	1400	B3	0.50	mg/L		12/11/18 07:22	12/12/18 17:31	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		12/14/18 16:37	12/17/18 16:22	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	180		6.0	mg/L			12/11/18 15:43	1
Bicarbonate Alkalinity as CaCO3	180		6.0	mg/L			12/11/18 15:43	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:43	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 15:43	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:43	1
Total Dissolved Solids	9300	D2	100	mg/L			12/11/18 10:42	1
pH	6.9	H5	1.7	SU			12/10/18 19:35	1
Temperature	19.0	H5	0.1	Degrees C			12/10/18 19:35	1

Client Sample ID: CH-CCR-FD01-12518

Lab Sample ID: 550-114629-5

Date Collected: 12/05/18 13:49

Matrix: Water

Date Received: 12/10/18 11:16

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6900	D2	200	mg/L			12/11/18 18:57	100
Fluoride	3.6	D1	0.80	mg/L			12/10/18 17:36	2
Sulfate	4100	D2	200	mg/L			12/11/18 18:57	100

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	43		0.050	mg/L		12/11/18 07:22	12/12/18 17:36	1
Calcium	760		2.0	mg/L		12/11/18 07:22	12/12/18 17:36	1
Magnesium	470		2.0	mg/L		12/11/18 07:22	12/12/18 17:36	1
Potassium	89		0.50	mg/L		12/11/18 07:22	12/12/18 17:36	1
Sodium	4000	D2	1.0	mg/L		12/11/18 07:22	12/13/18 22:17	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		12/14/18 16:37	12/17/18 16:24	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	100		6.0	mg/L			12/11/18 15:52	1
Bicarbonate Alkalinity as CaCO3	100		6.0	mg/L			12/11/18 15:52	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-FD01-12518

Lab Sample ID: 550-114629-5

Date Collected: 12/05/18 13:49

Matrix: Water

Date Received: 12/10/18 11:16

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:52	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 15:52	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:52	1
Total Dissolved Solids	16000	D2	200	mg/L			12/11/18 10:42	1
pH	7.4	H5	1.7	SU			12/10/18 19:35	1
Temperature	18.4	H5	0.1	Degrees C			12/10/18 19:35	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-164154/2
Matrix: Water
Analysis Batch: 164154

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			12/10/18 16:04	1
Fluoride	ND		0.40	mg/L			12/10/18 16:04	1
Sulfate	ND		2.0	mg/L			12/10/18 16:04	1

Lab Sample ID: LCS 550-164154/5
Matrix: Water
Analysis Batch: 164154

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	4.15		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-164154/6
Matrix: Water
Analysis Batch: 164154

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	4.04		mg/L		101	90 - 110	3	20
Sulfate	20.0	20.5		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-114628-A-1 MS ^2
Matrix: Water
Analysis Batch: 164154

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	8.00	8.64	D1	mg/L		101	80 - 120

Lab Sample ID: 550-114628-A-1 MS ^50
Matrix: Water
Analysis Batch: 164154

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	4000	D2	1000	4770	D2	mg/L		81	80 - 120
Sulfate	3300	D2	1000	4190	D2	mg/L		91	80 - 120

Lab Sample ID: 550-114628-A-1 MSD ^2
Matrix: Water
Analysis Batch: 164154

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	8.00	8.69	D1	mg/L		101	80 - 120	1	20

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114628-A-1 MSD ^50

Matrix: Water
Analysis Batch: 164154

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	4000	D2	1000	4850	D2	mg/L		89	80 - 120	2	20
Sulfate	3300	D2	1000	4270	D2	mg/L		99	80 - 120	2	20

Lab Sample ID: MB 550-164284/2

Matrix: Water
Analysis Batch: 164284

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			12/11/18 15:16	1
Fluoride	ND		0.40	mg/L			12/11/18 15:16	1
Sulfate	ND		2.0	mg/L			12/11/18 15:16	1

Lab Sample ID: LCS 550-164284/5

Matrix: Water
Analysis Batch: 164284

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	4.10		mg/L		103	90 - 110
Sulfate	20.0	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-164284/6

Matrix: Water
Analysis Batch: 164284

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	4.11		mg/L		103	90 - 110	0	20
Sulfate	20.0	20.4		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-114686-A-1 MS

Matrix: Water
Analysis Batch: 164284

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		4.00	4.18		mg/L		102	80 - 120
Sulfate	72		20.0	88.7		mg/L		81	80 - 120

Lab Sample ID: 550-114686-A-1 MS ^10

Matrix: Water
Analysis Batch: 164284

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	250	D2	200	478	D2	mg/L		113	80 - 120

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114686-A-1 MSD
Matrix: Water
Analysis Batch: 164284

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		4.00	4.24		mg/L		104	80 - 120	2	20
Sulfate	72		20.0	88.9		mg/L		82	80 - 120	0	20

Lab Sample ID: 550-114686-A-1 MSD ^10
Matrix: Water
Analysis Batch: 164284

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	250	D2	200	475	D2	mg/L		111	80 - 120	1	20

Lab Sample ID: MB 550-164511/2
Matrix: Water
Analysis Batch: 164511

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			12/13/18 18:23	1
Fluoride	ND		0.40	mg/L			12/13/18 18:23	1
Sulfate	ND		2.0	mg/L			12/13/18 18:23	1

Lab Sample ID: LCS 550-164511/5
Matrix: Water
Analysis Batch: 164511

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	4.07		mg/L		102	90 - 110
Sulfate	20.0	20.3		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-164511/6
Matrix: Water
Analysis Batch: 164511

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	21.2		mg/L		106	90 - 110	0	20
Fluoride	4.00	4.08		mg/L		102	90 - 110	0	20
Sulfate	20.0	20.3		mg/L		101	90 - 110	0	20

Lab Sample ID: 550-114843-A-1 MS
Matrix: Water
Analysis Batch: 164511

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	59		20.0	76.8		mg/L		87	80 - 120
Fluoride	ND		4.00	4.39		mg/L		102	80 - 120
Sulfate	33		20.0	52.7		mg/L		100	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114843-A-1 MSD
Matrix: Water
Analysis Batch: 164511

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	59		20.0	77.1		mg/L		88	80 - 120	0	20
Fluoride	ND		4.00	4.47		mg/L		104	80 - 120	2	20
Sulfate	33		20.0	53.1		mg/L		102	80 - 120	1	20

Lab Sample ID: MB 550-164796/2
Matrix: Water
Analysis Batch: 164796

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			12/14/18 18:31	1
Fluoride	ND		0.40	mg/L			12/14/18 18:31	1
Sulfate	ND		2.0	mg/L			12/14/18 18:31	1

Lab Sample ID: LCS 550-164796/5
Matrix: Water
Analysis Batch: 164796

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	4.08		mg/L		102	90 - 110
Sulfate	20.0	20.3		mg/L		101	90 - 110

Lab Sample ID: LCSD 550-164796/6
Matrix: Water
Analysis Batch: 164796

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	21.2		mg/L		106	90 - 110	0	20
Fluoride	4.00	4.09		mg/L		102	90 - 110	0	20
Sulfate	20.0	20.3		mg/L		101	90 - 110	0	20

Lab Sample ID: 550-114629-1 MS
Matrix: Water
Analysis Batch: 164796

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.9	D1 M2	8.00	7.40	D1 M2	mg/L		69	80 - 120

Lab Sample ID: 550-114629-1 MS
Matrix: Water
Analysis Batch: 164796

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	7200	D2 M2	4000	11400	D2	mg/L		106	80 - 120
Sulfate	4000	D2 M2	4000	8330	D2	mg/L		107	80 - 120

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-114629-1 MSD
Matrix: Water
Analysis Batch: 164796

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	1.9	D1 M2	8.00	7.51	D1 M2	mg/L		71	80 - 120	1	20

Lab Sample ID: 550-114629-1 MSD
Matrix: Water
Analysis Batch: 164796

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	7200	D2 M2	4000	11500	D2	mg/L		107	80 - 120	0	20
Sulfate	4000	D2 M2	4000	8370	D2	mg/L		108	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-164126/1-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164126

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		12/11/18 07:22	12/12/18 15:18	1
Calcium	ND		2.0	mg/L		12/11/18 07:22	12/12/18 15:18	1
Magnesium	ND		2.0	mg/L		12/11/18 07:22	12/12/18 15:18	1
Potassium	ND		0.50	mg/L		12/11/18 07:22	12/12/18 15:18	1
Sodium	ND		0.50	mg/L		12/11/18 07:22	12/12/18 15:18	1

Lab Sample ID: LCS 550-164126/2-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.950		mg/L		95	85 - 115
Calcium	21.0	20.7		mg/L		99	85 - 115
Magnesium	21.0	21.1		mg/L		100	85 - 115
Potassium	20.0	20.2		mg/L		101	85 - 115
Sodium	20.0	19.7		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-164126/3-A
Matrix: Water
Analysis Batch: 164399

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.00	0.933		mg/L		93	85 - 115	2	20
Calcium	21.0	20.5		mg/L		98	85 - 115	1	20
Magnesium	21.0	20.9		mg/L		99	85 - 115	1	20
Potassium	20.0	19.9		mg/L		100	85 - 115	1	20
Sodium	20.0	19.5		mg/L		97	85 - 115	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

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

Lab Sample ID: 550-114629-1 MS
Matrix: Water
Analysis Batch: 164399

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Boron	43	M3	1.00	41.9	M3	mg/L		-134	70 - 130
Calcium	760	M3	21.0	722	M3	mg/L		-185	70 - 130
Magnesium	470	M3	21.0	462	M3	mg/L		-57	70 - 130
Potassium	91	M3	20.0	88.1	M3	mg/L		-16	70 - 130

Lab Sample ID: 550-114629-1 MS
Matrix: Water
Analysis Batch: 164498

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Sodium	4000	D2 M3	20.0	3990	M3	mg/L		-37	70 - 130

Lab Sample ID: 550-114629-1 MSD
Matrix: Water
Analysis Batch: 164399

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Boron	43	M3	1.00	41.8	M3	mg/L		-137	70 - 130	0	20
Calcium	760	M3	21.0	734	M3	mg/L		-130	70 - 130	2	20
Magnesium	470	M3	21.0	462	M3	mg/L		-60	70 - 130	0	20
Potassium	91	M3	20.0	88.0	M3	mg/L		-17	70 - 130	0	20

Lab Sample ID: 550-114629-1 MSD
Matrix: Water
Analysis Batch: 164498

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA
Prep Batch: 164126

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Sodium	4000	D2 M3	20.0	3920	M3	mg/L		-366	70 - 130	2	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-164583/1-A
Matrix: Water
Analysis Batch: 164727

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 164583

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Hg	ND		0.00020	mg/L		12/14/18 16:37	12/17/18 16:09	1

Lab Sample ID: LCS 550-164583/2-A
Matrix: Water
Analysis Batch: 164727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 164583

Analyte	Spike	LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
Hg	0.00500	0.00456		mg/L		91	85 - 115

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: 245.1 - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 550-164583/3-A
Matrix: Water
Analysis Batch: 164727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 164583

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	0.00500	0.00466		mg/L		93	85 - 115	2	20

Lab Sample ID: 550-114629-1 MS
Matrix: Water
Analysis Batch: 164727

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA
Prep Batch: 164583

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	ND		0.00500	0.00399		mg/L		80	70 - 130		

Lab Sample ID: 550-114629-1 MSD
Matrix: Water
Analysis Batch: 164727

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA
Prep Batch: 164583

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	ND		0.00500	0.00395		mg/L		79	70 - 130	1	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-164215/32
Matrix: Water
Analysis Batch: 164215

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			12/11/18 15:00	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:00	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:00	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			12/11/18 15:00	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			12/11/18 15:00	1

Lab Sample ID: LCS 550-164215/31
Matrix: Water
Analysis Batch: 164215

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity as CaCO3	250	246		mg/L		99	90 - 110		

Lab Sample ID: LCSD 550-164215/39
Matrix: Water
Analysis Batch: 164215

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	248		mg/L		99	90 - 110	1	20

Lab Sample ID: 550-114629-1 DU
Matrix: Water
Analysis Batch: 164215

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity as CaCO3	100		104		mg/L		2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 550-114629-1 DU
Matrix: Water
Analysis Batch: 164215

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Bicarbonate Alkalinity as CaCO3	100		104		mg/L		2	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 550-164156/1
Matrix: Water
Analysis Batch: 164156

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

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Dissolved Solids	ND		20	mg/L			12/11/18 10:42	1

Lab Sample ID: LCS 550-164156/2
Matrix: Water
Analysis Batch: 164156

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

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Total Dissolved Solids	1000	970		mg/L		97	90 - 110

Lab Sample ID: LCSD 550-164156/3
Matrix: Water
Analysis Batch: 164156

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

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	Limit
		Result	Qualifier						
Total Dissolved Solids	1000	940		mg/L		94	90 - 110	3	10

Lab Sample ID: 550-114629-1 DU
Matrix: Water
Analysis Batch: 164156

Client Sample ID: CH-CCR-W-126-125128
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	17000	D2	15300	D2	mg/L		8	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-164118/36
Matrix: Water
Analysis Batch: 164118

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

Analyte	Spike Added	LCSSRM	LCSSRM	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
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: 550-114629-1
 SDG: Cholla

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

Lab Sample ID: LCSSRM 550-164118/47
Matrix: Water
Analysis Batch: 164118

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: 550-114629-1 DU
Matrix: Water
Analysis Batch: 164118

Client Sample ID: CH-CCR-W-126-125128
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		0.1	5
Temperature	19.2	H5	19.4	H5	Degrees C		1	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

HPLC/IC

Analysis Batch: 164154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	300.0	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	300.0	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	300.0	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	300.0	
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	300.0	
MB 550-164154/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164154/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-164154/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114628-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-114628-A-1 MS ^50	Matrix Spike	Total/NA	Water	300.0	
550-114628-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-114628-A-1 MSD ^50	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 164284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	300.0	
MB 550-164284/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164284/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-164284/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114686-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-114686-A-1 MS ^10	Matrix Spike	Total/NA	Water	300.0	
550-114686-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-114686-A-1 MSD ^10	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 164511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	300.0	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	300.0	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	300.0	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	300.0	
MB 550-164511/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164511/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-164511/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114843-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-114843-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 164796

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-164796/2	Method Blank	Total/NA	Water	300.0	
LCS 550-164796/5	Lab Control Sample	Total/NA	Water	300.0	
LCS 550-164796/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	300.0	
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	300.0	
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	300.0	
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	300.0	

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Metals

Prep Batch: 164126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	200.7	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	200.7	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	200.7	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	200.7	
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	200.7	
MB 550-164126/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-164126/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-164126/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	200.7	
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	200.7	

Analysis Batch: 164399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	200.7 Rev 4.4	164126
MB 550-164126/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	164126
LCS 550-164126/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	164126
LCSD 550-164126/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	200.7 Rev 4.4	164126

Analysis Batch: 164498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	200.7 Rev 4.4	164126
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	200.7 Rev 4.4	164126

Prep Batch: 164583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	245.1	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	245.1	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	245.1	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	245.1	
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	245.1	
MB 550-164583/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-164583/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-164583/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	245.1	
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	245.1	

Analysis Batch: 164727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	245.1	164583
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	245.1	164583
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	245.1	164583
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	245.1	164583

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Metals (Continued)

Analysis Batch: 164727 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	245.1	164583
MB 550-164583/1-A	Method Blank	Total/NA	Water	245.1	164583
LCS 550-164583/2-A	Lab Control Sample	Total/NA	Water	245.1	164583
LCSD 550-164583/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	164583
550-114629-1 MS	CH-CCR-W-126-125128	Total/NA	Water	245.1	164583
550-114629-1 MSD	CH-CCR-W-126-125128	Total/NA	Water	245.1	164583

General Chemistry

Analysis Batch: 164118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	SM 4500 H+ B	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	SM 4500 H+ B	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	SM 4500 H+ B	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	SM 4500 H+ B	
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-164118/36	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-164118/47	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-114629-1 DU	CH-CCR-W-126-125128	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 164156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	SM 2540C	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	SM 2540C	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	SM 2540C	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	SM 2540C	
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	SM 2540C	
MB 550-164156/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-164156/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-164156/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-114629-1 DU	CH-CCR-W-126-125128	Total/NA	Water	SM 2540C	

Analysis Batch: 164215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-114629-1	CH-CCR-W-126-125128	Total/NA	Water	SM 2320B	
550-114629-2	CH-CCR-MW65A-2518	Total/NA	Water	SM 2320B	
550-114629-3	CH-CCR-MW66A-2518	Total/NA	Water	SM 2320B	
550-114629-4	CH-CCR-MW67A-2518	Total/NA	Water	SM 2320B	
550-114629-5	CH-CCR-FD01-12518	Total/NA	Water	SM 2320B	
MB 550-164215/32	Method Blank	Total/NA	Water	SM 2320B	
LCS 550-164215/31	Lab Control Sample	Total/NA	Water	SM 2320B	
LCSD 550-164215/39	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-114629-1 DU	CH-CCR-W-126-125128	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-W-126-125128

Lab Sample ID: 550-114629-1

Date Collected: 12/05/18 13:49

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 03:43	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/13/18 21:09	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 15:56	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	164498	12/13/18 21:12	ARE	TAL PHX
Total/NA	Prep	245.1			164583	12/14/18 16:37	JTG	TAL PHX
Total/NA	Analysis	245.1		1	164727	12/17/18 16:18	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 15:09	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156		YET	TAL PHX
					(Start)	12/11/18 10:42		
					(End)	12/12/18 11:45		
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-MW65A-2518

Lab Sample ID: 550-114629-2

Date Collected: 12/05/18 16:42

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 03:06	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/13/18 21:27	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:19	SRA	TAL PHX
Total/NA	Prep	245.1			164583	12/14/18 16:37	JTG	TAL PHX
Total/NA	Analysis	245.1		1	164727	12/17/18 16:19	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 15:26	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156		YET	TAL PHX
					(Start)	12/11/18 10:42		
					(End)	12/12/18 11:45		
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-MW66A-2518

Lab Sample ID: 550-114629-3

Date Collected: 12/05/18 14:58

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 02:30	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/13/18 21:46	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:25	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	164498	12/13/18 22:05	ARE	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
SDG: Cholla

Client Sample ID: CH-CCR-MW66A-2518

Lab Sample ID: 550-114629-3

Date Collected: 12/05/18 14:58

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	245.1			164583	12/14/18 16:37	JTG	TAL PHX
Total/NA	Analysis	245.1		1	164727	12/17/18 16:21	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 15:34	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-MW67A-2518

Lab Sample ID: 550-114629-4

Date Collected: 12/05/18 14:58

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		200	164154	12/11/18 01:53	NEL	TAL PHX
Total/NA	Analysis	300.0		2	164511	12/13/18 23:55	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:31	SRA	TAL PHX
Total/NA	Prep	245.1			164583	12/14/18 16:37	JTG	TAL PHX
Total/NA	Analysis	245.1		1	164727	12/17/18 16:22	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 15:43	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

Client Sample ID: CH-CCR-FD01-12518

Lab Sample ID: 550-114629-5

Date Collected: 12/05/18 13:49

Matrix: Water

Date Received: 12/10/18 11:16

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	164154	12/10/18 17:36	NEL	TAL PHX
Total/NA	Analysis	300.0		100	164284	12/11/18 18:57	KJS	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	164399	12/12/18 17:36	SRA	TAL PHX
Total/NA	Prep	200.7			164126	12/11/18 07:22	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		2	164498	12/13/18 22:17	ARE	TAL PHX
Total/NA	Prep	245.1			164583	12/14/18 16:37	JTG	TAL PHX
Total/NA	Analysis	245.1		1	164727	12/17/18 16:24	JTG	TAL PHX
Total/NA	Analysis	SM 2320B		1	164215	12/11/18 15:52	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	164156	12/11/18 10:42 12/12/18 11:45	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	164118	12/10/18 19:35	MRR	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-1
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: 550-114629-1
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: 550-114629-1
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



Radiation Safety Engineering, Inc.

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

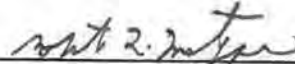
(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-126-125128 (550-114629-1)	< 0.4	< 0.6	< 0.6
Date of Analysis	12/21/2018	12/21/2018	12/21/2018


Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
Date
Laboratory License Number AZ0462

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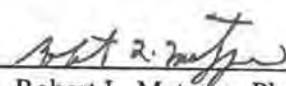
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
 Sample Received: December 11, 2018
 Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-MW65A-2518 (550-114629-2)	< 0.4	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018


 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462



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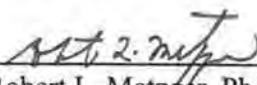
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-MW66A-2518 (550-114629-3)	< 0.4	< 0.6	< 0.6

Date of Analysis	12/21/2018	12/21/2018	12/21/2018
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 _____ 12/26/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462

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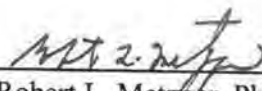
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
 Sample Received: December 11, 2018
 Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-MW67A-2518 (550-114629-4)	< 0.4	< 0.6	< 0.6

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
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 _____ 12/26/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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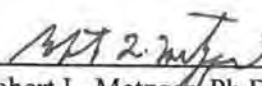
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD01-12518 (550-114629-5)	< 0.4	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
------------------	------------	------------	------------


 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462

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

Carrier Tracking No(s):

Lab PM: Baker, Ken
E-Mail: ken.baker@testamericainc.com
Accreditations Required (See note):
State Program - Arizona

Client Information (Sub Contract Lab)
Client Contact: Baker, Ken
Shipping/Receiving
Company: Radiation Safety Eng., Inc.
Address: 3245 North Washington Street,
City: Chandler
State, Zip: AZ, 85225
Phone:
Email:
Project Name: APS - Cholla CCR
Site: Arizona Public Service

COC No: 550-23058.1
Page: Page 1 of 1
Job #: 550-114629-1

Sample ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Swab, Dose, etc.)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Total Number of Containers	Special Instructions/Note:
CH-CCR-W-126-125128 (550-114629-1)	12/5/18	13:49	Arizona	Water		X	X	2	Job 3
CH-CCR-MW65A-2518 (550-114629-2)	12/5/18	16:42	Arizona	Water		X	X	2	Job 3
CH-CCR-MW66A-2518 (550-114629-3)	12/5/18	14:58	Arizona	Water		X	X	2	Job 3
CH-CCR-MW67A-2518 (550-114629-4)	12/5/18	14:58	Arizona	Water		X	X	2	Job 3
CH-CCR-FD01-12518 (550-114629-5)	12/5/18	13:49	Arizona	Water		X	X	2	Job 3

Analysis Requested

Preservation Codes:
 A - HCL
 B - NaOH
 C - Zn Acetate
 D - Nitric Acid
 E - Nitric Acid
 F - MeOH
 G - Amchlor
 H - Ascorbic Acid
 I - Ice
 J - DI Water
 K - EDTA
 L - EDA
 Other:

M - Heptane
 N - None
 O - AsNO2
 P - Na2O4S
 Q - Na2SO3
 R - Na2SO3
 S - H2SO4
 T - TSP Dodecahydrate
 U - Acetone
 V - MCAA
 W - pH 4.5
 Z - other (specify)

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/OC Requirements:

Received by: *MARK WALKER* Date/Time: 12-11-18 14:15
 Company: *R-S-E*

Received by: _____ Date/Time: _____
 Company: _____

Cooler Temperature(s) °C and Other Remarks:

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon 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/instruments being analyzed, the samples must be shipped back to the TestAmerica laboratory or other restrictions 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 Returned by: _____ Date: _____
 Relinquished by: *DATAMAN D.C.S.* Date/Time: 12/11/18
 Relinquished by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Custody Seal Intact: Yes No
 Custody Seal No.:

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

114629

Regulatory Program: **CCR**

CCR

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarway** 928-587-0319
 Analysis Turnaround Time: _____
 TAT if different from Below: _____
 Project Name: **CCR**
 Site: **Cholla**
 P O # _____

Sample Identification	Sample Date	Sample Time	Sample Type (C=Cont, 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
CH-CCR-W-126-12518	12/6/2018	1349 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-MW65A-12518	12/5/2018	1642 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-MW66A-12518	12/5/2018	1458 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-MW67A-12518	12/5/2018	1548 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-FD01-12518	12/5/2018	1349 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 _____
 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.
 Comments Section if the lab is to dispose of the sample: _____

Special Instructions/QC Requirements & Comments: _____
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No
 Cooler Temp. (°C): Obs'd _____
 Therm ID No.: _____

Relinquished by: **Doug Lavarway** Company: **APS** Date/Time: **12/6/18**
 Received by: _____ Company: _____ Date/Time: _____

Relinquished by: _____ Company: _____ Date/Time: _____
 Received in Laboratory by: _____ Company: **TRP/TH** Date/Time: **12-10-18**



TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114629

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarway 928-587-0319
Analysis Turnaround Time: TAT if different from Below
Lab Contact: Doug Lavarway 12/9/2018
Carrier: COC No. 1 of 1 COCS

APS Cholla
4801 Cholla Lake Road
Joseph City, Az 86032
(928) 587-0319 Phone
(xxx) xxx-xxxx FAX
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)	EPA 200.7 (Li, Mg, SiO2)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Tl)	EPA 300.0 (F)	Sampler:	For Lab Use Only:
CH-CCR-W-126-12518	12/5/2018	1349	G	W	2	N	X	X	X	X		Walk-in Client: Lab Sampling:
CH-CCR-MW65A-12518	12/5/2018	1642	G	W	2	N	X	X	X		Job / SDG No.:	
CH-CCR-MW66A-12518	12/5/2018	1458	G	W	2	N	X	X	X		Sample Specific Notes:	
CH-CCR-MW67A-12518	12/5/2018	1548	G	W	2	N	X	X	X			
CH-CCR-FD01-12518	12/5/2018	1349	G	W	2	N	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:
 Non-Hazard
 Flammable
 Skin Irritant
 Poison 8
 Unknown
 Return to Client
 Disposal by Lab
 Archive for _____ Months

Custody Seal Intact: Yes No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: 2-2.2, 2-0.0, 1.8, -0.1, 0.6
Therm ID No.:

Relinquished by: Doug Lavarway
Company: TBS
Date/Time: 12/10/18
Received by: TAPHX TAPHS
Company: LAB
Date/Time: 12-10-18

Relinquished by: [Signature]
Company: [Signature]
Date/Time: [Signature]

TestAmerica Phoenix
4625 E Colton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114629

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

APS, Cholla	Client Contact	Doug Lavarnway	928-587-0319	Analysis Turnaround Time	Doug Lavarnway	Lab Contact:	Carrier:	12/9/2018	COC No:	1 of 1 COCs
4801 Cholla Lake Road									Sampler:	
Joseph City, Az 86032									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									
	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)	932.0 Radium 226 and 228
CH-CCR-W-126-12518	12/5/2018	1349 G	W		2	N	X	X
CH-CCR-MMW65A-12518	12/5/2018	1642 G	W		2	N	X	X
CH-CCR-MMW66A-12518	12/5/2018	1458 G	W		2	N	X	X
CH-CCR-MMW67A-12518	12/5/2018	1548 G	W		2	N	X	X
CH-CCR-FD01-12518	12/5/2018	1349 G	W		2	N	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: Radium shall be sent off to Radiation Safety Engineering for analysis.

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)

Cooler Temp. (°C): Obs'd: _____ Cor'd: _____ Term ID No.: _____

Custody Seals Intact: Yes No

Relinquished by: Doug Lavarnway Company: APS Date/Time: 12/10/18

Relinquished by: _____ Company: _____ Date/Time: _____

Received by: _____ Company: _____ Date/Time: _____

Received in Laboratory by: IA-PHX Company: IAS Date/Time: 12-10-18

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114629-1

SDG Number: Cholla

Login Number: 114629

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: 550-114629-3

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:

1/16/2019 8:01:30 AM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
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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Table of Contents

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-3
SDG: Cholla

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: 550-114629-3
SDG: Cholla

Job ID: 550-114629-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-114629-3

Comments

No additional comments.

Receipt

The samples were received on 12/10/2018 11:16 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.6° C, 1.8° C, 2.0° C and 2.2° C.

Receipt Exceptions

Several of the sample sites were missing from the pick list.

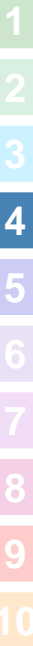
CH-CCR-W-126-125128 (550-114629-1), CH-CCR-W-126-125128 (550-114629-1[DU]), CH-CCR-W-126-125128 (550-114629-1[MS]), CH-CCR-W-126-125128 (550-114629-1[MSD]), CH-CCR-MW65A-2518 (550-114629-2), CH-CCR-MW66A-2518 (550-114629-3), CH-CCR-MW67A-2518 (550-114629-4) and CH-CCR-FD01-12518 (550-114629-5)

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: 550-114629-3
SDG: Cholla

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-114629-1	CH-CCR-W-126-125128	Water	12/05/18 13:49	12/10/18 11:16
550-114629-2	CH-CCR-MW65A-2518	Water	12/05/18 16:42	12/10/18 11:16
550-114629-3	CH-CCR-MW66A-2518	Water	12/05/18 14:58	12/10/18 11:16
550-114629-4	CH-CCR-MW67A-2518	Water	12/05/18 14:58	12/10/18 11:16
550-114629-5	CH-CCR-FD01-12518	Water	12/05/18 13:49	12/10/18 11:16

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Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-114629-3
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: 550-114629-3
SDG: Cholla

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

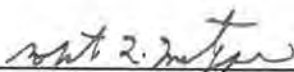
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-W-126-125128 (550-114629-1)	< 0.4	< 0.6	< 0.6

Date of Analysis	12/21/2018	12/21/2018	12/21/2018
------------------	------------	------------	------------


 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 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: December 05, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-MW65A-2518 (550-114629-2)	< 0.4	0.9 ± 0.3	0.9 ± 0.3
Date of Analysis	12/14/2018	12/14/2018	12/14/2018

Robert L. Metzger, Ph.D., C.H.P.

12/26/2018

Date

Laboratory License Number AZ0462

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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: December 05, 2018
 Sample Received: December 11, 2018
 Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-MW66A-2518 (550-114629-3)	< 0.4	< 0.6	< 0.6

Date of Analysis	12/21/2018	12/21/2018	12/21/2018
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Robert L. Metzger
 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 Date
 Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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

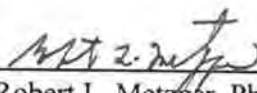
(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

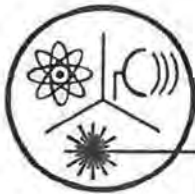
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: December 05, 2018
Sample Received: December 11, 2018
Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-MW67A-2518 (550-114629-4)	< 0.4	< 0.6	< 0.6
Date of Analysis	12/14/2018	12/14/2018	12/14/2018


Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
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

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

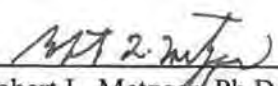
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: December 05, 2018
 Sample Received: December 11, 2018
 Analysis Completed: December 26, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD01-12518 (550-114629-5)	< 0.4	0.9 ± 0.3	0.9 ± 0.3

Date of Analysis	12/14/2018	12/14/2018	12/14/2018
------------------	------------	------------	------------


 Robert L. Metzger, Ph.D., C.H.P. 12/26/2018
 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)		Lab PM Baker, Kent		COC No. 550-23058.1					
Shipping/Receiving		E-Mail ken.baker@testamericainc.com		Page Page 1 of 1					
Radiation Safety Eng., Inc.		Accreditations Required (See note) State Program - Arizona		Job # 550-114629-1					
Address: 3245 North Washington Street, City Chandler State, Zip AZ, 85225 Phone		Due Date Requested: 12/19/2018 TAT Requested (days):		Preservation Codes: M - Hexane N - None O - AsNiO2 P - Na2OAS Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecylaldehyde U - Asulfone V - MCAA W - pH 4.5 X - EDTA L - EDA Other:					
Project Name APS - Cholla CCR Site Arizona Public Service		Project # 55009651 SSOW#		Analysis Requested					
Sample Date		Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Preserve, Dissolve, On-site/Off-site) BT-Trace, AA/B	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Sub (Radium 226/228/ Radium 226/228)	Total Number of Containers	Special Instructions/Note:
CH-CCR-W-126-125128 (550-114629-1)	12/5/18	13:49 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-MW66A-2518 (550-114629-2)	12/5/18	16:42 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-MW66A-2518 (550-114629-3)	12/5/18	14:58 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-MW67A-2518 (550-114629-4)	12/5/18	14:58 Arizona	Water	Water	X	X		2	Job 3
CH-CCR-FD01-12518 (550-114629-5)	12/5/18	13:49 Arizona	Water	Water	X	X		2	Job 3
<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/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)									
Empty Kit Returned by:									
Date:									
Primary Deliverable Rank: 2									
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)									
Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months									
Special Instructions/QC Requirements:									
Method of Shipment:									
Date/Time:									
Company:									
Date/Time:									
Company:									
Date/Time:									
Company:									
Cooler Temperature(s) °C and Other Remarks:									



TestAmerica Phoenix

4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

114629

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact: Doug Lavarway 928-587-0319
 Analysis Turnaround Time: _____
 TAT if different from Below: _____
 Project Name: CCR
 Site: Cholla
 P O #

Sample Identification	Sample Date	Sample Time	Sample Type (C=Cont, 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
CH-CCR-W-126-12518	12/6/2018	1349 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-MW65A-12518	12/5/2018	1642 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-MW66A-12518	12/5/2018	1458 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-MW67A-12518	12/5/2018	1548 G		W	2	N	X	X	X	X	X	X	X	X	X
CH-CCR-FD01-12518	12/5/2018	1349 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

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: _____

Cooler Temp. (°C): Obs'd: _____

Company: APS
 Date/Time: 12/6/18
 Received by: _____
 Received in Laboratory by: _____



Chain of Custody Record



THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Phoenix
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

114629

Regulatory Program:

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarway 928-587-0319
 Analysis Turnaround Time
 TAT if different from Below
 Lab Contact: Doug Lavarway
 Carrier: 12/9/2018
 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, Ti)	EPA 300.0 (F)
CH-CCR-W-126-12518	12/5/2018	1349	G	W	2	N	X	X	X	X
CH-CCR-MW65A-12518	12/5/2018	1642	G	W	2	N	X	X	X	X
CH-CCR-MW66A-12518	12/5/2018	1458	G	W	2	N	X	X	X	X
CH-CCR-MW67A-12518	12/5/2018	1548	G	W	2	N	X	X	X	X
CH-CCR-FD01-12518	12/5/2018	1349	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.

Special Instructions/QC Requirements & Comments:
 Non-Hazard
 Flammable
 Skin Irritant
 Poison 8
 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)
 2-2-e, 2-0-e, 1-8-e, 1-6-e

Custody Seals Intact: Yes No
 Relinquished by: Doug Lavarway
 Relinquished by: Company: TBS Date/Time: 12/10/18
 Relinquished by: Company: TAPHX TAPHS Date/Time: 12-10-18
 Relinquished by: Company: LAB Date/Time: 12-10-18
 Cooler Temp. (°C): Obs'd: Corrd:
 Therm ID No.:

Chain of Custody Record



THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Phoenix
 4625 E Colton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

114629

Regulatory Program: CCR

CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarnway	928-587-0319	Analysis Turnaround Time	Lab Contact:	Doug Lavarnway	Carrier:	12/9/2018	COC No.:	1 of 1 COCs
APS, Cholla	4801 Cholla Lake Road	Joseph City, Az 86032	(928) 587-0319	Phone	(xxx) xxx-xxxx	FAX	Project Name: CCR	Site: Cholla	P O #
TAT if different from Below									

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	932.0 Radium 226 and 228	Sample Specific Notes:
CH-CCR-W-126-12518	12/5/2018	1349 G	W	W	2	N	X	X	
CH-CCR-MMW65A-12518	12/5/2018	1642 G	W	W	2	N	X	X	
CH-CCR-MMW66A-12518	12/5/2018	1458 G	W	W	2	N	X	X	
CH-CCR-MMW67A-12518	12/5/2018	1548 G	W	W	2	N	X	X	
CH-CCR-FD01-12518	12/5/2018	1349 G	W	W	2	N	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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Relinquished by: *Doug Lavarnway* Company: *APS* Date/Time: *12/10/18*

Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *[Signature]*

Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *[Signature]*

Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *[Signature]*

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-114629-3

SDG Number: Cholla

Login Number: 114629

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: 550-99290-1

Client Project/Site: APP

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

3/16/2018 2:02:55 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

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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: APP

TestAmerica Job ID: 550-99290-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
E2	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
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
D1	Sample required dilution due to matrix.
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: APP

TestAmerica Job ID: 550-99290-1

Job ID: 550-99290-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-99290-1**

Comments

No additional comments.

Receipt

The samples were received on 3/9/2018 5:28 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° 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: APP

TestAmerica Job ID: 550-99290-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-99290-1	CH-CCR-CR1-3918	Water	03/09/18 09:41	03/09/18 17:28
550-99290-2	CH-CCR-DM5-3918	Water	03/09/18 09:13	03/09/18 17:28
550-99290-3	CH-CCR-M56A-3818	Water	03/08/18 12:11	03/09/18 17:28
550-99290-4	CH-CCR-M57A-3818	Water	03/08/18 11:45	03/09/18 17:28
550-99290-5	CH-CCR-M58A-3818	Water	03/08/18 11:17	03/09/18 17:28
550-99290-6	CH-CCR-M62A-3818	Water	03/08/18 12:45	03/09/18 17:28
550-99290-7	CH-CCR-FD01-3818	Water	03/08/18 11:17	03/09/18 17:28
550-99290-8	CH-CCR-W317-3818	Water	03/08/18 14:54	03/09/18 17:28



Detection Summary

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-CR1-3918

Lab Sample ID: 550-99290-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	280	D2	20	mg/L	10		300.0	Total/NA
Boron	0.16		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	2300	D2	40	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-DM5-3918

Lab Sample ID: 550-99290-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	21		2.0	mg/L	1		300.0	Total/NA
Boron	0.12		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	2600	D2	40	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-M56A-3818

Lab Sample ID: 550-99290-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	710	D2	20	mg/L	10		300.0	Total/NA
Boron	0.24		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	4000	D2	100	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-M57A-3818

Lab Sample ID: 550-99290-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1400	D2	100	mg/L	50		300.0	Total/NA
Boron	0.60		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	4900	D2	100	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-M58A-3818

Lab Sample ID: 550-99290-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	550	D2	40	mg/L	20		300.0	Total/NA
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	4200	D2	100	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-M62A-3818

Lab Sample ID: 550-99290-6

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	580	D2	40	mg/L	20		300.0	Total/NA
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	5700	D2	100	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-FD01-3818

Lab Sample ID: 550-99290-7

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	550	D2	40	mg/L	20		300.0	Total/NA
Boron	0.20		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	3700	D2	100	mg/L	1		SM 2540C	Total/NA

Client Sample ID: CH-CCR-W317-3818

Lab Sample ID: 550-99290-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	690	D2	40	mg/L	20		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Detection Summary

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-W317-3818 (Continued)

Lab Sample ID: 550-99290-8

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	3400	D2	100	mg/L	1		SM 2540C	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: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-CR1-3918

Date Collected: 03/09/18 09:41

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-1

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	280	D2	20	mg/L			03/13/18 22:32	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.16		0.050	mg/L		03/13/18 08:52	03/15/18 00:32	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2300	D2	40	mg/L			03/13/18 11:14	1

Client Sample ID: CH-CCR-DM5-3918

Date Collected: 03/09/18 09:13

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-2

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	21		2.0	mg/L			03/13/18 04:49	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.12		0.050	mg/L		03/13/18 08:52	03/15/18 00:35	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2600	D2	40	mg/L			03/13/18 11:14	1

Client Sample ID: CH-CCR-M56A-3818

Date Collected: 03/08/18 12:11

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-3

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	710	D2	20	mg/L			03/15/18 05:18	10

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.24		0.050	mg/L		03/13/18 08:52	03/15/18 00:40	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4000	D2	100	mg/L			03/13/18 08:39	1

Client Sample ID: CH-CCR-M57A-3818

Date Collected: 03/08/18 11:45

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-4

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1400	D2	100	mg/L			03/12/18 21:34	50

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-M57A-3818

Lab Sample ID: 550-99290-4

Date Collected: 03/08/18 11:45

Matrix: Water

Date Received: 03/09/18 17:28

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.60		0.050	mg/L		03/13/18 08:52	03/15/18 00:46	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4900	D2	100	mg/L			03/13/18 08:39	1

Client Sample ID: CH-CCR-M58A-3818

Lab Sample ID: 550-99290-5

Date Collected: 03/08/18 11:17

Matrix: Water

Date Received: 03/09/18 17:28

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	550	D2	40	mg/L			03/12/18 21:53	20

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		03/13/18 08:52	03/15/18 00:52	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4200	D2	100	mg/L			03/13/18 08:39	1

Client Sample ID: CH-CCR-M62A-3818

Lab Sample ID: 550-99290-6

Date Collected: 03/08/18 12:45

Matrix: Water

Date Received: 03/09/18 17:28

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	580	D2	40	mg/L			03/12/18 23:07	20

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		03/13/18 08:52	03/15/18 00:58	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5700	D2	100	mg/L			03/13/18 08:39	1

Client Sample ID: CH-CCR-FD01-3818

Lab Sample ID: 550-99290-7

Date Collected: 03/08/18 11:17

Matrix: Water

Date Received: 03/09/18 17:28

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	550	D2	40	mg/L			03/12/18 23:25	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.20		0.050	mg/L		03/13/18 08:52	03/15/18 01:04	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-FD01-3818

Lab Sample ID: 550-99290-7

Date Collected: 03/08/18 11:17

Matrix: Water

Date Received: 03/09/18 17:28

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3700	D2	100	mg/L			03/13/18 11:14	1

Client Sample ID: CH-CCR-W317-3818

Lab Sample ID: 550-99290-8

Date Collected: 03/08/18 14:54

Matrix: Water

Date Received: 03/09/18 17:28

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	690	D2	40	mg/L			03/12/18 23:43	20

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		03/13/18 08:52	03/15/18 01:10	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3400	D2	100	mg/L			03/13/18 11:14	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-141588/19
Matrix: Water
Analysis Batch: 141588

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	mg/L			03/12/18 22:53	1

Lab Sample ID: LCS 550-141588/6
Matrix: Water
Analysis Batch: 141588

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	20.9		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-141588/7
Matrix: Water
Analysis Batch: 141588

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
Sulfate	20.0	20.9		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-99355-A-1 MS
Matrix: Water
Analysis Batch: 141588

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	62		20.0	82.1		mg/L		101	80 - 120

Lab Sample ID: 550-99355-A-1 MSD
Matrix: Water
Analysis Batch: 141588

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	62		20.0	82.8		mg/L		105	80 - 120	1	20

Lab Sample ID: MB 550-141601/2
Matrix: Water
Analysis Batch: 141601

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	mg/L			03/12/18 13:54	1

Lab Sample ID: LCS 550-141601/5
Matrix: Water
Analysis Batch: 141601

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	20.9		mg/L		105	90 - 110

Lab Sample ID: LCSD 550-141601/6
Matrix: Water
Analysis Batch: 141601

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
Sulfate	20.0	20.9		mg/L		105	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Lab Sample ID: 550-99289-A-1 MS ^2
Matrix: Water
Analysis Batch: 141601

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	1600	E2 M3 D1	40.0	1600	D1 E2 M3	mg/L		-8	80 - 120

Lab Sample ID: 550-99289-A-1 MSD ^2
Matrix: Water
Analysis Batch: 141601

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	1600	E2 M3 D1	40.0	1550	D1 E2 M3	mg/L		-114	80 - 120	3	20

Lab Sample ID: MB 550-141686/2
Matrix: Water
Analysis Batch: 141686

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	mg/L			03/13/18 14:18	1

Lab Sample ID: LCS 550-141686/5
Matrix: Water
Analysis Batch: 141686

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	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-141686/6
Matrix: Water
Analysis Batch: 141686

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
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-99290-1 MS
Matrix: Water
Analysis Batch: 141686

Client Sample ID: CH-CCR-CR1-3918
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	280	D2	200	484	D2	mg/L		104	80 - 120

Lab Sample ID: 550-99290-1 MSD
Matrix: Water
Analysis Batch: 141686

Client Sample ID: CH-CCR-CR1-3918
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	280	D2	200	479	D2	mg/L		101	80 - 120	1	20

Lab Sample ID: MB 550-141838/2
Matrix: Water
Analysis Batch: 141838

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	mg/L			03/14/18 12:52	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-141838/5
Matrix: Water
Analysis Batch: 141838

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	20.8		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-141838/6
Matrix: Water
Analysis Batch: 141838

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
Sulfate	20.0	20.9		mg/L		105	90 - 110	1	20

Lab Sample ID: 550-99446-A-1 MS
Matrix: Water
Analysis Batch: 141838

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	9.3		20.0	29.7		mg/L		102	80 - 120

Lab Sample ID: 550-99446-A-1 MSD
Matrix: Water
Analysis Batch: 141838

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	9.3		20.0	30.4		mg/L		106	80 - 120	2	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-141617/1-A
Matrix: Water
Analysis Batch: 141879

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 141617

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		03/13/18 08:52	03/15/18 00:18	1

Lab Sample ID: LCS 550-141617/2-A
Matrix: Water
Analysis Batch: 141879

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 141617

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.958		mg/L		96	85 - 115

Lab Sample ID: LCSD 550-141617/3-A
Matrix: Water
Analysis Batch: 141879

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 141617

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.00	0.973		mg/L		97	85 - 115	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

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

Lab Sample ID: 550-99290-1 MS

Matrix: Water

Analysis Batch: 141879

Client Sample ID: CH-CCR-CR1-3918

Prep Type: Total/NA

Prep Batch: 141617

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	0.16		1.00	1.15		mg/L		99	70 - 130

Lab Sample ID: 550-99290-1 MSD

Matrix: Water

Analysis Batch: 141879

Client Sample ID: CH-CCR-CR1-3918

Prep Type: Total/NA

Prep Batch: 141617

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	0.16		1.00	1.15		mg/L		99	70 - 130	0	20

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

Lab Sample ID: MB 550-141615/1

Matrix: Water

Analysis Batch: 141615

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			03/13/18 08:39	1

Lab Sample ID: LCS 550-141615/2

Matrix: Water

Analysis Batch: 141615

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	1000	1020		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-141615/3

Matrix: Water

Analysis Batch: 141615

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Dissolved Solids	1000	1010		mg/L		101	90 - 110	1	10

Lab Sample ID: 550-99235-E-4 DU

Matrix: Water

Analysis Batch: 141615

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	1900		1890		mg/L		2	10

Lab Sample ID: MB 550-141646/1

Matrix: Water

Analysis Batch: 141646

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			03/13/18 11:14	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

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

Lab Sample ID: LCS 550-141646/2
Matrix: Water
Analysis Batch: 141646

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	962		mg/L		96	90 - 110

Lab Sample ID: LCSD 550-141646/3
Matrix: Water
Analysis Batch: 141646

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	988		mg/L		99	90 - 110	3	10

Lab Sample ID: 550-99259-A-6 DU
Matrix: Water
Analysis Batch: 141646

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	4500	D1	4270	D1	mg/L		6	10

Lab Sample ID: 550-99290-1 DU
Matrix: Water
Analysis Batch: 141646

Client Sample ID: CH-CCR-CR1-3918
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	2300	D2	2250	D2	mg/L		0.9	10

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

HPLC/IC

Analysis Batch: 141588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-2	CH-CCR-DM5-3918	Total/NA	Water	300.0	
MB 550-141588/19	Method Blank	Total/NA	Water	300.0	
LCS 550-141588/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-141588/7	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99355-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-99355-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 141601

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-4	CH-CCR-M57A-3818	Total/NA	Water	300.0	
550-99290-5	CH-CCR-M58A-3818	Total/NA	Water	300.0	
550-99290-6	CH-CCR-M62A-3818	Total/NA	Water	300.0	
550-99290-7	CH-CCR-FD01-3818	Total/NA	Water	300.0	
550-99290-8	CH-CCR-W317-3818	Total/NA	Water	300.0	
MB 550-141601/2	Method Blank	Total/NA	Water	300.0	
LCS 550-141601/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-141601/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99289-A-1 MS ^2	Matrix Spike	Total/NA	Water	300.0	
550-99289-A-1 MSD ^2	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 141686

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-1	CH-CCR-CR1-3918	Total/NA	Water	300.0	
MB 550-141686/2	Method Blank	Total/NA	Water	300.0	
LCS 550-141686/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-141686/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99290-1 MS	CH-CCR-CR1-3918	Total/NA	Water	300.0	
550-99290-1 MSD	CH-CCR-CR1-3918	Total/NA	Water	300.0	

Analysis Batch: 141838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-3	CH-CCR-M56A-3818	Total/NA	Water	300.0	
MB 550-141838/2	Method Blank	Total/NA	Water	300.0	
LCS 550-141838/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-141838/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-99446-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-99446-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 141617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-1	CH-CCR-CR1-3918	Total/NA	Water	200.7	
550-99290-2	CH-CCR-DM5-3918	Total/NA	Water	200.7	
550-99290-3	CH-CCR-M56A-3818	Total/NA	Water	200.7	
550-99290-4	CH-CCR-M57A-3818	Total/NA	Water	200.7	
550-99290-5	CH-CCR-M58A-3818	Total/NA	Water	200.7	
550-99290-6	CH-CCR-M62A-3818	Total/NA	Water	200.7	
550-99290-7	CH-CCR-FD01-3818	Total/NA	Water	200.7	
550-99290-8	CH-CCR-W317-3818	Total/NA	Water	200.7	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Metals (Continued)

Prep Batch: 141617 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-141617/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-141617/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-141617/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-99290-1 MS	CH-CCR-CR1-3918	Total/NA	Water	200.7	
550-99290-1 MSD	CH-CCR-CR1-3918	Total/NA	Water	200.7	

Analysis Batch: 141879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-1	CH-CCR-CR1-3918	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-2	CH-CCR-DM5-3918	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-3	CH-CCR-M56A-3818	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-4	CH-CCR-M57A-3818	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-5	CH-CCR-M58A-3818	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-6	CH-CCR-M62A-3818	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-7	CH-CCR-FD01-3818	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-8	CH-CCR-W317-3818	Total/NA	Water	200.7 Rev 4.4	141617
MB 550-141617/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	141617
LCS 550-141617/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	141617
LCSD 550-141617/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-1 MS	CH-CCR-CR1-3918	Total/NA	Water	200.7 Rev 4.4	141617
550-99290-1 MSD	CH-CCR-CR1-3918	Total/NA	Water	200.7 Rev 4.4	141617

General Chemistry

Analysis Batch: 141615

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-3	CH-CCR-M56A-3818	Total/NA	Water	SM 2540C	
550-99290-4	CH-CCR-M57A-3818	Total/NA	Water	SM 2540C	
550-99290-5	CH-CCR-M58A-3818	Total/NA	Water	SM 2540C	
550-99290-6	CH-CCR-M62A-3818	Total/NA	Water	SM 2540C	
MB 550-141615/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-141615/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-141615/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-99235-E-4 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 141646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-99290-1	CH-CCR-CR1-3918	Total/NA	Water	SM 2540C	
550-99290-2	CH-CCR-DM5-3918	Total/NA	Water	SM 2540C	
550-99290-7	CH-CCR-FD01-3818	Total/NA	Water	SM 2540C	
550-99290-8	CH-CCR-W317-3818	Total/NA	Water	SM 2540C	
MB 550-141646/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-141646/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-141646/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-99259-A-6 DU	Duplicate	Total/NA	Water	SM 2540C	
550-99290-1 DU	CH-CCR-CR1-3918	Total/NA	Water	SM 2540C	

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-CR1-3918

Date Collected: 03/09/18 09:41

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	141686	03/13/18 22:32	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 00:32	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141646		YET	TAL PHX
					(Start)	03/13/18 11:14		
					(End)	03/14/18 12:10		

Client Sample ID: CH-CCR-DM5-3918

Date Collected: 03/09/18 09:13

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	141588	03/13/18 04:49	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 00:35	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141646		YET	TAL PHX
					(Start)	03/13/18 11:14		
					(End)	03/14/18 12:10		

Client Sample ID: CH-CCR-M56A-3818

Date Collected: 03/08/18 12:11

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	141838	03/15/18 05:18	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 00:40	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141615		YET	TAL PHX
					(Start)	03/13/18 08:39		
					(End)	03/14/18 11:55		

Client Sample ID: CH-CCR-M57A-3818

Date Collected: 03/08/18 11:45

Date Received: 03/09/18 17:28

Lab Sample ID: 550-99290-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		50	141601	03/12/18 21:34	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 00:46	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141615		YET	TAL PHX
					(Start)	03/13/18 08:39		
					(End)	03/14/18 11:55		

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

Client Sample ID: CH-CCR-M58A-3818

Lab Sample ID: 550-99290-5

Date Collected: 03/08/18 11:17

Matrix: Water

Date Received: 03/09/18 17:28

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	141601	03/12/18 21:53	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 00:52	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141615	03/13/18 08:39 03/14/18 11:55	YET	TAL PHX

Client Sample ID: CH-CCR-M62A-3818

Lab Sample ID: 550-99290-6

Date Collected: 03/08/18 12:45

Matrix: Water

Date Received: 03/09/18 17:28

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	141601	03/12/18 23:07	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 00:58	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141615	03/13/18 08:39 03/14/18 11:55	YET	TAL PHX

Client Sample ID: CH-CCR-FD01-3818

Lab Sample ID: 550-99290-7

Date Collected: 03/08/18 11:17

Matrix: Water

Date Received: 03/09/18 17:28

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	141601	03/12/18 23:25	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 01:04	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141646	03/13/18 11:14 03/14/18 12:10	YET	TAL PHX

Client Sample ID: CH-CCR-W317-3818

Lab Sample ID: 550-99290-8

Date Collected: 03/08/18 14:54

Matrix: Water

Date Received: 03/09/18 17:28

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	141601	03/12/18 23:43	NBL	TAL PHX
Total/NA	Prep	200.7			141617	03/13/18 08:52	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	141879	03/15/18 01:10	ARE	TAL PHX
Total/NA	Analysis	SM 2540C		1	141646	03/13/18 11:14 03/14/18 12:10	YET	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APP

TestAmerica Job ID: 550-99290-1

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: APP

TestAmerica Job ID: 550-99290-1

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: APP

TestAmerica Job ID: 550-99290-1

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

Protocol References:

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

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
 4645 E Cotton Cir Blvd Bldg 3
 Phoenix, AZ 85040

phone 602.437.3340 fax 623.445.6192

99290

Chain of Custody Record

TestAmerica Laboratories, Inc.

Client Contact: **Doug Lavarnway** Project Manager: **Doug Lavarnway** Site Contact: **Doug Lavarnway** Carrier: **3/9/2018** COC No: **1 of 1 COCs**

PO Box 188 Joseph city, Az 86032 Analysis Turnaround Time: **Calendar (C) or Work Days (W)** Job No. **1**

Phone: **TAT if different from Below** Fax: **2 weeks** SDG No. **1**

Project Name: **APP** 1 week E-Mail Address: **2 days** 2 days 1 day

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Perform MS / MSD (Y / N)
CH-CCR-CR1-3918	3/9/2018	941	G	W	3	N	X
CH-CCR-DM5-3918	3/9/2018	913	G	W	3	N	X
CH-CCR-M56A-3818	3/8/2018	1211	G	W	3	N	X
CH-CCR-M57A-3818	3/8/2018	1145	G	W	3	N	X
CH-CCR-M58A-3818	3/8/2018	1117	G	W	3	N	X
CH-CCR-M62A-3818	3/8/2018	1245	G	W	3	N	X
CH-CCR-FD01-3818	3/8/2018	1117	G	W	3	N	X
CH-CCR-FD01-3818	3/8/2018	1454	G	W	3	N	X

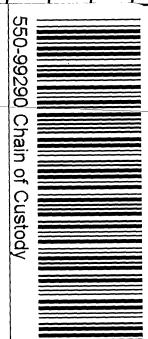
Possible Hazard Identification: **Flammable** **Skin Irritant** **Poison B** **Unknown**

Special Instructions/OC Requirements & Comments: **Return To Client** **Dispose By Lab** **Archive For** **Months**

Relinquished by: **Debra** Company: **APS** Date/Time: **3/9/2018** Received by: **[Signature]** Company: **RL** Date/Time: **3/9/2018**

Relinquished by: **[Signature]** Company: **APS** Date/Time: **3/9/2018** Received by: **[Signature]** Company: **RL** Date/Time: **3/9/2018**

Relinquished by: **[Signature]** Company: **APS** Date/Time: **3/9/2018** Received by: **[Signature]** Company: **RL** Date/Time: **3/9/2018**



1500 RC

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-99290-1

Login Number: 99290
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.	False	Refer to Job Narrative for details.
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: 550-103239-1

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

5/31/2018 2:11:40 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

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results through

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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: 550-103239-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
E2	Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
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.

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.
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.
B1	Target analyte detected in method blank at or above the method reporting limit.

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: 550-103239-1

Job ID: 550-103239-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103239-1**

Comments

No additional comments.

Receipt

The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.1° C and 4.6° 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: CH-CCR-FD02-52118 (550-103239-3). Sample contained high concentrations of Chloride and Sulfate which contributed to a total sum of anions that exceeded the instrument's column capacity. Therefore, a dilution was required to bring anion levels within a working range and Fluoride was not detected in the diluted sample. An elevated reporting limit (RL) has been provided and data has 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) 200.7 Rev 4.4: The continuing calibration blank (CCB) for analytical batch 550-148212 contained Sodium above the reporting limit (RL). All reported samples associated with this CCB contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

Method(s) 200.7 Rev 4.4: The method blank for preparation batch 550-147956 and analytical batch 550-148212 contained Sodium above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

No additional analytical or quality issues were noted, other than those described above or 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: 550-103239-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103239-1	CH-CCR-M-56A-52118	Water	05/21/18 12:01	05/22/18 09:25
550-103239-2	CH-CCR-M-57A-52118	Water	05/21/18 12:33	05/22/18 09:25
550-103239-3	CH-CCR-FD02-52118	Water	05/21/18 12:33	05/22/18 09:25
550-103239-4	CH-CCR-M-58A-52118	Water	05/21/18 13:18	05/22/18 09:25
550-103239-5	CH-CCR-M-62A-52118	Water	05/21/18 13:50	05/22/18 09:25

- 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: 550-103239-1

Client Sample ID: CH-CCR-M-56A-52118

Lab Sample ID: 550-103239-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1900	D2	100	mg/L	50		300.0	Total/NA
Sulfate	710	D2	100	mg/L	50		300.0	Total/NA
Boron	0.25		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	270	M3	2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	87		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	7.4		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1100	B7 M3	0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Alkalinity as CaCO3	200		6.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	200		6.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	4100	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.1	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1900	D2	100	mg/L	50		300.0	Total/NA
Sulfate	1200	D2	100	mg/L	50		300.0	Total/NA
Boron	0.59		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	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	6.2		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1100	B7	0.50	mg/L	1		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	4800	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.0	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	20.9	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-FD02-52118

Lab Sample ID: 550-103239-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1900	D2	200	mg/L	100		300.0	Total/NA
Sulfate	1200	D2	200	mg/L	100		300.0	Total/NA
Boron	0.60		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	120		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	6.3		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1100	B7	0.50	mg/L	1		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	4900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000		100	mg/L	50		300.0	Total/NA
Sulfate	520		100	mg/L	50		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: 550-103239-1

Client Sample ID: CH-CCR-M-58A-52118 (Continued)

Lab Sample ID: 550-103239-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	290		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Magnesium	110		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	7.3		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	940	B7	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	3900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-62A-52118

Lab Sample ID: 550-103239-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3000		100	mg/L	50		300.0	Total/NA
Sulfate	560		100	mg/L	50		300.0	Total/NA
Boron	0.22		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	160		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Potassium	7.9		0.50	mg/L	1		200.7 Rev 4.4	Total/NA
Sodium	1200	B7	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	5500	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.4	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	21.2	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: 550-103239-1

Client Sample ID: CH-CCR-M-56A-52118

Lab Sample ID: 550-103239-1

Date Collected: 05/21/18 12:01

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1900	D2	100	mg/L			05/25/18 00:38	50
Fluoride	ND		0.40	mg/L			05/25/18 00:11	1
Sulfate	710	D2	100	mg/L			05/25/18 00:38	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.25		0.050	mg/L		05/23/18 08:28	05/24/18 21:39	1
Calcium	270	M3	2.0	mg/L		05/23/18 08:28	05/24/18 21:39	1
Magnesium	87		2.0	mg/L		05/23/18 08:28	05/24/18 21:39	1
Potassium	7.4		0.50	mg/L		05/23/18 08:28	05/24/18 21:39	1
Sodium	1100	B7 M3	0.50	mg/L		05/23/18 08:28	05/24/18 21:39	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	200		6.0	mg/L			05/23/18 12:57	1
Bicarbonate Alkalinity as CaCO3	200		6.0	mg/L			05/23/18 12:57	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:57	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 12:57	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 12:57	1
Total Dissolved Solids	4100	D2	100	mg/L			05/23/18 08:22	1
pH	7.4	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.1	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1900	D2	100	mg/L			05/24/18 05:53	50
Fluoride	ND		0.40	mg/L			05/24/18 05:26	1
Sulfate	1200	D2	100	mg/L			05/24/18 05:53	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.59		0.050	mg/L		05/23/18 08:28	05/24/18 22:43	1
Calcium	410		2.0	mg/L		05/23/18 08:28	05/24/18 22:43	1
Magnesium	120		2.0	mg/L		05/23/18 08:28	05/24/18 22:43	1
Potassium	6.2		0.50	mg/L		05/23/18 08:28	05/24/18 22:43	1
Sodium	1100	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:43	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	270		6.0	mg/L			05/23/18 13:16	1
Bicarbonate Alkalinity as CaCO3	270		6.0	mg/L			05/23/18 13:16	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:16	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 13:16	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:16	1
Total Dissolved Solids	4800	D2	100	mg/L			05/23/18 08:22	1
pH	7.0	H5	1.7	SU			05/23/18 09:50	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Temperature	20.9	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-FD02-52118

Lab Sample ID: 550-103239-3

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1900	D2	200	mg/L			05/23/18 05:40	100
Fluoride	ND	D1 D5	0.80	mg/L			05/23/18 05:22	2
Sulfate	1200	D2	200	mg/L			05/23/18 05:40	100

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.60		0.050	mg/L		05/23/18 08:28	05/24/18 22:49	1
Calcium	430		2.0	mg/L		05/23/18 08:28	05/24/18 22:49	1
Magnesium	120		2.0	mg/L		05/23/18 08:28	05/24/18 22:49	1
Potassium	6.3		0.50	mg/L		05/23/18 08:28	05/24/18 22:49	1
Sodium	1100	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:49	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	270		6.0	mg/L			05/23/18 13:25	1
Bicarbonate Alkalinity as CaCO3	270		6.0	mg/L			05/23/18 13:25	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:25	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 13:25	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:25	1
Total Dissolved Solids	4900	D2	100	mg/L			05/23/18 11:24	1
pH	7.1	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Date Collected: 05/21/18 13:18

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000		100	mg/L			05/24/18 07:43	50
Fluoride	ND		0.40	mg/L			05/24/18 07:15	1
Sulfate	520		100	mg/L			05/24/18 07:43	50

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		05/23/18 08:28	05/24/18 22:55	1
Calcium	290		2.0	mg/L		05/23/18 08:28	05/24/18 22:55	1
Magnesium	110		2.0	mg/L		05/23/18 08:28	05/24/18 22:55	1
Potassium	7.3		0.50	mg/L		05/23/18 08:28	05/24/18 22:55	1
Sodium	940	B7	0.50	mg/L		05/23/18 08:28	05/24/18 22:55	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Date Collected: 05/21/18 13:18

Matrix: Water

Date Received: 05/22/18 09:25

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	190		6.0	mg/L			05/23/18 13:34	1
Bicarbonate Alkalinity as CaCO3	190		6.0	mg/L			05/23/18 13:34	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:34	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 13:34	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:34	1
Total Dissolved Solids	3900	D2	100	mg/L			05/23/18 11:24	1
pH	7.4	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

Client Sample ID: CH-CCR-M-62A-52118

Lab Sample ID: 550-103239-5

Date Collected: 05/21/18 13:50

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3000		100	mg/L			05/24/18 08:38	50
Fluoride	ND		0.40	mg/L			05/24/18 08:10	1
Sulfate	560		100	mg/L			05/24/18 08:38	50

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		05/23/18 08:28	05/24/18 23:01	1
Calcium	450		2.0	mg/L		05/23/18 08:28	05/24/18 23:01	1
Magnesium	160		2.0	mg/L		05/23/18 08:28	05/24/18 23:01	1
Potassium	7.9		0.50	mg/L		05/23/18 08:28	05/24/18 23:01	1
Sodium	1200	B7	0.50	mg/L		05/23/18 08:28	05/24/18 23:01	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	190		6.0	mg/L			05/23/18 13:43	1
Bicarbonate Alkalinity as CaCO3	190		6.0	mg/L			05/23/18 13:43	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:43	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 13:43	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 13:43	1
Total Dissolved Solids	5500	D2	100	mg/L			05/23/18 11:24	1
pH	7.4	H5	1.7	SU			05/23/18 09:50	1
Temperature	21.2	H5	0.1	Degrees C			05/23/18 09:50	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148002/2

Matrix: Water

Analysis Batch: 148002

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			05/22/18 19:14	1
Fluoride	ND		0.40	mg/L			05/22/18 19:14	1
Sulfate	ND		2.0	mg/L			05/22/18 19:14	1

Lab Sample ID: LCS 550-148002/5

Matrix: Water

Analysis Batch: 148002

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	21.1		mg/L		106	90 - 110
Fluoride	4.00	4.14		mg/L		104	90 - 110
Sulfate	20.0	20.4		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-148002/6

Matrix: Water

Analysis Batch: 148002

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	4.14		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-103292-C-1 MS

Matrix: Water

Analysis Batch: 148002

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	21		20.0	41.5		mg/L		104	80 - 120
Fluoride	2.1		4.00	6.27		mg/L		105	80 - 120
Sulfate	260	E2 M3	20.0	263	E2 M3	mg/L		16	80 - 120

Lab Sample ID: 550-103292-C-1 MSD

Matrix: Water

Analysis Batch: 148002

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	21		20.0	41.5		mg/L		104	80 - 120	0	20
Fluoride	2.1		4.00	6.27		mg/L		105	80 - 120	0	20
Sulfate	260	E2 M3	20.0	263	E2 M3	mg/L		17	80 - 120	0	20

Lab Sample ID: MB 550-148063/2

Matrix: Water

Analysis Batch: 148063

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			05/23/18 13:27	1
Fluoride	ND		0.40	mg/L			05/23/18 13:27	1
Sulfate	ND		2.0	mg/L			05/23/18 13:27	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 550-148063/5
Matrix: Water
Analysis Batch: 148063

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	20.5		mg/L		102	90 - 110
Fluoride	4.00	4.20		mg/L		105	90 - 110
Sulfate	20.0	20.8		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148063/6
Matrix: Water
Analysis Batch: 148063

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	4.20		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.8		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103304-B-1 MS
Matrix: Water
Analysis Batch: 148063

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	13		20.0	35.2		mg/L		109	80 - 120
Fluoride	ND		4.00	4.35		mg/L		105	80 - 120
Sulfate	9.0		20.0	29.9		mg/L		105	80 - 120

Lab Sample ID: 550-103304-B-1 MSD
Matrix: Water
Analysis Batch: 148063

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	13		20.0	35.2		mg/L		109	80 - 120	0	20
Fluoride	ND		4.00	4.39		mg/L		106	80 - 120	1	20
Sulfate	9.0		20.0	30.1		mg/L		106	80 - 120	1	20

Lab Sample ID: MB 550-148170/2
Matrix: Water
Analysis Batch: 148170

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			05/24/18 15:03	1
Fluoride	ND		0.40	mg/L			05/24/18 15:03	1
Sulfate	ND		2.0	mg/L			05/24/18 15:03	1

Lab Sample ID: LCS 550-148170/5
Matrix: Water
Analysis Batch: 148170

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	20.6		mg/L		103	90 - 110
Fluoride	4.00	4.20		mg/L		105	90 - 110
Sulfate	20.0	20.9		mg/L		104	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 550-148170/6
Matrix: Water
Analysis Batch: 148170

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	20.6		mg/L		103	90 - 110	0	20
Fluoride	4.00	4.22		mg/L		105	90 - 110	0	20
Sulfate	20.0	20.9		mg/L		105	90 - 110	0	20

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148170

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1900	D2	1000	3020	D2	mg/L		115	80 - 120		
Fluoride	ND	D1 D5	200	210	D1	mg/L		105	80 - 120		
Sulfate	710	D2	1000	1760	D2	mg/L		105	80 - 120		

Lab Sample ID: 550-103239-1 MSD
Matrix: Water
Analysis Batch: 148170

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1900	D2	1000	3000	D2	mg/L		113	80 - 120	1	20
Fluoride	ND	D1 D5	200	208	D1	mg/L		104	80 - 120	1	20
Sulfate	710	D2	1000	1740	D2	mg/L		104	80 - 120	1	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		05/23/18 08:28	05/24/18 21:02	1
Calcium	ND		2.0	mg/L		05/23/18 08:28	05/24/18 21:02	1
Magnesium	ND		2.0	mg/L		05/23/18 08:28	05/24/18 21:02	1
Potassium	ND		0.50	mg/L		05/23/18 08:28	05/24/18 21:02	1
Sodium	0.721	B1	0.50	mg/L		05/23/18 08:28	05/24/18 21:02	1

Lab Sample ID: LCS 550-147956/2-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.00	0.952		mg/L		95	85 - 115		
Calcium	21.0	20.7		mg/L		99	85 - 115		
Magnesium	21.0	20.7		mg/L		99	85 - 115		
Potassium	20.0	19.2		mg/L		96	85 - 115		
Sodium	20.0	19.6		mg/L		98	85 - 115		

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

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

Lab Sample ID: LCSD 550-147956/3-A
Matrix: Water
Analysis Batch: 148212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.00	0.966		mg/L		97	85 - 115	2	20
Calcium	21.0	20.9		mg/L		100	85 - 115	1	20
Magnesium	21.0	20.8		mg/L		99	85 - 115	1	20
Potassium	20.0	19.3		mg/L		96	85 - 115	0	20
Sodium	20.0	19.4		mg/L		97	85 - 115	1	20

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	0.25		1.00	1.27		mg/L		102	70 - 130		
Calcium	270	M3	21.0	277	M3	mg/L		20	70 - 130		
Magnesium	87		21.0	102	M3	mg/L		71	70 - 130		
Potassium	7.4		20.0	27.0		mg/L		98	70 - 130		
Sodium	1100	M3 B7	20.0	1010	M3	mg/L		-360	70 - 130		

Lab Sample ID: 550-103239-1 MSD
Matrix: Water
Analysis Batch: 148212

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	0.25		1.00	1.26		mg/L		101	70 - 130	1	20
Calcium	270	M3	21.0	278	M3	mg/L		24	70 - 130	0	20
Magnesium	87		21.0	102	M3	mg/L		74	70 - 130	1	20
Potassium	7.4		20.0	27.1		mg/L		98	70 - 130	0	20
Sodium	1100	M3 B7	20.0	1030	M3	mg/L		-294	70 - 130	1	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 550-148038/5
Matrix: Water
Analysis Batch: 148038

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			05/23/18 10:42	1
Bicarbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1
Carbonate Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1
Alkalinity, Phenolphthalein	ND		6.0	mg/L			05/23/18 10:42	1
Hydroxide Alkalinity as CaCO3	ND		6.0	mg/L			05/23/18 10:42	1

Lab Sample ID: LCSD 550-148038/17
Matrix: Water
Analysis Batch: 148038

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	260		mg/L		104	90 - 110	3	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 550-103239-1 DU

Matrix: Water

Analysis Batch: 148038

Client Sample ID: CH-CCR-M-56A-52118

Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity as CaCO3	200		204		mg/L		0.6	20
Bicarbonate Alkalinity as CaCO3	200		204		mg/L		0.6	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

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

Lab Sample ID: MB 550-147955/1

Matrix: Water

Analysis Batch: 147955

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Dissolved Solids	ND		20	mg/L			05/23/18 08:22	1

Lab Sample ID: LCS 550-147955/2

Matrix: Water

Analysis Batch: 147955

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Total Dissolved Solids	1000	976		mg/L		98	90 - 110

Lab Sample ID: LCSD 550-147955/3

Matrix: Water

Analysis Batch: 147955

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	Limit
		Result	Qualifier						
Total Dissolved Solids	1000	986		mg/L		99	90 - 110	1	10

Lab Sample ID: 550-103239-1 DU

Matrix: Water

Analysis Batch: 147955

Client Sample ID: CH-CCR-M-56A-52118

Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	4100	D2	4000	D2	mg/L		1	10

Lab Sample ID: MB 550-147986/1

Matrix: Water

Analysis Batch: 147986

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Total Dissolved Solids	ND		20	mg/L			05/23/18 11:24	1

Lab Sample ID: LCS 550-147986/2

Matrix: Water

Analysis Batch: 147986

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Total Dissolved Solids	1000	966		mg/L		97	90 - 110

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

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

Lab Sample ID: LCSD 550-147986/3
Matrix: Water
Analysis Batch: 147986

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	972		mg/L		97	90 - 110	1	10

Lab Sample ID: 550-103240-A-1 DU
Matrix: Water
Analysis Batch: 147986

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	7900	D2	7920	D2	mg/L		0.1	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-147966/1
Matrix: Water
Analysis Batch: 147966

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		100.6	98.5 - 101.5

Lab Sample ID: LCSSRM 550-147966/13
Matrix: Water
Analysis Batch: 147966

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 550-147966/25
Matrix: Water
Analysis Batch: 147966

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: 550-103239-1 DU
Matrix: Water
Analysis Batch: 147966

Client Sample ID: CH-CCR-M-56A-52118
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	21.1	H5	21.1	H5	Degrees C		0	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

HPLC/IC

Analysis Batch: 148002

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	300.0	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	300.0	
MB 550-148002/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148002/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148002/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103292-C-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-103292-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 148063

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	300.0	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	300.0	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	300.0	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	300.0	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	300.0	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	300.0	
MB 550-148063/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148063/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148063/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103304-B-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-103304-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 148170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	300.0	
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	300.0	
MB 550-148170/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148170/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148170/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	300.0	
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	300.0	

Metals

Prep Batch: 147956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	200.7	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	200.7	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	200.7	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	200.7	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	200.7	
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	200.7	
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	200.7	

Analysis Batch: 148212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	200.7 Rev 4.4	147956

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Metals (Continued)

Analysis Batch: 148212 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	200.7 Rev 4.4	147956
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	200.7 Rev 4.4	147956

General Chemistry

Analysis Batch: 147955

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	SM 2540C	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	SM 2540C	
MB 550-147955/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-147955/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCS 550-147955/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103239-1 DU	CH-CCR-M-56A-52118	Total/NA	Water	SM 2540C	

Analysis Batch: 147966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	SM 4500 H+ B	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	SM 4500 H+ B	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	SM 4500 H+ B	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	SM 4500 H+ B	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-147966/25	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-103239-1 DU	CH-CCR-M-56A-52118	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 147986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	SM 2540C	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	SM 2540C	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	SM 2540C	
MB 550-147986/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-147986/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCS 550-147986/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-103240-A-1 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 148038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	SM 2320B	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	SM 2320B	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	SM 2320B	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	SM 2320B	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	SM 2320B	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

General Chemistry (Continued)

Analysis Batch: 148038 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 550-148038/5	Method Blank	Total/NA	Water	SM 2320B	
LCSD 550-148038/17	Lab Control Sample Dup	Total/NA	Water	SM 2320B	
550-103239-1 DU	CH-CCR-M-56A-52118	Total/NA	Water	SM 2320B	

- 1
- 2
- 3
- 4
- 5
- 6
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Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Client Sample ID: CH-CCR-M-56A-52118

Lab Sample ID: 550-103239-1

Date Collected: 05/21/18 12:01

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148170	05/25/18 00:11	NEL	TAL PHX
Total/NA	Analysis	300.0		50	148170	05/25/18 00:38	NEL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 21:39	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 12:57	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955		YET	TAL PHX
					(Start)	05/23/18 08:22		
					(End)	05/24/18 10:30		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148063	05/24/18 05:26	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148063	05/24/18 05:53	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:43	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 13:16	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147955		YET	TAL PHX
					(Start)	05/23/18 08:22		
					(End)	05/24/18 10:30		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-FD02-52118

Lab Sample ID: 550-103239-3

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148002	05/23/18 05:22	NBL	TAL PHX
Total/NA	Analysis	300.0		100	148002	05/23/18 05:40	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:49	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 13:25	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147986		YET	TAL PHX
					(Start)	05/23/18 11:24		
					(End)	05/24/18 11:05		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Date Collected: 05/21/18 13:18

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148063	05/24/18 07:15	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148063	05/24/18 07:43	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 22:55	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 13:34	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147986		YET	TAL PHX
						(Start) 05/23/18 11:24		
						(End) 05/24/18 11:05		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	BDN	TAL PHX

Client Sample ID: CH-CCR-M-62A-52118

Lab Sample ID: 550-103239-5

Date Collected: 05/21/18 13:50

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148063	05/24/18 08:10	NBL	TAL PHX
Total/NA	Analysis	300.0		50	148063	05/24/18 08:38	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148212	05/24/18 23:01	ARE	TAL PHX
Total/NA	Analysis	SM 2320B		1	148038	05/23/18 13:43	DGS	TAL PHX
Total/NA	Analysis	SM 2540C		1	147986		YET	TAL PHX
						(Start) 05/23/18 11:24		
						(End) 05/24/18 11:05		
Total/NA	Analysis	SM 4500 H+ B		1	147966	05/23/18 09:50	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: 550-103239-1

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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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-1

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
 4625 E Cotton Center Blvd
 Suite 189
 Phoenix, AZ 85040
 phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

103239-1

Regulatory Program: CCR

Client Contact: Doug Lavarnway
 928-587-0319

Lab Contact: Doug Lavarnway
 5/21/2018

Carrier: 5/21/2018

TestAmerica Laboratories, Inc.
 COC No: 1 of 1 COCs

APS Cholla
 4801 Cholla Lake Road
 Joseph City, AZ 86032
 (928) 587-0319 Phone
 (xxx) xxx-xxxx FAX
 Project Name: CCR
 Site: Cholla
 P O #

Analysis Turnaround Time
 TAT if different from Below _____

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)

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 Rev 4.4 (B, Ca, Na, K, Mg)	EPA 300.0 (Cl, F, SO4)	SM 2540C (TDS)	SM 4500-HB (pH)	SM 2320B (HCO3)	Carrier	COC No:
CH-CCR-M-56A-52118	5/21/2018	1201 G	W		2	N	X	X	X	X	X	X		
CH-CCR-M-57A-52118	5/21/2018	1233 G	W		2	N	X	X	X	X	X	X		
CH-CCR-FD02-52118	5/21/2018	1233 G	W		2	N	X	X	X	X	X	X		
CH-CCR-M-58A-52118	5/21/2018	1318 G	W		2	N	X	X	X	X	X	X		
CH-CCR-M-62A-52118	5/21/2018	1350 G	W		2	N	X	X	X	X	X	X		

Preservation Limit: _____
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:

Custody Seals Intact: _____
 Cooler Temp. (°C): Obs'd: _____
 Custody Seal No.: _____
 Therm ID No.: _____

Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *5/21/18 15:00*
 Relinquished by: *[Signature]* Company: *[Signature]* Date/Time: *5/21/18 15:00*
 Relinquished by: _____ Company: _____ Date/Time: _____

Received In Laboratory by: *[Signature]* Company: *[Signature]* Date/Time: *5/22/18 9:25*
 Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler	Lab PM:	Carmer Tracking Not(s)		COC No:
Client Contact: Shipping/Receiving		Phone:	Baker, Ken	State of Origin:		550-21231-1
Company: TestAmerica Laboratories, Inc.		E-Mail:	ken.baker@testamericainc.com	Arizona		Page 1 of 1
Address: 13715 Rider Trail North,		Accreditations Required (See note): State Program - Arizona		Job #:		550-103239-1
City: Earth City		Due Date Requested:	Analysis Requested			
State, Zip: MO, 63045		TAT Requested (days):	Total Number of Containers			
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		PO #:	Field Filtered Sample (Yes or No)			
Email:		WO #:	Perform MS/MSD (Yes or No)			
Project Name: APS - Cholla CCR		Project #: 55009651	904.0/PreSep_0 Radium 228			
Site: Arizona Public Service		SSOW#:	903.0/PreSep_21 Radium 226			
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=tissue, A=air)	Preservation Code:	Special Instructions/Note:
CH-CCR-M-56A-52118 (550-103239-1)	5/21/18	12:01 Arizona	Water	Water	X	AZ Sample
CH-CCR-M-57A-52118 (550-103239-2)	5/21/18	12:33 Arizona	Water	Water	X	AZ Sample
CH-CCR-FD02-52118 (550-103239-3)	5/21/18	12:33 Arizona	Water	Water	X	AZ Sample
CH-CCR-M-58A-52118 (550-103239-4)	5/21/18	13:18 Arizona	Water	Water	X	AZ Sample
CH-CCR-M-62A-52118 (550-103239-5)	5/21/18	13:50 Arizona	Water	Water	X	AZ Sample

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: *Ken Baker* Date/Time: *05-23-18 09:10* Company: *TA SL*

Relinquished by: _____ Date/Time: _____ Company: _____

Relinquished by: _____ Date/Time: _____ Company: _____

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 Archive For _____ Months

Special Instructions/QC Requirements: _____

Method of Shipment: _____

Received by: *Ken Baker* Date/Time: *05-23-18 09:10* Company: *TA SL*

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: 550-103239-1

Login Number: 103239

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103239-2

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

5/31/2018 2:29:51 PM

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: 550-103239-2

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
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: 550-103239-2

Job ID: 550-103239-2

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-103239-2**

Comments

No additional comments.

Receipt

The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.1° C and 4.6° 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: CH-CCR-FD02-52118 (550-103239-3). Sample contained high concentrations of Chloride and Sulfate which contributed to a total sum of anions that exceeded the instrument's column capacity. Therefore, a dilution was required to bring anion levels within a working range and Fluoride was not detected in the diluted sample. An elevated reporting limit (RL) has been provided and data has 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: 550-103239-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103239-1	CH-CCR-M-56A-52118	Water	05/21/18 12:01	05/22/18 09:25
550-103239-2	CH-CCR-M-57A-52118	Water	05/21/18 12:33	05/22/18 09:25
550-103239-3	CH-CCR-FD02-52118	Water	05/21/18 12:33	05/22/18 09:25
550-103239-4	CH-CCR-M-58A-52118	Water	05/21/18 13:18	05/22/18 09:25
550-103239-5	CH-CCR-M-62A-52118	Water	05/21/18 13:50	05/22/18 09:25

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Detection Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Client Sample ID: CH-CCR-M-56A-52118

Lab Sample ID: 550-103239-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00081		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.061		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0046		0.0010	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0079		0.00050	mg/L	1		200.8 LL	Total/NA
Thallium	0.00012		0.00010	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0022	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.043	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.0023	D1	0.0020	mg/L	2		200.8 LL	Total/NA
Cobalt	0.0058	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0026	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD02-52118

Lab Sample ID: 550-103239-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0028	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.043	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Chromium	0.0031	D1	0.0020	mg/L	2		200.8 LL	Total/NA
Cobalt	0.0058	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0026	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0042	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.071	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0018	D1	0.0010	mg/L	2		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M-62A-52118

Lab Sample ID: 550-103239-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0029	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Barium	0.072	D1	0.0010	mg/L	2		200.8 LL	Total/NA
Molybdenum	0.0024	D1	0.0010	mg/L	2		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: 550-103239-2

Client Sample ID: CH-CCR-M-56A-52118

Lab Sample ID: 550-103239-1

Date Collected: 05/21/18 12:01

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			05/25/18 00:11	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		05/23/18 08:28	05/24/18 21:39	1
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 21:39	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 18:11	1
Arsenic	0.00081		0.00050	mg/L		05/23/18 06:20	05/25/18 18:11	1
Barium	0.061		0.00050	mg/L		05/23/18 06:20	05/25/18 18:11	1
Cadmium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 18:11	1
Chromium	0.0046		0.0010	mg/L		05/23/18 06:20	05/25/18 18:11	1
Cobalt	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:11	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:11	1
Molybdenum	0.0079		0.00050	mg/L		05/23/18 06:20	05/25/18 18:11	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 18:11	1
Thallium	0.00012		0.00010	mg/L		05/23/18 06:20	05/25/18 18:11	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		05/24/18 14:58	05/24/18 19:05	1

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			05/24/18 05:26	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		05/23/18 08:28	05/24/18 22:43	1
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 22:43	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:55	2
Arsenic	0.0022	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:55	2
Barium	0.043	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:55	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:55	2
Chromium	0.0023	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 11:55	2
Cobalt	0.0058	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:55	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:55	2
Molybdenum	0.0026	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:55	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 11:55	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 11:55	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Client Sample ID: CH-CCR-M-57A-52118

Lab Sample ID: 550-103239-2

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		05/24/18 14:58	05/24/18 19:07	1

Client Sample ID: CH-CCR-FD02-52118

Lab Sample ID: 550-103239-3

Date Collected: 05/21/18 12:33

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	D1 D5	0.80	mg/L			05/23/18 05:22	2

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		05/23/18 08:28	05/24/18 22:49	1
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 22:49	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:00	2
Arsenic	0.0028	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:00	2
Barium	0.043	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:00	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:00	2
Chromium	0.0031	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:00	2
Cobalt	0.0058	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:00	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:00	2
Molybdenum	0.0026	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:00	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:00	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:00	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		05/24/18 14:58	05/24/18 19:08	1

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Date Collected: 05/21/18 13:18

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			05/24/18 07:15	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		05/23/18 08:28	05/24/18 22:55	1
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 22:55	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:04	2
Arsenic	0.0042	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:04	2
Barium	0.071	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:04	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:04	2

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Date Collected: 05/21/18 13:18

Matrix: Water

Date Received: 05/22/18 09:25

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

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:04	2
Cobalt	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:04	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:04	2
Molybdenum	0.0018	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:04	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:04	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:04	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		05/24/18 14:58	05/24/18 19:10	1

Client Sample ID: CH-CCR-M-62A-52118

Lab Sample ID: 550-103239-5

Date Collected: 05/21/18 13:50

Matrix: Water

Date Received: 05/22/18 09:25

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			05/24/18 08:10	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		05/23/18 08:28	05/24/18 23:01	1
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 23:01	1

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:09	2
Arsenic	0.0029	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:09	2
Barium	0.072	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:09	2
Cadmium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:09	2
Chromium	ND	D1	0.0020	mg/L		05/23/18 06:20	05/31/18 12:09	2
Cobalt	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:09	2
Lead	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:09	2
Molybdenum	0.0024	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:09	2
Selenium	ND	D1	0.0010	mg/L		05/23/18 06:20	05/31/18 12:09	2
Thallium	ND	D1	0.00020	mg/L		05/23/18 06:20	05/31/18 12:09	2

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		05/24/18 14:58	05/24/18 19:11	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-148002/2
Matrix: Water
Analysis Batch: 148002

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			05/22/18 19:14	1

Lab Sample ID: LCS 550-148002/5
Matrix: Water
Analysis Batch: 148002

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	4.14		mg/L		104	90 - 110

Lab Sample ID: LCSD 550-148002/6
Matrix: Water
Analysis Batch: 148002

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	4.14		mg/L		104	90 - 110	0	20

Lab Sample ID: 550-103292-C-1 MS
Matrix: Water
Analysis Batch: 148002

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	2.1		4.00	6.27		mg/L		105	80 - 120

Lab Sample ID: 550-103292-C-1 MSD
Matrix: Water
Analysis Batch: 148002

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	2.1		4.00	6.27		mg/L		105	80 - 120	0	20

Lab Sample ID: MB 550-148063/2
Matrix: Water
Analysis Batch: 148063

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			05/23/18 13:27	1

Lab Sample ID: LCS 550-148063/5
Matrix: Water
Analysis Batch: 148063

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	4.20		mg/L		105	90 - 110

Lab Sample ID: LCSD 550-148063/6
Matrix: Water
Analysis Batch: 148063

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	4.20		mg/L		105	90 - 110	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Lab Sample ID: 550-103304-B-1 MS
Matrix: Water
Analysis Batch: 148063

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		4.00	4.35		mg/L		105	80 - 120

Lab Sample ID: 550-103304-B-1 MSD
Matrix: Water
Analysis Batch: 148063

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		4.00	4.39		mg/L		106	80 - 120	1	20

Lab Sample ID: MB 550-148170/2
Matrix: Water
Analysis Batch: 148170

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			05/24/18 15:03	1

Lab Sample ID: LCS 550-148170/5
Matrix: Water
Analysis Batch: 148170

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	4.20		mg/L		105	90 - 110

Lab Sample ID: LCSD 550-148170/6
Matrix: Water
Analysis Batch: 148170

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	4.22		mg/L		105	90 - 110	0	20

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148170

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	D1 D5	200	210	D1	mg/L		105	80 - 120

Lab Sample ID: 550-103239-1 MSD
Matrix: Water
Analysis Batch: 148170

Client Sample ID: CH-CCR-M-56A-52118
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	200	208	D1	mg/L		104	80 - 120	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-147956/1-A
Matrix: Water
Analysis Batch: 148511

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147956

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0010	mg/L		05/23/18 08:28	05/24/18 21:02	1
Lithium	ND		0.20	mg/L		05/23/18 08:28	05/24/18 21:02	1

Lab Sample ID: LCS 550-147956/2-A
Matrix: Water
Analysis Batch: 148511

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	1.00	0.991		mg/L		99	85 - 115
Lithium	1.00	0.979		mg/L		98	85 - 115

Lab Sample ID: LCSD 550-147956/3-A
Matrix: Water
Analysis Batch: 148511

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Beryllium	1.00	1.01		mg/L		101	85 - 115	2	20
Lithium	1.00	0.987		mg/L		99	85 - 115	1	20

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148511

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		1.00	1.00		mg/L		100	70 - 130
Lithium	ND		1.00	1.06		mg/L		98	70 - 130

Lab Sample ID: 550-103239-1 MSD
Matrix: Water
Analysis Batch: 148511

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147956

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Beryllium	ND		1.00	1.00		mg/L		100	70 - 130	0	20
Lithium	ND		1.00	1.06		mg/L		98	70 - 130	0	20

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-147948/1-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147948

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Arsenic	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Barium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Cadmium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Chromium	ND		0.0010	mg/L		05/23/18 06:20	05/25/18 17:57	1
Cobalt	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Lead	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

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

Lab Sample ID: MB 550-147948/1-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147948

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Selenium	ND		0.00050	mg/L		05/23/18 06:20	05/25/18 17:57	1
Thallium	ND		0.00010	mg/L		05/23/18 06:20	05/25/18 17:57	1

Lab Sample ID: LCS 550-147948/2-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.0998		mg/L		100	85 - 115
Arsenic	0.100	0.0993		mg/L		99	85 - 115
Barium	0.100	0.0998		mg/L		100	85 - 115
Cadmium	0.100	0.0992		mg/L		99	85 - 115
Chromium	0.100	0.0987		mg/L		99	85 - 115
Cobalt	0.100	0.0990		mg/L		99	85 - 115
Lead	0.100	0.0990		mg/L		99	85 - 115
Molybdenum	0.100	0.0993		mg/L		99	85 - 115
Selenium	0.100	0.0984		mg/L		98	85 - 115
Thallium	0.100	0.0992		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-147948/3-A
Matrix: Water
Analysis Batch: 148285

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.100	0.101		mg/L		101	85 - 115	2	20
Arsenic	0.100	0.0982		mg/L		98	85 - 115	1	20
Barium	0.100	0.101		mg/L		101	85 - 115	1	20
Cadmium	0.100	0.101		mg/L		101	85 - 115	2	20
Chromium	0.100	0.0979		mg/L		98	85 - 115	1	20
Cobalt	0.100	0.0984		mg/L		98	85 - 115	1	20
Lead	0.100	0.0998		mg/L		100	85 - 115	1	20
Molybdenum	0.100	0.101		mg/L		101	85 - 115	1	20
Selenium	0.100	0.0976		mg/L		98	85 - 115	1	20
Thallium	0.100	0.100		mg/L		100	85 - 115	1	20

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148285

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147948

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.102		mg/L		101	70 - 130
Arsenic	0.00081		0.100	0.105		mg/L		105	70 - 130
Barium	0.061		0.100	0.162		mg/L		101	70 - 130
Cadmium	ND		0.100	0.0932		mg/L		93	70 - 130
Chromium	0.0046		0.100	0.105		mg/L		100	70 - 130
Cobalt	ND		0.100	0.0957		mg/L		95	70 - 130
Lead	ND		0.100	0.0891		mg/L		89	70 - 130
Molybdenum	0.0079		0.100	0.114		mg/L		106	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

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

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148285

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147948
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Selenium	ND		0.100	0.103		mg/L		103	70 - 130
Thallium	0.00012		0.100	0.0910		mg/L		91	70 - 130

Lab Sample ID: 550-103239-1 MSD
Matrix: Water
Analysis Batch: 148285

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 147948
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND		0.100	0.102		mg/L		101	70 - 130	0	20
Arsenic	0.00081		0.100	0.104		mg/L		104	70 - 130	1	20
Barium	0.061		0.100	0.160		mg/L		99	70 - 130	1	20
Cadmium	ND		0.100	0.0931		mg/L		93	70 - 130	0	20
Chromium	0.0046		0.100	0.106		mg/L		101	70 - 130	1	20
Cobalt	ND		0.100	0.0964		mg/L		96	70 - 130	1	20
Lead	ND		0.100	0.0891		mg/L		89	70 - 130	0	20
Molybdenum	0.0079		0.100	0.113		mg/L		106	70 - 130	0	20
Selenium	ND		0.100	0.104		mg/L		104	70 - 130	1	20
Thallium	0.00012		0.100	0.0913		mg/L		91	70 - 130	0	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-148151/1-A
Matrix: Water
Analysis Batch: 148215

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 148151

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.00020	mg/L		05/24/18 14:58	05/24/18 18:57	1

Lab Sample ID: LCS 550-148151/2-A
Matrix: Water
Analysis Batch: 148215

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 148151
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Hg	0.0100	0.0101		mg/L		101	85 - 115

Lab Sample ID: LCSD 550-148151/3-A
Matrix: Water
Analysis Batch: 148215

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 148151
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	0.0100	0.00997		mg/L		100	85 - 115	1	20

Lab Sample ID: 550-103239-1 MS
Matrix: Water
Analysis Batch: 148215

Client Sample ID: CH-CCR-M-56A-52118
Prep Type: Total/NA
Prep Batch: 148151
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Hg	ND		0.0100	0.00949		mg/L		95	70 - 130

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Method: 245.1 - Mercury (CVAA) (Continued)

Lab Sample ID: 550-103239-1 MSD
 Matrix: Water
 Analysis Batch: 148215

Client Sample ID: CH-CCR-M-56A-52118
 Prep Type: Total/NA
 Prep Batch: 148151

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Hg	ND		0.0100	0.00943		mg/L		94	70 - 130	1	20

- 1
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QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

HPLC/IC

Analysis Batch: 148002

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	300.0	
MB 550-148002/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148002/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148002/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103292-C-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-103292-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 148063

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	300.0	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	300.0	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	300.0	
MB 550-148063/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148063/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148063/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103304-B-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-103304-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 148170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	300.0	
MB 550-148170/2	Method Blank	Total/NA	Water	300.0	
LCS 550-148170/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-148170/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	300.0	
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	300.0	

Metals

Prep Batch: 147948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	200.8	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	200.8	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	200.8	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	200.8	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	200.8	
MB 550-147948/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-147948/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-147948/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	200.8	
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	200.8	

Prep Batch: 147956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	200.7	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	200.7	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	200.7	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	200.7	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	200.7	
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Metals (Continued)

Prep Batch: 147956 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	200.7	
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	200.7	

Prep Batch: 148151

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	245.1	
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	245.1	
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	245.1	
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	245.1	
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	245.1	
MB 550-148151/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-148151/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-148151/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	245.1	
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	245.1	

Analysis Batch: 148215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	245.1	148151
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	245.1	148151
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	245.1	148151
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	245.1	148151
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	245.1	148151
MB 550-148151/1-A	Method Blank	Total/NA	Water	245.1	148151
LCS 550-148151/2-A	Lab Control Sample	Total/NA	Water	245.1	148151
LCSD 550-148151/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	148151
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	245.1	148151
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	245.1	148151

Analysis Batch: 148285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	200.8 LL	147948
MB 550-147948/1-A	Method Blank	Total/NA	Water	200.8 LL	147948
LCS 550-147948/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	147948
LCSD 550-147948/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	147948
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	200.8 LL	147948
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	200.8 LL	147948

Analysis Batch: 148511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1	CH-CCR-M-56A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	200.7 Rev 4.4	147956
MB 550-147956/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	147956
LCS 550-147956/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	147956
LCSD 550-147956/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	147956
550-103239-1 MS	CH-CCR-M-56A-52118	Total/NA	Water	200.7 Rev 4.4	147956

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Metals (Continued)

Analysis Batch: 148511 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-1 MSD	CH-CCR-M-56A-52118	Total/NA	Water	200.7 Rev 4.4	147956

Analysis Batch: 148580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-103239-2	CH-CCR-M-57A-52118	Total/NA	Water	200.8 LL	147948
550-103239-3	CH-CCR-FD02-52118	Total/NA	Water	200.8 LL	147948
550-103239-4	CH-CCR-M-58A-52118	Total/NA	Water	200.8 LL	147948
550-103239-5	CH-CCR-M-62A-52118	Total/NA	Water	200.8 LL	147948

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Client Sample ID: CH-CCR-M-56A-52118

Date Collected: 05/21/18 12:01

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103239-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148170	05/25/18 00:11	NEL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148511	05/24/18 21:39	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	148285	05/25/18 18:11	TEK	TAL PHX
Total/NA	Prep	245.1			148151	05/24/18 14:58	JTG	TAL PHX
Total/NA	Analysis	245.1		1	148215	05/24/18 19:05	JTG	TAL PHX

Client Sample ID: CH-CCR-M-57A-52118

Date Collected: 05/21/18 12:33

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103239-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148063	05/24/18 05:26	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148511	05/24/18 22:43	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 11:55	TEK	TAL PHX
Total/NA	Prep	245.1			148151	05/24/18 14:58	JTG	TAL PHX
Total/NA	Analysis	245.1		1	148215	05/24/18 19:07	JTG	TAL PHX

Client Sample ID: CH-CCR-FD02-52118

Date Collected: 05/21/18 12:33

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103239-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	148002	05/23/18 05:22	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148511	05/24/18 22:49	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 12:00	TEK	TAL PHX
Total/NA	Prep	245.1			148151	05/24/18 14:58	JTG	TAL PHX
Total/NA	Analysis	245.1		1	148215	05/24/18 19:08	JTG	TAL PHX

Client Sample ID: CH-CCR-M-58A-52118

Date Collected: 05/21/18 13:18

Date Received: 05/22/18 09:25

Lab Sample ID: 550-103239-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148063	05/24/18 07:15	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148511	05/24/18 22:55	ARE	TAL PHX

TestAmerica Phoenix

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

Client Sample ID: CH-CCR-M-58A-52118

Lab Sample ID: 550-103239-4

Date Collected: 05/21/18 13:18

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 12:04	TEK	TAL PHX
Total/NA	Prep	245.1			148151	05/24/18 14:58	JTG	TAL PHX
Total/NA	Analysis	245.1		1	148215	05/24/18 19:10	JTG	TAL PHX

Client Sample ID: CH-CCR-M-62A-52118

Lab Sample ID: 550-103239-5

Date Collected: 05/21/18 13:50

Matrix: Water

Date Received: 05/22/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	148063	05/24/18 08:10	NBL	TAL PHX
Total/NA	Prep	200.7			147956	05/23/18 08:28	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	148511	05/24/18 23:01	ARE	TAL PHX
Total/NA	Prep	200.8			147948	05/23/18 06:20	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		2	148580	05/31/18 12:09	TEK	TAL PHX
Total/NA	Prep	245.1			148151	05/24/18 14:58	JTG	TAL PHX
Total/NA	Analysis	245.1		1	148215	05/24/18 19:11	JTG	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: 550-103239-2

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 *

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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-2

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
245.1	Mercury (CVAA)	EPA	TAL PHX
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.

Laboratory References:

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

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TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3940 fax 602.454.9303

Chain of Custody Record

103239-2

Regulatory Program: CCR

Doug Lavarway

CCR

TestAmerica Laboratories, Inc.

Client Contact: Doug Lavarway 928-587-0319 Analysis Turnaround Time Lab Contact: Doug Lavarway 5/21/2018

Carrier: 5/21/2018 COC No: 1 of 1 COCs

Sample #: _____ For Lab Use Only: _____

Walk-in Client: _____ Lab Sampling: _____

Job / SDG No.: _____

Sample Specific Notes: _____

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)	EPA 200.7 (Be, Li)	200.8 (Sb, As, Ba, Cd, Cr, Co, Pb, Mo, Se, Ti)	EPA 245.1 (Hg)	EPA 300.0 (F)
CH-CCR-M-56A-52118	5/21/2018	1201	G	W	2	N	X	X	X	X	X
CH-CCR-M-57A-52118	5/21/2018	1233	G	W	2	N	X	X	X	X	X
CH-CCR-FD02-52118	5/21/2018	1233	G	W	2	N	X	X	X	X	X
CH-CCR-M-58A-52118	5/21/2018	1318	G	W	2	N	X	X	X	X	X
CH-CCR-M-62A-52118	5/21/2018	1350	G	W	2	N	X	X	X	X	X
			G	W	2	N	X	X	X	X	X
			G	W	2	N	X	X	X	X	X
			G	W	2	N	X	X	X	X	X
			G	W	2	N	X	X	X	X	X
			G	W	2	N	X	X	X	X	X

Preservation Used: 1: Ice, 2: HCl, 3: HNO₃, 4: H₂O₂, 5: H₂SO₄, 6: H₂O, 7: None
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: Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Custody Seal Intact: _____ Cooler Temp. (°C): Obs'd: _____ Therm ID No.: _____
Relinquished by: _____ Company: APS Date/Time: 5/21/2018 Received by: _____ Date/Time: 5/21/2018
Relinquished by: _____ Company: APS Date/Time: 5/21/2018 Received by: _____ Date/Time: 5/21/2018
Relinquished by: _____ Company: _____ Date/Time: _____ Received by: _____ Date/Time: _____

Form No. CA-CW-002, Rev. 4.2, dated 04/02/2013
TAPPHX
5/22/18 9:25

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103239-2

Login Number: 103239

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-103239-3

Client Project/Site: CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

6/20/2018 3:52:36 PM

Ken Baker, Project Manager II

(602)659-7624

ken.baker@testamericainc.com

LINKS

Review your project
results through

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Have a Question?



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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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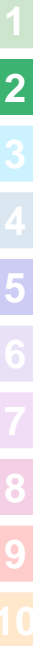


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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-3

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: 550-103239-3

Job ID: 550-103239-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-103239-3

Comments

No additional comments.

Receipt

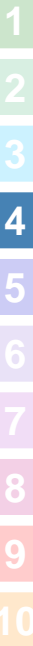
The samples were received on 5/22/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.1° C and 4.6° C.

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: CCR

TestAmerica Job ID: 550-103239-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-103239-1	CH-CCR-M-56A-52118	Water	05/21/18 12:01	05/22/18 09:25
550-103239-2	CH-CCR-M-57A-52118	Water	05/21/18 12:33	05/22/18 09:25
550-103239-3	CH-CCR-FD02-52118	Water	05/21/18 12:33	05/22/18 09:25
550-103239-4	CH-CCR-M-58A-52118	Water	05/21/18 13:18	05/22/18 09:25
550-103239-5	CH-CCR-M-62A-52118	Water	05/21/18 13:50	05/22/18 09:25



Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-103239-3

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: 550-103239-3

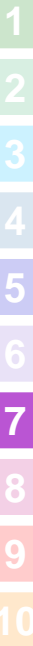
Method	Method Description	Protocol	Laboratory
Subcontract	Radium 226/228	None	Radiation

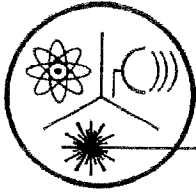
Protocol References:

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: May 21, 2018
Sample Received: June 04, 2018
Analysis Completed: June 15, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-62A-52118 (550-103239-5)	< 0.4	0.7 ± 0.2	0.7 ± 0.2

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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Robert L. Metzger, Ph.D., C.H.P.

6/15/2018

Date

Laboratory License Number AZ0462



Chain of Custody Record

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

Client Information (Sub Contract Lab)

Lab P/N: Baker, Ken
 E-Mail: ken.baker@testamericainc.com
 State of Origin: Arizona

Carrier Tracking No(s): 550-21275.1

Page: Page 1 of 1

Job #: 550-103239-3

Accreditations Required (See note): State Program - Arizona

Analysis Requested

Preservation Codes:
 M - Hexane
 N - None
 O - AsMAO2
 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)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=Water, S=solid, O=Other)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Radium 226/229/ Radium 226/228)	Total Number of Containers	Special Instructions/Note:
GH-CGR-M-56A-52118 (560-103239-F1)	5/21/18	12:01 Arizona	Water	Water	X	X		1	Job 3	
CH-CGR-M-57A-52118 (550-103239-F2)	5/21/18	13:50 Arizona	Water	Water	X	X		1	Job 3	
CH-CGR-M-62A-52118 (550-103239-F5)	5/21/18	13:50 Arizona	Water	Water	X	X		2	Job 3	

Possible Hazard Identification
 Unconfirmed

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:

Primary Deliverable Rank: 2

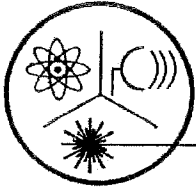
Empty Kit Relinquished by: Date: 5/24/18 Time: 13:50
 Relinquished by: Company: K.S. SO Company

Relinquished by: Date: 5/24/18 Time: 13:50
 Relinquished by: Company: K.S. SO Company

Relinquished by: Date: Time: Company:

Custody Seals Intact: (Custody Seal No.:
 Yes No

Cooler Temperature(s) °C and Other Remarks:



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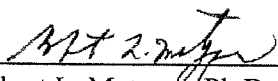
Radiochemical Activity in Water (pCi/L)

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

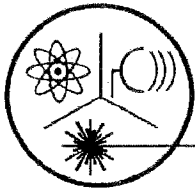
Sampling Date: May 21, 2018
Sample Received: June 04, 2018
Analysis Completed: June 18, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M-56A-52118 (550-103239-1)	< 0.4	1.4 ± 0.5	1.4 ± 0.5

Date of Analysis	6/6/2018	6/6/2018	6/6/2018
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 _____ 6/18/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462





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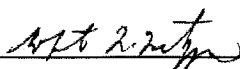
Radiochemical Activity in Water (pCi/L)

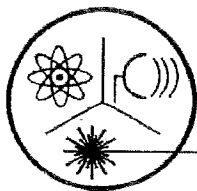
TestAmerica
4625 E. Cotton Center Blvd., Suite #189
Phoenix, AZ 85040

Sampling Date: May 21, 2018
Sample Received: June 04, 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)
CH-CCR-M-57A-52118 (550-103239-2)	< 0.4	< 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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Website: www.radsafe.com

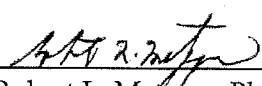
(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: May 21, 2018
Sample Received: June 04, 2018
Analysis Completed: June 18, 2018

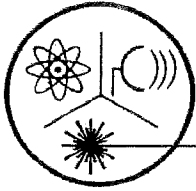
Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD02-52118 (550-103239-3)	< 0.4	< 0.6	< 0.6
Date of Analysis	6/6/2018	6/6/2018	6/6/2018


Robert L. Metzger, Ph.D., C.H.P.

6/18/2018

Date

Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

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

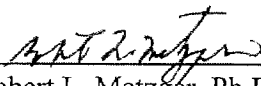
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: May 21, 2018
 Sample Received: June 04, 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)
CH-CCR-M-58A-52118 (550-103239-4)	< 0.4	0.7 ± 0.2	0.7 ± 0.2

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)		Sampler: Baker, Ken	Lab Piv: Ken	Carrier Tracking No(s): 550-21270-1	COC No: 550-21270-1
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 #: 550-103239-3	Preservation Codes: M - Hexane N - None O - ASNO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecalhydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA L - EDA Other:
Address: 3245 North Washington Street, City: Chandler, State, Zip: AZ, 85225, Phone: Email:		Due Date Requested: 6/1/2018 TAT Requested (days): PO #: WO #: Project #: 55009651 SSOW#:		Analysis Requested	
Site: Arizona Public Service		Field Filtered Sample (Yes or No)		Total Number of Containers	
Sample Identification - Client ID (Lab ID)		Perform MS/MSD (Yes or No)		Special Instructions/Note:	
CH-CCR-M-56A-52118 (550-103239-1)	Sample Date: 5/21/18	Sample Time: 12:01 Arizona	Sample Type (C=comp, G=grab) Preservation Code: Water	Job 3	2
CH-CCR-M-57A-52118 (550-103239-2)	Sample Date: 5/21/18	Sample Time: 12:33 Arizona	Sample Type (C=comp, G=grab) Preservation Code: Water	Job 3	2
CH-CCR-FD02-52118 (550-103239-3)	Sample Date: 5/21/18	Sample Time: 12:35 Arizona	Sample Type (C=comp, G=grab) Preservation Code: Water	Job 3	2
CH-CCR-M-58A-52118 (550-103239-4)	Sample Date: 5/21/18	Sample Time: 13:18 Arizona	Sample Type (C=comp, G=grab) Preservation Code: Water	Job 3	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/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 required 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
Special Instructions/QC 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

Empty Kit Relinquished by: Date: Time: Method of Shipment

Relinquished by: *SAZARAY* Date/Time: 6/4/18 13:50 Company: Company
 Relinquished by: *PROYANETA* Date/Time: 6-21-18 13:50 Company: Company
 Relinquished by: Date/Time: Company: Company

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



TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Chain of Custody Record

103239-3

Regulatory Program:
CCR

CCR

TestAmerica Laboratories, Inc.

APS Cholla 4801 Cholla Lake Road Joseph City, Az 86032 (928) 587-0319 Phone (xxx) xxx-xxxx FAX Project Name: CCR Site: Cholla P O #	Client Contact Doug Lavatnway 928-587-0319 Analysis Turnaround Time TAT if different from Below _____	Doug Lavatnway Lab Contact: 5/21/2018 Carrier: 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)	932.0 Radium 226 and 228	Sample Specific Notes:
CH-CCR-M-56A-52118	5/21/2018	1201	G	W	2	N	X	X	
CH-CCR-M-57A-52118	5/21/2018	1233	G	W	2	N	X	X	
CH-CCR-FD02-52118	5/21/2018	1233	G	W	2	N	X	X	
CH-CCR-M-58A-52118	5/21/2018	1318	G	W	2	N	X	X	
CH-CCR-M-62A-52118	5/21/2018	1350	G	W	2	N	X	X	
			G	W	2	N	X	X	
			G	W	2	N	X	X	
			G	W	2	N	X	X	
			G	W	2	N	X	X	
			G	W	2	N	X	X	
			G	W	2	N	X	X	



Preservation Limit: 1 Year
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: Radium shall be sent off to Radiation Safety Engineering for analysis.

Custody Seal Intact:	Custody Seal No.:	Cooler Temp. (°C):	Obs'd:	Therm ID No.:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
<i>[Signature]</i>	APS	5/21/18 1500	<i>[Signature]</i>	APS	5/21/18 1500
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
<i>[Signature]</i>	APS	5/21/18 9:25	<i>[Signature]</i>	APS	5/22/18 9:25

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-103239-3

Login Number: 103239

List Source: TestAmerica Phoenix

List Number: 1

Creator: Vilaboy, Monica

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: 550-108942-1

Client Project/Site: APS - Cholla CCR

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

9/19/2018 4:17:58 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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Receipt Checklists	22

Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

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 - Cholla CCR

TestAmerica Job ID: 550-108942-1

Job ID: 550-108942-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-108942-1**

Comments

No additional comments.

Receipt

The samples were received on 8/31/2018 11:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0° C.

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.

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Sample Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-108942-1	CH-CCR-M56A-082818	Water	08/28/18 14:07	08/31/18 11:40
550-108942-2	CH-CCR-M57A-082818	Water	08/28/18 13:07	08/31/18 11:40
550-108942-3	CH-CCR-M58A-082818	Water	08/28/18 09:35	08/31/18 11:40
550-108942-4	CH-CCR-M62A-082818	Water	08/28/18 14:36	08/31/18 11:40
550-108942-5	CH-CCR-FD01-082818	Water	08/28/18 09:35	08/31/18 11:40

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Detection Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Client Sample ID: CH-CCR-M56A-082818

Lab Sample ID: 550-108942-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0013		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.065		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0042		0.0010	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0057		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M57A-082818

Lab Sample ID: 550-108942-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0021		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.045		0.00050	mg/L	1		200.8 LL	Total/NA
Chromium	0.0067		0.0010	mg/L	1		200.8 LL	Total/NA
Cobalt	0.0057		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0030		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M58A-082818

Lab Sample ID: 550-108942-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0037		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.075		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0017		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-M62A-082818

Lab Sample ID: 550-108942-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0029		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.074		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0023		0.00050	mg/L	1		200.8 LL	Total/NA

Client Sample ID: CH-CCR-FD01-082818

Lab Sample ID: 550-108942-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0037		0.00050	mg/L	1		200.8 LL	Total/NA
Barium	0.076		0.00050	mg/L	1		200.8 LL	Total/NA
Molybdenum	0.0017		0.00050	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: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Client Sample ID: CH-CCR-M56A-082818

Lab Sample ID: 550-108942-1

Date Collected: 08/28/18 14:07

Matrix: Water

Date Received: 08/31/18 11:40

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.00050	mg/L		09/05/18 05:59	09/10/18 10:44	1
Barium	0.065		0.00050	mg/L		09/05/18 05:59	09/10/18 10:44	1
Chromium	0.0042		0.0010	mg/L		09/05/18 05:59	09/10/18 10:44	1
Cobalt	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:44	1
Molybdenum	0.0057		0.00050	mg/L		09/05/18 05:59	09/10/18 10:44	1
Thallium	ND		0.00010	mg/L		09/05/18 05:59	09/10/18 10:44	1

Client Sample ID: CH-CCR-M57A-082818

Lab Sample ID: 550-108942-2

Date Collected: 08/28/18 13:07

Matrix: Water

Date Received: 08/31/18 11:40

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0021		0.00050	mg/L		09/05/18 05:59	09/10/18 10:51	1
Barium	0.045		0.00050	mg/L		09/05/18 05:59	09/10/18 10:51	1
Chromium	0.0067		0.0010	mg/L		09/05/18 05:59	09/10/18 10:51	1
Cobalt	0.0057		0.00050	mg/L		09/05/18 05:59	09/10/18 10:51	1
Molybdenum	0.0030		0.00050	mg/L		09/05/18 05:59	09/10/18 10:51	1
Thallium	ND		0.00010	mg/L		09/05/18 05:59	09/10/18 10:51	1

Client Sample ID: CH-CCR-M58A-082818

Lab Sample ID: 550-108942-3

Date Collected: 08/28/18 09:35

Matrix: Water

Date Received: 08/31/18 11:40

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0037		0.00050	mg/L		09/05/18 05:59	09/10/18 10:53	1
Barium	0.075		0.00050	mg/L		09/05/18 05:59	09/10/18 10:53	1
Chromium	ND		0.0010	mg/L		09/05/18 05:59	09/10/18 10:53	1
Cobalt	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:53	1
Molybdenum	0.0017		0.00050	mg/L		09/05/18 05:59	09/10/18 10:53	1
Thallium	ND		0.00010	mg/L		09/05/18 05:59	09/10/18 10:53	1

Client Sample ID: CH-CCR-M62A-082818

Lab Sample ID: 550-108942-4

Date Collected: 08/28/18 14:36

Matrix: Water

Date Received: 08/31/18 11:40

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0029		0.00050	mg/L		09/05/18 05:59	09/10/18 10:56	1
Barium	0.074		0.00050	mg/L		09/05/18 05:59	09/10/18 10:56	1
Chromium	ND		0.0010	mg/L		09/05/18 05:59	09/10/18 10:56	1
Cobalt	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:56	1
Molybdenum	0.0023		0.00050	mg/L		09/05/18 05:59	09/10/18 10:56	1
Thallium	ND		0.00010	mg/L		09/05/18 05:59	09/10/18 10:56	1

Client Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Client Sample ID: CH-CCR-FD01-082818

Lab Sample ID: 550-108942-5

Date Collected: 08/28/18 09:35

Matrix: Water

Date Received: 08/31/18 11:40

Method: 200.8 LL - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0037		0.00050	mg/L		09/05/18 05:59	09/10/18 10:58	1
Barium	0.076		0.00050	mg/L		09/05/18 05:59	09/10/18 10:58	1
Chromium	ND		0.0010	mg/L		09/05/18 05:59	09/10/18 10:58	1
Cobalt	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:58	1
Molybdenum	0.0017		0.00050	mg/L		09/05/18 05:59	09/10/18 10:58	1
Thallium	ND		0.00010	mg/L		09/05/18 05:59	09/10/18 10:58	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Method: 200.8 LL - Metals (ICP/MS)

Lab Sample ID: MB 550-155783/1-A

Matrix: Water

Analysis Batch: 156226

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 155783

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:37	1
Barium	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:37	1
Chromium	ND		0.0010	mg/L		09/05/18 05:59	09/10/18 10:37	1
Cobalt	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:37	1
Molybdenum	ND		0.00050	mg/L		09/05/18 05:59	09/10/18 10:37	1
Thallium	ND		0.00010	mg/L		09/05/18 05:59	09/10/18 10:37	1

Lab Sample ID: LCS 550-155783/2-A

Matrix: Water

Analysis Batch: 156226

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 155783

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.104		mg/L		104	85 - 115
Barium	0.100	0.103		mg/L		103	85 - 115
Chromium	0.100	0.101		mg/L		101	85 - 115
Cobalt	0.100	0.105		mg/L		105	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: LCSD 550-155783/3-A

Matrix: Water

Analysis Batch: 156226

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 155783

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Arsenic	0.100	0.104		mg/L		104	85 - 115	1	20
Barium	0.100	0.103		mg/L		103	85 - 115	0	20
Chromium	0.100	0.101		mg/L		101	85 - 115	1	20
Cobalt	0.100	0.104		mg/L		104	85 - 115	1	20
Molybdenum	0.100	0.105		mg/L		105	85 - 115	0	20
Thallium	0.100	0.104		mg/L		104	85 - 115	0	20

Lab Sample ID: 550-108942-1 MS

Matrix: Water

Analysis Batch: 156226

Client Sample ID: CH-CCR-M56A-082818

Prep Type: Total/NA

Prep Batch: 155783

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.0013		0.100	0.110		mg/L		109	70 - 130
Barium	0.065		0.100	0.168		mg/L		103	70 - 130
Chromium	0.0042		0.100	0.107		mg/L		103	70 - 130
Cobalt	ND		0.100	0.100		mg/L		100	70 - 130
Molybdenum	0.0057		0.100	0.107		mg/L		102	70 - 130
Thallium	ND		0.100	0.0912		mg/L		91	70 - 130

Lab Sample ID: 550-108942-1 MSD

Matrix: Water

Analysis Batch: 156226

Client Sample ID: CH-CCR-M56A-082818

Prep Type: Total/NA

Prep Batch: 155783

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Arsenic	0.0013		0.100	0.109		mg/L		107	70 - 130	2	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
 Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

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

Lab Sample ID: 550-108942-1 MSD

Matrix: Water

Analysis Batch: 156226

Client Sample ID: CH-CCR-M56A-082818

Prep Type: Total/NA

Prep Batch: 155783

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	
Barium	0.065		0.100	0.169		mg/L		104	70 - 130	1	20
Chromium	0.0042		0.100	0.106		mg/L		102	70 - 130	1	20
Cobalt	ND		0.100	0.0997		mg/L		99	70 - 130	1	20
Molybdenum	0.0057		0.100	0.107		mg/L		101	70 - 130	0	20
Thallium	ND		0.100	0.0916		mg/L		91	70 - 130	0	20

QC Association Summary

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Metals

Prep Batch: 155783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-108942-1	CH-CCR-M56A-082818	Total/NA	Water	200.8	
550-108942-2	CH-CCR-M57A-082818	Total/NA	Water	200.8	
550-108942-3	CH-CCR-M58A-082818	Total/NA	Water	200.8	
550-108942-4	CH-CCR-M62A-082818	Total/NA	Water	200.8	
550-108942-5	CH-CCR-FD01-082818	Total/NA	Water	200.8	
MB 550-155783/1-A	Method Blank	Total/NA	Water	200.8	
LCS 550-155783/2-A	Lab Control Sample	Total/NA	Water	200.8	
LCSD 550-155783/3-A	Lab Control Sample Dup	Total/NA	Water	200.8	
550-108942-1 MS	CH-CCR-M56A-082818	Total/NA	Water	200.8	
550-108942-1 MSD	CH-CCR-M56A-082818	Total/NA	Water	200.8	

Analysis Batch: 156226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-108942-1	CH-CCR-M56A-082818	Total/NA	Water	200.8 LL	155783
550-108942-2	CH-CCR-M57A-082818	Total/NA	Water	200.8 LL	155783
550-108942-3	CH-CCR-M58A-082818	Total/NA	Water	200.8 LL	155783
550-108942-4	CH-CCR-M62A-082818	Total/NA	Water	200.8 LL	155783
550-108942-5	CH-CCR-FD01-082818	Total/NA	Water	200.8 LL	155783
MB 550-155783/1-A	Method Blank	Total/NA	Water	200.8 LL	155783
LCS 550-155783/2-A	Lab Control Sample	Total/NA	Water	200.8 LL	155783
LCSD 550-155783/3-A	Lab Control Sample Dup	Total/NA	Water	200.8 LL	155783
550-108942-1 MS	CH-CCR-M56A-082818	Total/NA	Water	200.8 LL	155783
550-108942-1 MSD	CH-CCR-M56A-082818	Total/NA	Water	200.8 LL	155783

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

Client Sample ID: CH-CCR-M56A-082818

Lab Sample ID: 550-108942-1

Date Collected: 08/28/18 14:07

Matrix: Water

Date Received: 08/31/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			155783	09/05/18 05:59	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	156226	09/10/18 10:44	TEK	TAL PHX

Client Sample ID: CH-CCR-M57A-082818

Lab Sample ID: 550-108942-2

Date Collected: 08/28/18 13:07

Matrix: Water

Date Received: 08/31/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			155783	09/05/18 05:59	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	156226	09/10/18 10:51	TEK	TAL PHX

Client Sample ID: CH-CCR-M58A-082818

Lab Sample ID: 550-108942-3

Date Collected: 08/28/18 09:35

Matrix: Water

Date Received: 08/31/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			155783	09/05/18 05:59	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	156226	09/10/18 10:53	TEK	TAL PHX

Client Sample ID: CH-CCR-M62A-082818

Lab Sample ID: 550-108942-4

Date Collected: 08/28/18 14:36

Matrix: Water

Date Received: 08/31/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			155783	09/05/18 05:59	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	156226	09/10/18 10:56	TEK	TAL PHX

Client Sample ID: CH-CCR-FD01-082818

Lab Sample ID: 550-108942-5

Date Collected: 08/28/18 09:35

Matrix: Water

Date Received: 08/31/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			155783	09/05/18 05:59	SGO	TAL PHX
Total/NA	Analysis	200.8 LL		1	156226	09/10/18 10:58	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: APS - Cholla CCR

TestAmerica Job ID: 550-108942-1

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 - Cholla CCR

TestAmerica Job ID: 550-108942-1

Method	Method Description	Protocol	Laboratory
200.8 LL	Metals (ICP/MS)	EPA	TAL PHX
Subcontract	Radium 226/228	None	Radiation
200.8	Preparation, Total Metals	EPA	TAL PHX

Protocol References:

EPA = US Environmental Protection Agency
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

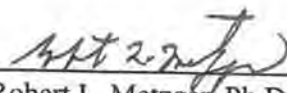
(480) 897-9459
 FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: August 28, 2018
 Sample Received: September 05, 2018
 Analysis Completed: September 17, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M56A-082818 (550-108942-1)	0.5 ± 0.2	< 0.6	0.5 ± 0.2
Date of Analysis	9/7/2018	9/7/2018	9/7/2018


 Robert L. Metzger, Ph.D., C.H.P. 9/17/2018
 Date
 Laboratory License Number AZ0462

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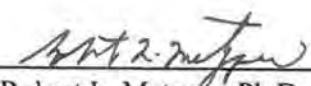
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: August 28, 2018
 Sample Received: September 05, 2018
 Analysis Completed: September 17, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M57A-082818 (550-108942-2)	< 0.4	0.7 ± 0.3	0.7 ± 0.3

Date of Analysis	9/7/2018	9/7/2018	9/7/2018
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 _____ 9/17/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462

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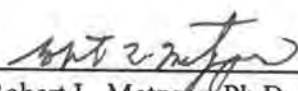
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: August 28, 2018
 Sample Received: September 05, 2018
 Analysis Completed: September 17, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M58A-082818 (550-108942-3)	< 0.4	< 0.6	< 0.6

Date of Analysis	9/7/2018	9/7/2018	9/7/2018
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 _____ 9/17/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
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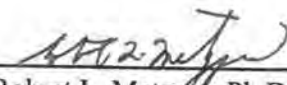
(480) 897-9459
FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

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

Sampling Date: August 28, 2018
Sample Received: September 05, 2018
Analysis Completed: September 17, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-M62A-082818 (550-108942-4)	0.5 ± 0.2	< 0.6	0.5 ± 0.2
Date of Analysis	9/7/2018	9/7/2018	9/7/2018


 _____ 9/17/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462



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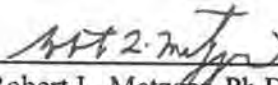
Radiochemical Activity in Water (pCi/L)

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

Sampling Date: August 28, 2018
Sample Received: September 05, 2018
Analysis Completed: September 17, 2018

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
CH-CCR-FD01-082818 (550-108942-5)	< 0.4	< 0.6	< 0.6

Date of Analysis	9/7/2018	9/7/2018	9/7/2018
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 _____ 9/17/2018
 Robert L. Metzger, Ph.D., C.H.P. Date
 Laboratory License Number AZ0462

Chain of Custody Record



TestAmerica

Client Information (Sub Contract Lab)		Lab PM: Baker, Ken		COC No: 550-22082-1	
Client Contact: Shipping/Receiving		E-Mail: ken.baker@testamericainc.com		Page: 1 of 1	
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona		Job #: 550-108942-1	
Address: 3245 North Washington Street.		Due Date Requested: 9/12/2018		Preservation Codes:	
City: Chandler		TAT Requested (days):		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Acetic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: AZ, 85225		PO #:		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)	
Email:		WO #:		Total Number of Containers	
Project Name: APS - Cholla CCR		Project #: 55009851		Special Instructions/Note:	
Site: Arizona Public Service		SSOW#:		Job 3 # 60902	
				Job 3 # 40903	
				Job 3 # 60904	
				Job 3 # 60905	
				Job 3 # 40906	

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Immol, Organics)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Radium 226/229/ Radium 226/228)
CH-CCR-M56A-082818 (550-108942-1)	8/28/18	14:07	Water	Water	X	X	
CH-CCR-M57A-082818 (550-108942-2)	8/28/18	13:07	Water	Water	X	X	
CH-CCR-M58A-082818 (550-108942-3)	8/28/18	09:35	Water	Water	X	X	
CH-CCR-M62A-082818 (550-108942-4)	8/28/18	14:36	Water	Water	X	X	
CH-CCR-FD01-082818 (550-108942-5)	8/28/18	09:35	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 subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin issued above for analysis, 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
 Special Instructions/QC Requirements: _____

Empty Kit Relinquished by: _____ Date: 9/4/18
 Relinquished by: **TestAmerica** Date/Time: 14:20
 Relinquished by: _____ Date/Time: _____
 Custody Seals Intact: _____ Custody Seal No.: _____
 Δ Yes Δ No

Received by: _____ Date: 9/19/18
 Received by: _____ Date: 9/19/18
 Received by: _____ Date: 9/19/18
 Received by: _____ Date: 9/19/18

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: _____

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

108942

Regulatory Program: CCR

Doug Lavarrway

Doug Lavarrway

Date: 08/30/2018

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarrway	Doug Lavarrway	Carrier:	COC No:
4801 Cholla Lake Rd	928-587-0319	Analysis Turnaround Time		1 of 1 COCs
Joseph City, AZ 86032				
(928) 587-0319				
(xxx) xxx-xxxx				
Project Name:				
Site:				
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)	200.8 (As, Ba, Cr, Co, Mo, Tl)	Radium 226 + 228 (Radiation Safet	Sampler:	For Lab Use Only:
CH-CCR-M56A-082818	8/28/2018	1407	G	W	3	N	X	X	X	Walk-in Client:	Lab Sampling:
CH-CCR-M57A-082818	8/28/18	1307	G	W	3	N	X	X	X	Job / SDG No.:	
CH-CCR-M58A-082818	8/28/18	935	G	W	3	N	X	X	X	Sample Specific Notes:	
CH-CCR-M62A-082818	8/28/18	1436	G	W	3	N	X	X	X		
CH-CCR-FD01-082818	8/28/18	935	G	W	3	N	X	X	X		



550-108942 Chain of Custody

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

10°C 28

Custody Seats Intact:	Custody Seal No.:	Cooler Temp. (C):	Obs'd:	Corr'd:	Therm ID No.:
Relinquished by:	Company:	APPS	Date/Time:	8/30/18	945
Relinquished by:	Company:	APPS	Date/Time:	8/31/18	1140
Relinquished by:	Company:		Date/Time:		

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-108942-1

Login Number: 108942

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.	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: 550-112462-1

Client Project/Site: Cholla

For:

Arizona Public Service Company

4801 Cholla Lake Rd

Joseph City, Arizona 86032

Attn: Doug Lavarney



Authorized for release by:

11/12/2018 3:11:19 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: Cholla

TestAmerica Job ID: 550-112462-1

Qualifiers

HPLC/IC

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.
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: Cholla

TestAmerica Job ID: 550-112462-1

Job ID: 550-112462-1

Laboratory: TestAmerica Phoenix

Narrative

**Job Narrative
550-112462-1**

Comments

No additional comments.

Receipt

The samples were received on 10/27/2018 7:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.5° 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: Cholla

TestAmerica Job ID: 550-112462-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-112462-1	CH-CCR-M-56A-102418	Water	10/24/18 15:32	10/27/18 07:50
550-112462-2	CH-CCR-M-57A-102418	Water	10/24/18 15:08	10/27/18 07:50
550-112462-3	CH-CCR-M-58A-102418	Water	10/24/18 14:47	10/27/18 07:50
550-112462-4	CH-CCR-M-62A-102418	Water	10/24/18 14:07	10/27/18 07:50

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Detection Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Client Sample ID: CH-CCR-M-56A-102418

Lab Sample ID: 550-112462-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000	D2	100	mg/L	50		300.0	Total/NA
Sulfate	630	D2	100	mg/L	50		300.0	Total/NA
Boron	0.24		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	280		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	4100	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	10.8	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-57A-102418

Lab Sample ID: 550-112462-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2100	D2	100	mg/L	50		300.0	Total/NA
Sulfate	1300	D2	100	mg/L	50		300.0	Total/NA
Boron	0.60		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	5000	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.1	H5	1.7	SU	1		SM 4500 H+ B	Total/NA
Temperature	12.2	H5	0.1	Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: CH-CCR-M-58A-102418

Lab Sample ID: 550-112462-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2000	D2	100	mg/L	50		300.0	Total/NA
Sulfate	530	D2	100	mg/L	50		300.0	Total/NA
Boron	0.21		0.050	mg/L	1		200.7 Rev 4.4	Total/NA
Calcium	290		2.0	mg/L	1		200.7 Rev 4.4	Total/NA
Total Dissolved Solids	3900	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	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: CH-CCR-M-62A-102418

Lab Sample ID: 550-112462-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2900	D2	100	mg/L	50		300.0	Total/NA
Sulfate	570	D2	100	mg/L	50		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	5300	D2	100	mg/L	1		SM 2540C	Total/NA
pH	7.5	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

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Client Sample ID: CH-CCR-M-56A-102418

Lab Sample ID: 550-112462-1

Date Collected: 10/24/18 15:32

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000	D2	100	mg/L			11/08/18 04:32	50
Fluoride	ND		0.40	mg/L			11/07/18 07:15	1
Sulfate	630	D2	100	mg/L			11/08/18 04:32	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.24		0.050	mg/L		10/30/18 08:35	10/31/18 23:58	1
Calcium	280		2.0	mg/L		10/30/18 08:35	10/31/18 23:58	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	4100	D2	100	mg/L			10/31/18 09:31	1
pH	7.5	H5	1.7	SU			11/05/18 15:27	1
Temperature	10.8	H5	0.1	Degrees C			11/05/18 15:27	1

Client Sample ID: CH-CCR-M-57A-102418

Lab Sample ID: 550-112462-2

Date Collected: 10/24/18 15:08

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2100	D2	100	mg/L			11/08/18 04:51	50
Fluoride	ND		0.40	mg/L			11/07/18 07:52	1
Sulfate	1300	D2	100	mg/L			11/08/18 04:51	50

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.60		0.050	mg/L		10/30/18 08:35	11/01/18 00:04	1
Calcium	470		2.0	mg/L		10/30/18 08:35	11/01/18 00:04	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5000	D2	100	mg/L			10/31/18 09:31	1
pH	7.1	H5	1.7	SU			11/05/18 15:27	1
Temperature	12.2	H5	0.1	Degrees C			11/05/18 15:27	1

Client Sample ID: CH-CCR-M-58A-102418

Lab Sample ID: 550-112462-3

Date Collected: 10/24/18 14:47

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2000	D2	100	mg/L			11/08/18 05:09	50
Fluoride	ND		0.40	mg/L			11/07/18 08:29	1
Sulfate	530	D2	100	mg/L			11/08/18 05:09	50

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		10/30/18 08:35	11/01/18 00:10	1
Calcium	290		2.0	mg/L		10/30/18 08:35	11/01/18 00:10	1

TestAmerica Phoenix

Client Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Client Sample ID: CH-CCR-M-58A-102418

Lab Sample ID: 550-112462-3

Date Collected: 10/24/18 14:47

Matrix: Water

Date Received: 10/27/18 07:50

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3900	D2	100	mg/L			10/31/18 09:31	1
pH	7.5	H5	1.7	SU			11/05/18 15:27	1
Temperature	11.7	H5	0.1	Degrees C			11/05/18 15:27	1

Client Sample ID: CH-CCR-M-62A-102418

Lab Sample ID: 550-112462-4

Date Collected: 10/24/18 14:07

Matrix: Water

Date Received: 10/27/18 07:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2900	D2	100	mg/L			11/08/18 05:28	50
Fluoride	ND		0.40	mg/L			11/07/18 09:42	1
Sulfate	570	D2	100	mg/L			11/08/18 05:28	50

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		10/30/18 08:35	11/01/18 00:39	1
Calcium	460		2.0	mg/L		10/30/18 08:35	11/01/18 00:39	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5300	D2	100	mg/L			10/31/18 09:31	1
pH	7.5	H5	1.7	SU			11/05/18 15:27	1
Temperature	11.7	H5	0.1	Degrees C			11/05/18 15:27	1

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-161412/1041
Matrix: Water
Analysis Batch: 161412

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			11/07/18 05:43	1
Fluoride	ND		0.40	mg/L			11/07/18 05:43	1
Sulfate	ND		2.0	mg/L			11/07/18 05:43	1

Lab Sample ID: LCS 550-161412/73
Matrix: Water
Analysis Batch: 161412

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	4.15		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-161412/74
Matrix: Water
Analysis Batch: 161412

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	21.6		mg/L		108	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: 550-112724-A-1 MS
Matrix: Water
Analysis Batch: 161412

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	67	M2	20.0	82.8	M2	mg/L		79	80 - 120
Fluoride	3.0		4.00	7.26		mg/L		107	80 - 120

Lab Sample ID: 550-112724-A-1 MS ^10
Matrix: Water
Analysis Batch: 161412

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	100	M1 D2	200	352	D2 M1	mg/L		126	80 - 120

Lab Sample ID: 550-112724-A-1 MSD
Matrix: Water
Analysis Batch: 161412

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	67	M2	20.0	83.0		mg/L		80	80 - 120	0	20
Fluoride	3.0		4.00	7.34		mg/L		109	80 - 120	1	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 550-112724-A-1 MSD ^10

Matrix: Water

Analysis Batch: 161412

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	100	M1 D2	200	353	D2 M1	mg/L		127	80 - 120	0	20

Lab Sample ID: MB 550-161415/1029

Matrix: Water

Analysis Batch: 161415

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			11/08/18 03:37	1
Fluoride	ND		0.40	mg/L			11/08/18 03:37	1
Sulfate	ND		2.0	mg/L			11/08/18 03:37	1

Lab Sample ID: LCS 550-161415/42

Matrix: Water

Analysis Batch: 161415

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		108	90 - 110
Fluoride	4.00	4.14		mg/L		104	90 - 110
Sulfate	20.0	20.5		mg/L		102	90 - 110

Lab Sample ID: LCSD 550-161415/43

Matrix: Water

Analysis Batch: 161415

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	4.15		mg/L		104	90 - 110	0	20
Sulfate	20.0	20.5		mg/L		102	90 - 110	0	20

Lab Sample ID: 550-112462-1 MS

Matrix: Water

Analysis Batch: 161415

Client Sample ID: CH-CCR-M-56A-102418

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2000	D2	1000	3110	D2	mg/L		113	80 - 120
Fluoride	ND	D1 D5	200	210	D1	mg/L		105	80 - 120
Sulfate	630	D2	1000	1750	D2	mg/L		112	80 - 120

Lab Sample ID: 550-112462-1 MSD

Matrix: Water

Analysis Batch: 161415

Client Sample ID: CH-CCR-M-56A-102418

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2000	D2	1000	3100	D2	mg/L		112	80 - 120	0	20
Fluoride	ND	D1 D5	200	211	D1	mg/L		106	80 - 120	1	20
Sulfate	630	D2	1000	1760	D2	mg/L		112	80 - 120	0	20

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-160568/1-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 160568

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.050	mg/L		10/30/18 08:35	10/31/18 22:58	1
Calcium	ND		2.0	mg/L		10/30/18 08:35	10/31/18 22:58	1

Lab Sample ID: LCS 550-160568/2-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.00	0.954		mg/L		95	85 - 115
Calcium	21.0	21.2		mg/L		101	85 - 115

Lab Sample ID: LCSD 550-160568/3-A
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	1.00	0.942		mg/L		94	85 - 115	1	20
Calcium	21.0	21.2		mg/L		101	85 - 115	0	20

Lab Sample ID: 550-112461-D-1-A MS
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Boron	0.32		1.00	1.31		mg/L		99	70 - 130
Calcium	710	M3	21.0	700	M3	mg/L		-63	70 - 130

Lab Sample ID: 550-112461-D-1-B MSD
Matrix: Water
Analysis Batch: 160783

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 160568

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Boron	0.32		1.00	1.33		mg/L		101	70 - 130	2	20
Calcium	710	M3	21.0	709	M3	mg/L		-17	70 - 130	1	20

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

Lab Sample ID: MB 550-160668/1
Matrix: Water
Analysis Batch: 160668

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			10/31/18 09:31	1

TestAmerica Phoenix

QC Sample Results

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

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

Lab Sample ID: LCS 550-160668/2
Matrix: Water
Analysis Batch: 160668

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 550-160668/3
Matrix: Water
Analysis Batch: 160668

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: 550-112462-1 DU
Matrix: Water
Analysis Batch: 160668

Client Sample ID: CH-CCR-M-56A-102418
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	4100	D2	3890	D2	mg/L		5	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-161037/1
Matrix: Water
Analysis Batch: 161037

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		99.3	98.5 - 101.5

Lab Sample ID: LCSSRM 550-161037/13
Matrix: Water
Analysis Batch: 161037

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: 550-112464-A-4 DU
Matrix: Water
Analysis Batch: 161037

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	13.1	H5	13.6	H5	Degrees C		4	

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

HPLC/IC

Analysis Batch: 161412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112462-1	CH-CCR-M-56A-102418	Total/NA	Water	300.0	
550-112462-2	CH-CCR-M-57A-102418	Total/NA	Water	300.0	
550-112462-3	CH-CCR-M-58A-102418	Total/NA	Water	300.0	
550-112462-4	CH-CCR-M-62A-102418	Total/NA	Water	300.0	
MB 550-161412/1041	Method Blank	Total/NA	Water	300.0	
LCS 550-161412/73	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161412/74	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112724-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
550-112724-A-1 MS ^10	Matrix Spike	Total/NA	Water	300.0	
550-112724-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
550-112724-A-1 MSD ^10	Matrix Spike Duplicate	Total/NA	Water	300.0	

Analysis Batch: 161415

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112462-1	CH-CCR-M-56A-102418	Total/NA	Water	300.0	
550-112462-2	CH-CCR-M-57A-102418	Total/NA	Water	300.0	
550-112462-3	CH-CCR-M-58A-102418	Total/NA	Water	300.0	
550-112462-4	CH-CCR-M-62A-102418	Total/NA	Water	300.0	
MB 550-161415/1029	Method Blank	Total/NA	Water	300.0	
LCS 550-161415/42	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-161415/43	Lab Control Sample Dup	Total/NA	Water	300.0	
550-112462-1 MS	CH-CCR-M-56A-102418	Total/NA	Water	300.0	
550-112462-1 MSD	CH-CCR-M-56A-102418	Total/NA	Water	300.0	

Metals

Prep Batch: 160568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112462-1	CH-CCR-M-56A-102418	Total/NA	Water	200.7	
550-112462-2	CH-CCR-M-57A-102418	Total/NA	Water	200.7	
550-112462-3	CH-CCR-M-58A-102418	Total/NA	Water	200.7	
550-112462-4	CH-CCR-M-62A-102418	Total/NA	Water	200.7	
MB 550-160568/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-160568/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-160568/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-112461-D-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-112461-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 160783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112462-1	CH-CCR-M-56A-102418	Total/NA	Water	200.7 Rev 4.4	160568
550-112462-2	CH-CCR-M-57A-102418	Total/NA	Water	200.7 Rev 4.4	160568
550-112462-3	CH-CCR-M-58A-102418	Total/NA	Water	200.7 Rev 4.4	160568
550-112462-4	CH-CCR-M-62A-102418	Total/NA	Water	200.7 Rev 4.4	160568
MB 550-160568/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	160568
LCS 550-160568/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	160568
LCSD 550-160568/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-D-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	160568
550-112461-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	160568

TestAmerica Phoenix

QC Association Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

General Chemistry

Analysis Batch: 160668

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112462-1	CH-CCR-M-56A-102418	Total/NA	Water	SM 2540C	
550-112462-2	CH-CCR-M-57A-102418	Total/NA	Water	SM 2540C	
550-112462-3	CH-CCR-M-58A-102418	Total/NA	Water	SM 2540C	
550-112462-4	CH-CCR-M-62A-102418	Total/NA	Water	SM 2540C	
MB 550-160668/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 550-160668/2	Lab Control Sample	Total/NA	Water	SM 2540C	
LCSD 550-160668/3	Lab Control Sample Dup	Total/NA	Water	SM 2540C	
550-112462-1 DU	CH-CCR-M-56A-102418	Total/NA	Water	SM 2540C	

Analysis Batch: 161037

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-112462-1	CH-CCR-M-56A-102418	Total/NA	Water	SM 4500 H+ B	
550-112462-2	CH-CCR-M-57A-102418	Total/NA	Water	SM 4500 H+ B	
550-112462-3	CH-CCR-M-58A-102418	Total/NA	Water	SM 4500 H+ B	
550-112462-4	CH-CCR-M-62A-102418	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161037/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-161037/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
550-112464-A-4 DU	Duplicate	Total/NA	Water	SM 4500 H+ B	

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Client Sample ID: CH-CCR-M-56A-102418

Lab Sample ID: 550-112462-1

Date Collected: 10/24/18 15:32

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 07:15	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161415	11/08/18 04:32	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	10/31/18 23:58	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160668	(Start) 10/31/18 09:31 (End) 11/01/18 08:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	TAL PHX

Client Sample ID: CH-CCR-M-57A-102418

Lab Sample ID: 550-112462-2

Date Collected: 10/24/18 15:08

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 07:52	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161415	11/08/18 04:51	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:04	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160668	(Start) 10/31/18 09:31 (End) 11/01/18 08:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	TAL PHX

Client Sample ID: CH-CCR-M-58A-102418

Lab Sample ID: 550-112462-3

Date Collected: 10/24/18 14:47

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 08:29	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161415	11/08/18 05:09	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:10	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160668	(Start) 10/31/18 09:31 (End) 11/01/18 08:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	MRR	TAL PHX

Lab Chronicle

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

Client Sample ID: CH-CCR-M-62A-102418

Lab Sample ID: 550-112462-4

Date Collected: 10/24/18 14:07

Matrix: Water

Date Received: 10/27/18 07:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	161412	11/07/18 09:42	NEL	TAL PHX
Total/NA	Analysis	300.0		50	161415	11/08/18 05:28	NEL	TAL PHX
Total/NA	Prep	200.7			160568	10/30/18 08:35	SGO	TAL PHX
Total/NA	Analysis	200.7 Rev 4.4		1	160783	11/01/18 00:39	SRA	TAL PHX
Total/NA	Analysis	SM 2540C		1	160668	(Start) 10/31/18 09:31 (End) 11/01/18 08:15	YET	TAL PHX
Total/NA	Analysis	SM 4500 H+ B		1	161037	11/05/18 15:27	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: Cholla

TestAmerica Job ID: 550-112462-1

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

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

Method Summary

Client: Arizona Public Service Company
Project/Site: Cholla

TestAmerica Job ID: 550-112462-1

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

112462

TestAmerica Phoenix
4625 E Cotton Center Blvd
Suite 189
Phoenix, AZ 85040
phone 602.437.3340 fax 602.454.9303

Regulatory Program: DW NPDES RCRA Other: CCR

TestAmerica Laboratories, Inc.

Client Contact		Doug Lavarnway		928-587-0319		Analysis Turnaround Time		Doug Lavarnway		Date: 10/26/2018		COC No. _____ of _____ COCs	
4801 Cholla Lake Rd		Joseph City, AZ 86032		(928) 587-0319		Phone		Lab Contact:		Carrier:		Sampler: _____	
(xxx) xxx-xxxx		FAX		TAT if different from Below		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Perform MS / MSD (Y / N)				For Lab Use Only: Walk-in Client: Lab Sampling:	
Project Name:		Site:		P O #		Sample Identification		Filtered Sample (Y / N)				Job / SDG No.:	
Sample Date		Sample Time		Sample Type (G=Comp G=Grab)		Matrix		# of Cont.		EPA 200.7 (B, Ca)		Sample Specific Notes:	
CH-CCR-M-56A-102418		10/24/2018		1532 G		W		2		EPA 300.0 (Cl, F, SO4)		201	
CH-CCR-M-57A-102418		10/24/18		1508 G		W		2		SM 2540C (TDS)		202	
CH-CCR-M-58A-102418		10/24/18		1447 G		W		2		SM 4500-HB (pH)		203	
CH-CCR-M-62A-102418		10/24/18		1407 G		W		2				204	



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:

Non-hazard
 Flammable
 Skin Irritant
 Poison B
 Unknown
 Return to Client
 Disposal by Lab
 Archive for _____ Months

Cooler Temp. (°C): Obs'd: 4.5°C

Therm ID No.: DG

Relinquished by: [Signature] Company: APS Date/Time: 10/26/18 Received by: [Signature] Date/Time: 10/22/18

Relinquished by: [Signature] Company: APS Date/Time: 10/22/18 Received in Laboratory by: [Signature] Date/Time: 10/22/18

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-112462-1

Login Number: 112462

List Source: TestAmerica Phoenix

List Number: 1

Creator: Doerr, Bret C

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.

APPENDIX E

DATA VALIDATION REPORTS FOR DETECTION AND ASSESSMENT MONITORING



TECHNICAL MEMORANDUM

DATE: July 23, 2018 **PROJECT:** 897.0703
TO: Doug Lavarney
Michele Robertson
FROM: Marla Odom, Alyssa Miller, and Leslie Katz
SUBJECT: Cholla CCR Data Validation Report – February, May and June
Sampling Rounds (Two Full Rounds; one re-sample of M-52A)

SUMMARY

In accordance with our scope of work, Montgomery & Associates (M&A) has reviewed field sampling procedures and conducted a quality assurance/quality control evaluation of laboratory results for groundwater monitoring associated with the Coal Combustion Residuals (CCR) program at the Cholla Power Plant (Site). Observations and recommendations summarized below are based on a comparison of field and laboratory procedures with the Cholla CCR Groundwater Sampling and Analysis Plan (SAP), dated November 30, 2015 (M&A, 2015). Monitoring covered by this data validation report includes two sampling rounds that were conducted in February and May of 2018, and one re-sample of well M-52A in June of 2018.

FIELD SAMPLING OBSERVATIONS & RECOMMENDATIONS

Purging and Sampling

Drawdown and Purge Volumes

Field forms occasionally indicate that wells have “negative” drawdown or no drawdown (from the static depth to water measurement) at the time of sampling. When this occurs, the discrepancy indicates that there is likely to be a measurement error or a data entry issue.

February 14-15 Monitoring Round

1. The drawdown limit of 0.30 feet was not exceeded during low-flow purging at any of the wells.
2. All total purge volumes were indicated on field forms.

May 19-25 Monitoring Round

1. The drawdown limit of 0.30 feet was exceeded during low-flow purging at well W-314; the drawdown was 0.33 feet.
2. One well (M-62A) had an initial water level measurement that appears to be inconsistent with the water level measurements taken with the parameter measurements. Instead of using the initial measurement, the water level associated with parameter measurement was used, and drawdown does not exceed 0.3 feet. **However, APS may want to revisit the issue of the recorded depth to water at the top of the field sheet, as it appears to be about 4 feet deeper than the other measurements that day.**
3. One well (M-58A) had no total purge volume indicated on the field form.
4. The purge volume for well M-61A indicated “4800”, which was assumed to be in mL (4.8L).

June 7 Re-sample of M-52A

No issues.

Parameter Stability

Dissolved Oxygen (DO) was the most common parameter that was not stable at the time of sampling for all monitoring rounds. In most cases, DO was the only parameter that was not stable. The substantial number of wells with DO stabilization issues suggests that the meter should be checked prior to each sampling round.

February 14-15 Monitoring Round

Parameter stabilization criteria were not met at 6 of the 9 wells that were sampled.

1. Three of the 9 wells sampled were stable for all parameters (M-51A, W-306, and W-123).
2. Six of the wells were not stable for DO, and DO was the only parameter that was not stable in 4 of these 6 wells. The percent difference ranged from about 20 percent to about 70 percent.
3. Turbidity was not stable at the time of sampling for two wells (M-52A and M-64A).
4. ORP was not stable for one well (M-52A).
5. Temperature was stable for all wells sampled.
6. Conductivity and pH were stable for all wells sampled.

May 19-25 Monitoring Round

A total of 17 wells were sampled. Of these, 15 wells had enough measurements to evaluate parameter stabilization, and 2 wells (W-123 and M-51A) did not have a third set of parameters recorded on the field forms. **Therefore, parameter stability could not be evaluated for W-123 and M-51A.** Of the 15 wells with sufficient data for analysis:

1. One well (M-64A) was stable for all parameters, and parameter stabilization criteria were not met at 14 wells.

2. Fourteen of the wells were not stable for DO, and DO was the only parameter that was not stable in 5 of these 14 wells. The percent difference ranged from 11 percent about 88 percent.
3. Turbidity was not stable at the time of sampling for one well (M-52A).
4. ORP was not stable for 8 wells (M-51A, M-54, M-56A, M-57A, M-58A, M-59, M-60, and M-61).
5. Temperature was not stable for six of the wells (M-50A, M-52A, M-57A, M-58A, M-59, and M-61).
6. Conductivity and pH were stable for all 15 wells.

June 7 Re-sample of M-52A

Parameters were all stable with the exception of turbidity and ORP. While Doug Lavarnway indicated that his meter indicated that turbidity was stable at the time of sampling, the stability criteria established in the SAP were not met. **We recommend reviewing the turbidity meter's internal stability criteria and confirming that it is consistent with the criteria specified in the SAP.**

Field Duplicates/Field Blanks

February 14-15 Monitoring Round

Field duplicates were taken at two wells (M-50A and W-306). No issues were found with the duplicate samples.

May 19-25 Monitoring Round

Field duplicates were taken at two wells (M-53A and M-57A). No issues were found with the duplicate samples.

June 7 Re-sample of M-52A

No duplicate collected.

Quality Control Sampling

1. During all sampling rounds, duplicate samples were obtained at the appropriate frequency of 10 percent of the total number of groundwater samples collected during each monitoring event.
2. The SAP recommendation to collect at least one equipment blank (rinsate blank) per sampling round was not followed during the sampling events.
3. **M&A recommends that the protocol of obtaining at least one equipment blank (rinsate blank) per sampling round be implemented during subsequent sampling rounds.**

Sample Chain of Custody (COC)

February 14-15 Monitoring Round

- No COC issues were identified.

May 19-25 Monitoring Round

- The sample time indicated on the field form (16:40) differs from the chain of custody (COC) sent to the laboratory (16:38). The laboratory report reflects the COC sample time of 16:38.

June 7 Re-sample of M-52A

- No issues.

DATA QUALITY/VALIDITY ISSUES AND RECOMMENDATIONS

February 14-15 Monitoring Round

1.) Unusually high arsenic and lead values for one sample

Report 550-98153-1:

CH-CCR-M52A-21518 – arsenic = 0.0018 mg/L and lead = 0.0010 mg/L.

- *Requested re-analysis*
- *Lab re-analysis confirmed arsenic at 0.0016 mg/L. Keep original value.*
- *Lab re-analysis **did not confirm** lead value at 0.00056 mg/L. Lab did not have enough sample to re-analyze and did not address discrepancy in report narrative. See report issues below for status on this sample and report.*

2.) Unusually low molybdenum values for one sample

Report 550-98153-1:

CH-CCR-M53A-21518 – molybdenum = 0.0059.

- *Requested re-analysis*
- *Lab re-analysis confirmed molybdenum at 0.0053 mg/L. Keep original value.*

3.) Reporting issues on 550-98153-1

- Lab re-analysis **did not confirm** lead value on CH-CCR-M52A-21518 and there was not enough sample to re-analyze.
 - *M&A requested that the lab address the analysis discrepancy in the report narrative to help determine whether to accept or reject the original value. Multiple requests to address this issue within the report narrative (beginning on April 19th), have gone without reply. The lab has been contacted approximately every 2 weeks on this issue and M&A is still awaiting the lab's official position on the discrepancy and a revision to the report narrative.*

- Lab re-analyses, as well as reporting of total radium was received in a secondary report named “550-98153-3”. No report has been issued with total radium accompanying the Ra-226 and Ra-228 values.
 - *When Test America revises the report narrative regarding lead, they have also been asked to include the total radium values in the report. The revised report, when issued, should reflect “Revision 2”. Revision 1 added Ra-226 and Ra-228 data to the main report, but not total radium.*

May 19-25 Monitoring Round

RPD exceedances on fluoride

Report 550-103238-1:

CH-CCR-M-53A-52018 – fluoride = 2.4 mg/L

CH-CCR-FD01-52018 – fluoride = 3.3 mg/L (anomalously high vs. historic)

RPD = 31.6%

- *Requested re-analysis of the field duplicate*
- *Lab re-analysis **did not confirm** duplicate fluoride value at 2.6 mg/L. An additional re-analysis yielded 2.3 mg/L, confirming the original re-analysis results. Lab therefore replaced initial result of 3.3 with re-analysis value of 2.6 in a revised report.*

Mass balance error on M-52A

Report 550-103238-1:

CH-CCR-M-52A-52018 – chloride was a bit high (4,500 mg/L), and sodium was low (1,800 mg/L) on this sample. Mass balance was 13.66% (<10% is acceptable)

- *Requested re-analysis of both parameters*
- *Lab re-analysis confirmed chloride at 4,600 mg/L. Keep original value.*
- *Lab re-analysis **did not confirm** sodium value at 2,400 mg/L. An additional re-analysis yielded 2,500 mg/L, confirming the original re-analysis results. Lab therefore replaced initial result of 1,800 with re-analysis value of 2,400 in a revised report. This replacement improved the mass balance error to 5.4%, which is well within acceptable range.*

Mass balance error on W-305

Report 550-103238-1:

CH-CCR-W-305-51918 – chloride was a bit high (2,700 mg/L), and sulfate was a bit high (2,800 mg/L) on this sample. Mass balance was 11% (<10% is acceptable)

- *Requested re-analysis of the both parameters*
- *Lab re-analysis confirmed chloride at 2,700 mg/L. Keep original value.*
- *Lab re-analysis confirmed sulfate at 2,300 mg/L. Keep original value.*
- *Please note – The re-analysis value for sulfate changed enough to fix the mass balance error. However, the lab has indicated that the sulfate*

values are within an acceptable RPD to consider the original values good, and as such, did not do a second re-analysis. We will likewise consider the original results as good, since the lab feels that confirmation was achieved. Mass balance of 11% will be deemed acceptable in this case.

RPD exceedances on arsenic

Report 550-103239-2:

CH-CCR-M-57A-52118 – arsenic = 0.0022 mg/L

CH-CCR-FD02-52118 – arsenic = 0.0028 mg/L

RPD = 24%

- *Due to the very low concentrations involved, and RPD just over the criterion of 20%, M&A does not recommend, and did not request re-analysis.*

RPD exceedances on chromium

Report 550-103239-2:

CH-CCR-M-57A-52118 – chromium = 0.0023 mg/L

CH-CCR-FD02-52118 – chromium = 0.0031 mg/L

RPD = 29.63%

- *Due to the very low concentrations involved, and RPD just over the criterion of 20%, M&A does not recommend, and did not request re-analysis. Results are all consistent with historic data.*

High 200.8LL metals results

Report 550-103238-2:

CH-CCR-M-52A-52018 – Of the 10 metals analyzed under EPA 200.8LL method:

- Six returned anomalously high results (generally about 1.5-2 times greater than any detection that we have seen in the past on arsenic, chromium, cobalt, lead, molybdenum, selenium)
- 3 were within the normal range (antimony, cadmium, thallium)
- 1 was on the very high end of what we have seen historically (barium)

Turbidity was not stable at the time of sample collection during the May round, and appears to have still been coming down from a very high starting value for well M-52A. The table below shows the most recent turbidity against other recent sampling events. May data are highlighted. “Turbidity 1” was the measurement at the time of sampling, and “Turbidity 3” was the first of the three measurements. The starting value of 113.2 was much higher than previous sampling rounds at this well, as was the final value of 27.7.

Turbidity 1_(NTU) Measurement at time of sample collection	Turbidity 2_(NTU)	Turbidity 3_(NTU)	Turb Percent Diff	Turbidity Stable?
11.1	11.7	11.1	5.13	Stable
12.2	10.9	13	16.15	Not Stable
14.1	14.2	14.9	5.37	Stable
3.4	3.6	4.8	29.17	Stable
5.2	5.8	6.3	17.46	Not Stable
27.7	88.4	113.2	75.53	Not Stable

It is believed that the sample itself was problematic, and not the lab analysis, for the following reasons:

- The high number of problematic analytes
 - The fact that our M-52A sample was used for the Matrix Spike (MS) and Matrix Spike Duplicate (MSD) for the analysis batch (effectively demonstrating that the result has already undergone confirmation processes)
 - Apparent lack of parameter stability on M-52A
- *M&A recommended re-sampling M-52A.*
- *M&A recommends rejecting all M-52A results collected on 5/20/2018.*

June 7 Re-sample of M-52A

Report 550-104209-1:

CH-CCR-M-52A-6718 – chloride was a bit high (4600 mg/L) on this sample. Mass balance was 10.36% (<10% is acceptable). Chloride is the most apparent contributor to the mass balance error.

- *Requested re-analysis (based on SVL indicating that they would not charge for re-analyses). Lab indicated that because the sample was used for the MS/MSD, there is no volume left to reanalyze. Re-analysis was not expected to yield differing results for the following reasons:*
- Our sample was used for the MS/MSD, effectively meaning that the result has already undergone confirmation processes in the lab.
 - Re-analysis is not expected to yield differing results, or results that differ enough for the lab to override their original result.

Recent re-analyses that could have corrected mass balance have been found by the lab to be within “confirmation range” of the original result. We expect this would have been the case for this sample. Even if re-analysis yielded a different result, it would likely have been confirmation range, and therefore the lab would not have replaced the original result or re-analyzed a third time if they could have.

- All parameters feeding into the mass balance equation are consistent with historic data. Since the error is just above 10%, we believe that several parameters are off just enough to drive the mass balance over 10%. We will consider 10.36% acceptable in this case.

Report 550-104209-2:

CH-CCR-M-52A-6718 – lead was a bit high (0.0010 mg/L), and selenium was a bit high (0.0013 mg/L) on this sample.

Lead value is identical to the questionable value from February for M-52A, whose results were not confirmed by the lab during re-analysis (re-analysis value was 0.00056 mg/L), but lab did not have enough sample to re-analyze a third time in February.

- *Requested re-analysis of both parameters (based on SVL indicating that they would not charge for re-analyses). Lab indicated that because the sample was used for the MS/MSD, there is no volume left to reanalyze.*
- *February lead and selenium values are consistent with each other, even though they are higher than past data. Both samples had questionable lead results. It cannot be determined if the lead value has reached a new normal, or if there are reporting issues at the lab.*
- ***M&A recommends requesting that the lab not use M-52A for the MS/MSD for the next sampling round, in case a re-analysis is needed again. The last 3 samples at M-52A have had issues that are difficult to resolve because it is consistently used for the MS/MSD and there is not enough sample left for re-analysis. In addition to making this request with the lab, the chances of M-52A being used for the MS/MSD might decrease if it is moved lower on the COC, instead of being the first sample listed each time.***
- *Due to inability to re-sample, and consistency with February results, M&A recommends keeping the original data for both parameters. This suggestion can be revisited after additional sampling results are received.*

REFERENCE

Montgomery & Associates, 2015, Groundwater Sampling and Analysis Program, Cholla Power Plant, Joseph City, Arizona, Document #CH_GW_SAP_021_11-30-15: report prepared for APS, November 30, 2015.

TECHNICAL MEMORANDUM

DATE: November 20, 2018 **PROJECT:** 897.0703
TO: Doug Lavarney
Michele Robertson
FROM: Marla Odom, Alyssa Miller, and Leslie Katz
SUBJECT: Cholla CCR Data Validation Report – August 2018 Sampling Round

SUMMARY

In accordance with our scope of work, Montgomery & Associates (M&A) has reviewed field sampling procedures and conducted a quality assurance/quality control evaluation of laboratory results for groundwater monitoring associated with the Coal Combustion Residuals (CCR) program at the Cholla Power Plant (Site). Observations and recommendations summarized below are based on a comparison of field and laboratory procedures with the Cholla CCR Groundwater Sampling and Analysis Plan (SAP), dated November 30, 2015 (M&A, 2015). Monitoring covered by this data validation report includes one sampling round of SEDI wells that was conducted on August 28, 2018.

FIELD SAMPLING OBSERVATIONS & RECOMMENDATIONS

Purging and Sampling

Drawdown and Purge Volumes

Field forms occasionally indicate that wells have “negative” drawdown or no drawdown (from the static depth to water measurement) at the time of sampling. When this occurs, the discrepancy indicates that there is likely to be a measurement error or a data entry issue.

1. The drawdown limit of 0.30 feet was not exceeded during low-flow purging at any of the wells.
2. All total purge volumes were indicated on field forms.
3. Three of the wells had zero drawdown measured (M-62A, M-58A, and M-57A).

Parameter Stability

Dissolved Oxygen (DO) was the most common parameter that was not stable at the time of sampling. The substantial number of wells with DO stabilization issues suggests that the meter should be checked prior to each sampling round.

Parameter stabilization criteria were not met at any of the wells that were sampled (M-56A, M-57A, M-58A, and M-62A).

1. All four of the wells were not stable for DO, and DO was the only parameter that was not stable in 2 of the 4 wells. The percent difference ranged from about 60 percent to greater than 90 percent. This was primarily caused by the first DO measurement being significantly higher than the last two measurements prior to sample collection.
2. Temperature was not stable at the time of sampling for two wells, M-56A and M-57A, which were slightly above the 3% stability criteria at 8.26% and 6.82%.
3. pH was not stable at the time of sampling for two wells, M-56A and M-57A, which were above the 0.1 s.u. stability criteria.

Field Duplicates/Field Blanks

A field duplicate was taken at one well (M-58A). No issues were found with the duplicate sample.

Quality Control Sampling

1. During the sampling round, duplicate samples were obtained at the appropriate frequency of 10 percent of the total number of groundwater samples collected during each monitoring event.
2. The SAP recommendation to collect at least one equipment blank (rinsate blank) per sampling round was not followed during the sampling event.
3. **M&A recommends that the protocol of obtaining at least one equipment blank (rinsate blank) per sampling round be implemented during subsequent sampling rounds.**

Sample Chain of Custody (COC)

No COC issues were identified.

DATA QUALITY/VALIDITY ISSUES AND RECOMMENDATIONS

No water quality issues were identified with the data. Data was very consistent with historical data, and no anomalies were noted.

OUTSTANDING ISSUES

The previous reporting issue for report 550-98153 (February sampling round) has still not been addressed by the lab in a final report re-issue. The lab has been contacted about this report narrative addition and re-issue over 10 times since April of 2018, including a sit-down meeting in August at M&A with the new Test America account representative, Jeanie Elsholz. During the meeting, many issues with APS reports were reviewed, including the lack of final product on this particular report after numerous attempts to get it finalized with a descriptive narrative and with radium data added. The following information was sent to Jeanie Elsholz after the meeting:

550-98153 - Requested revised report with all original and re-analysis data, all total radium (including total radium 226 + 228), and a narrative addressing the differences in lead concentrations that helps give us either guidance or justification to reject or keep the original data. This is the report that I have written to TA about eight times. In the last correspondence, I was send a narrative for review (on 7/23), but still have not received a final report. Correspondence began on April 19th. Sample was collected in February.

Since the requested re-issue of this report, an identical lead value was received for the June sample which could not be re-analyzed. The descriptions of the two issues are listed below. The need for a report narrative addition on 550-98153 may now be a moot point, since another value of the same magnitude has since been received. M&A would still like to have the narrative added to demonstrate due diligence at the time of the first noted increase. The lab must re-issue the report in any event to include the total radium data.

M&A is still in the process of trying to get a finalized copy of report 550-98153 with the approved narrative and radium data added. This issue only affects the final report, and not the data used for statistical analysis, since we are choosing to keep the original reported values, which were provided to APS for statistical analyses.

From previous validation memo:

Report 550-98153-1:

- Lab re-analysis **did not confirm** lead value on CH-CCR-M52A-21518 and there was not enough sample to re-analyze.
 - *M&A requested that the lab address the analysis discrepancy in the report narrative to help determine whether to accept or reject the original value. Multiple requests to address this issue within the report narrative (beginning on April 19th), have gone without reply. The lab has been contacted approximately every 2 weeks on this issue and M&A is still awaiting the lab's official position on the discrepancy and a revision to the report narrative.*
- Lab re-analyses, as well as reporting of total radium was received in a secondary report named "550-98153-3". No report has been issued with total radium accompanying the Ra-226 and Ra-228 values.

- *When Test America revises the report narrative regarding lead, they have also been asked to include the total radium values in the report. The revised report, when issued, should reflect “Revision 2”. Revision 1 added Ra-226 and Ra-228 data to the main report, but not total radium.*

Report 550-104209-2:

CH-CCR-M-52A-6718 – lead (0.0010 mg/L) and selenium were a bit high (0.0013 mg/L) on this sample.

Lead value is identical to the questionable value from February for M-52A, whose results were not confirmed by the lab during re-analysis (re-analysis value was 0.00056 mg/L), but lab did not have enough sample to re-analyze a third time in February.

- *Requested re-analysis of both parameters (based on Test America indicating that they would not charge for re-analyses). Lab indicated that because the sample was used for the MS/MSD, there is no volume left to reanalyze.*
- *February lead and selenium values are consistent with each other, even though they are higher than past data. Both samples had questionable lead results. It cannot be determined if the lead value has reached a new normal, or if there are reporting issues at the lab.*
- *M&A recommends requesting that the lab not use M-52A for the MS/MSD for the next sampling round, in case a re-analysis is needed again. The last three samples at M-52A have had issues that are difficult to resolve because it is consistently used for the MS/MSD and there is not enough sample left for re-analysis. In addition to making this request with the lab, the chances of M-52A being used for the MS/MSD might decrease if it is moved lower on the COC, instead of being the first sample listed each time.*
- *Due to inability to re-sample, and consistency with February results, M&A recommends keeping the original data for both parameters. This suggestion can be revisited after additional sampling results are received.*

REFERENCE

Montgomery & Associates, 2015, Groundwater Sampling and Analysis Program, Cholla Power Plant, Joseph City, Arizona, Document #CH_GW_SAP_021_11-30-15: report prepared for APS, November 30, 2015.

TECHNICAL MEMORANDUM

DATE: December 19, 2018 **PROJECT:** 897.0703
TO: Doug Lavarney
Michele Robertson
FROM: Marla Odom, Alyssa Miller, and Leslie Katz
SUBJECT: Cholla CCR Data Validation Report – October 2018 Sampling Round

SUMMARY

In accordance with our scope of work, Montgomery & Associates (M&A) has reviewed field sampling procedures and conducted a quality assurance/quality control evaluation of laboratory results for groundwater monitoring associated with the Coal Combustion Residuals (CCR) program at the Cholla Power Plant (Site). Observations and recommendations summarized below are based on a comparison of field and laboratory procedures with the Cholla CCR Groundwater Sampling and Analysis Plan (SAP), dated November 30, 2015 (M&A, 2015). Monitoring covered by this data validation report was conducted in October of 2018.

FIELD SAMPLING OBSERVATIONS & RECOMMENDATIONS

Purging and Sampling

Drawdown and Purge Volumes

Field forms occasionally indicate that wells have “negative” drawdown or no drawdown (from the static depth to water measurement) at the time of sampling. When this occurs, the discrepancy indicates that there is likely to be a measurement error or a data entry issue.

1. The drawdown limit of 0.3 feet was exceeded during low-flow purging at well W-314; the drawdown was 0.35 feet.
2. All total purge volumes were indicated on field forms.

Parameter Stability

Dissolved Oxygen (DO) was the most common parameter that was not stable at the time of sampling. The substantial number of wells with DO stabilization issues suggests that the meter should be checked prior to each sampling round.

Parameter stabilization criteria were not met at 13 of the 17 wells that were sampled.

1. Four of the 17 wells sampled were stable for all parameters (M-62A, M-57A, M-56A, and M-50A).
2. Twelve of the wells were not stable for DO, and DO was the only parameter that was not stable in 6 of these 12 wells. The percent difference ranged from about 12 percent to 69 percent.
3. Turbidity was not stable at the time of sampling for two wells (M-52A and M-64A).
4. Oxidation Reduction Potential (ORP) was not stable for five wells, ranging from slightly greater than 10 millivolts (mV) difference to about 30 mV difference between the three measurements leading up to sampling.
5. Temperature and conductivity were stable for all wells sampled.
6. pH was stable for all wells sampled, except for well M-64A.

Field Duplicates/Field Blanks

Field duplicates were taken at two wells (M-64A, W-123). No issues were found with the duplicate samples.

A second sample was indicated on the field form for M-62A with an identifier that is not consistent with APS duplicate sampling nomenclature. This sample was named CH-VRP-M-62A-102418. No results were received from the lab for this sample.

Four samples were marked as “Split Samples” on field forms (M-50A, M-52A, W-306, and W-314). No information or lab data on these split samples has been provided by APS, and no QA/QC has been conducted to compare one set of lab results to the other by M&A.

Quality Control Sampling

1. During the sampling round, duplicate samples were obtained at the appropriate frequency of 10 percent of the total number of groundwater samples collected during each monitoring event.
2. The SAP recommendation to collect at least one equipment blank (rinsate blank) per sampling round was not followed during the sampling event.
3. **M&A recommends that the protocol of obtaining at least one equipment blank (rinsate blank) per sampling round be implemented during subsequent sampling rounds.**

Sample Chain of Custody (COC)

No COC issues were identified.

DATA QUALITY/VALIDITY ISSUES AND RECOMMENDATIONS

Unusually high molybdenum value for one sample

Report 550-112451:

CH-CCR-M-51A-102418 – molybdenum = 0.090 mg/L (usually less than half this value).

- *M&A requested re-analysis.*
- *Re-analysis of 0.092 mg/L confirmed original result. Keep original value.*

OUTSTANDING ISSUES

The previous reporting issue for report 550-98153 (February sampling round) is still in process of being addressed by the lab in a final report re-issue. Test America has responded that this particular work order is stored in their system in three parts and that merging into one report is confusing and proving difficult. Ken Baker attempted another report generation that is in preliminary form at the moment, but still has issues. This report will likely be resolved this month.

REFERENCE

Montgomery & Associates, 2015, Groundwater Sampling and Analysis Program, Cholla Power Plant, Joseph City, Arizona, Document #CH_GW_SAP_021_11-30-15: report prepared for APS, November 30, 2015.

APPENDIX F

MONTGOMERY & ASSOCIATES REPORT DOCUMENTING STATISTICAL ANALYSIS OF BASELINE CCR RULE APPENDIX III DATA





**MONTGOMERY
& ASSOCIATES**

Water Resource Consultants

REVISED REPORT

May 22, 2018

Prepared for:



Cholla Power Plant Coal Combustion Residuals Program - Statistical Analysis of Baseline Groundwater Monitoring Data November 2015 through September 2017 Navajo County, Arizona

May 22, 2018

Revised Report

Cholla Power Plant Coal Combustion Residuals Program – Statistical Analysis of Baseline Groundwater Monitoring Data – November 2015 through September 2017

ARIZONA PUBLIC SERVICE, NAVAJO COUNTY, ARIZONA

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Figure 1. Site Location

Figure 2. CCR Units and Groundwater Monitoring Well Locations

1 INTRODUCTION

1.1 Description of Revision

This report comprises a revised version of the *Cholla Power Plant Coal Combustion Residuals Program – Statistical Analysis of Baseline Groundwater Monitoring Data – November 2015 through September 2017*, which Montgomery & Associates (M&A) originally submitted to Arizona Public Service (APS) on January 12, 2018. The reason for the report revision was to ensure that the protocol followed for statistical analyses was consistent with the approach described and certified in M&A’s report entitled *Cholla Power Plant Coal Combustion Residuals Program – Statistical Method Selected for Evaluation of Groundwater Monitoring Data*, dated September 19, 2017. In that report, M&A indicated that we would utilize upper prediction limits to establish background concentrations for each detection monitoring constituent at each Coal Combustions Residuals (CCR) unit, based on the requirements of CCR Rule, 40CFR 257.93(f)(3). This approach is highly regarded in the Environmental Protection Agencies (EPA’s) *Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (EPA, 2009). However, in M&A’s January 12, 2018 statistical analysis report we mistakenly used upper confidence rather than upper prediction limits. Since this is inconsistent with the approach laid out in our statistical method selection report, M&A is submitting this revised report.

Upper prediction limits are by definition higher than upper confidence limits; therefore, revised background concentrations for many of the constituents at the CCR units are somewhat higher than those originally developed using the upper confidence limit approach. In most cases these increases are minor, and in only one case did revised results change the evaluation relative to exceedances of a specific detection monitoring constituent down-gradient from a specific CCR unit. Specifically, for the Fly Ash Pond (FAP), results of the revised evaluation no longer show that total dissolved solids concentrations are elevated down-gradient from the unit relative to background. Because six other detection monitoring constituents continue to show statistically significant increases above background, there is no change in the conclusion that assessment monitoring should be initiated at the FAP.

1.2 Site and CCR Units

The APS Cholla Power Plant (Cholla) is located between the City of Winslow and the City of Holbrook in Navajo County, Arizona, as shown on **Figure 1**. Situated north of

the Little Colorado River (LCR), the facility has four CCR units that are subject to requirements for the EPA Coal Combustion Residual (CCR) Rule (the Rule). The CCR units at Cholla, all of which are currently active, are shown on **Figure 2** and include: the FAP, Bottom Ash Pond (BAP), Bottom Ash Monofill (BAM), and Sedimentation Pond (SEDI). Wells included in the CCR monitoring networks associated with each unit are also shown on **Figure 2**. Detailed information on the CCR units and associated monitoring networks is included in the report entitled *Cholla Power Plant Coal Combustion Residuals Program – Design, Installation, and Evaluation of Completeness of Groundwater Monitoring Networks* (M&A, 2017).

1.3 Purpose

The purpose of this report is to present results of statistical analyses conducted by M&A on water quality data collected from monitor wells associated with the four Cholla CCR unit monitoring networks, pursuant to requirements of the Rule. Goals of CCR baseline monitoring period statistical analyses comprise: (1) use data from background monitor wells to define background water quality for each detection monitoring constituent at each CCR unit; and (2) use data from down-gradient monitor wells to identify statistically significant increases above background for each detection constituent at each CCR unit.

2 MONITORING PERIOD AND DATA SET

The dataset included in statistical analyses presented herein comprises laboratory results for detection monitoring constituents obtained pursuant to the Rule during the baseline monitoring period, which began in November 2015 and ended in September 2017. Most of the Cholla CCR monitoring network was in place by late 2015; however, an additional monitor well (M-64A) was installed in February 2017 after five CCR monitoring rounds had already been completed at the remainder of the wells. Samples were obtained from the entire network of Cholla CCR monitor wells during each of the eight remaining rounds. As such, most of the CCR monitor wells were sampled a total of 13 times during the baseline monitoring period.

Laboratory data validation was conducted for each of the data points and only data deemed to be valid were included in the statistical evaluation of background and downgradient water quality. Water quality data used in statistical analyses for the Cholla baseline monitoring period are summarized in **Table 1**.

3 STATISTICAL ANALYSIS

3.1 Approach and Tools

The methods used to analyze the groundwater monitoring data were developed in accordance with the EPA's *Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (EPA, 2009). These methods are described and certified in the report entitled: *Cholla Power Plant Coal Combustion Residuals Program – Statistical Method Selected for Evaluation of Groundwater Monitoring Data* (M&A, 2017). The EPA software ProUCL was used to analyze the chemistry data. This software was developed to compute rigorous statistics on environmental datasets and is well-suited to fulfilling Rule requirements for statistical analysis of CCR water quality data.

3.2 Process and Results

For the purposes of the discussion below, a sample is considered a dataset composed of at least eight independent observations of an analyte at a single well.

3.2.1 Assess Presence/Number of Non-detects

Initially, general statistics were compiled and developed for each sample, including the number of observations, the number of non-detect results, maximum/minimum values, as well as the mean, variance, and standard deviation for the data set. These general statistics are summarized in **Table 2**. Samples that include non-detects (up to 50 percent) were evaluated using appropriate statistical methods, as described below.

3.2.2 Evaluate Temporal Dependence

To ensure that observations are temporally independent, data sets for each monitor well were analyzed to determine if temporal dependence occurred between any two samples. The Rule requires that groundwater flow rate calculations be conducted using water level data collected during each monitoring round conducted at each CCR unit. The minimum groundwater flow rate computed for any of the monitoring rounds was applied at each CCR unit to determine if sufficient time had passed between samples to ensure that they were independent. The method used for this calculation is based on Darcy's Law and is described in the EPA's *Unified Guidance on Statistical Analysis* (EPA, 2009). Results of analyses for minimum sample interval at each CCR unit, including samples removed due to temporal dependence, are summarized in **Table 3**.

3.2.3 Identify Outliers

Dixon's outlier test was used to evaluate each sample for statistical outliers, as shown on **Table 4**. If outliers were identified, M&A reviewed the data set to determine if the outlier could be traced to laboratory error, groundwater sampling error, etc., or other possible causes. In accordance with the EPA guidance (EPA, 2009), the only outliers that were removed from the sample were those that appeared to be truly anomalous and could be traced to a likely cause.

3.2.4 Identify Trends

Each sample was tested for a significant trend using the Mann-Kendall or Theil-Sen trend test, as appropriate. The Theil-Sen trend test was used for samples containing more than one, but less than 50 percent non-detects. Results of the evaluation of significant trends in samples for each of the detection monitoring constituents at each of the CCR monitor wells are summarized in **Table 5**.

3.2.5 Evaluate Normality

Samples that contained sufficient detections were evaluated to determine if they fit a normal distribution at the 99 percent confidence level. Due to the presence of non-detects, the samples were evaluated for normality using the Shapiro-Wilk test. Determination of normality is required to select an appropriate statistical method for assessing upper prediction limits. Results of the normality analysis for each of the well-constituent pairs are summarized in **Table 6**.

3.2.6 Determine 99% Upper Prediction Limit Concentrations

Upper prediction limit concentrations were then established for each detection monitoring constituent at the background well for each of the CCR units. A 99 percent upper prediction limit was used, with results summarized in **Table 7**.

3.2.7 Develop Central Tendency Concentrations and Identify Statistically Significant Exceedances

As appropriate based on the composition of the sample, a median or mean value was computed for each down-gradient well pair and used to represent the central tendency concentration for that sample. ProUCL was used to determine if the central tendency value for any given well-constituent pair represented a statistically significant exceedance of the upper prediction limit background concentration for any given constituent at a CCR unit. Results of the analysis of exceedances of background are summarized in **Table 8**.

4 RECOMMENDATIONS

Based on the Rule, if statistically significant increases above background are observed in down-gradient monitor wells, notification is required, along with appropriate follow-up actions. Recommendations for follow-up actions, summarized in **Table 9**, are consistent with provisions of the Rule and include either proceeding to assessment monitoring or initiating an evaluation to determine if factors other than leakage from the CCR unit in question are responsible for observed exceedances of background.

5 REFERENCES CITED

Montgomery & Associates, 2017, Cholla Power Plant Coal Combustion Residuals Program – Design, Installation, and Evaluation of Completeness of Groundwater Monitoring Networks, September 19, 2017.

Montgomery & Associates, 2017, Cholla Power Plant Coal Combustion Residuals Program – Statistical Method Selected for Evaluation of Groundwater Monitoring Data, September 19, 2017.

U.S. Environmental Protection Agency, 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA facilities, Unified Guidance; EPA/530/R-09/007, March 2009.

**Table 1. Laboratory Results for Detection Monitoring Constituents,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

(Page 1 of 5)

Well Identifier	Collection Date	Field Sample ID	Constituents ^a						
			B (mg/L) ^b	Ca (mg/L)	Cl (mg/L)	F (mg/L)	pH (s.u.) ^c	SO ₄ (mg/L)	TDS (mg/L)
Bottom Ash Monofill									
M-54	12/3/2015	7799	0.52	100	1,500	1.2	7.34	380	3,000
M-54	3/10/2016	CH-M-54-0316	0.53	100	1,600	1.3	7.56	360	2,900
M-54	5/20/2016	CH-CCR-M54-516	0.51	100	1,500	1.4	---	350	3,000
M-54	8/27/2016	CH-CCR-M54-816	0.53	110	1,600	1.4	7.5	370	3,100
M-54	9/22/2016	CH-CCR-M54-916	0.52	99	1,400	1.3	7.7	350	3,200
M-54	2/21/2017	CH-CCR-M54-217	0.52	100	1,300	1.3	7.7	350	2,900
M-54	4/11/2017	CH-CCR-M54-41117	0.51	100	1,500	1.3	7.7	360	3,100
M-54	4/24/2017	CH-CCR-M54-42417	0.53	95	1,500	1.3	7.6	370	3,000
M-54	5/19/2017	CH-CCR-M54-51917	0.50	99	1,600	1.3	7.8	380	3,200
M-54	5/25/2017	CH-CCR-M54-52517	0.52	100	1,500	1.4	7.7	370	3,200
M-54	6/29/2017	CH-CCR-M54-62917	0.51	97	1,600	1.4	7.6	380	2,900
M-54	7/29/2017	CH-CCR-M54-72917	0.56	100	1,500	1.4	7.4	350	3,100
M-54	9/5/2017	CH-CCR-M54-90517	0.55	100	1,500	1.4	7.5	370	3,100
M-59	12/3/2015	7803	0.50	87	1,300	1.3	7.53	340	2,700
M-59	3/10/2016	CH-M-59-0316	0.48	85	1,400	1.3	7.57	350	2,700
M-59	5/20/2016	CH-CCR-M59-516	0.49	86	1,400	1.4	---	340	2,700
M-59	8/27/2016	CH-CCR-M59-816	0.50	89	1,400	1.4	7.6	350	2,700
M-59	9/22/2016	CH-CCR-M59-916	0.50	88	1,300	1.4	7.8	340	2,900
M-59	2/22/2017	CH-CCR-M59-217	0.48	86	1,200	1.3	7.8	330	2,800
M-59	4/11/2017	CH-CCR-M59-41117	0.49	90	1,400	1.3	8.1	350	2,800
M-59	4/24/2017	CH-CCR-M59-42417	0.52	89	1,300	1.4	7.7	350	2,800
M-59	5/19/2017	CH-CCR-M59-51917	0.50	93	1,400	1.4	7.8	360	2,700
M-59	5/25/2017	CH-CCR-M59-52517	0.50	88	1,300	1.4	7.6	350	2,700
M-59	6/29/2017	CH-CCR-M59-62917	0.49	84	1,400	1.5	7.8	370	2,500
M-59	7/29/2017	CH-CCR-M59-72917	0.53	92	1,300	1.5	7.6	340	2,800
M-59	9/5/2017	CH-CCR-M59-90517	0.51	90	1,300	1.4	7.7	360	2,700
M-60	12/3/2015	7801	0.54	88	1,400	1.3	7.56	350	2,800
M-60	3/9/2016	CH-M-60A-0316	0.50	86	1,400	1.4	7.83	350	2,800
M-60	5/20/2016	CH-CCR-M60-516	0.50	89	1,400	1.5	---	350	2,800
M-60	8/27/2016	CH-CCR-M60-816	0.52	90	1,400	1.5	7.5	360	2,800
M-60	9/22/2016	CH-CCR-M60-916	0.51	88	1,300	1.4	7.8	350	3,000
M-60	2/22/2017	CH-CCR-M60-217	0.52	91	1,300	1.4	7.8	340	2,800
M-60	4/11/2017	CH-CCR-M60-41117	0.48	90	1,400	1.4	8.0	360	2,900
M-60	4/24/2017	CH-CCR-M60-42417	0.53	86	1,400	1.4	7.8	350	2,700
M-60	5/19/2017	CH-CCR-M60-51917	0.53	92	1,400	1.4	7.7	360	2,800
M-60	5/25/2017	CH-CCR-M60-52517	0.51	86	1,300	1.4	7.7	350	2,800
M-60	6/29/2017	CH-CCR-M60-62917	0.51	84	1,500	1.5	7.7	380	2,500
M-60	7/29/2017	CH-CCR-M60-72917	0.53	89	1,400	1.5	7.6	370	2,800
M-60	9/5/2017	CH-CCR-M60-90517	0.53	90	1,400	1.5	7.6	360	2,800
M-61	12/3/2015	7802	0.51	90	1,400	1.3	7.22	350	2,800
M-61	3/10/2016	CH-M-61-0316	0.49	90	1,400	1.4	7.59	340	2,800
M-61	5/20/2016	CH-CCR-M61-516	0.49	89	1,400	1.4	---	350	2,800
M-61	8/27/2016	CH-CCR-M61-816	0.50	90	1,400	1.5	7.5	360	2,900
M-61	9/22/2016	CH-CCR-M61-916	0.50	90	1,300	1.4	7.9	350	3,000
M-61	2/22/2017	CH-CCR-M61-217	0.50	92	1,100	1.4	7.8	340	2,700
M-61	4/11/2017	CH-CCR-M61-41117	0.50	93	1,700	1.4	8.0	420	3,000
M-61	4/24/2017	CH-CCR-M61-42417	0.52	88	1,400	1.4	7.7	360	2,700
M-61	5/19/2017	CH-CCR-M61-51917	0.50	92	1,400	1.3	7.8	370	2,800
M-61	5/25/2017	CH-CCR-M61-52517	0.51	92	1,400	1.4	7.7	370	2,800
M-61	6/29/2017	CH-CCR-M61-62917	0.50	86	1,500	1.5	7.8	380	2,700
M-61	7/29/2017	CH-CCR-M61-72917	0.52	94	1,300	1.5	7.6	360	2,900
M-61	9/5/2017	CH-CCR-M61-90517	0.50	91	1,400	1.5	7.6	360	2,800

**Table 1. Laboratory Results for Detection Monitoring Constituents,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

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Well Identifier	Collection Date	Field Sample ID	Constituents ^a						
			B (mg/L) ^b	Ca (mg/L)	Cl (mg/L)	F (mg/L)	pH (s.u.) ^c	SO ₄ (mg/L)	TDS (mg/L)
Sedimentation Pond									
M-62A	11/30/2015	7872	0.14	280	2,000	<0.40	7.68	610	4,300
M-62A	3/8/2016	CH-M-62A-0316	0.20	380	2,500	<0.80	7.60	510	5,100
M-62A	5/5/2016	CH-CCR-MW62A-50516	0.22	420	2,600	<0.40	---	510	5,100
M-62A	8/29/2016	CH-CCR-M62A-816	0.21	410	2,500	<0.80	7.4	550	6,100
M-62A	9/21/2016	CH-CCR-M62A-916	0.21	400	2,600	<0.80	7.6	520	4,300
M-62A	2/20/2017	CH-CCR-M62A-217	0.22	420	2,800	<0.40	7.4	570	5,100
M-62A	4/13/2017	CH-CCR-M62A-41317	0.21	460	3,000	<0.40	7.8	540	5,600
M-62A	4/25/2017	CH-CCR-M62A-42517	0.22	450	2,800	<0.80	7.4	550	5,800
M-62A	5/18/2017	CH-CCR-M62A-51817	0.21	490	3,000	<0.40	7.6	550	5,500
M-62A	5/25/2017	CH-CCR-M62A-52517	0.22	500	3,100	<0.40	7.5	550	6,100
M-62A	7/1/2017	CH-CCR-M62A-70117	0.23	450	3,100	<0.40	7.4	580	6,400
M-62A	7/26/2017	CH-CCR-M62A-72617	0.23	480	3,000	<0.40	7.5	580	6,800
M-62A	9/7/2017	CH-CCR-M62A-90717	0.22	480	3,000	<0.40	7.4	560	6,500
M-56A	11/30/2015	7873	0.18	260	1,900	<0.40	7.58	590	4,000
M-56A	3/8/2016	CH-M-56A-0316	0.25	200	1,700	0.43	7.68	570	3,600
M-56A	5/10/2016	CH-CCR-M56A-05102016	0.24	200	1,700	0.42	---	560	3,700
M-56A	8/29/2016	CH-CCR-M56A-816	0.26	220	1,800	0.46	7.5	570	3,900
M-56A	9/21/2016	CH-CCR-M56A-916	0.26	220	1,700	0.40	7.8	580	3,900
M-56A	2/20/2017	CH-CCR-M56A-217	0.27	240	2,000	0.40	7.6	640	3,700
M-56A	4/13/2017	CH-CCR-M56A-41317	0.26	260	2,000	<0.40	7.7	630	3,900
M-56A	4/25/2017	CH-CCR-M56A-42517	0.27	250	1,800	<0.80	7.6	630	3,800
M-56A	5/18/2017	CH-CCR-M56A-51817	0.26	260	2,000	<0.40	7.7	680	4,100
M-56A	5/25/2017	CH-CCR-M56A-52517	0.25	250	1,900	<0.40	7.6	660	3,900
M-56A	7/1/2017	CH-CCR-M56A-70117	0.27	260	2,000	0.41	7.5	690	4,000
M-56A	7/26/2017	CH-CCR-M56A-72617	0.27	270	1,900	<0.40	7.5	690	4,300
M-56A	9/8/2017	CH-CCR-M56A-90817	0.27	270	2,000	0.47	7.4	680	4,100
M-57A	11/30/2015	7874	0.42	280	1,500	<0.40	7.39	1,000	3,900
M-57A	3/8/2016	CH-M-57A-0316	0.42	290	1,600	<0.40	7.56	1,000	4,200
M-57A	5/11/2016	CH-CCR-M57A-05112016	0.46	320	1,600	<0.40	---	1,000	4,100
M-57A	8/25/2016	CH-CCR-M57A-816	0.49	340	1,600	<0.40	7.2	1,100	4,400
M-57A	9/21/2016	CH-CCR-M57A-916	0.51	340	1,600	<0.40	7.6	1,100	3,900
M-57A	2/20/2017	CH-CCR-M57A-217	0.60	380	1,700	<0.40	7.1	1,400	4,400
M-57A	4/12/2017	CH-CCR-M57A-41217	0.60	410	1,800	<0.40	7.4	1,400	4,800
M-57A	4/25/2017	CH-CCR-M57A-42517	0.60	380	1,600	<0.40	7.1	1,300	4,600
M-57A	5/18/2017	CH-CCR-M57A-51817	0.62	410	1,800	<0.40	7.4	1,400	4,800
M-57A	5/25/2017	CH-CCR-M57A-52517	0.59	400	1,700	<0.40	7.3	1,400	4,900
M-57A	7/1/2017	CH-CCR-M57A-70117	0.57	380	1,800	0.42	7.1	1,400	4,500
M-57A	7/26/2017	CH-CCR-M57A-72617	0.64	420	1,800	<0.40	7.1	1,600	5,000
M-57A	9/8/2017	CH-CCR-M57A-90817	0.63	420	1,800	<0.40	7.1	1,400	4,800
M-58A	11/30/2015	7876	0.19	250	1,900	0.43	7.60	570	3,700
M-58A	3/8/2016	CH-M-58A-0316	0.19	250	1,800	<0.40	7.74	520	3,700
M-58A	5/11/2016	CH-CCR-M58A-05112016	0.21	250	1,800	<0.40	---	540	3,700
M-58A	8/25/2016	CH-CCR-M58A-816	0.20	270	1,900	<0.40	7.5	490	4,200
M-58A	9/21/2016	CH-CCR-M58A-916	0.21	280	1,800	<0.40	7.8	510	4,500
M-58A	2/20/2017	CH-CCR-M58A-217	0.23	260	2,000	<0.40	7.5	580	3,700
M-58A	4/12/2017	CH-CCR-M58A-41217	0.21	280	1,900	<0.40	8.0	570	3,900
M-58A	4/25/2017	CH-CCR-M58A-42517	0.21	270	1,700	<0.80	7.5	550	3,600
M-58A	5/18/2017	CH-CCR-M58A-51817	0.21	260	1,900	<0.40	7.7	600	3,700
M-58A	5/25/2017	CH-CCR-M58A-52517	0.21	270	1,800	<0.40	7.7	550	3,700
M-58A	7/1/2017	CH-CCR-M58A-70117	0.28	270	2,000	<0.40	7.5	540	4,100
M-58A	7/26/2017	CH-CCR-M58A-72617	0.23	300	1,900	<0.40	7.6	560	4,100
M-58A	9/8/2017	CH-CCR-M58A-90817	0.22	300	2,000	<0.40	7.5	520	4,300

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Well Identifier	Collection Date	Field Sample ID	Constituents ^a						
			B (mg/L) ^b	Ca (mg/L)	Cl (mg/L)	F (mg/L)	pH (s.u.) ^c	SO ₄ (mg/L)	TDS (mg/L)
Fly Ash Pond									
M-64A	2/20/2017	CH-CCR-M64A-217	1.2	520	4,500	<0.80	7.4	4,400	10,000
M-64A	4/12/2017	CH-CCR-M64A-41217	1.2	500	4,200	<0.80	7.6	4,200	13,000
M-64A	4/25/2017	CH-CCR-M64A-42517	1.3	490	4,100	<0.80	7.5	4,300	11,000
M-64A	5/18/2017	CH-CCR-M64A-51817	1.3	510	4,400	<0.80	7.6	4,400	12,000
M-64A	5/24/2017	CH-CCR-M64A-52417	1.3	520	4,200	<0.80	7.4	4,400	12,000
M-64A	6/30/2017	CH-CCR-M64A-63017	1.2	600	5,100	<0.80	7.3	4,700	13,000
M-64A	7/27/2017	CH-CCR-M64A-72717	1.3	640	4,900	<0.80	7.4	4,800	13,000
M-64A	9/7/2017	CH-CCR-M64A-90717	1.2	620	4,700	<0.80	7.3	4,300	12,000
M-50A	12/2/2015	7792	2.8	680	2,800	2.0	7.55	2,900	8,300
M-50A	3/8/2016	CH-M-50A-0316	2.9	660	5,300	2.0	7.37	5,700	8,300
M-50A	5/5/2016	CH-CCR-M50A-516	3.0	680	2,500	2.2	---	2,700	8,300
M-50A	8/25/2016	CH-CCR-M50A-816	2.6	650	2,600	2.3	7.2	2,800	8,400
M-50A	9/23/2016	CH-CCR-M50A-916	2.8	630	2,500	2.1	7.4	2,900	8,500
M-50A	2/21/2017	CH-CCR-M50A-217	2.9	680	2,400	2.1	7.5	2,800	7,900
M-50A	4/13/2017	CH-CCR-M50A-41317	2.8	680	2,800	2.0	7.8	3,000	8,200
M-50A	4/26/2017	CH-CCR-M50A-42617	2.8	620	2,400	2.0	7.2	2,900	7,900
M-50A	5/18/2017	CH-CCR-M50A-51817	2.8	670	2,600	2.2	7.6	3,200	7,300
M-50A	5/24/2017	CH-CCR-M50A-52417	3.0	680	2,700	2.3	7.4	3,200	8,300
M-50A	6/30/2017	CH-CCR-M50A-63017	2.7	630	2,700	2.4	7.3	3,300	8,100
M-50A	7/27/2017	CH-CCR-M50A-72717	2.8	660	2,600	2.5	7.4	3,100	8,400
M-50A	9/7/2017	CH-CCR-M50A-90717	3.0	660	2,500	2.2	7.2	3,100	8,400
M-51A	12/2/2015	7880	33	940	6,700	4.8	7.29	2,800	13,000
M-51A	3/9/2016	CH-M-51A-0316	33	930	6,400	4.6	7.27	2,700	14,000
M-51A	5/5/2016	CH-CCR-M51A-0516	35	980	6,600	5.5	---	2,800	14,000
M-51A	8/25/2016	CH-CCR-M51A-816	36	960	6,500	6.0	7.1	3,000	15,000
M-51A	9/23/2016	CH-CCR-M51A-916	36	920	6,000	5.4	7.3	2,800	15,000
M-51A	2/21/2017	CH-CCR-M51A-217	33	920	6,500	4.4	7.1	2,800	13,000
M-51A	4/13/2017	CH-CCR-M51A-41317	35	970	7,500	4.1	7.6	2,900	14,000
M-51A	4/26/2017	CH-CCR-M51A-42617	35	880	6,300	4.6	7.2	2,900	13,000
M-51A	5/18/2017	CH-CCR-M51A-51817	35	890	6,800	5.0	7.3	3,200	13,000
M-51A	5/24/2017	CH-CCR-M51A-52417	38	940	6,600	5.3	7.3	3,100	13,000
M-51A	6/30/2017	CH-CCR-M51A-63017	36	880	7,000	4.9	7.2	3,300	14,000
M-51A	7/27/2017	CH-CCR-M51A-72717	38	950	7,100	6.0	7.3	3,500	14,000
M-51A	9/7/2017	CH-CCR-M51A-90717	38	950	6,600	5.7	7.2	3,100	14,000
W-123	12/3/2015	7800	36	790	6,100	3.7	7.55	3,400	13,000
W-123	3/8/2016	CH-W-123-0316	34	800	6,100	3.6	7.47	3,300	14,000
W-123	5/6/2016	CH-CCR-W123-0516	35	830	6,200	3.6	---	3,300	14,000
W-123	8/25/2016	CH-CCR-W123-816	36	800	5,900	4.1	7.6	3,600	14,000
W-123	9/22/2016	CH-CCR-W123-916	37	810	6,000	3.7	7.7	3,600	15,000
W-123	2/20/2017	CH-CCR-W123-217	37	860	6,200	4.1	7.6	3,400	13,000
W-123	4/13/2017	CH-CCR-W123-41317	35	880	6,600	4.0	8.1	3,600	14,000
W-123	4/26/2017	CH-CCR-W123-42617	34	780	6,300	3.5	7.7	3,600	14,000
W-123	5/22/2017	CH-CCR-W123-52217	35	850	6,300	3.8	7.6	3,500	14,000
W-123	5/24/2017	CH-CCR-W123-52417	34	810	6,200	3.8	7.6	3,500	14,000
W-123	6/30/2017	CH-CCR-W123-63017	35	810	6,700	3.8	7.5	3,700	14,000
W-123	7/27/2017	CH-CCR-W123-72717	36	860	6,900	3.7	7.6	3,800	14,000
W-123	9/7/2017	CH-CCR-W123-90717	36	870	6,700	3.7	7.5	3,600	14,000

**Table 1. Laboratory Results for Detection Monitoring Constituents,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

(Page 4 of 5)

Well Identifier	Collection Date	Field Sample ID	Constituents ^a						
			B (mg/L) ^b	Ca (mg/L)	Cl (mg/L)	F (mg/L)	pH (s.u.) ^c	SO ₄ (mg/L)	TDS (mg/L)
Bottom Ash Pond									
M-64A	2/20/2017	CH-CCR-M64A-217	1.2	520	4,500	<0.80	7.4	4,400	10,000
M-64A	4/12/2017	CH-CCR-M64A-41217	1.2	500	4,200	<0.80	7.6	4,200	13,000
M-64A	4/25/2017	CH-CCR-M64A-42517	1.3	490	4,100	<0.80	7.5	4,300	11,000
M-64A	5/18/2017	CH-CCR-M64A-51817	1.3	510	4,400	<0.80	7.6	4,400	12,000
M-64A	5/24/2017	CH-CCR-M64A-52417	1.3	520	4,200	<0.80	7.4	4,400	12,000
M-64A	6/30/2017	CH-CCR-M64A-63017	1.2	600	5,100	<0.80	7.3	4,700	13,000
M-64A	7/27/2017	CH-CCR-M64A-72717	1.3	640	4,900	<0.80	7.4	4,800	13,000
M-64A	9/7/2017	CH-CCR-M64A-90717	1.2	620	4,700	<0.80	7.3	4,300	12,000
M-52A	12/1/2015	7879	3.9	790	3,600	0.53	6.99	3,000	9,600
M-52A	3/9/2016	CH-M-52A-0316	3.4	780	3,800	<2.0	7.01	2,700	10,000
M-52A	5/10/2016	CH-CCR-M52A-516	3.4	910	5,100	<2.0	---	2,400	12,000
M-52A	8/26/2016	CH-CCR-M52A-816	3.3	890	4,000	0.97	6.8	2,600	11,000
M-52A	9/22/2016	CH-CCR-M52A-916	3.2	810	3,700	0.89	7.2	2,700	11,000
M-52A	2/21/2017	CH-CCR-M52A-217	3.8	850	3,700	0.98	7.2	2,600	9,700
M-52A	4/11/2017	CH-CCR-M52A-41117	3.6	850	4,600	0.80	7.5	2,800	11,000
M-52A	4/25/2017	CH-CCR-M52A-42517	3.6	810	4,100	0.99	7.0	2,700	11,000
M-52A	5/18/2017	CH-CCR-M52A-51817	3.7	880	4,400	0.86	7.3	2,900	10,000
M-52A	5/24/2017	CH-CCR-M52A-52417	3.6	850	4,300	0.96	7.2	2,800	10,000
M-52A	6/30/2017	CH-CCR-M52A-63017	3.3	790	4,000	1.0	7.0	3,100	9,800
M-52A	7/28/2017	CH-CCR-M52A-72817	3.1	780	3,500	1.0	7.0	3,100	9,200
M-52A	9/7/2017	CH-CCR-M52A-90717	3.2	790	3,200	0.90	7.1	2,900	9,100
M-53A	12/1/2015	7878	2.9	740	2,600	0.87	7.57	2,900	8,100
M-53A	3/9/2016	CH-M-53A-0316	2.4	770	2,500	0.94	7.44	2,600	7,400
M-53A	5/10/2016	CH-CCR-M53A-516	2.4	750	2,400	<2.0	---	2,500	7,800
M-53A	8/26/2016	CH-CCR-M53A-816	3.0	660	2,400	2.3	7.4	3,000	8,000
M-53A	9/22/2016	CH-CCR-M53A-916	3.0	640	2,500	2.2	7.6	3,000	8,300
M-53A	2/21/2017	CH-CCR-M53A-217	3.1	660	2,300	2.0	7.5	2,900	7,600
M-53A	4/12/2017	CH-CCR-M53A-41217	3.0	710	2,800	1.3	7.5	2,700	8,100
M-53A	4/25/2017	CH-CCR-M53A-42517	2.6	740	2,500	1.3	7.4	2,700	7,900
M-53A	5/18/2017	CH-CCR-M53A-51817	3.1	640	2,400	2.2	7.7	3,200	8,100
M-53A	5/24/2017	CH-CCR-M53A-52417	3.3	660	2,300	2.4	7.6	3,100	7,600
M-53A	7/1/2017	CH-CCR-M53A-70117	3.1	600	2,500	2.6	7.4	3,300	7,700
M-53A	7/28/2017	CH-CCR-M53A-72817	3.3	670	2,500	2.4	7.5	3,300	7,900
M-53A	9/7/2017	CH-CCR-M53A-90717	3.3	650	2,400	2.3	7.5	3,100	7,900
W-305	12/2/2015	7796	0.32	770	2,600	1.4	7.05	2,300	7,000
W-305	3/9/2016	CH-W-305-0316	0.30	690	2,300	<0.80	7.32	2,300	7,000
W-305	5/11/2016	CH-CCR-W305-516	0.29	710	2,100	<2.0	---	2,200	7,000
W-305	8/27/2016	CH-CCR-W305-816	0.31	720	2,200	<0.80	7.3	2,400	7,200
W-305	9/22/2016	CH-CCR-W305-916	0.32	700	2,300	<0.40	7.6	2,400	7,400
W-305	2/21/2017	CH-CCR-W305-217	0.32	730	2,200	<0.80	7.4	2,300	6,800
W-305	4/11/2017	CH-CCR-W305-41117	0.32	730	2,300	<0.80	7.7	2,400	7,300
W-305	4/24/2017	CH-CCR-W305-42417	0.33	690	2,300	<0.80	7.6	2,400	6,800
W-305	5/22/2017	CH-CCR-W305-52217	0.33	750	2,300	<0.80	7.6	2,400	7,200
W-305	5/24/2017	CH-CCR-W305-52417	0.35	740	2,400	<0.80	7.5	2,500	6,800
W-305	6/29/2017	CH-CCR-W305-62917	0.31	670	2,600	<0.40	7.5	2,500	6,900
W-305	7/28/2017	CH-CCR-W305-72817	0.35	750	2,300	<0.80	7.3	2,300	7,200
W-305	9/6/2017	CH-CCR-W305-90617	0.33	770	2,200	<0.80	7.4	2,400	6,900

**Table 1. Laboratory Results for Detection Monitoring Constituents,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

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Well Identifier	Collection Date	Field Sample ID	Constituents ^a						
			B (mg/L) ^b	Ca (mg/L)	Cl (mg/L)	F (mg/L)	pH (s.u.) ^c	SO ₄ (mg/L)	TDS (mg/L)
Bottom Ash Pond (continued)									
W-306	12/2/2015	7797	0.32	550	2,400	0.75	7.02	3,600	8,900
W-306	3/9/2016	CH-W-306-0316	0.46	460	2,200	1.4	7.82	7,100	13,000
W-306	5/11/2016	CH-CCR-W306-516	0.56	430	1,900	<2.0	---	8,000	15,000
W-306	8/26/2016	CH-CCR-W306-816	1.1	440	1,800	1.4	7.7	11,000	19,000
W-306	9/22/2016	CH-CCR-W306-916	1.1	430	2,000	<2.0	7.9	11,000	20,000
W-306	2/21/2017	CH-CCR-W306-217	1.1	430	1,800	1.5	7.9	12,000	18,000
W-306	4/12/2017	CH-CCR-W306-41217	1.0	410	1,800	1.4	8.2	12,000	20,000
W-306	4/25/2017	CH-CCR-W306-42517	1.1	410	1,900	1.5	7.9	13,000	20,000
W-306	5/22/2017	CH-CCR-W306-52217	1.0	420	1,800	1.1	7.9	12,000	20,000
W-306	5/24/2017	CH-CCR-W306-52417	1.0	420	1,800	1.0	7.9	12,000	18,000
W-306	7/1/2017	CH-CCR-W306-70117	0.95	380	2,100	1.3	7.8	13,000	19,000
W-306	7/28/2017	CH-CCR-W306-72817	0.99	410	2,100	1.2	7.8	12,000	18,000
W-306	9/6/2017	CH-CCR-W306-90617	0.97	430	1,800	1.4	7.8	11,000	17,000
W-314	12/2/2015	7798	0.98	780	2,900	1.2	7.62	2,200	7,400
W-314	3/10/2016	CH-W-314-0316	0.96	760	3,000	<0.80	7.35	2,300	7,200
W-314	5/11/2016	CH-CCR-W314-516	0.97	780	2,600	<2.0	---	2,100	7,400
W-314	8/26/2016	CH-CCR-W314-816	1.1	820	2,600	0.93	7.3	2,200	8,000
W-314	9/22/2016	CH-CCR-W314-916	1.1	800	2,700	1.1	7.6	2,300	8,100
W-314	2/21/2017	CH-CCR-W314-217	1.1	810	2,600	0.97	7.5	2,100	7,200
W-314	4/11/2017	CH-CCR-W314-41117	1.1	780	2,800	0.91	7.7	2,200	7,700
W-314	4/25/2017	CH-CCR-W314-42517	1.1	810	2,800	0.80	7.5	2,300	7,500
W-314	5/22/2017	CH-CCR-W314-52217	1.1	840	2,800	0.90	7.5	2,300	7,600
W-314	5/24/2017	CH-CCR-W314-52417	1.1	840	2,800	0.90	7.4	2,300	7,400
W-314	6/30/2017	CH-CCR-W314-63017	1.1	770	2,900	1.1	7.4	2,500	7,900
W-314	7/28/2017	CH-CCR-W314-72817	1.1	800	2,800	0.90	7.3	2,200	7,600
W-314	9/7/2017	CH-CCR-W314-90717	1.1	860	2,800	0.90	7.3	2,200	7,700

Notes:

^a Constituents:

- B = Boron
- Ca = Calcium
- Cl = Chloride
- F = Fluoride
- pH = Potential of Hydrogen (Laboratory)
- SO₄ = Sulfate
- TDS = Total Dissolved Solids (Laboratory)

^b mg/L = milligrams per liter

^c s.u. = standard unit

W-123 Data point removed from statistical analysis for violating minimum sampling interval

Value Data point identified as a statistical outlier; black text indicates value was used in statistical analysis

Value Data point identified as a statistical outlier; red text indicates value was removed from statistical analysis

Value After initial statistical review, outlier was replaced with data from field duplicate sample; data re-analyzed

Value After initial statistical review, outlier from DM* Fluoride sample was replaced with AM* sample; data re-analyzed

Value As part of QA/QC process, outlier from DM* Fluoride sample was replaced with AM* sample; data re-analyzed

**For many samples, fluoride was collected twice, once for the Detection Monitoring suite of parameters (DM) and once for the Assessment Monitoring suite of parameters (AM). In cases where questionable DM data was rejected or could not otherwise be resolved, the AM value was used for statistical analysis.*

**Table 2. Summary Statistics for Water Quality Data Set,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

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Well Identifier	Constituent ^a	Number of Observations	Number of Detections	Number of NDs ^b	Percent NDs	Minimum ND	Maximum ND	Minimum Concentration	Maximum Concentration	KM ^d Mean
Bottom Ash Monofill										
M-54	B	13	13	0	0	N/A	N/A	0.50	0.56	0.52
M-54	Ca	13	13	0	0	N/A	N/A	95	110	100
M-54	Cl	13	13	0	0	N/A	N/A	1,300	1,600	1,508
M-54	F	13	13	0	0	N/A	N/A	1.2	1.4	1.3
M-54	pH	12	12	0	0	N/A	N/A	7.3	7.8	7.6
M-54	SO ₄	13	13	0	0	N/A	N/A	350	380	365
M-54	TDS	13	13	0	0	N/A	N/A	2,900	3,200	3,054
M-59	B	13	13	0	0	N/A	N/A	0.48	0.53	0.50
M-59	Ca	13	13	0	0	N/A	N/A	84	93	88
M-59	Cl	13	13	0	0	N/A	N/A	1,200	1,400	1,338
M-59	F	13	13	0	0	N/A	N/A	1.3	1.5	1.4
M-59	pH	12	12	0	0	N/A	N/A	7.5	8.1	7.7
M-59	SO ₄	13	13	0	0	N/A	N/A	330	370	349
M-59	TDS	13	13	0	0	N/A	N/A	2,500	2,900	2,731
M-60	B	13	13	0	0	N/A	N/A	0.48	0.54	0.52
M-60	Ca	13	13	0	0	N/A	N/A	84	92	88
M-60	Cl	13	13	0	0	N/A	N/A	1,300	1,500	1,385
M-60	F	13	13	0	0	N/A	N/A	1.3	1.5	1.4
M-60	pH	12	12	0	0	N/A	N/A	7.5	8.0	7.7
M-60	SO ₄	13	13	0	0	N/A	N/A	340	380	356
M-60	TDS	13	13	0	0	N/A	N/A	2,500	3,000	2,792
M-61	B	13	13	0	0	N/A	N/A	0.49	0.52	0.50
M-61	Ca	13	13	0	0	N/A	N/A	86	94	91
M-61	Cl	13	13	0	0	N/A	N/A	1,100	1,700	1,392
M-61	F	13	13	0	0	N/A	N/A	1.3	1.5	1.4
M-61	pH	12	12	0	0	N/A	N/A	7.2	8.0	7.7
M-61	SO ₄	13	13	0	0	N/A	N/A	340	420	362
M-61	TDS	13	13	0	0	N/A	N/A	2,700	3,000	2,823

**Table 2. Summary Statistics for Water Quality Data Set,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

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Well Identifier	Constituent ^a	Number of Observations	Number of Detections	Number of NDs ^b	Percent NDs	Minimum ND	Maximum ND	Minimum Concentration	Maximum Concentration	KM ^d Mean
Sedimentation Pond										
M-62A	B	13	13	0	0	N/A	N/A	0.14	0.23	0.21
M-62A	Ca	13	13	0	0	N/A	N/A	280	500	432
M-62A	Cl	13	13	0	0	N/A	N/A	2,000	3,100	2,769
M-62A	F	13	0	13	100	0.4	0.8	N/A	N/A	N/A
M-62A	pH	12	12	0	0	N/A	N/A	7.4	7.8	7.5
M-62A	SO ₄	13	13	0	0	N/A	N/A	510	610	552
M-62A	TDS	13	13	0	0	N/A	N/A	4,300	6,800	5,592
M-56A	B	13	13	0	0	N/A	N/A	0.18	0.27	0.26
M-56A	Ca	13	13	0	0	N/A	N/A	200	270	243
M-56A	Cl	13	13	0	0	N/A	N/A	1,700	2,000	1,877
M-56A	F	13	7	6	46.2	0.4	0.8	0.40	0.47	0.42
M-56A	pH	12	12	0	0	N/A	N/A	7.4	7.8	7.6
M-56A	SO ₄	13	13	0	0	N/A	N/A	560	690	629
M-56A	TDS	13	13	0	0	N/A	N/A	3,600	4,300	3,915
M-57A	B	13	13	0	0	N/A	N/A	0.42	0.64	0.55
M-57A	Ca	13	13	0	0	N/A	N/A	280	420	367
M-57A	Cl	13	13	0	0	N/A	N/A	1,500	1,800	1,685
M-57A	F	13	1	12	92.3	0.4	0.4	0.42	0.42	0.40
M-57A	pH	12	12	0	0	N/A	N/A	7.1	7.6	7.3
M-57A	SO ₄	13	13	0	0	N/A	N/A	1,000	1,600	1,269
M-57A	TDS	13	13	0	0	N/A	N/A	3,900	5,000	4,485
M-58A	B	13	13	0	0	N/A	N/A	0.19	0.28	0.22
M-58A	Ca	13	13	0	0	N/A	N/A	250	300	270
M-58A	Cl	13	13	0	0	N/A	N/A	1,700	2,000	1,877
M-58A	F	13	1	12	92.3	0.4	0.8	0.43	0.43	0.40
M-58A	pH	12	12	0	0	N/A	N/A	7.5	8.0	7.637
M-58A	SO ₄	13	13	0	0	N/A	N/A	490	600	546.2
M-58A	TDS	13	13	0	0	N/A	N/A	3,600	4,500	3,915

**Table 2. Summary Statistics for Water Quality Data Set,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

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Well Identifier	Constituent ^a	Number of Observations	Number of Detections	Number of NDs ^b	Percent NDs	Minimum ND	Maximum ND	Minimum Concentration	Maximum Concentration	KM ^d Mean
Fly Ash Pond										
M-64A	B	8	8	0	0	N/A	N/A	1.2	1.3	1.3
M-64A	Ca	8	8	0	0	N/A	N/A	490	640	550
M-64A	Cl	8	8	0	0	N/A	N/A	4,100	5,100	4,513
M-64A	F	8	0	8	100	0.8	0.8	N/A	N/A	N/A
M-64A	pH	8	8	0	0	N/A	N/A	7.3	7.6	7.4
M-64A	SO ₄	8	8	0	0	N/A	N/A	4,200	4,800	4,438
M-64A	TDS	8	8	0	0	N/A	N/A	10,000	13,000	12,000
M-50A	B	13	13	0	0	N/A	N/A	2.6	3.0	2.8
M-50A	Ca	13	13	0	0	N/A	N/A	620	680	660
M-50A	Cl	12	12	0	0	N/A	N/A	2,400	2,800	2,592
M-50A	F	13	13	0	0	N/A	N/A	2	2.5	2.2
M-50A	pH	12	12	0	0	N/A	N/A	7.2	7.8	7.4
M-50A	SO ₄	12	12	0	0	N/A	N/A	2,700	3,300	2,992
M-50A	TDS	13	13	0	0	N/A	N/A	7,300	8,500	8,177
M-51A	B	13	13	0	0	N/A	N/A	33	38	35
M-51A	Ca	13	13	0	0	N/A	N/A	880	980	932
M-51A	Cl	13	13	0	0	N/A	N/A	6,000	7,500	6,662
M-51A	F	13	13	0	0	N/A	N/A	4.1	6.0	5.1
M-51A	pH	12	12	0	0	N/A	N/A	7.1	7.6	7.3
M-51A	SO ₄	13	13	0	0	N/A	N/A	2,700	3,500	2,992
M-51A	TDS	13	13	0	0	N/A	N/A	13,000	15,000	13,769
W-123	B	12	12	0	0	N/A	N/A	34	37	36
W-123	Ca	12	12	0	0	N/A	N/A	780	880	828
W-123	Cl	12	12	0	0	N/A	N/A	5,900	6,900	6,333
W-123	F	12	12	0	0	N/A	N/A	3.5	4.1	3.8
W-123	pH	11	11	0	0	N/A	N/A	7.47	8.10	7.63
W-123	SO ₄	12	12	0	0	N/A	N/A	3,300	3,800	3,533
W-123	TDS	12	12	0	0	N/A	N/A	13,000	15,000	13,917

**Table 2. Summary Statistics for Water Quality Data Set,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**
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Well Identifier	Constituent ^a	Number of Observations	Number of Detections	Number of NDs ^b	Percent NDs	Minimum ND	Maximum ND	Minimum Concentration	Maximum Concentration	KM ^d Mean
Bottom Ash Pond										
M-64A	B	8	8	0	0	N/A	N/A	1.2	1.3	1.3
M-64A	Ca	8	8	0	0	N/A	N/A	490	640	550
M-64A	Cl	8	8	0	0	N/A	N/A	4,100	5,100	4,513
M-64A	F	8	0	8	100	0.8	0.8	N/A	N/A	N/A
M-64A	pH	8	8	0	0	N/A	N/A	7.3	7.6	7.4
M-64A	SO ₄	8	8	0	0	N/A	N/A	4,200	4,800	4,438
M-64A	TDS	8	8	0	0	N/A	N/A	10,000	13,000	12,000
M-52A	B	13	13	0	0	N/A	N/A	3.1	3.9	3.5
M-52A	Ca	13	13	0	0	N/A	N/A	780	910	829
M-52A	Cl	13	13	0	0	N/A	N/A	3,200	5,100	4,000
M-52A	F	13	11	2	15.4	2	2	0.53	1.00	0.90
M-52A	pH	12	12	0	0	N/A	N/A	6.8	7.5	7.1
M-52A	SO ₄	13	13	0	0	N/A	N/A	2,400	3,100	2,792
M-52A	TDS	13	13	0	0	N/A	N/A	9,100	12,000	10,262
M-53A	B	13	13	0	0	N/A	N/A	2.4	3.3	3.0
M-53A	Ca	13	13	0	0	N/A	N/A	600	770	684
M-53A	Cl	13	13	0	0	N/A	N/A	2,300	2,800	2,469
M-53A	F	13	12	1	7.7	2	2	0.87	2.60	1.84
M-53A	pH	12	12	0	0	N/A	N/A	7.4	7.7	7.5
M-53A	SO ₄	13	13	0	0	N/A	N/A	2,500	3,300	2,946
M-53A	TDS	13	13	0	0	N/A	N/A	7,400	8,300	7,877
W-305	B	13	13	0	0	N/A	N/A	0.29	0.35	0.32
W-305	Ca	13	13	0	0	N/A	N/A	670	770	725
W-305	Cl	13	13	0	0	N/A	N/A	2,100	2,600	2,315
W-305	F	12	0	12	100	0.4	2	N/A	N/A	N/A
W-305	pH	12	12	0	0	N/A	N/A	7.05	7.70	7.44
W-305	SO ₄	13	13	0	0	N/A	N/A	2,200	2,500	2,369
W-305	TDS	13	13	0	0	N/A	N/A	6,800	7,400	7,038

**Table 2. Summary Statistics for Water Quality Data Set,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

(Page 5 of 5)

Well Identifier	Constituent ^a	Number of Observations	Number of Detections	Number of NDs ^b	Percent NDs	Minimum ND	Maximum ND	Minimum Concentration	Maximum Concentration	KM ^d Mean
Bottom Ash Pond (continued)										
W-306	B	13	13	0	0	N/A	N/A	0.32	1.10	0.90
W-306	Ca	12	12	0	0	N/A	N/A	380	460	423
W-306	Cl	13	13	0	0	N/A	N/A	1,800	2,400	1,954
W-306	F	13	11	2	15.4	2	2	0.75	1.5	1.268
W-306	pH	12	12	0	0	N/A	N/A	7.02	8.20	7.80
W-306	SO ₄	13	13	0	0	N/A	N/A	3,600	13,000	10,592
W-306	TDS	13	13	0	0	N/A	N/A	8,900	20,000	17,377
W-314	B	13	13	0	0	N/A	N/A	0.96	1.10	1.07
W-314	Ca	13	13	0	0	N/A	N/A	760	860	803.8
W-314	Cl	13	13	0	0	N/A	N/A	2,600	3,000	2,777
W-314	F	13	11	2	15.4	0.8	2	0.8	1.2	1.0
W-314	pH	12	12	0	0	N/A	N/A	7.3	7.7	7.5
W-314	SO ₄	13	13	0	0	N/A	N/A	2,100	2,500	2,246
W-314	TDS	13	13	0	0	N/A	N/A	7,200	8,100	7,592

Notes:

^a Constituents:

B = Boron (milligrams per liter (mg/L))

Ca = Calcium (mg/L)

Cl = Chloride (mg/L)

F = Fluoride (mg/L)

pH = Potential of Hydrogen (Laboratory) (standard units (s.u.))

SO₄ = Sulfate (mg/L)

TDS = Total Dissolved Solids (Laboratory) (mg/L)

^b NDs = non-detect values

^c KM = Kaplan-Meier

N/A = not applicable

**Table 3. Results of Analysis of Minimum Sampling Interval
for Temporal Dependence Evaluation,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

Well Identifier	Well Type	Recommended Minimum Sampling Interval (days)	Number of Samples	Data Points Removed for Violating Minimum Sampling Interval
Bottom Ash Monofill				
M-54	Background	0.2	13	None
M-59	Down-gradient	0.2	13	None
M-60	Down-gradient	0.2	13	None
M-61	Down-gradient	0.2	13	None
Sedimentation Pond				
M-62A	Background	2.7	13	None
M-56A	Down-gradient	2.4	13	None
M-57A	Down-gradient	2.4	13	None
M-58A	Down-gradient	2.4	13	None
Fly Ash Pond				
M-64A	Background	0.5	8	None
M-50A	Down-gradient	2.4	13	None
M-51A	Down-gradient	2.4	13	None
W-123	Down-gradient	3.0	13	CH-CCR-W123-52417
Bottom Ash Pond				
M-64A	Background	0.5	8	None
M-52A	Down-gradient	0.5	13	None
M-53A	Down-gradient	0.5	13	None
W-305	Down-gradient	0.6	13	None
W-306	Down-gradient	0.6	13	None
W-314	Down-gradient	0.5	13	None

**Table 4. Data Points Identified as Statistical Outliers,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

Well Identifier	Well Type	Sample Date	Constituent ^a	Value (mg/L or pH s.u.) ^b	Comment	Removed from Dataset? (YES/NO)
Bottom Ash Monofill						
M-54	Background	8/27/2016	Ca	110	Small overall magnitude of variation in sample	NO
M-54	Background	2/21/2017	Cl	1,300	Small overall magnitude of variation in sample	NO
M-54	Background	4/24/2017	Ca	95	Small overall magnitude of variation in sample	NO
M-59	Down-gradient	6/29/2017	TDS	2,500	Magnitude of variation comparable to other CCR wells	NO
M-60	Down-gradient	9/22/2016	TDS	3,000	Magnitude of variation comparable to other CCR wells	NO
M-60	Down-gradient	6/29/2017	TDS	2,500	Magnitude of variation comparable to other CCR wells	NO
M-61	Down-gradient	4/11/2017	Cl	1,700	Variation reasonable; ion balance within 15%	NO
M-61	Down-gradient	4/11/2017	SO ₄	420	Variation reasonable; ion balance within 15%	NO
Sedimentation Pond						
M-62A	Background	11/30/2015	B	0.14	Small overall magnitude of variation in sample	NO
M-56A	Down-gradient	11/30/2015	B	0.18	Small overall magnitude of variation in sample	NO
Fly Ash Pond						
M-50A	Down-gradient	3/8/2016	Cl	5,300	Likely laboratory error; past holding time for re-analysis	YES
M-50A	Down-gradient	3/8/2016	SO ₄	5,700	Likely laboratory error; past holding time for re-analysis	YES
W-123	Down-gradient	12/3/2015	TDS	13,000	Small overall magnitude of variation in sample	NO
W-123	Down-gradient	2/20/2017	TDS	13,000	Small overall magnitude of variation in sample	NO
Bottom Ash Pond						
M-52A	Down-gradient	12/1/2015	F	0.53	Small overall magnitude of variation in sample	NO
W-305	Down-gradient	12/2/2015	F	1.4	Re-analyzed past holding time; subsequent samples were all non-detects	YES
W-306	Down-gradient	12/2/2015	Ca	550	Inconsistent with subsequent samples	YES
W-306	Down-gradient	12/2/2015	pH	7.02	Small overall magnitude of variation in sample	NO
W-314	Down-gradient	3/10/2016	F	<0.80	Small overall magnitude of variation in sample	NO

Notes:

Statistical outliers identified using Dixon's test

^a Constituents:

B = Boron	pH = Potential of Hydrogen (Laboratory)
Ca = Calcium	SO ₄ = Sulfate
Cl = Chloride	TDS = Total Dissolved Solids (Laboratory)
F = Fluoride	

^b mg/L or pH s.u. = milligrams per liter, or standard unit (for pH)

**Table 5. Analysis of Trends in Detection Monitoring Constituents,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

Well Identifier	Well Type	Constituent													
		Boron		Calcium		Chloride		Fluoride		pH		Sulfate		TDS ^c	
		Significant Trend (YES/NO)	Trend Slope	Significant Trend (YES/NO)	Trend Slope	Significant Trend (YES/NO)	Trend Slope	Significant Trend (YES/NO)	Trend Slope	Significant Trend (YES/NO)	Trend Slope	Significant Trend (YES/NO)	Trend Slope	Significant Trend (YES/NO)	Trend Slope
			mg/L/d ^a		mg/L/d		mg/L/d		mg/L/d		s.u./d ^b		mg/L/d		mg/L/d
Bottom Ash Monofill															
M-54	Background	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-59	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-60	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-61	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
Sedimentation Pond															
M-62A	Background	NO	--	YES	0.221	YES	1.308	NO	--	NO	--	NO	--	YES	3.712
M-56A	Down-gradient	NO	--	YES	0.132	NO	--	NO	--	NO	--	YES	0.241	NO	--
M-57A	Down-gradient	YES	3.65E-04	YES	0.221	NO	--	NO	--	NO	--	NO	--	YES	1.583
M-58A	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
Fly Ash Pond															
M-64A	Background	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-50A	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-51A	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	YES	0.887	NO	--
W-123	Down-gradient	NO	--	NO	--	YES	1.25	NO	--	NO	--	NO	--	NO	--
Bottom Ash Pond															
M-64A	Background	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-52A	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
M-53A	Down-gradient	YES	9.32E-04	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
W-305	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
W-306	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--
W-314	Down-gradient	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--	NO	--

Notes:

^a mg/L/d = milligrams per liter per day

^b s.u./d = standard unit per day

^c TDS = total dissolved solids

--- = Trend slope not calculated where no significant trend indicated

**Table 6. Assessment of Normality,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

Well Identifier	Well Type	Constituents ^a						
		B	Ca	Cl	F	pH	SO ₄	TDS
Bottom Ash Monofill								
M-54	Background	YES	NO	NO	NO	YES	YES	YES
M-59	Down-gradient	YES	YES	NO	NO	YES	YES	NO
M-60	Down-gradient	YES	YES	NO	NO	YES	YES	NO
M-61	Down-gradient	NO	YES	NO	NO	YES	YES	NO
Sedimentation Pond								
M-62A	Background	NO	YES	YES	N/A	YES	YES	YES
M-56A	Down-gradient	NO	YES	YES	YES	YES	YES	YES
M-57A	Down-gradient	YES	YES	YES	N/A	YES	NO	YES
M-58A	Down-gradient	NO	YES	YES	N/A	YES	YES	NO
Fly Ash Pond								
M-64A	Background	NO	YES	YES	N/A	YES	YES	YES
M-50A	Down-gradient	YES	YES	YES	YES	YES	YES	NO
M-51A	Down-gradient	YES	YES	YES	YES	NO	YES	NO
W-123	Down-gradient	YES	YES	YES	YES	NO	YES	NO
Bottom Ash Pond								
M-64A	Background	NO	YES	YES	N/A	YES	YES	YES
M-52A	Down-gradient	YES	YES	YES	NO	YES	YES	YES
M-53A	Down-gradient	YES	YES	YES	YES	YES	YES	YES
W-305	Down-gradient	YES	YES	NO	N/A	YES	YES	YES
W-306	Down-gradient	NO	YES	NO	YES	NO	NO	NO
W-314	Down-gradient	NO	YES	YES	YES	YES	YES	YES

Notes:

Each sample was evaluated using the Shapiro-Wilk test at 99% confidence level to determine if the sample can be assumed to be normally distributed

^a **Constituents:**

- | | |
|---------------|---|
| B = Boron | pH = Potential of Hydrogen (Laboratory) |
| Ca = Calcium | SO ₄ = Sulfate |
| Cl = Chloride | TDS = Total Dissolved Solids (Laboratory) |
| F = Fluoride | |

Normality:

YES	= Sample determined to be normal at 99% confidence level
NO	= Sample determined not to be normal at 99% confidence level
N/A	= Sample included too many non-detects; normality cannot be determined

**Table 7. Upper Prediction Limit Background Concentrations for Detection Monitoring Constituents at CCR Units
Cholla CCR Baseline Monitoring Program
November 2015 through September 2017**

Unit	Background Monitor Well Identifier	Constituents ^a						
		B (mg/L) ^b	Ca (mg/L)	Cl (mg/L)	F (mg/L)	pH (s.u.) ^c	SO ₄ (mg/L)	TDS (mg/L)
Bottom Ash Monofill	M-54	0.57	110	1,600	1.4	7.6	400	3,400
Sedimentation Pond	M-62A	0.23	600	3,700	0.8	7.5	630	7,800
Bottom Ash Pond	M-64A	1.3	740	5,700	0.8	7.4	5,100	15,000
Fly Ash Pond	M-64A	1.3	740	5,700	0.8	7.4	5,100	15,000

Notes:

^a Constituents:

- B = Boron
- Ca = Calcium
- Cl = Chloride
- F = Fluoride
- pH = Potential of Hydrogen (Laboratory)
- SO₄ = Sulfate
- TDS = Total Dissolved Solids (Laboratory)

	99% UPL determined using Student's-t method
	99% UPL determined using highest order statistic
	KM Mean
	Too many non-detects to compute 99% UCL; background value assumed to be equal to maximum non-detect

UPL = Upper prediction limit

^b mg/L = milligrams per liter

^c s.u. = standard unit

**Table 8. Exceedances of Background Concentrations in Down-Gradient Monitor Wells,
Cholla CCR Baseline Monitoring Program,
November 2015 through September 2017**

Well Identifier	Well Type	Constituent ^a													
		B		Ca		Cl		F		pH		SO ₄		TDS	
		KM ^b Mean (mg/L) ^c	Exceeds Background 99% UPL	KM Mean (mg/L)	Exceeds Background 99% UPL	KM Mean (mg/L)	Exceeds Background 99% UPL	KM Mean (mg/L)	Exceeds Background 99% UPL	KM Mean (s.u.) ^d	Differs from Background KM Mean ^f	KM Mean (mg/L)	Exceeds Background 99% UPL	KM Mean (mg/L)	Exceeds Background 99% UPL
Bottom Ash Monofill															
M-54	Background	0.57 ^e		110		1,600		1.4		7.6		400		3,400	
M-59	Down-gradient	0.50	NO	88	NO	1,300	NO	1.4	NO	7.7	NO	350	NO	2,700	NO
M-60	Down-gradient	0.52	NO	88	NO	1,400	NO	1.4	NO	7.7	NO	360	NO	2,800	NO
M-61	Down-gradient	0.50	NO	91	NO	1,400	NO	1.4	NO	7.7	NO	360	NO	2,800	NO
Sedimentation Pond															
M-62A	Background	0.23		600		3,700		0.8		7.5		630		7,800	
M-56A	Down-gradient	0.26	YES	240	NO	1,900	NO	0.4	NO	7.6	NO	630	NO	3,900	NO
M-57A	Down-gradient	0.55	YES	370	NO	1,700	NO	0.4	N/A	7.3	YES	1,300	YES	4,500	NO
M-58A	Down-gradient	0.22	NO	270	NO	1,900	NO	0.4	N/A	7.6	NO	550	NO	3,900	NO
Fly Ash Pond															
M-64A	Background	1.3		740		5,700		0.8		7.4		5,100		15,000	
M-50A	Down-gradient	2.8	YES	660	NO	2,600	NO	2.2	YES	7.4	NO	3,000	NO	8,200	NO
M-51A	Down-gradient	35	YES	930	YES	6,700	YES	5.1	YES	7.3	YES	3,000	NO	14,000	NO
W-123	Down-gradient	36	YES	830	YES	6,300	YES	3.8	YES	7.6	NO	3,500	NO	14,000	NO
Bottom Ash Pond															
M-64A	Background	1.3		740		5,700		0.8		7.4		5,100		15,000	
M-52A	Down-gradient	3.5	YES	830	YES	4,000	NO	0.9	NO	7.1	YES	2,800	NO	10,000	NO
M-53A	Down-gradient	3.0	YES	680	NO	2,500	NO	1.8	YES	7.5	NO	2,900	NO	7,900	NO
W-305	Down-gradient	0.32	NO	720	NO	2,300	NO	N/A	N/A	7.4	NO	2,400	NO	7,000	NO
W-306	Down-gradient	0.9	NO	420	NO	2,000	NO	1.3	YES	7.8	YES	11,000	YES	17,000	YES
W-314	Down-gradient	1.1	NO	800	YES	2,800	NO	1.0	NO	7.5	NO	2,200	NO	7,600	NO

Notes:
^a **Constituents:**
 B = Boron Cl = Chloride pH = Potential of Hydrogen (Laboratory) TDS = Total Dissolved Solids (Laboratory)
 Ca = Calcium F = Fluoride SO₄ = Sulfate

^b KM = Kaplan-Meier
^c mg/L = milligrams per liter
^d s.u. = standard unit
^e Background concentrations are 99% upper prediction limits (UPL)

^f Downgradient samples for pH are compared to the background sample using a two-sample, two-sided test; values are flagged if they show statistically significant differences

N/A: Sample does not contain enough detects to calculate statistics or perform hypothesis testing

YES	Sample mean/median exceeds background 99% UPL with 99% confidence
NO	Cannot reject null hypothesis: sample mean/median does not exceed background 99% UPL statistically significantly
	Testing performed using single-sample, one-sided t-test
	Testing performed using single-sample, one-sided Wilcoxon Signed Rank test
	Testing performed using two-sample, two-sided t-test
	Testing performed using two-sample, two-sided Wilcoxon-Mann-Whitney test



**Table 9. Background Exceedances and Associated Recommendations
Cholla CCR Baseline Monitoring Program
November 2015 through September 2017**

Down-gradient Well Identifier	Constituents ^a	Recommendations
Bottom Ash Monofill		
No Exceedances		Continue detection monitoring
Sedimentation Pond		
M-56A	B, SO ₄	Three detection monitoring constituents show statistically significant increases above background; additional evaluation required; continue with detection monitoring
M-57A	B, pH ^b , SO ₄	
Fly Ash Pond		
M-50A	B, F	Five detection monitoring constituents show statistically significant increases above background; proceed to assessment monitoring
M-51A	B, Ca, Cl, F, pH ^b	
W-123	B, Ca, Cl, F	
Bottom Ash Pond		
M-52A	B, Ca, pH ^b	Six detection monitoring constituents show statistically significant increases above background; proceed to assessment monitoring
M-53A	B, F	
W-305	Ca	
W-306	F, pH ^b , SO ₄ , TDS	
W-314	Ca	

Notes:

^a Constituents:

B = Boron	pH = Potential of Hydrogen (Laboratory)
Ca = Calcium	SO ₄ = Sulfate
Cl = Chloride	TDS = Total Dissolved Solids (Laboratory)
F = Fluoride	

^bFor pH, reference Table 8 to determine if the KM mean of the downgradient well is above or below the KM mean of the background well.



FIGURE 1. SITE LOCATION, ARIZONA

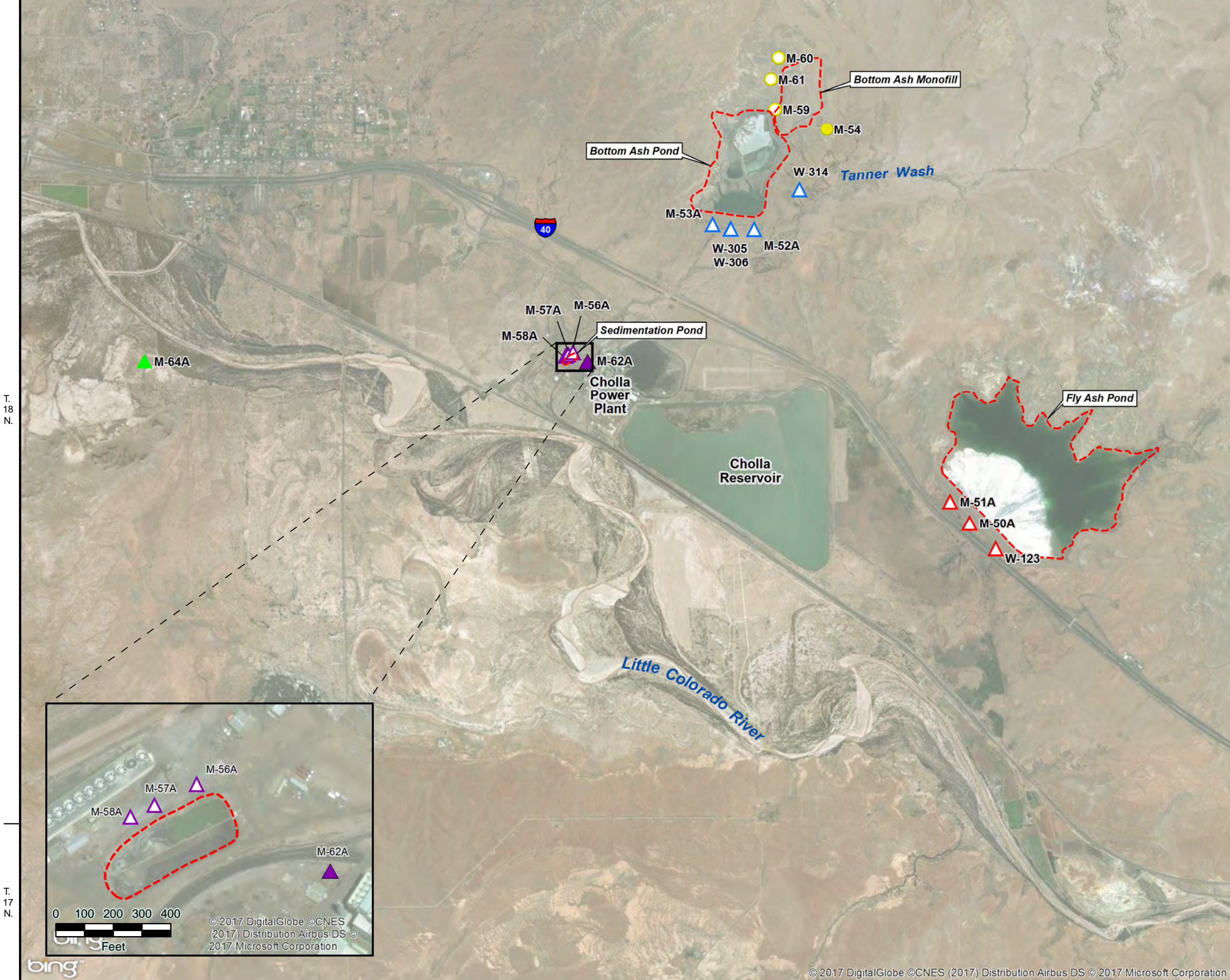
EXPLANATION

Approximate Extent of Coal Combustion Residual Unit

M-51A Monitor Well Location and Identifier

CCR WELLS:

- Alluvium, Background, Fly Ash Pond and Bottom Ash Pond
- Alluvium, Downgradient, Bottom Ash Pond
- Alluvium, Downgradient, Fly Ash Pond
- Alluvium, Upgradient, Sedimentation Pond
- Alluvium, Downgradient, Sedimentation Pond
- Coconino, Upgradient, Bottom Ash Monofill
- Coconino, Downgradient, Bottom Ash Monofill

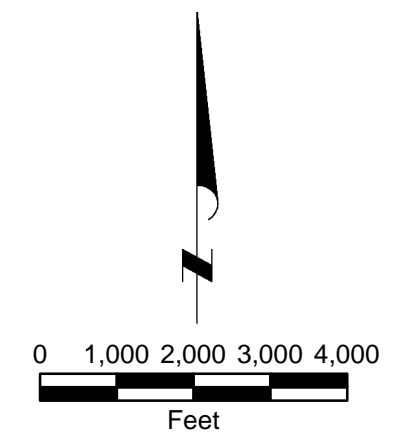
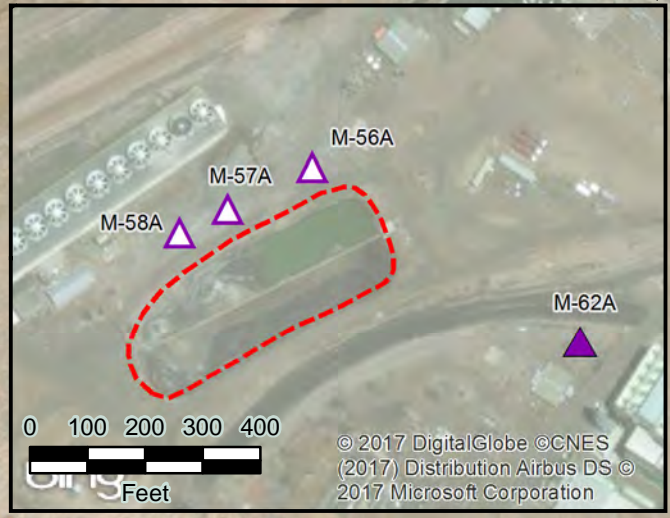


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T. 17 N.



ARIZONA PUBLIC SERVICE
CHOLLA POWER PLANT
NAVAJO COUNTY, ARIZONA

**CCR UNITS AND
GROUNDWATER MONITORING
WELL LOCATIONS**

MONTGOMERY & ASSOCIATES 2017
Water Resource Consultants **FIGURE 2**

APPENDIX G

**WOOD TECHNICAL MEMORANDUM DOCUMENTING THE STATISTICAL ANALYSIS
OF INITIAL ASSESSMENT MONITORING APPENDIX IV CONSTITUENT DATA
COLLECTED FROM THE BAP**



Technical Memorandum

To: Michele Robertson, RG
Pamela Norris
From: Natalie Chrisman Lazarr, PE
Carla Landrum, PhD
Date: October 15, 2018
File No: 1420182040.03
cc: File

**Subject: CCR GROUNDWATER ASSESSMENT MONITORING
STATISTICAL ANALYSIS AND RESULTS FOR THE BOTTOM ASH POND
Arizona Public Service Cholla Power Plant – Navajo County, Arizona**

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 Bottom Ash Pond (BAP) located at the Arizona Public Service (APS) Cholla Power Plant (Cholla) in Navajo County, Arizona. 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 Cholla 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 BAP groundwater monitoring well network consists of one background monitoring well (M-64A) and five compliance (i.e., downgradient), monitoring wells (M-52A, M-53A, W-305, W-306 and W-314). The period of evaluation for the BAP Appendix IV constituent statistical analysis ranges from December 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 for data collection is shorter (i.e. February 2017 through May 2018) for M-64A, which was installed in February 2017.

Due principally to the addition of wells to the monitoring program in 2017 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 BAP was conducted in February 2018; all Appendix IV constituents were evaluated in collected



samples during this monitoring event. During the second round of assessment monitoring conducted in May 2018, only detected Appendix IV constituents from the first round of assessment monitoring were evaluated in collected samples as prescribed by the CCR Rule. A supplementary round of assessment monitoring was conducted at M-52A in June 2018. Based on these frequencies of sample collection for Appendix IV constituents, the minimum sample numbers used in the statistical evaluation of available data were 14 and 9 for compliance monitoring wells and the background monitoring well, 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 to the analyte's reporting limit value for the corresponding sample date. Field duplicates and split samples were retracted.

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.

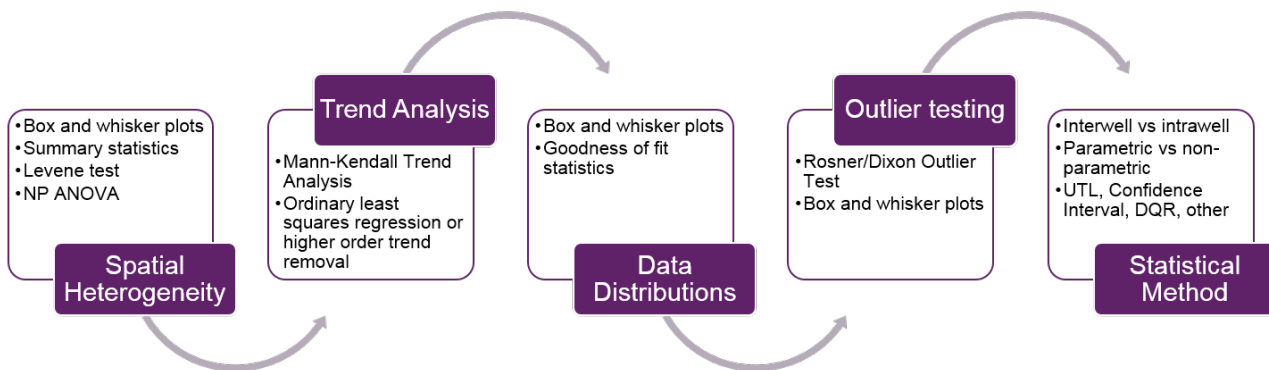


Figure 1. Assessment monitoring EDA and statistical method workflow procedures. Each box represent as separate step in the EDA workflow process. The items listed in each box identifies the statistical method(s) applied for each step. Both quantitative and qualitative methods are listed.

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 BAP 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 Cholla BAP 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 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 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 Cholla. 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 BAP. 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), 3) structurally-compromised wells that do not produce representative groundwater samples and 4) background wells that do not adequately represent site-specific activity independent of the CCR unit. 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* ($1-\alpha$) 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 compute 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 BAP: 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. For all Appendix IV constituents except lithium, the U.S. EPA's promulgated MCL or the risk-based alternative GWPS, is higher than the BTVs.

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 following monitoring wells: M-52A, M-53A, W-305 and W-314. Monitoring wells M-53A and W-314 exhibit statistically significant ($p < 0.05$) decreasing trends for cobalt concentrations. There is sufficient evidence to declare and SSI for lithium in monitoring well W-306.

Several compliance monitoring wells exhibit statistically significant ($p < 0.05$) temporal trends with no SSI declaration. There are statistically significant ($p < 0.05$) decreasing trends for arsenic (M-53A), barium (M-52A, M-53A, W-306 and W-314), cobalt (W-306) and lithium (M-52A and W-314). There are statistically significant ($p < 0.05$) increasing trends for fluoride (M-53A), molybdenum (M-52A) and combined radium (M-52A).

5.0 RECOMMENDATIONS

This statistical analysis results in the following recommendations for the BAP assessment monitoring statistical analysis:

- There is sufficient evidence to declare an SSI above the GWPS for cobalt in wells M-52A, M-53A, W-305 and W-314 and lithium in monitoring well W-306. 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 assessment or demonstrate that the SSI is due to an alternative source.
- A lower sampling frequency is necessary to avoid temporal-dependence 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 SSIs for cobalt indicate that concentrations are decreasing over time for several wells. The rate of change should be considered when interpreting the SSI declaration. The rate of change is sensitive to data representativeness (i.e. how well the data represent temporal variations in constituent concentrations) and the amount of data available.
- 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 or positive SSIs when applying statistical tests.
- With the exception of lithium, the GWPS selections for the BAP defaults to the U.S. EPA's MCL or the risk-based alternative GWPS by consequence of the respective BTVs exhibiting lower

constituent concentrations (Table 1). It is important to interpret the selected GWPSs within the context of the Cholla conceptual site model to ensure that the GWPSs are adequate and representative of groundwater conditions upgradient of the BAP. If it is possible for true background constituent concentrations at Cholla (i.e. those absent of a release from the BAP) to exceed the selected GWPSs, then it is possible for the SSIs declared herein to be false. In the event that the GWPSs in Table 1 are deemed inadequate or misrepresent true background constituent concentrations for the BAP, and it is impractical to establish a background well location closer and upgradient to the site, intrawell statistical comparisons should be considered.

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.

U.S. EPA, 2015. *ProUCL (Version 5.1.1) User Guide, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations*. EPA/600/R-07/041. Washington D.C. October 2015.

Wood Environment & Infrastructure Solutions, Inc, 2018. *Statistical Data Analysis Work Plan*. Coal Combustion Residual Rule Groundwater Monitoring System Compliance, Cholla Power Plant, Navajo County, Arizona. Prepared for Arizona Public Service. October, 2018.

TABLES



Table 1
GWPS Selection for the Cholla BAP
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
M-64A	Antimony	0.006	---	0.004 (DQR)	mg/L	US EPA MCL
M-64A	Arsenic	0.01	---	0.004 (P-UTL)	mg/L	US EPA MCL
M-64A	Barium	2	---	0.05 (P-UTL)	mg/L	US EPA MCL
M-64A	Beryllium	0.004	---	0.001 (DQR)	mg/L	US EPA MCL
M-64A	Cadmium	0.005	---	0.0004 (DQR)	mg/L	US EPA MCL
M-64A	Chromium	0.1	---	0.004 (NP-UTL)	mg/L	US EPA MCL
M-64A	Cobalt	---	0.006	0.002 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
M-64A	Fluoride	4	---	0.8 (DQR)	mg/L	US EPA MCL
M-64A	Lead	---	0.015	0.002 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
M-64A	Lithium	---	0.04	0.31 (P-UTL)	mg/L	BTV
M-64A	Mercury	0.002	---	0.0002 (DQR)	mg/L	US EPA MCL
M-64A	Molybdenum	---	0.1	0.0061 (P-UTL)	mg/L	Alternative Risk-Based GWPS
M-64A	Selenium	0.05	---	0.002 (NP-UTL)	mg/L	US EPA MCL
M-64A	Thallium	0.002	---	0.0014 (DQR)	mg/L	US EPA MCL
M-64A	Combined Radium	5	---	1.6 (NP-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

Table 2
 Statistical Results Summary - Cholla BAP 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	0.006	0.01	2	0.004	0.005	0.1	0.006	4	0.015	0.31	0.002	0.1	0.05	0.002	5
M-52A	NP-LCL (0.0025)	P-LCL (0.00024)	P-LCLT (0.0094)	NP-LCL (0.001)	P-LCL (0.00026)	P-LCL (0.00066)	P-LCL (0.038)	P-LCL (0.71)	NP-LCL (0.002)	P-LCLT (0.21)	NP-LCL (0.0002)	P-LCLT (0.029)	P-LCL (0.00030)	NP-LCL (0.0004)	P-LCLT (0.53)
M-53A	NP-LCL (0.0025)	P-LCLT (0.00072)	NP-LCL (0.021)	NP-LCL (0.001)	P-LCL (0.0012)	NP-LCL (0.004)	P-LCLT (0.012)	NP-LCL (2.4)	NP-LCL (0.001)	P-LCL (0.19)	NP-LCL (0.0002)	NP-LCL (0.047)	NP-LCL (0.001)	NP-LCL (0.0002)	NP-LCL (0.7)
W-305	NP-LCL (0.0025)	P-LCL (0.00056)	NP-LCL (0.012)	NP-LCL (0.001)	NP-LCL (0.00022)	P-LCL (0.00030)	NP-LCL (0.018)	NP-LCL (0.8)	P-LCL (0.0015)	NP-LCL (0.22)	NP-LCL (0.0002)	P-LCL (0.015)	NP-LCL (0.00067)	NP-LCL (0.0001)	NP-LCL (1.1)
W-306	NP-LCL (0.0025)	NP-LCL (0.0051)	P-LCLT (0.0082)	NP-LCL (0.001)	NP-LCL (0.0004)	NP-LCL (0.002)	NP-LCL (0.0043)	P-LCL (0.88)	NP-LCL (0.002)	P-LCL (0.52)	NP-LCL (0.0002)	P-LCL (0.021)	P-LCL (0.0017)	NP-LCL (0.0004)	NP-LCL (0.7)
W-314	NP-LCL (0.0025)	NP-LCL (0.001)	P-LCLT (0.0085)	NP-LCL (0.001)	P-LCL (0.00015)	P-LCL (0.00066)	P-LCLT (0.010)	P-LCL (0.75)	NP-LCL (0.002)	P-LCLT (0.29)	NP-LCL (0.0002)	P-LCL (0.0064)	NP-LCL (0.001)	NP-LCL (0.0002)	NP-LCL (0.7)

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
All Constituents - All Wells

StationName	QC_SampleID	SampDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Fluoride	D_Fluoride	Lead	D_Lead
M-52A	7879_O	12/1/2015	0.0025	0	0.0005	1	0.027	1	0.001	0	0.00071	1	0.0014	1	0.06	1	0.53	1	0.0005	0
M-52A	CH-M-52A-0316_O	3/9/2016	0.05	0	0.01	0	0.022	1	0.001	0	0.0012	1	0.01	0	0.054	1	2	0	0.01	0
M-52A	CH-CCR-M52A-516_O	5/10/2016	0.0002	0	0.001	0	0.023	1	0.001	0	0.00048	1	0.001	0	0.043	1	2	0	0.001	0
M-52A	CH-CCR-M52A-816_O	8/26/2016	0.00012	1	0.0005	0	0.024	1	0.001	0	0.0013	1	0.0012	1	0.061	1	0.97	1	0.0005	0
M-52A	CH-CCR-M52A-916_O	9/22/2016	0.0005	0	0.00047	1	0.019	1	0.001	0	0.0014	1	0.0011	1	0.054	1	0.89	1	0.00048	1
M-52A	CH-CCR-M52A-217_O	2/21/2017	0.001	0	0.00071	1	0.016	1	0.001	0	0.00051	1	0.0058	1	0.043	1	0.98	1	0.0005	0
M-52A	CH-CCR-M52A-41117_O	4/11/2017	0.001	0	0.00097	1	0.016	1	0.001	0	0.00048	1	0.019	1	0.045	1	0.8	1	0.0005	0
M-52A	CH-CCR-M52A-42517_O	4/25/2017	0.001	0	0.0005	0	0.015	1	0.001	0	0.00049	1	0.014	1	0.041	1	0.99	1	0.0005	0
M-52A	CH-CCR-M52A-51817_O	5/18/2017	0.001	0	0.00054	1	0.013	1	0.001	0	0.00052	1	0.016	1	0.037	1	0.86	1	0.0005	0
M-52A	CH-CCR-M52A-52417_O	5/24/2017	0.001	0	0.0005	1	0.016	1	0.001	0	0.0006	1	0.034	1	0.044	1	0.96	1	0.002	0
M-52A	CH-CCR-M52A-63017_O	6/30/2017	0.001	0	0.0005	0	0.014	1	0.001	0	0.0013	1	0.0071	1	0.051	1	1	1	0.0005	0
M-52A	CH-CCR-M52A-72817_O	7/28/2017	0.002	0	0.001	0	0.014	1	0.001	0	0.0018	1	0.0046	1	0.063	1	1	1	0.001	0
M-52A	CH-CCR-M52A-90717_O	9/7/2017	0.004	0	0.002	0	0.014	1	0.001	0	0.0019	1	0.004	0	0.066	1	0.9	1	0.002	0
M-52A	CH-CCR-M52A-120717_O	12/7/2017															0.84	1		
M-52A	CH-CCR-M52A-21518_O	2/15/2018	0.001	0	0.0018	1	0.017	1	0.001	0	0.0011	1	0.011	1	0.052	1	1.1	1	0.001	1
M-52A	CH-CCR-M52A-6718_O	6/7/2018	0.001	0	0.0026	1	0.018	1			0.00094	1	0.018	1	0.062	1	0.99	1	0.001	1
M-53A	7878_O	12/1/2015	0.0025	0	0.0014	1	0.021	1	0.001	0	0.0013	1	0.0014	1	0.024	1	0.87	1	0.00058	1
M-53A	CH-M-53A-0316_O	3/9/2016	0.05	0	0.01	0	0.024	1	0.001	0	0.0024	1	0.01	0	0.023	1	0.94	1	0.01	0
M-53A	CH-CCR-M53A-516_O	5/10/2016	0.0002	0	0.0018	1	0.021	1	0.001	0	0.0014	1	0.0015	1	0.023	1	2	0	0.001	0
M-53A	CH-CCR-M53A-816_O	8/26/2016	0.0001	0	0.0012	1	0.0094	1	0.001	0	0.0018	1	0.0011	1	0.018	1	2.3	1	0.00057	1
M-53A	CH-CCR-M53A-916_O	9/22/2016	0.0005	0	0.0013	1	0.0092	1	0.001	0	0.0016	1	0.001	1	0.017	1			0.00062	1
M-53A	CH-CCR-M53A-217_O	2/21/2017	0.001	0	0.00098	1	0.0091	1	0.001	0	0.0015	1	0.0062	1	0.018	1	2	1	0.0005	0
M-53A	CH-CCR-M53A-41217_O	4/12/2017	0.001	0	0.0017	1	0.018	1	0.001	0	0.0015	1	0.0038	1	0.018	1	1.3	1	0.00077	1
M-53A	CH-CCR-M53A-42517_O	4/25/2017	0.001	0	0.00083	1	0.013	1	0.001	0	0.0018	1	0.002	1	0.015	1	1.3	1	0.0005	0
M-53A	CH-CCR-M53A-51817_O	5/18/2017	0.001	0	0.00096	1	0.0079	1	0.001	0	0.0014	1	0.0011	1	0.016	1	2.2	1	0.0005	0
M-53A	CH-CCR-M53A-52417_O	5/24/2017	0.001	0	0.0011	1	0.0083	1	0.001	0	0.0015	1	0.0014	1	0.016	1	2.4	1	0.00052	1
M-53A	CH-CCR-M53A-70117_O	7/1/2017	0.001	0	0.0011	1	0.0085	1	0.001	0	0.0014	1	0.0014	1	0.016	1	2.6	1	0.0005	0
M-53A	CH-CCR-M53A-72817_O	7/28/2017	0.002	0	0.001	1	0.0087	1	0.001	0	0.0014	1	0.0017	1	0.017	1	2.4	1	0.001	0
M-53A	CH-CCR-M53A-90717_O	9/7/2017	0.004	0	0.002	0	0.0086	1	0.001	0	0.0015	1	0.004	0	0.017	1	2.3	1	0.002	0
M-53A	CH-CCR-M53A-120717_O	12/7/2017															2.3	1		
M-53A	CH-CCR-M53A-21518_O	2/15/2018	0.001	0	0.00076	1	0.018	1	0.001	0	0.0012	1	0.001	1	0.011	1	1.4	1	0.0005	0
M-53A	CH-CCR-M-53A-52018_O	5/20/2018	0.001	0	0.0011	1	0.0091	1			0.0013	1	0.0015	1	0.016	1	2.4	1	0.0005	0
M-64A	CH-CCR-M64A-217_O	2/20/2017	0.001	0	0.00094	1	0.034	1	0.001	0	0.0001	0	0.0021	1	0.0015	1	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-41217_O	4/12/2017	0.001	0	0.0026	1	0.019	1	0.001	0	0.0001	0	0.0015	1	0.00068	1	0.8	0	0.00071	1
M-64A	CH-CCR-M64A-42517_O	4/25/2017	0.001	0	0.0017	1	0.015	1	0.001	0	0.0001	0	0.0005	0	0.00056	1	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-51817_O	5/18/2017	0.001	0	0.0016	1	0.012	1	0.001	0	0.0001	0	0.0005	0	0.0005	0	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-52417_O	5/24/2017	0.001	0	0.0019	1	0.014	1	0.001	0	0.0001	0	0.0005	0	0.0005	0	0.8	0	0.002	0
M-64A	CH-CCR-M64A-63017_O	6/30/2017	0.001	0	0.0033	1	0.017	1	0.001	0	0.0001	0	0.0005	0	0.0011	1	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-72717_O	7/27/2017	0.002	0	0.0028	1	0.017	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.8	0	0.001	0
M-64A	CH-CCR-M64A-90717_O	9/7/2017	0.004	0	0.0025	1	0.017	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.8	0	0.002	0
M-64A	CH-CCR-M64A-120817_O	12/8/2017															0.8	0		
M-64A	CH-CCR-M64A-21518_O	2/15/2018	0.002	0	0.001	0	0.015	1	0.001	0	0.0002	0	0.0022	1	0.0005	0	0.8	0	0.001	0
M-64A	CH-CCR-M-64A-51918_O	5/19/2018	0.002	0	0.0012	1	0.012	1			0.0002	0	0.002	0	0.001	0	0.8	0	0.001	0
W-305	7796_O	12/2/2015	0.0025	0	0.00088	1	0.013	1	0.001	0	0.00022	1	0.00066	1	0.01	1	1.4	1	0.0017	1
W-305	CH-W-305-0316_O	3/9/2016	0.05	0	0.01	0	0.0083	1	0.001	0	0.002	0	0.01	0	0.016	1	0.8	0	0.01	0
W-305	CH-CCR-W305-516_O	5/11/2016	0.0001	0	0.00058	1	0.0059	1	0.001	0	0.00012	1	0.0005	0	0.014	1	2	0	0.0005	0
W-305	CH-CCR-W305-816_O	8/27/2016	0.00011	1	0.0017	1	0.022	1	0.001	0	0.00013	1	0.0012	1	0.019	1	0.8	0	0.0035	1
W-305	CH-CCR-W305-916_O	9/22/2016	0.0005	0	0.0006	1	0.011	1	0.001	0	0.0001	0	0.0098	1	0.016	1	0.4	0	0.0025	1
W-305	CH-CCR-W305-217_O	2/21/2017	0.001	0	0.00066	1	0.012	1	0.001	0	0.00011	1	0.0022	1	0.018	1	0.8	0	0.0021	1
W-305	CH-CCR-W305-41117_O	4/11/2017	0.001	0	0.00098	1	0.012	1	0.001	0	0.0001	0	0.00092	1	0.019	1	0.8	0	0.0024	1
W-305	CH-CCR-W305-42417_O	4/24/2017	0.001	0	0.00078	1	0.012	1	0.001	0	0.0001	0	0.0031	1	0.017	1	0.8	0	0.002	1
W-305	CH-CCR-W305-52217_O	5/22/2017	0.001	0	0.0007	1	0.01	1	0.001	0	0.0001	0	0.0007	1	0.015	1	0.8	0	0.0017	1
W-305	CH-CCR-W305-52417_O	5/24/2017	0.004	0	0.002	0	0.012	1	0.001	0	0.0004	0	0.002	0	0.017	1	0.8	0	0.002	0

Table A-1
All Constituents - All Wells

StationName	QC_SampleID	SampDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Fluoride	D_Fluoride	Lead	D_Lead
W-305	CH-CCR-W305-62917_O	6/29/2017	0.001	0	0.00076	1	0.012	1	0.001	0	0.00011	1	0.004	1	0.018	1	0.4	0	0.0025	1
W-305	CH-CCR-W305-72817_O	7/28/2017	0.001	0	0.00078	1	0.01	1	0.001	0	0.0001	0	0.00062	1	0.017	1	0.8	0	0.0021	1
W-305	CH-CCR-W305-90617_O	9/6/2017	0.001	0	0.00073	1	0.011	1	0.001	0	0.0001	1	0.0038	1	0.018	1	0.8	0	0.002	1
W-305	CH-CCR-W305-120717_O	12/7/2017															0.8	0		
W-305	CH-CCR-W305-21518_O	2/15/2018	0.001	0	0.00092	1	0.012	1	0.001	0	0.0001	0	0.001	0	0.017	1	0.8	0	0.002	1
W-305	CH-CCR-W-305-51918_O	5/19/2018	0.001	0	0.00099	1	0.012	1			0.0001	0	0.0012	1	0.017	1	0.8	0	0.002	1
W-306	7797_O	12/2/2015	0.0025	0	0.0019	1	0.014	1	0.001	0	0.0015	1	0.00073	1	0.03	1	0.75	1	0.00066	1
W-306	CH-W-306-0316_O	3/9/2016	0.05	0	0.01	0	0.013	1	0.001	0	0.002	0	0.01	0	0.0099	1	1.4	1	0.01	0
W-306	CH-CCR-W306-516_O	5/11/2016	0.00024	1	0.0039	1	0.014	1	0.001	0	0.0002	0	0.001	0	0.0082	1	2	0	0.001	0
W-306	CH-CCR-W306-816_O	8/26/2016	0.00024	1	0.0051	1	0.015	1	0.001	0	0.0001	0	0.00093	1	0.0043	1	1.4	1	0.0005	0
W-306	CH-CCR-W306-916_O	9/22/2016	0.001	0	0.0042	1	0.013	1	0.001	0	0.0002	0	0.001	0	0.0038	1	0.4	0	0.0002	0
W-306	CH-CCR-W306-217_O	2/21/2017	0.001	0	0.0048	1	0.012	1	0.001	0	0.0001	0	0.00087	1	0.0021	1	1.5	1	0.0005	0
W-306	CH-CCR-W306-41217_O	4/12/2017	0.001	0	0.005	1	0.012	1	0.001	0	0.0001	0	0.0005	0	0.0021	1	1.4	1	0.0005	0
W-306	CH-CCR-W306-42517_O	4/25/2017	0.001	0	0.0048	1	0.012	1	0.001	0	0.0001	0	0.0005	1	0.002	1	1.5	1	0.001	0
W-306	CH-CCR-W306-52217_O	5/22/2017	0.001	0	0.0042	1	0.01	1	0.001	0	0.0001	0	0.0005	0	0.0018	1	1.1	1	0.0005	0
W-306	CH-CCR-W306-52417_O	5/24/2017	0.004	0	0.0046	1	0.013	1	0.001	0	0.0004	0	0.002	0	0.0022	1	1	1	0.002	0
W-306	CH-CCR-W306-70117_O	7/1/2017	0.001	0	0.0046	1	0.011	1	0.001	0	0.0001	1	0.0005	0	0.0023	1	1.3	1	0.0005	0
W-306	CH-CCR-W306-72817_O	7/28/2017	0.001	0	0.0044	1	0.0094	1	0.001	0	0.0004	0	0.0005	0	0.0024	1	1.2	1	0.002	0
W-306	CH-CCR-W306-90617_O	9/6/2017	0.001	0	0.0047	1	0.01	1	0.001	0	0.0001	0	0.001	0	0.0023	1	1.4	1	0.0005	0
W-306	CH-CCR-W306-120717_O	12/7/2017															1.4	1		
W-306	CH-CCR-W306-21518_O	2/15/2018	0.001	0	0.0048	1	0.01	1	0.001	0	0.0001	0	0.001	0	0.0014	1	1.3	1	0.0005	0
W-306	CH-CCR-W-306-51918_O	5/19/2018	0.002	0	0.0052	1	0.01	1			0.0002	0	0.002	0	0.0014	1	1.6	1	0.001	0
W-314	7798_O	12/2/2015	0.0025	0	0.0005	0	0.016	1	0.001	0	0.00022	1	0.00078	1	0.016	1	1.2	1	0.00067	1
W-314	CH-W-314-0316_O	3/10/2016	0.05	0	0.01	0	0.013	1	0.001	0	0.002	0	0.01	0	0.018	1	0.8	0	0.01	0
W-314	CH-CCR-W314-516_O	5/11/2016	0.0002	0	0.001	0	0.012	1	0.001	0	0.0002	0	0.001	0	0.015	1	2	0	0.001	0
W-314	CH-CCR-W314-816_O	8/26/2016	0.00014	1	0.00056	1	0.013	1	0.001	0	0.00017	1	0.00078	1	0.015	1	0.93	1	0.0005	0
W-314	CH-CCR-W314-916_O	9/22/2016	0.0005	0	0.0006	1	0.012	1	0.001	0	0.00015	1	0.00073	1	0.013	1	1.1	1	0.00041	1
W-314	CH-CCR-W314-217_O	2/21/2017	0.001	0	0.00054	1	0.011	1	0.001	0	0.00016	1	0.001	1	0.013	1	0.97	1	0.0005	0
W-314	CH-CCR-W314-41117_O	4/11/2017	0.001	0	0.0005	0	0.012	1	0.001	0	0.00019	1	0.0012	1	0.014	1	0.91	1	0.0005	0
W-314	CH-CCR-W314-42517_O	4/25/2017	0.001	0	0.0005	0	0.011	1	0.001	0	0.00017	1	0.0017	1	0.013	1	0.8	1	0.0023	1
W-314	CH-CCR-W314-52217_O	5/22/2017	0.001	0	0.0005	0	0.0097	1	0.001	0	0.00016	1	0.002	1	0.011	1	0.9	1	0.0005	0
W-314	CH-CCR-W314-52417_O	5/24/2017	0.004	0	0.002	0	0.013	1	0.001	0	0.0004	0	0.002	0	0.014	1	0.9	1	0.002	0
W-314	CH-CCR-W314-63017_O	6/30/2017	0.001	0	0.00069	1	0.011	1	0.001	0	0.0002	1	0.00098	1	0.012	1	1.1	1	0.0005	0
W-314	CH-CCR-W314-72817_O	7/28/2017	0.001	0	0.00053	1	0.0093	1	0.001	0	0.00018	1	0.00087	1	0.012	1	0.9	1	0.0005	0
W-314	CH-CCR-W314-90717_O	9/7/2017	0.001	0	0.00091	1	0.011	1	0.001	0	0.00018	1	0.0012	1	0.013	1	0.9	1	0.0005	0
W-314	CH-CCR-W314-120717_O	12/7/2017															0.85	1		
W-314	CH-CCR-W314-21518_O	2/15/2018	0.001	0	0.0006	1	0.012	1	0.001	0	0.00019	1	0.001	0	0.013	1	1.1	1	0.0005	0
W-314	CH-CCR-W-314-52018_O	5/20/2018	0.002	0	0.001	0	0.011	1			0.0002	0	0.002	0	0.013	1	1.3	1	0.001	0

Table A-1
All Constituents - All Wells

StationName	QC_SampleID	SampDate	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Radium	D_Radium	Selenium	D_Selenium	Thallium	D_Thallium
M-52A	7879_O	12/1/2015	0.27	1	0.0002	0	0.021	1	0.4	1	0.00074	1	0.0001	0
M-52A	CH-M-52A-0316_O	3/9/2016	0.25	1	0.0002	0	0.016	1	0.6	0	0.01	0	0.0015	1
M-52A	CH-CCR-M52A-516_O	5/10/2016	0.28	1	0.0002	0	0.013	1	0.4	0	0.001	0	0.0002	0
M-52A	CH-CCR-M52A-816_O	8/26/2016	0.24	1	0.0002	0	0.04	1	0.6	1	0.00057	1	0.0001	0
M-52A	CH-CCR-M52A-916_O	9/22/2016	0.24	1	0.0002	0	0.05	1	0.6	1	0.0006	0	0.00011	1
M-52A	CH-CCR-M52A-217_O	2/21/2017	0.26	1	0.0002	0	0.021	1	0.6	0	0.00078	1	0.0001	0
M-52A	CH-CCR-M52A-41117_O	4/11/2017	0.24	1	0.0002	0	0.018	1	0.6	0	0.00079	1	0.0001	0
M-52A	CH-CCR-M52A-42517_O	4/25/2017	0.26	1	0.0002	0	0.018	1	0.9	1	0.0005	0	0.0001	0
M-52A	CH-CCR-M52A-51817_O	5/18/2017	0.27	1	0.0002	0	0.017	1	0.6	1	0.00052	1	0.0001	0
M-52A	CH-CCR-M52A-52417_O	5/24/2017	0.26	1	0.0002	0	0.024	1	0.6	0	0.00064	1	0.0004	0
M-52A	CH-CCR-M52A-63017_O	6/30/2017	0.23	1	0.0002	0	0.038	1	0.7	0	0.00051	1	0.0001	0
M-52A	CH-CCR-M52A-72817_O	7/28/2017	0.21	1	0.0002	0	0.062	1	0.7	0	0.001	0	0.0002	0
M-52A	CH-CCR-M52A-90717_O	9/7/2017	0.22	1	0.0002	0	0.071	1	0.6	1	0.002	0	0.0004	0
M-52A	CH-CCR-M52A-120717_O	12/7/2017												
M-52A	CH-CCR-M52A-21518_O	2/15/2018	0.25	1	0.0002	0	0.048	1	0.9	1	0.00091	1	0.00018	1
M-52A	CH-CCR-M52A-6718_O	6/7/2018	0.24	1			0.052	1	0.7	1	0.0013	1	0.00013	1
M-53A	7878_O	12/1/2015	0.21	1	0.0002	0	0.041	1	0.7	0	0.00071	1	0.0001	0
M-53A	CH-M-53A-0316_O	3/9/2016	0.2	0	0.0002	0	0.036	1	0.5	1	0.01	0	0.002	0
M-53A	CH-CCR-M53A-516_O	5/10/2016	0.2	0	0.0002	0	0.037	1	0.4	0	0.001	0	0.0002	0
M-53A	CH-CCR-M53A-816_O	8/26/2016	0.2	1	0.0002	0	0.053	1	0.6	1	0.0005	0	0.0001	0
M-53A	CH-CCR-M53A-916_O	9/22/2016	0.21	1	0.0002	0	0.048	1	0.7	0	0.00066	1	0.0001	0
M-53A	CH-CCR-M53A-217_O	2/21/2017	0.21	1	0.0002	0	0.047	1	0.6	0	0.0005	0	0.0001	0
M-53A	CH-CCR-M53A-41217_O	4/12/2017	0.2	0	0.0002	0	0.037	1	0.6	1	0.00067	1	0.0001	0
M-53A	CH-CCR-M53A-42517_O	4/25/2017	0.2	0	0.0002	0	0.027	1	0.6	0	0.0005	0	0.0001	0
M-53A	CH-CCR-M53A-51817_O	5/18/2017	0.21	1	0.0002	0	0.041	1	0.6	0	0.0005	0	0.0001	0
M-53A	CH-CCR-M53A-52417_O	5/24/2017	0.2	1	0.0002	0	0.043	1	0.4	0	0.0005	0	0.0001	0
M-53A	CH-CCR-M53A-70117_O	7/1/2017	0.2	1	0.0002	0	0.042	1	0.7	0	0.0005	0	0.0001	0
M-53A	CH-CCR-M53A-72817_O	7/28/2017	0.2	1	0.0002	0	0.045	1	0.7	0	0.001	0	0.0002	0
M-53A	CH-CCR-M53A-90717_O	9/7/2017	0.2	1	0.0002	0	0.046	1	0.6	1	0.002	0	0.0004	0
M-53A	CH-CCR-M53A-120717_O	12/7/2017												
M-53A	CH-CCR-M53A-21518_O	2/15/2018	0.2	0	0.0002	0	0.0059	1	0.4	1	0.00057	1	0.00012	1
M-53A	CH-CCR-M-53A-52018_O	5/20/2018	0.2	0			0.045	1	0.7	0	0.0005	0	0.00015	1
M-64A	CH-CCR-M64A-217_O	2/20/2017	0.27	1	0.0002	0	0.0061	1	0.6	0	0.00082	1	0.0001	0
M-64A	CH-CCR-M64A-41217_O	4/12/2017	0.25	1	0.0002	0	0.005	1	0.6	0	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-42517_O	4/25/2017	0.27	1	0.0002	0	0.005	1	1.6	1	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-51817_O	5/18/2017	0.28	1	0.0002	0	0.0042	1	1.3	1	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-52417_O	5/24/2017	0.27	1	0.0002	0	0.0051	1	0.4	1	0.0005	0	0.0004	0
M-64A	CH-CCR-M64A-63017_O	6/30/2017	0.25	1	0.0002	0	0.005	1	0.7	0	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-72717_O	7/27/2017	0.25	1	0.0002	0	0.0051	1	0.7	0	0.001	0	0.0002	0
M-64A	CH-CCR-M64A-90717_O	9/7/2017	0.26	1	0.0002	0	0.0059	1	0.7	0	0.002	0	0.0004	0
M-64A	CH-CCR-M64A-120817_O	12/8/2017												
M-64A	CH-CCR-M64A-21518_O	2/15/2018	0.27	1	0.0002	0	0.0058	1	1	1	0.0005	0	0.0002	0
M-64A	CH-CCR-M-64A-51918_O	5/19/2018	0.26	1			0.0055	1	0.7	0	0.001	0	0.0002	0
W-305	7796_O	12/2/2015	0.23	1	0.0002	0	0.016	1	0.7	0	0.00024	1	0.0001	0
W-305	CH-W-305-0316_O	3/9/2016	0.21	1	0.0002	0	0.017	1	0.4	0	0.01	0	0.002	0
W-305	CH-CCR-W305-516_O	5/11/2016	0.21	1	0.0002	0	0.014	1	0.7	0	0.0005	0	0.0001	0
W-305	CH-CCR-W305-816_O	8/27/2016	0.21	1	0.0002	0	0.031	1	1.1	1	0.0005	0	0.0001	0
W-305	CH-CCR-W305-916_O	9/22/2016	0.22	1	0.0002	0	0.024	1	0.7	0	0.00067	1	0.0001	0
W-305	CH-CCR-W305-217_O	2/21/2017	0.22	1	0.0002	0	0.02	1	0.6	0	0.0005	0	0.0001	0
W-305	CH-CCR-W305-41117_O	4/11/2017	0.2	1	0.0002	0	0.021	1	0.6	0	0.0005	0	0.0001	0
W-305	CH-CCR-W305-42417_O	4/24/2017	0.21	1	0.0002	0	0.02	1	1.1	1	0.0005	0	0.0001	0
W-305	CH-CCR-W305-52217_O	5/22/2017	0.2	1	0.0002	0	0.017	1	1.2	1	0.0005	0	0.0001	0
W-305	CH-CCR-W305-52417_O	5/24/2017	0.23	1	0.0002	0	0.02	1	0.6	0	0.002	0	0.0004	0

Table A-1
All Constituents - All Wells

StationName	QC_SampleID	SampDate	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Radium	D_Radium	Selenium	D_Selenium	Thallium	D_Thallium
W-305	CH-CCR-W305-62917_O	6/29/2017	0.21	1	0.0002	0	0.02	1	1.7	1	0.0005	0	0.0001	0
W-305	CH-CCR-W305-72817_O	7/28/2017	0.21	1	0.0002	0	0.018	1	0.6	1	0.0005	0	0.0001	0
W-305	CH-CCR-W305-90617_O	9/6/2017	0.2	1	0.0002	0	0.021	1	0.8	1	0.0005	0	0.0001	0
W-305	CH-CCR-W305-120717_O	12/7/2017												
W-305	CH-CCR-W305-21518_O	2/15/2018	0.21	1	0.0002	0	0.021	1	0.6	1	0.0005	0	0.0001	0
W-305	CH-CCR-W-305-51918_O	5/19/2018	0.21	1			0.02	1	0.7	0	0.0005	0	0.0001	0
W-306	7797_O	12/2/2015	0.43	1	0.0002	0	0.032	1	0.7	0	0.0016	1	0.0001	0
W-306	CH-W-306-0316_O	3/9/2016	0.51	1	0.0002	0	0.02	1	0.6	0	0.002	1	0.002	0
W-306	CH-CCR-W306-516_O	5/11/2016	0.56	1	0.0002	0	0.02	1	0.4	0	0.0037	1	0.0002	0
W-306	CH-CCR-W306-816_O	8/26/2016	0.67	1	0.0002	0	0.057	1	0.5	1	0.0047	1	0.0001	0
W-306	CH-CCR-W306-916_O	9/22/2016	0.72	1	0.0002	0	0.032	1	0.7	0	0.0039	1	0.0002	0
W-306	CH-CCR-W306-217_O	2/21/2017	0.78	1	0.0002	0	0.033	1	0.6	0	0.0042	1	0.0001	0
W-306	CH-CCR-W306-41217_O	4/12/2017	0.7	1	0.0002	0	0.035	1	0.6	0	0.0039	1	0.0001	0
W-306	CH-CCR-W306-42517_O	4/25/2017	0.71	1	0.0002	0	0.032	1	0.6	0	0.0039	1	0.0002	0
W-306	CH-CCR-W306-52217_O	5/22/2017	0.65	1	0.0002	0	0.026	1	0.6	0	0.003	1	0.0001	0
W-306	CH-CCR-W306-52417_O	5/24/2017	0.74	1	0.0002	0	0.029	1	0.6	0	0.003	1	0.0004	0
W-306	CH-CCR-W306-70117_O	7/1/2017	0.64	1	0.0002	0	0.028	1	0.7	0	0.0031	1	0.0001	0
W-306	CH-CCR-W306-72817_O	7/28/2017	0.64	1	0.0002	0	0.027	1	1.1	1	0.0027	1	0.0004	0
W-306	CH-CCR-W306-90617_O	9/6/2017	0.62	1	0.0002	0	0.028	1	0.7	0	0.0029	1	0.0001	0
W-306	CH-CCR-W306-120717_O	12/7/2017												
W-306	CH-CCR-W306-21518_O	2/15/2018	0.69	1	0.0002	0	0.028	1	0.4	1	0.0021	1	0.0001	0
W-306	CH-CCR-W-306-51918_O	5/19/2018	0.68	1			0.031	1	0.8	1	0.0016	1	0.0002	0
W-314	7798_O	12/2/2015	0.35	1	0.0002	0	0.0066	1	0.7	0	0.0004	1	0.0001	0
W-314	CH-W-314-0316_O	3/10/2016	0.32	1	0.0002	0	0.0072	1	0.5	0	0.01	0	0.002	0
W-314	CH-CCR-W314-516_O	5/11/2016	0.33	1	0.0002	0	0.0073	1	0.5	0	0.001	0	0.0002	0
W-314	CH-CCR-W314-816_O	8/26/2016	0.32	1	0.0002	0	0.013	1	0.6	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-916_O	9/22/2016	0.34	1	0.0002	0	0.0082	1	0.7	0	0.00064	1	0.0001	0
W-314	CH-CCR-W314-217_O	2/21/2017	0.35	1	0.0002	0	0.0077	1	0.6	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-41117_O	4/11/2017	0.31	1	0.0002	0	0.0086	1	0.6	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-42517_O	4/25/2017	0.33	1	0.0002	0	0.0079	1	0.5	1	0.0005	0	0.0001	0
W-314	CH-CCR-W314-52217_O	5/22/2017	0.32	1	0.0002	0	0.007	1	0.6	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-52417_O	5/24/2017	0.34	1	0.0002	0	0.0085	1	0.6	0	0.002	0	0.0004	0
W-314	CH-CCR-W314-63017_O	6/30/2017	0.3	1	0.0002	0	0.008	1	0.7	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-72817_O	7/28/2017	0.3	1	0.0002	0	0.0071	1	0.6	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-90717_O	9/7/2017	0.31	1	0.0002	0	0.008	1	0.7	0	0.0005	0	0.0001	0
W-314	CH-CCR-W314-120717_O	12/7/2017												
W-314	CH-CCR-W314-21518_O	2/15/2018	0.32	1	0.0002	0	0.0085	1	0.2	1	0.0005	0	0.0001	0
W-314	CH-CCR-W-314-52018_O	5/20/2018	0.32	1			0.0093	1	0.7	0	0.001	0	0.0002	0

Table A-2
All Constituents - Background Wells Only

StationName	QC_Sample_ID	SampDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	0.001	0	0.00094	1	0.034	1	0.001	0	0.0001	0	0.0021	1	0.0015	1
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0.001	0	0.0026	1	0.019	1	0.001	0	0.0001	0	0.0015	1	0.00068	1
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0.001	0	0.0017	1	0.015	1	0.001	0	0.0001	0	0.0005	0	0.00056	1
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0.001	0	0.0016	1	0.012	1	0.001	0	0.0001	0	0.0005	0	0.0005	0
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0.001	0	0.0019	1	0.014	1	0.001	0	0.0001	0	0.0005	0	0.0005	0
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0.001	0	0.0033	1	0.017	1	0.001	0	0.0001	0	0.0005	0	0.0011	1
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0.002	0	0.0028	1	0.017	1	0.001	0	0.0002	0	0.001	0	0.001	0
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0.004	0	0.0025	1	0.017	1	0.001	0	0.0004	0	0.004	0	0.002	0
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56														
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0.002	0	0.001	0	0.015	1	0.001	0	0.0002	0	0.0022	1	0.0005	0
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34	0.002	0	0.0012	1	0.012	1			0.0002	0	0.002	0	0.001	0

Table A-2
All Constituents - Background Wells Only

StationName	QC_Sample_ID	SampDate	Fluoride	D_Fluoride	Lead	D_Lead	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Radium	D_Radium	Selenium
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	0.8	0	0.0005	0	0.27	1	0.0002	0	0.0061	1	0.6	0	0.00082
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0.8	0	0.00071	1	0.25	1	0.0002	0	0.005	1	0.6	0	0.0005
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0.8	0	0.0005	0	0.27	1	0.0002	0	0.005	1	1.6	1	0.0005
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0.8	0	0.0005	0	0.28	1	0.0002	0	0.0042	1	1.3	1	0.0005
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0.8	0	0.002	0	0.27	1	0.0002	0	0.0051	1	0.4	1	0.0005
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0.8	0	0.0005	0	0.25	1	0.0002	0	0.005	1	0.7	0	0.0005
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0.8	0	0.001	0	0.25	1	0.0002	0	0.0051	1	0.7	0	0.001
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0.8	0	0.002	0	0.26	1	0.0002	0	0.0059	1	0.7	0	0.002
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56	0.8	0											
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0.8	0	0.001	0	0.27	1	0.0002	0	0.0058	1	1	1	0.0005
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34	0.8	0	0.001	0	0.26	1			0.0055	1	0.7	0	0.001

Table A-2
All Constituents - Background Wells Only

StationName	QC_Sample_ID	SampDate	D_Selenium	Thallium	D_Thallium
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	1	0.0001	0
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0	0.0001	0
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0	0.0001	0
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0	0.0001	0
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0	0.0004	0
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0	0.0001	0
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0	0.0002	0
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0	0.0004	0
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56			
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0	0.0002	0
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34	0	0.0002	0

APPENDIX B
PROUCL OUTPUT FILES



TABLE B-1
BAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.110/10/2018 9:42:34 AM										
User Selected Options											
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls										
Full Precision	OFF										
From File: BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.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 (m-52a)	15	1	1	14	93.33%	2.0000E-4	0.05	1.2000E-4	0	0	N/A
Antimony (m-53a)	15	1	0	15	100.00%	1.0000E-4	0.05	N/A	N/A	N/A	N/A
Antimony (m-64a)	10	1	0	10	100.00%	0.001	0.004	N/A	N/A	N/A	N/A
Antimony (w-305)	15	1	1	14	93.33%	1.0000E-4	0.05	1.0500E-4	2.500E-11	5.0000E-6	0.0476
Antimony (w-306)	15	1	2	13	86.67%	0.001	0.05	2.4000E-4	0	0	N/A
Antimony (w-314)	15	1	1	14	93.33%	2.0000E-4	0.05	1.4000E-4	0	0	N/A
Arsenic (m-52a)	15	1	8	7	46.67%	5.0000E-4	0.01	8.0734E-4	3.7687E-7	6.1390E-4	0.76
Arsenic (m-53a)	15	1	13	2	13.33%	0.002	0.01	0.00117	8.8921E-8	2.9820E-4	0.255
Arsenic (m-64a)	10	1	9	1	10.00%	0.001	0.001	0.00195	6.0602E-7	7.7847E-4	0.4
Arsenic (w-305)	15	1	13	2	13.33%	0.002	0.01	8.5077E-4	7.6238E-8	2.7611E-4	0.325
Arsenic (w-306)	15	1	14	1	6.67%	0.01	0.01	0.00444	6.2102E-7	7.8805E-4	0.177
Arsenic (w-314)	15	1	7	8	53.33%	5.0000E-4	0.01	5.8455E-4	1.3788E-8	1.1742E-4	0.201
Barium (m-52a)	15	1	15	0	0.00%	N/A	N/A	0.0179	1.8124E-5	0.00426	0.238
Barium (m-53a)	15	1	15	0	0.00%	N/A	N/A	0.0129	3.3066E-5	0.00575	0.445
Barium (m-64a)	10	1	10	0	0.00%	N/A	N/A	0.0172	3.9956E-5	0.00632	0.368
Barium (w-305)	15	1	15	0	0.00%	N/A	N/A	0.0117	1.1455E-5	0.00338	0.29
Barium (w-306)	15	1	15	0	0.00%	N/A	N/A	0.0119	3.1135E-6	0.00176	0.148
Barium (w-314)	15	1	15	0	0.00%	N/A	N/A	0.0118	2.5700E-6	0.0016	0.136
Beryllium (m-52a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (m-53a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (m-64a)	9	2	0	9	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (w-305)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (w-306)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (w-314)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-52a)	15	1	15	0	0.00%	N/A	N/A	9.8200E-4	2.3959E-7	4.8948E-4	0.498
Cadmium (m-53a)	15	1	15	0	0.00%	N/A	N/A	0.00153	8.5238E-8	2.9196E-4	0.19
Cadmium (m-64a)	10	1	0	10	100.00%	1.0000E-4	4.0000E-4	N/A	N/A	N/A	N/A
Cadmium (w-305)	15	1	6	9	60.00%	1.0000E-4	0.002	1.1462E-4	1.0095E-9	3.1772E-5	0.277
Cadmium (w-306)	15	1	2	13	86.67%	1.0000E-4	0.002	2.0000E-4	1.3000E-7	3.6056E-4	1.803
Cadmium (w-314)	15	1	11	4	26.67%	2.0000E-4	0.002	1.7803E-4	3.474E-10	1.8639E-5	0.105

TABLE B-1
BAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Chromium (m-52a)	15	1	12	3	20.00%	0.001	0.01	0.00922	8.4345E-5	0.00918	0.996
Chromium (m-53a)	15	1	13	2	13.33%	0.004	0.01	0.00191	1.9111E-6	0.00138	0.726
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 (m-64a)	10	1	3	7	70.00%	5.0000E-4	0.004	9.9630E-4	4.8888E-7	6.9920E-4	0.702
Chromium (w-305)	15	1	11	4	26.67%	5.0000E-4	0.01	0.00216	5.8797E-6	0.00242	1.124
Chromium (w-306)	15	1	4	11	73.33%	5.0000E-4	0.01	6.2875E-4	3.0261E-8	1.7396E-4	0.277
Chromium (w-314)	15	1	10	5	33.33%	0.001	0.01	0.00106	1.3772E-7	3.7111E-4	0.349
Cobalt (m-52a)	15	1	15	0	0.00%	N/A	N/A	0.0517	8.5067E-5	0.00922	0.178
Cobalt (m-53a)	15	1	15	0	0.00%	N/A	N/A	0.0177	1.1524E-5	0.00339	0.192
Cobalt (m-64a)	10	1	4	6	60.00%	5.0000E-4	0.002	7.1511E-4	1.1044E-7	3.3232E-4	0.465
Cobalt (w-305)	15	1	15	0	0.00%	N/A	N/A	0.0165	5.1238E-6	0.00226	0.137
Cobalt (w-306)	15	1	15	0	0.00%	N/A	N/A	0.00508	5.3732E-5	0.00733	1.443
Cobalt (w-314)	15	1	15	0	0.00%	N/A	N/A	0.0137	3.0952E-6	0.00176	0.129
Fluoride (m-52a)	16	0	14	2	12.50%	2	2	0.915	0.0172	0.131	0.143
Fluoride (m-53a)	15	1	14	1	6.67%	2	2	1.858	0.356	0.596	0.321
Fluoride (m-64a)	11	0	0	11	100.00%	0.8	0.8	N/A	N/A	N/A	N/A
Fluoride (w-305)	16	0	1	15	93.75%	0.4	2	0.467	0.0622	0.249	0.535
Fluoride (w-306)	16	0	14	2	12.50%	0.4	2	1.243	0.095	0.308	0.248
Fluoride (w-314)	16	0	14	2	12.50%	0.8	2	0.977	0.0206	0.143	0.147
Lead (m-52a)	15	1	3	12	80.00%	5.0000E-4	0.01	5.6667E-4	3.7556E-8	1.9379E-4	0.342
Lead (m-53a)	15	1	5	10	66.67%	5.0000E-4	0.01	5.5091E-4	6.4083E-9	8.0052E-5	0.145
Lead (m-64a)	10	1	1	9	90.00%	5.0000E-4	0.002	5.4200E-4	7.0560E-9	8.4000E-5	0.155
Lead (w-305)	15	1	12	3	20.00%	5.0000E-4	0.01	0.00202	4.4026E-7	6.6352E-4	0.328
Lead (w-306)	15	1	1	14	93.33%	2.0000E-4	0.01	2.5111E-4	2.0899E-8	1.4456E-4	0.576
Lead (w-314)	15	1	3	12	80.00%	5.0000E-4	0.01	5.6914E-4	2.3610E-7	4.8590E-4	0.854
Lithium (m-52a)	15	1	15	0	0.00%	N/A	N/A	0.248	3.7429E-4	0.0193	0.078
Lithium (m-53a)	15	1	9	6	40.00%	0.2	0.2	0.203	1.9556E-5	0.00442	0.0218
Lithium (m-64a)	10	1	10	0	0.00%	N/A	N/A	0.263	1.1222E-4	0.0106	0.0403
Lithium (w-305)	15	1	15	0	0.00%	N/A	N/A	0.212	8.8571E-5	0.00941	0.0444
Lithium (w-306)	15	1	15	0	0.00%	N/A	N/A	0.649	0.00829	0.0911	0.14
Lithium (w-314)	15	1	15	0	0.00%	N/A	N/A	0.324	2.5429E-4	0.0159	0.0492
Mercury (m-52a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (m-53a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (m-64a)	9	2	0	9	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (w-305)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (w-306)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (w-314)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-52a)	15	1	15	0	0.00%	N/A	N/A	0.0339	3.5607E-4	0.0189	0.556
Molybdenum (m-53a)	15	1	15	0	0.00%	N/A	N/A	0.0396	1.2474E-4	0.0112	0.282

TABLE B-1
BAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Molybdenum (m-64a)	10	1	10	0	0.00%	N/A	N/A	0.00527	3.1567E-7	5.6184E-4	0.107
Molybdenum (w-305)	15	1	15	0	0.00%	N/A	N/A	0.02	1.5286E-5	0.00391	0.195
Molybdenum (w-306)	15	1	15	0	0.00%	N/A	N/A	0.0305	7.2124E-5	0.00849	0.278
Molybdenum (w-314)	15	1	15	0	0.00%	N/A	N/A	0.00819	2.2878E-6	0.00151	0.185
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
Radium (m-52a)	15	1	8	7	46.67%	0.4	0.7	0.551	0.0294	0.172	0.312
Radium (m-53a)	15	1	5	10	66.67%	0.4	0.7	0.478	0.00774	0.088	0.184
Radium (m-64a)	10	1	4	6	60.00%	0.6	0.7	0.67	0.188	0.434	0.647
Radium (w-305)	15	1	7	8	53.33%	0.4	0.7	0.704	0.148	0.384	0.545
Radium (w-306)	15	1	4	11	73.33%	0.4	0.7	0.502	0.0358	0.189	0.377
Radium (w-314)	15	1	2	13	86.67%	0.5	0.7	0.275	0.0169	0.13	0.472
Selenium (m-52a)	15	1	9	6	40.00%	5.0000E-4	0.01	6.9862E-4	4.8049E-8	2.1920E-4	0.314
Selenium (m-53a)	15	1	4	11	73.33%	5.0000E-4	0.01	5.5545E-4	6.3339E-9	7.9586E-5	0.143
Selenium (m-64a)	10	1	1	9	90.00%	5.0000E-4	0.002	5.4571E-4	1.2539E-8	1.1198E-4	0.205
Selenium (w-305)	15	1	2	13	86.67%	5.0000E-4	0.01	2.7308E-4	1.3129E-8	1.1458E-4	0.42
Selenium (w-306)	15	1	15	0	0.00%	N/A	N/A	0.00309	9.2695E-7	9.6278E-4	0.312
Selenium (w-314)	15	1	2	13	86.67%	5.0000E-4	0.01	4.2182E-4	4.7603E-9	6.8995E-5	0.164
Thallium (m-52a)	15	1	4	11	73.33%	1.0000E-4	4.0000E-4	2.0453E-4	1.2043E-7	3.4703E-4	1.697
Thallium (m-53a)	15	1	2	13	86.67%	1.0000E-4	0.002	1.0636E-4	2.231E-10	1.4938E-5	0.14
Thallium (m-64a)	10	1	0	10	100.00%	1.0000E-4	4.0000E-4	N/A	N/A	N/A	N/A
Thallium (w-305)	15	1	0	15	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Thallium (w-306)	15	1	0	15	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Thallium (w-314)	15	1	0	15	100.00%	1.0000E-4	0.002	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
Antimony (m-52a)	1	1	1.2000E-4	1.2000E-4	1.2000E-4	1.2000E-4	N/A	N/A	0	N/A	N/A
Antimony (m-53a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony (m-64a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony (w-305)	1	1	1.1000E-4	1.1000E-4	1.1000E-4	1.1000E-4	N/A	N/A	0	N/A	N/A
Antimony (w-306)	2	1	2.4000E-4	2.4000E-4	2.4000E-4	2.4000E-4	0	0	0	N/A	N/A
Antimony (w-314)	1	1	1.4000E-4	1.4000E-4	1.4000E-4	1.4000E-4	N/A	N/A	0	N/A	N/A
Arsenic (m-52a)	8	1	4.7000E-4	0.0026	0.00101	6.2500E-4	6.1093E-7	7.8162E-4	2.0756E-4	1.573	0.773
Arsenic (m-53a)	13	1	7.6000E-4	0.0018	0.00117	0.0011	9.6331E-8	3.1037E-4	2.0756E-4	0.915	0.265
Arsenic (m-64a)	9	1	9.4000E-4	0.0033	0.00206	0.0019	6.1640E-7	7.8511E-4	0.00104	0.121	0.381
Arsenic (w-305)	13	1	5.8000E-4	0.0017	8.5077E-4	7.8000E-4	8.2591E-8	2.8739E-4	1.7791E-4	2.359	0.338
Arsenic (w-306)	14	1	0.0019	0.0052	0.00444	0.00465	6.6879E-7	8.1780E-4	4.4477E-4	-2.556	0.184
Arsenic (w-314)	7	1	5.3000E-4	9.1000E-4	6.3286E-4	6.0000E-4	1.7790E-8	1.3338E-4	8.8955E-5	1.881	0.211

TABLE B-1
BAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Barium (m-52a)	15	1	0.013	0.027	0.0179	0.016	1.8124E-5	0.00426	0.00297	0.927	0.238
Barium (m-53a)	15	1	0.0079	0.024	0.0129	0.0092	3.3066E-5	0.00575	0.00133	0.869	0.445
Barium (m-64a)	10	1	0.012	0.034	0.0172	0.016	3.9956E-5	0.00632	0.00222	2.426	0.368
Barium (w-305)	15	1	0.0059	0.022	0.0117	0.012	1.1455E-5	0.00338	0.00148	1.828	0.29
Barium (w-306)	15	1	0.0094	0.015	0.0119	0.012	3.1135E-6	0.00176	0.00297	0.141	0.148
Barium (w-314)	15	1	0.0093	0.016	0.0118	0.012	2.5700E-6	0.0016	0.00148	1.037	0.136
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 (m-52a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (m-53a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (m-64a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (w-305)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (w-306)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (w-314)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-52a)	15	1	4.8000E-4	0.0019	9.8200E-4	9.4000E-4	2.3959E-7	4.8948E-4	6.2268E-4	0.575	0.498
Cadmium (m-53a)	15	1	0.0012	0.0024	0.00153	0.0015	8.5238E-8	2.9196E-4	1.4826E-4	2.044	0.19
Cadmium (m-64a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (w-305)	6	1	1.0000E-4	2.2000E-4	1.3167E-4	1.1500E-4	1.9767E-9	4.4460E-5	1.4826E-5	2.17	0.338
Cadmium (w-306)	2	1	1.0000E-4	0.0015	8.0000E-4	8.0000E-4	9.8000E-7	9.8995E-4	0.00104	N/A	1.237
Cadmium (w-314)	11	1	1.5000E-4	2.2000E-4	1.7909E-4	1.8000E-4	4.091E-10	2.0226E-5	1.4826E-5	0.593	0.113
Chromium (m-52a)	12	1	0.0011	0.034	0.0111	0.00905	9.5027E-5	0.00975	0.0108	1.131	0.878
Chromium (m-53a)	13	1	0.001	0.0062	0.00193	0.0014	2.1756E-6	0.00148	4.4477E-4	2.485	0.764
Chromium (m-64a)	3	1	0.0015	0.0022	0.00193	0.0021	1.4333E-7	3.7859E-4	1.4826E-4	-1.597	0.196
Chromium (w-305)	11	1	6.2000E-4	0.0098	0.00256	0.0012	7.3672E-6	0.00271	8.5990E-4	2.162	1.059
Chromium (w-306)	4	1	5.0000E-4	9.3000E-4	7.5750E-4	8.0000E-4	3.6492E-8	1.9103E-4	1.4826E-4	-1.008	0.252
Chromium (w-314)	10	1	7.3000E-4	0.002	0.00112	9.9000E-4	1.7814E-7	4.2206E-4	3.1134E-4	1.294	0.376
Cobalt (m-52a)	15	1	0.037	0.066	0.0517	0.052	8.5067E-5	0.00922	0.0133	0.0278	0.178
Cobalt (m-53a)	15	1	0.011	0.024	0.0177	0.017	1.1524E-5	0.00339	0.00148	0.47	0.192
Cobalt (m-64a)	4	1	5.6000E-4	0.0015	9.6000E-4	8.9000E-4	1.8320E-7	4.2802E-4	4.0030E-4	0.631	0.446
Cobalt (w-305)	15	1	0.01	0.019	0.0165	0.017	5.1238E-6	0.00226	0.00148	-1.841	0.137
Cobalt (w-306)	15	1	0.0014	0.03	0.00508	0.0023	5.3732E-5	0.00733	7.4129E-4	3.204	1.443
Cobalt (w-314)	15	1	0.011	0.018	0.0137	0.013	3.0952E-6	0.00176	0.00148	1.043	0.129
Fluoride (m-52a)	14	0	0.53	1.1	0.915	0.965	0.0185	0.136	0.0741	-1.796	0.149
Fluoride (m-53a)	14	1	0.87	2.6	1.908	2.25	0.367	0.606	0.297	-0.69	0.318
Fluoride (m-64a)	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fluoride (w-305)	1	0	1.4	1.4	1.4	1.4	N/A	N/A	0	N/A	N/A
Fluoride (w-306)	14	0	0.75	1.6	1.304	1.4	0.0509	0.226	0.148	-1.26	0.173
Fluoride (w-314)	14	0	0.8	1.3	0.99	0.92	0.0212	0.145	0.089	0.869	0.147
Lead (m-52a)	3	1	4.8000E-4	0.001	8.2667E-4	0.001	9.0133E-8	3.0022E-4	0	-1.732	0.363
Lead (m-53a)	5	1	5.2000E-4	7.7000E-4	6.1200E-4	5.8000E-4	9.0700E-9	9.5237E-5	5.9303E-5	1.476	0.156

TABLE B-1
BAP ProUCL GENERAL STATISTICS*

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Lead (m-64a)	1	1	7.1000E-4	7.1000E-4	7.1000E-4	7.1000E-4	N/A	N/A	0	N/A	N/A
Lead (w-305)	12	1	0.0017	0.0035	0.00221	0.00205	2.3538E-7	4.8516E-4	2.9652E-4	1.825	0.22
Lead (w-306)	1	1	6.6000E-4	6.6000E-4	6.6000E-4	6.6000E-4	N/A	N/A	0	N/A	N/A
Lead (w-314)	3	1	4.1000E-4	0.0023	0.00113	6.7000E-4	1.0494E-6	0.00102	3.8547E-4	1.607	0.909
Lithium (m-52a)	15	1	0.21	0.28	0.248	0.25	3.7429E-4	0.0193	0.0148	-0.29	0.078
Lithium (m-53a)	9	1	0.2	0.21	0.204	0.2	2.7778E-5	0.00527	0	0.271	0.0258
Lithium (m-64a)	10	1	0.25	0.28	0.263	0.265	1.1222E-4	0.0106	0.00741	-0.0421	0.0403
Lithium (w-305)	15	1	0.2	0.23	0.212	0.21	8.8571E-5	0.00941	0	0.736	0.0444
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Lithium (w-306)	15	1	0.43	0.78	0.649	0.67	0.00829	0.0911	0.0593	-1.114	0.14
Lithium (w-314)	15	1	0.3	0.35	0.324	0.32	2.5429E-4	0.0159	0.0148	0.21	0.0492
Mercury (m-52a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-53a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-64a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (w-305)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (w-306)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (w-314)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (m-52a)	15	1	0.013	0.071	0.0339	0.024	3.5607E-4	0.0189	0.0163	0.65	0.556
Molybdenum (m-53a)	15	1	0.0059	0.053	0.0396	0.042	1.2474E-4	0.0112	0.00741	-2.146	0.282
Molybdenum (m-64a)	10	1	0.0042	0.0061	0.00527	0.0051	3.1567E-7	5.6184E-4	3.7064E-4	-0.244	0.107
Molybdenum (w-305)	15	1	0.014	0.031	0.02	0.02	1.5286E-5	0.00391	0.00148	1.456	0.195
Molybdenum (w-306)	15	1	0.02	0.057	0.0305	0.029	7.2124E-5	0.00849	0.00445	2.17	0.278
Molybdenum (w-314)	15	1	0.0066	0.013	0.00819	0.008	2.2878E-6	0.00151	8.8955E-4	2.468	0.185
Radium (m-52a)	8	1	0.4	0.9	0.663	0.6	0.0284	0.169	0.0741	0.31	0.254
Radium (m-53a)	5	1	0.4	0.6	0.54	0.6	0.008	0.0894	0	-1.258	0.166
Radium (m-64a)	4	1	0.4	1.6	1.075	1.15	0.263	0.512	0.445	-0.753	0.477
Radium (w-305)	7	1	0.6	1.7	1.014	1.1	0.151	0.389	0.445	0.705	0.384
Radium (w-306)	4	1	0.4	1.1	0.7	0.65	0.1	0.316	0.297	0.632	0.452
Radium (w-314)	2	1	0.2	0.5	0.35	0.35	0.045	0.212	0.222	N/A	0.606
Selenium (m-52a)	9	1	5.1000E-4	0.0013	7.5111E-4	7.4000E-4	6.0711E-8	2.4640E-4	2.5204E-4	1.459	0.328
Selenium (m-53a)	4	1	5.7000E-4	7.1000E-4	6.5250E-4	6.6500E-4	3.4917E-9	5.9090E-5	3.7064E-5	-1.181	0.0906
Selenium (m-64a)	1	1	8.2000E-4	8.2000E-4	8.2000E-4	8.2000E-4	N/A	N/A	0	N/A	N/A
Selenium (w-305)	2	1	2.4000E-4	6.7000E-4	4.5500E-4	4.5500E-4	9.2450E-8	3.0406E-4	3.1875E-4	N/A	0.668
Selenium (w-306)	15	1	0.0016	0.0047	0.00309	0.003	9.2695E-7	9.6278E-4	0.00133	-0.135	0.312
Selenium (w-314)	2	1	4.0000E-4	6.4000E-4	5.2000E-4	5.2000E-4	2.8800E-8	1.6971E-4	1.7791E-4	N/A	0.326
Thallium (m-52a)	4	1	1.1000E-4	0.0015	4.8000E-4	1.5500E-4	4.6327E-7	6.8064E-4	5.1890E-5	1.989	1.418
Thallium (m-53a)	2	1	1.2000E-4	1.5000E-4	1.3500E-4	1.3500E-4	4.500E-10	2.1213E-5	2.2239E-5	N/A	0.157
Thallium (m-64a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Thallium (w-305)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE B-1
 BAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Thallium (w-306)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Thallium (w-314)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.110/10/2018 9:52:25 AM
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Antimony-m-52a	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	1.2000E-4
Maximum	0.05
Mean	0.00449
Geometric Mean	0.00118
Median	0.001
Standard Deviation	0.0126
Coefficient of Variation	2.814
Mann-Kendall Test	
M-K Test Value (S)	17
Tabulated p-value	0.218
Standard Deviation of S	18.52
Standardized Value of S	0.864
Approximate p-value	0.194
Insufficient evidence to identify a significant trend at the specified level of significance.	
Antimony-m-53a	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	1.0000E-4
Maximum	0.05
Mean	0.00449
Geometric Mean	0.00117
Median	0.001
Standard Deviation	0.0126
Coefficient of Variation	2.815
Mann-Kendall Test	
M-K Test Value (S)	17
Tabulated p-value	0.218
Standard Deviation of S	18.52
Standardized Value of S	0.864

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	0.194								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Antimony-m-64a									
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	0.001								
Maximum	0.004								
Mean	0.0016								
Geometric Mean	0.00141								
Median	0.001								
Standard Deviation	9.6609E-4								
Coefficient of Variation	0.604								
Mann-Kendall Test									
M-K Test Value (S)	23								
Tabulated p-value	0.023								
Standard Deviation of S	9.644								
Standardized Value of S	2.281								
Approximate p-value	0.0113								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Antimony-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.0000E-4								
Maximum	0.05								
Mean	0.00441								
Geometric Mean	0.00107								
Median	0.001								
Standard Deviation	0.0126								
Coefficient of Variation	2.865								
Mann-Kendall Test									
M-K Test Value (S)	9								
Tabulated p-value	0.349								
Standard Deviation of S	17.79								
Standardized Value of S	0.45								
Approximate p-value	0.326								
Insufficient evidence to identify a significant trend at the specified level of significance.									

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Antimony-w-306							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	15						
Number Values Reported (n)	16						
Number Values Missing	1						
Number Values Used	15						
Minimum	2.4000E-4						
Maximum	0.05						
Mean	0.00453						
Geometric Mean	0.00131						
Median	0.001						
Standard Deviation	0.0126						
Coefficient of Variation	2.783						
Mann-Kendall Test							
M-K Test Value (S)	8						
Tabulated p-value	0.349						
Standard Deviation of S	17.76						
Standardized Value of S	0.394						
Approximate p-value	0.347						
Insufficient evidence to identify a significant trend at the specified level of significance.							
Antimony-w-314							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	15						
Number Values Reported (n)	16						
Number Values Missing	1						
Number Values Used	15						
Minimum	1.4000E-4						
Maximum	0.05						
Mean	0.00449						
Geometric Mean	0.00119						
Median	0.001						
Standard Deviation	0.0126						
Coefficient of Variation	2.813						
Mann-Kendall Test							
M-K Test Value (S)	15						
Tabulated p-value	0.248						
Standard Deviation of S	18.52						
Standardized Value of S	0.756						
Approximate p-value	0.225						
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 5.110/3/2018 5:53:47 PM					

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls					
Full Precision	OFF					
Confidence Coefficient	0.95					
Level of Significance	0.05					
Arsenic-m-52a						
General Statistics						
Number or Reported Events Not Used	0					
Number of Generated Events	15					
Number Values Reported (n)	16					
Number Values Missing	1					
Number Values Used	15					
Minimum	4.7000E-4					
Maximum	0.01					
Mean	0.00157					
Geometric Mean	9.5626E-4					
Median	7.1000E-4					
Standard Deviation	0.00242					
Coefficient of Variation	1.54					
Mann-Kendall Test						
M-K Test Value (S)	26					
Tabulated p-value	0.101					
Standard Deviation of S	19.77					
Standardized Value of S	1.265					
Approximate p-value	0.103					
Insufficient evidence to identify a significant trend at the specified level of significance.						
Arsenic-m-53a						
General Statistics						
Number or Reported Events Not Used	0					
Number of Generated Events	15					
Number Values Reported (n)	16					
Number Values Missing	1					
Number Values Used	15					
Minimum	7.6000E-4					
Maximum	0.01					
Mean	0.00182					
Geometric Mean	0.00136					
Median	0.0011					
Standard Deviation	0.00229					
Coefficient of Variation	1.263					
Mann-Kendall Test						
M-K Test Value (S)	-36					
Tabulated p-value	0.037					
Standard Deviation of S	20.12					
Standardized Value of S	-1.74					
Approximate p-value	0.0409					
Statistically significant evidence of a decreasing						

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

trend at the specified level of significance.								
Arsenic-m-64a								
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	9.4000E-4							
Maximum	0.0033							
Mean	0.00195							
Geometric Mean	0.0018							
Median	0.0018							
Standard Deviation	8.1257E-4							
Coefficient of Variation	0.416							
Mann-Kendall Test								
M-K Test Value (S)	1							
Tabulated p-value	0.5							
Standard Deviation of S	11.18							
Standardized Value of S	0							
Approximate p-value	0.5							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Arsenic-w-305								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	5.8000E-4							
Maximum	0.01							
Mean	0.00154							
Geometric Mean	0.00103							
Median	7.8000E-4							
Standard Deviation	0.00237							
Coefficient of Variation	1.545							
Mann-Kendall Test								
M-K Test Value (S)	10							
Tabulated p-value	0.313							
Standard Deviation of S	20.18							
Standardized Value of S	0.446							
Approximate p-value	0.328							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Arsenic-w-306								
General Statistics								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0019								
Maximum	0.01								
Mean	0.00481								
Geometric Mean	0.00459								
Median	0.0047								
Standard Deviation	0.00164								
Coefficient of Variation	0.34								
Mann-Kendall Test									
M-K Test Value (S)	16								
Tabulated p-value	0.218								
Standard Deviation of S	20.07								
Standardized Value of S	0.748								
Approximate p-value	0.227								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Arsenic-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00136								
Geometric Mean	8.1357E-4								
Median	6.0000E-4								
Standard Deviation	0.00242								
Coefficient of Variation	1.778								
Mann-Kendall Test									
M-K Test Value (S)	7								
Tabulated p-value	0.385								
Standard Deviation of S	19.94								
Standardized Value of S	0.301								
Approximate p-value	0.382								
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 5.110/3/2018 6:58:32 PM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Level of Significance	0.05							
Barium-m-52a								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.013							
Maximum	0.027							
Mean	0.0179							
Geometric Mean	0.0174							
Median	0.016							
Standard Deviation	0.00426							
Coefficient of Variation	0.238							
Mann-Kendall Test								
M-K Test Value (S)	-49							
Tabulated p-value	0.008							
Standard Deviation of S	20.02							
Standardized Value of S	-2.397							
Approximate p-value	0.00826							
Statistically significant evidence of a decreasing trend at the specified level of significance.								
Barium-m-53a								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0079							
Maximum	0.024							
Mean	0.0129							
Geometric Mean	0.0119							
Median	0.0092							
Standard Deviation	0.00575							
Coefficient of Variation	0.445							
Mann-Kendall Test								
M-K Test Value (S)	-42							
Tabulated p-value	0.018							
Standard Deviation of S	20.13							
Standardized Value of S	-2.036							
Approximate p-value	0.0209							
Statistically significant evidence of a decreasing trend at the specified level of significance.								
Barium-m-64a								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

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	0.012							
Maximum	0.034							
Mean	0.0172							
Geometric Mean	0.0164							
Median	0.016							
Standard Deviation	0.00632							
Coefficient of Variation	0.368							
Mann-Kendall Test								
M-K Test Value (S)	-16							
Tabulated p-value	0.078							
Standard Deviation of S	10.92							
Standardized Value of S	-1.373							
Approximate p-value	0.0849							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Barium-w-305								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0059							
Maximum	0.022							
Mean	0.0117							
Geometric Mean	0.0113							
Median	0.012							
Standard Deviation	0.00338							
Coefficient of Variation	0.29							
Mann-Kendall Test								
M-K Test Value (S)	2							
Tabulated p-value	0.461							
Standard Deviation of S	19.03							
Standardized Value of S	0.0526							
Approximate p-value	0.479							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Barium-w-306								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Missing	1								
Number Values Used	15								
Minimum	0.0094								
Maximum	0.015								
Mean	0.0119								
Geometric Mean	0.0118								
Median	0.012								
Standard Deviation	0.00176								
Coefficient of Variation	0.148								
Mann-Kendall Test									
M-K Test Value (S)	-68								
Tabulated p-value	0								
Standard Deviation of S	19.78								
Standardized Value of S	-3.387								
Approximate p-value	3.5345E-4								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Barium-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0093								
Maximum	0.016								
Mean	0.0118								
Geometric Mean	0.0117								
Median	0.012								
Standard Deviation	0.0016								
Coefficient of Variation	0.136								
Mann-Kendall Test									
M-K Test Value (S)	-48								
Tabulated p-value	0.008								
Standard Deviation of S	19.48								
Standardized Value of S	-2.413								
Approximate p-value	0.00791								
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 5.110/10/2018 9:53:45 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Beryllium-m-52a									

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.501E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.501E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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-m-64a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Reported (n)	11								
Number Values Missing	2								
Number Values Used	9								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	0								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.54								
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-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.501E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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-w-306									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	0.001								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.501E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.501E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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 5.110/3/2018 7:51:46 PM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Cadmium-m-52a									
General Statistics									
Number or Reported Events Not Used	0								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	4.8000E-4								
Maximum	0.0019								
Mean	9.8200E-4								
Geometric Mean	8.7195E-4								
Median	9.4000E-4								
Standard Deviation	4.8948E-4								
Coefficient of Variation	0.498								
Mann-Kendall Test									
M-K Test Value (S)	27								
Tabulated p-value	0.101								
Standard Deviation of S	20.16								
Standardized Value of S	1.29								
Approximate p-value	0.0986								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0012								
Maximum	0.0024								
Mean	0.00153								
Geometric Mean	0.00151								
Median	0.0015								
Standard Deviation	2.9196E-4								
Coefficient of Variation	0.19								
Mann-Kendall Test									
M-K Test Value (S)	-37								
Tabulated p-value	0.037								
Standard Deviation of S	19.72								
Standardized Value of S	-1.825								
Approximate p-value	0.034								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Cadmium-m-64a									
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								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Minimum	1.0000E-4						
Maximum	4.0000E-4						
Mean	1.6000E-4						
Geometric Mean	1.4142E-4						
Median	1.0000E-4						
Standard Deviation	9.6609E-5						
Coefficient of Variation	0.604						
Mann-Kendall Test							
M-K Test Value (S)	23						
Tabulated p-value	0.023						
Standard Deviation of S	9.644						
Standardized Value of S	2.281						
Approximate p-value	0.0113						
Statistically significant evidence of an increasing trend at the specified level of significance.							
Cadmium-w-305							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	15						
Number Values Reported (n)	16						
Number Values Missing	1						
Number Values Used	15						
Minimum	1.0000E-4						
Maximum	0.002						
Mean	2.5933E-4						
Geometric Mean	1.4726E-4						
Median	1.0000E-4						
Standard Deviation	4.8808E-4						
Coefficient of Variation	1.882						
Mann-Kendall Test							
M-K Test Value (S)	-46						
Tabulated p-value	0.01						
Standard Deviation of S	18.49						
Standardized Value of S	-2.433						
Approximate p-value	0.00748						
Statistically significant evidence of a decreasing trend at the specified level of significance.							
Cadmium-w-306							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	15						
Number Values Reported (n)	16						
Number Values Missing	1						
Number Values Used	15						
Minimum	1.0000E-4						
Maximum	0.002						
Mean	3.8000E-4						
Geometric Mean	2.0213E-4						

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Median	1.0000E-4								
Standard Deviation	5.7346E-4								
Coefficient of Variation	1.509								
Mann-Kendall Test									
M-K Test Value (S)	-23								
Tabulated p-value	0.141								
Standard Deviation of S	18.39								
Standardized Value of S	-1.196								
Approximate p-value	0.116								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.5000E-4								
Maximum	0.002								
Mean	3.1800E-4								
Geometric Mean	2.2428E-4								
Median	1.9000E-4								
Standard Deviation	4.6904E-4								
Coefficient of Variation	1.475								
Mann-Kendall Test									
M-K Test Value (S)	-2								
Tabulated p-value	0.461								
Standard Deviation of S	20.02								
Standardized Value of S	-0.05								
Approximate p-value	0.48								
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 5.110/3/2018 8:22:06 PM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Chromium-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Used	15								
Minimum	0.001								
Maximum	0.034								
Mean	0.00988								
Geometric Mean	0.00594								
Median	0.0071								
Standard Deviation	0.00917								
Coefficient of Variation	0.928								
Mann-Kendall Test									
M-K Test Value (S)	33								
Tabulated p-value	0.057								
Standard Deviation of S	20.21								
Standardized Value of S	1.584								
Approximate p-value	0.0566								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Chromium-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.001								
Maximum	0.01								
Mean	0.00261								
Geometric Mean	0.00196								
Median	0.0015								
Standard Deviation	0.00252								
Coefficient of Variation	0.965								
Mann-Kendall Test									
M-K Test Value (S)	-9								
Tabulated p-value	0.349								
Standard Deviation of S	20.04								
Standardized Value of S	-0.399								
Approximate p-value	0.345								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Chromium-m-64a									
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	0.004								
Mean	0.00148								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Geometric Mean	0.00113						
Median	0.00125						
Standard Deviation	0.00114						
Coefficient of Variation	0.767						
Mann-Kendall Test							
M-K Test Value (S)	9						
Tabulated p-value	0.242						
Standard Deviation of S	10.79						
Standardized Value of S	0.742						
Approximate p-value	0.229						
Insufficient evidence to identify a significant trend at the specified level of significance.							
Chromium-w-305							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	15						
Number Values Reported (n)	16						
Number Values Missing	1						
Number Values Used	15						
Minimum	5.0000E-4						
Maximum	0.01						
Mean	0.00278						
Geometric Mean	0.00173						
Median	0.0012						
Standard Deviation	0.00311						
Coefficient of Variation	1.118						
Mann-Kendall Test							
M-K Test Value (S)	0						
Tabulated p-value	0.5						
Standard Deviation of S	20.18						
Standardized Value of S	N/A						
Approximate p-value	N/A						
Insufficient evidence to identify a significant trend at the specified level of significance.							
Chromium-w-306							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	15						
Number Values Reported (n)	16						
Number Values Missing	1						
Number Values Used	15						
Minimum	5.0000E-4						
Maximum	0.01						
Mean	0.00154						
Geometric Mean	9.7998E-4						
Median	9.3000E-4						
Standard Deviation	0.00239						
Coefficient of Variation	1.557						

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test									
M-K Test Value (S)	-4								
Tabulated p-value	0.423								
Standard Deviation of S	19.54								
Standardized Value of S	-0.153								
Approximate p-value	0.439								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Chromium-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	7.3000E-4								
Maximum	0.01								
Mean	0.00182								
Geometric Mean	0.00133								
Median	0.001								
Standard Deviation	0.00231								
Coefficient of Variation	1.273								
Mann-Kendall Test									
M-K Test Value (S)	21								
Tabulated p-value	0.164								
Standard Deviation of S	19.97								
Standardized Value of S	1.001								
Approximate p-value	0.158								
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 5.110/3/2018 8:55:49 PM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Cobalt-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.037								
Maximum	0.066								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mean	0.0517							
Geometric Mean	0.051							
Median	0.052							
Standard Deviation	0.00922							
Coefficient of Variation	0.178							
Mann-Kendall Test								
M-K Test Value (S)	13							
Tabulated p-value	0.279							
Standard Deviation of S	20.16							
Standardized Value of S	0.595							
Approximate p-value	0.276							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Cobalt-m-53a								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.011							
Maximum	0.024							
Mean	0.0177							
Geometric Mean	0.0174							
Median	0.017							
Standard Deviation	0.00339							
Coefficient of Variation	0.192							
Mann-Kendall Test								
M-K Test Value (S)	-62							
Tabulated p-value	0.001							
Standard Deviation of S	19.78							
Standardized Value of S	-3.084							
Approximate p-value	0.00102							
Statistically significant evidence of a decreasing trend at the specified level of significance.								
Cobalt-m-64a								
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	0.002							
Mean	9.3400E-4							
Geometric Mean	8.3102E-4							
Median	8.4000E-4							
Standard Deviation	5.0138E-4							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Coefficient of Variation	0.537							
Mann-Kendall Test								
M-K Test Value (S)	-1							
Tabulated p-value	0.5							
Standard Deviation of S	10.97							
Standardized Value of S	0							
Approximate p-value	0.5							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Cobalt-w-305								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.01							
Maximum	0.019							
Mean	0.0165							
Geometric Mean	0.0164							
Median	0.017							
Standard Deviation	0.00226							
Coefficient of Variation	0.137							
Mann-Kendall Test								
M-K Test Value (S)	24							
Tabulated p-value	0.12							
Standard Deviation of S	19.65							
Standardized Value of S	1.171							
Approximate p-value	0.121							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Cobalt-w-306								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0014							
Maximum	0.03							
Mean	0.00508							
Geometric Mean	0.00318							
Median	0.0023							
Standard Deviation	0.00733							
Coefficient of Variation	1.443							
Mann-Kendall Test								
M-K Test Value (S)	-62							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.001								
Standard Deviation of S	20.13								
Standardized Value of S	-3.03								
Approximate p-value	0.00122								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Cobalt-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.011								
Maximum	0.018								
Mean	0.0137								
Geometric Mean	0.0136								
Median	0.013								
Standard Deviation	0.00176								
Coefficient of Variation	0.129								
Mann-Kendall Test									
M-K Test Value (S)	-51								
Tabulated p-value	0.006								
Standard Deviation of S	19.42								
Standardized Value of S	-2.575								
Approximate p-value	0.00501								
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 5.110/3/2018 9:47:41 PM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Fluoride-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	0.53								
Maximum	2								
Mean	1.051								
Geometric Mean	0.998								
Median	0.975								
Standard Deviation	0.392								
Coefficient of Variation	0.373								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test									
M-K Test Value (S)	7								
Tabulated p-value	0.412								
Standard Deviation of S	22.14								
Standardized Value of S	0.271								
Approximate p-value	0.393								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.87								
Maximum	2.6								
Mean	1.914								
Geometric Mean	1.812								
Median	2.2								
Standard Deviation	0.584								
Coefficient of Variation	0.305								
Mann-Kendall Test									
M-K Test Value (S)	47								
Tabulated p-value	0.01								
Standard Deviation of S	19.97								
Standardized Value of S	2.303								
Approximate p-value	0.0106								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-m-64a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.8								
Maximum	0.8								
Mean	0.8								
Geometric Mean	0.8								
Median	0.8								
Standard Deviation	1.164E-16								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
Standard Deviation of S	0								
Standardized Value of S	N/A								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	N/A								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	0.4								
Maximum	2								
Mean	0.863								
Geometric Mean	0.804								
Median	0.8								
Standard Deviation	0.37								
Coefficient of Variation	0.429								
Mann-Kendall Test									
M-K Test Value (S)	-19								
Tabulated p-value	0.225								
Standard Deviation of S	16.72								
Standardized Value of S	-1.076								
Approximate p-value	0.141								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-w-306									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	0.4								
Maximum	2								
Mean	1.291								
Geometric Mean	1.226								
Median	1.4								
Standard Deviation	0.362								
Coefficient of Variation	0.28								
Mann-Kendall Test									
M-K Test Value (S)	8								
Tabulated p-value	0.378								
Standard Deviation of S	21.79								
Standardized Value of S	0.321								
Approximate p-value	0.374								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-w-314									
General Statistics									
Number or Reported Events Not Used	0								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	0.8								
Maximum	2								
Mean	1.041								
Geometric Mean	1.012								
Median	0.92								
Standard Deviation	0.293								
Coefficient of Variation	0.282								
Mann-Kendall Test									
M-K Test Value (S)	-12								
Tabulated p-value	0.313								
Standard Deviation of S	21.91								
Standardized Value of S	-0.502								
Approximate p-value	0.308								
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 5.110/4/2018 9:00:08 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Lead-m-52a									
General Statistics									
Number of Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	4.8000E-4								
Maximum	0.01								
Mean	0.00147								
Geometric Mean	8.8120E-4								
Median	5.0000E-4								
Standard Deviation	0.00242								
Coefficient of Variation	1.649								
Mann-Kendall Test									
M-K Test Value (S)	21								
Tabulated p-value	0.164								
Standard Deviation of S	18.82								
Standardized Value of S	1.062								
Approximate p-value	0.144								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lead-m-53a									

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00134								
Geometric Mean	7.8331E-4								
Median	5.7000E-4								
Standard Deviation	0.00243								
Coefficient of Variation	1.816								
Mann-Kendall Test									
M-K Test Value (S)	-27								
Tabulated p-value	0.101								
Standard Deviation of S	19.47								
Standardized Value of S	-1.336								
Approximate p-value	0.0909								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lead-m-64a									
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	0.002								
Mean	9.7100E-4								
Geometric Mean	8.4124E-4								
Median	8.5500E-4								
Standard Deviation	5.8459E-4								
Coefficient of Variation	0.602								
Mann-Kendall Test									
M-K Test Value (S)	17								
Tabulated p-value	0.078								
Standard Deviation of S	10.57								
Standardized Value of S	1.514								
Approximate p-value	0.065								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lead-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	5.0000E-4							
Maximum	0.01							
Mean	0.0026							
Geometric Mean	0.00216							
Median	0.002							
Standard Deviation	0.00214							
Coefficient of Variation	0.822							
Mann-Kendall Test								
M-K Test Value (S)	-18							
Tabulated p-value	0.19							
Standard Deviation of S	19.71							
Standardized Value of S	-0.862							
Approximate p-value	0.194							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Lead-w-306								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	2.0000E-4							
Maximum	0.01							
Mean	0.00142							
Geometric Mean	8.0853E-4							
Median	5.0000E-4							
Standard Deviation	0.00243							
Coefficient of Variation	1.708							
Mann-Kendall Test								
M-K Test Value (S)	-2							
Tabulated p-value	0.461							
Standard Deviation of S	18.96							
Standardized Value of S	-0.0528							
Approximate p-value	0.479							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Lead-w-314								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	4.1000E-4							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Maximum	0.01								
Mean	0.00143								
Geometric Mean	8.1826E-4								
Median	5.0000E-4								
Standard Deviation	0.00244								
Coefficient of Variation	1.713								
Mann-Kendall Test									
M-K Test Value (S)	-12								
Tabulated p-value	0.279								
Standard Deviation of S	18.49								
Standardized Value of S	-0.595								
Approximate p-value	0.276								
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 5.110/4/2018 9:17:38 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Lithium-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.21								
Maximum	0.28								
Mean	0.248								
Geometric Mean	0.247								
Median	0.25								
Standard Deviation	0.0193								
Coefficient of Variation	0.078								
Mann-Kendall Test									
M-K Test Value (S)	-36								
Tabulated p-value	0.037								
Standard Deviation of S	19.85								
Standardized Value of S	-1.763								
Approximate p-value	0.0389								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Lithium-m-53a									
General Statistics									
Number or Reported Events Not Used	0								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.2								
Maximum	0.21								
Mean	0.203								
Geometric Mean	0.203								
Median	0.2								
Standard Deviation	0.00458								
Coefficient of Variation	0.0226								
Mann-Kendall Test									
M-K Test Value (S)	-22								
Tabulated p-value	0.141								
Standard Deviation of S	15.32								
Standardized Value of S	-1.371								
Approximate p-value	0.0852								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-m-64a									
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	0.25								
Maximum	0.28								
Mean	0.263								
Geometric Mean	0.263								
Median	0.265								
Standard Deviation	0.0106								
Coefficient of Variation	0.0403								
Mann-Kendall Test									
M-K Test Value (S)	-5								
Tabulated p-value	0.364								
Standard Deviation of S	10.57								
Standardized Value of S	-0.379								
Approximate p-value	0.353								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Minimum	0.2								
Maximum	0.23								
Mean	0.212								
Geometric Mean	0.212								
Median	0.21								
Standard Deviation	0.00941								
Coefficient of Variation	0.0444								
Mann-Kendall Test									
M-K Test Value (S)	-22								
Tabulated p-value	0.141								
Standard Deviation of S	18.37								
Standardized Value of S	-1.143								
Approximate p-value	0.126								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-w-306									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.43								
Maximum	0.78								
Mean	0.649								
Geometric Mean	0.643								
Median	0.67								
Standard Deviation	0.0911								
Coefficient of Variation	0.14								
Mann-Kendall Test									
M-K Test Value (S)	16								
Tabulated p-value	0.218								
Standard Deviation of S	20.18								
Standardized Value of S	0.743								
Approximate p-value	0.229								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.3								
Maximum	0.35								
Mean	0.324								
Geometric Mean	0.324								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Median	0.32								
Standard Deviation	0.0159								
Coefficient of Variation	0.0492								
Mann-Kendall Test									
M-K Test Value (S)	-34								
Tabulated p-value	0.046								
Standard Deviation of S	19.66								
Standardized Value of S	-1.678								
Approximate p-value	0.0467								
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 5.110/10/2018 9:55:13 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Mercury-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.626E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Number Values Used	14							
Minimum	2.0000E-4							
Maximum	2.0000E-4							
Mean	2.0000E-4							
Geometric Mean	2.0000E-4							
Median	2.0000E-4							
Standard Deviation	5.626E-20							
Coefficient of Variation	N/A							
Mann-Kendall Test								
M-K Test Value (S)	0							
Tabulated p-value	0.5							
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-m-64a								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	9							
Number Values Reported (n)	11							
Number Values Missing	2							
Number Values Used	9							
Minimum	2.0000E-4							
Maximum	2.0000E-4							
Mean	2.0000E-4							
Geometric Mean	2.0000E-4							
Median	2.0000E-4							
Standard Deviation	2.875E-20							
Coefficient of Variation	N/A							
Mann-Kendall Test								
M-K Test Value (S)	0							
Tabulated p-value	0.54							
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-w-305								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	14							
Number Values Reported (n)	16							
Number Values Missing	2							
Number Values Used	14							
Minimum	2.0000E-4							
Maximum	2.0000E-4							
Mean	2.0000E-4							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Geometric Mean	2.0000E-4						
Median	2.0000E-4						
Standard Deviation	5.626E-20						
Coefficient of Variation	N/A						
Mann-Kendall Test							
M-K Test Value (S)	0						
Tabulated p-value	0.5						
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-w-306							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	14						
Number Values Reported (n)	16						
Number Values Missing	2						
Number Values Used	14						
Minimum	2.0000E-4						
Maximum	2.0000E-4						
Mean	2.0000E-4						
Geometric Mean	2.0000E-4						
Median	2.0000E-4						
Standard Deviation	5.626E-20						
Coefficient of Variation	N/A						
Mann-Kendall Test							
M-K Test Value (S)	0						
Tabulated p-value	0.5						
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-w-314							
General Statistics							
Number or Reported Events Not Used	0						
Number of Generated Events	14						
Number Values Reported (n)	16						
Number Values Missing	2						
Number Values Used	14						
Minimum	2.0000E-4						
Maximum	2.0000E-4						
Mean	2.0000E-4						
Geometric Mean	2.0000E-4						
Median	2.0000E-4						
Standard Deviation	5.626E-20						
Coefficient of Variation	N/A						

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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 5.110/4/2018 9:42:20 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Molybdenum-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.013								
Maximum	0.071								
Mean	0.0339								
Geometric Mean	0.0293								
Median	0.024								
Standard Deviation	0.0189								
Coefficient of Variation	0.556								
Mann-Kendall Test									
M-K Test Value (S)	47								
Tabulated p-value	0.01								
Standard Deviation of S	20.16								
Standardized Value of S	2.282								
Approximate p-value	0.0112								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Molybdenum-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0059								
Maximum	0.053								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mean	0.0396							
Geometric Mean	0.0364							
Median	0.042							
Standard Deviation	0.0112							
Coefficient of Variation	0.282							
Mann-Kendall Test								
M-K Test Value (S)	4							
Tabulated p-value	0.423							
Standard Deviation of S	20.13							
Standardized Value of S	0.149							
Approximate p-value	0.441							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Molybdenum-m-64a								
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	0.0042							
Maximum	0.0061							
Mean	0.00527							
Geometric Mean	0.00524							
Median	0.0051							
Standard Deviation	5.6184E-4							
Coefficient of Variation	0.107							
Mann-Kendall Test								
M-K Test Value (S)	11							
Tabulated p-value	0.19							
Standard Deviation of S	10.97							
Standardized Value of S	0.912							
Approximate p-value	0.181							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Molybdenum-w-305								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.014							
Maximum	0.031							
Mean	0.02							
Geometric Mean	0.0197							
Median	0.02							
Standard Deviation	0.00391							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Coefficient of Variation	0.195							
Mann-Kendall Test								
M-K Test Value (S)	17							
Tabulated p-value	0.218							
Standard Deviation of S	19.67							
Standardized Value of S	0.813							
Approximate p-value	0.208							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Molybdenum-w-306								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.02							
Maximum	0.057							
Mean	0.0305							
Geometric Mean	0.0296							
Median	0.029							
Standard Deviation	0.00849							
Coefficient of Variation	0.278							
Mann-Kendall Test								
M-K Test Value (S)	-12							
Tabulated p-value	0.279							
Standard Deviation of S	20							
Standardized Value of S	-0.55							
Approximate p-value	0.291							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Molybdenum-w-314								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0066							
Maximum	0.013							
Mean	0.00819							
Geometric Mean	0.00809							
Median	0.008							
Standard Deviation	0.00151							
Coefficient of Variation	0.185							
Mann-Kendall Test								
M-K Test Value (S)	31							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.07								
Standard Deviation of S	20.16								
Standardized Value of S	1.488								
Approximate p-value	0.0683								
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 5.110/4/2018 10:06:06 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Radium-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.4								
Maximum	0.9								
Mean	0.633								
Geometric Mean	0.619								
Median	0.6								
Standard Deviation	0.14								
Coefficient of Variation	0.221								
Mann-Kendall Test									
M-K Test Value (S)	52								
Tabulated p-value	0.004								
Standard Deviation of S	18.37								
Standardized Value of S	2.777								
Approximate p-value	0.00275								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Radium-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.4								
Maximum	0.7								
Mean	0.587								
Geometric Mean	0.575								
Median	0.6								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation	0.113							
Coefficient of Variation	0.192							
Mann-Kendall Test								
M-K Test Value (S)	7							
Tabulated p-value	0.385							
Standard Deviation of S	18.96							
Standardized Value of S	0.316							
Approximate p-value	0.376							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Radium-m-64a								
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	0.4							
Maximum	1.6							
Mean	0.83							
Geometric Mean	0.769							
Median	0.7							
Standard Deviation	0.365							
Coefficient of Variation	0.44							
Mann-Kendall Test								
M-K Test Value (S)	6							
Tabulated p-value	0.3							
Standard Deviation of S	10.74							
Standardized Value of S	0.466							
Approximate p-value	0.321							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Radium-w-305								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.4							
Maximum	1.7							
Mean	0.807							
Geometric Mean	0.755							
Median	0.7							
Standard Deviation	0.333							
Coefficient of Variation	0.412							
Mann-Kendall Test								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	8								
Tabulated p-value	0.349								
Standard Deviation of S	19.54								
Standardized Value of S	0.358								
Approximate p-value	0.36								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Radium-w-306									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.4								
Maximum	1.1								
Mean	0.64								
Geometric Mean	0.621								
Median	0.6								
Standard Deviation	0.168								
Coefficient of Variation	0.263								
Mann-Kendall Test									
M-K Test Value (S)	25								
Tabulated p-value	0.12								
Standard Deviation of S	19.24								
Standardized Value of S	1.247								
Approximate p-value	0.106								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Radium-w-314									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.2								
Maximum	0.7								
Mean	0.587								
Geometric Mean	0.566								
Median	0.6								
Standard Deviation	0.13								
Coefficient of Variation	0.222								
Mann-Kendall Test									
M-K Test Value (S)	13								
Tabulated p-value	0.279								
Standard Deviation of S	18.96								
Standardized Value of S	0.633								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	0.263								
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 5.110/4/2018 10:22:41 AM								
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Selenium-m-52a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00146								
Geometric Mean	9.2551E-4								
Median	7.8000E-4								
Standard Deviation	0.0024								
Coefficient of Variation	1.644								
Mann-Kendall Test									
M-K Test Value (S)	10								
Tabulated p-value	0.313								
Standard Deviation of S	20.18								
Standardized Value of S	0.446								
Approximate p-value	0.328								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-m-53a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	5.0000E-4								
Maximum	0.01								
Mean	0.00134								
Geometric Mean	7.8784E-4								
Median	5.7000E-4								
Standard Deviation	0.00243								
Coefficient of Variation	1.811								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test									
M-K Test Value (S)	-19								
Tabulated p-value	0.19								
Standard Deviation of S	19.05								
Standardized Value of S	-0.945								
Approximate p-value	0.172								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-m-64a									
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	0.002								
Mean	7.8200E-4								
Geometric Mean	6.9321E-4								
Median	5.0000E-4								
Standard Deviation	4.7809E-4								
Coefficient of Variation	0.611								
Mann-Kendall Test									
M-K Test Value (S)	11								
Tabulated p-value	0.19								
Standard Deviation of S	9.781								
Standardized Value of S	1.022								
Approximate p-value	0.153								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	2.4000E-4								
Maximum	0.01								
Mean	0.00123								
Geometric Mean	6.5023E-4								
Median	5.0000E-4								
Standard Deviation	0.00246								
Coefficient of Variation	2.004								
Mann-Kendall Test									
M-K Test Value (S)	-4								
Tabulated p-value	0.423								
Standard Deviation of S	15.6								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standardized Value of S	-0.192							
Approximate p-value	0.424							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Selenium-w-306								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0016							
Maximum	0.0047							
Mean	0.00309							
Geometric Mean	0.00293							
Median	0.003							
Standard Deviation	9.6278E-4							
Coefficient of Variation	0.312							
Mann-Kendall Test								
M-K Test Value (S)	-32							
Tabulated p-value	0.057							
Standard Deviation of S	20.07							
Standardized Value of S	-1.545							
Approximate p-value	0.0612							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Selenium-w-314								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	4.0000E-4							
Maximum	0.01							
Mean	0.0013							
Geometric Mean	7.3564E-4							
Median	5.0000E-4							
Standard Deviation	0.00244							
Coefficient of Variation	1.873							
Mann-Kendall Test								
M-K Test Value (S)	-4							
Tabulated p-value	0.423							
Standard Deviation of S	17.76							
Standardized Value of S	-0.169							
Approximate p-value	0.433							
Insufficient evidence to identify a significant trend at the specified level of significance.								

TABLE B-2
BAP 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 5.110/10/2018 9:55:50 AM							
From File		BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Thallium-m-52a									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		15							
Number Values Reported (n)		16							
Number Values Missing		1							
Number Values Used		15							
Minimum		1.0000E-4							
Maximum		0.0015							
Mean		2.5467E-4							
Geometric Mean		1.6834E-4							
Median		1.1000E-4							
Standard Deviation		3.5942E-4							
Coefficient of Variation		1.411							
Mann-Kendall Test									
M-K Test Value (S)		10							
Tabulated p-value		0.313							
Standard Deviation of S		19.03							
Standardized Value of S		0.473							
Approximate p-value		0.318							
Insufficient evidence to identify a significant trend at the specified level of significance.									
Thallium-m-53a									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		15							
Number Values Reported (n)		16							
Number Values Missing		1							
Number Values Used		15							
Minimum		1.0000E-4							
Maximum		0.002							
Mean		2.6467E-4							
Geometric Mean		1.5277E-4							
Median		1.0000E-4							
Standard Deviation		4.8669E-4							
Coefficient of Variation		1.839							
Mann-Kendall Test									
M-K Test Value (S)		14							
Tabulated p-value		0.248							

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation of S	17.76								
Standardized Value of S	0.732								
Approximate p-value	0.232								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Thallium-m-64a									
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	1.0000E-4								
Maximum	4.0000E-4								
Mean	1.9000E-4								
Geometric Mean	1.6245E-4								
Median	1.5000E-4								
Standard Deviation	1.1972E-4								
Coefficient of Variation	0.63								
Mann-Kendall Test									
M-K Test Value (S)	19								
Tabulated p-value	0.054								
Standard Deviation of S	10.18								
Standardized Value of S	1.768								
Approximate p-value	0.0385								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Thallium-w-305									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.0000E-4								
Maximum	0.002								
Mean	2.4667E-4								
Geometric Mean	1.3393E-4								
Median	1.0000E-4								
Standard Deviation	4.9116E-4								
Coefficient of Variation	1.991								
Mann-Kendall Test									
M-K Test Value (S)	-9								
Tabulated p-value	0.349								
Standard Deviation of S	11.82								
Standardized Value of S	-0.677								
Approximate p-value	0.249								

TABLE B-2
BAP ProUCL MANN-KENDALL TREND ANALYSIS*

Insufficient evidence to identify a significant trend at the specified level of significance.								
Thallium-w-306								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	1.0000E-4							
Maximum	0.002							
Mean	2.9333E-4							
Geometric Mean	1.7672E-4							
Median	1.0000E-4							
Standard Deviation	4.8324E-4							
Coefficient of Variation	1.647							
Mann-Kendall Test								
M-K Test Value (S)	-4							
Tabulated p-value	0.423							
Standard Deviation of S	18.26							
Standardized Value of S	-0.164							
Approximate p-value	0.435							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Thallium-w-314								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	1.0000E-4							
Maximum	0.002							
Mean	2.6000E-4							
Geometric Mean	1.4690E-4							
Median	1.0000E-4							
Standard Deviation	4.8815E-4							
Coefficient of Variation	1.877							
Mann-Kendall Test								
M-K Test Value (S)	-7							
Tabulated p-value	0.385							
Standard Deviation of S	15.57							
Standardized Value of S	-0.385							
Approximate p-value	0.35							
Insufficient evidence to identify a significant trend at the specified level of significance.								

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects							
User Selected Options							
Date/Time of Computation	ProUCL 5.110/10/2018 9:43:38 AM						
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls						
Full Precision	OFF						
Confidence Coefficient	0.95						
Antimony (m-52a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	1	15	1	14	93.33%	
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 Antimony (m-52a) was not processed!							
Antimony (m-53a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	1	15	0	15	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 Antimony (m-53a) was not processed!							
Antimony (m-64a)							
	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).							
The data set for variable Antimony (m-64a) was not processed!							
Antimony (w-305)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	1	15	1	14	93.33%	
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							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

The data set for variable Antimony (w-305) was not processed!						
Antimony (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
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 Antimony (w-306) was not processed!						
Antimony (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	1	14	93.33%
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 Antimony (w-314) was not processed!						
Arsenic (m-52a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	8	7	46.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	5.0000E-4	0.01	0.0022	0.001	0.0034
Statistics (Non-Detects Only)	8	4.7000E-4	0.0026	0.0010	6.2500E-4	7.8162E-4
Statistics (All: NDs treated as DL value)	15	4.7000E-4	0.01	0.0015	7.1000E-4	0.0024
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	0.0010	5.0000E-4	0.0012
Statistics (Normal ROS Imputed Data)	15	-4.769E-4	0.0026	6.4895E-4	5.4000E-4	7.4199E-4
Statistics (Gamma ROS Imputed Data)	15	4.7000E-4	0.01	0.0052	0.0026	0.0046
Statistics (Lognormal ROS Imputed Data)	15	2.2494E-4	0.0026	7.4638E-4	5.4000E-4	6.3426E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	2.54	1.671	3.9813E-4	-7.106	0.652	-0.0917
Statistics (NDs = DL)	1.143	0.959	0.0013	-6.952	0.865	-0.124
Statistics (NDs = DL/2)	1.325	1.104	7.9709E-4	-7.276	0.869	-0.119
Statistics (Gamma ROS Estimates)	0.863	0.735	0.0060	-5.939	1.371	-0.231
Statistics (Lognormal ROS Estimates)	--	--	--	-7.421	0.63	-0.085
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.866	0.68	0.789	0.921		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.751	0.818	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.491	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.642	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.867	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.275	0.283	Data Appear Normal			
Lilliefors (NDs = DL)	0.327	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.318	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.236	0.22	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.961	0.874	0.945	0.747		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.767	0.723				
Kolmogorov-Smirnov (Detects Only)	0.254	0.297	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	1.67	0.76				
Kolmogorov-Smirnov (NDs = DL)	0.283	0.227	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.087	0.757				
Kolmogorov-Smirnov (NDs = DL/2)	0.251	0.226	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.681	0.77				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.314	0.229	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.919	0.889	0.947	0.95		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.831	0.818	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.795	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.895	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.912	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.239	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.213	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.212	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.193	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	13	2	13.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.002	0.01	0.006	0.006	0.00566
Statistics (Non-Detects Only)	13	7.6000E-4	0.0018	0.00117	0.0011	3.1037E-4
Statistics (All: NDs treated as DL value)	15	7.6000E-4	0.01	0.00182	0.0011	0.00229
Statistics (All: NDs treated as DL/2 value)	15	7.6000E-4	0.005	0.00142	0.0011	0.00103
Statistics (Normal ROS Imputed Data)	15	7.6000E-4	0.0018	0.00117	0.0011	2.8735E-4
Statistics (Gamma ROS Imputed Data)	15	7.6000E-4	0.01	0.00235	0.0011	0.00312

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Lognormal ROS Imputed Data)	15	7.6000E-4	0.0018	0.00117	0.0011	2.8761E-4		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	16.64	12.86	7.0384E-5	-6.78	0.253	-0.0373		
Statistics (NDs = DL)	1.9	1.565	9.5534E-4	-6.597	0.616	-0.0934		
Statistics (NDs = DL/2)	4.03	3.269	3.5116E-4	-6.69	0.452	-0.0675		
Statistics (Gamma ROS Estimates)	1.288	1.075	0.00182	-6.49	0.8	-0.123		
Statistics (Lognormal ROS Estimates)	--	--	--	-6.78	0.234	-0.0346		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.959	0.624	0.71	0.957				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.917	0.866	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.421	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.534	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.917	0.881	Data Appear Normal					
Lilliefors (Detects Only)	0.207	0.234	Data Appear Normal					
Lilliefors (NDs = DL)	0.401	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.306	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.194	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.977	0.784	0.817	0.854				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.328	0.733						
Kolmogorov-Smirnov (Detects Only)	0.184	0.236	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	2.288	0.748						
Kolmogorov-Smirnov (NDs = DL)	0.286	0.225	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.636	0.74						
Kolmogorov-Smirnov (NDs = DL/2)	0.242	0.223	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.752	0.758						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.361	0.227	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.983	0.826	0.866	0.977				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.961	0.866	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.709	0.881	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.774	0.881	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.956	0.881	Data Appear Lognormal					
Lilliefors (Detects Only)	0.167	0.234	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.217	0.22	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.207	0.22	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.167	0.22	Data Appear Lognormal					

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	9	1	10.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.001	0.001	0.001	0.001	N/A
Statistics (Non-Detects Only)	9	9.4000E-4	0.0033	0.00206	0.0019	7.8511E-4
Statistics (All: NDs treated as DL value)	10	9.4000E-4	0.0033	0.00195	0.0018	8.1257E-4
Statistics (All: NDs treated as DL/2 value)	10	5.0000E-4	0.0033	0.0019	0.0018	8.8953E-4
Statistics (Normal ROS Imputed Data)	10	7.0318E-4	0.0033	0.00192	0.0018	8.5557E-4
Statistics (Gamma ROS Imputed Data)	10	9.4000E-4	0.01	0.00285	0.0022	0.00262
Statistics (Lognormal ROS Imputed Data)	10	9.3357E-4	0.0033	0.00195	0.0018	8.2146E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.128	4.826	2.8902E-4	-6.257	0.415	-0.0663
Statistics (NDs = DL)	6.111	4.344	3.1977E-4	-6.322	0.442	-0.0699
Statistics (NDs = DL/2)	4.083	2.924	4.6638E-4	-6.391	0.578	-0.0904
Statistics (Gamma ROS Estimates)	2.302	1.678	0.00124	-6.092	0.652	-0.107
Statistics (Lognormal ROS Estimates)	--	--	--	-6.329	0.452	-0.0715
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.988	0.979	0.993	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.965	0.829	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.941	0.842	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.976	0.842	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.964	0.842	Data Appear Normal			
Lilliefors (Detects Only)	0.157	0.274	Data Appear Normal			
Lilliefors (NDs = DL)	0.149	0.262	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.149	0.262	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.149	0.262	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.98	0.979	0.968	0.896		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.228	0.722				
Kolmogorov-Smirnov (Detects Only)	0.189	0.28	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.286	0.728				
Kolmogorov-Smirnov (NDs = DL)	0.179	0.267	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.243	0.729				
Kolmogorov-Smirnov (NDs = DL/2)	0.17	0.268	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.688	0.735				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.228	0.269	Data Appear Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.982	0.979	0.961	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.955	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.938	0.842	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.925	0.842	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.929	0.842	Data Appear Lognormal			
Lilliefors (Detects Only)	0.183	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.173	0.262	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.168	0.262	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.172	0.262	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	13	2	13.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.002	0.01	0.006	0.006	0.00566
Statistics (Non-Detects Only)	13	5.8000E-4	0.0017	8.5077E-4	7.8000E-4	2.8739E-4
Statistics (All: NDs treated as DL value)	15	5.8000E-4	0.01	0.00154	7.8000E-4	0.00237
Statistics (All: NDs treated as DL/2 value)	15	5.8000E-4	0.005	0.00114	7.8000E-4	0.0011
Statistics (Normal ROS Imputed Data)	15	5.8000E-4	0.0017	8.5077E-4	7.8000E-4	2.6607E-4
Statistics (Gamma ROS Imputed Data)	15	5.8000E-4	0.01	0.00207	7.8000E-4	0.00323
Statistics (Lognormal ROS Imputed Data)	15	5.8000E-4	0.0017	8.4629E-4	7.8000E-4	2.6633E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	12.58	9.726	6.7646E-5	-7.11	0.279	-0.0392
Statistics (NDs = DL)	1.376	1.146	0.00112	-6.883	0.719	-0.104
Statistics (NDs = DL/2)	2.701	2.205	4.2103E-4	-6.975	0.533	-0.0765
Statistics (Gamma ROS Estimates)	0.972	0.822	0.00213	-6.776	0.918	-0.136
Statistics (Lognormal ROS Estimates)	--	--	--	-7.11	0.258	-0.0363
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.852	0.615	0.664	0.847		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.75	0.866	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.409	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.472	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.743	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.237	0.234	Data Not Normal			
Lilliefors (NDs = DL)	0.391	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.416	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.234	0.22	Data Not Normal			
Gamma GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.899	0.805	0.801	0.86		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.661	0.734				
Kolmogorov-Smirnov (Detects Only)	0.198	0.237	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	2.556	0.756				
Kolmogorov-Smirnov (NDs = DL)	0.374	0.226	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.156	0.745				
Kolmogorov-Smirnov (NDs = DL/2)	0.367	0.224	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.061	0.764				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.415	0.228	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.931	0.815	0.83	0.926		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.883	0.866	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.686	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.712	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.876	0.881	Data Not Lognormal			
Lilliefors (Detects Only)	0.182	0.234	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.319	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.316	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.167	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	14	1	6.67%
	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)	14	0.0019	0.0052	0.00444	0.00465	8.1780E-4
Statistics (All: NDs treated as DL value)	15	0.0019	0.01	0.00481	0.0047	0.00164
Statistics (All: NDs treated as DL/2 value)	15	0.0019	0.0052	0.00448	0.0047	8.0107E-4
Statistics (Normal ROS Imputed Data)	15	0.0019	0.0052	0.00444	0.0046	7.8805E-4
Statistics (Gamma ROS Imputed Data)	15	0.0019	0.01	0.00481	0.0047	0.00164
Statistics (Lognormal ROS Imputed Data)	15	0.0019	0.0052	0.00444	0.0046	7.8850E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	21.33	16.81	2.0827E-4	-5.44	0.251	-0.0461
Statistics (NDs = DL)	10.57	8.5	4.5542E-4	-5.384	0.324	-0.0602
Statistics (NDs = DL/2)	22.39	17.96	2.0008E-4	-5.431	0.245	-0.045
Statistics (Gamma ROS Estimates)	10.57	8.5	4.5542E-4	-5.384	0.324	-0.0602
Statistics (Lognormal ROS Estimates)	--	--	--	-5.44	0.242	-0.0444
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.833	0.797	0.828	0.832		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.72	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.681	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.71	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.718	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.24	0.226	Data Not Normal			
Lilliefors (NDs = DL)	0.34	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.23	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.246	0.22	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.794	0.83	0.789	0.83		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.808	0.734				
Kolmogorov-Smirnov (Detects Only)	0.284	0.228	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.738	0.737				
Kolmogorov-Smirnov (NDs = DL)	0.294	0.221	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.933	0.735				
Kolmogorov-Smirnov (NDs = DL/2)	0.275	0.221	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.738	0.737				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.294	0.221	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.753	0.836	0.747	0.752		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.597	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.749	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.587	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.595	0.881	Data Not Lognormal			
Lilliefors (Detects Only)	0.305	0.226	Data Not Lognormal			
Lilliefors (NDs = DL)	0.283	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.298	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.313	0.22	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	7	8	53.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	5.0000E-4	0.01	0.002	7.5000E-4	0.00327
Statistics (Non-Detects Only)	7	5.3000E-4	9.1000E-4	6.3286E-4	6.0000E-4	1.3338E-4
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.00136	6.0000E-4	0.00242
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	8.2867E-4	5.4000E-4	0.00118

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Normal ROS Imputed Data)	15	1.8503E-4	9.1000E-4	5.1092E-4	5.3000E-4	1.7662E-4	
Statistics (Gamma ROS Imputed Data)	15	5.3000E-4	0.01	0.00563	0.01	0.00484	
Statistics (Lognormal ROS Imputed Data)	15	3.2418E-4	9.1000E-4	5.3753E-4	5.3000E-4	1.4235E-4	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	30.51	17.53	2.0741E-5	-7.382	0.189	-0.0256	
Statistics (NDs = DL)	1.107	0.93	0.00123	-7.114	0.795	-0.112	
Statistics (NDs = DL/2)	1.432	1.19	5.7856E-4	-7.484	0.758	-0.101	
Statistics (Gamma ROS Estimates)	0.82	0.701	0.00686	-5.901	1.439	-0.244	
Statistics (Lognormal ROS Estimates)	--	--	--	-7.559	0.256	-0.0338	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	0.874	0.602	0.65	0.975			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.777	0.803	Data Not Normal				
Shapiro-Wilk (NDs = DL)	0.392	0.881	Data Not Normal				
Shapiro-Wilk (NDs = DL/2)	0.454	0.881	Data Not Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.963	0.881	Data Appear Normal				
Lilliefors (Detects Only)	0.312	0.304	Data Not Normal				
Lilliefors (NDs = DL)	0.426	0.22	Data Not Normal				
Lilliefors (NDs = DL/2)	0.375	0.22	Data Not Normal				
Lilliefors (Normal ROS Estimates)	0.169	0.22	Data Appear Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	0.908	0.814	0.82	0.686			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	0.651	0.707					
Kolmogorov-Smirnov (Detects Only)	0.306	0.311	Detected Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL)	2.778	0.761					
Kolmogorov-Smirnov (NDs = DL)	0.359	0.227	Data Not Gamma Distributed				
Anderson-Darling (NDs = DL/2)	1.66	0.755					
Kolmogorov-Smirnov (NDs = DL/2)	0.271	0.226	Data Not Gamma Distributed				
Anderson-Darling (Gamma ROS Estimates)	2.45	0.772					
Kolmogorov-Smirnov (Gamma ROS Est.)	0.358	0.23	Data Not Gamma Distributed				
Lognormal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Log ROS			
Correlation Coefficient R	0.904	0.796	0.892	0.98			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.825	0.803	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL)	0.652	0.881	Data Not Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.812	0.881	Data Not Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.97	0.881	Data Appear Lognormal				
Lilliefors (Detects Only)	0.291	0.304	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.27	0.22	Data Not Lognormal				
Lilliefors (NDs = DL/2)	0.199	0.22	Data Appear Lognormal				

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Lognormal ROS Estimates)	0.169	0.22	Data Appear Lognormal				
Note: Substitution methods such as DL or DL/2 are not recommended.							
Barium (m-52a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	11						
Minimum	0.013						
Maximum	0.027						
Mean of Raw Data	0.0179						
Standard Deviation of Raw Data	0.00426						
Khat	20.56						
Theta hat	8.6881E-4						
Kstar	16.5						
Theta star	0.00108						
Mean of Log Transformed Data	-4.049						
Standard Deviation of Log Transformed Data	0.225						
Normal GOF Test Results							
Correlation Coefficient R	0.947						
Shapiro Wilk Test Statistic	0.89						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0768						
Lilliefors Test Statistic	0.203						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.968						
A-D Test Statistic	0.58						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.195						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.966						
Shapiro Wilk Test Statistic	0.922						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.247						
Lilliefors Test Statistic	0.182						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Barium (m-53a)							
Raw Statistics							
Number of Valid Observations	15						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Number of Missing Observations	1						
Number of Distinct Observations	12						
Minimum	0.0079						
Maximum	0.024						
Mean of Raw Data	0.0129						
Standard Deviation of Raw Data	0.00575						
Khat	6.142						
Theta hat	0.0021						
Kstar	4.958						
Theta star	0.00261						
Mean of Log Transformed Data	-4.433						
Standard Deviation of Log Transformed Data	0.411						
Normal GOF Test Results							
Correlation Coefficient R	0.891						
Shapiro Wilk Test Statistic	0.779						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00207						
Lilliefors Test Statistic	0.33						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.93						
A-D Test Statistic	1.513						
A-D Critical (0.05) Value	0.738						
K-S Test Statistic	0.329						
K-S Critical(0.05) Value	0.222						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.904						
Shapiro Wilk Test Statistic	0.798						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00404						
Lilliefors Test Statistic	0.316						
Lilliefors Critical (0.05) Value	0.22						
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 (m-64a)							
Raw Statistics							
Number of Valid Observations	10						
Number of Missing Observations	1						
Number of Distinct Observations	6						
Minimum	0.012						
Maximum	0.034						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Mean of Raw Data	0.0172						
Standard Deviation of Raw Data	0.00632						
Khat	11.18						
Theta hat	0.00154						
Kstar	7.896						
Theta star	0.00218						
Mean of Log Transformed Data	-4.108						
Standard Deviation of Log Transformed Data	0.297						
Normal GOF Test Results							
Correlation Coefficient R	0.822						
Shapiro Wilk Test Statistic	0.703						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	7.2756E-4						
Lilliefors Test Statistic	0.313						
Lilliefors Critical (0.05) Value	0.262						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.875						
A-D Test Statistic	0.835						
A-D Critical (0.05) Value	0.725						
K-S Test Statistic	0.276						
K-S Critical(0.05) Value	0.267						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.9						
Shapiro Wilk Test Statistic	0.829						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.022						
Lilliefors Test Statistic	0.255						
Lilliefors Critical (0.05) Value	0.262						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Barium (w-305)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.0059						
Maximum	0.022						
Mean of Raw Data	0.0117						
Standard Deviation of Raw Data	0.00338						
Khat	14.43						
Theta hat	8.0929E-4						
Kstar	11.59						
Theta star	0.00101						
Mean of Log Transformed Data	-4.485						
Standard Deviation of Log Transformed Data	0.272						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results							
Correlation Coefficient R	0.84						
Shapiro Wilk Test Statistic	0.747						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	3.8627E-4						
Lilliefors Test Statistic	0.329						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.863						
A-D Test Statistic	1.348						
A-D Critical (0.05) Value	0.736						
K-S Test Statistic	0.291						
K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.886						
Shapiro Wilk Test Statistic	0.825						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00438						
Lilliefors Test Statistic	0.276						
Lilliefors Critical (0.05) Value	0.22						
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 (w-306)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.0094						
Maximum	0.015						
Mean of Raw Data	0.0119						
Standard Deviation of Raw Data	0.00176						
Khat	48.56						
Theta hat	2.4494E-4						
Kstar	38.89						
Theta star	3.0583E-4						
Mean of Log Transformed Data	-4.442						
Standard Deviation of Log Transformed Data	0.149						
Normal GOF Test Results							
Correlation Coefficient R	0.969						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Test Statistic	0.925						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.285						
Lilliefors Test Statistic	0.192						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.97						
A-D Test Statistic	0.553						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.203						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.967						
Shapiro Wilk Test Statistic	0.921						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.254						
Lilliefors Test Statistic	0.196						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Barium (w-314)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	6						
Minimum	0.0093						
Maximum	0.016						
Mean of Raw Data	0.0118						
Standard Deviation of Raw Data	0.0016						
Khat	61.23						
Theta hat	1.9270E-4						
Kstar	49.03						
Theta star	2.4066E-4						
Mean of Log Transformed Data	-4.448						
Standard Deviation of Log Transformed Data	0.131						
Normal GOF Test Results							
Correlation Coefficient R	0.938						
Shapiro Wilk Test Statistic	0.898						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0697						
Lilliefors Test Statistic	0.184						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.949						
A-D Test Statistic	0.558						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.175						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.955						
Shapiro Wilk Test Statistic	0.927						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.204						
Lilliefors Test Statistic	0.185						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Beryllium (m-52a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-52a) was not processed!							
Beryllium (m-53a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-53a) was not processed!							
Beryllium (m-64a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	11	2	9	0	9	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 (m-64a) was not processed!							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Beryllium (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	0	14	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 (w-305) was not processed!						
Beryllium (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	0	14	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 (w-306) was not processed!						
Beryllium (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	0	14	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 (w-314) was not processed!						
Cadmium (m-52a)						
Raw Statistics						
Number of Valid Observations	15					
Number of Missing Observations	1					
Number of Distinct Observations	13					
Minimum	4.8000E-4					
Maximum	0.0019					
Mean of Raw Data	9.8200E-4					
Standard Deviation of Raw Data	4.8948E-4					
Khat	4.367					
Theta hat	2.2489E-4					

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Kstar	3.538						
Theta star	2.7758E-4						
Mean of Log Transformed Data	-7.045						
Standard Deviation of Log Transformed Data	0.508						
Normal GOF Test Results							
Correlation Coefficient R	0.948						
Shapiro Wilk Test Statistic	0.88						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0647						
Lilliefors Test Statistic	0.182						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.969						
A-D Test Statistic	0.687						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.184						
K-S Critical(0.05) Value	0.222						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.953						
Shapiro Wilk Test Statistic	0.883						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0773						
Lilliefors Test Statistic	0.179						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Cadmium (m-53a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.0012						
Maximum	0.0024						
Mean of Raw Data	0.00153						
Standard Deviation of Raw Data	2.9196E-4						
Khat	34.92						
Theta hat	4.3913E-5						
Kstar	27.98						
Theta star	5.4804E-5						
Mean of Log Transformed Data	-6.495						
Standard Deviation of Log Transformed Data	0.169						
Normal GOF Test Results							
Correlation Coefficient R	0.878						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Test Statistic	0.792						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00196						
Lilliefors Test Statistic	0.279						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.907						
A-D Test Statistic	0.887						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.262						
K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.922						
Shapiro Wilk Test Statistic	0.867						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0243						
Lilliefors Test Statistic	0.251						
Lilliefors Critical (0.05) Value	0.22						
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							
Cadmium (m-64a)							
	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).							
The data set for variable Cadmium (m-64a) was not processed!							
Cadmium (w-305)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	1	15	6	9	60.00%	
	Number	Minimum	Maximum	Mean	Median	SD	
Statistics (Non-Detects Only)	9	1.0000E-4	0.002	3.4444E-4	1.0000E-4	6.2871E-4	
Statistics (Non-Detects Only)	6	1.0000E-4	2.2000E-4	1.3167E-4	1.1500E-4	4.4460E-5	
Statistics (All: NDs treated as DL value)	15	1.0000E-4	0.002	2.5933E-4	1.0000E-4	4.8808E-4	
Statistics (All: NDs treated as DL/2 value)	15	5.0000E-5	0.001	1.5600E-4	1.0000E-4	2.3999E-4	
Statistics (Normal ROS Imputed Data)	15	-6.529E-5	2.2000E-4	6.3071E-5	6.2941E-5	7.2363E-5	

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Imputed Data)	15	1.0000E-4	0.01	0.00605	0.01	0.005		
Statistics (Lognormal ROS Imputed Data)	15	3.4204E-5	2.2000E-4	8.9591E-5	8.0263E-5	4.6184E-5		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	13.39	6.805	9.8341E-6	-8.973	0.284	-0.0317		
Statistics (NDs = DL)	1.018	0.859	2.5477E-4	-8.823	0.819	-0.0928		
Statistics (NDs = DL/2)	1.195	1	1.3054E-4	-9.239	0.84	-0.0909		
Statistics (Gamma ROS Estimates)	0.509	0.451	0.0119	-6.352	2.221	-0.35		
Statistics (Lognormal ROS Estimates)	--	--	--	-9.429	0.479	-0.0508		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.828	0.587	0.664	0.986				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.708	0.788	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.374	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.469	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.979	0.881	Data Appear Normal					
Lilliefors (Detects Only)	0.348	0.325	Data Not Normal					
Lilliefors (NDs = DL)	0.404	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.343	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.111	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.883	0.813	0.852	0.567				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.786	0.698						
Kolmogorov-Smirnov (Detects Only)	0.315	0.332	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL)	3.446	0.763						
Kolmogorov-Smirnov (NDs = DL)	0.409	0.228	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.696	0.759						
Kolmogorov-Smirnov (NDs = DL/2)	0.253	0.227	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.756	0.792						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.401	0.234	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.872	0.732	0.881	0.99				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.78	0.788	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.556	0.881	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.783	0.881	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.986	0.881	Data Appear Lognormal					
Lilliefors (Detects Only)	0.298	0.325	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.361	0.22	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.252	0.22	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.101	0.22	Data Appear Lognormal					

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	1.0000E-4	0.002	3.1538E-4	1.0000E-4	5.1776E-4
Statistics (Non-Detects Only)	2	1.0000E-4	0.0015	8.0000E-4	8.0000E-4	9.8995E-4
Statistics (All: NDs treated as DL value)	15	1.0000E-4	0.002	3.8000E-4	1.0000E-4	5.7346E-4
Statistics (All: NDs treated as DL/2 value)	15	5.0000E-5	0.0015	2.4333E-4	1.0000E-4	4.2252E-4
Statistics (Normal ROS Imputed Data)	15	-0.00489	0.0015	-0.00219	-0.00225	0.00164
Statistics (Gamma ROS Imputed Data)	15	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	15	6.4292E-9	0.0015	1.0861E-4	1.0704E-6	3.8575E-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)	0.923	0.783	4.1163E-4	-8.507	1.006	-0.118
Statistics (NDs = DL/2)	0.76	0.652	3.2018E-4	-9.107	1.095	-0.12
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-13.63	3.163	-0.232
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.737	0.709	0.983		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.555	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.52	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.972	0.881	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.357	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.408	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.118	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.926	0.922	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)	2.123	0.767				
Kolmogorov-Smirnov (NDs = DL)	0.31	0.229	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.235	0.775				
Kolmogorov-Smirnov (NDs = DL/2)	0.34	0.23	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.734				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.221				
Lognormal GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.862	0.864	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.736	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.743	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.972	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.291	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.271	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.118	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cadmium (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	11	4	26.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	2.0000E-4	0.002	7.0000E-4	3.0000E-4	8.7178E-4
Statistics (Non-Detects Only)	11	1.5000E-4	2.2000E-4	1.7909E-4	1.8000E-4	2.0226E-5
Statistics (All: NDs treated as DL value)	15	1.5000E-4	0.002	3.1800E-4	1.9000E-4	4.6904E-4
Statistics (All: NDs treated as DL/2 value)	15	1.0000E-4	0.001	2.2467E-4	1.8000E-4	2.1709E-4
Statistics (Normal ROS Imputed Data)	15	1.5000E-4	2.2000E-4	1.7812E-4	1.7768E-4	1.7480E-5
Statistics (Gamma ROS Imputed Data)	15	1.5000E-4	0.01	0.0028	1.9000E-4	0.0045
Statistics (Lognormal ROS Imputed Data)	15	1.5000E-4	2.2000E-4	1.7790E-4	1.7670E-4	1.7489E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	88.39	64.34	2.0262E-6	-8.633	0.111	-0.0129
Statistics (NDs = DL)	1.578	1.307	2.0151E-4	-8.403	0.647	-0.077
Statistics (NDs = DL/2)	2.836	2.313	7.9225E-5	-8.587	0.517	-0.0603
Statistics (Gamma ROS Estimates)	0.393	0.359	0.00712	-7.559	1.846	-0.244
Statistics (Lognormal ROS Estimates)	--	--	--	-8.639	0.096	-0.0111
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.981	0.577	0.625	0.972		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.964	0.85	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.364	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.425	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.955	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.128	0.251	Data Appear Normal			
Lilliefors (NDs = DL)	0.449	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.442	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.164	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.987	0.762	0.749	0.817		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.202	0.726				
Kolmogorov-Smirnov (Detects Only)	0.128	0.254	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	3.488	0.753				
Kolmogorov-Smirnov (NDs = DL)	0.431	0.225	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.489	0.745				
Kolmogorov-Smirnov (NDs = DL/2)	0.368	0.223	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.14	0.816				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.448	0.237	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.988	0.716	0.803	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.976	0.85	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.541	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.679	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.971	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.117	0.251	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.379	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.313	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.164	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (m-52a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	12	3	20.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.001	0.01	0.005	0.004	0.00458
Statistics (Non-Detects Only)	12	0.0011	0.034	0.0111	0.00905	0.00975
Statistics (All: NDs treated as DL value)	15	0.001	0.034	0.00988	0.0071	0.00917
Statistics (All: NDs treated as DL/2 value)	15	5.0000E-4	0.034	0.00938	0.0058	0.00939
Statistics (Normal ROS Imputed Data)	15	-0.0116	0.034	0.00807	0.0058	0.011
Statistics (Gamma ROS Imputed Data)	15	0.0011	0.034	0.0109	0.01	0.00865
Statistics (Lognormal ROS Imputed Data)	15	4.1846E-4	0.034	0.00914	0.0058	0.00955
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.163	0.928	0.00954	-4.989	1.171	-0.235
Statistics (NDs = DL)	1.119	0.94	0.00883	-5.127	1.162	-0.227
Statistics (NDs = DL/2)	0.972	0.822	0.00965	-5.265	1.264	-0.24
Statistics (Gamma ROS Estimates)	1.422	1.182	0.00765	-4.912	1.05	-0.214
Statistics (Lognormal ROS Estimates)	--	--	--	-5.36	1.331	-0.248
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.943	0.93	0.921	0.97		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.89	0.859	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.867	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.85	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.955	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.159	0.243	Data Appear Normal			
Lilliefors (NDs = DL)	0.166	0.22	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.196	0.22	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.135	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.982	0.988	0.987	0.982		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.334	0.753				
Kolmogorov-Smirnov (Detects Only)	0.158	0.251	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.331	0.761				
Kolmogorov-Smirnov (NDs = DL)	0.156	0.227	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.286	0.764				
Kolmogorov-Smirnov (NDs = DL/2)	0.135	0.228	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.394	0.755				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.173	0.226	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.959	0.966	0.979	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.902	0.859	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.915	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.948	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.938	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.162	0.243	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.16	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.13	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.152	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	13	2	13.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.004	0.01	0.007	0.007	0.00424
Statistics (Non-Detects Only)	13	0.001	0.0062	0.00193	0.0014	0.00148
Statistics (All: NDs treated as DL value)	15	0.001	0.01	0.00261	0.0015	0.00252
Statistics (All: NDs treated as DL/2 value)	15	0.001	0.0062	0.00214	0.0015	0.00158
Statistics (Normal ROS Imputed Data)	15	0.001	0.0062	0.00192	0.0015	0.00137

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Imputed Data)	15	0.001	0.01	0.00301	0.0015	0.00315		
Statistics (Lognormal ROS Imputed Data)	15	0.001	0.0062	0.00188	0.0015	0.00137		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	3.168	2.488	6.0945E-4	-6.416	0.533	-0.0831		
Statistics (NDs = DL)	1.899	1.563	0.00137	-6.236	0.707	-0.113		
Statistics (NDs = DL/2)	2.918	2.379	7.3332E-4	-6.328	0.572	-0.0905		
Statistics (Gamma ROS Estimates)	1.505	1.249	0.002	-6.174	0.806	-0.131		
Statistics (Lognormal ROS Estimates)	--	--	--	-6.421	0.494	-0.077		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.781	0.809	0.836	0.781				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.629	0.866	Data Not Normal					
Shapiro-Wilk (NDs = DL)	0.668	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.704	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.631	0.881	Data Not Normal					
Lilliefors (Detects Only)	0.331	0.234	Data Not Normal					
Lilliefors (NDs = DL)	0.329	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.335	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.343	0.22	Data Not Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.894	0.942	0.933	0.927				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	1.415	0.739						
Kolmogorov-Smirnov (Detects Only)	0.287	0.238	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	1.426	0.748						
Kolmogorov-Smirnov (NDs = DL)	0.284	0.225	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.345	0.745						
Kolmogorov-Smirnov (NDs = DL/2)	0.267	0.223	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	1.761	0.754						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.307	0.225	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.89	0.914	0.919	0.882				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.799	0.866	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.831	0.881	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.839	0.881	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.789	0.881	Data Not Lognormal					
Lilliefors (Detects Only)	0.257	0.234	Data Not Lognormal					
Lilliefors (NDs = DL)	0.247	0.22	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.222	0.22	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.265	0.22	Data Not Lognormal					

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	3	7	70.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	5.0000E-4	0.004	0.00129	5.0000E-4	0.00132
Statistics (Non-Detects Only)	3	0.0015	0.0022	0.00193	0.0021	3.7859E-4
Statistics (All: NDs treated as DL value)	10	5.0000E-4	0.004	0.00148	0.00125	0.00114
Statistics (All: NDs treated as DL/2 value)	10	2.5000E-4	0.0022	0.00103	7.5000E-4	8.4268E-4
Statistics (Normal ROS Imputed Data)	10	2.0225E-4	0.0022	0.00114	9.9857E-4	6.3619E-4
Statistics (Gamma ROS Imputed Data)	10	0.0015	0.01	0.00758	0.01	0.0039
Statistics (Lognormal ROS Imputed Data)	10	7.3856E-4	0.0022	0.00131	0.00114	4.8998E-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)	2.018	1.479	7.3338E-4	-6.783	0.782	-0.115
Statistics (NDs = DL/2)	1.424	1.064	7.2325E-4	-7.269	0.982	-0.135
Statistics (Gamma ROS Estimates)	2.425	1.764	0.00313	-5.102	0.807	-0.158
Statistics (Lognormal ROS Estimates)	--	--	--	-6.699	0.349	-0.0521
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.924	0.915	0.918	0.97		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.855	0.767	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.836	0.842	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.81	0.842	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.936	0.842	Data Appear Normal			
Lilliefors (Detects Only)	0.337	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.206	0.262	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.235	0.262	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.192	0.262	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.974	0.909	0.659		
	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)	0.618	0.736				
Kolmogorov-Smirnov (NDs = DL)	0.254	0.27	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.843	0.741				
Kolmogorov-Smirnov (NDs = DL/2)	0.257	0.272	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	2.05	0.734				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.446	0.269	Data Not Gamma Distributed			

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.916	0.938	0.916	0.969		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.84	0.767	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.858	0.842	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.803	0.842	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.934	0.842	Data Appear Lognormal			
Lilliefors (Detects Only)	0.345	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.252	0.262	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.252	0.262	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.192	0.262	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	11	4	26.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	5.0000E-4	0.01	0.00338	0.0015	0.00446
Statistics (Non-Detects Only)	11	6.2000E-4	0.0098	0.00256	0.0012	0.00271
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.00278	0.0012	0.00311
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.0098	0.00233	0.0012	0.00255
Statistics (Normal ROS Imputed Data)	15	-0.00298	0.0098	0.00182	0.0012	0.00279
Statistics (Gamma ROS Imputed Data)	15	6.2000E-4	0.01	0.00455	0.0031	0.0041
Statistics (Lognormal ROS Imputed Data)	15	2.0221E-4	0.0098	0.00207	0.0012	0.00245
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.393	1.074	0.00184	-6.366	0.905	-0.142
Statistics (NDs = DL)	1.199	1.003	0.00232	-6.357	0.969	-0.152
Statistics (NDs = DL/2)	1.18	0.988	0.00197	-6.542	1.014	-0.155
Statistics (Gamma ROS Estimates)	1.131	0.949	0.00402	-5.897	1.111	-0.188
Statistics (Lognormal ROS Estimates)	--	--	--	-6.654	0.979	-0.147
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.845	0.842	0.862	0.902		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.729	0.85	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.707	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.756	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.846	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.238	0.251	Data Appear Normal			
Lilliefors (NDs = DL)	0.241	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.271	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.188	0.22	Data Appear Normal			
Gamma GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.965	0.952	0.981	0.865		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.54	0.744				
Kolmogorov-Smirnov (Detects Only)	0.236	0.26	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.758	0.759				
Kolmogorov-Smirnov (NDs = DL)	0.219	0.227	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.521	0.76				
Kolmogorov-Smirnov (NDs = DL/2)	0.228	0.227	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.931	0.761				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.224	0.227	Detected Data appear Approximate Gamma			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.964	0.968	0.984	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.917	0.85	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.921	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.966	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.959	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.2	0.251	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.181	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.172	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.169	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	4	11	73.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	5.0000E-4	0.01	0.00182	0.001	0.00277
Statistics (Non-Detects Only)	4	5.0000E-4	9.3000E-4	7.5750E-4	8.0000E-4	1.9103E-4
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.00154	9.3000E-4	0.00239
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	8.6867E-4	5.0000E-4	0.00118
Statistics (Normal ROS Imputed Data)	15	-5.094E-5	9.3000E-4	4.6534E-4	4.6534E-4	2.9258E-4
Statistics (Gamma ROS Imputed Data)	15	5.0000E-4	0.01	0.00754	0.01	0.00423
Statistics (Lognormal ROS Imputed Data)	15	2.3513E-4	9.3000E-4	5.2798E-4	4.8778E-4	2.1693E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	18.55	4.805	4.0828E-5	-7.213	0.278	-0.0386
Statistics (NDs = DL)	1.254	1.048	0.00122	-6.928	0.792	-0.114
Statistics (NDs = DL/2)	1.433	1.191	6.0603E-4	-7.436	0.784	-0.105
Statistics (Gamma ROS Estimates)	1.355	1.128	0.00556	-5.301	1.2	-0.226
Statistics (Lognormal ROS Estimates)	--	--	--	-7.626	0.415	-0.0544
Normal GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.966	0.642	0.678	0.993		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.929	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.443	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.49	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.974	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.222	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.389	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.389	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.103	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.931	0.83	0.84	0.568		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.349	0.657				
Kolmogorov-Smirnov (Detects Only)	0.254	0.394	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.921	0.758				
Kolmogorov-Smirnov (NDs = DL)	0.355	0.227	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.317	0.755				
Kolmogorov-Smirnov (NDs = DL/2)	0.259	0.226	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.397	0.756				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.469	0.226	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.946	0.871	0.915	0.991		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.895	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.772	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.848	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.97	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.236	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.29	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.184	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.103	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	10	5	33.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	0.001	0.01	0.0032	0.002	0.00383
Statistics (Non-Detects Only)	10	7.3000E-4	0.002	0.00112	9.9000E-4	4.2206E-4
Statistics (All: NDs treated as DL value)	15	7.3000E-4	0.01	0.00182	0.001	0.00231

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (All: NDs treated as DL/2 value)	15	5.0000E-4	0.005	0.00128	0.001	0.0011		
Statistics (Normal ROS Imputed Data)	15	7.0168E-4	0.002	0.00106	9.8000E-4	3.6304E-4		
Statistics (Gamma ROS Imputed Data)	15	7.3000E-4	0.01	0.00408	0.0012	0.00434		
Statistics (Lognormal ROS Imputed Data)	15	7.3000E-4	0.002	0.00106	9.8000E-4	3.6006E-4		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	9.228	6.526	1.2181E-4	-6.846	0.339	-0.0495		
Statistics (NDs = DL)	1.764	1.455	0.00103	-6.621	0.66	-0.0997		
Statistics (NDs = DL/2)	2.747	2.242	4.6691E-4	-6.852	0.572	-0.0834		
Statistics (Gamma ROS Estimates)	0.969	0.819	0.00421	-6.099	1.127	-0.185		
Statistics (Lognormal ROS Estimates)	--	--	--	-6.896	0.293	-0.0425		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.92	0.65	0.757	0.907				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.843	0.842	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.453	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.602	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.828	0.881	Data Not Normal					
Lilliefors (Detects Only)	0.229	0.262	Data Appear Normal					
Lilliefors (NDs = DL)	0.402	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.33	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.221	0.22	Data Not Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.96	0.81	0.874	0.834				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.509	0.726						
Kolmogorov-Smirnov (Detects Only)	0.194	0.267	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	1.905	0.75						
Kolmogorov-Smirnov (NDs = DL)	0.285	0.225	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.094	0.745						
Kolmogorov-Smirnov (NDs = DL/2)	0.262	0.224	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	1.934	0.765						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.273	0.228	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.957	0.86	0.93	0.943				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.906	0.842	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.757	0.881	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.881	0.881	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.887	0.881	Data Appear Lognormal					
Lilliefors (Detects Only)	0.172	0.262	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.23	0.22	Data Not Lognormal					

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL/2)	0.213	0.22	Data Appear Lognormal				
Lilliefors (Lognormal ROS Estimates)	0.18	0.22	Data Appear Lognormal				
Note: Substitution methods such as DL or DL/2 are not recommended.							
Cobalt (m-52a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	13						
Minimum	0.037						
Maximum	0.066						
Mean of Raw Data	0.0517						
Standard Deviation of Raw Data	0.00922						
Khat	33.12						
Theta hat	0.00156						
Kstar	26.54						
Theta star	0.00195						
Mean of Log Transformed Data	-2.977						
Standard Deviation of Log Transformed Data	0.181						
Normal GOF Test Results							
Correlation Coefficient R	0.976						
Shapiro Wilk Test Statistic	0.938						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.436						
Lilliefors Test Statistic	0.167						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.972						
A-D Test Statistic	0.437						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.166						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.976						
Shapiro Wilk Test Statistic	0.938						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.433						
Lilliefors Test Statistic	0.153						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Cobalt (m-53a)							
Raw Statistics							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Number of Valid Observations	15					
Number of Missing Observations	1					
Number of Distinct Observations	7					
Minimum	0.011					
Maximum	0.024					
Mean of Raw Data	0.0177					
Standard Deviation of Raw Data	0.00339					
Khat	29.11					
Theta hat	6.0684E-4					
Kstar	23.33					
Theta star	7.5711E-4					
Mean of Log Transformed Data	-4.053					
Standard Deviation of Log Transformed Data	0.194					
Normal GOF Test Results						
Correlation Coefficient R	0.932					
Shapiro Wilk Test Statistic	0.879					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.041					
Lilliefors Test Statistic	0.261					
Lilliefors Critical (0.05) Value	0.22					
Data not Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.939					
A-D Test Statistic	0.86					
A-D Critical (0.05) Value	0.735					
K-S Test Statistic	0.235					
K-S Critical(0.05) Value	0.221					
Data not Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.934					
Shapiro Wilk Test Statistic	0.887					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.0499					
Lilliefors Test Statistic	0.226					
Lilliefors Critical (0.05) Value	0.22					
Data appear Approximate_Lognormal at (0.05) Significance Level						
Cobalt (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	4	6	60.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	5.0000E-4	0.002	9.1667E-4	7.5000E-4	5.8452E-4
Statistics (Non-Detects Only)	4	5.6000E-4	0.0015	9.6000E-4	8.9000E-4	4.2802E-4
Statistics (All: NDs treated as DL value)	10	5.0000E-4	0.002	9.3400E-4	8.4000E-4	5.0138E-4
Statistics (All: NDs treated as DL/2 value)	10	2.5000E-4	0.0015	6.5900E-4	5.3000E-4	4.1908E-4
Statistics (Normal ROS Imputed Data)	10	-5.009E-4	0.0015	3.9811E-4	3.9940E-4	6.0231E-4

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Imputed Data)	10	5.6000E-4	0.01	0.00638	0.01	0.00467	
Statistics (Lognormal ROS Imputed Data)	10	1.9007E-4	0.0015	5.9372E-4	4.9236E-4	4.1091E-4	
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV	
Statistics (Non-Detects Only)	6.798	1.866	1.4123E-4	-7.024	0.449	-0.0639	
Statistics (NDs = DL)	4.44	3.175	2.1036E-4	-7.093	0.499	-0.0703	
Statistics (NDs = DL/2)	2.874	2.078	2.2931E-4	-7.509	0.647	-0.0862	
Statistics (Gamma ROS Estimates)	1.101	0.837	0.0058	-5.573	1.276	-0.229	
Statistics (Lognormal ROS Estimates)	--	--	--	-7.618	0.636	-0.0835	
Normal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	0.972	0.923	0.945	0.989			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.934	0.748	Data Appear Normal				
Shapiro-Wilk (NDs = DL)	0.848	0.842	Data Appear Normal				
Shapiro-Wilk (NDs = DL/2)	0.884	0.842	Data Appear Normal				
Shapiro-Wilk (Normal ROS Estimates)	0.977	0.842	Data Appear Normal				
Lilliefors (Detects Only)	0.244	0.375	Data Appear Normal				
Lilliefors (NDs = DL)	0.194	0.262	Data Appear Normal				
Lilliefors (NDs = DL/2)	0.193	0.262	Data Appear Normal				
Lilliefors (Normal ROS Estimates)	0.12	0.262	Data Appear Normal				
Gamma GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	0.988	0.975	0.986	0.673			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Anderson-Darling (Detects Only)	0.287	0.658					
Kolmogorov-Smirnov (Detects Only)	0.264	0.396	Detected Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL)	0.514	0.729					
Kolmogorov-Smirnov (NDs = DL)	0.196	0.268	Data Appear Gamma Distributed				
Anderson-Darling (NDs = DL/2)	0.386	0.733					
Kolmogorov-Smirnov (NDs = DL/2)	0.186	0.269	Data Appear Gamma Distributed				
Anderson-Darling (Gamma ROS Estimates)	1.567	0.746					
Kolmogorov-Smirnov (Gamma ROS Est.)	0.394	0.273	Data Not Gamma Distributed				
Lognormal GOF Test Results							
	No NDs	NDs = DL	NDs = DL/2	Log ROS			
Correlation Coefficient R	0.982	0.954	0.966	0.988			
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.95	0.748	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL)	0.891	0.842	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.912	0.842	Data Appear Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.973	0.842	Data Appear Lognormal				
Lilliefors (Detects Only)	0.226	0.375	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.186	0.262	Data Appear Lognormal				
Lilliefors (NDs = DL/2)	0.187	0.262	Data Appear Lognormal				
Lilliefors (Lognormal ROS Estimates)	0.119	0.262	Data Appear Lognormal				

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Note: Substitution methods such as DL or DL/2 are not recommended.							
Cobalt (w-305)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.01						
Maximum	0.019						
Mean of Raw Data	0.0165						
Standard Deviation of Raw Data	0.00226						
Khat	47.11						
Theta hat	3.5091E-4						
Kstar	37.74						
Theta star	4.3813E-4						
Mean of Log Transformed Data	-4.113						
Standard Deviation of Log Transformed Data	0.159						
Normal GOF Test Results							
Correlation Coefficient R	0.898						
Shapiro Wilk Test Statistic	0.823						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00556						
Lilliefors Test Statistic	0.248						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.877						
A-D Test Statistic	1.159						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.262						
K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.852						
Shapiro Wilk Test Statistic	0.748						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	5.0531E-4						
Lilliefors Test Statistic	0.262						
Lilliefors Critical (0.05) Value	0.22						
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							
Cobalt (w-306)							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	12						
Minimum	0.0014						
Maximum	0.03						
Mean of Raw Data	0.00508						
Standard Deviation of Raw Data	0.00733						
Khat	1.208						
Theta hat	0.00421						
Kstar	1.011						
Theta star	0.00503						
Mean of Log Transformed Data	-5.75						
Standard Deviation of Log Transformed Data	0.845						
Normal GOF Test Results							
Correlation Coefficient R	0.704						
Shapiro Wilk Test Statistic	0.523						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	1.2535E-6						
Lilliefors Test Statistic	0.342						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.892						
A-D Test Statistic	1.771						
A-D Critical (0.05) Value	0.759						
K-S Test Statistic	0.326						
K-S Critical(0.05) Value	0.227						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.894						
Shapiro Wilk Test Statistic	0.807						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00375						
Lilliefors Test Statistic	0.297						
Lilliefors Critical (0.05) Value	0.22						
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							
Cobalt (w-314)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Number of Distinct Observations	7						
Minimum	0.011						
Maximum	0.018						
Mean of Raw Data	0.0137						
Standard Deviation of Raw Data	0.00176						
Khat	68.46						
Theta hat	1.9962E-4						
Kstar	54.81						
Theta star	2.4933E-4						
Mean of Log Transformed Data	-4.3						
Standard Deviation of Log Transformed Data	0.124						
Normal GOF Test Results							
Correlation Coefficient R	0.947						
Shapiro Wilk Test Statistic	0.909						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.112						
Lilliefors Test Statistic	0.248						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.96						
A-D Test Statistic	0.586						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.244						
K-S Critical(0.05) Value	0.221						
Data follow Appr. Gamma Distribution at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.962						
Shapiro Wilk Test Statistic	0.936						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.287						
Lilliefors Test Statistic	0.235						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Fluoride (m-52a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	0	16	14	2	12.50%	
	Number	Minimum	Maximum	Mean	Median	SD	
Statistics (Non-Detects Only)	2	2	2	2	2	0	
Statistics (Non-Detects Only)	14	0.53	1.1	0.915	0.965	0.136	
Statistics (All: NDs treated as DL value)	16	0.53	2	1.051	0.975	0.392	
Statistics (All: NDs treated as DL/2 value)	16	0.53	1.1	0.926	0.975	0.13	
Statistics (Normal ROS Imputed Data)	16	0.53	1.1	0.915	0.965	0.128	
Statistics (Gamma ROS Imputed Data)	16	0.53	1.1	0.915	0.965	0.128	
Statistics (Lognormal ROS Imputed Data)	16	0.53	1.1	0.914	0.965	0.129	

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	39.55	31.12	0.0231	-0.102	0.175	-1.725
Statistics (NDs = DL)	9.858	8.051	0.107	-0.00219	0.317	-144.4
Statistics (NDs = DL/2)	43.46	35.35	0.0213	-0.0888	0.167	-1.876
Statistics (Gamma ROS Estimates)	44.13	35.9	0.0207	-0.101	0.165	-1.636
Statistics (Lognormal ROS Estimates)	--	--	--	-0.102	0.165	-1.627
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.898	0.82	0.878	0.897		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.832	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.688	0.887	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.795	0.887	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.83	0.887	Data Not Normal			
Lilliefors (Detects Only)	0.201	0.226	Data Appear Normal			
Lilliefors (NDs = DL)	0.364	0.213	Data Not Normal			
Lilliefors (NDs = DL/2)	0.229	0.213	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.199	0.213	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.877	0.862	0.855	0.879		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.108	0.733				
Kolmogorov-Smirnov (Detects Only)	0.211	0.228	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	1.781	0.739				
Kolmogorov-Smirnov (NDs = DL)	0.331	0.215	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.451	0.736				
Kolmogorov-Smirnov (NDs = DL/2)	0.24	0.214	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.186	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.209	0.214	Detected Data appear Approximate Gamma			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.847	0.884	0.826	0.849		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.746	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.803	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.711	0.887	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.748	0.887	Data Not Lognormal			
Lilliefors (Detects Only)	0.21	0.226	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.31	0.213	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.238	0.213	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.207	0.213	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Fluoride (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	14	1	6.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	2	2	2	2	N/A
Statistics (Non-Detects Only)	14	0.87	2.6	1.908	2.25	0.606
Statistics (All: NDs treated as DL value)	15	0.87	2.6	1.914	2.2	0.584
Statistics (All: NDs treated as DL/2 value)	15	0.87	2.6	1.847	2.2	0.629
Statistics (Normal ROS Imputed Data)	15	0.87	2.6	1.869	2.2	0.603
Statistics (Gamma ROS Imputed Data)	15	0.87	2.6	1.871	2.2	0.601
Statistics (Lognormal ROS Imputed Data)	15	0.87	2.6	1.865	2.2	0.607
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	8.685	6.872	0.22	0.587	0.376	0.641
Statistics (NDs = DL)	9.282	7.47	0.206	0.594	0.364	0.612
Statistics (NDs = DL/2)	7.786	6.273	0.237	0.548	0.393	0.717
Statistics (Gamma ROS Estimates)	8.76	7.052	0.214	0.568	0.37	0.652
Statistics (Lognormal ROS Estimates)	--	--	--	0.564	0.374	0.663
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.923	0.93	0.928	0.931		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.836	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.85	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.84	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.849	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.257	0.226	Data Not Normal			
Lilliefors (NDs = DL)	0.225	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.246	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.242	0.22	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.878	0.886	0.888	0.894		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	1.217	0.735				
Kolmogorov-Smirnov (Detects Only)	0.278	0.229	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.206	0.738				
Kolmogorov-Smirnov (NDs = DL)	0.263	0.222	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.204	0.738				
Kolmogorov-Smirnov (NDs = DL/2)	0.266	0.222	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.144	0.738				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.261	0.222	Data Not Gamma Distributed			
Lognormal GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.906	0.908	0.917	0.92		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.809	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL)	0.814	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.823	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.832	0.881	Data Not Lognormal			
Lilliefors (Detects Only)	0.275	0.226	Data Not Lognormal			
Lilliefors (NDs = DL)	0.274	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.263	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.259	0.22	Data Not Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Fluoride (m-64a)						
	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 Fluoride (m-64a) was not processed!						
Fluoride (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	1	15	93.75%
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 Fluoride (w-305) was not processed!						
Fluoride (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	14	2	12.50%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.4	2	1.2	1.2	1.131
Statistics (Non-Detects Only)	14	0.75	1.6	1.304	1.4	0.226
Statistics (All: NDs treated as DL value)	16	0.4	2	1.291	1.4	0.362
Statistics (All: NDs treated as DL/2 value)	16	0.2	1.6	1.216	1.35	0.351
Statistics (Normal ROS Imputed Data)	16	0.75	1.6	1.27	1.35	0.246
Statistics (Gamma ROS Imputed Data)	16	0.75	1.6	1.273	1.35	0.238
Statistics (Lognormal ROS Imputed Data)	16	0.75	1.6	1.271	1.35	0.241

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	30.14	23.73	0.0433	0.248	0.199	0.801		
Statistics (NDs = DL)	9.835	8.033	0.131	0.203	0.368	1.811		
Statistics (NDs = DL/2)	6.534	5.35	0.186	0.117	0.5	4.282		
Statistics (Gamma ROS Estimates)	26.14	21.28	0.0487	0.222	0.211	0.951		
Statistics (Lognormal ROS Estimates)	--	--	--	0.22	0.214	0.974		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.937	0.943	0.896	0.943				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.887	0.874	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.912	0.887	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.818	0.887	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.886	0.887	Data Not Normal					
Lilliefors (Detects Only)	0.237	0.226	Data Not Normal					
Lilliefors (NDs = DL)	0.198	0.213	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.22	0.213	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.202	0.213	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.912	0.916	0.822	0.927				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.897	0.734						
Kolmogorov-Smirnov (Detects Only)	0.248	0.228	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL)	1.141	0.739						
Kolmogorov-Smirnov (NDs = DL)	0.239	0.215	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.825	0.741						
Kolmogorov-Smirnov (NDs = DL/2)	0.244	0.216	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.897	0.736						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.212	0.215	Detected Data appear Approximate Gamma					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.9	0.868	0.759	0.922				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.824	0.874	Data Not Lognormal					
Shapiro-Wilk (NDs = DL)	0.779	0.887	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.602	0.887	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.851	0.887	Data Not Lognormal					
Lilliefors (Detects Only)	0.242	0.226	Data Not Lognormal					
Lilliefors (NDs = DL)	0.251	0.213	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.283	0.213	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.207	0.213	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Fluoride (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	14	2	12.50%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.8	2	1.4	1.4	0.849
Statistics (Non-Detects Only)	14	0.8	1.3	0.99	0.92	0.145
Statistics (All: NDs treated as DL value)	16	0.8	2	1.041	0.92	0.293
Statistics (All: NDs treated as DL/2 value)	16	0.4	1.3	0.954	0.92	0.2
Statistics (Normal ROS Imputed Data)	16	0.644	1.3	0.967	0.92	0.161
Statistics (Gamma ROS Imputed Data)	16	0.67	1.3	0.968	0.92	0.157
Statistics (Lognormal ROS Imputed Data)	16	0.699	1.3	0.97	0.92	0.154
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	52.75	41.49	0.0188	-0.0196	0.141	-7.226
Statistics (NDs = DL)	17.92	14.6	0.0581	0.0123	0.23	18.75
Statistics (NDs = DL/2)	18.66	15.21	0.0511	-0.0744	0.26	-3.499
Statistics (Gamma ROS Estimates)	40.8	33.19	0.0237	-0.0444	0.162	-3.657
Statistics (Lognormal ROS Estimates)	--	--	--	-0.042	0.156	-3.723
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.943	0.825	0.93	0.968		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.888	0.874	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.703	0.887	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.89	0.887	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.948	0.887	Data Appear Normal			
Lilliefors (Detects Only)	0.231	0.226	Data Not Normal			
Lilliefors (NDs = DL)	0.233	0.213	Data Not Normal			
Lilliefors (NDs = DL/2)	0.207	0.213	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.18	0.213	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.956	0.873	0.917	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.745	0.733				
Kolmogorov-Smirnov (Detects Only)	0.228	0.228	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.17	0.737				
Kolmogorov-Smirnov (NDs = DL)	0.214	0.215	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	1.023	0.737				
Kolmogorov-Smirnov (NDs = DL/2)	0.245	0.215	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.48	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.163	0.214	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.955	0.894	0.853	0.974		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.909	0.874	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.813	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.758	0.887	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.956	0.887	Data Appear Lognormal			
Lilliefors (Detects Only)	0.218	0.226	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.206	0.213	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.265	0.213	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.158	0.213	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (m-52a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	3	12	80.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	5.0000E-4	0.01	0.00163	5.0000E-4	0.0027
Statistics (Non-Detects Only)	3	4.8000E-4	0.001	8.2667E-4	0.001	3.0022E-4
Statistics (All: NDs treated as DL value)	15	4.8000E-4	0.01	0.00147	5.0000E-4	0.00242
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	8.1533E-4	4.8000E-4	0.0012
Statistics (Normal ROS Imputed Data)	15	1.6930E-4	0.001	5.6586E-4	5.5833E-4	2.3193E-4
Statistics (Gamma ROS Imputed Data)	15	4.8000E-4	0.01	0.00817	0.01	0.0038
Statistics (Lognormal ROS Imputed Data)	15	3.0959E-4	0.001	5.7093E-4	5.3612E-4	2.0267E-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)	1.12	0.941	0.00131	-7.034	0.842	-0.12
Statistics (NDs = DL/2)	1.188	0.994	6.8658E-4	-7.589	0.87	-0.115
Statistics (Gamma ROS Estimates)	1.778	1.467	0.00459	-5.115	1.067	-0.209
Statistics (Lognormal ROS Estimates)	--	--	--	-7.521	0.327	-0.0435
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.866	0.641	0.682	0.979		
	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)	0.44	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.493	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.956	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Normal			
Lilliefors (NDs = DL)	0.376	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.372	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.106	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.842	0.861	0.526		

TABLE B-3
BAP 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)	2.162	0.761				
Kolmogorov-Smirnov (NDs = DL)	0.321	0.227	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.595	0.76				
Kolmogorov-Smirnov (NDs = DL/2)	0.24	0.227	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.944	0.75				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.501	0.225	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.866	0.845	0.886	0.979		
	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)	0.725	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.787	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.956	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.283	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.258	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.106	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	5	10	66.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	5.0000E-4	0.01	0.0017	5.0000E-4	0.00296
Statistics (Non-Detects Only)	5	5.2000E-4	7.7000E-4	6.1200E-4	5.8000E-4	9.5237E-5
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.00134	5.7000E-4	0.00243
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	7.7067E-4	5.0000E-4	0.00119
Statistics (Normal ROS Imputed Data)	15	1.5272E-4	7.7000E-4	4.4583E-4	4.4547E-4	1.5954E-4
Statistics (Gamma ROS Imputed Data)	15	5.2000E-4	0.01	0.00687	0.01	0.00458
Statistics (Lognormal ROS Imputed Data)	15	2.9535E-4	7.7000E-4	4.8135E-4	4.6723E-4	1.2224E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	55.65	22.39	1.0997E-5	-7.408	0.147	-0.0199
Statistics (NDs = DL)	1.071	0.901	0.00125	-7.152	0.807	-0.113
Statistics (NDs = DL/2)	1.262	1.054	6.1060E-4	-7.614	0.799	-0.105
Statistics (Gamma ROS Estimates)	1.029	0.868	0.00667	-5.539	1.37	-0.247
Statistics (Lognormal ROS Estimates)	--	--	--	-7.668	0.25	-0.0326
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.927	0.598	0.642	0.994		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.875	0.762	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.387	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.443	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.991	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.267	0.343	Data Appear Normal			
Lilliefors (NDs = DL)	0.422	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.367	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.101	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.947	0.815	0.827	0.6		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.393	0.678				
Kolmogorov-Smirnov (Detects Only)	0.244	0.357	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	2.946	0.762				
Kolmogorov-Smirnov (NDs = DL)	0.349	0.228	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.787	0.758				
Kolmogorov-Smirnov (NDs = DL/2)	0.273	0.227	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.038	0.762				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.434	0.228	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.946	0.779	0.877	0.995		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.909	0.762	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.625	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.78	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.993	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.241	0.343	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.289	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.203	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.101	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (m-64a)						
	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! 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 Lead (m-64a) was not processed!						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Lead (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	12	3	20.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	5.0000E-4	0.01	0.00417	0.002	0.00511
Statistics (Non-Detects Only)	12	0.0017	0.0035	0.00221	0.00205	4.8516E-4
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.0026	0.002	0.00214
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	0.00218	0.002	0.00106
Statistics (Normal ROS Imputed Data)	15	0.00113	0.0035	0.00208	0.002	5.3915E-4
Statistics (Gamma ROS Imputed Data)	15	0.0017	0.01	0.00377	0.0021	0.00325
Statistics (Lognormal ROS Imputed Data)	15	0.00137	0.0035	0.0021	0.002	5.0248E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	26.44	19.89	8.3510E-5	-6.135	0.197	-0.0321
Statistics (NDs = DL)	2.882	2.35	9.0228E-4	-6.136	0.593	-0.0966
Statistics (NDs = DL/2)	3.55	2.884	6.1503E-4	-6.274	0.66	-0.105
Statistics (Gamma ROS Estimates)	2.175	1.785	0.00173	-5.829	0.657	-0.113
Statistics (Lognormal ROS Estimates)	--	--	--	-6.19	0.223	-0.036
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.887	0.705	0.916	0.939		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.806	0.859	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.535	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.869	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.906	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.255	0.243	Data Not Normal			
Lilliefors (NDs = DL)	0.385	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.249	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.218	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.917	0.815	0.941	0.87		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.71	0.731				
Kolmogorov-Smirnov (Detects Only)	0.243	0.245	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.874	0.745				
Kolmogorov-Smirnov (NDs = DL)	0.314	0.223	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.06	0.742				
Kolmogorov-Smirnov (NDs = DL/2)	0.26	0.223	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.414	0.746				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.363	0.224	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.928	0.852	0.853	0.961		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.875	0.859	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.773	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.763	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.941	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.23	0.243	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.275	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.305	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.191	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	1	14	93.33%
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 (w-306) was not processed!						
Lead (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	3	12	80.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	5.0000E-4	0.01	0.0015	5.0000E-4	0.00271
Statistics (Non-Detects Only)	3	4.1000E-4	0.0023	0.00113	6.7000E-4	0.00102
Statistics (All: NDs treated as DL value)	15	4.1000E-4	0.01	0.00143	5.0000E-4	0.00244
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	8.2533E-4	2.5000E-4	0.00127
Statistics (Normal ROS Imputed Data)	15	-7.010E-4	0.0023	3.9848E-4	3.7376E-4	6.7597E-4
Statistics (Gamma ROS Imputed Data)	15	4.1000E-4	0.01	0.00823	0.01	0.00369
Statistics (Lognormal ROS Imputed Data)	15	1.5101E-4	0.0023	5.3862E-4	4.1000E-4	5.1164E-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)	1.036	0.873	0.00138	-7.108	0.873	-0.123
Statistics (NDs = DL/2)	1.022	0.862	8.0726E-4	-7.663	0.927	-0.121
Statistics (Gamma ROS Estimates)	1.84	1.516	0.00447	-5.096	1.071	-0.21
Statistics (Lognormal ROS Estimates)	--	--	--	-7.753	0.625	-0.0806
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.922	0.644	0.709	0.927		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.851	0.767	Data Appear Normal			

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.444	0.881	Data Not Normal		
Shapiro-Wilk (NDs = DL/2)	0.525	0.881	Data Not Normal		
Shapiro-Wilk (Normal ROS Estimates)	0.885	0.881	Data Appear Normal		
Lilliefors (Detects Only)	0.339	0.425	Data Appear Normal		
Lilliefors (NDs = DL)	0.369	0.22	Data Not Normal		
Lilliefors (NDs = DL/2)	0.349	0.22	Data Not Normal		
Lilliefors (Normal ROS Estimates)	0.202	0.22	Data Appear Normal		
Gamma GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Gamma RO	
Correlation Coefficient R	N/A	0.856	0.914	0.53	
	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)	2.407	0.762			
Kolmogorov-Smirnov (NDs = DL)	0.312	0.228	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL/2)	2.07	0.763			
Kolmogorov-Smirnov (NDs = DL/2)	0.283	0.228	Data Not Gamma Distributed		
Anderson-Darling (Gamma ROS Estimates)	3.791	0.749			
Kolmogorov-Smirnov (Gamma ROS Est.)	0.498	0.225	Data Not Gamma Distributed		
Lognormal GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Log ROS	
Correlation Coefficient R	0.97	0.832	0.86	0.946	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Shapiro-Wilk (Detects Only)	0.942	0.767	Data Appear Lognormal		
Shapiro-Wilk (NDs = DL)	0.706	0.881	Data Not Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.74	0.881	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.918	0.881	Data Appear Lognormal		
Lilliefors (Detects Only)	0.276	0.425	Data Appear Lognormal		
Lilliefors (NDs = DL)	0.314	0.22	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.285	0.22	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.154	0.22	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Lithium (m-52a)					
Raw Statistics					
Number of Valid Observations	15				
Number of Missing Observations	1				
Number of Distinct Observations	8				
Minimum	0.21				
Maximum	0.28				
Mean of Raw Data	0.248				
Standard Deviation of Raw Data	0.0193				
Khat	172.7				
Theta hat	0.00144				
Kstar	138.2				
Theta star	0.00179				

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Mean of Log Transformed Data	-1.397					
Standard Deviation of Log Transformed Data	0.0792					
Normal GOF Test Results						
Correlation Coefficient R	0.985					
Shapiro Wilk Test Statistic	0.968					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.813					
Lilliefors Test Statistic	0.14					
Lilliefors Critical (0.05) Value	0.22					
Data appear Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.982					
A-D Test Statistic	0.297					
A-D Critical (0.05) Value	0.734					
K-S Test Statistic	0.143					
K-S Critical(0.05) Value	0.221					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.981					
Shapiro Wilk Test Statistic	0.961					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.692					
Lilliefors Test Statistic	0.153					
Lilliefors Critical (0.05) Value	0.22					
Data appear Lognormal at (0.05) Significance Level						
Lithium (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	9	6	40.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.2	0.2	0.2	0.2	3.040E-17
Statistics (Non-Detects Only)	9	0.2	0.21	0.204	0.2	0.00527
Statistics (All: NDs treated as DL value)	15	0.2	0.21	0.203	0.2	0.00458
Statistics (All: NDs treated as DL/2 value)	15	0.1	0.21	0.163	0.2	0.0531
Statistics (Normal ROS Imputed Data)	15	0.186	0.21	0.199	0.2	0.00777
Statistics (Gamma ROS Imputed Data)	15	0.187	0.21	0.2	0.2	0.00768
Statistics (Lognormal ROS Imputed Data)	15	0.187	0.21	0.2	0.2	0.00758
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1699	1132	1.2036E-4	-1.588	0.0257	-0.0162
Statistics (NDs = DL)	2132	1706	9.5050E-5	-1.596	0.0223	-0.014
Statistics (NDs = DL/2)	8.839	7.116	0.0184	-1.874	0.363	-0.194
Statistics (Gamma ROS Estimates)	724.9	580	2.7525E-4	-1.612	0.0384	-0.0238
Statistics (Lognormal ROS Estimates)	--	--	--	-1.612	0.0379	-0.0235
Normal GOF Test Results						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Normal RO
Correlation Coefficient R	0.829	0.759	0.839	0.96
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.654	0.829	Data Not Normal	
Shapiro-Wilk (NDs = DL)	0.561	0.881	Data Not Normal	
Shapiro-Wilk (NDs = DL/2)	0.676	0.881	Data Not Normal	
Shapiro-Wilk (Normal ROS Estimates)	0.905	0.881	Data Appear Normal	
Lilliefors (Detects Only)	0.356	0.274	Data Not Normal	
Lilliefors (NDs = DL)	0.453	0.22	Data Not Normal	
Lilliefors (NDs = DL/2)	0.359	0.22	Data Not Normal	
Lilliefors (Normal ROS Estimates)	0.206	0.22	Data Appear Normal	
Gamma GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Gamma RO
Correlation Coefficient R	0.825	0.76	0.806	0.956
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Anderson-Darling (Detects Only)	1.646	0.72		
Kolmogorov-Smirnov (Detects Only)	0.37	0.279	Data Not Gamma Distributed	
Anderson-Darling (NDs = DL)	3.512	0.734		
Kolmogorov-Smirnov (NDs = DL)	0.463	0.221	Data Not Gamma Distributed	
Anderson-Darling (NDs = DL/2)	2.496	0.738		
Kolmogorov-Smirnov (NDs = DL/2)	0.372	0.222	Data Not Gamma Distributed	
Anderson-Darling (Gamma ROS Estimates)	0.623	0.734		
Kolmogorov-Smirnov (Gamma ROS Est.)	0.203	0.221	Data Appear Gamma Distributed	
Lognormal GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.829	0.759	0.831	0.96
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.654	0.829	Data Not Lognormal	
Shapiro-Wilk (NDs = DL)	0.561	0.881	Data Not Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.664	0.881	Data Not Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.905	0.881	Data Appear Lognormal	
Lilliefors (Detects Only)	0.356	0.274	Data Not Lognormal	
Lilliefors (NDs = DL)	0.453	0.22	Data Not Lognormal	
Lilliefors (NDs = DL/2)	0.367	0.22	Data Not Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.206	0.22	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Lithium (m-64a)				
Raw Statistics				
Number of Valid Observations	10			
Number of Missing Observations	1			
Number of Distinct Observations	4			
Minimum	0.25			
Maximum	0.28			

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Mean of Raw Data	0.263						
Standard Deviation of Raw Data	0.0106						
Khat	683.5						
Theta hat	3.8477E-4						
Kstar	478.5						
Theta star	5.4960E-4						
Mean of Log Transformed Data	-1.336						
Standard Deviation of Log Transformed Data	0.0403						
Normal GOF Test Results							
Correlation Coefficient R	0.943						
Shapiro Wilk Test Statistic	0.874						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.142						
Lilliefors Test Statistic	0.246						
Lilliefors Critical (0.05) Value	0.262						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.941						
A-D Test Statistic	0.671						
A-D Critical (0.05) Value	0.724						
K-S Test Statistic	0.259						
K-S Critical(0.05) Value	0.266						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.942						
Shapiro Wilk Test Statistic	0.871						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.136						
Lilliefors Test Statistic	0.248						
Lilliefors Critical (0.05) Value	0.262						
Data appear Lognormal at (0.05) Significance Level							
Lithium (w-305)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	4						
Minimum	0.2						
Maximum	0.23						
Mean of Raw Data	0.212						
Standard Deviation of Raw Data	0.00941						
Khat	552.9						
Theta hat	3.8341E-4						
Kstar	442.4						
Theta star	4.7921E-4						
Mean of Log Transformed Data	-1.552						
Standard Deviation of Log Transformed Data	0.0438						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results							
Correlation Coefficient R	0.919						
Shapiro Wilk Test Statistic	0.838						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0122						
Lilliefors Test Statistic	0.317						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.922						
A-D Test Statistic	1.169						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.316						
K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.922						
Shapiro Wilk Test Statistic	0.844						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0149						
Lilliefors Test Statistic	0.311						
Lilliefors Critical (0.05) Value	0.22						
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							
Lithium (w-306)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	14						
Minimum	0.43						
Maximum	0.78						
Mean of Raw Data	0.649						
Standard Deviation of Raw Data	0.0911						
Khat	48.3						
Theta hat	0.0134						
Kstar	38.68						
Theta star	0.0168						
Mean of Log Transformed Data	-0.442						
Standard Deviation of Log Transformed Data	0.154						
Normal GOF Test Results							
Correlation Coefficient R	0.955						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Test Statistic	0.921						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.18						
Lilliefors Test Statistic	0.193						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.94						
A-D Test Statistic	0.674						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.212						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.928						
Shapiro Wilk Test Statistic	0.872						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.031						
Lilliefors Test Statistic	0.223						
Lilliefors Critical (0.05) Value	0.22						
Data not Lognormal at (0.05) Significance Level							
Lithium (w-314)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	6						
Minimum	0.3						
Maximum	0.35						
Mean of Raw Data	0.324						
Standard Deviation of Raw Data	0.0159						
Khat	444.1						
Theta hat	7.2961E-4						
Kstar	355.3						
Theta star	9.1189E-4						
Mean of Log Transformed Data	-1.128						
Standard Deviation of Log Transformed Data	0.0491						
Normal GOF Test Results							
Correlation Coefficient R	0.973						
Shapiro Wilk Test Statistic	0.933						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.362						
Lilliefors Test Statistic	0.199						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.973						
A-D Test Statistic	0.43						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.197						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.974						
Shapiro Wilk Test Statistic	0.935						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.387						
Lilliefors Test Statistic	0.191						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Mercury (m-52a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-52a) was not processed!							
Mercury (m-53a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-53a) was not processed!							
Mercury (m-64a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	11	2	9	0	9	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 (m-64a) was not processed!							

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Mercury (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	0	14	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 (w-305) was not processed!						
Mercury (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	0	14	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 (w-306) was not processed!						
Mercury (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	0	14	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 (w-314) was not processed!						
Molybdenum (m-52a)						
Raw Statistics						
Number of Valid Observations	15					
Number of Missing Observations	1					
Number of Distinct Observations	13					
Minimum	0.013					
Maximum	0.071					
Mean of Raw Data	0.0339					
Standard Deviation of Raw Data	0.0189					
Khat	3.572					
Theta hat	0.0095					

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Kstar	2.902						
Theta star	0.0117						
Mean of Log Transformed Data	-3.53						
Standard Deviation of Log Transformed Data	0.562						
Normal GOF Test Results							
Correlation Coefficient R	0.946						
Shapiro Wilk Test Statistic	0.881						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0633						
Lilliefors Test Statistic	0.234						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.971						
A-D Test Statistic	0.685						
A-D Critical (0.05) Value	0.742						
K-S Test Statistic	0.211						
K-S Critical(0.05) Value	0.223						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.964						
Shapiro Wilk Test Statistic	0.911						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.186						
Lilliefors Test Statistic	0.19						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Molybdenum (m-53a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	12						
Minimum	0.0059						
Maximum	0.053						
Mean of Raw Data	0.0396						
Standard Deviation of Raw Data	0.0112						
Khat	6.19						
Theta hat	0.0064						
Kstar	4.997						
Theta star	0.00792						
Mean of Log Transformed Data	-3.312						
Standard Deviation of Log Transformed Data	0.528						
Normal GOF Test Results							
Correlation Coefficient R	0.875						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Test Statistic	0.791						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00178						
Lilliefors Test Statistic	0.24						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.803						
A-D Test Statistic	2.085						
A-D Critical (0.05) Value	0.738						
K-S Test Statistic	0.328						
K-S Critical(0.05) Value	0.222						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.72						
Shapiro Wilk Test Statistic	0.55						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	2.2703E-6						
Lilliefors Test Statistic	0.357						
Lilliefors Critical (0.05) Value	0.22						
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 (m-64a)							
Raw Statistics							
Number of Valid Observations	10						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.0042						
Maximum	0.0061						
Mean of Raw Data	0.00527						
Standard Deviation of Raw Data	5.6184E-4						
Khat	95.26						
Theta hat	5.5320E-5						
Kstar	66.75						
Theta star	7.8949E-5						
Mean of Log Transformed Data	-5.251						
Standard Deviation of Log Transformed Data	0.109						
Normal GOF Test Results							
Correlation Coefficient R	0.957						
Shapiro Wilk Test Statistic	0.923						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.332						
Lilliefors Test Statistic	0.219						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors Critical (0.05) Value	0.262						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.956						
A-D Test Statistic	0.478						
A-D Critical (0.05) Value	0.724						
K-S Test Statistic	0.218						
K-S Critical(0.05) Value	0.266						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.95						
Shapiro Wilk Test Statistic	0.912						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.241						
Lilliefors Test Statistic	0.232						
Lilliefors Critical (0.05) Value	0.262						
Data appear Lognormal at (0.05) Significance Level							
Molybdenum (w-305)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	8						
Minimum	0.014						
Maximum	0.031						
Mean of Raw Data	0.02						
Standard Deviation of Raw Data	0.00391						
Khat	31						
Theta hat	6.4525E-4						
Kstar	24.84						
Theta star	8.0512E-4						
Mean of Log Transformed Data	-3.928						
Standard Deviation of Log Transformed Data	0.183						
Normal GOF Test Results							
Correlation Coefficient R	0.913						
Shapiro Wilk Test Statistic	0.859						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0163						
Lilliefors Test Statistic	0.266						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.931						
A-D Test Statistic	0.675						
A-D Critical (0.05) Value	0.735						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

K-S Test Statistic	0.236						
K-S Critical(0.05) Value	0.221						
Data follow Appr. Gamma Distribution at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.947						
Shapiro Wilk Test Statistic	0.919						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.136						
Lilliefors Test Statistic	0.228						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Molybdenum (w-306)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	10						
Minimum	0.02						
Maximum	0.057						
Mean of Raw Data	0.0305						
Standard Deviation of Raw Data	0.00849						
Khat	16.95						
Theta hat	0.0018						
Kstar	13.6						
Theta star	0.00224						
Mean of Log Transformed Data	-3.519						
Standard Deviation of Log Transformed Data	0.244						
Normal GOF Test Results							
Correlation Coefficient R	0.855						
Shapiro Wilk Test Statistic	0.761						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	6.7759E-4						
Lilliefors Test Statistic	0.252						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.887						
A-D Test Statistic	0.886						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.21						
K-S Critical(0.05) Value	0.221						
Data follow Appr. Gamma Distribution at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.919						
Shapiro Wilk Test Statistic	0.868						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.0232					
Lilliefors Test Statistic	0.196					
Lilliefors Critical (0.05) Value	0.22					
Data appear Approximate_Lognormal at (0.05) Significance Level						
Molybdenum (w-314)						
Raw Statistics						
Number of Valid Observations	15					
Number of Missing Observations	1					
Number of Distinct Observations	13					
Minimum	0.0066					
Maximum	0.013					
Mean of Raw Data	0.00819					
Standard Deviation of Raw Data	0.00151					
Khat	38.27					
Theta hat	2.1409E-4					
Kstar	30.66					
Theta star	2.6722E-4					
Mean of Log Transformed Data	-4.818					
Standard Deviation of Log Transformed Data	0.16					
Normal GOF Test Results						
Correlation Coefficient R	0.848					
Shapiro Wilk Test Statistic	0.745					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	4.3933E-4					
Lilliefors Test Statistic	0.261					
Lilliefors Critical (0.05) Value	0.22					
Data not Normal at (0.05) Significance Level						
Gamma GOF Test Results						
Correlation Coefficient R	0.877					
A-D Test Statistic	0.887					
A-D Critical (0.05) Value	0.735					
K-S Test Statistic	0.228					
K-S Critical(0.05) Value	0.221					
Data not Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.902					
Shapiro Wilk Test Statistic	0.836					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.00807					
Lilliefors Test Statistic	0.217					
Lilliefors Critical (0.05) Value	0.22					
Data appear Approximate_Lognormal at (0.05) Significance Level						
Radium (m-52a)						

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	8	7	46.67%		
	Number	Minimum	Maximum	Mean	Median	SD		
Statistics (Non-Detects Only)	7	0.4	0.7	0.6	0.6	0.1		
Statistics (Non-Detects Only)	8	0.4	0.9	0.663	0.6	0.169		
Statistics (All: NDs treated as DL value)	15	0.4	0.9	0.633	0.6	0.14		
Statistics (All: NDs treated as DL/2 value)	15	0.2	0.9	0.493	0.4	0.224		
Statistics (Normal ROS Imputed Data)	15	0.191	0.9	0.514	0.529	0.218		
Statistics (Gamma ROS Imputed Data)	15	0.254	0.9	0.527	0.528	0.201		
Statistics (Lognormal ROS Imputed Data)	15	0.311	0.9	0.54	0.523	0.187		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	17.32	10.91	0.0382	-0.441	0.261	-0.593		
Statistics (NDs = DL)	21.68	17.39	0.0292	-0.48	0.226	-0.471		
Statistics (NDs = DL/2)	5.321	4.302	0.0927	-0.803	0.458	-0.571		
Statistics (Gamma ROS Estimates)	7.418	5.979	0.0711	-0.709	0.388	-0.548		
Statistics (Lognormal ROS Estimates)	--	--	--	-0.671	0.336	-0.501		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.929	0.915	0.946	0.977				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.866	0.818	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.843	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.883	0.881	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.944	0.881	Data Appear Normal					
Lilliefors (Detects Only)	0.27	0.283	Data Appear Normal					
Lilliefors (NDs = DL)	0.272	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.205	0.22	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.146	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.932	0.922	0.962	0.977				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.606	0.716						
Kolmogorov-Smirnov (Detects Only)	0.252	0.294	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	1.196	0.735						
Kolmogorov-Smirnov (NDs = DL)	0.296	0.221	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.665	0.738						
Kolmogorov-Smirnov (NDs = DL/2)	0.196	0.222	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.313	0.738						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.151	0.222	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.929	0.912	0.964	0.978				

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.873	0.818	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.838	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.919	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.941	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.269	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.312	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.205	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.149	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Radium (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	5	10	66.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.4	0.7	0.61	0.65	0.12
Statistics (Non-Detects Only)	5	0.4	0.6	0.54	0.6	0.0894
Statistics (All: NDs treated as DL value)	15	0.4	0.7	0.587	0.6	0.113
Statistics (All: NDs treated as DL/2 value)	15	0.2	0.6	0.383	0.35	0.133
Statistics (Normal ROS Imputed Data)	15	0.297	0.6	0.454	0.452	0.107
Statistics (Gamma ROS Imputed Data)	15	0.32	0.6	0.46	0.454	0.0999
Statistics (Lognormal ROS Imputed Data)	15	0.33	0.6	0.46	0.449	0.0979
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	41.16	16.6	0.0131	-0.628	0.179	-0.285
Statistics (NDs = DL)	25.95	20.8	0.0226	-0.553	0.21	-0.38
Statistics (NDs = DL/2)	9.102	7.326	0.0421	-1.015	0.348	-0.343
Statistics (Gamma ROS Estimates)	22.73	18.23	0.0202	-0.8	0.218	-0.273
Statistics (Lognormal ROS Estimates)	--	--	--	-0.799	0.211	-0.265
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.882	0.913	0.939	0.969		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.771	0.762	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.813	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.868	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.917	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.349	0.343	Data Not Normal			
Lilliefors (NDs = DL)	0.28	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.265	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.153	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.85	0.889	0.947	0.963		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (Detects Only)	0.695	0.678				
Kolmogorov-Smirnov (Detects Only)	0.37	0.357	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	1.315	0.735				
Kolmogorov-Smirnov (NDs = DL)	0.305	0.221	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.699	0.738				
Kolmogorov-Smirnov (NDs = DL/2)	0.23	0.222	Detected Data appear Approximate Gamn			
Anderson-Darling (Gamma ROS Estimates)	0.442	0.735				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.151	0.221	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.877	0.896	0.956	0.968		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.764	0.762	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.785	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.902	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.914	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.344	0.343	Data Not Lognormal			
Lilliefors (NDs = DL)	0.312	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.207	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.153	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Radium (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	4	6	60.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.6	0.7	0.667	0.7	0.0516
Statistics (Non-Detects Only)	4	0.4	1.6	1.075	1.15	0.512
Statistics (All: NDs treated as DL value)	10	0.4	1.6	0.83	0.7	0.365
Statistics (All: NDs treated as DL/2 value)	10	0.3	1.6	0.63	0.35	0.484
Statistics (Normal ROS Imputed Data)	10	-0.0858	1.6	0.635	0.522	0.529
Statistics (Gamma ROS Imputed Data)	10	0.0833	1.6	0.658	0.507	0.493
Statistics (Lognormal ROS Imputed Data)	10	0.237	1.6	0.68	0.492	0.463
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	4.386	1.263	0.245	-0.046	0.611	-13.29
Statistics (NDs = DL)	6.664	4.732	0.125	-0.263	0.404	-1.534
Statistics (NDs = DL/2)	2.457	1.787	0.256	-0.679	0.652	-0.96
Statistics (Gamma ROS Estimates)	1.826	1.345	0.36	-0.716	0.884	-1.234
Statistics (Lognormal ROS Estimates)	--	--	--	-0.575	0.634	-1.103
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.985	0.912	0.843	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.972	0.748	Data Appear Normal			

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Shapiro-Wilk (NDs = DL)	0.84	0.842	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.706	0.842	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.958	0.842	Data Appear Normal			
Lilliefors (Detects Only)	0.192	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.339	0.262	Data Not Normal			
Lilliefors (NDs = DL/2)	0.383	0.262	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.156	0.262	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.921	0.955	0.932	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.337	0.659				
Kolmogorov-Smirnov (Detects Only)	0.254	0.396	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.645	0.728				
Kolmogorov-Smirnov (NDs = DL)	0.317	0.267	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	1.415	0.734				
Kolmogorov-Smirnov (NDs = DL/2)	0.37	0.269	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.145	0.737				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.104	0.27	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.938	0.952	0.869	0.978		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.886	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.916	0.842	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.742	0.842	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.945	0.842	Data Appear Lognormal			
Lilliefors (Detects Only)	0.28	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.292	0.262	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.342	0.262	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.156	0.262	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Radium (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	7	8	53.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.4	0.7	0.625	0.65	0.104
Statistics (Non-Detects Only)	7	0.6	1.7	1.014	1.1	0.389
Statistics (All: NDs treated as DL value)	15	0.4	1.7	0.807	0.7	0.333
Statistics (All: NDs treated as DL/2 value)	15	0.2	1.7	0.64	0.35	0.444
Statistics (Normal ROS Imputed Data)	15	-0.372	1.7	0.492	0.535	0.605
Statistics (Gamma ROS Imputed Data)	15	0.01	1.7	0.577	0.552	0.512
Statistics (Lognormal ROS Imputed Data)	15	0.239	1.7	0.672	0.59	0.426

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BAP ProUCL GOODNESS OF FIT STATISTICS*

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	8.108	4.729	0.125	-0.0487	0.385	-7.892		
Statistics (NDs = DL)	7.708	6.211	0.105	-0.281	0.364	-1.293		
Statistics (NDs = DL/2)	2.6	2.124	0.246	-0.651	0.649	-0.997		
Statistics (Gamma ROS Estimates)	0.828	0.707	0.697	-1.263	1.617	-1.28		
Statistics (Lognormal ROS Estimates)	--	--	--	-0.57	0.602	-1.057		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.956	0.894	0.911	0.985				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.91	0.803	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.813	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.828	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.961	0.881	Data Appear Normal					
Lilliefors (Detects Only)	0.174	0.304	Data Appear Normal					
Lilliefors (NDs = DL)	0.292	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.276	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.109	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.974	0.943	0.973	0.961				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.344	0.709						
Kolmogorov-Smirnov (Detects Only)	0.209	0.312	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.94	0.738						
Kolmogorov-Smirnov (NDs = DL)	0.27	0.222	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.85	0.745						
Kolmogorov-Smirnov (NDs = DL/2)	0.281	0.224	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.379	0.771						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.163	0.23	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.965	0.943	0.956	0.982				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.92	0.803	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.902	0.881	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.906	0.881	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.952	0.881	Data Appear Lognormal					
Lilliefors (Detects Only)	0.217	0.304	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.249	0.22	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.264	0.22	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.132	0.22	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Radium (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	4	11	73.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	0.4	0.7	0.618	0.6	0.0874
Statistics (Non-Detects Only)	4	0.4	1.1	0.7	0.65	0.316
Statistics (All: NDs treated as DL value)	15	0.4	1.1	0.64	0.6	0.168
Statistics (All: NDs treated as DL/2 value)	15	0.2	1.1	0.413	0.35	0.234
Statistics (Normal ROS Imputed Data)	15	-0.0716	1.1	0.38	0.389	0.321
Statistics (Gamma ROS Imputed Data)	15	0.0685	1.1	0.412	0.392	0.279
Statistics (Lognormal ROS Imputed Data)	15	0.207	1.1	0.451	0.4	0.239
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	6.602	1.817	0.106	-0.434	0.456	-1.05
Statistics (NDs = DL)	16.8	13.48	0.0381	-0.476	0.252	-0.529
Statistics (NDs = DL/2)	5.104	4.127	0.081	-0.985	0.425	-0.432
Statistics (Gamma ROS Estimates)	2.137	1.754	0.193	-1.138	0.796	-0.699
Statistics (Lognormal ROS Estimates)	--	--	--	-0.907	0.472	-0.52
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.975	0.917	0.798	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.941	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.861	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.658	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.961	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.236	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.227	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.34	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0947	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.99	0.937	0.885	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.27	0.658				
Kolmogorov-Smirnov (Detects Only)	0.253	0.396	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.731	0.736				
Kolmogorov-Smirnov (NDs = DL)	0.229	0.221	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	1.703	0.739				
Kolmogorov-Smirnov (NDs = DL/2)	0.319	0.222	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.21	0.747				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.135	0.224	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		

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BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.986	0.944	0.885	0.984		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.959	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.906	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.802	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.963	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.215	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.246	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.294	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0936	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Radium (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	0.5	0.7	0.623	0.6	0.0725
Statistics (Non-Detects Only)	2	0.2	0.5	0.35	0.35	0.212
Statistics (All: NDs treated as DL value)	15	0.2	0.7	0.587	0.6	0.13
Statistics (All: NDs treated as DL/2 value)	15	0.2	0.5	0.317	0.3	0.0673
Statistics (Normal ROS Imputed Data)	15	0.0471	0.5	0.267	0.265	0.145
Statistics (Gamma ROS Imputed Data)	15	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	15	0.125	0.5	0.27	0.244	0.123
	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)	14.11	11.33	0.0416	-0.569	0.313	-0.551
Statistics (NDs = DL/2)	25.2	20.21	0.0126	-1.17	0.206	-0.176
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-1.404	0.444	-0.316
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.863	0.911	0.986		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.76	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.858	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.955	0.881	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.274	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.243	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.11	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.817	0.924	0.979		

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BAP 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)	1.685	0.736				
Kolmogorov-Smirnov (NDs = DL)	0.302	0.221	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.81	0.735				
Kolmogorov-Smirnov (NDs = DL/2)	0.22	0.221	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.734				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.221				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.772	0.935	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.622	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.899	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.955	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.307	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.234	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.11	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (m-52a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	9	6	40.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	5.0000E-4	0.01	0.00252	0.001	0.0037
Statistics (Non-Detects Only)	9	5.1000E-4	0.0013	7.5111E-4	7.4000E-4	2.4640E-4
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.00146	7.8000E-4	0.0024
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	9.5400E-4	6.4000E-4	0.00115
Statistics (Normal ROS Imputed Data)	15	2.0835E-4	0.0013	6.6767E-4	6.6407E-4	2.4424E-4
Statistics (Gamma ROS Imputed Data)	15	5.1000E-4	0.01	0.00445	9.1000E-4	0.00469
Statistics (Lognormal ROS Imputed Data)	15	3.6619E-4	0.0013	6.7811E-4	6.4624E-4	2.2157E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	12.1	8.139	6.2088E-5	-7.236	0.299	-0.0413
Statistics (NDs = DL)	1.241	1.038	0.00117	-6.985	0.761	-0.109
Statistics (NDs = DL/2)	1.774	1.464	5.3775E-4	-7.262	0.693	-0.0954
Statistics (Gamma ROS Estimates)	0.775	0.665	0.00574	-6.184	1.353	-0.219
Statistics (Lognormal ROS Estimates)	--	--	--	-7.34	0.3	-0.0408
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.926	0.616	0.684	0.949		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.866	0.829	Data Appear Normal			

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BAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.41	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.5	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.927	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.215	0.274	Data Appear Normal			
Lilliefors (NDs = DL)	0.393	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.351	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.175	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.96	0.812	0.834	0.778		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.334	0.722				
Kolmogorov-Smirnov (Detects Only)	0.17	0.279	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	2.303	0.759				
Kolmogorov-Smirnov (NDs = DL)	0.334	0.227	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.35	0.75				
Kolmogorov-Smirnov (NDs = DL/2)	0.243	0.225	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.106	0.774				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.291	0.23	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.967	0.842	0.92	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.933	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.729	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.871	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.968	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.156	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.26	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.179	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.123	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Selenium (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	4	11	73.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	5.0000E-4	0.01	0.00159	5.0000E-4	0.00283
Statistics (Non-Detects Only)	4	5.7000E-4	7.1000E-4	6.5250E-4	6.6500E-4	5.9090E-5
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.01	0.00134	5.7000E-4	0.00243
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	7.5733E-4	5.0000E-4	0.0012
Statistics (Normal ROS Imputed Data)	15	3.2708E-4	7.1000E-4	5.2127E-4	5.2056E-4	1.0651E-4
Statistics (Gamma ROS Imputed Data)	15	5.7000E-4	0.01	0.00751	0.01	0.00428
Statistics (Lognormal ROS Imputed Data)	15	3.9144E-4	7.1000E-4	5.3690E-4	5.2939E-4	9.0167E-5

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	156.1	39.19	4.1799E-6	-7.338	0.0934	-0.0127		
Statistics (NDs = DL)	1.077	0.906	0.00125	-7.146	0.804	-0.113		
Statistics (NDs = DL/2)	1.206	1.009	6.2803E-4	-7.655	0.82	-0.107		
Statistics (Gamma ROS Estimates)	1.272	1.062	0.0059	-5.334	1.252	-0.235		
Statistics (Lognormal ROS Estimates)	--	--	--	-7.543	0.166	-0.0221		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.949	0.598	0.643	0.991				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.915	0.748	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.388	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.444	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.979	0.881	Data Appear Normal					
Lilliefors (Detects Only)	0.3	0.375	Data Appear Normal					
Lilliefors (NDs = DL)	0.422	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.382	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.104	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.94	0.814	0.833	0.561				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.383	0.657						
Kolmogorov-Smirnov (Detects Only)	0.317	0.394	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	2.914	0.762						
Kolmogorov-Smirnov (NDs = DL)	0.35	0.228	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	1.842	0.759						
Kolmogorov-Smirnov (NDs = DL/2)	0.272	0.227	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	3.519	0.758						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.47	0.227	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.941	0.782	0.869	0.99				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.899	0.748	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.63	0.881	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.764	0.881	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.977	0.881	Data Appear Lognormal					
Lilliefors (Detects Only)	0.312	0.375	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.286	0.22	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.249	0.22	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.106	0.22	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Selenium (m-64a)						
	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! Tested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B						
The data set for variable Selenium (m-64a) was not processed!						
Selenium (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.01	0.00135	5.0000E-4	0.00263
Statistics (Non-Detects Only)	2	2.4000E-4	6.7000E-4	4.5500E-4	4.5500E-4	3.0406E-4
Statistics (All: NDs treated as DL value)	15	2.4000E-4	0.01	0.00123	5.0000E-4	0.00246
Statistics (All: NDs treated as DL/2 value)	15	2.4000E-4	0.005	6.4400E-4	2.5000E-4	0.00122
Statistics (Normal ROS Imputed Data)	15	-6.647E-5	6.7000E-4	2.6604E-4	2.6226E-4	1.8512E-4
Statistics (Gamma ROS Imputed Data)	15	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	15	1.1546E-4	6.7000E-4	2.8090E-4	2.5310E-4	1.3799E-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)	0.918	0.779	0.00134	-7.338	0.865	-0.118
Statistics (NDs = DL/2)	0.979	0.828	6.5784E-4	-7.939	0.844	-0.106
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-8.273	0.442	-0.0534
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.578	0.587	0.986		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.366	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.375	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.981	0.881	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.456	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.426	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.127	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.809	0.817	0.442		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	N/A	N/A				

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (Detects Only)	N/A	N/A			
Anderson-Darling (NDs = DL)	3.703	0.767			
Kolmogorov-Smirnov (NDs = DL)	0.448	0.229	Data Not Gamma Distributed		
Anderson-Darling (NDs = DL/2)	3.734	0.764			
Kolmogorov-Smirnov (NDs = DL/2)	0.474	0.228	Data Not Gamma Distributed		
Anderson-Darling (Gamma ROS Estimates)	N/A	0.734			
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.221			
Lognormal GOF Test Results					
	No NDs	NDs = DL	NDs = DL/2	Log ROS	
Correlation Coefficient R	1	0.734	0.703	N/A	
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)		
Shapiro-Wilk (NDs = DL)	0.573	0.881	Data Not Lognormal		
Shapiro-Wilk (NDs = DL/2)	0.516	0.881	Data Not Lognormal		
Shapiro-Wilk (Lognormal ROS Estimates)	0.981	0.881	Data Appear Lognormal		
Lilliefors (Detects Only)	N/A	N/A			
Lilliefors (NDs = DL)	0.419	0.22	Data Not Lognormal		
Lilliefors (NDs = DL/2)	0.463	0.22	Data Not Lognormal		
Lilliefors (Lognormal ROS Estimates)	0.127	0.22	Data Appear Lognormal		
Note: Substitution methods such as DL or DL/2 are not recommended.					
Selenium (w-306)					
Raw Statistics					
Number of Valid Observations	15				
Number of Missing Observations	1				
Number of Distinct Observations	11				
Minimum	0.0016				
Maximum	0.0047				
Mean of Raw Data	0.00309				
Standard Deviation of Raw Data	9.6278E-4				
Khat	9.894				
Theta hat	3.1197E-4				
Kstar	7.96				
Theta star	3.8779E-4				
Mean of Log Transformed Data	-5.832				
Standard Deviation of Log Transformed Data	0.344				
Normal GOF Test Results					
Correlation Coefficient R	0.98				
Shapiro Wilk Test Statistic	0.947				
Shapiro Wilk Critical (0.05) Value	0.881				
Approximate Shapiro Wilk P Value	0.549				
Lilliefors Test Statistic	0.138				
Lilliefors Critical (0.05) Value	0.22				
Data appear Normal at (0.05) Significance Level					
Gamma GOF Test Results					
Correlation Coefficient R	0.966				

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

A-D Test Statistic	0.46					
A-D Critical (0.05) Value	0.737					
K-S Test Statistic	0.156					
K-S Critical(0.05) Value	0.222					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.963					
Shapiro Wilk Test Statistic	0.915					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.197					
Lilliefors Test Statistic	0.154					
Lilliefors Critical (0.05) Value	0.22					
Data appear Lognormal at (0.05) Significance Level						
Selenium (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.01	0.00142	5.0000E-4	0.00261
Statistics (Non-Detects Only)	2	4.0000E-4	6.4000E-4	5.2000E-4	5.2000E-4	1.6971E-4
Statistics (All: NDs treated as DL value)	15	4.0000E-4	0.01	0.0013	5.0000E-4	0.00244
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.005	6.8600E-4	2.5000E-4	0.00121
Statistics (Normal ROS Imputed Data)	15	2.3763E-4	6.4000E-4	4.1732E-4	4.1518E-4	9.8440E-5
Statistics (Gamma ROS Imputed Data)	15	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	15	2.9105E-4	6.4000E-4	4.2122E-4	4.1207E-4	8.4971E-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)	1.009	0.852	0.00129	-7.215	0.834	-0.116
Statistics (NDs = DL/2)	1.078	0.907	6.3637E-4	-7.815	0.825	-0.106
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-7.79	0.193	-0.0247
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.597	0.612	0.984		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.387	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.405	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.98	0.881	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.416	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.382	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.114	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	N/A	0.819	0.826	0.452		
	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)	3.105	0.763				
Kolmogorov-Smirnov (NDs = DL)	0.35	0.228	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.659	0.762				
Kolmogorov-Smirnov (NDs = DL/2)	0.311	0.228	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.734				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.221				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.772	0.801	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.618	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.657	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.98	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.345	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.319	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.114	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (m-52a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	4	11	73.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	1.0000E-4	4.0000E-4	1.7273E-4	1.0000E-4	1.1909E-4
Statistics (Non-Detects Only)	4	1.1000E-4	0.0015	4.8000E-4	1.5500E-4	6.8064E-4
Statistics (All: NDs treated as DL value)	15	1.0000E-4	0.0015	2.5467E-4	1.1000E-4	3.5942E-4
Statistics (All: NDs treated as DL/2 value)	15	5.0000E-5	0.0015	1.9133E-4	1.0000E-4	3.6643E-4
Statistics (Normal ROS Imputed Data)	15	-0.00246	0.0015	-7.752E-4	-8.355E-4	0.001
Statistics (Gamma ROS Imputed Data)	15	1.1000E-4	0.01	0.00746	0.01	0.00437
Statistics (Lognormal ROS Imputed Data)	15	1.0878E-6	0.0015	1.4098E-4	2.1868E-5	3.7981E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	0.893	0.39	5.3747E-4	-8.297	1.214	-0.146
Statistics (NDs = DL)	1.35	1.125	1.8861E-4	-8.69	0.779	-0.0896
Statistics (NDs = DL/2)	0.917	0.778	2.0873E-4	-9.198	0.929	-0.101
Statistics (Gamma ROS Estimates)	0.851	0.725	0.00877	-5.59	1.781	-0.319
Statistics (Lognormal ROS Estimates)	--	--	--	-10.62	1.85	-0.174
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.81	0.676	0.615	0.981		

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.668	0.748	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.484	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.409	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.97	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.42	0.375	Data Not Normal			
Lilliefors (NDs = DL)	0.36	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.424	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.113	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.976	0.862	0.83	0.511		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.717	0.668				
Kolmogorov-Smirnov (Detects Only)	0.413	0.404	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL)	2.057	0.757				
Kolmogorov-Smirnov (NDs = DL)	0.29	0.226	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.028	0.767				
Kolmogorov-Smirnov (NDs = DL/2)	0.28	0.229	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.352	0.77				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.473	0.229	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.875	0.849	0.865	0.985		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.774	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.728	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.758	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.977	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.356	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.252	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.243	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.113	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (m-53a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	1.0000E-4	0.002	2.8462E-4	1.0000E-4	5.2257E-4
Statistics (Non-Detects Only)	2	1.2000E-4	1.5000E-4	1.3500E-4	1.3500E-4	2.1213E-5
Statistics (All: NDs treated as DL value)	15	1.0000E-4	0.002	2.6467E-4	1.0000E-4	4.8669E-4
Statistics (All: NDs treated as DL/2 value)	15	5.0000E-5	0.001	1.4133E-4	5.0000E-5	2.4198E-4
Statistics (Normal ROS Imputed Data)	15	-8.185E-5	1.5000E-4	2.8792E-5	2.7898E-5	6.0873E-5
Statistics (Gamma ROS Imputed Data)	15	N/A	N/A	N/A	N/A	N/A

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Lognormal ROS Imputed Data)	15	2.6738E-5	1.5000E-4	6.7162E-5	6.0487E-5	3.2622E-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)	1.045	0.88	2.5327E-4	-8.787	0.818	-0.0931		
Statistics (NDs = DL/2)	1.093	0.919	1.2935E-4	-9.387	0.838	-0.0893		
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A		
Statistics (Lognormal ROS Estimates)	--	--	--	-9.706	0.453	-0.0466		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	1	0.596	0.626	0.991				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (NDs = DL)	0.385	0.881	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.422	0.881	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.985	0.881	Data Appear Normal					
Lilliefors (Detects Only)	N/A	N/A						
Lilliefors (NDs = DL)	0.42	0.22	Data Not Normal					
Lilliefors (NDs = DL/2)	0.353	0.22	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.106	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	N/A	0.817	0.835	0.402				
	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)	3.084	0.762						
Kolmogorov-Smirnov (NDs = DL)	0.342	0.228	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	2.418	0.761						
Kolmogorov-Smirnov (NDs = DL/2)	0.321	0.227	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	N/A	0.734						
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.221						
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	1	0.764	0.82	N/A				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (NDs = DL)	0.603	0.881	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.684	0.881	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.985	0.881	Data Appear Lognormal					
Lilliefors (Detects Only)	N/A	N/A						
Lilliefors (NDs = DL)	0.302	0.22	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.331	0.22	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.106	0.22	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								

TABLE B-3
BAP ProUCL GOODNESS OF FIT STATISTICS*

Thallium (m-64a)						
	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).						
The data set for variable Thallium (m-64a) was not processed!						
Thallium (w-305)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	0	15	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 Thallium (w-305) was not processed!						
Thallium (w-306)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	0	15	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 Thallium (w-306) was not processed!						
Thallium (w-314)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	0	15	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 Thallium (w-314) was not processed!						

TABLE B-4
BAP ProUCL OUTLIER TESTING*

User Selected Options		Outlier Tests for Selected Variables excluding nondetects					
Date/Time of Computation	ProUCL 5.110/10/2018 9:49:14 AM						
From File	BottomAshPond_Cholla_AllWells_AssessmentMontSept2018.xls						
Full Precision	OFF						
No Outlier Test for Antimony (m-52a)							
No Outlier Test for Antimony (m-53a)							
No Outlier Test for Antimony (m-64a)							
No Outlier Test for Antimony (w-305)							
No Outlier Test for Antimony (w-306)							
No Outlier Test for Antimony (w-314)							
Dixon's Outlier Test for Arsenic (m-52a)							
Total N = 15							
Number NDs = 7							
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 0.0026 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.381							
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 0.00047 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.023							
For 10% significance level, 0.00047 is not an outlier.							
For 5% significance level, 0.00047 is not an outlier.							
For 1% significance level, 0.00047 is not an outlier.							
Dixon's Outlier Test for Arsenic (m-53a)							
Total N = 15							
Number NDs = 2							
Number Detects = 13							
10% critical value: 0.467							
5% critical value: 0.521							
1% critical value: 0.615							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Note: NDs excluded from Outlier Test									
1. Data Value 0.0018 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.412									
For 10% significance level, 0.0018 is not an outlier.									
For 5% significance level, 0.0018 is not an outlier.									
For 1% significance level, 0.0018 is not an outlier.									
2. Data Value 0.00076 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.213									
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 Arsenic (m-64a)									
Total N = 10									
Number NDs = 1									
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 0.0033 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.238									
For 10% significance level, 0.0033 is not an outlier.									
For 5% significance level, 0.0033 is not an outlier.									
For 1% significance level, 0.0033 is not an outlier.									
2. Data Value 0.00094 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.140									
For 10% significance level, 0.00094 is not an outlier.									
For 5% significance level, 0.00094 is not an outlier.									
For 1% significance level, 0.00094 is not an outlier.									
Dixon's Outlier Test for Arsenic (w-305)									
Total N = 15									
Number NDs = 2									
Number Detects = 13									
10% critical value: 0.467									
5% critical value: 0.521									
1% critical value: 0.615									

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Note: NDs excluded from Outlier Test									
1. Data Value 0.0017 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.655									
For 10% significance level, 0.0017 is an outlier.									
For 5% significance level, 0.0017 is an outlier.									
For 1% significance level, 0.0017 is an outlier.									
2. Data Value 0.00058 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.195									
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 Arsenic (w-306)									
Total N = 15									
Number NDs = 1									
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 0.0052 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.200									
For 10% significance level, 0.0052 is not an outlier.									
For 5% significance level, 0.0052 is not an outlier.									
For 1% significance level, 0.0052 is not an outlier.									
2. Data Value 0.0019 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.742									
For 10% significance level, 0.0019 is an outlier.									
For 5% significance level, 0.0019 is an outlier.									
For 1% significance level, 0.0019 is an outlier.									
Dixon's Outlier Test for Arsenic (w-314)									
Total N = 15									
Number NDs = 8									
Number Detects = 7									
10% critical value: 0.434									
5% critical value: 0.507									
1% critical value: 0.637									

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Note: NDs excluded from Outlier Test									
1. Data Value 0.00091 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.579									
For 10% significance level, 0.00091 is an outlier.									
For 5% significance level, 0.00091 is an outlier.									
For 1% significance level, 0.00091 is not an outlier.									
2. Data Value 0.00053 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.026									
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.									
Dixon's Outlier Test for Barium (m-52a)									
Total N = 15									
Number NDs = 0									
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 0.027 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.308									
For 10% significance level, 0.027 is not an outlier.									
For 5% significance level, 0.027 is not an outlier.									
For 1% significance level, 0.027 is not an outlier.									
2. Data Value 0.013 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.100									
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 (m-53a)									
Total N = 15									
Number NDs = 0									
Number Detects = 15									
10% critical value: 0.472									
5% critical value: 0.525									
1% critical value: 0.616									

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Note: NDs excluded from Outlier Test									
1. Data Value 0.024 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.194									
For 10% significance level, 0.024 is not an outlier.									
For 5% significance level, 0.024 is not an outlier.									
For 1% significance level, 0.024 is not an outlier.									
2. Data Value 0.0079 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.046									
For 10% significance level, 0.0079 is not an outlier.									
For 5% significance level, 0.0079 is not an outlier.									
For 1% significance level, 0.0079 is not an outlier.									
Dixon's Outlier Test for Barium (m-64a)									
Total N = 10									
Number NDs = 0									
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 0.034 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.682									
For 10% significance level, 0.034 is an outlier.									
For 5% significance level, 0.034 is an outlier.									
For 1% significance level, 0.034 is an outlier.									
2. Data Value 0.012 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.000									
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.									
Dixon's Outlier Test for Barium (w-305)									
Total N = 15									
Number NDs = 0									
Number Detects = 15									
10% critical value: 0.472									
5% critical value: 0.525									
1% critical value: 0.616									

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Note: NDs excluded from Outlier Test									
1. Data Value 0.022 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.833									
For 10% significance level, 0.022 is an outlier.									
For 5% significance level, 0.022 is an outlier.									
For 1% significance level, 0.022 is an outlier.									
2. Data Value 0.0059 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.672									
For 10% significance level, 0.0059 is an outlier.									
For 5% significance level, 0.0059 is an outlier.									
For 1% significance level, 0.0059 is an outlier.									
Dixon's Outlier Test for Barium (w-306)									
Total N = 15									
Number NDs = 0									
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 0.015 is a Potential Outlier (Upper Tail)									
Test Statistic: 0.200									
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 0.0094 is a Potential Outlier (Lower Tail)									
Test Statistic: 0.130									
For 10% significance level, 0.0094 is not an outlier.									
For 5% significance level, 0.0094 is not an outlier.									
For 1% significance level, 0.0094 is not an outlier.									
Dixon's Outlier Test for Barium (w-314)									
Total N = 15									
Number NDs = 0									
Number Detects = 15									
10% critical value: 0.472									
5% critical value: 0.525									
1% critical value: 0.616									

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Note: NDs excluded from Outlier Test								
1. Data Value 0.016 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.600								
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 not an outlier.								
2. Data Value 0.0093 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.459								
For 10% significance level, 0.0093 is not an outlier.								
For 5% significance level, 0.0093 is not an outlier.								
For 1% significance level, 0.0093 is not an outlier.								
No Outlier Test for Beryllium (m-52a)								
No Outlier Test for Beryllium (m-53a)								
No Outlier Test for Beryllium (m-64a)								
No Outlier Test for Beryllium (w-305)								
No Outlier Test for Beryllium (w-306)								
No Outlier Test for Beryllium (w-314)								
Dixon's Outlier Test for Cadmium (m-52a)								
Total N = 15								
Number NDs = 0								
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 0.0019 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.355								
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.								
2. Data Value 0.00048 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.011								
For 10% significance level, 0.00048 is not an outlier.								

TABLE B-4
BAP ProUCL OUTLIER TESTING*

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 Cadmium (m-53a)							
Total N = 15							
Number NDs = 0							
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 0.0024 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.545							
For 10% significance level, 0.0024 is an outlier.							
For 5% significance level, 0.0024 is an outlier.							
For 1% significance level, 0.0024 is not an outlier.							
2. Data Value 0.0012 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.167							
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.							
No Outlier Test for Cadmium (m-64a)							
Dixon's Outlier Test for Cadmium (w-305)							
Total N = 15							
Number NDs = 9							
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 0.00022 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.750							
For 10% significance level, 0.00022 is an outlier.							
For 5% significance level, 0.00022 is an outlier.							
For 1% significance level, 0.00022 is an outlier.							
2. Data Value 0.0001 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.083							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

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.							
No Outlier Test for Cadmium (w-306)							
Dixon's Outlier Test for Cadmium (w-314)							
Total N = 15							
Number NDs = 4							
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 0.00022 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.500							
For 10% significance level, 0.00022 is not an outlier.							
For 5% significance level, 0.00022 is not an outlier.							
For 1% significance level, 0.00022 is not an outlier.							
2. Data Value 0.00015 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.200							
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 Chromium (m-52a)							
Total N = 15							
Number NDs = 3							
Number Detects = 12							
10% critical value: 0.49							
5% critical value: 0.546							
1% critical value: 0.642							
Note: NDs excluded from Outlier Test							
1. Data Value 0.034 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.488							
For 10% significance level, 0.034 is not an outlier.							
For 5% significance level, 0.034 is not an outlier.							
For 1% significance level, 0.034 is not an outlier.							
2. Data Value 0.0011 is a Potential Outlier (Lower Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.017							
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.							
Dixon's Outlier Test for Chromium (m-53a)							
Total N = 15							
Number NDs = 2							
Number Detects = 13							
10% critical value: 0.467							
5% critical value: 0.521							
1% critical value: 0.615							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0062 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.808							
For 10% significance level, 0.0062 is an outlier.							
For 5% significance level, 0.0062 is an outlier.							
For 1% significance level, 0.0062 is an outlier.							
2. Data Value 0.001 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.036							
For 10% significance level, 0.001 is not an outlier.							
For 5% significance level, 0.001 is not an outlier.							
For 1% significance level, 0.001 is not an outlier.							
Dixon's Outlier Test for Chromium (m-64a)							
Total N = 10							
Number NDs = 7							
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 0.0022 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.143							
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.							
2. Data Value 0.0015 is a Potential Outlier (Lower Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.857							
For 10% significance level, 0.0015 is not an outlier.							
For 5% significance level, 0.0015 is not an outlier.							
For 1% significance level, 0.0015 is not an outlier.							
Dixon's Outlier Test for Chromium (w-305)							
Total N = 15							
Number NDs = 4							
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 0.0098 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.656							
For 10% significance level, 0.0098 is an outlier.							
For 5% significance level, 0.0098 is an outlier.							
For 1% significance level, 0.0098 is not an outlier.							
2. Data Value 0.00062 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.024							
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 Chromium (w-306)							
Total N = 15							
Number NDs = 11							
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 0.00093 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.140							
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 0.0005 is a Potential Outlier (Lower Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.535							
For 10% significance level, 0.0005 is not an outlier.							
For 5% significance level, 0.0005 is not an outlier.							
For 1% significance level, 0.0005 is not an outlier.							
Dixon's Outlier Test for Chromium (w-314)							
Total N = 15							
Number NDs = 5							
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 0.002 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.246							
For 10% significance level, 0.002 is not an outlier.							
For 5% significance level, 0.002 is not an outlier.							
For 1% significance level, 0.002 is not an outlier.							
2. Data Value 0.00073 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.052							
For 10% significance level, 0.00073 is not an outlier.							
For 5% significance level, 0.00073 is not an outlier.							
For 1% significance level, 0.00073 is not an outlier.							
Dixon's Outlier Test for Cobalt (m-52a)							
Total N = 15							
Number NDs = 0							
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 0.066 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.174							
For 10% significance level, 0.066 is not an outlier.							
For 5% significance level, 0.066 is not an outlier.							
For 1% significance level, 0.066 is not an outlier.							
2. Data Value 0.037 is a Potential Outlier (Lower Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.240							
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 Cobalt (m-53a)							
Total N = 15							
Number NDs = 0							
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 0.024 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.125							
For 10% significance level, 0.024 is not an outlier.							
For 5% significance level, 0.024 is not an outlier.							
For 1% significance level, 0.024 is not an outlier.							
2. Data Value 0.011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.417							
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 Cobalt (m-64a)							
Total N = 10							
Number NDs = 6							
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 0.0015 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.426							
For 10% significance level, 0.0015 is not an outlier.							
For 5% significance level, 0.0015 is not an outlier.							
For 1% significance level, 0.0015 is not an outlier.							
2. Data Value 0.00056 is a Potential Outlier (Lower Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.128							
For 10% significance level, 0.00056 is not an outlier.							
For 5% significance level, 0.00056 is not an outlier.							
For 1% significance level, 0.00056 is not an outlier.							
Dixon's Outlier Test for Cobalt (w-305)							
Total N = 15							
Number NDs = 0							
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 0.019 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.250							
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 0.01 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.625							
For 10% significance level, 0.01 is an outlier.							
For 5% significance level, 0.01 is an outlier.							
For 1% significance level, 0.01 is an outlier.							
Dixon's Outlier Test for Cobalt (w-306)							
Total N = 15							
Number NDs = 0							
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 0.03 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.773							
For 10% significance level, 0.03 is an outlier.							
For 5% significance level, 0.03 is an outlier.							
For 1% significance level, 0.03 is an outlier.							
2. Data Value 0.0014 is a Potential Outlier (Lower Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.059							
For 10% significance level, 0.0014 is not an outlier.							
For 5% significance level, 0.0014 is not an outlier.							
For 1% significance level, 0.0014 is not an outlier.							
Dixon's Outlier Test for Cobalt (w-314)							
Total N = 15							
Number NDs = 0							
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 0.018 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.500							
For 10% significance level, 0.018 is an outlier.							
For 5% significance level, 0.018 is not an outlier.							
For 1% significance level, 0.018 is not an outlier.							
2. Data Value 0.011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.250							
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 Fluoride (m-52a)							
Total N = 16							
Number NDs = 2							
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 1.1 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.385							
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.							
2. Data Value 0.53 is a Potential Outlier (Lower Tail)?							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.660							
For 10% significance level, 0.53 is an outlier.							
For 5% significance level, 0.53 is an outlier.							
For 1% significance level, 0.53 is an outlier.							
Dixon's Outlier Test for Fluoride (m-53a)							
Total N = 15							
Number NDs = 1							
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 2.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.154							
For 10% significance level, 2.6 is not an outlier.							
For 5% significance level, 2.6 is not an outlier.							
For 1% significance level, 2.6 is not an outlier.							
2. Data Value 0.87 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.281							
For 10% significance level, 0.87 is not an outlier.							
For 5% significance level, 0.87 is not an outlier.							
For 1% significance level, 0.87 is not an outlier.							
No Outlier Test for Fluoride (m-64a)							
No Outlier Test for Fluoride (w-305)							
Dixon's Outlier Test for Fluoride (w-306)							
Total N = 16							
Number NDs = 2							
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 1.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.200							
For 10% significance level, 1.6 is not an outlier.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

For 5% significance level, 1.6 is not an outlier.							
For 1% significance level, 1.6 is not an outlier.							
2. Data Value 0.75 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.467							
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 Fluoride (w-314)							
Total N = 16							
Number NDs = 2							
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 1.3 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.500							
For 10% significance level, 1.3 is an outlier.							
For 5% significance level, 1.3 is not an outlier.							
For 1% significance level, 1.3 is not an outlier.							
2. Data Value 0.8 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.333							
For 10% significance level, 0.8 is not an outlier.							
For 5% significance level, 0.8 is not an outlier.							
For 1% significance level, 0.8 is not an outlier.							
Dixon's Outlier Test for Lead (m-52a)							
Total N = 15							
Number NDs = 12							
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 0.001 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.001 is not an outlier.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

For 5% significance level, 0.001 is not an outlier.							
For 1% significance level, 0.001 is not an outlier.							
2. Data Value 0.00048 is a Potential Outlier (Lower Tail)							
Test Statistic: 1.000							
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 an outlier.							
Dixon's Outlier Test for Lead (m-53a)							
Total N = 15							
Number NDs = 10							
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 0.00077 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.600							
For 10% significance level, 0.00077 is an outlier.							
For 5% significance level, 0.00077 is not an outlier.							
For 1% significance level, 0.00077 is not an outlier.							
2. Data Value 0.00052 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.200							
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.							
No Outlier Test for Lead (m-64a)							
Dixon's Outlier Test for Lead (w-305)							
Total N = 15							
Number NDs = 3							
Number Detects = 12							
10% critical value: 0.49							
5% critical value: 0.546							
1% critical value: 0.642							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0035 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.556							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

For 10% significance level, 0.0035 is an outlier.							
For 5% significance level, 0.0035 is an outlier.							
For 1% significance level, 0.0035 is not an outlier.							
2. Data Value 0.0017 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.375							
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.							
No Outlier Test for Lead (w-306)							
Dixon's Outlier Test for Lead (w-314)							
Total N = 15							
Number NDs = 12							
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 0.0023 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.862							
For 10% significance level, 0.0023 is not an outlier.							
For 5% significance level, 0.0023 is not an outlier.							
For 1% significance level, 0.0023 is not an outlier.							
2. Data Value 0.00041 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.138							
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.							
Dixon's Outlier Test for Lithium (m-52a)							
Total N = 15							
Number NDs = 0							
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 0.28 is a Potential Outlier (Upper Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.200							
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.							
2. Data Value 0.21 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.333							
For 10% significance level, 0.21 is not an outlier.							
For 5% significance level, 0.21 is not an outlier.							
For 1% significance level, 0.21 is not an outlier.							
Dixon's Outlier Test for Lithium (m-53a)							
Total N = 15							
Number NDs = 6							
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 0.21 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.000							
For 10% significance level, 0.21 is not an outlier.							
For 5% significance level, 0.21 is not an outlier.							
For 1% significance level, 0.21 is not an outlier.							
2. Data Value 0.2 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
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 Lithium (m-64a)							
Total N = 10							
Number NDs = 0							
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 0.28 is a Potential Outlier (Upper Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.333							
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.							
2. Data Value 0.25 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
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 (w-305)							
Total N = 15							
Number NDs = 0							
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 0.23 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.333							
For 10% significance level, 0.23 is not an outlier.							
For 5% significance level, 0.23 is not an outlier.							
For 1% significance level, 0.23 is not an outlier.							
2. Data Value 0.2 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
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 Lithium (w-306)							
Total N = 15							
Number NDs = 0							
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 0.78 is a Potential Outlier (Upper Tail)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Test Statistic: 0.273							
For 10% significance level, 0.78 is not an outlier.							
For 5% significance level, 0.78 is not an outlier.							
For 1% significance level, 0.78 is not an outlier.							
2. Data Value 0.43 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.448							
For 10% significance level, 0.43 is not an outlier.							
For 5% significance level, 0.43 is not an outlier.							
For 1% significance level, 0.43 is not an outlier.							
Dixon's Outlier Test for Lithium (w-314)							
Total N = 15							
Number NDs = 0							
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 0.35 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.250							
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 0.3 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.250							
For 10% significance level, 0.3 is not an outlier.							
For 5% significance level, 0.3 is not an outlier.							
For 1% significance level, 0.3 is not an outlier.							
No Outlier Test for Mercury (m-52a)							
No Outlier Test for Mercury (m-53a)							
No Outlier Test for Mercury (m-64a)							
No Outlier Test for Mercury (w-305)							
No Outlier Test for Mercury (w-306)							
No Outlier Test for Mercury (w-314)							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Dixon's Outlier Test for Molybdenum (m-52a)							
Total N = 15							
Number NDs = 0							
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 0.071 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.352							
For 10% significance level, 0.071 is not an outlier.							
For 5% significance level, 0.071 is not an outlier.							
For 1% significance level, 0.071 is not an outlier.							
2. Data Value 0.013 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.103							
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 (m-53a)							
Total N = 15							
Number NDs = 0							
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 0.053 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.353							
For 10% significance level, 0.053 is not an outlier.							
For 5% significance level, 0.053 is not an outlier.							
For 1% significance level, 0.053 is not an outlier.							
2. Data Value 0.0059 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.732							
For 10% significance level, 0.0059 is an outlier.							
For 5% significance level, 0.0059 is an outlier.							
For 1% significance level, 0.0059 is an outlier.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Dixon's Outlier Test for Molybdenum (m-64a)							
Total N = 10							
Number NDs = 0							
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 0.0061 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.182							
For 10% significance level, 0.0061 is not an outlier.							
For 5% significance level, 0.0061 is not an outlier.							
For 1% significance level, 0.0061 is not an outlier.							
2. Data Value 0.0042 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.471							
For 10% significance level, 0.0042 is an outlier.							
For 5% significance level, 0.0042 is not an outlier.							
For 1% significance level, 0.0042 is not an outlier.							
Dixon's Outlier Test for Molybdenum (w-305)							
Total N = 15							
Number NDs = 0							
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 0.031 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.714							
For 10% significance level, 0.031 is an outlier.							
For 5% significance level, 0.031 is an outlier.							
For 1% significance level, 0.031 is an outlier.							
2. Data Value 0.014 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.429							
For 10% significance level, 0.014 is not an outlier.							
For 5% significance level, 0.014 is not an outlier.							
For 1% significance level, 0.014 is not an outlier.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Dixon's Outlier Test for Molybdenum (w-306)							
Total N = 15							
Number NDs = 0							
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 0.057 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.774							
For 10% significance level, 0.057 is an outlier.							
For 5% significance level, 0.057 is an outlier.							
For 1% significance level, 0.057 is an outlier.							
2. Data Value 0.02 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.462							
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.							
Dixon's Outlier Test for Molybdenum (w-314)							
Total N = 15							
Number NDs = 0							
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 0.013 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.746							
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: 0.250							
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.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Dixon's Outlier Test for Radium (m-52a)							
Total N = 15							
Number NDs = 7							
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 0.9 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.000							
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.							
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 Radium (m-53a)							
Total N = 15							
Number NDs = 10							
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 0.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.000							
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.							
2. Data Value 0.4 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.500							
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.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Dixon's Outlier Test for Radium (m-64a)							
Total N = 10							
Number NDs = 6							
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 1.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.250							
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: 0.500							
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 Radium (w-305)							
Total N = 15							
Number NDs = 8							
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 1.7 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.455							
For 10% significance level, 1.7 is an outlier.							
For 5% significance level, 1.7 is not an outlier.							
For 1% significance level, 1.7 is not an outlier.							
2. Data Value 0.6 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
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.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

Dixon's Outlier Test for Radium (w-306)							
Total N = 15							
Number NDs = 11							
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 1.1 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.429							
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.							
2. Data Value 0.4 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.143							
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.							
No Outlier Test for Radium (w-314)							
Dixon's Outlier Test for Selenium (m-52a)							
Total N = 15							
Number NDs = 6							
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 0.0013 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.500							
For 10% significance level, 0.0013 is an outlier.							
For 5% significance level, 0.0013 is not an outlier.							
For 1% significance level, 0.0013 is not an outlier.							
2. Data Value 0.00051 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.025							
For 10% significance level, 0.00051 is not an outlier.							
For 5% significance level, 0.00051 is not an outlier.							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

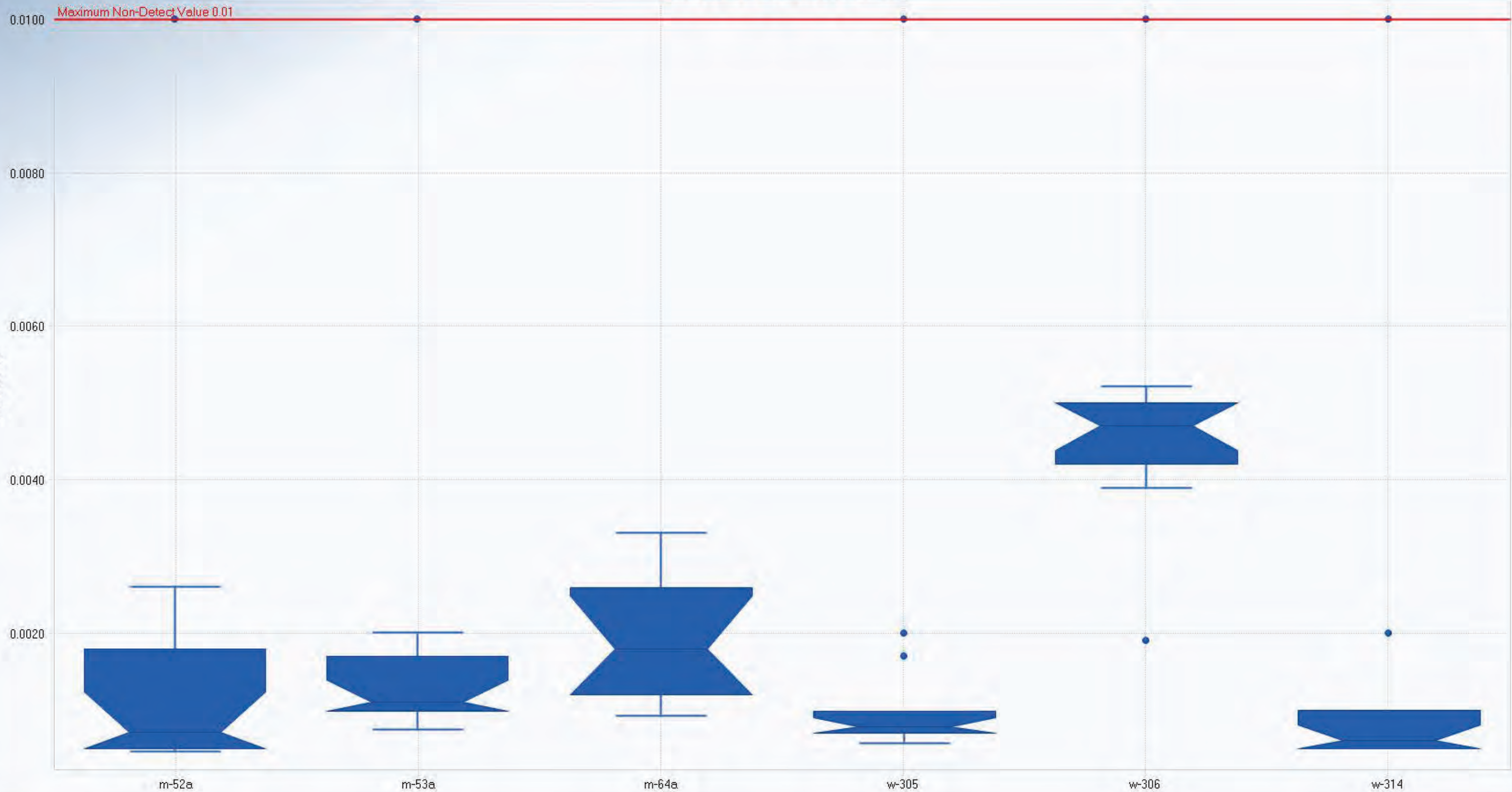
For 1% significance level, 0.00051 is not an outlier.							
Dixon's Outlier Test for Selenium (m-53a)							
Total N = 15							
Number NDs = 11							
Number Detects = 4							
10% critical value: 0.679							
5% critical value: 0.765							
1% critical value: 0.889							
Note: NDs excluded from Outlier Test							
1. Data Value 0.00071 is a Potential Outlier (Upper T							
Test Statistic: 0.286							
For 10% significance level, 0.00071 is not an outlier.							
For 5% significance level, 0.00071 is not an outlier.							
For 1% significance level, 0.00071 is not an outlier.							
2. Data Value 0.00057 is a Potential Outlier (Lower T							
Test Statistic: 0.643							
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.							
No Outlier Test for Selenium (m-64a)							
No Outlier Test for Selenium (w-305)							
Dixon's Outlier Test for Selenium (w-306)							
Total N = 15							
Number NDs = 0							
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 0.0047 is a Potential Outlier (Upper T							
Test Statistic: 0.296							
For 10% significance level, 0.0047 is not an outlier.							
For 5% significance level, 0.0047 is not an outlier.							
For 1% significance level, 0.0047 is not an outlier.							
2. Data Value 0.0016 is a Potential Outlier (Lower Ta							

TABLE B-4
BAP ProUCL OUTLIER TESTING*

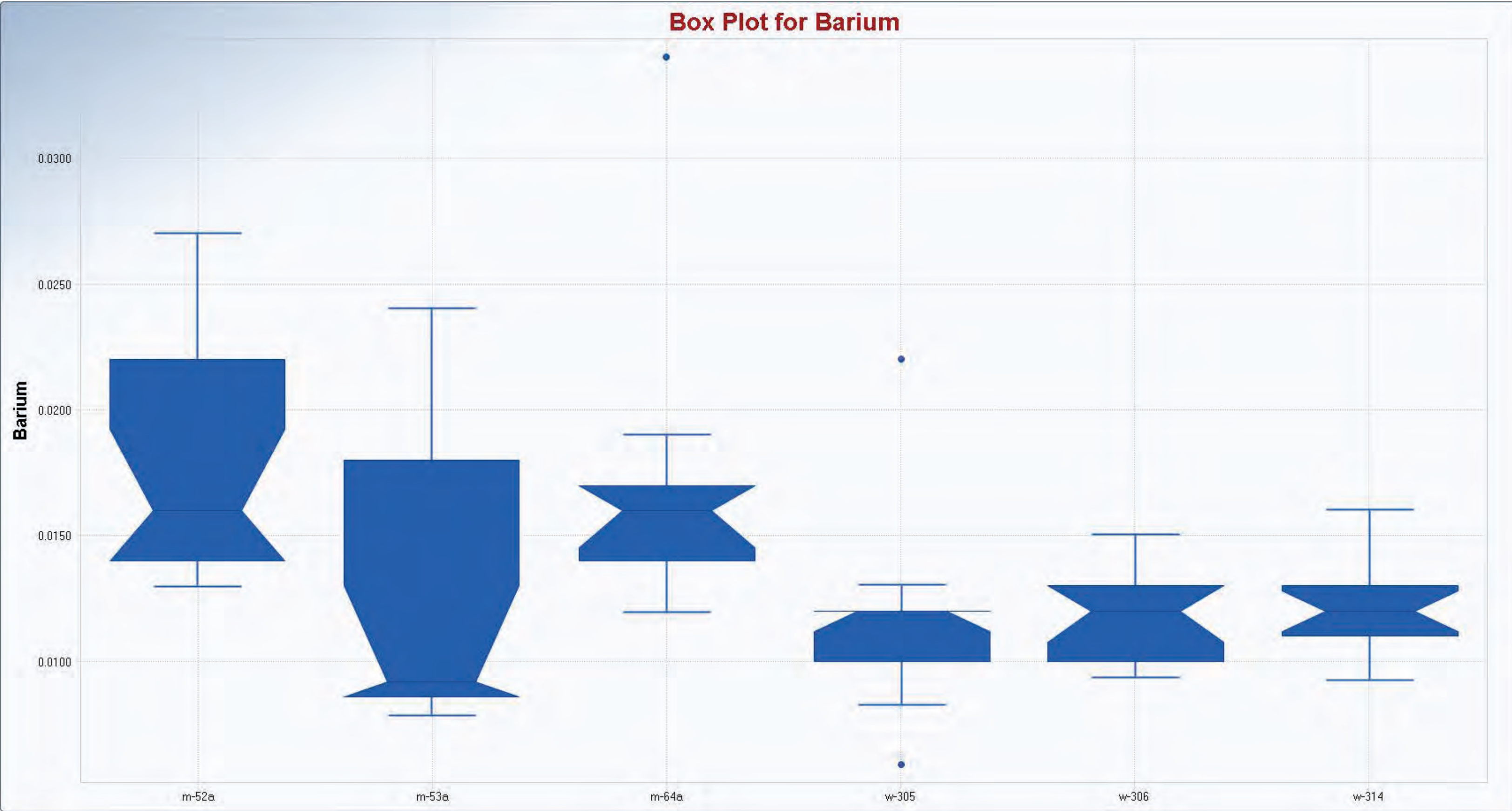
Test Statistic: 0.174							
For 10% significance level, 0.0016 is not an outlier.							
For 5% significance level, 0.0016 is not an outlier.							
For 1% significance level, 0.0016 is not an outlier.							
No Outlier Test for Selenium (w-314)							
Dixon's Outlier Test for Thallium (m-52a)							
Total N = 15							
Number NDs = 11							
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 0.0015 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.950							
For 10% significance level, 0.0015 is an outlier.							
For 5% significance level, 0.0015 is an outlier.							
For 1% significance level, 0.0015 is an outlier.							
2. Data Value 0.00011 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.014							
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 Thallium (m-53a)							
No Outlier Test for Thallium (m-64a)							
No Outlier Test for Thallium (w-305)							
No Outlier Test for Thallium (w-306)							
No Outlier Test for Thallium (w-314)							

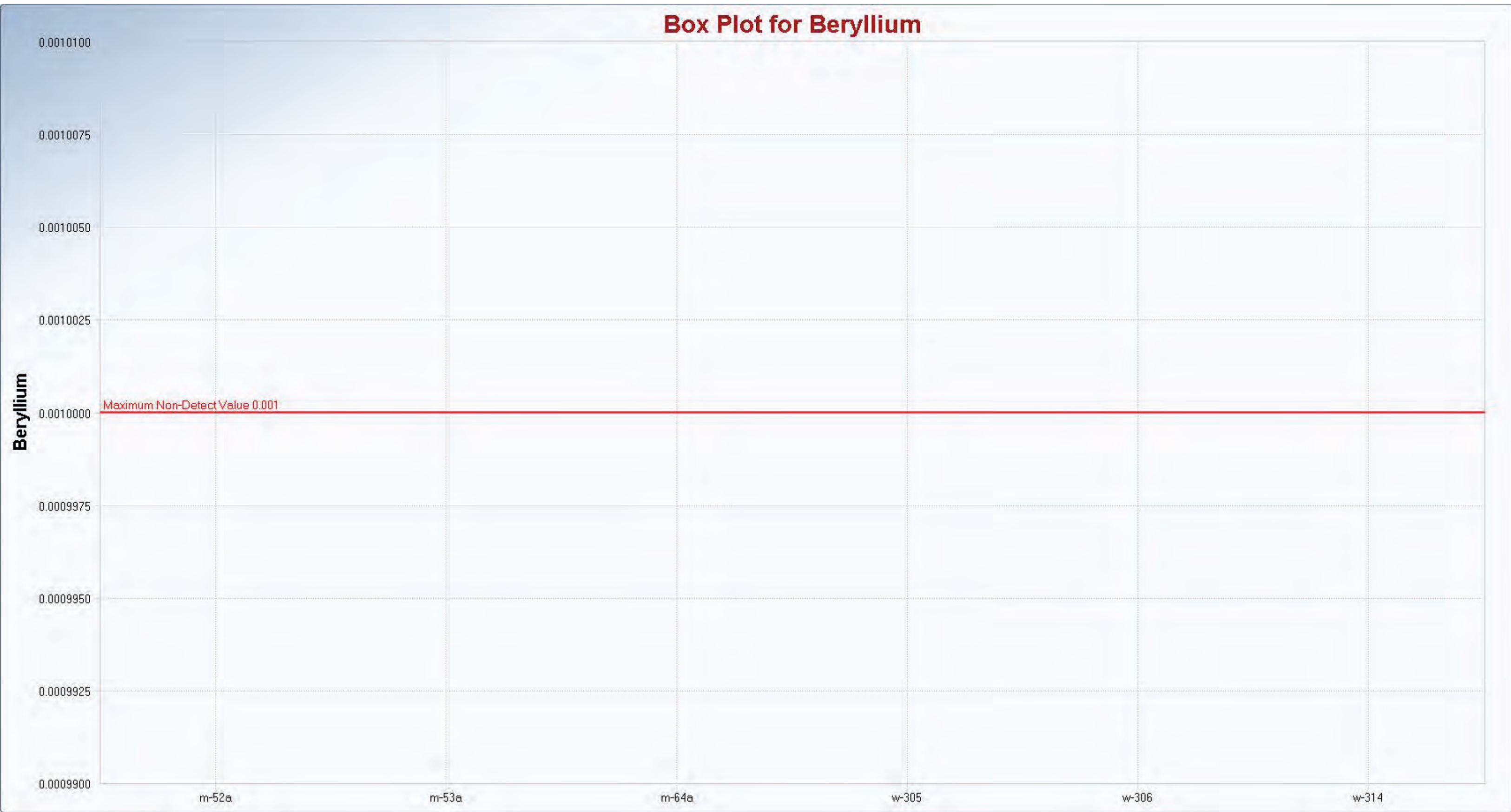


Box Plot for Arsenic

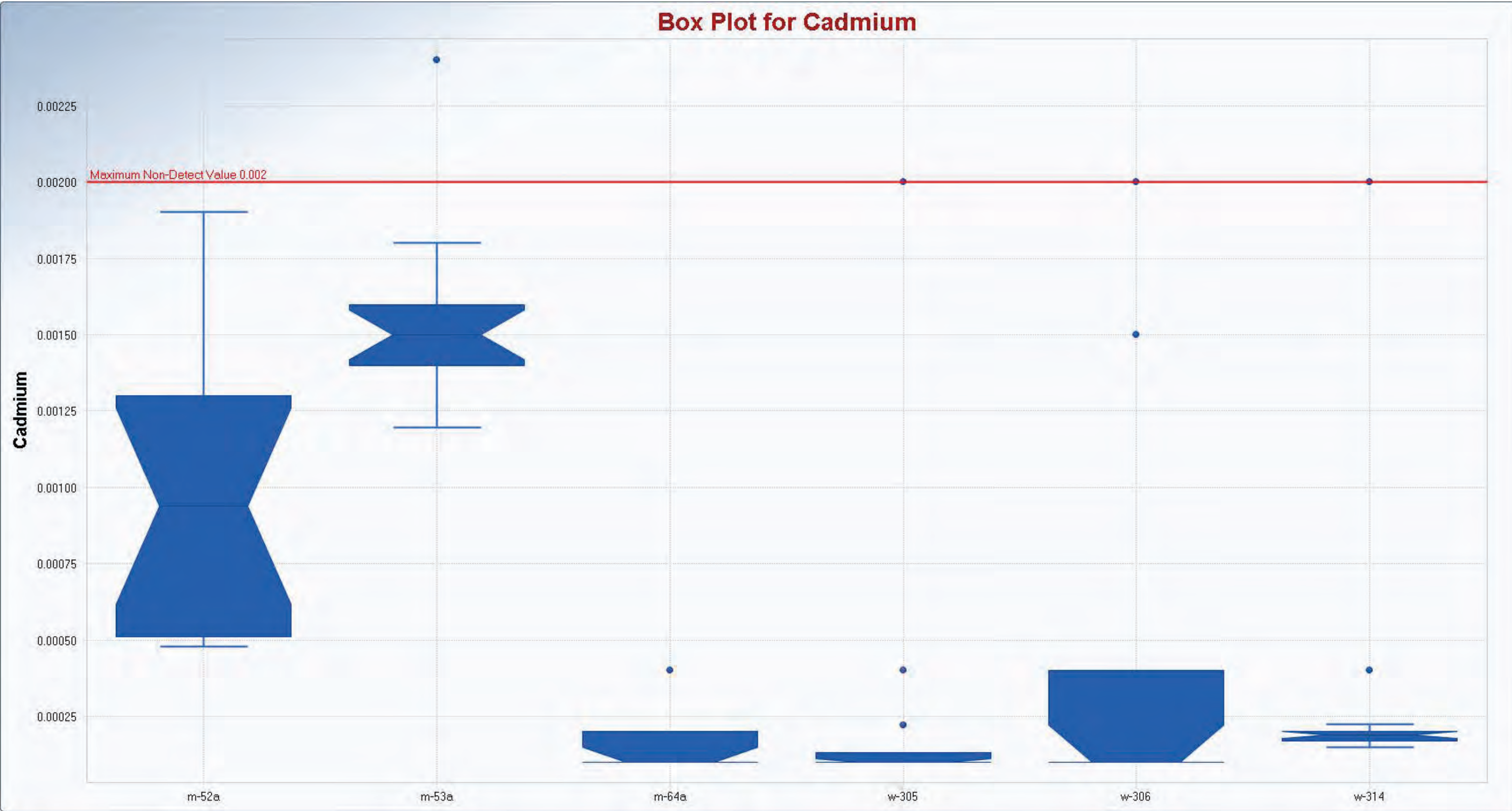


Box Plot for Barium

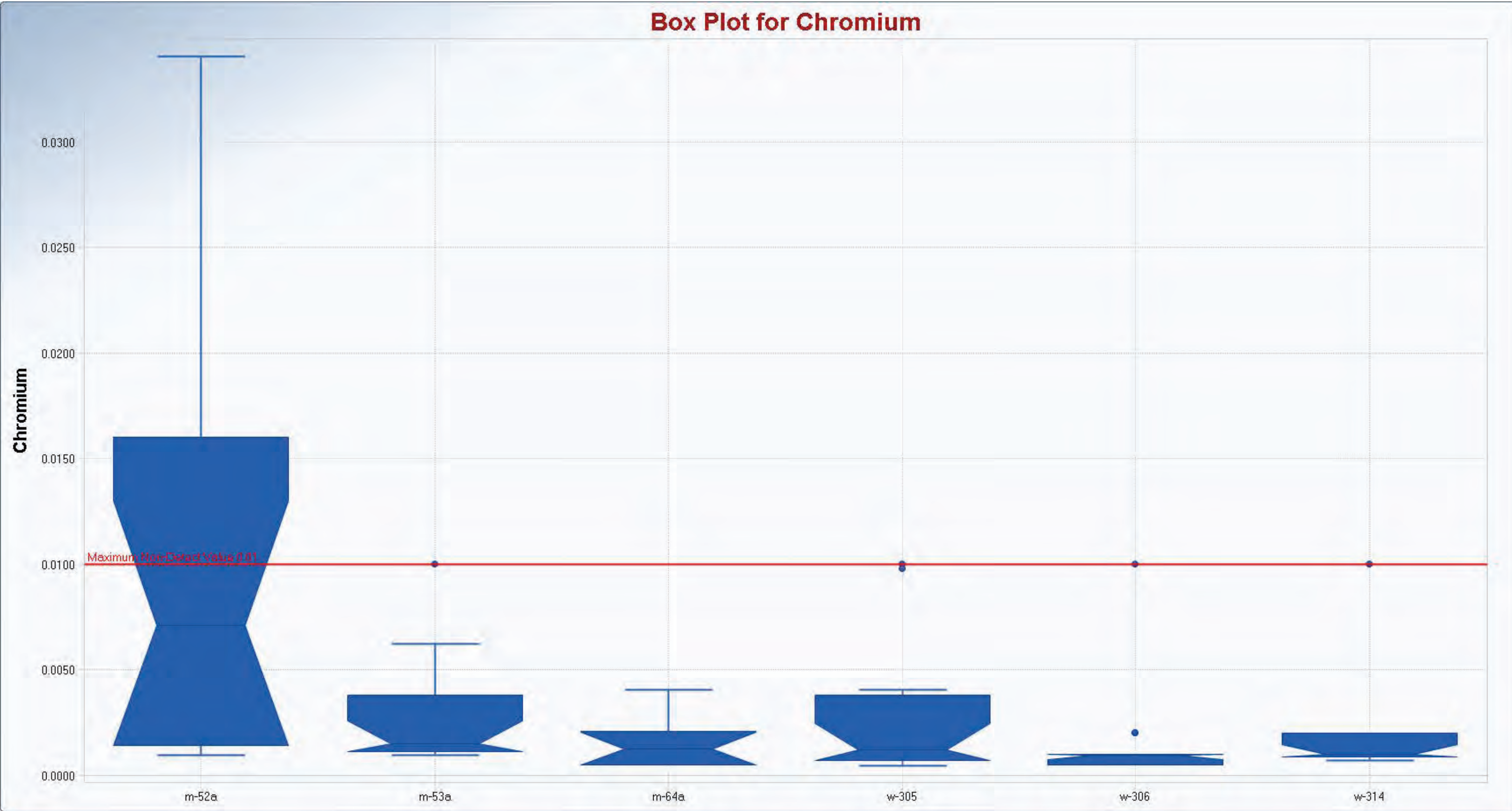




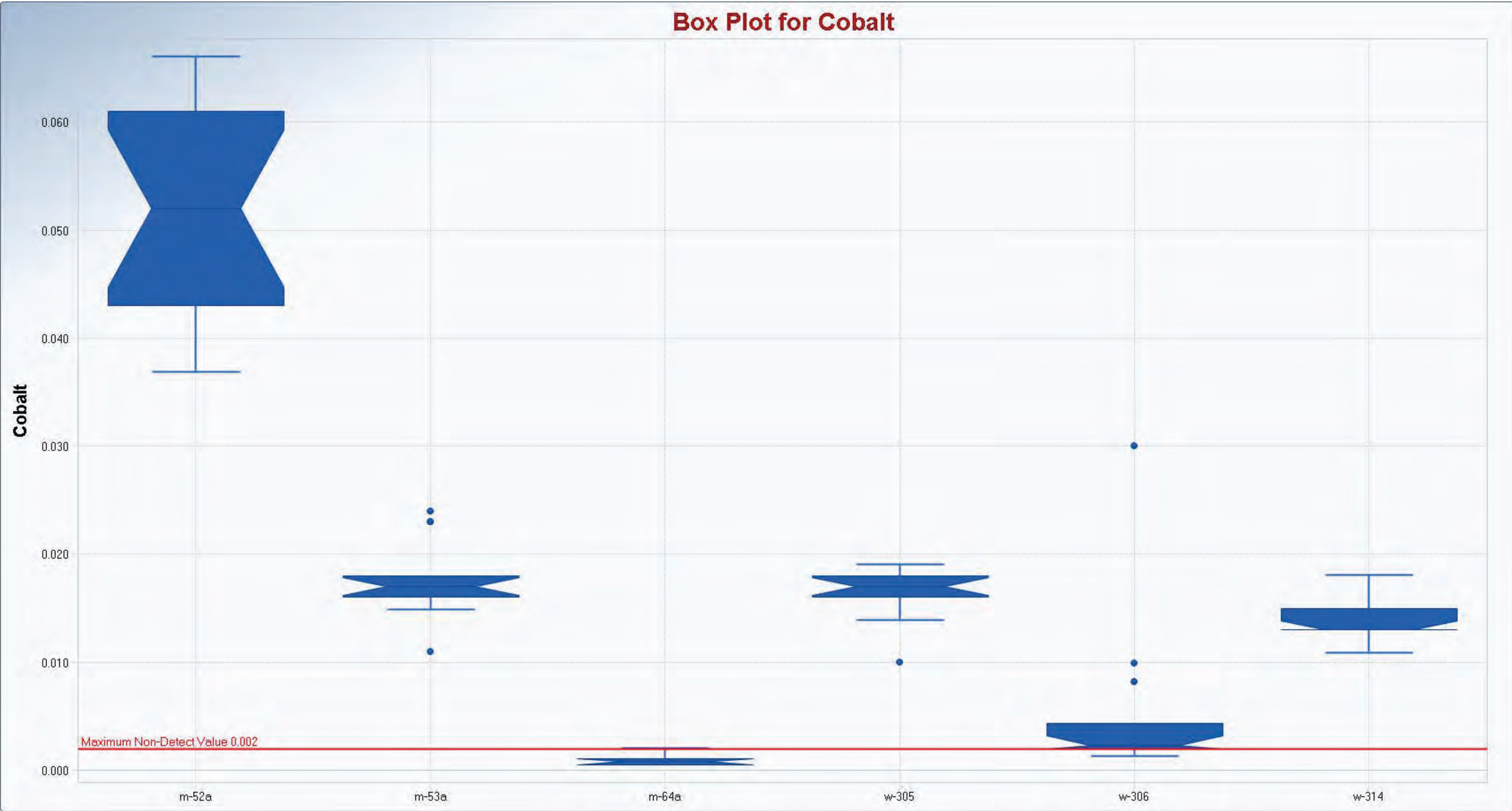
Box Plot for Cadmium



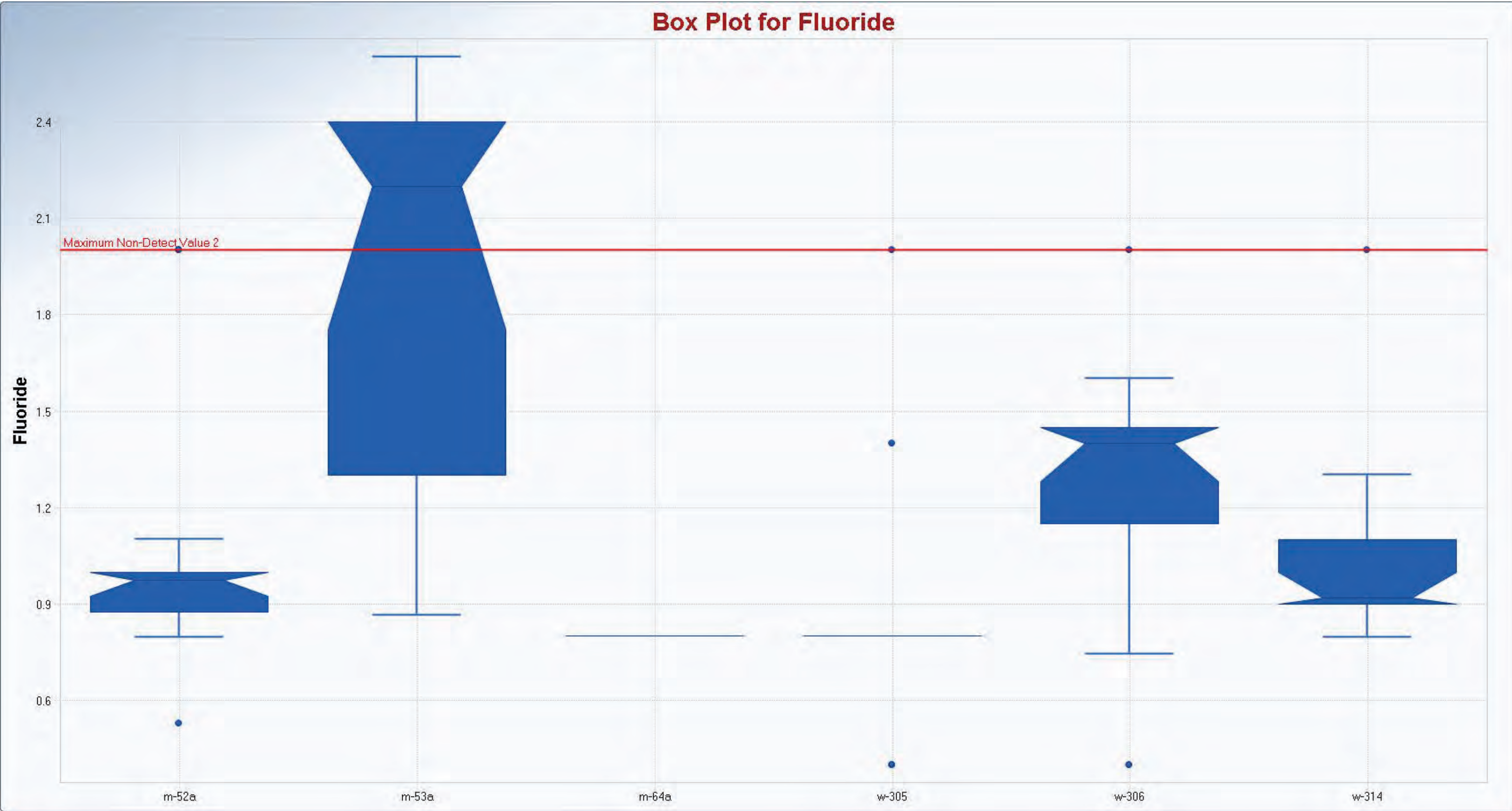
Box Plot for Chromium

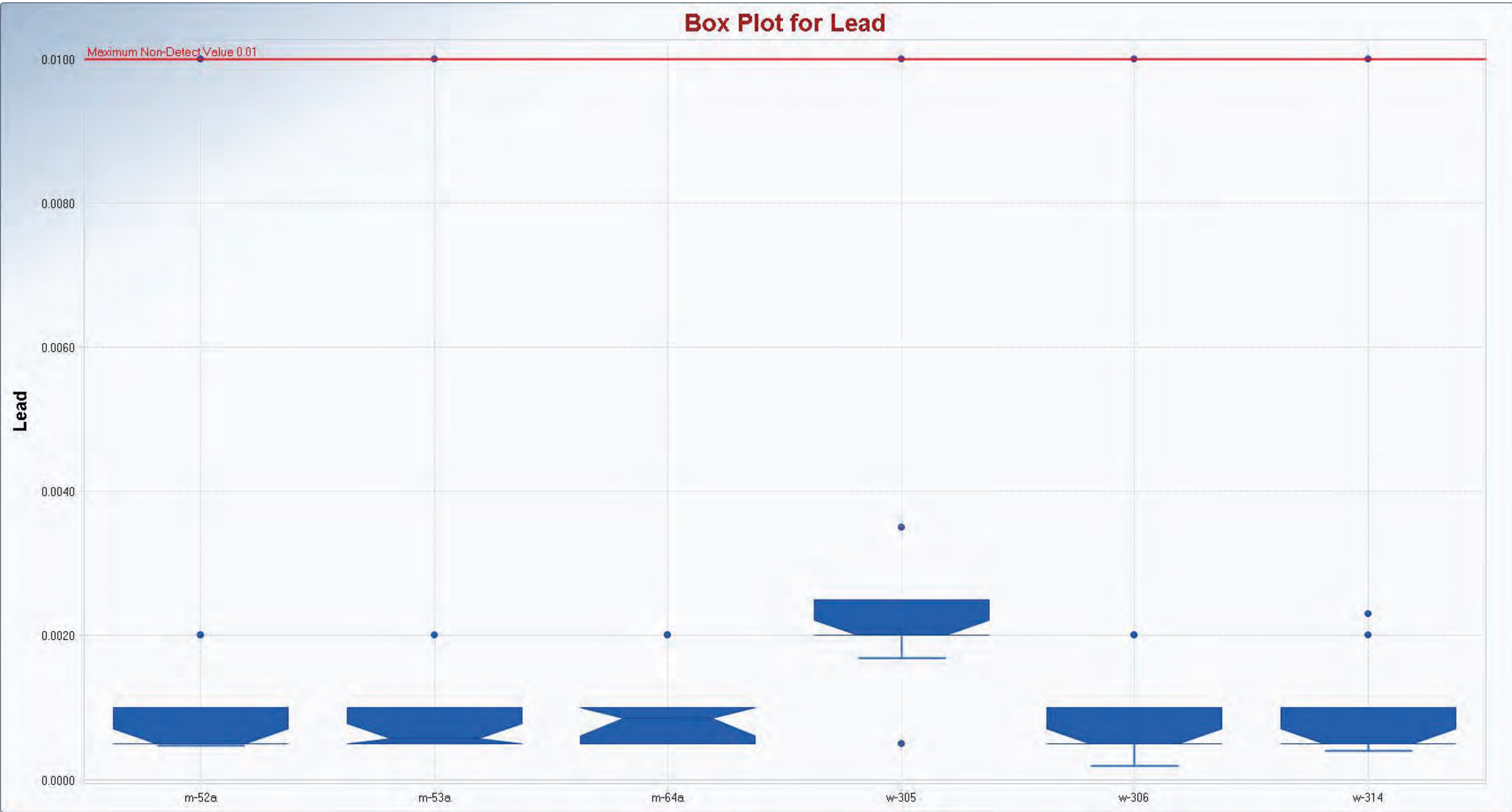


Box Plot for Cobalt

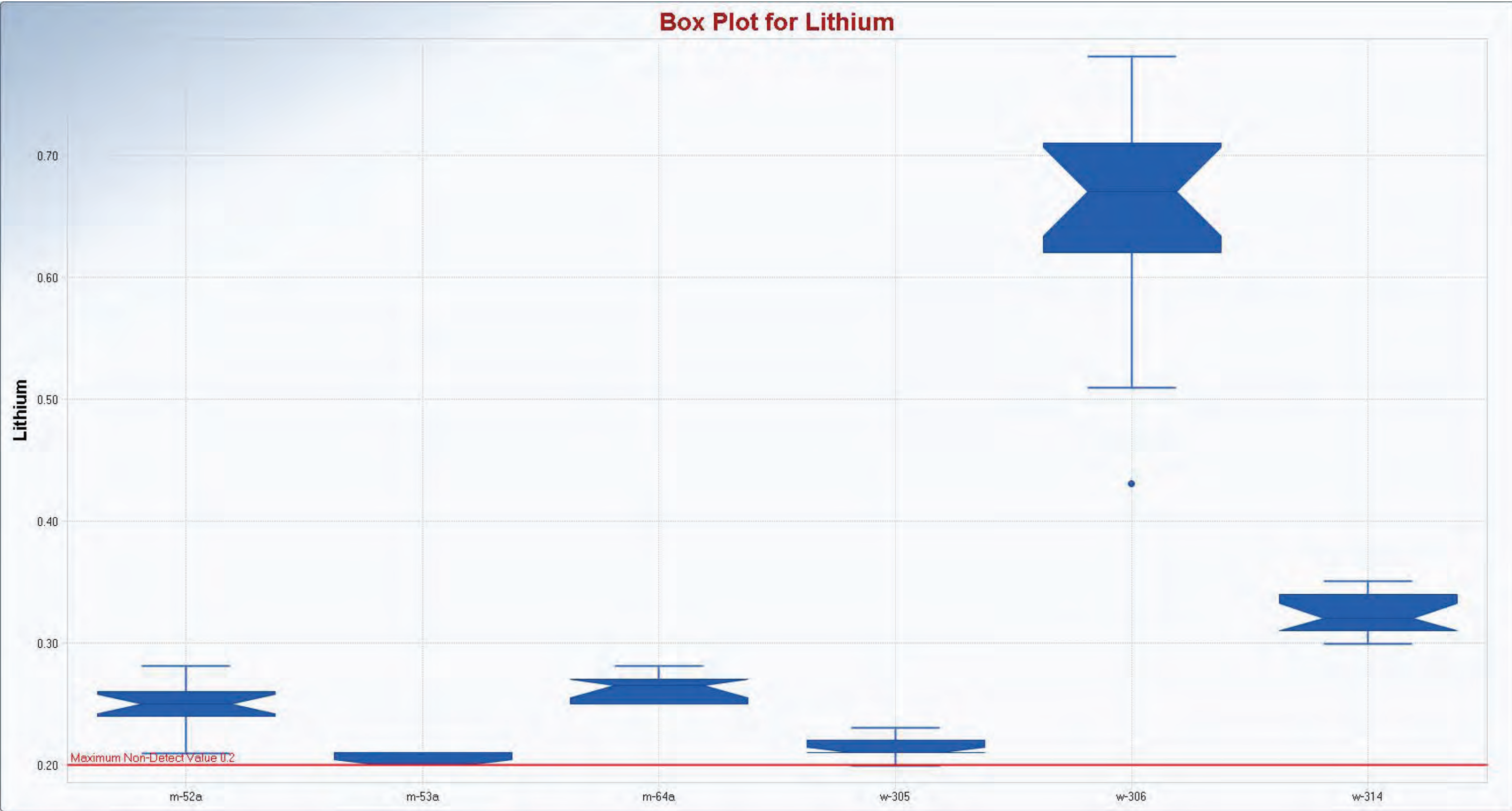


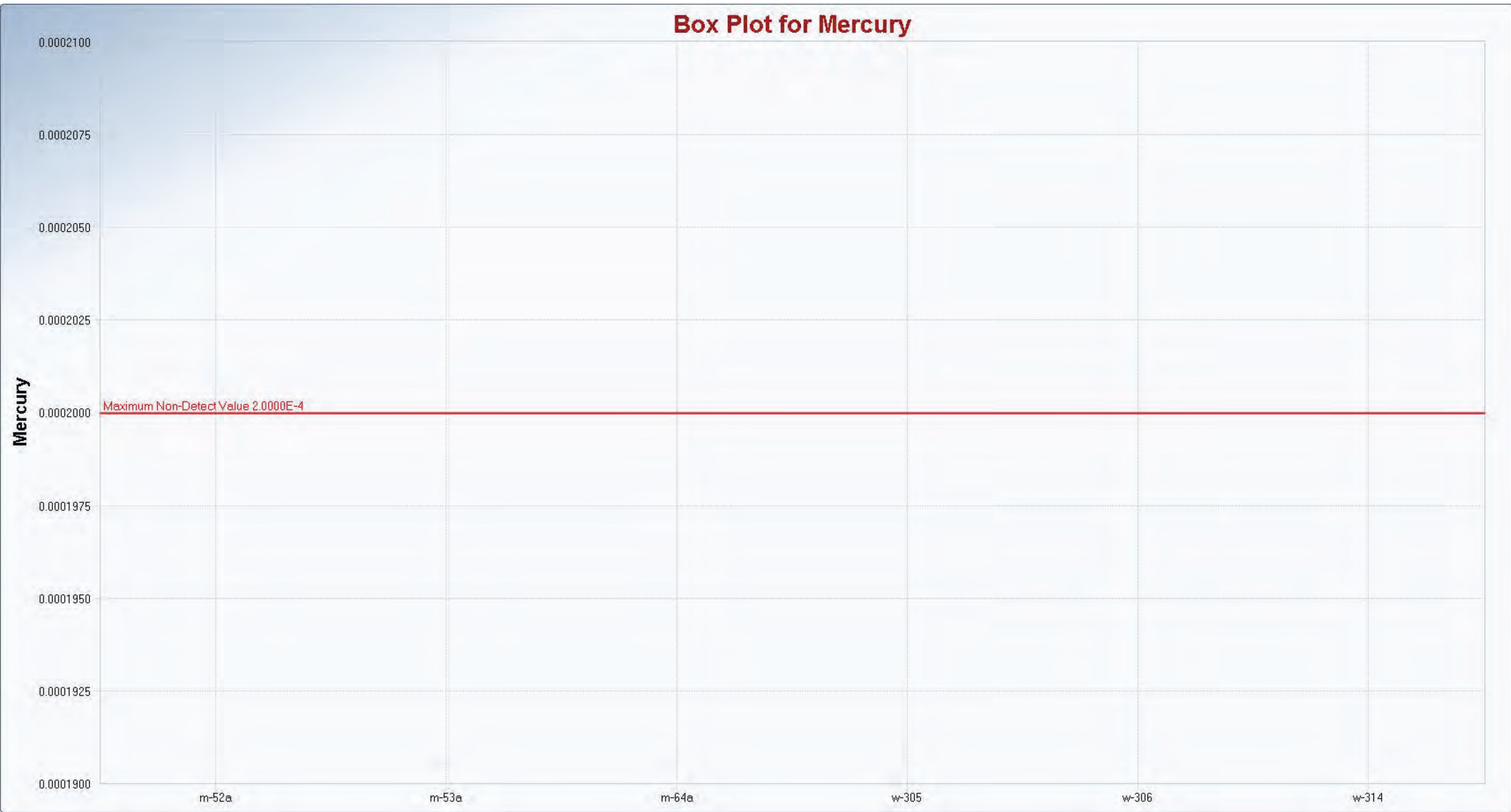
Box Plot for Fluoride



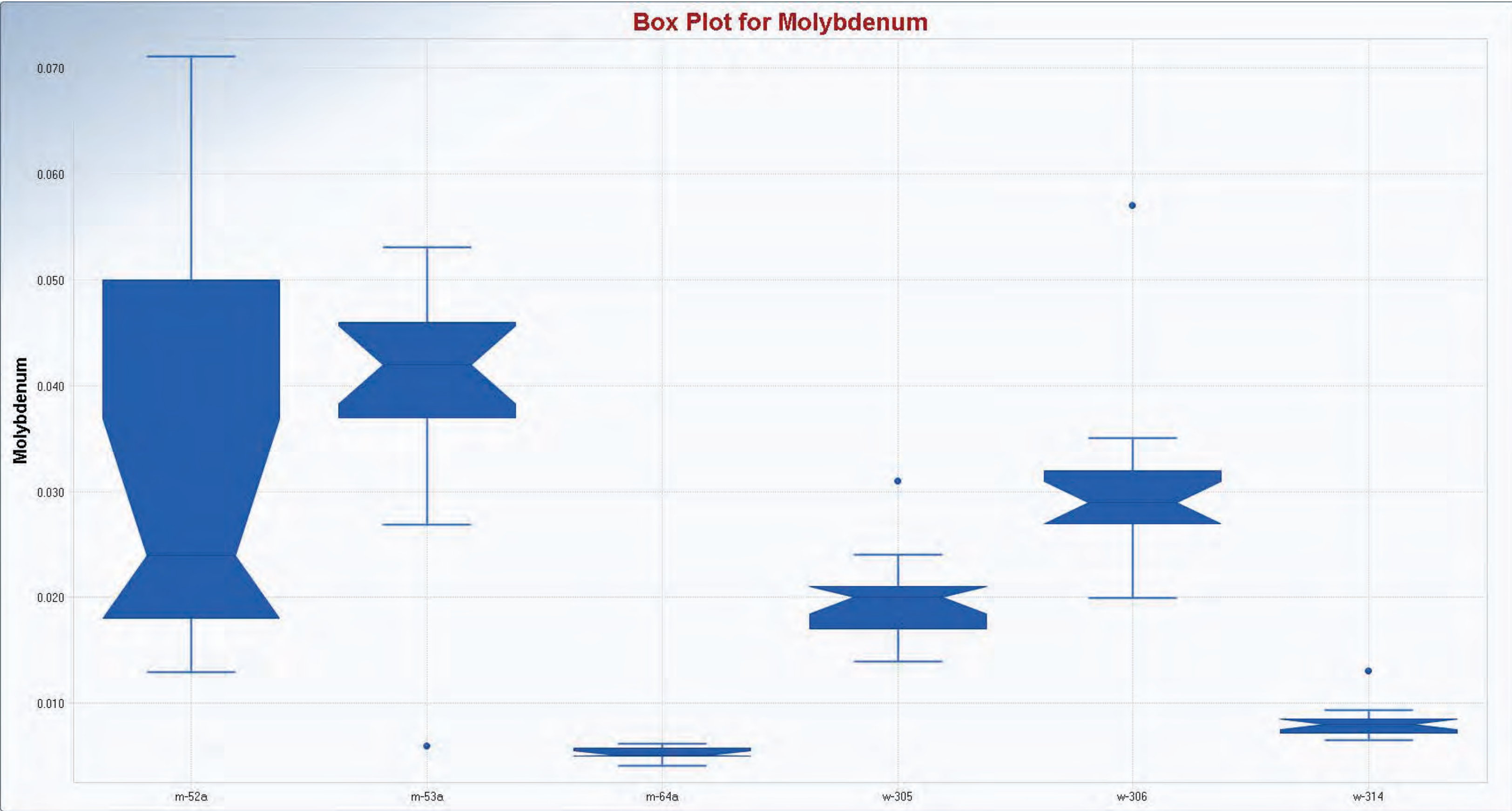


Box Plot for Lithium

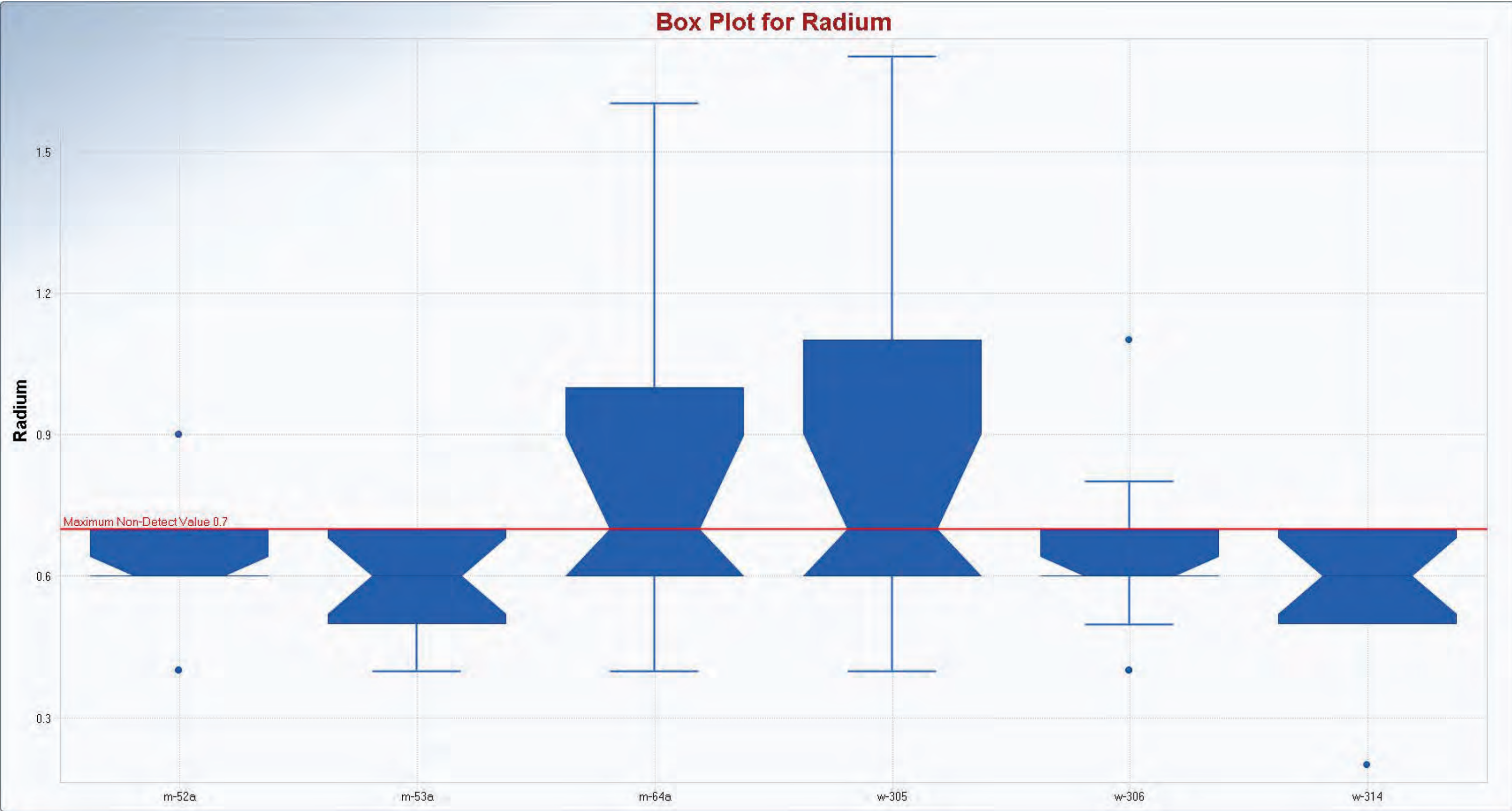




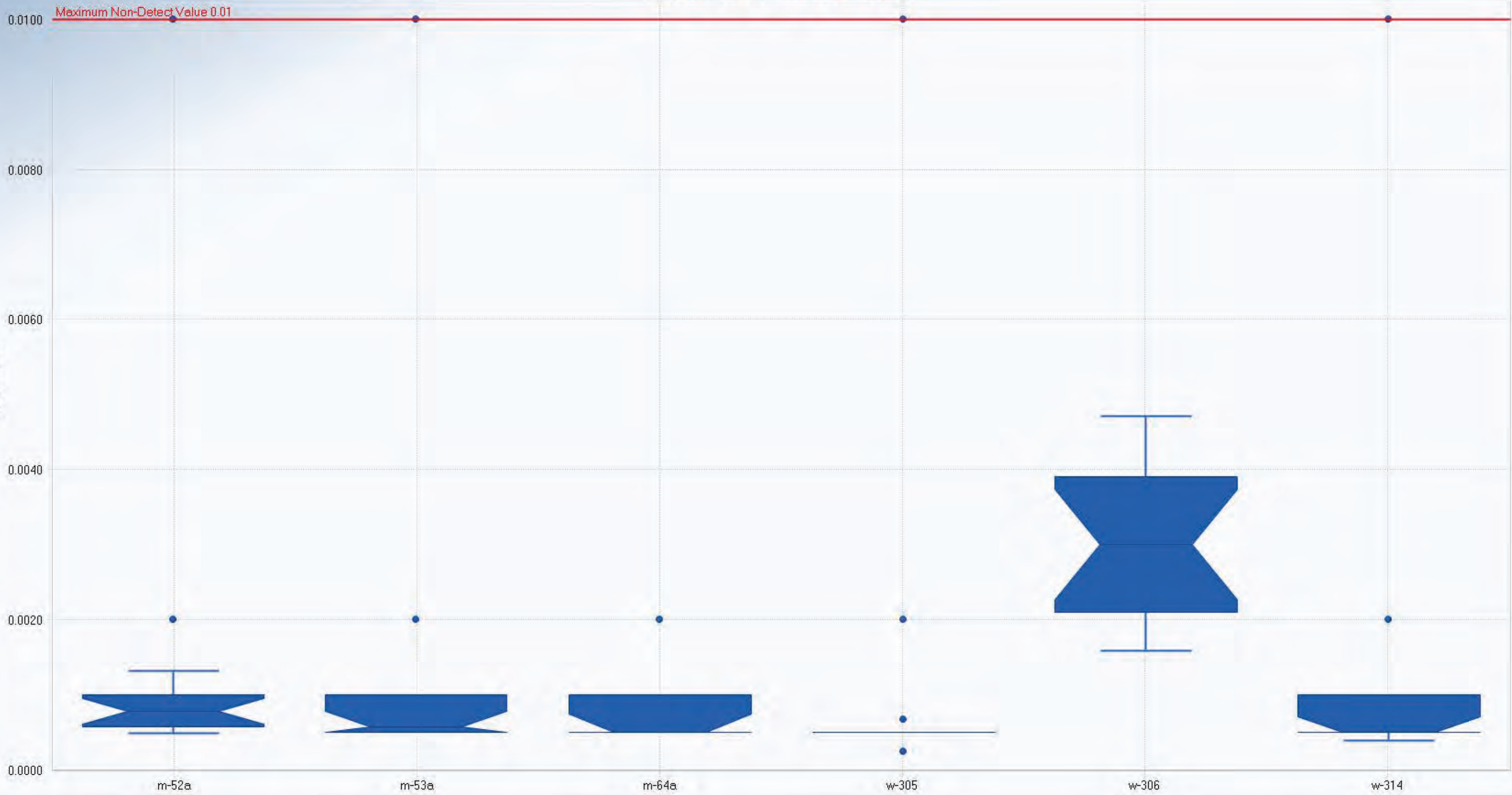
Box Plot for Molybdenum



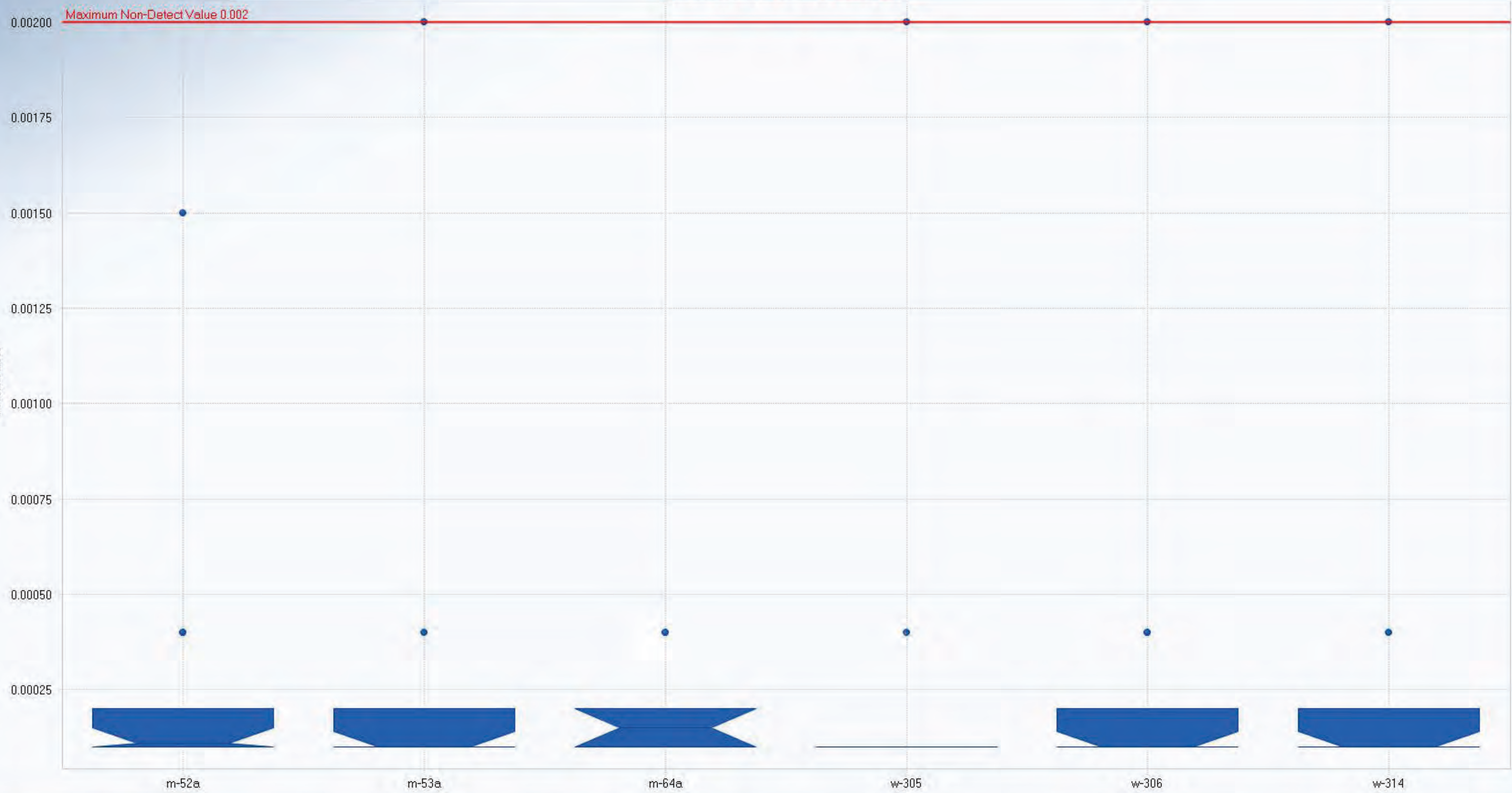
Box Plot for Radium



Box Plot for Selenium



Box Plot for Thallium



APPENDIX H

**WOOD TECHNICAL MEMORANDUM DOCUMENTING THE STATISTICAL ANALYSIS
OF INITIAL ASSESSMENT MONITORING APPENDIX IV CONSTITUENT DATA
COLLECTED FROM THE FAP**



Technical Memorandum

To: Michele Robertson, RG
 Pamela Norris
From: Natalie Chrisman Lazarr, PE
 Carla Landrum, PhD
Date: October 15, 2018
File No: 1420182040.03
cc: File

**Subject: CCR GROUNDWATER ASSESSMENT MONITORING
 STATISTICAL ANALYSIS AND RESULTS FOR THE FLY ASH POND
 Arizona Public Service Cholla Power Plant – Navajo County, Arizona**

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 Fly Ash Pond (FAP) located at the Arizona Public Service (APS) Cholla Power Plant (Cholla) in Navajo County, Arizona. 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 Cholla 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 FAP groundwater monitoring well network consists of one background monitoring well (M-64A) and three compliance (i.e., downgradient), monitoring wells (M-50A, M-51A and W-123). The period of evaluation for the FAP Appendix IV constituent statistical analysis ranges from December 2015 through May 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 for data collection is shorter (i.e. February 2017 through May 2018) for M-64A, which was installed in February 2017.

Due principally to the addition of wells to the monitoring program in 2017 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 FAP was conducted in February 2018; all Appendix IV constituents were evaluated in collected



samples during this monitoring event. During the second round of assessment monitoring conducted in May 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 14 and 9 for compliance monitoring wells and the background monitoring well, 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 to the analyte's reporting limit value for the corresponding sample date. Field and split sample duplicates were retracted.

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.

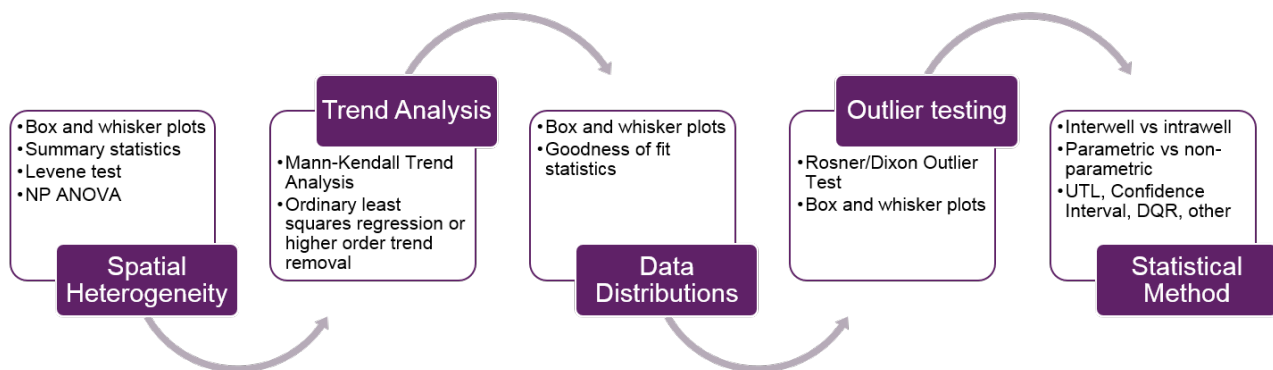


Figure 1. Assessment monitoring EDA and statistical method workflow procedures. Each box represent as separate step in the EDA workflow process. The items listed in each box identifies the statistical method(s) applied for each step. Both quantitative and qualitative methods are listed.

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 FAP 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 Cholla FAP 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 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 Cholla. 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 FAP. 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), 3) structurally-compromised wells that do not produce representative groundwater samples and 4) background wells that do not adequately represent site-specific activity independent of the CCR unit. 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* ($1-\alpha$) 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 compute 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 FAP: 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. For all Appendix IV constituents except lithium, the U.S. EPA's promulgated MCL or the risk-based alternative GWPS, is higher than the BTVs.

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 lithium in following monitoring wells: M-50A, M-51A and W-123. Monitoring wells M-50A and M-51A exhibit statistically significant ($p < 0.05$) decreasing trends in lithium concentrations. Monitoring well W-123 exhibits a statistically significant ($p < 0.05$) increasing trend for lithium.

This statistical analysis also indicates there is sufficient evidence to declare an SSI for arsenic, cobalt and fluoride in M-51A and molybdenum in W-123. The SSI for cobalt in M-51A corresponds to a reporting limit value that exceeds the GWPS and may be representative of a false positive SSI. There is insufficient evidence indicating the presence of any statistically significant temporal trends in these wells for these constituents.

Several compliance monitoring wells exhibit statistically significant ($p < 0.05$) temporal trends with no SSI declaration, including statistically significant ($p < 0.05$) decreasing trends in M-50A for barium and selenium and statistically significant ($p < 0.05$) increasing trends for chromium (W-123), molybdenum (M-50A and M-51A) and selenium (W-123).

5.0 RECOMMENDATIONS

This statistical analysis results in the following recommendations for the FAP assessment monitoring statistical analysis:

- There is sufficient evidence to declare an SSI above the GWPS for lithium in monitoring wells M-50A, M-51A and W-123; for arsenic, cobalt and fluoride in M-51A; and molybdenum in monitoring well W-123. 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.
- Several of the constituents that exhibit SSIs above their respective GWPS for the FAP do so by a very narrow margin. It is possible that the accelerated sampling frequency, made in effort to obtain the minimum sample counts under the CCR Rule, might be the cause of these narrow exceedances. This is because sampling groundwater at high frequencies tends to generate temporally-dependent sample data that can underestimate the true temporal variation in constituent concentrations beneath the FAP. This, in turn, can conservatively underestimate the position of the lower confidence limit for both parametric and non-parametric methods which can result in a false positive SSI. A lower sampling frequency is necessary to avoid temporal-dependence 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 SSI for cobalt in M-51A is likely a false positive because the non-parametric method ranks a reporting limit value as the lower confidence limit. 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 or positive SSIs when applying statistical tests.
- With the exception of lithium, the GWPS selections for the FAP defaults to the U.S. EPA's MCL or the risk-based alternative GWPS by consequence of the respective BTVs exhibiting lower constituent concentrations (Table 1). It is important to interpret the selected GWPSs within the context of the Cholla conceptual site model to ensure that the GWPSs are adequate and representative of groundwater conditions upgradient of the FAP. If it is possible for true background constituent concentrations at Cholla (i.e. those absent of a release from the FAP) to exceed the selected GWPSs, then it is possible for the SSIs declared herein to be false. In the event that the GWPSs in Table 1 are deemed inadequate or misrepresent true background constituent concentrations for the FAP, and it is impractical to establish a background well location closer and upgradient to the site, intrawell statistical comparisons should be considered.

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.

U.S. EPA, 2015. *ProUCL (Version 5.1.1) User Guide, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations*. EPA/600/R-07/041. Washington D.C. October 2015.

Wood Environment & Infrastructure Solutions, Inc, 2018. *Statistical Data Analysis Work Plan*. Coal Combustion Residual Rule Groundwater Monitoring System Compliance, Cholla Power Plant, Navajo County, Arizona. Prepared for Arizona Public Service. October, 2018.

TABLES



Table 1
GWPS Selection for the Cholla FAP
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
M-64A	Antimony	0.006	---	0.004 (DQR)	mg/L	US EPA MCL
M-64A	Arsenic	0.01	---	0.004 (P-UTL)	mg/L	US EPA MCL
M-64A	Barium	2	---	0.05 (P-UTL)	mg/L	US EPA MCL
M-64A	Beryllium	0.004	---	0.001 (DQR)	mg/L	US EPA MCL
M-64A	Cadmium	0.005	---	0.0004 (DQR)	mg/L	US EPA MCL
M-64A	Chromium	0.1	---	0.004 (NP-UTL)	mg/L	US EPA MCL
M-64A	Cobalt	---	0.006	0.002 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
M-64A	Fluoride	4	---	0.8 (DQR)	mg/L	US EPA MCL
M-64A	Lead	---	0.015	0.002 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
M-64A	Lithium	---	0.04	0.31 (P-UTL)	mg/L	BTV
M-64A	Mercury	0.002	---	0.0002 (DQR)	mg/L	US EPA MCL
M-64A	Molybdenum	---	0.1	0.0061 (P-UTL)	mg/L	Alternative Risk-Based GWPS
M-64A	Selenium	0.05	---	0.002 (NP-UTL)	mg/L	US EPA MCL
M-64A	Thallium	0.002	---	0.0014 (DQR)	mg/L	US EPA MCL
M-64A	Combined Radium	5	---	1.6 (NP-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

Table 2
 Statistical Results Summary - Cholla FAP 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	0.006	0.01	2	0.004	0.005	0.1	0.006	4	0.015	0.31	0.002	0.1	0.05	0.002	5
M-50A	NP-LCL (0.004)	P-LCL (0.0023)	NP-LCL (0.013)	NP-LCL (0.001)	NP-LCL (0.0004)	P-LCL (0.0023)	P-LCL (0.0024)	P-LCLT (2.2)	NP-LCL (0.002)	<u>P-LCLT (0.43)</u>	NP-LCL (0.0002)	NP-LCL (0.0091)	<u>P-LCLT (0.0025)</u>	NP-LCL (0.0004)	NP-LCL (0.7)
M-51A	NP-LCL (0.004)	<u>P-LCL (0.012)</u>	NP-LCL (0.011)	NP-LCL (0.001)	NP-LCL (0.0005)	P-LCL (0.01)	<u>NP-LCL (0.01)*</u>	<u>P-LCL (4.3)</u>	NP-LCL (0.002)	<u>P-LCLT (0.47)</u>	NP-LCL (0.0002)	P-LCLT (0.0043)	NP-LCL (0.005)	P-LCL (0.0005)	NP-LCL (0.8)
W-123	NP-LCL (0.0025)	P-LCL (0.0023)	P-LCL (0.0093)	NP-LCL (0.001)	NP-LCL (0.0002)	P-LCLT (0.048)	P-LCL (0.0012)	P-LCL (3.5)	NP-LCL (0.002)	<u>P-LCLT (0.63)</u>	NP-LCL (0.0002)	<u>P-LCL (0.32)</u>	P-LCLT (0.0044)	NP-LCL (0.0003)	NP-LCL (0.7)

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
All Constituents - All Wells

StationName	QC_Sample_ID	SampDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Fluoride	D_Fluoride	Lead	D_Lead	Lithium	D_Lithium
M-50A	7792_O	12/2/2015 8:32	0.0025	0	0.0023	1	0.018	1	0.001	0	0.0001	0	0.0005	0	0.00051	1	2	1	0.0005	0	0.51	1
M-50A	CH-M-50A-0316_O	3/8/2016 18:10	0.05	0	0.01	0	0.013	1	0.001	0	0.002	0	0.01	0	0.01	0	2	1	0.01	0	0.47	1
M-50A	CH-CCR-M50A-516_O	5/5/2016 16:55	0.00026	1	0.0025	1	0.011	1	0.001	0	0.0001	0	0.0005	0	0.00051	1	2.2	1	0.0005	0	0.47	1
M-50A	CH-CCR-M50A-816_O	8/25/2016 9:25	0.00018	1	0.0025	1	0.0084	1	0.001	0	0.0001	0	0.0005	0	0.00056	1	2.3	1	0.0005	0	0.45	1
M-50A	CH-CCR-M50A-916_O	9/23/2016 12:47	0.0005	0	0.0024	1	0.0093	1	0.001	0	0.0001	0	0.0024	1	0.00084	1	2.1	1	0.00012	1	0.5	1
M-50A	CH-CCR-M50A-217_O	2/21/2017 8:49	0.001	0	0.0026	1	0.014	1	0.001	0	0.0001	0	0.022	1	0.0009	1	2.1	1	0.0005	0	0.5	1
M-50A	CH-CCR-M50A-41317_O	4/13/2017 10:41	0.001	0	0.003	1	0.01	1	0.001	0	0.0001	0	0.015	1	0.00093	1	2	1	0.0005	0	0.46	1
M-50A	CH-CCR-M50A-42617_O	4/26/2017 9:22	0.001	0	0.0024	1	0.0084	1	0.001	0	0.0001	0	0.0066	1	0.00069	1	2	1	0.0005	0	0.48	1
M-50A	CH-CCR-M50A-51817_O	5/18/2017 15:27	0.001	0	0.0023	1	0.0081	1	0.001	0	0.0001	0	0.0049	1	0.00056	1	2.2	1	0.0005	0	0.48	1
M-50A	CH-CCR-M50A-52417_O	5/24/2017 17:31	0.001	0	0.0026	1	0.0085	1	0.001	0	0.0001	0	0.0037	1	0.00067	1	2.3	1	0.0005	0	0.49	1
M-50A	CH-CCR-M50A-63017_O	6/30/2017 14:05	0.001	0	0.0025	1	0.0084	1	0.001	0	0.0001	0	0.0038	1	0.0014	1	2.4	1	0.0005	0	0.45	1
M-50A	CH-CCR-M50A-72717_O	7/27/2017 15:03	0.004	0	0.0025	1	0.0089	1	0.001	0	0.0004	0	0.002	0	0.002	0	2.5	1	0.002	0	0.46	1
M-50A	CH-CCR-M50A-90717_O	9/7/2017 14:11	0.004	0	0.0026	1	0.0091	1	0.001	0	0.0004	0	0.004	0	0.002	0	2.2	1	0.002	0	0.48	1
M-50A	CH-CCR-M50A-120817_O	12/8/2017 12:51															2.2	1				
M-50A	CH-CCR-M50A-21418_O	2/14/2018 13:57	0.001	0	0.0027	1	0.0087	1	0.001	0	0.0001	0	0.001	1	0.00055	1	2.6	1	0.0012	1	0.44	1
M-50A	CH-CCR-M-50A-52118_O	5/21/2018 10:06			0.0025	1	0.0086	1			0.0001	0	0.0012	1	0.00079	1	2.4	1	0.0005	0	0.43	1
M-51A	7880_O	12/2/2015 7:45	0.0025	0	0.02	1	0.012	1	0.001	0	0.0001	0	0.01	0	0.01	0	4.8	1	0.0005	0	0.6	1
M-51A	CH-M-51A-0316_O	3/9/2016 16:35	0.05	0	0.016	1	0.0095	1	0.001	0	0.002	0	0.025	0	0.025	0	4.6	1	0.01	0	0.54	1
M-51A	CH-CCR-M51A-0516_O	5/5/2016 13:59	0.0001	0	0.0029	1	0.011	1	0.001	0	0.0001	0	0.002	0	0.002	0	5.5	1	0.0005	0	0.57	1
M-51A	CH-CCR-M51A-816_O	8/25/2016 8:34	0.00015	1	0.029	1	0.01	1	0.001	0	0.00011	1	0.005	0	0.005	0	6	1	0.0005	0	0.56	1
M-51A	CH-CCR-M51A-916_O	9/23/2016 12:19	0.0025	0	0.025	1	0.01	1	0.001	0	0.0005	0	0.0025	0	0.0025	1	5.4	1	0.0005	0	0.61	1
M-51A	CH-CCR-M51A-217_O	2/21/2017 7:52	0.001	0	0.023	1	0.0091	1	0.001	0	0.0001	0	0.053	1	0.0023	1	4.4	1	0.0005	0	0.58	1
M-51A	CH-CCR-M51A-41317_O	4/13/2017 10:00	0.001	0	0.02	1	0.0099	1	0.001	0	0.0001	0	0.014	1	0.002	0	4.1	1	0.0005	0	0.49	1
M-51A	CH-CCR-M51A-42617_O	4/26/2017 8:51	0.001	0	0.024	1	0.0096	1	0.001	0	0.0001	0	0.0081	1	0.005	0	4.6	1	0.001	0	0.57	1
M-51A	CH-CCR-M51A-51817_O	5/18/2017 14:57	0.001	0	0.024	1	0.0096	1	0.001	0	0.0001	0	0.0081	1	0.005	0	5	1	0.0005	0	0.56	1
M-51A	CH-CCR-M51A-52417_O	5/24/2017 17:05	0.01	0	0.028	1	0.012	1	0.001	0	0.001	0	0.0084	1	0.005	0	5.3	1	0.005	0	0.54	1
M-51A	CH-CCR-M51A-63017_O	6/30/2017 13:18	0.001	0	0.029	1	0.01	1	0.001	0	0.0001	0	0.01	0	0.01	0	4.9	1	0.0005	0	0.54	1
M-51A	CH-CCR-M51A-72717_O	7/27/2017 14:35	0.002	0	0.026	1	0.0098	1	0.001	0	0.0002	0	0.07	1	0.005	0	6	1	0.001	0	0.54	1
M-51A	CH-CCR-M51A-90717_O	9/7/2017 13:39	0.004	0	0.035	1	0.0097	1	0.001	0	0.0004	0	0.036	1	0.005	0	5.7	1	0.002	0	0.55	1
M-51A	CH-CCR-M51A-120817_O	12/8/2017 12:25															5.1	1				
M-51A	CH-CCR-M51A-21418_O	2/14/2018 13:24	0.002	0	0.015	1	0.0089	1	0.001	0	0.0002	0	0.0034	1	0.001	1	5.4	1	0.001	0	0.49	1
M-51A	CH-CCR-M-51A-52118_O	5/21/2018 9:21			0.022	1	0.01	1			0.0002	0	0.04	1	0.0018	1	5.7	1	0.001	0	0.48	1
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	0.001	0	0.00094	1	0.034	1	0.001	0	0.0001	0	0.0021	1	0.0015	1	0.8	0	0.0005	0	0.27	1
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0.001	0	0.0026	1	0.019	1	0.001	0	0.0001	0	0.0015	1	0.00068	1	0.8	0	0.00071	1	0.25	1
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0.001	0	0.0017	1	0.015	1	0.001	0	0.0001	0	0.0005	0	0.00056	1	0.8	0	0.0005	0	0.27	1
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0.001	0	0.0016	1	0.012	1	0.001	0	0.0001	0	0.0005	0	0.0005	0	0.8	0	0.0005	0	0.28	1
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0.001	0	0.0019	1	0.014	1	0.001	0	0.0001	0	0.0005	0	0.0005	0	0.8	0	0.002	0	0.27	1
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0.001	0	0.0033	1	0.017	1	0.001	0	0.0001	0	0.0005	0	0.0011	1	0.8	0	0.0005	0	0.25	1
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0.002	0	0.0028	1	0.017	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.8	0	0.001	0	0.25	1
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0.004	0	0.0025	1	0.017	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.8	0	0.002	0	0.26	1
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56															0.8	0				
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0.002	0	0.001	0	0.015	1	0.001	0	0.0002	0	0.0022	1	0.0005	0	0.8	0	0.001	0	0.27	1
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34	0.002	0	0.0012	1	0.012	1			0.0002	0	0.002	0	0.001	0	0.8	0	0.001	0	0.26	1
W-123	7800_O	12/3/2015 10:10	0.0025	0	0.0027	1	0.011	1	0.001	0	0.0001	0	0.00099	1	0.0023	1	3.7	1	0.00094	1	0.6	1
W-123	CH-W-123-0316_O	3/8/2016 16:55	0.05	0	0.01	0	0.011	1	0.001	0	0.002	0	0.01	0	0.0025	1	3.6	1	0.01	0	0.58	1
W-123	CH-CCR-W123-0516_O	5/6/2016 9:05	0.00026	1	0.0021	1	0.012	1	0.001	0	0.0001	0	0.001	1	0.0019	1	3.6	1	0.0005	0	0.6	1
W-123	CH-CCR-W123-816_O	8/25/2016 10:39	0.00055	1	0.0025	1	0.0097	1	0.001	0	0.0001	0	0.0018	1	0.002	1	4.1	1	0.0005	0	0.62	1
W-123	CH-CCR-W123-916_O	9/22/2016 11:45	0.001	0	0.0019	1	0.0096	1	0.001	0	0.0002	0	0.041	1	0.002	1	3.7	1	0.0002	0	0.64	1
W-123	CH-CCR-W123-217_O	2/20/2017 16:40	0.001	0	0.0017	1	0.0094	1	0.001	0	0.0001	0	0.13	1	0.0014	1	8	0	0.0005	0	0.66	1
W-123	CH-CCR-W123-41317_O	4/13/2017 11:55	0.001	0	0.002	1	0.01	1	0.001	0	0.0001	0	0.045	1	0.0014	1	4	1	0.0005	0	0.59	1
W-123	CH-CCR-W123-42617_O	4/26/2017 10:14	0.001	0	0.0017	1	0.01	1	0.001	0	0.0001	0	0.016	1	0.0014	1	3.5	1	0.001	0	0.64	1
W-123	CH-CCR-W123-52217_O	5/22/2017 11:25	0.001	0	0.0014	1	0.0095	1	0.001	0	0.0001	0	0.0099	1	0.0012	1	3.8	1	0.0005	0	0.65	1
W-123	CH-CCR-W123-52417_O	5/24/2017 18:18	0.001	0	0.002	1	0.01	1	0.001	0	0.0001	0	0.018	1	0.0015	1	3.8	1	0.002	0	0.68	1
W-123	CH-CCR-W123-63017_O	6/30/2017 14:46	0.001	0	0.002	1	0.011	1	0.001	0	0.0001	0	0.008	1	0.0013	1	3.8	1	0.0005	0	0.63	1
W-123	CH-CCR-W123-72717_O	7/27/2017 16:09	0.002	0	0.0015	1	0.01	1	0.001	0	0.0002	0	0.046	1	0.0017	1	3.7	1	0.001	0	0.66	1
W-123	CH-CCR-W123-90717_O	9/7/2017 14:59	0.004	0	0.002	0	0.011	1	0.001	0	0.0004	0	0.097	1	0.0022	1	3.7	1	0.002	0	0.7	1
W-123	CH-CCR-W123-120817_O	12/8/2017 13:10															4.1	1				
W-123	CH-CCR-W123-21418_O	2/14/2018 14:45	0.002	0	0.0018	1	0.01	1	0.001	0	0.0002	0	0.12	1	0.0021	1	4.2	1	0.001	0	0.63	1
W-123	CH-CCR-W-123-52118_O	5/21/2018 10:41			0.003	1	0.011	1			0.0002	0										

Table A-1
All Constituents - All Wells

StationName	QC_Sample_ID	SampDate	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Radium	D_Radium	Selenium	D_Selenium	Thallium	D_Thallium	
M-50A	7792_O	12/2/2015 8:32	0.0002	0	0.005	1	0.7	0	0.0068	1	0.0001	0	10.24751
M-50A	CH-M-50A-0316_O	3/8/2016 18:10	0.0002	0	0.0059	1	0.5	0	0.005	1	0.002	0	8.0891
M-50A	CH-CCR-M50A-516_O	5/5/2016 16:55	0.0002	0	0.0056	1	0.7	1	0.0054	1	0.0001	0	12.39767
M-50A	CH-CCR-M50A-816_O	8/25/2016 9:25	0.0002	0	0.0059	1	0.6	0	0.0049	1	0.0001	0	11.37484
M-50A	CH-CCR-M50A-916_O	9/23/2016 12:47	0.0002	0	0.0075	1	1.1	1	0.0046	1	0.00013	1	14.72909
M-50A	CH-CCR-M50A-217_O	2/21/2017 8:49	0.0002	0	0.0091	1	0.6	0	0.0043	1	0.0001	0	11.2553
M-50A	CH-CCR-M50A-41317_O	4/13/2017 10:41	0.0002	0	0.0083	1	0.6	0	0.004	1	0.0001	0	11.10413
M-50A	CH-CCR-M50A-42617_O	4/26/2017 9:22	0.0002	0	0.0067	1	0.6	0	0.0042	1	0.0001	0	11.11189
M-50A	CH-CCR-M50A-51817_O	5/18/2017 15:27	0.0002	0	0.0059	1	0.6	1	0.0037	1	0.0001	0	12.30836
M-50A	CH-CCR-M50A-52417_O	5/24/2017 17:31	0.0002	0	0.0061	1	0.8	0	0.0044	1	0.0001	0	11.61887
M-50A	CH-CCR-M50A-63017_O	6/30/2017 14:05	0.0002	0	0.028	1	0.7	0	0.004	1	0.00011	1	12.60101
M-50A	CH-CCR-M50A-72717_O	7/27/2017 15:03	0.0002	0	0.0077	1	0.7	0	0.0039	1	0.0004	0	9.695
M-50A	CH-CCR-M50A-90717_O	9/7/2017 14:11	0.0002	0	0.0091	1	0.6	0	0.003	1	0.0004	0	9.3178
M-50A	CH-CCR-M50A-120817_O	12/8/2017 12:51											3.2
M-50A	CH-CCR-M50A-21418_O	2/14/2018 13:57	0.0002	0	0.0085	1	0.5	1	0.0029	1	0.0001	0	13.56795
M-50A	CH-CCR-M-50A-52118_O	5/21/2018 10:06			0.007	1	0.4	1	0.0027	1			12.25339
M-51A	7880_O	12/2/2015 7:45	0.0002	0	0.034	1	0.9	0	0.0001	0	0.0002	1	12.3906
M-51A	CH-M-51A-0316_O	3/9/2016 16:35	0.0002	0	0.031	1	0.9	0	0.025	0	0.002	0	11.2367
M-51A	CH-CCR-M51A-0516_O	5/5/2016 13:59	0.0002	0	0.029	1	0.8	0	0.002	0	0.00015	1	12.92095
M-51A	CH-CCR-M51A-816_O	8/25/2016 8:34	0.0002	0	0.042	1	0.6	0	0.005	0	0.00027	1	15.25823
M-51A	CH-CCR-M51A-916_O	9/23/2016 12:19	0.0002	0	0.043	1	0.7	0	0.003	0	0.0005	0	12.8012
M-51A	CH-CCR-M51A-217_O	2/21/2017 7:52	0.0002	0	0.038	1	0.6	1	0.002	0	0.00014	1	14.71034
M-51A	CH-CCR-M51A-41317_O	4/13/2017 10:00	0.0002	0	0.038	1	0.6	0	0.002	0	0.00014	1	12.27884
M-51A	CH-CCR-M51A-42617_O	4/26/2017 8:51	0.0002	0	0.036	1	0.6	0	0.005	0	0.0002	0	11.8612
M-51A	CH-CCR-M51A-51817_O	5/18/2017 14:57	0.0002	0	0.03	1	0.6	0	0.005	0	0.00012	1	13.24462
M-51A	CH-CCR-M51A-52417_O	5/24/2017 17:05	0.0002	0	0.036	1	0.6	1	0.005	0	0.001	0	13.5526
M-51A	CH-CCR-M51A-63017_O	6/30/2017 13:18	0.0002	0	0.038	1	0.7	0	0.01	0	0.00021	1	12.25001
M-51A	CH-CCR-M51A-72717_O	7/27/2017 14:35	0.0002	0	0.054	1	0.7	0	0.005	0	0.00021	1	14.41441
M-51A	CH-CCR-M51A-90717_O	9/7/2017 13:39	0.0002	0	0.054	1	0.6	0	0.005	0	0.0004	0	13.0027
M-51A	CH-CCR-M51A-120817_O	12/8/2017 12:25											6.1
M-51A	CH-CCR-M51A-21418_O	2/14/2018 13:24	0.0002	0	0.046	1	0.2	1	0.0005	0	0.0002	0	14.1694
M-51A	CH-CCR-M-51A-52118_O	5/21/2018 9:21			0.057	1	0.6	0	0.001	0			13.913
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	0.0002	0	0.0061	1	0.6	0	0.00082	1	0.0001	0	8.71836
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0.0002	0	0.005	1	0.6	0	0.0005	0	0.0001	0	8.68239
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0.0002	0	0.005	1	1.6	1	0.0005	0	0.0001	0	8.69616
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0.0002	0	0.0042	1	1.3	1	0.0005	0	0.0001	0	7.4022
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0.0002	0	0.0051	1	0.4	1	0.0005	0	0.0004	0	6.4972
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0.0002	0	0.005	1	0.7	0	0.0005	0	0.0001	0	6.7803
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0.0002	0	0.0051	1	0.7	0	0.001	0	0.0002	0	5.7825
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0.0002	0	0.0059	1	0.7	0	0.002	0	0.0004	0	5.8014
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56											0.8
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0.0002	0	0.0058	1	1	1	0.0005	0	0.0002	0	7.0996
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34			0.0055	1	0.7	0	0.001	0	0.0002	0	5.7861
W-123	7800_O	12/3/2015 10:10	0.0002	0	0.35	1	0.7	1	0.0017	1	0.00026	1	16.37369
W-123	CH-W-123-0316_O	3/8/2016 16:55	0.0002	0	0.34	1	0.4	0	0.0023	1	0.0003	1	12.0193
W-123	CH-CCR-W123-0516_O	5/6/2016 9:05	0.0002	0	0.33	1	0.8	0	0.0024	1	0.0001	0	14.35156
W-123	CH-CCR-W123-816_O	8/25/2016 10:39	0.0002	0	0.36	1	0.5	1	0.0032	1	0.0001	0	15.60165
W-123	CH-CCR-W123-916_O	9/22/2016 11:45	0.0002	0	0.34	1	0.6	1	0.0033	1	0.0002	0	14.3406
W-123	CH-CCR-W123-217_O	2/20/2017 16:40	0.0002	0	0.34	1	0.6	0	0.0031	1	0.0001	0	16.7485
W-123	CH-CCR-W123-41317_O	4/13/2017 11:55	0.0002	0	0.36	1	0.6	0	0.0034	1	0.0001	0	13.6147
W-123	CH-CCR-W123-42617_O	4/26/2017 10:14	0.0002	0	0.35	1	0.6	0	0.0033	1	0.0002	0	13.1259
W-123	CH-CCR-W123-52217_O	5/22/2017 11:25	0.0002	0	0.3	1	0.6	0	0.0032	1	0.0001	0	13.3781
W-123	CH-CCR-W123-52417_O	5/24/2017 18:18	0.0002	0	0.35	1	0.6	0	0.0038	1	0.0004	0	13.47
W-123	CH-CCR-W123-63017_O	6/30/2017 14:46	0.0002	0	0.33	1	0.7	0	0.0046	1	0.0001	0	13.4898
W-123	CH-CCR-W123-72717_O	7/27/2017 16:09	0.0002	0	0.33	1	0.6	0	0.0043	1	0.0002	0	13.3581
W-123	CH-CCR-W123-90717_O	9/7/2017 14:59	0.0002	0	0.36	1	0.7	0	0.0045	1	0.0004	0	12.5847
W-123	CH-CCR-W123-120817_O	12/8/2017 13:10											5.1
W-123	CH-CCR-W123-21418_O	2/14/2018 14:45	0.0002	0	0.37	1	0.5	1	0.0035	1	0.0002	0	14.842
W-123	CH-CCR-W-123-52118_O	5/21/2018 10:41			0.38	1	0.8	1	0.0058	1			14.217

Table A-2
All Constituents - Background Wells Only

StationName	QC_Sample_ID	SampDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium	D_Chromium	Cobalt	D_Cobalt	Fluoride	D_Fluoride	Lead	D_Lead
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	0.001	0	0.00094	1	0.034	1	0.001	0	0.0001	0	0.0021	1	0.0015	1	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0.001	0	0.0026	1	0.019	1	0.001	0	0.0001	0	0.0015	1	0.00068	1	0.8	0	0.00071	1
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0.001	0	0.0017	1	0.015	1	0.001	0	0.0001	0	0.0005	0	0.00056	1	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0.001	0	0.0016	1	0.012	1	0.001	0	0.0001	0	0.0005	0	0.0005	0	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0.001	0	0.0019	1	0.014	1	0.001	0	0.0001	0	0.0005	0	0.0005	0	0.8	0	0.002	0
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0.001	0	0.0033	1	0.017	1	0.001	0	0.0001	0	0.0005	0	0.0011	1	0.8	0	0.0005	0
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0.002	0	0.0028	1	0.017	1	0.001	0	0.0002	0	0.001	0	0.001	0	0.8	0	0.001	0
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0.004	0	0.0025	1	0.017	1	0.001	0	0.0004	0	0.004	0	0.002	0	0.8	0	0.002	0
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56															0.8	0		
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0.002	0	0.001	0	0.015	1	0.001	0	0.0002	0	0.0022	1	0.0005	0	0.8	0	0.001	0
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34	0.002	0	0.0012	1	0.012	1			0.0002	0	0.002	0	0.001	0	0.8	0	0.001	0

Table A-2
All Constituents - Background Wells Only

StationName	QC_Sample_ID	SampDate	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum	Radium	D_Radium	Selenium	D_Selenium	Thallium	D_Thallium
M-64A	CH-CCR-M64A-217_O	2/20/2017 13:20	0.27	1	0.0002	0	0.0061	1	0.6	0	0.00082	1	0.0001	0
M-64A	CH-CCR-M64A-41217_O	4/12/2017 16:15	0.25	1	0.0002	0	0.005	1	0.6	0	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-42517_O	4/25/2017 11:08	0.27	1	0.0002	0	0.005	1	1.6	1	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-51817_O	5/18/2017 12:09	0.28	1	0.0002	0	0.0042	1	1.3	1	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-52417_O	5/24/2017 12:11	0.27	1	0.0002	0	0.0051	1	0.4	1	0.0005	0	0.0004	0
M-64A	CH-CCR-M64A-63017_O	6/30/2017 17:22	0.25	1	0.0002	0	0.005	1	0.7	0	0.0005	0	0.0001	0
M-64A	CH-CCR-M64A-72717_O	7/27/2017 11:42	0.25	1	0.0002	0	0.0051	1	0.7	0	0.001	0	0.0002	0
M-64A	CH-CCR-M64A-90717_O	9/7/2017 17:51	0.26	1	0.0002	0	0.0059	1	0.7	0	0.002	0	0.0004	0
M-64A	CH-CCR-M64A-120817_O	12/8/2017 13:56												
M-64A	CH-CCR-M64A-21518_O	2/15/2018 11:00	0.27	1	0.0002	0	0.0058	1	1	1	0.0005	0	0.0002	0
M-64A	CH-CCR-M-64A-51918_O	5/19/2018 10:34	0.26	1			0.0055	1	0.7	0	0.001	0	0.0002	0

APPENDIX B
PROUCL OUTPUT FILES



TABLE B-1
FAP 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 8:06:46 PM									
User Selected Options											
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls									
Full Precision		OFF									
From File: FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.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 (m-50a)	14	2	2	12	85.71%	5.0000E-4	0.05	2.2000E-4	1.6000E-9	4.0000E-5	0.182
Antimony (m-51a)	14	2	1	13	92.86%	1.0000E-4	0.05	1.2500E-4	6.250E-10	2.5000E-5	0.2
Antimony (m-64a)	10	1	0	10	100.00%	0.001	0.004	N/A	N/A	N/A	N/A
Antimony (w-123)	14	2	2	12	85.71%	0.001	0.05	4.0500E-4	2.1025E-8	1.4500E-4	0.358
Arsenic (m-50a)	15	1	14	1	6.67%	0.01	0.01	0.00253	2.9184E-8	1.7083E-4	0.0676
Arsenic (m-51a)	15	1	15	0	0.00%	N/A	N/A	0.0226	5.6395E-5	0.00751	0.332
Arsenic (m-64a)	10	1	9	1	10.00%	0.001	0.001	0.00195	6.0602E-7	7.7847E-4	0.4
Arsenic (w-123)	15	1	13	2	13.33%	0.002	0.01	0.002	1.9499E-7	4.4158E-4	0.221
Barium (m-50a)	15	1	15	0	0.00%	N/A	N/A	0.0102	7.8083E-6	0.00279	0.275
Barium (m-51a)	15	1	15	0	0.00%	N/A	N/A	0.0101	8.3210E-7	9.1219E-4	0.0906
Barium (m-64a)	10	1	10	0	0.00%	N/A	N/A	0.0172	3.9956E-5	0.00632	0.368
Barium (w-123)	15	1	15	0	0.00%	N/A	N/A	0.0103	5.7552E-7	7.5863E-4	0.0733
Beryllium (m-50a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (m-51a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (m-64a)	9	2	0	9	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Beryllium (w-123)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-50a)	15	1	0	15	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Cadmium (m-51a)	15	1	1	14	93.33%	1.0000E-4	0.002	1.0125E-4	1.094E-11	3.3072E-6	0.0327
Cadmium (m-64a)	10	1	0	10	100.00%	1.0000E-4	4.0000E-4	N/A	N/A	N/A	N/A
Cadmium (w-123)	15	1	0	15	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Chromium (m-50a)	15	1	9	6	40.00%	5.0000E-4	0.01	0.00445	3.5389E-5	0.00595	1.337
Chromium (m-51a)	15	1	9	6	40.00%	0.002	0.025	0.0175	4.3510E-4	0.0209	1.189
Chromium (m-64a)	10	1	3	7	70.00%	5.0000E-4	0.004	9.9630E-4	4.8888E-7	6.9920E-4	0.702
Chromium (w-123)	15	1	14	1	6.67%	0.01	0.01	0.0415	0.0019	0.0436	1.049
Cobalt (m-50a)	15	1	12	3	20.00%	0.002	0.01	7.4250E-4	6.0319E-8	2.4560E-4	0.331
Cobalt (m-51a)	15	1	4	11	73.33%	0.002	0.025	0.00173	3.3222E-7	5.7639E-4	0.333
Cobalt (m-64a)	10	1	4	6	60.00%	5.0000E-4	0.002	7.1511E-4	1.1044E-7	3.3232E-4	0.465
Cobalt (w-123)	15	1	14	1	6.67%	0.002	0.002	0.00176	1.5960E-7	3.9950E-4	0.227
Fluoride (m-50a)	16	0	16	0	0.00%	N/A	N/A	2.219	0.035	0.187	0.0843
Fluoride (m-51a)	16	0	16	0	0.00%	N/A	N/A	5.156	0.32	0.566	0.11

TABLE B-1
FAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Fluoride (m-64a)	11	0	0	11	100.00%	0.8	0.8	N/A	N/A	N/A	N/A
Fluoride (w-123)	16	0	15	1	6.25%	8	8	3.84	0.0544	0.233	0.0607
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
Lead (m-50a)	15	1	2	13	86.67%	5.0000E-4	0.01	2.1000E-4	8.9100E-8	2.9850E-4	1.421
Lead (m-51a)	15	1	0	15	100.00%	5.0000E-4	0.01	N/A	N/A	N/A	N/A
Lead (m-64a)	10	1	1	9	90.00%	5.0000E-4	0.002	5.4200E-4	7.0560E-9	8.4000E-5	0.155
Lead (w-123)	15	1	1	14	93.33%	2.0000E-4	0.01	2.9250E-4	5.9894E-8	2.4473E-4	0.837
Lithium (m-50a)	15	1	15	0	0.00%	N/A	N/A	0.471	5.4095E-4	0.0233	0.0493
Lithium (m-51a)	15	1	15	0	0.00%	N/A	N/A	0.548	0.00146	0.0382	0.0697
Lithium (m-64a)	10	1	10	0	0.00%	N/A	N/A	0.263	1.1222E-4	0.0106	0.0403
Lithium (w-123)	15	1	15	0	0.00%	N/A	N/A	0.634	0.00111	0.0333	0.0526
Mercury (m-50a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (m-51a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (m-64a)	9	2	0	9	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Mercury (w-123)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-50a)	15	1	15	0	0.00%	N/A	N/A	0.00842	3.1053E-5	0.00557	0.662
Molybdenum (m-51a)	15	1	15	0	0.00%	N/A	N/A	0.0404	7.9257E-5	0.0089	0.22
Molybdenum (m-64a)	10	1	10	0	0.00%	N/A	N/A	0.00527	3.1567E-7	5.6184E-4	0.107
Molybdenum (w-123)	15	1	15	0	0.00%	N/A	N/A	0.346	3.8286E-4	0.0196	0.0566
Radium (m-50a)	15	1	5	10	66.67%	0.5	0.8	0.513	0.0328	0.181	0.353
Radium (m-51a)	15	1	3	12	80.00%	0.6	0.9	0.289	0.0277	0.166	0.576
Radium (m-64a)	10	1	4	6	60.00%	0.6	0.7	0.67	0.188	0.434	0.647
Radium (w-123)	15	1	5	10	66.67%	0.4	0.8	0.517	0.012	0.11	0.212
Selenium (m-50a)	15	1	15	0	0.00%	N/A	N/A	0.00425	1.0927E-6	0.00105	0.246
Selenium (m-51a)	15	1	0	15	100.00%	1.0000E-4	0.025	N/A	N/A	N/A	N/A
Selenium (m-64a)	10	1	1	9	90.00%	5.0000E-4	0.002	5.4571E-4	1.2539E-8	1.1198E-4	0.205
Selenium (w-123)	15	1	15	0	0.00%	N/A	N/A	0.00349	1.0392E-6	0.00102	0.292
Thallium (m-50a)	14	2	2	12	85.71%	1.0000E-4	0.002	1.0364E-4	7.769E-11	8.8140E-6	0.085
Thallium (m-51a)	14	2	8	6	42.86%	2.0000E-4	0.002	1.7150E-4	2.1128E-9	4.5965E-5	0.268
Thallium (m-64a)	10	1	0	10	100.00%	1.0000E-4	4.0000E-4	N/A	N/A	N/A	N/A
Thallium (w-123)	14	2	2	12	85.71%	1.0000E-4	4.0000E-4	1.3000E-4	4.5667E-9	6.7577E-5	0.52
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 (m-50a)	2	2	1.8000E-4	2.6000E-4	2.2000E-4	2.2000E-4	3.2000E-9	5.6569E-5	5.9303E-5	N/A	0.257
Antimony (m-51a)	1	2	1.5000E-4	1.5000E-4	1.5000E-4	1.5000E-4	N/A	N/A	0	N/A	N/A
Antimony (m-64a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony (w-123)	2	2	2.6000E-4	5.5000E-4	4.0500E-4	4.0500E-4	4.2050E-8	2.0506E-4	2.1497E-4	N/A	0.506

TABLE B-1
FAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Arsenic (m-50a)	14	1	0.0023	0.003	0.00253	0.0025	3.1429E-8	1.7728E-4	1.4826E-4	1.331	0.0701
Arsenic (m-51a)	15	1	0.0029	0.035	0.0226	0.024	5.6395E-5	0.00751	0.00593	-1.118	0.332
Arsenic (m-64a)	9	1	9.4000E-4	0.0033	0.00206	0.0019	6.1640E-7	7.8511E-4	0.00104	0.121	0.381
Arsenic (w-123)	13	1	0.0014	0.003	0.00202	0.002	2.1526E-7	4.6396E-4	4.4477E-4	0.874	0.229
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Barium (m-50a)	15	1	0.0081	0.018	0.0102	0.0089	7.8083E-6	0.00279	7.4129E-4	1.97	0.275
Barium (m-51a)	15	1	0.0089	0.012	0.0101	0.0099	8.3210E-7	9.1219E-4	4.4477E-4	1.312	0.0906
Barium (m-64a)	10	1	0.012	0.034	0.0172	0.016	3.9956E-5	0.00632	0.00222	2.426	0.368
Barium (w-123)	15	1	0.0094	0.012	0.0103	0.01	5.7552E-7	7.5863E-4	7.4129E-4	0.673	0.0733
Beryllium (m-50a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (m-51a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (m-64a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium (w-123)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-50a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-51a)	1	1	1.1000E-4	1.1000E-4	1.1000E-4	1.1000E-4	N/A	N/A	0	N/A	N/A
Cadmium (m-64a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (w-123)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (m-50a)	9	1	0.001	0.022	0.00673	0.0038	5.0608E-5	0.00711	0.00385	1.618	1.057
Chromium (m-51a)	9	1	0.0034	0.07	0.0268	0.014	5.7011E-4	0.0239	0.0157	0.8	0.892
Chromium (m-64a)	3	1	0.0015	0.0022	0.00193	0.0021	1.4333E-7	3.7859E-4	1.4826E-4	-1.597	0.196
Chromium (w-123)	14	1	9.9000E-4	0.13	0.0442	0.0295	0.00208	0.0456	0.0365	0.865	1.031
Cobalt (m-50a)	12	1	5.1000E-4	0.0014	7.4250E-4	6.8000E-4	6.5802E-8	2.5652E-4	2.1497E-4	1.621	0.345
Cobalt (m-51a)	4	1	0.001	0.0025	0.0019	0.00205	4.4667E-7	6.6833E-4	5.1890E-4	-1.005	0.352
Cobalt (m-64a)	4	1	5.6000E-4	0.0015	9.6000E-4	8.9000E-4	1.8320E-7	4.2802E-4	4.0030E-4	0.631	0.446
Cobalt (w-123)	14	1	0.0012	0.0025	0.00178	0.0018	1.7412E-7	4.1728E-4	5.9303E-4	0.198	0.235
Fluoride (m-50a)	16	0	2	2.6	2.219	2.2	0.035	0.187	0.222	0.529	0.0843
Fluoride (m-51a)	16	0	4.1	6	5.156	5.2	0.32	0.566	0.667	-0.179	0.11
Fluoride (m-64a)	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fluoride (w-123)	15	0	3.5	4.3	3.84	3.8	0.0583	0.241	0.297	0.616	0.0629
Lead (m-50a)	2	1	1.2000E-4	0.0012	6.6000E-4	6.6000E-4	5.8320E-7	7.6368E-4	8.0059E-4	N/A	1.157
Lead (m-51a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead (m-64a)	1	1	7.1000E-4	7.1000E-4	7.1000E-4	7.1000E-4	N/A	N/A	0	N/A	N/A
Lead (w-123)	1	1	9.4000E-4	9.4000E-4	9.4000E-4	9.4000E-4	N/A	N/A	0	N/A	N/A
Lithium (m-50a)	15	1	0.43	0.51	0.471	0.47	5.4095E-4	0.0233	0.0297	-0.0677	0.0493
Lithium (m-51a)	15	1	0.48	0.61	0.548	0.55	0.00146	0.0382	0.0297	-0.399	0.0697
Lithium (m-64a)	10	1	0.25	0.28	0.263	0.265	1.1222E-4	0.0106	0.00741	-0.0421	0.0403
Lithium (w-123)	15	1	0.58	0.7	0.634	0.63	0.00111	0.0333	0.0445	0.223	0.0526
Mercury (m-50a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-51a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE B-1
FAP ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

Mercury (m-64a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (w-123)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (m-50a)	15	1	0.005	0.028	0.00842	0.007	3.1053E-5	0.00557	0.00163	3.513	0.662
Molybdenum (m-51a)	15	1	0.029	0.057	0.0404	0.038	7.9257E-5	0.0089	0.00741	0.688	0.22
Molybdenum (m-64a)	10	1	0.0042	0.0061	0.00527	0.0051	3.1567E-7	5.6184E-4	3.7064E-4	-0.244	0.107
Molybdenum (w-123)	15	1	0.3	0.38	0.346	0.35	3.8286E-4	0.0196	0.0148	-0.536	0.0566
General Statistics for Raw Data Sets using Detected Data Only											
Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Radium (m-50a)	5	1	0.4	1.1	0.66	0.6	0.073	0.27	0.148	1.339	0.409
Radium (m-51a)	3	1	0.2	0.6	0.467	0.6	0.0533	0.231	0	-1.732	0.495
Radium (m-64a)	4	1	0.4	1.6	1.075	1.15	0.263	0.512	0.445	-0.753	0.477
Radium (w-123)	5	1	0.5	0.8	0.62	0.6	0.017	0.13	0.148	0.541	0.21
Selenium (m-50a)	15	1	0.0027	0.0068	0.00425	0.0042	1.0927E-6	0.00105	7.4129E-4	0.744	0.246
Selenium (m-51a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Selenium (m-64a)	1	1	8.2000E-4	8.2000E-4	8.2000E-4	8.2000E-4	N/A	N/A	0	N/A	N/A
Selenium (w-123)	15	1	0.0017	0.0058	0.00349	0.0033	1.0392E-6	0.00102	7.4129E-4	0.49	0.292
Thallium (m-50a)	2	2	1.1000E-4	1.3000E-4	1.2000E-4	1.2000E-4	2.000E-10	1.4142E-5	1.4826E-5	N/A	0.118
Thallium (m-51a)	8	2	1.2000E-4	2.7000E-4	1.8000E-4	1.7500E-4	2.5714E-9	5.0709E-5	5.1890E-5	0.614	0.282
Thallium (m-64a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Thallium (w-123)	2	2	2.6000E-4	3.0000E-4	2.8000E-4	2.8000E-4	8.000E-10	2.8284E-5	2.9652E-5	N/A	0.101

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.110/9/2018 8:34:13 PM
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Antimony-m-50a	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.8000E-4
Maximum	0.05
Mean	0.00489
Geometric Mean	0.00132
Median	0.001
Standard Deviation	0.013
Coefficient of Variation	2.668
Mann-Kendall Test	
M-K Test Value (S)	19
Tabulated p-value	0.165
Standard Deviation of S	16.98
Standardized Value of S	1.06
Approximate p-value	0.145
Insufficient evidence to identify a significant trend at the specified level of significance.	
Antimony-m-51a	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.05
Mean	0.00559
Geometric Mean	0.0016
Median	0.0015
Standard Deviation	0.013
Coefficient of Variation	2.33
Mann-Kendall Test	
M-K Test Value (S)	13
Tabulated p-value	0.259
Standard Deviation of S	17.75
Standardized Value of S	0.676

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	0.249								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Antimony-m-64a									
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	0.001								
Maximum	0.004								
Mean	0.0016								
Geometric Mean	0.00141								
Median	0.001								
Standard Deviation	9.6609E-4								
Coefficient of Variation	0.604								
Mann-Kendall Test									
M-K Test Value (S)	23								
Tabulated p-value	0.023								
Standard Deviation of S	9.644								
Standardized Value of S	2.281								
Approximate p-value	0.0113								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Antimony-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	2.6000E-4								
Maximum	0.05								
Mean	0.00488								
Geometric Mean	0.0015								
Median	0.001								
Standard Deviation	0.013								
Coefficient of Variation	2.669								
Mann-Kendall Test									
M-K Test Value (S)	21								
Tabulated p-value	0.14								
Standard Deviation of S	16.98								
Standardized Value of S	1.178								
Approximate p-value	0.119								
Insufficient evidence to identify a significant trend at the specified level of significance.									

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standardized Value of S	1.242							
Approximate p-value	0.107							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Arsenic-m-64a								
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	9.4000E-4							
Maximum	0.0033							
Mean	0.00195							
Geometric Mean	0.0018							
Median	0.0018							
Standard Deviation	8.1257E-4							
Coefficient of Variation	0.416							
Mann-Kendall Test								
M-K Test Value (S)	1							
Tabulated p-value	0.5							
Standard Deviation of S	11.18							
Standardized Value of S	0							
Approximate p-value	0.5							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Arsenic-w-123								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0014							
Maximum	0.01							
Mean	0.00255							
Geometric Mean	0.0022							
Median	0.002							
Standard Deviation	0.0021							
Coefficient of Variation	0.824							
Mann-Kendall Test								
M-K Test Value (S)	-28							
Tabulated p-value	0.084							
Standard Deviation of S	19.97							
Standardized Value of S	-1.352							
Approximate p-value	0.0881							
Insufficient evidence to identify a significant trend at the specified level of significance.								

TABLE B-2
FAP 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 5.110/1/2018 4:51:26 PM							
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Barium-m-50a									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		15							
Number Values Reported (n)		16							
Number Values Missing		1							
Number Values Used		15							
Minimum		0.0081							
Maximum		0.018							
Mean		0.0102							
Geometric Mean		0.00988							
Median		0.0089							
Standard Deviation		0.00279							
Coefficient of Variation		0.275							
Mann-Kendall Test									
M-K Test Value (S)		-38							
Tabulated p-value		0.029							
Standard Deviation of S		20.12							
Standardized Value of S		-1.839							
Approximate p-value		0.0329							
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Barium-m-51a									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		15							
Number Values Reported (n)		16							
Number Values Missing		1							
Number Values Used		15							
Minimum		0.0089							
Maximum		0.012							
Mean		0.0101							
Geometric Mean		0.01							
Median		0.0099							
Standard Deviation		9.1219E-4							
Coefficient of Variation		0.0906							
Mann-Kendall Test									
M-K Test Value (S)		-21							
Tabulated p-value		0.164							

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation of S	19.94							
Standardized Value of S	-1.003							
Approximate p-value	0.158							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Barium-m-64a								
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	0.012							
Maximum	0.034							
Mean	0.0172							
Geometric Mean	0.0164							
Median	0.016							
Standard Deviation	0.00632							
Coefficient of Variation	0.368							
Mann-Kendall Test								
M-K Test Value (S)	-16							
Tabulated p-value	0.078							
Standard Deviation of S	10.92							
Standardized Value of S	-1.373							
Approximate p-value	0.0849							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Barium-w-123								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.0094							
Maximum	0.012							
Mean	0.0103							
Geometric Mean	0.0103							
Median	0.01							
Standard Deviation	7.5863E-4							
Coefficient of Variation	0.0733							
Mann-Kendall Test								
M-K Test Value (S)	5							
Tabulated p-value	0.423							
Standard Deviation of S	19.36							
Standardized Value of S	0.207							
Approximate p-value	0.418							

TABLE B-2
FAP 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 5.110/9/2018 8:34:50 PM								
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision		OFF								
Confidence Coefficient		0.95								
Level of Significance		0.05								
Beryllium-m-50a										
General Statistics										
Number or Reported Events Not Used		0								
Number of Generated Events		14								
Number Values Reported (n)		16								
Number Values Missing		2								
Number Values Used		14								
Minimum		0.001								
Maximum		0.001								
Mean		0.001								
Geometric Mean		0.001								
Median		0.001								
Standard Deviation		4.501E-19								
Coefficient of Variation		N/A								
Mann-Kendall Test										
M-K Test Value (S)		0								
Tabulated p-value		0.5								
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-m-51a										
General Statistics										
Number or Reported Events Not Used		0								
Number of Generated Events		14								
Number Values Reported (n)		16								
Number Values Missing		2								
Number Values Used		14								
Minimum		0.001								
Maximum		0.001								
Mean		0.001								
Geometric Mean		0.001								
Median		0.001								
Standard Deviation		4.501E-19								
Coefficient of Variation		N/A								
Mann-Kendall Test										
M-K Test Value (S)		0								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.5								
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-m-64a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	11								
Number Values Missing	2								
Number Values Used	9								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	0								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.54								
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-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	0.001								
Maximum	0.001								
Mean	0.001								
Geometric Mean	0.001								
Median	0.001								
Standard Deviation	4.501E-19								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								

TABLE B-2
FAP 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 5.110/9/2018 8:35:22 PM							
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Cadmium-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.0000E-4								
Maximum	0.002								
Mean	2.6667E-4								
Geometric Mean	1.4690E-4								
Median	1.0000E-4								
Standard Deviation	4.9087E-4								
Coefficient of Variation	1.841								
Mann-Kendall Test									
M-K Test Value (S)	4								
Tabulated p-value	0.423								
Standard Deviation of S	13.95								
Standardized Value of S	0.215								
Approximate p-value	0.415								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.0000E-4								
Maximum	0.002								
Mean	3.5400E-4								
Geometric Mean	2.0096E-4								
Median	1.1000E-4								
Standard Deviation	5.1633E-4								
Coefficient of Variation	1.459								
Mann-Kendall Test									

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	13								
Tabulated p-value	0.279								
Standard Deviation of S	18.98								
Standardized Value of S	0.632								
Approximate p-value	0.264								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cadmium-m-64a									
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	1.0000E-4								
Maximum	4.0000E-4								
Mean	1.6000E-4								
Geometric Mean	1.4142E-4								
Median	1.0000E-4								
Standard Deviation	9.6609E-5								
Coefficient of Variation	0.604								
Mann-Kendall Test									
M-K Test Value (S)	23								
Tabulated p-value	0.023								
Standard Deviation of S	9.644								
Standardized Value of S	2.281								
Approximate p-value	0.0113								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Cadmium-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.0000E-4								
Maximum	0.002								
Mean	2.7333E-4								
Geometric Mean	1.6112E-4								
Median	1.0000E-4								
Standard Deviation	4.8472E-4								
Coefficient of Variation	1.773								
Mann-Kendall Test									
M-K Test Value (S)	21								
Tabulated p-value	0.164								
Standard Deviation of S	17.54								
Standardized Value of S	1.14								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	0.127								
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 5.110/1/2018 4:53:03 PM								
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Chromium-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	5.0000E-4								
Maximum	0.022								
Mean	0.00521								
Geometric Mean	0.00277								
Median	0.0037								
Standard Deviation	0.00614								
Coefficient of Variation	1.178								
Mann-Kendall Test									
M-K Test Value (S)	-6								
Tabulated p-value	0.385								
Standard Deviation of S	20.12								
Standardized Value of S	-0.249								
Approximate p-value	0.402								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Chromium-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.002								
Maximum	0.07								
Mean	0.0197								
Geometric Mean	0.0116								
Median	0.01								
Standard Deviation	0.0208								
Coefficient of Variation	1.056								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test								
M-K Test Value (S)	25							
Tabulated p-value	0.12							
Standard Deviation of S	20.16							
Standardized Value of S	1.191							
Approximate p-value	0.117							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Chromium-m-64a								
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	0.004							
Mean	0.00148							
Geometric Mean	0.00113							
Median	0.00125							
Standard Deviation	0.00114							
Coefficient of Variation	0.767							
Mann-Kendall Test								
M-K Test Value (S)	9							
Tabulated p-value	0.242							
Standard Deviation of S	10.79							
Standardized Value of S	0.742							
Approximate p-value	0.229							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Chromium-w-123								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	9.9000E-4							
Maximum	0.13							
Mean	0.0419							
Geometric Mean	0.0175							
Median	0.018							
Standard Deviation	0.0448							
Coefficient of Variation	1.069							
Mann-Kendall Test								
M-K Test Value (S)	51							
Tabulated p-value	0.006							
Standard Deviation of S	20.21							

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standardized Value of S	2.474								
Approximate p-value	0.00667								
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 5.110/1/2018 4:55:33 PM								
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Cobalt-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	5.1000E-4								
Maximum	0.01								
Mean	0.00153								
Geometric Mean	9.7120E-4								
Median	7.9000E-4								
Standard Deviation	0.0024								
Coefficient of Variation	1.569								
Mann-Kendall Test									
M-K Test Value (S)	22								
Tabulated p-value	0.141								
Standard Deviation of S	20.13								
Standardized Value of S	1.043								
Approximate p-value	0.148								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cobalt-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.001								
Maximum	0.025								
Mean	0.00577								
Geometric Mean	0.00411								
Median	0.005								
Standard Deviation	0.00597								
Coefficient of Variation	1.034								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test									
M-K Test Value (S)	-22								
Tabulated p-value	0.141								
Standard Deviation of S	19.44								
Standardized Value of S	-1.08								
Approximate p-value	0.14								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cobalt-m-64a									
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	0.002								
Mean	9.3400E-4								
Geometric Mean	8.3102E-4								
Median	8.4000E-4								
Standard Deviation	5.0138E-4								
Coefficient of Variation	0.537								
Mann-Kendall Test									
M-K Test Value (S)	-1								
Tabulated p-value	0.5								
Standard Deviation of S	10.97								
Standardized Value of S	0								
Approximate p-value	0.5								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Cobalt-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0012								
Maximum	0.0025								
Mean	0.00179								
Geometric Mean	0.00175								
Median	0.0019								
Standard Deviation	4.0614E-4								
Coefficient of Variation	0.226								
Mann-Kendall Test									
M-K Test Value (S)	-15								
Tabulated p-value	0.248								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation of S	20.02								
Standardized Value of S	-0.699								
Approximate p-value	0.242								
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 5.110/1/2018 5:20:33 PM								
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Fluoride-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	2								
Maximum	2.6								
Mean	2.219								
Geometric Mean	2.212								
Median	2.2								
Standard Deviation	0.187								
Coefficient of Variation	0.0843								
Mann-Kendall Test									
M-K Test Value (S)	59								
Tabulated p-value	0.004								
Standard Deviation of S	21.75								
Standardized Value of S	2.667								
Approximate p-value	0.00383								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Fluoride-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	4.1								
Maximum	6								
Mean	5.156								
Geometric Mean	5.127								
Median	5.2								
Standard Deviation	0.566								
Coefficient of Variation	0.11								
Mann-Kendall Test									
M-K Test Value (S)	30								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.097								
Standard Deviation of S	22.12								
Standardized Value of S	1.311								
Approximate p-value	0.0949								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Fluoride-m-64a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	11								
Number Values Reported (n)	11								
Minimum	0.8								
Maximum	0.8								
Mean	0.8								
Geometric Mean	0.8								
Median	0.8								
Standard Deviation	1.164E-16								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
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.									
Fluoride-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	16								
Number Values Reported (n)	16								
Minimum	3.5								
Maximum	8								
Mean	4.1								
Geometric Mean	4.013								
Median	3.8								
Standard Deviation	1.066								
Coefficient of Variation	0.26								
Mann-Kendall Test									
M-K Test Value (S)	37								
Tabulated p-value	0.058								
Standard Deviation of S	21.89								
Standardized Value of S	1.645								
Approximate p-value	0.05								
Insufficient evidence to identify a significant trend at the specified level of significance.									

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.110/9/2018 8:35:59 PM
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05
Lead-m-50a	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	1.2000E-4
Maximum	0.01
Mean	0.00135
Geometric Mean	7.0796E-4
Median	5.0000E-4
Standard Deviation	0.00246
Coefficient of Variation	1.813
Mann-Kendall Test	
M-K Test Value (S)	17
Tabulated p-value	0.218
Standard Deviation of S	16.8
Standardized Value of S	0.952
Approximate p-value	0.17
Insufficient evidence to identify a significant trend at the specified level of significance.	
Lead-m-51a	
General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	5.0000E-4
Maximum	0.01
Mean	0.00167
Geometric Mean	9.3926E-4
Median	5.0000E-4
Standard Deviation	0.00258
Coefficient of Variation	1.549
Mann-Kendall Test	
M-K Test Value (S)	27
Tabulated p-value	0.101
Standard Deviation of S	18.28
Standardized Value of S	1.422

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	0.0775								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lead-m-64a									
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	0.002								
Mean	9.7100E-4								
Geometric Mean	8.4124E-4								
Median	8.5500E-4								
Standard Deviation	5.8459E-4								
Coefficient of Variation	0.602								
Mann-Kendall Test									
M-K Test Value (S)	17								
Tabulated p-value	0.078								
Standard Deviation of S	10.57								
Standardized Value of S	1.514								
Approximate p-value	0.065								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lead-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	2.0000E-4								
Maximum	0.01								
Mean	0.00148								
Geometric Mean	8.6697E-4								
Median	9.4000E-4								
Standard Deviation	0.00242								
Coefficient of Variation	1.637								
Mann-Kendall Test									
M-K Test Value (S)	23								
Tabulated p-value	0.141								
Standard Deviation of S	19.24								
Standardized Value of S	1.143								
Approximate p-value	0.126								
Insufficient evidence to identify a significant trend at the specified level of significance.									

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

		Mann-Kendall Trend Test Analysis						
User Selected Options								
Date/Time of Computation	ProUCL 5.110/1/2018 5:22:14 PM							
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision	OFF							
Confidence Coefficient	0.95							
Level of Significance	0.05							
Lithium-m-50a								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.43							
Maximum	0.51							
Mean	0.471							
Geometric Mean	0.471							
Median	0.47							
Standard Deviation	0.0233							
Coefficient of Variation	0.0493							
Mann-Kendall Test								
M-K Test Value (S)	-40							
Tabulated p-value	0.023							
Standard Deviation of S	20.02							
Standardized Value of S	-1.948							
Approximate p-value	0.0257							
Statistically significant evidence of a decreasing trend at the specified level of significance.								
Lithium-m-51a								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.48							
Maximum	0.61							
Mean	0.548							
Geometric Mean	0.547							
Median	0.55							
Standard Deviation	0.0382							
Coefficient of Variation	0.0697							
Mann-Kendall Test								
M-K Test Value (S)	-52							
Tabulated p-value	0.004							
Standard Deviation of S	19.92							

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standardized Value of S	-2.561								
Approximate p-value	0.00522								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Lithium-m-64a									
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	0.25								
Maximum	0.28								
Mean	0.263								
Geometric Mean	0.263								
Median	0.265								
Standard Deviation	0.0106								
Coefficient of Variation	0.0403								
Mann-Kendall Test									
M-K Test Value (S)	-5								
Tabulated p-value	0.364								
Standard Deviation of S	10.57								
Standardized Value of S	-0.379								
Approximate p-value	0.353								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Lithium-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.58								
Maximum	0.7								
Mean	0.634								
Geometric Mean	0.633								
Median	0.63								
Standard Deviation	0.0333								
Coefficient of Variation	0.0526								
Mann-Kendall Test									
M-K Test Value (S)	43								
Tabulated p-value	0.018								
Standard Deviation of S	20.04								
Standardized Value of S	2.096								
Approximate p-value	0.0181								
Statistically significant evidence of an increasing trend at the specified level of significance.									

TABLE B-2
FAP 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 8:36:36 PM							
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Mercury-m-50a									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		14							
Number Values Reported (n)		16							
Number Values Missing		2							
Number Values Used		14							
Minimum		2.0000E-4							
Maximum		2.0000E-4							
Mean		2.0000E-4							
Geometric Mean		2.0000E-4							
Median		2.0000E-4							
Standard Deviation		5.626E-20							
Coefficient of Variation		N/A							
Mann-Kendall Test									
M-K Test Value (S)		0							
Tabulated p-value		0.5							
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-m-51a									
General Statistics									
Number or Reported Events Not Used		0							
Number of Generated Events		14							
Number Values Reported (n)		16							
Number Values Missing		2							
Number Values Used		14							
Minimum		2.0000E-4							
Maximum		2.0000E-4							
Mean		2.0000E-4							
Geometric Mean		2.0000E-4							
Median		2.0000E-4							
Standard Deviation		5.626E-20							
Coefficient of Variation		N/A							
Mann-Kendall Test									
M-K Test Value (S)		0							
Tabulated p-value		0.5							

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

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-m-64a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	9								
Number Values Reported (n)	11								
Number Values Missing	2								
Number Values Used	9								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	2.875E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.54								
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-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	2.0000E-4								
Maximum	2.0000E-4								
Mean	2.0000E-4								
Geometric Mean	2.0000E-4								
Median	2.0000E-4								
Standard Deviation	5.626E-20								
Coefficient of Variation	N/A								
Mann-Kendall Test									
M-K Test Value (S)	0								
Tabulated p-value	0.5								
Standard Deviation of S	0								
Standardized Value of S	N/A								
Approximate p-value	N/A								

TABLE B-2
FAP 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 5.110/1/2018 5:24:11 PM							
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Molybdenum-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.005								
Maximum	0.028								
Mean	0.00842								
Geometric Mean	0.00758								
Median	0.007								
Standard Deviation	0.00557								
Coefficient of Variation	0.662								
Mann-Kendall Test									
M-K Test Value (S)	47								
Tabulated p-value	0.01								
Standard Deviation of S	20.09								
Standardized Value of S	2.29								
Approximate p-value	0.011								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Molybdenum-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.029								
Maximum	0.057								
Mean	0.0404								
Geometric Mean	0.0395								
Median	0.038								
Standard Deviation	0.0089								
Coefficient of Variation	0.22								
Mann-Kendall Test									
M-K Test Value (S)	48								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Tabulated p-value	0.008								
Standard Deviation of S	20.07								
Standardized Value of S	2.342								
Approximate p-value	0.00959								
Statistically significant evidence of an increasing trend at the specified level of significance.									
Molybdenum-m-64a									
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	0.0042								
Maximum	0.0061								
Mean	0.00527								
Geometric Mean	0.00524								
Median	0.0051								
Standard Deviation	5.6184E-4								
Coefficient of Variation	0.107								
Mann-Kendall Test									
M-K Test Value (S)	11								
Tabulated p-value	0.19								
Standard Deviation of S	10.97								
Standardized Value of S	0.912								
Approximate p-value	0.181								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Molybdenum-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.3								
Maximum	0.38								
Mean	0.346								
Geometric Mean	0.345								
Median	0.35								
Standard Deviation	0.0196								
Coefficient of Variation	0.0566								
Mann-Kendall Test									
M-K Test Value (S)	23								
Tabulated p-value	0.141								
Standard Deviation of S	19.84								
Standardized Value of S	1.109								
Approximate p-value	0.134								

TABLE B-2
FAP 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 5.110/1/2018 7:51:27 PM							
From File		FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls							
Full Precision		OFF							
Confidence Coefficient		0.95							
Level of Significance		0.05							
Selenium-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0027								
Maximum	0.0068								
Mean	0.00425								
Geometric Mean	0.00414								
Median	0.0042								
Standard Deviation	0.00105								
Coefficient of Variation	0.246								
Mann-Kendall Test									
M-K Test Value (S)	-88								
Tabulated p-value	0								
Standard Deviation of S	20.18								
Standardized Value of S	-4.311								
Approximate p-value	8.1382E-6								
Statistically significant evidence of a decreasing trend at the specified level of significance.									
Selenium-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	1.0000E-4								
Maximum	0.025								
Mean	0.00504								
Geometric Mean	0.00278								
Median	0.005								
Standard Deviation	0.00607								
Coefficient of Variation	1.205								
Mann-Kendall Test									

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

M-K Test Value (S)	3								
Tabulated p-value	0.461								
Standard Deviation of S	19.4								
Standardized Value of S	0.103								
Approximate p-value	0.459								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-m-64a									
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	0.002								
Mean	7.8200E-4								
Geometric Mean	6.9321E-4								
Median	5.0000E-4								
Standard Deviation	4.7809E-4								
Coefficient of Variation	0.611								
Mann-Kendall Test									
M-K Test Value (S)	11								
Tabulated p-value	0.19								
Standard Deviation of S	9.781								
Standardized Value of S	1.022								
Approximate p-value	0.153								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Selenium-w-123									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.0017								
Maximum	0.0058								
Mean	0.00349								
Geometric Mean	0.00335								
Median	0.0033								
Standard Deviation	0.00102								
Coefficient of Variation	0.292								
Mann-Kendall Test									
M-K Test Value (S)	79								
Tabulated p-value	0								
Standard Deviation of S	20.16								
Standardized Value of S	3.869								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Approximate p-value	5.4532E-5								
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 5.110/1/2018 8:06:12 PM								
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Thallium-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	1.0000E-4								
Maximum	0.002								
Mean	2.8143E-4								
Geometric Mean	1.5489E-4								
Median	1.0000E-4								
Standard Deviation	5.0613E-4								
Coefficient of Variation	1.798								
Mann-Kendall Test									
M-K Test Value (S)	10								
Tabulated p-value	0.295								
Standard Deviation of S	15.51								
Standardized Value of S	0.58								
Approximate p-value	0.281								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Thallium-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	14								
Number Values Reported (n)	16								
Number Values Missing	2								
Number Values Used	14								
Minimum	1.2000E-4								
Maximum	0.002								
Mean	4.1000E-4								
Geometric Mean	2.7400E-4								
Median	2.0500E-4								
Standard Deviation	5.1245E-4								
Coefficient of Variation	1.25								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test								
M-K Test Value (S)	-2							
Tabulated p-value	0.457							
Standard Deviation of S	18.11							
Standardized Value of S	-0.0552							
Approximate p-value	0.478							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Thallium-m-64a								
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	1.0000E-4							
Maximum	4.0000E-4							
Mean	1.9000E-4							
Geometric Mean	1.6245E-4							
Median	1.5000E-4							
Standard Deviation	1.1972E-4							
Coefficient of Variation	0.63							
Mann-Kendall Test								
M-K Test Value (S)	19							
Tabulated p-value	0.054							
Standard Deviation of S	10.18							
Standardized Value of S	1.768							
Approximate p-value	0.0385							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Thallium-w-123								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	14							
Number Values Reported (n)	16							
Number Values Missing	2							
Number Values Used	14							
Minimum	1.0000E-4							
Maximum	4.0000E-4							
Mean	1.9714E-4							
Geometric Mean	1.7208E-4							
Median	2.0000E-4							
Standard Deviation	1.0866E-4							
Coefficient of Variation	0.551							
Mann-Kendall Test								
M-K Test Value (S)	9							
Tabulated p-value	0.334							
Standard Deviation of S	17.19							

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standardized Value of S	0.465								
Approximate p-value	0.321								
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 5.110/10/2018 9:22:02 AM								
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls								
Full Precision	OFF								
Confidence Coefficient	0.95								
Level of Significance	0.05								
Radium-m-50a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.4								
Maximum	1.1								
Mean	0.647								
Geometric Mean	0.63								
Median	0.6								
Standard Deviation	0.16								
Coefficient of Variation	0.247								
Mann-Kendall Test									
M-K Test Value (S)	-21								
Tabulated p-value	0.164								
Standard Deviation of S	19.24								
Standardized Value of S	-1.039								
Approximate p-value	0.149								
Insufficient evidence to identify a significant trend at the specified level of significance.									
Radium-m-51a									
General Statistics									
Number or Reported Events Not Used	0								
Number of Generated Events	15								
Number Values Reported (n)	16								
Number Values Missing	1								
Number Values Used	15								
Minimum	0.2								
Maximum	0.9								
Mean	0.647								
Geometric Mean	0.619								
Median	0.6								
Standard Deviation	0.164								
Coefficient of Variation	0.254								

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Mann-Kendall Test								
M-K Test Value (S)	-45							
Tabulated p-value	0.014							
Standard Deviation of S	18.39							
Standardized Value of S	-2.392							
Approximate p-value	0.00838							
Statistically significant evidence of a decreasing trend at the specified level of significance.								
Radium-m-64a								
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	0.4							
Maximum	1.6							
Mean	0.83							
Geometric Mean	0.769							
Median	0.7							
Standard Deviation	0.365							
Coefficient of Variation	0.44							
Mann-Kendall Test								
M-K Test Value (S)	6							
Tabulated p-value	0.3							
Standard Deviation of S	10.74							
Standardized Value of S	0.466							
Approximate p-value	0.321							
Insufficient evidence to identify a significant trend at the specified level of significance.								
Radium-w-123								
General Statistics								
Number or Reported Events Not Used	0							
Number of Generated Events	15							
Number Values Reported (n)	16							
Number Values Missing	1							
Number Values Used	15							
Minimum	0.4							
Maximum	0.8							
Mean	0.62							
Geometric Mean	0.611							
Median	0.6							
Standard Deviation	0.108							
Coefficient of Variation	0.175							
Mann-Kendall Test								
M-K Test Value (S)	17							
Tabulated p-value	0.218							

TABLE B-2
FAP ProUCL MANN-KENDALL TREND ANALYSIS*

Standard Deviation of S	18.93							
Standardized Value of S	0.845							
Approximate p-value	0.199							
Insufficient evidence to identify a significant trend at the specified level of significance.								

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects						
User Selected Options						
Date/Time of Computation	ProUCL 5.110/1/2018 8:08:08 PM					
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls					
Full Precision	OFF					
Confidence Coefficient	0.95					
Antimony (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	2	12	85.71%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	5.0000E-4	0.05	0.00567	0.001	0.014
Statistics (Non-Detects Only)	2	1.8000E-4	2.6000E-4	2.2000E-4	2.2000E-4	5.6569E-5
Statistics (All: NDs treated as DL value)	14	1.8000E-4	0.05	0.00489	0.001	0.013
Statistics (All: NDs treated as DL/2 value)	14	1.8000E-4	0.025	0.00246	5.0000E-4	0.00651
Statistics (Normal ROS Imputed Data)	14	1.1317E-4	3.2683E-4	2.2000E-4	2.2000E-4	5.4648E-5
Statistics (Gamma ROS Imputed Data)	14	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	14	1.3239E-4	3.5349E-4	2.2276E-4	2.1633E-4	5.6585E-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)	0.486	0.43	0.0101	-6.633	1.363	-0.206
Statistics (NDs = DL/2)	0.518	0.455	0.00475	-7.227	1.24	-0.172
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-8.439	0.251	-0.0298
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.58	0.577	0.986		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.368	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.364	0.874	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.981	0.874	Data Appear Normal			
Lilliefors (Detected Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.456	0.226	Data Not Normal			
Lilliefors (NDs = DL/2)	0.457	0.226	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.143	0.226	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.856	0.85	0.425		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detected Only)	N/A	N/A				
Kolmogorov-Smirnov (Detected Only)	N/A	N/A				
Anderson-Darling (NDs = DL)	2.103	0.796				
Kolmogorov-Smirnov (NDs = DL)	0.358	0.242	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.44	0.792				

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL/2)	0.375	0.241	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.733				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.228				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.911	0.871	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.852	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.78	0.874	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.981	0.874	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.294	0.226	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.333	0.226	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.143	0.226	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Antimony (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	1	13	92.86%
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 Antimony (m-51a) was not processed!						
Antimony (m-64a)						
	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).						
The data set for variable Antimony (m-64a) was not processed!						
Antimony (w-123)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	2	12	85.71%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	0.001	0.05	0.00563	0.001	0.014
Statistics (Non-Detects Only)	2	2.6000E-4	5.5000E-4	4.0500E-4	4.0500E-4	2.0506E-4
Statistics (All: NDs treated as DL value)	14	2.6000E-4	0.05	0.00488	0.001	0.013

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (All: NDs treated as DL/2 value)	14	2.6000E-4	0.025	0.00247	5.0000E-4	0.0065		
Statistics (Normal ROS Imputed Data)	14	1.7746E-5	7.9225E-4	4.0500E-4	4.0500E-4	1.9810E-4		
Statistics (Gamma ROS Imputed Data)	14	N/A	N/A	N/A	N/A	N/A		
Statistics (Lognormal ROS Imputed Data)	14	1.3905E-4	0.00103	4.2685E-4	3.7815E-4	2.2804E-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	N/A	
Statistics (NDs = DL)	0.533	0.466	0.00916	-6.504	1.206	-0.185		
Statistics (NDs = DL/2)	0.569	0.495	0.00434	-7.098	1.107	-0.156		
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A		
Statistics (Lognormal ROS Estimates)	--	--	--	-7.88	0.512	-0.0649		
Normal GOF Test Results								
		No NDs	NDs = DL	NDs = DL/2	Normal RO			
Correlation Coefficient R	1	0.568	0.563	0.986				
		Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (NDs = DL)	0.354	0.874	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.348	0.874	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.981	0.874	Data Appear Normal					
Lilliefors (Detects Only)	N/A	N/A						
Lilliefors (NDs = DL)	0.455	0.226	Data Not Normal					
Lilliefors (NDs = DL/2)	0.457	0.226	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.143	0.226	Data Appear Normal					
Gamma GOF Test Results								
		No NDs	NDs = DL	NDs = DL/2	Gamma RO			
Correlation Coefficient R	N/A	0.84	0.832	0.447				
		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)	2.559	0.79						
Kolmogorov-Smirnov (NDs = DL)	0.342	0.241	Data Not Gamma Distributed					
Anderson-Darling (NDs = DL/2)	2.966	0.787						
Kolmogorov-Smirnov (NDs = DL/2)	0.357	0.241	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	N/A	0.733						
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.228						
Lognormal GOF Test Results								
		No NDs	NDs = DL	NDs = DL/2	Log ROS			
Correlation Coefficient R	1	0.868	0.809	N/A				
		Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (NDs = DL)	0.786	0.874	Data Not Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.684	0.874	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.981	0.874	Data Appear Lognormal					
Lilliefors (Detects Only)	N/A	N/A						
Lilliefors (NDs = DL)	0.274	0.226	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.287	0.226	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.143	0.226	Data Appear Lognormal					

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	14	1	6.67%
	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)	14	0.0023	0.003	0.00253	0.0025	1.7728E-4
Statistics (All: NDs treated as DL value)	15	0.0023	0.01	0.00303	0.0025	0.00194
Statistics (All: NDs treated as DL/2 value)	15	0.0023	0.005	0.00269	0.0025	6.6059E-4
Statistics (Normal ROS Imputed Data)	15	0.0023	0.003	0.00253	0.0025	1.7083E-4
Statistics (Gamma ROS Imputed Data)	15	0.0023	0.01	0.00303	0.0025	0.00194
Statistics (Lognormal ROS Imputed Data)	15	0.0023	0.003	0.00253	0.0025	1.7084E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	229.3	180.2	1.1029E-5	-5.982	0.0678	-0.0113
Statistics (NDs = DL)	5.706	4.609	5.3046E-4	-5.89	0.362	-0.0614
Statistics (NDs = DL/2)	25.53	20.47	1.0548E-4	-5.937	0.188	-0.0317
Statistics (Gamma ROS Estimates)	5.706	4.609	5.3046E-4	-5.89	0.362	-0.0614
Statistics (Lognormal ROS Estimates)	--	--	--	-5.982	0.0654	-0.0109
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.927	0.571	0.688	0.923		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.875	0.874	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.357	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.505	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.87	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.207	0.226	Data Appear Normal			
Lilliefors (NDs = DL)	0.439	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.363	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.205	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.936	0.675	0.738	0.675		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.597	0.733				
Kolmogorov-Smirnov (Detects Only)	0.202	0.228	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	3.857	0.738				
Kolmogorov-Smirnov (NDs = DL)	0.417	0.222	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.515	0.735				
Kolmogorov-Smirnov (NDs = DL/2)	0.344	0.221	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.857	0.738				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.222	Data Not Gamma Distributed			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.94	0.639	0.748	0.936
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.897	0.874	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL)	0.441	0.881	Data Not Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.589	0.881	Data Not Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.891	0.881	Data Appear Lognormal	
Lilliefors (Detects Only)	0.197	0.226	Data Appear Lognormal	
Lilliefors (NDs = DL)	0.393	0.22	Data Not Lognormal	
Lilliefors (NDs = DL/2)	0.333	0.22	Data Not Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.19	0.22	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Arsenic (m-51a)				
Raw Statistics				
Number of Valid Observations	15			
Number of Missing Observations	1			
Number of Distinct Observations	12			
Minimum	0.0029			
Maximum	0.035			
Mean of Raw Data	0.0226			
Standard Deviation of Raw Data	0.00751			
Khat	5.011			
Theta hat	0.00451			
Kstar	4.053			
Theta star	0.00557			
Mean of Log Transformed Data	-3.893			
Standard Deviation of Log Transformed Data	0.584			
Normal GOF Test Results				
Correlation Coefficient R	0.951			
Shapiro Wilk Test Statistic	0.925			
Shapiro Wilk Critical (0.05) Value	0.881			
Approximate Shapiro Wilk P Value	0.179			
Lilliefors Test Statistic	0.165			
Lilliefors Critical (0.05) Value	0.22			
Data appear Normal at (0.05) Significance Level				
Gamma GOF Test Results				
Correlation Coefficient R	0.9			
A-D Test Statistic	1.275			
A-D Critical (0.05) Value	0.739			
K-S Test Statistic	0.254			
K-S Critical(0.05) Value	0.222			
Data not Gamma Distributed at (0.05) Significance Level				
Lognormal GOF Test Results				

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.787					
Shapiro Wilk Test Statistic	0.65					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	2.8697E-5					
Lilliefors Test Statistic	0.287					
Lilliefors Critical (0.05) Value	0.22					
Data not Lognormal at (0.05) Significance Level						
Arsenic (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	9	1	10.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	0.001	0.001	0.001	0.001	N/A
Statistics (Non-Detects Only)	9	9.4000E-4	0.0033	0.00206	0.0019	7.8511E-4
Statistics (All: NDs treated as DL value)	10	9.4000E-4	0.0033	0.00195	0.0018	8.1257E-4
Statistics (All: NDs treated as DL/2 value)	10	5.0000E-4	0.0033	0.0019	0.0018	8.8953E-4
Statistics (Normal ROS Imputed Data)	10	7.0318E-4	0.0033	0.00192	0.0018	8.5557E-4
Statistics (Gamma ROS Imputed Data)	10	9.4000E-4	0.01	0.00285	0.0022	0.00262
Statistics (Lognormal ROS Imputed Data)	10	9.3357E-4	0.0033	0.00195	0.0018	8.2146E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	7.128	4.826	2.8902E-4	-6.257	0.415	-0.0663
Statistics (NDs = DL)	6.111	4.344	3.1977E-4	-6.322	0.442	-0.0699
Statistics (NDs = DL/2)	4.083	2.924	4.6638E-4	-6.391	0.578	-0.0904
Statistics (Gamma ROS Estimates)	2.302	1.678	0.00124	-6.092	0.652	-0.107
Statistics (Lognormal ROS Estimates)	--	--	--	-6.329	0.452	-0.0715
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.988	0.979	0.993	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.965	0.829	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.941	0.842	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.976	0.842	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.964	0.842	Data Appear Normal			
Lilliefors (Detects Only)	0.157	0.274	Data Appear Normal			
Lilliefors (NDs = DL)	0.149	0.262	Data Appear Normal			
Lilliefors (NDs = DL/2)	0.149	0.262	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.149	0.262	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.98	0.979	0.968	0.896		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.228	0.722				
Kolmogorov-Smirnov (Detects Only)	0.189	0.28	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.286	0.728				

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL)	0.179	0.267	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.243	0.729				
Kolmogorov-Smirnov (NDs = DL/2)	0.17	0.268	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.688	0.735				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.228	0.269	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.982	0.979	0.961	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.955	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.938	0.842	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.925	0.842	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.929	0.842	Data Appear Lognormal			
Lilliefors (Detects Only)	0.183	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.173	0.262	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.168	0.262	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.172	0.262	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Arsenic (w-123)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	13	2	13.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.002	0.01	0.006	0.006	0.00566
Statistics (Non-Detects Only)	13	0.0014	0.003	0.00202	0.002	4.6396E-4
Statistics (All: NDs treated as DL value)	15	0.0014	0.01	0.00255	0.002	0.0021
Statistics (All: NDs treated as DL/2 value)	15	0.001	0.005	0.00215	0.002	9.3493E-4
Statistics (Normal ROS Imputed Data)	15	0.0014	0.003	0.002	0.00195	4.3951E-4
Statistics (Gamma ROS Imputed Data)	15	0.0014	0.01	0.00309	0.002	0.00284
Statistics (Lognormal ROS Imputed Data)	15	0.0014	0.003	0.00195	0.00195	4.3983E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	22	16.97	9.1956E-5	-6.226	0.22	-0.0354
Statistics (NDs = DL)	3.563	2.895	7.1669E-4	-6.117	0.465	-0.0761
Statistics (NDs = DL/2)	7.42	5.98	2.9021E-4	-6.21	0.369	-0.0594
Statistics (Gamma ROS Estimates)	2.334	1.912	0.00132	-6.01	0.606	-0.101
Statistics (Lognormal ROS Estimates)	--	--	--	-6.239	0.209	-0.0335
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.962	0.659	0.876	0.952		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.924	0.866	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.466	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.793	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.909	0.881	Data Appear Normal			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Detects Only)	0.212	0.234	Data Appear Normal	
Lilliefors (NDs = DL)	0.349	0.22	Data Not Normal	
Lilliefors (NDs = DL/2)	0.256	0.22	Data Not Normal	
Lilliefors (Normal ROS Estimates)	0.231	0.22	Data Not Normal	
Gamma GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Gamma RO
Correlation Coefficient R	0.977	0.777	0.928	0.854
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Anderson-Darling (Detects Only)	0.346	0.733		
Kolmogorov-Smirnov (Detects Only)	0.185	0.236	Detected Data Appear Gamma Distributed	
Anderson-Darling (NDs = DL)	2.165	0.742		
Kolmogorov-Smirnov (NDs = DL)	0.304	0.223	Data Not Gamma Distributed	
Anderson-Darling (NDs = DL/2)	0.579	0.738		
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.222	Data Appear Gamma Distributed	
Anderson-Darling (Gamma ROS Estimates)	2.309	0.746		
Kolmogorov-Smirnov (Gamma ROS Est.)	0.296	0.224	Data Not Gamma Distributed	
Lognormal GOF Test Results				
	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.981	0.819	0.96	0.976
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)	
Shapiro-Wilk (Detects Only)	0.96	0.866	Data Appear Lognormal	
Shapiro-Wilk (NDs = DL)	0.698	0.881	Data Not Lognormal	
Shapiro-Wilk (NDs = DL/2)	0.944	0.881	Data Appear Lognormal	
Shapiro-Wilk (Lognormal ROS Estimates)	0.953	0.881	Data Appear Lognormal	
Lilliefors (Detects Only)	0.172	0.234	Data Appear Lognormal	
Lilliefors (NDs = DL)	0.275	0.22	Data Not Lognormal	
Lilliefors (NDs = DL/2)	0.186	0.22	Data Appear Lognormal	
Lilliefors (Lognormal ROS Estimates)	0.187	0.22	Data Appear Lognormal	
Note: Substitution methods such as DL or DL/2 are not recommended.				
Barium (m-50a)				
Raw Statistics				
Number of Valid Observations	15			
Number of Missing Observations	1			
Number of Distinct Observations	13			
Minimum	0.0081			
Maximum	0.018			
Mean of Raw Data	0.0102			
Standard Deviation of Raw Data	0.00279			
Khat	17.77			
Theta hat	5.7168E-4			
Kstar	14.26			
Theta star	7.1238E-4			
Mean of Log Transformed Data	-4.618			
Standard Deviation of Log Transformed Data	0.234			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Normal GOF Test Results							
Correlation Coefficient R	0.842						
Shapiro Wilk Test Statistic	0.719						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	2.4999E-4						
Lilliefors Test Statistic	0.288						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.891						
A-D Test Statistic	1.531						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.28						
K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.879						
Shapiro Wilk Test Statistic	0.775						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00144						
Lilliefors Test Statistic	0.268						
Lilliefors Critical (0.05) Value	0.22						
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 (m-51a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	10						
Minimum	0.0089						
Maximum	0.012						
Mean of Raw Data	0.0101						
Standard Deviation of Raw Data	9.1219E-4						
Khat	138.7						
Theta hat	7.2628E-5						
Kstar	111						
Theta star	9.0749E-5						
Mean of Log Transformed Data	-4.601						
Standard Deviation of Log Transformed Data	0.0867						
Normal GOF Test Results							
Correlation Coefficient R	0.906						
Shapiro Wilk Test Statistic	0.822						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.00643						
Lilliefors Test Statistic	0.332						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.916						
A-D Test Statistic	1.114						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.323						
K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.92						
Shapiro Wilk Test Statistic	0.848						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0155						
Lilliefors Test Statistic	0.317						
Lilliefors Critical (0.05) Value	0.22						
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 (m-64a)							
Raw Statistics							
Number of Valid Observations	10						
Number of Missing Observations	1						
Number of Distinct Observations	6						
Minimum	0.012						
Maximum	0.034						
Mean of Raw Data	0.0172						
Standard Deviation of Raw Data	0.00632						
Khat	11.18						
Theta hat	0.00154						
Kstar	7.896						
Theta star	0.00218						
Mean of Log Transformed Data	-4.108						
Standard Deviation of Log Transformed Data	0.297						
Normal GOF Test Results							
Correlation Coefficient R	0.822						
Shapiro Wilk Test Statistic	0.703						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	7.2756E-4						
Lilliefors Test Statistic	0.313						
Lilliefors Critical (0.05) Value	0.262						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.875						
A-D Test Statistic	0.835						
A-D Critical (0.05) Value	0.725						
K-S Test Statistic	0.276						
K-S Critical(0.05) Value	0.267						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.9						
Shapiro Wilk Test Statistic	0.829						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.022						
Lilliefors Test Statistic	0.255						
Lilliefors Critical (0.05) Value	0.262						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Barium (w-123)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.0094						
Maximum	0.012						
Mean of Raw Data	0.0103						
Standard Deviation of Raw Data	7.5863E-4						
Khat	204.2						
Theta hat	5.0681E-5						
Kstar	163.4						
Theta star	6.3334E-5						
Mean of Log Transformed Data	-4.574						
Standard Deviation of Log Transformed Data	0.0721						
Normal GOF Test Results							
Correlation Coefficient R	0.936						
Shapiro Wilk Test Statistic	0.873						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.0402						
Lilliefors Test Statistic	0.276						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.94						
A-D Test Statistic	0.94						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.278						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

K-S Critical(0.05) Value	0.221						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.941						
Shapiro Wilk Test Statistic	0.881						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.055						
Lilliefors Test Statistic	0.27						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate_Lognormal at (0.05) Significance Level							
Beryllium (m-50a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-50a) was not processed!							
Beryllium (m-51a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-51a) was not processed!							
Beryllium (m-64a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	11	2	9	0	9	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 (m-64a) was not processed!							
Beryllium (w-123)							

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	2	14	0	14	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 (w-123) was not processed!								
Cadmium (m-50a)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	0	15	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 Cadmium (m-50a) was not processed!								
Cadmium (m-51a)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	1	14	93.33%		
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 Cadmium (m-51a) was not processed!								
Cadmium (m-64a)								
	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).								
The data set for variable Cadmium (m-64a) was not processed!								
Cadmium (w-123)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	0	15	100.00%		

TABLE B-3
FAP 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 Cadmium (w-123) was not processed!						
Chromium (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	9	6	40.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	5.0000E-4	0.01	0.00292	0.00125	0.00373
Statistics (Non-Detects Only)	9	0.001	0.022	0.00673	0.0038	0.00711
Statistics (All: NDs treated as DL value)	15	5.0000E-4	0.022	0.00521	0.0037	0.00614
Statistics (All: NDs treated as DL/2 value)	15	2.5000E-4	0.022	0.00462	0.0024	0.00611
Statistics (Normal ROS Imputed Data)	15	-0.0122	0.022	0.00183	0.0012	0.00864
Statistics (Gamma ROS Imputed Data)	15	0.001	0.022	0.00804	0.01	0.00563
Statistics (Lognormal ROS Imputed Data)	15	2.2067E-4	0.022	0.00434	0.00148	0.00618
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.214	0.884	0.00555	-5.466	1.034	-0.189
Statistics (NDs = DL)	0.923	0.783	0.00564	-5.889	1.22	-0.207
Statistics (NDs = DL/2)	0.757	0.65	0.00611	-6.166	1.411	-0.229
Statistics (Gamma ROS Estimates)	1.825	1.505	0.00441	-5.122	0.895	-0.175
Statistics (Lognormal ROS Estimates)	--	--	--	-6.232	1.313	-0.211
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.882	0.868	0.835	0.968		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.781	0.829	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.761	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.709	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.947	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.285	0.274	Data Not Normal			
Lilliefors (NDs = DL)	0.253	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.275	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.161	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.982	0.991	0.98	0.961		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.348	0.74				
Kolmogorov-Smirnov (Detects Only)	0.175	0.286	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.338	0.767				
Kolmogorov-Smirnov (NDs = DL)	0.121	0.229	Data Appear Gamma Distributed			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	0.349	0.775				
Kolmogorov-Smirnov (NDs = DL/2)	0.125	0.23	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.555	0.749				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.242	0.225	Detected Data appear Approximate Gamma			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.985	0.982	0.977	0.992		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.96	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.948	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.941	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.978	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.115	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.127	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.134	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.119	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	9	6	40.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.002	0.025	0.00908	0.0075	0.00855
Statistics (Non-Detects Only)	9	0.0034	0.07	0.0268	0.014	0.0239
Statistics (All: NDs treated as DL value)	15	0.002	0.07	0.0197	0.01	0.0208
Statistics (All: NDs treated as DL/2 value)	15	0.001	0.07	0.0179	0.0081	0.0214
Statistics (Normal ROS Imputed Data)	15	-0.0291	0.07	0.00982	0.0081	0.0293
Statistics (Gamma ROS Imputed Data)	15	0.0034	0.07	0.0201	0.01	0.02
Statistics (Lognormal ROS Imputed Data)	15	0.00139	0.07	0.0173	0.0081	0.0217
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	1.288	0.933	0.0208	-4.056	1.05	-0.259
Statistics (NDs = DL)	1.073	0.903	0.0184	-4.46	1.103	-0.247
Statistics (NDs = DL/2)	0.828	0.707	0.0216	-4.738	1.304	-0.275
Statistics (Gamma ROS Estimates)	1.508	1.25	0.0133	-4.276	0.841	-0.197
Statistics (Lognormal ROS Estimates)	--	--	--	-4.821	1.307	-0.271
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	0.935	0.895	0.874	0.972		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.862	0.829	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.799	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.762	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.938	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.259	0.274	Data Appear Normal			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL)	0.28	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.305	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.186	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.97	0.985	0.979	0.952		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.477	0.738				
Kolmogorov-Smirnov (Detects Only)	0.229	0.285	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.497	0.762				
Kolmogorov-Smirnov (NDs = DL)	0.215	0.228	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.496	0.771				
Kolmogorov-Smirnov (NDs = DL/2)	0.189	0.23	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	1.601	0.754				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.351	0.225	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.965	0.984	0.986	0.976		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.918	0.829	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.955	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.96	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.933	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.202	0.274	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.152	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.127	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.154	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Chromium (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	3	7	70.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	5.0000E-4	0.004	0.00129	5.0000E-4	0.00132
Statistics (Non-Detects Only)	3	0.0015	0.0022	0.00193	0.0021	3.7859E-4
Statistics (All: NDs treated as DL value)	10	5.0000E-4	0.004	0.00148	0.00125	0.00114
Statistics (All: NDs treated as DL/2 value)	10	2.5000E-4	0.0022	0.00103	7.5000E-4	8.4268E-4
Statistics (Normal ROS Imputed Data)	10	2.0225E-4	0.0022	0.00114	9.9857E-4	6.3619E-4
Statistics (Gamma ROS Imputed Data)	10	0.0015	0.01	0.00758	0.01	0.0039
Statistics (Lognormal ROS Imputed Data)	10	7.3856E-4	0.0022	0.00131	0.00114	4.8998E-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)	2.018	1.479	7.3338E-4	-6.783	0.782	-0.115
Statistics (NDs = DL/2)	1.424	1.064	7.2325E-4	-7.269	0.982	-0.135

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	2.425	1.764	0.00313	-5.102	0.807	-0.158		
Statistics (Lognormal ROS Estimates)	--	--	--	-6.699	0.349	-0.0521		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.924	0.915	0.918	0.97				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.855	0.767	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.836	0.842	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.81	0.842	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.936	0.842	Data Appear Normal					
Lilliefors (Detects Only)	0.337	0.425	Data Appear Normal					
Lilliefors (NDs = DL)	0.206	0.262	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.235	0.262	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.192	0.262	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	N/A	0.974	0.909	0.659				
	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)	0.618	0.736						
Kolmogorov-Smirnov (NDs = DL)	0.254	0.27	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.843	0.741						
Kolmogorov-Smirnov (NDs = DL/2)	0.257	0.272	Detected Data appear Approximate Gamma					
Anderson-Darling (Gamma ROS Estimates)	2.05	0.734						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.446	0.269	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.916	0.938	0.916	0.969				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.84	0.767	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.858	0.842	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.803	0.842	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.934	0.842	Data Appear Lognormal					
Lilliefors (Detects Only)	0.345	0.425	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.252	0.262	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.252	0.262	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.192	0.262	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Chromium (w-123)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	14	1	6.67%		

TABLE B-3
FAP 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)	14	9.9000E-4	0.13	0.0442	0.0295	0.0456
Statistics (All: NDs treated as DL value)	15	9.9000E-4	0.13	0.0419	0.018	0.0448
Statistics (All: NDs treated as DL/2 value)	15	9.9000E-4	0.13	0.0416	0.018	0.0451
Statistics (Normal ROS Imputed Data)	15	9.9000E-4	0.13	0.0413	0.018	0.0453
Statistics (Gamma ROS Imputed Data)	15	9.9000E-4	0.13	0.0419	0.018	0.0448
Statistics (Lognormal ROS Imputed Data)	15	9.9000E-4	0.13	0.0415	0.018	0.0452
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	0.684	0.585	0.0646	-4.006	1.714	-0.428
Statistics (NDs = DL)	0.693	0.598	0.0605	-4.046	1.659	-0.41
Statistics (NDs = DL/2)	0.667	0.578	0.0623	-4.092	1.685	-0.412
Statistics (Gamma ROS Estimates)	0.693	0.598	0.0605	-4.046	1.659	-0.41
Statistics (Lognormal ROS Estimates)	--	--	--	-4.118	1.708	-0.415
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.932	0.921	0.92	0.92		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.85	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.832	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.831	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.83	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.217	0.226	Data Appear Normal			
Lilliefors (NDs = DL)	0.237	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.233	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.23	0.22	Data Not Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.943	0.95	0.948	0.95		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.34	0.777				
Kolmogorov-Smirnov (Detects Only)	0.136	0.239	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.333	0.779				
Kolmogorov-Smirnov (NDs = DL)	0.118	0.231	Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.324	0.781				
Kolmogorov-Smirnov (NDs = DL/2)	0.123	0.231	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.333	0.779				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.118	0.231	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.955	0.962	0.967	0.966		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.892	0.874	Data Appear Lognormal			

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FAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.907	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.914	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.912	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.182	0.226	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.163	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.17	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.172	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	12	3	20.00%
	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)	12	5.1000E-4	0.0014	7.4250E-4	6.8000E-4	2.5652E-4
Statistics (All: NDs treated as DL value)	15	5.1000E-4	0.01	0.00153	7.9000E-4	0.0024
Statistics (All: NDs treated as DL/2 value)	15	5.1000E-4	0.005	0.00106	7.9000E-4	0.00112
Statistics (Normal ROS Imputed Data)	15	5.1000E-4	0.0014	7.4250E-4	6.9000E-4	2.3169E-4
Statistics (Gamma ROS Imputed Data)	15	5.1000E-4	0.01	0.00259	7.9000E-4	0.00384
Statistics (Lognormal ROS Imputed Data)	15	5.1000E-4	0.0014	7.3683E-4	6.9000E-4	2.3114E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	10.99	8.295	6.7589E-5	-7.252	0.306	-0.0422
Statistics (NDs = DL)	1.245	1.04	0.00123	-6.937	0.788	-0.114
Statistics (NDs = DL/2)	2.358	1.931	4.4976E-4	-7.076	0.574	-0.0812
Statistics (Gamma ROS Estimates)	0.776	0.665	0.00334	-6.722	1.129	-0.168
Statistics (Lognormal ROS Estimates)	--	--	--	-7.252	0.277	-0.0382
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.907	0.644	0.666	0.913		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.83	0.859	Data Not Normal			
Shapiro-Wilk (NDs = DL)	0.445	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.474	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.844	0.881	Data Not Normal			
Lilliefors (Detects Only)	0.182	0.243	Data Appear Normal			
Lilliefors (NDs = DL)	0.355	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.388	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.158	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.949	0.836	0.807	0.872		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.505	0.73				
Kolmogorov-Smirnov (Detects Only)	0.202	0.245	Detected Data Appear Gamma Distributed			

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FAP ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL)	1.967	0.759				
Kolmogorov-Smirnov (NDs = DL)	0.312	0.227	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.789	0.746				
Kolmogorov-Smirnov (NDs = DL/2)	0.315	0.224	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.668	0.774				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.377	0.23	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.952	0.868	0.859	0.959		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.904	0.859	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.766	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.758	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.921	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.196	0.243	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.255	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.252	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.136	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	4	11	73.33%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	0.002	0.025	0.00718	0.005	0.00645
Statistics (Non-Detects Only)	4	0.001	0.0025	0.0019	0.00205	6.6833E-4
Statistics (All: NDs treated as DL value)	15	0.001	0.025	0.00577	0.005	0.00597
Statistics (All: NDs treated as DL/2 value)	15	0.001	0.0125	0.00314	0.0025	0.00285
Statistics (Normal ROS Imputed Data)	15	9.2452E-4	0.0025	0.00171	0.0017	5.0708E-4
Statistics (Gamma ROS Imputed Data)	15	0.001	0.01	0.00784	0.01	0.00372
Statistics (Lognormal ROS Imputed Data)	15	0.001	0.00254	0.00167	0.00159	5.0825E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	8.843	2.377	2.1486E-4	-6.324	0.414	-0.0654
Statistics (NDs = DL)	1.619	1.339	0.00357	-5.494	0.818	-0.149
Statistics (NDs = DL/2)	2.245	1.841	0.0014	-6.002	0.665	-0.111
Statistics (Gamma ROS Estimates)	2.481	2.029	0.00316	-5.063	0.81	-0.16
Statistics (Lognormal ROS Estimates)	--	--	--	-6.436	0.307	-0.0478
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.965	0.801	0.771	0.99		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.927	0.748	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.665	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.621	0.881	Data Not Normal			

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FAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (Normal ROS Estimates)	0.962	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.225	0.375	Data Appear Normal			
Lilliefors (NDs = DL)	0.352	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.389	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0771	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.91	0.924	0.887	0.63		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.373	0.658				
Kolmogorov-Smirnov (Detects Only)	0.257	0.395	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.77	0.752				
Kolmogorov-Smirnov (NDs = DL)	0.265	0.225	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.247	0.746				
Kolmogorov-Smirnov (NDs = DL/2)	0.34	0.224	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	3.142	0.746				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.462	0.224	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.936	0.964	0.923	0.988		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.876	0.748	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.938	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.861	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.957	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.253	0.375	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.205	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.293	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0802	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Cobalt (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	4	6	60.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	5.0000E-4	0.002	9.1667E-4	7.5000E-4	5.8452E-4
Statistics (Non-Detects Only)	4	5.6000E-4	0.0015	9.6000E-4	8.9000E-4	4.2802E-4
Statistics (All: NDs treated as DL value)	10	5.0000E-4	0.002	9.3400E-4	8.4000E-4	5.0138E-4
Statistics (All: NDs treated as DL/2 value)	10	2.5000E-4	0.0015	6.5900E-4	5.3000E-4	4.1908E-4
Statistics (Normal ROS Imputed Data)	10	-5.009E-4	0.0015	3.9811E-4	3.9940E-4	6.0231E-4
Statistics (Gamma ROS Imputed Data)	10	5.6000E-4	0.01	0.00638	0.01	0.00467
Statistics (Lognormal ROS Imputed Data)	10	1.9007E-4	0.0015	5.9372E-4	4.9236E-4	4.1091E-4
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	6.798	1.866	1.4123E-4	-7.024	0.449	-0.0639

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (NDs = DL)	4.44	3.175	2.1036E-4	-7.093	0.499	-0.0703		
Statistics (NDs = DL/2)	2.874	2.078	2.2931E-4	-7.509	0.647	-0.0862		
Statistics (Gamma ROS Estimates)	1.101	0.837	0.0058	-5.573	1.276	-0.229		
Statistics (Lognormal ROS Estimates)	--	--	--	-7.618	0.636	-0.0835		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.972	0.923	0.945	0.989				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.934	0.748	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.848	0.842	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.884	0.842	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.977	0.842	Data Appear Normal					
Lilliefors (Detects Only)	0.244	0.375	Data Appear Normal					
Lilliefors (NDs = DL)	0.194	0.262	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.193	0.262	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.12	0.262	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.988	0.975	0.986	0.673				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.287	0.658						
Kolmogorov-Smirnov (Detects Only)	0.264	0.396	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.514	0.729						
Kolmogorov-Smirnov (NDs = DL)	0.196	0.268	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.386	0.733						
Kolmogorov-Smirnov (NDs = DL/2)	0.186	0.269	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	1.567	0.746						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.394	0.273	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.982	0.954	0.966	0.988				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.95	0.748	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.891	0.842	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.912	0.842	Data Appear Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.973	0.842	Data Appear Lognormal					
Lilliefors (Detects Only)	0.226	0.375	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.186	0.262	Data Appear Lognormal					
Lilliefors (NDs = DL/2)	0.187	0.262	Data Appear Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.119	0.262	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Cobalt (w-123)								

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	14	1	6.67%		
	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)	14	0.0012	0.0025	0.00178	0.0018	4.1728E-4		
Statistics (All: NDs treated as DL value)	15	0.0012	0.0025	0.00179	0.0019	4.0614E-4		
Statistics (All: NDs treated as DL/2 value)	15	0.001	0.0025	0.00173	0.0017	4.4955E-4		
Statistics (Normal ROS Imputed Data)	15	0.0012	0.0025	0.00176	0.0017	4.0761E-4		
Statistics (Gamma ROS Imputed Data)	15	0.0012	0.01	0.00233	0.0019	0.00216		
Statistics (Lognormal ROS Imputed Data)	15	0.0012	0.0025	0.00176	0.0017	4.0869E-4		
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV		
Statistics (Non-Detects Only)	19.43	15.31	9.1550E-5	-6.358	0.238	-0.0374		
Statistics (NDs = DL)	20.43	16.39	8.7769E-5	-6.348	0.232	-0.0365		
Statistics (NDs = DL/2)	15.32	12.3	1.1272E-4	-6.395	0.269	-0.0421		
Statistics (Gamma ROS Estimates)	2.969	2.42	7.8356E-4	-6.241	0.507	-0.0813		
Statistics (Lognormal ROS Estimates)	--	--	--	-6.368	0.232	-0.0364		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.974	0.974	0.983	0.973				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.933	0.874	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.935	0.881	Data Appear Normal					
Shapiro-Wilk (NDs = DL/2)	0.955	0.881	Data Appear Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.933	0.881	Data Appear Normal					
Lilliefors (Detects Only)	0.176	0.226	Data Appear Normal					
Lilliefors (NDs = DL)	0.167	0.22	Data Appear Normal					
Lilliefors (NDs = DL/2)	0.166	0.22	Data Appear Normal					
Lilliefors (Normal ROS Estimates)	0.19	0.22	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.975	0.972	0.979	0.776				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.475	0.734						
Kolmogorov-Smirnov (Detects Only)	0.183	0.228	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.528	0.735						
Kolmogorov-Smirnov (NDs = DL)	0.184	0.221	Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL/2)	0.364	0.736						
Kolmogorov-Smirnov (NDs = DL/2)	0.16	0.221	Data Appear Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	2.026	0.745						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.308	0.223	Data Not Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.974	0.971	0.981	0.975				

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)				
Shapiro-Wilk (Detects Only)	0.932	0.874	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL)	0.929	0.881	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.954	0.881	Data Appear Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.935	0.881	Data Appear Lognormal				
Lilliefors (Detects Only)	0.173	0.226	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.185	0.22	Data Appear Lognormal				
Lilliefors (NDs = DL/2)	0.15	0.22	Data Appear Lognormal				
Lilliefors (Lognormal ROS Estimates)	0.186	0.22	Data Appear Lognormal				
Note: Substitution methods such as DL or DL/2 are not recommended.							
Fluoride (m-50a)							
Raw Statistics							
Number of Valid Observations	16						
Number of Distinct Observations	7						
Minimum	2						
Maximum	2.6						
Mean of Raw Data	2.219						
Standard Deviation of Raw Data	0.187						
Khat	153.3						
Theta hat	0.0145						
Kstar	124.6						
Theta star	0.0178						
Mean of Log Transformed Data	0.794						
Standard Deviation of Log Transformed Data	0.0831						
Normal GOF Test Results							
Correlation Coefficient R	0.967						
Shapiro Wilk Test Statistic	0.922						
Shapiro Wilk Critical (0.05) Value	0.887						
Approximate Shapiro Wilk P Value	0.22						
Lilliefors Test Statistic	0.165						
Lilliefors Critical (0.05) Value	0.213						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.971						
A-D Test Statistic	0.449						
A-D Critical (0.05) Value	0.736						
K-S Test Statistic	0.156						
K-S Critical(0.05) Value	0.214						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.97						
Shapiro Wilk Test Statistic	0.926						
Shapiro Wilk Critical (0.05) Value	0.887						
Approximate Shapiro Wilk P Value	0.26						
Lilliefors Test Statistic	0.15						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors Critical (0.05) Value	0.213						
Data appear Lognormal at (0.05) Significance Level							
Fluoride (m-51a)							
Raw Statistics							
Number of Valid Observations	16						
Number of Distinct Observations	12						
Minimum	4.1						
Maximum	6						
Mean of Raw Data	5.156						
Standard Deviation of Raw Data	0.566						
Khat	86.73						
Theta hat	0.0595						
Kstar	70.51						
Theta star	0.0731						
Mean of Log Transformed Data	1.634						
Standard Deviation of Log Transformed Data	0.112						
Normal GOF Test Results							
Correlation Coefficient R	0.99						
Shapiro Wilk Test Statistic	0.969						
Shapiro Wilk Critical (0.05) Value	0.887						
Approximate Shapiro Wilk P Value	0.868						
Lilliefors Test Statistic	0.104						
Lilliefors Critical (0.05) Value	0.213						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.985						
A-D Test Statistic	0.212						
A-D Critical (0.05) Value	0.736						
K-S Test Statistic	0.118						
K-S Critical(0.05) Value	0.214						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.987						
Shapiro Wilk Test Statistic	0.965						
Shapiro Wilk Critical (0.05) Value	0.887						
Approximate Shapiro Wilk P Value	0.785						
Lilliefors Test Statistic	0.117						
Lilliefors Critical (0.05) Value	0.213						
Data appear Lognormal at (0.05) Significance Level							
Fluoride (m-64a)							
	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!							

TABLE B-3
FAP 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 Fluoride (m-64a) was not processed!						
Fluoride (w-123)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	15	1	6.25%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	1	8	8	8	8	N/A
Statistics (Non-Detects Only)	15	3.5	4.3	3.84	3.8	0.241
Statistics (All: NDs treated as DL value)	16	3.5	8	4.1	3.8	1.066
Statistics (All: NDs treated as DL/2 value)	16	3.5	4.3	3.85	3.8	0.237
Statistics (Normal ROS Imputed Data)	16	3.5	4.3	3.84	3.8	0.233
Statistics (Gamma ROS Imputed Data)	16	3.5	4.3	3.84	3.8	0.233
Statistics (Lognormal ROS Imputed Data)	16	3.5	4.3	3.84	3.8	0.233
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	276.4	221.2	0.0139	1.344	0.062	0.0461
Statistics (NDs = DL)	23.6	19.21	0.174	1.39	0.193	0.139
Statistics (NDs = DL/2)	286.5	232.8	0.0134	1.346	0.0608	0.0452
Statistics (Gamma ROS Estimates)	294.8	239.6	0.013	1.344	0.0599	0.0446
Statistics (Lognormal ROS Estimates)	--	--	--	1.344	0.0599	0.0446
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.961	0.662	0.97	0.965		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.915	0.881	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.469	0.887	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.932	0.887	Data Appear Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.925	0.887	Data Appear Normal			
Lilliefors (Detects Only)	0.232	0.22	Data Not Normal			
Lilliefors (NDs = DL)	0.363	0.213	Data Not Normal			
Lilliefors (NDs = DL/2)	0.209	0.213	Data Appear Normal			
Lilliefors (Normal ROS Estimates)	0.193	0.213	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.964	0.714	0.972	0.968		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.625	0.734				
Kolmogorov-Smirnov (Detects Only)	0.228	0.221	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL)	2.769	0.736				
Kolmogorov-Smirnov (NDs = DL)	0.319	0.215	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.532	0.736				

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Kolmogorov-Smirnov (NDs = DL/2)	0.205	0.214	Data Appear Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.574	0.736				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.188	0.214	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.965	0.726	0.973	0.969		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.922	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.558	0.887	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.938	0.887	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.932	0.887	Data Appear Lognormal			
Lilliefors (Detects Only)	0.222	0.22	Data Not Lognormal			
Lilliefors (NDs = DL)	0.298	0.213	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.199	0.213	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.188	0.213	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	2	13	86.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	5.0000E-4	0.01	0.00146	5.0000E-4	0.00263
Statistics (Non-Detects Only)	2	1.2000E-4	0.0012	6.6000E-4	6.6000E-4	7.6368E-4
Statistics (All: NDs treated as DL value)	15	1.2000E-4	0.01	0.00135	5.0000E-4	0.00246
Statistics (All: NDs treated as DL/2 value)	15	1.2000E-4	0.005	7.2133E-4	2.5000E-4	0.00123
Statistics (Normal ROS Imputed Data)	15	-6.319E-4	0.0012	1.9111E-4	1.8154E-4	4.5910E-4
Statistics (Gamma ROS Imputed Data)	15	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	15	2.4156E-5	0.0012	2.2724E-4	1.3682E-4	2.9304E-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)	0.901	0.765	0.0015	-7.253	0.993	-0.137
Statistics (NDs = DL/2)	0.939	0.796	7.6829E-4	-7.854	0.96	-0.122
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-8.876	0.979	-0.11
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal ROS		
Correlation Coefficient R	1	0.639	0.662	0.989		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.439	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.468	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.986	0.881	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.369	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.382	0.22	Data Not Normal			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (Normal ROS Estimates)	0.108	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.857	0.874	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)	2.398	0.768				
Kolmogorov-Smirnov (NDs = DL)	0.402	0.229	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.514	0.766				
Kolmogorov-Smirnov (NDs = DL/2)	0.427	0.228	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.734				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.221				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.855	0.837	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.763	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.718	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.986	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.37	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.41	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.108	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Lead (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	0	15	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 Lead (m-51a) was not processed!						
Lead (m-64a)						
	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!						
Instead, use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

The data set for variable Lead (m-64a) was not processed!							
Lead (w-123)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	1	15	1	14	93.33%	
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 (w-123) was not processed!							
Lithium (m-50a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	9						
Minimum	0.43						
Maximum	0.51						
Mean of Raw Data	0.471						
Standard Deviation of Raw Data	0.0233						
Khat	438.3						
Theta hat	0.00108						
Kstar	350.7						
Theta star	0.00134						
Mean of Log Transformed Data	-0.753						
Standard Deviation of Log Transformed Data	0.0495						
Normal GOF Test Results							
Correlation Coefficient R	0.992						
Shapiro Wilk Test Statistic	0.975						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.937						
Lilliefors Test Statistic	0.112						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.99						
A-D Test Statistic	0.203						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.122						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.991						
Shapiro Wilk Test Statistic	0.974						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.927						
Lilliefors Test Statistic	0.119						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Lithium (m-51a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	9						
Minimum	0.48						
Maximum	0.61						
Mean of Raw Data	0.548						
Standard Deviation of Raw Data	0.0382						
Khat	215.8						
Theta hat	0.00254						
Kstar	172.7						
Theta star	0.00317						
Mean of Log Transformed Data	-0.604						
Standard Deviation of Log Transformed Data	0.0709						
Normal GOF Test Results							
Correlation Coefficient R	0.969						
Shapiro Wilk Test Statistic	0.933						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.325						
Lilliefors Test Statistic	0.217						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.966						
A-D Test Statistic	0.531						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.224						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.963						
Shapiro Wilk Test Statistic	0.922						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.228						
Lilliefors Test Statistic	0.231						
Lilliefors Critical (0.05) Value	0.22						
Data appear Approximate_Lognormal at (0.05) Significance Level							

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lithium (m-64a)							
Raw Statistics							
Number of Valid Observations	10						
Number of Missing Observations	1						
Number of Distinct Observations	4						
Minimum	0.25						
Maximum	0.28						
Mean of Raw Data	0.263						
Standard Deviation of Raw Data	0.0106						
Khat	683.5						
Theta hat	3.8477E-4						
Kstar	478.5						
Theta star	5.4960E-4						
Mean of Log Transformed Data	-1.336						
Standard Deviation of Log Transformed Data	0.0403						
Normal GOF Test Results							
Correlation Coefficient R	0.943						
Shapiro Wilk Test Statistic	0.874						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.142						
Lilliefors Test Statistic	0.246						
Lilliefors Critical (0.05) Value	0.262						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.941						
A-D Test Statistic	0.671						
A-D Critical (0.05) Value	0.724						
K-S Test Statistic	0.259						
K-S Critical(0.05) Value	0.266						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.942						
Shapiro Wilk Test Statistic	0.871						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.136						
Lilliefors Test Statistic	0.248						
Lilliefors Critical (0.05) Value	0.262						
Data appear Lognormal at (0.05) Significance Level							
Lithium (w-123)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	10						
Minimum	0.58						
Maximum	0.7						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Mean of Raw Data	0.634						
Standard Deviation of Raw Data	0.0333						
Khat	389.1						
Theta hat	0.00163						
Kstar	311.3						
Theta star	0.00204						
Mean of Log Transformed Data	-0.457						
Standard Deviation of Log Transformed Data	0.0524						
Normal GOF Test Results							
Correlation Coefficient R	0.989						
Shapiro Wilk Test Statistic	0.975						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.913						
Lilliefors Test Statistic	0.119						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.99						
A-D Test Statistic	0.208						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.124						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.99						
Shapiro Wilk Test Statistic	0.976						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.933						
Lilliefors Test Statistic	0.128						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Mercury (m-50a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (m-50a) was not processed!							
Mercury (m-51a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Raw Statistics	16	2	14	0	14	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 (m-51a) was not processed!							
Mercury (m-64a)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	11	2	9	0	9	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 (m-64a) was not processed!							
Mercury (w-123)							
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs	
Raw Statistics	16	2	14	0	14	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 (w-123) was not processed!							
Molybdenum (m-50a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	12						
Minimum	0.005						
Maximum	0.028						
Mean of Raw Data	0.00842						
Standard Deviation of Raw Data	0.00557						
Khat	4.894						
Theta hat	0.00172						
Kstar	3.959						
Theta star	0.00213						
Mean of Log Transformed Data	-4.883						
Standard Deviation of Log Transformed Data	0.407						
Normal GOF Test Results							

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.687						
Shapiro Wilk Test Statistic	0.503						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	7.6200E-7						
Lilliefors Test Statistic	0.385						
Lilliefors Critical (0.05) Value	0.22						
Data not Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.784						
A-D Test Statistic	1.812						
A-D Critical (0.05) Value	0.739						
K-S Test Statistic	0.306						
K-S Critical(0.05) Value	0.222						
Data not Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.835						
Shapiro Wilk Test Statistic	0.725						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	2.4066E-4						
Lilliefors Test Statistic	0.26						
Lilliefors Critical (0.05) Value	0.22						
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 (m-51a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	11						
Minimum	0.029						
Maximum	0.057						
Mean of Raw Data	0.0404						
Standard Deviation of Raw Data	0.0089						
Khat	23.22						
Theta hat	0.00174						
Kstar	18.62						
Theta star	0.00217						
Mean of Log Transformed Data	-3.231						
Standard Deviation of Log Transformed Data	0.214						
Normal GOF Test Results							
Correlation Coefficient R	0.962						
Shapiro Wilk Test Statistic	0.913						
Shapiro Wilk Critical (0.05) Value	0.881						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Approximate Shapiro Wilk P Value	0.182						
Lilliefors Test Statistic	0.206						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.973						
A-D Test Statistic	0.414						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.188						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.978						
Shapiro Wilk Test Statistic	0.941						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.473						
Lilliefors Test Statistic	0.173						
Lilliefors Critical (0.05) Value	0.22						
Data appear Lognormal at (0.05) Significance Level							
Molybdenum (m-64a)							
Raw Statistics							
Number of Valid Observations	10						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.0042						
Maximum	0.0061						
Mean of Raw Data	0.00527						
Standard Deviation of Raw Data	5.6184E-4						
Khat	95.26						
Theta hat	5.5320E-5						
Kstar	66.75						
Theta star	7.8949E-5						
Mean of Log Transformed Data	-5.251						
Standard Deviation of Log Transformed Data	0.109						
Normal GOF Test Results							
Correlation Coefficient R	0.957						
Shapiro Wilk Test Statistic	0.923						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.332						
Lilliefors Test Statistic	0.219						
Lilliefors Critical (0.05) Value	0.262						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.956						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

A-D Test Statistic	0.478						
A-D Critical (0.05) Value	0.724						
K-S Test Statistic	0.218						
K-S Critical(0.05) Value	0.266						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.95						
Shapiro Wilk Test Statistic	0.912						
Shapiro Wilk Critical (0.05) Value	0.842						
Approximate Shapiro Wilk P Value	0.241						
Lilliefors Test Statistic	0.232						
Lilliefors Critical (0.05) Value	0.262						
Data appear Lognormal at (0.05) Significance Level							
Molybdenum (w-123)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	7						
Minimum	0.3						
Maximum	0.38						
Mean of Raw Data	0.346						
Standard Deviation of Raw Data	0.0196						
Khat	327.7						
Theta hat	0.00106						
Kstar	262.2						
Theta star	0.00132						
Mean of Log Transformed Data	-1.063						
Standard Deviation of Log Transformed Data	0.0575						
Normal GOF Test Results							
Correlation Coefficient R	0.971						
Shapiro Wilk Test Statistic	0.955						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.525						
Lilliefors Test Statistic	0.14						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.97						
A-D Test Statistic	0.343						
A-D Critical (0.05) Value	0.734						
K-S Test Statistic	0.136						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Correlation Coefficient R	0.964					
Shapiro Wilk Test Statistic	0.944					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.362					
Lilliefors Test Statistic	0.146					
Lilliefors Critical (0.05) Value	0.22					
Data appear Lognormal at (0.05) Significance Level						
Radium (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	5	10	66.67%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.5	0.8	0.64	0.6	0.0843
Statistics (Non-Detects Only)	5	0.4	1.1	0.66	0.6	0.27
Statistics (All: NDs treated as DL value)	15	0.4	1.1	0.647	0.6	0.16
Statistics (All: NDs treated as DL/2 value)	15	0.25	1.1	0.433	0.35	0.223
Statistics (Normal ROS Imputed Data)	15	0.182	1.1	0.483	0.45	0.219
Statistics (Gamma ROS Imputed Data)	15	0.224	1.1	0.481	0.434	0.213
Statistics (Lognormal ROS Imputed Data)	15	0.302	1.1	0.502	0.453	0.196
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	8.385	3.488	0.0787	-0.476	0.382	-0.801
Statistics (NDs = DL)	19.74	15.83	0.0328	-0.461	0.23	-0.498
Statistics (NDs = DL/2)	5.888	4.755	0.0736	-0.924	0.4	-0.433
Statistics (Gamma ROS Estimates)	6.747	5.442	0.0713	-0.808	0.392	-0.485
Statistics (Lognormal ROS Estimates)	--	--	--	-0.743	0.321	-0.433
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.946	0.907	0.836	0.93		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.903	0.762	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.849	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.716	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.884	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.241	0.343	Data Appear Normal			
Lilliefors (NDs = DL)	0.236	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.293	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.163	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.982	0.931	0.915	0.957		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.25	0.679				
Kolmogorov-Smirnov (Detects Only)	0.187	0.358	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.715	0.735				
Kolmogorov-Smirnov (NDs = DL)	0.2	0.221	Data Appear Gamma Distributed			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Anderson-Darling (NDs = DL/2)	1.172	0.738				
Kolmogorov-Smirnov (NDs = DL/2)	0.254	0.222	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	0.294	0.738				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.125	0.222	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.984	0.945	0.916	0.955		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.974	0.762	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.917	0.881	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.846	0.881	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.924	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.177	0.343	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.215	0.22	Data Appear Lognormal			
Lilliefors (NDs = DL/2)	0.226	0.22	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.146	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Radium (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	3	12	80.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	0.6	0.9	0.692	0.65	0.116
Statistics (Non-Detects Only)	3	0.2	0.6	0.467	0.6	0.231
Statistics (All: NDs treated as DL value)	15	0.2	0.9	0.647	0.6	0.164
Statistics (All: NDs treated as DL/2 value)	15	0.2	0.6	0.37	0.35	0.113
Statistics (Normal ROS Imputed Data)	15	-0.0205	0.6	0.287	0.283	0.177
Statistics (Gamma ROS Imputed Data)	15	0.0694	0.6	0.294	0.275	0.157
Statistics (Lognormal ROS Imputed Data)	15	0.109	0.6	0.285	0.251	0.15
	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)	11.51	9.252	0.0562	-0.48	0.346	-0.721
Statistics (NDs = DL/2)	12.58	10.11	0.0294	-1.035	0.29	-0.28
Statistics (Gamma ROS Estimates)	3.667	2.978	0.0803	-1.366	0.577	-0.422
Statistics (Lognormal ROS Estimates)	--	--	--	-1.37	0.487	-0.356
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.866	0.882	0.923	0.985		
	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)	0.804	0.881	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.854	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.965	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Normal			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lilliefors (NDs = DL)	0.321	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.237	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.108	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.87	0.947	0.981		
	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)	1.676	0.737				
Kolmogorov-Smirnov (NDs = DL)	0.373	0.221	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	0.808	0.737				
Kolmogorov-Smirnov (NDs = DL/2)	0.207	0.221	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.19	0.742				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0967	0.223	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.866	0.786	0.947	0.985		
	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)	0.65	0.881	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.904	0.881	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.965	0.881	Data Appear Lognormal			
Lilliefors (Detects Only)	0.385	0.425	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.398	0.22	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.213	0.22	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.108	0.22	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Radium (m-64a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	11	1	10	4	6	60.00%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.6	0.7	0.667	0.7	0.0516
Statistics (Non-Detects Only)	4	0.4	1.6	1.075	1.15	0.512
Statistics (All: NDs treated as DL value)	10	0.4	1.6	0.83	0.7	0.365
Statistics (All: NDs treated as DL/2 value)	10	0.3	1.6	0.63	0.35	0.484
Statistics (Normal ROS Imputed Data)	10	-0.0858	1.6	0.635	0.522	0.529
Statistics (Gamma ROS Imputed Data)	10	0.0833	1.6	0.658	0.507	0.493
Statistics (Lognormal ROS Imputed Data)	10	0.237	1.6	0.68	0.492	0.463
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	4.386	1.263	0.245	-0.046	0.611	-13.29
Statistics (NDs = DL)	6.664	4.732	0.125	-0.263	0.404	-1.534
Statistics (NDs = DL/2)	2.457	1.787	0.256	-0.679	0.652	-0.96

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Statistics (Gamma ROS Estimates)	1.826	1.345	0.36	-0.716	0.884	-1.234		
Statistics (Lognormal ROS Estimates)	--	--	--	-0.575	0.634	-1.103		
Normal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Normal RO				
Correlation Coefficient R	0.985	0.912	0.843	0.981				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.972	0.748	Data Appear Normal					
Shapiro-Wilk (NDs = DL)	0.84	0.842	Data Not Normal					
Shapiro-Wilk (NDs = DL/2)	0.706	0.842	Data Not Normal					
Shapiro-Wilk (Normal ROS Estimates)	0.958	0.842	Data Appear Normal					
Lilliefors (Detects Only)	0.192	0.375	Data Appear Normal					
Lilliefors (NDs = DL)	0.339	0.262	Data Not Normal					
Lilliefors (NDs = DL/2)	0.383	0.262	Data Not Normal					
Lilliefors (Normal ROS Estimates)	0.156	0.262	Data Appear Normal					
Gamma GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Gamma RO				
Correlation Coefficient R	0.921	0.955	0.932	0.989				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Anderson-Darling (Detects Only)	0.337	0.659						
Kolmogorov-Smirnov (Detects Only)	0.254	0.396	Detected Data Appear Gamma Distributed					
Anderson-Darling (NDs = DL)	0.645	0.728						
Kolmogorov-Smirnov (NDs = DL)	0.317	0.267	Detected Data appear Approximate Gamma					
Anderson-Darling (NDs = DL/2)	1.415	0.734						
Kolmogorov-Smirnov (NDs = DL/2)	0.37	0.269	Data Not Gamma Distributed					
Anderson-Darling (Gamma ROS Estimates)	0.145	0.737						
Kolmogorov-Smirnov (Gamma ROS Est.)	0.104	0.27	Data Appear Gamma Distributed					
Lognormal GOF Test Results								
	No NDs	NDs = DL	NDs = DL/2	Log ROS				
Correlation Coefficient R	0.938	0.952	0.869	0.978				
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)					
Shapiro-Wilk (Detects Only)	0.886	0.748	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL)	0.916	0.842	Data Appear Lognormal					
Shapiro-Wilk (NDs = DL/2)	0.742	0.842	Data Not Lognormal					
Shapiro-Wilk (Lognormal ROS Estimates)	0.945	0.842	Data Appear Lognormal					
Lilliefors (Detects Only)	0.28	0.375	Data Appear Lognormal					
Lilliefors (NDs = DL)	0.292	0.262	Data Not Lognormal					
Lilliefors (NDs = DL/2)	0.342	0.262	Data Not Lognormal					
Lilliefors (Lognormal ROS Estimates)	0.156	0.262	Data Appear Lognormal					
Note: Substitution methods such as DL or DL/2 are not recommended.								
Radium (w-123)								
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs		
Raw Statistics	16	1	15	5	10	66.67%		

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.4	0.8	0.62	0.6	0.103
Statistics (Non-Detects Only)	5	0.5	0.8	0.62	0.6	0.13
Statistics (All: NDs treated as DL value)	15	0.4	0.8	0.62	0.6	0.108
Statistics (All: NDs treated as DL/2 value)	15	0.2	0.8	0.413	0.35	0.172
Statistics (Normal ROS Imputed Data)	15	0.296	0.8	0.495	0.5	0.135
Statistics (Gamma ROS Imputed Data)	15	0.327	0.8	0.502	0.5	0.127
Statistics (Lognormal ROS Imputed Data)	15	0.363	0.8	0.511	0.5	0.118
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	28.98	11.73	0.0214	-0.495	0.207	-0.418
Statistics (NDs = DL)	33.63	26.95	0.0184	-0.493	0.182	-0.369
Statistics (NDs = DL/2)	7.148	5.763	0.0578	-0.955	0.382	-0.4
Statistics (Gamma ROS Estimates)	17.77	14.26	0.0282	-0.719	0.245	-0.34
Statistics (Lognormal ROS Estimates)	--	--	--	-0.695	0.216	-0.311
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.96	0.955	0.921	0.975		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.902	0.762	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.915	0.881	Data Appear Normal			
Shapiro-Wilk (NDs = DL/2)	0.849	0.881	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.952	0.881	Data Appear Normal			
Lilliefors (Detects Only)	0.221	0.343	Data Appear Normal			
Lilliefors (NDs = DL)	0.24	0.22	Data Not Normal			
Lilliefors (NDs = DL/2)	0.244	0.22	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.162	0.22	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.972	0.952	0.962	0.981		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.349	0.679				
Kolmogorov-Smirnov (Detects Only)	0.254	0.357	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	0.729	0.735				
Kolmogorov-Smirnov (NDs = DL)	0.248	0.221	Detected Data appear Approximate Gamma			
Anderson-Darling (NDs = DL/2)	0.843	0.738				
Kolmogorov-Smirnov (NDs = DL/2)	0.22	0.222	Detected Data appear Approximate Gamma			
Anderson-Darling (Gamma ROS Estimates)	0.261	0.735				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.148	0.221	Data Appear Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.962	0.945	0.953	0.976		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.901	0.762	Data Appear Lognormal			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Shapiro-Wilk (NDs = DL)	0.902	0.881	Data Appear Lognormal				
Shapiro-Wilk (NDs = DL/2)	0.909	0.881	Data Appear Lognormal				
Shapiro-Wilk (Lognormal ROS Estimates)	0.954	0.881	Data Appear Lognormal				
Lilliefors (Detects Only)	0.23	0.343	Data Appear Lognormal				
Lilliefors (NDs = DL)	0.261	0.22	Data Not Lognormal				
Lilliefors (NDs = DL/2)	0.209	0.22	Data Appear Lognormal				
Lilliefors (Lognormal ROS Estimates)	0.162	0.22	Data Appear Lognormal				
Note: Substitution methods such as DL or DL/2 are not recommended.							
Selenium (m-50a)							
Raw Statistics							
Number of Valid Observations	15						
Number of Missing Observations	1						
Number of Distinct Observations	14						
Minimum	0.0027						
Maximum	0.0068						
Mean of Raw Data	0.00425						
Standard Deviation of Raw Data	0.00105						
Khat	18.29						
Theta hat	2.3251E-4						
Kstar	14.68						
Theta star	2.8975E-4						
Mean of Log Transformed Data	-5.488						
Standard Deviation of Log Transformed Data	0.243						
Normal GOF Test Results							
Correlation Coefficient R	0.969						
Shapiro Wilk Test Statistic	0.947						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.419						
Lilliefors Test Statistic	0.111						
Lilliefors Critical (0.05) Value	0.22						
Data appear Normal at (0.05) Significance Level							
Gamma GOF Test Results							
Correlation Coefficient R	0.981						
A-D Test Statistic	0.264						
A-D Critical (0.05) Value	0.735						
K-S Test Statistic	0.12						
K-S Critical(0.05) Value	0.221						
Data appear Gamma Distributed at (0.05) Significance Level							
Lognormal GOF Test Results							
Correlation Coefficient R	0.981						
Shapiro Wilk Test Statistic	0.967						
Shapiro Wilk Critical (0.05) Value	0.881						
Approximate Shapiro Wilk P Value	0.757						
Lilliefors Test Statistic	0.137						
Lilliefors Critical (0.05) Value	0.22						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Data appear Lognormal at (0.05) Significance Level						
Selenium (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	1	15	0	15	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 Selenium (m-51a) was not processed!						
Selenium (m-64a)						
	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!						
Estimated to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).						
The data set for variable Selenium (m-64a) was not processed!						
Selenium (w-123)						
Raw Statistics						
Number of Valid Observations	15					
Number of Missing Observations	1					
Number of Distinct Observations	13					
Minimum	0.0017					
Maximum	0.0058					
Mean of Raw Data	0.00349					
Standard Deviation of Raw Data	0.00102					
Khat	12.26					
Theta hat	2.8498E-4					
Kstar	9.851					
Theta star	3.5461E-4					
Mean of Log Transformed Data	-5.698					
Standard Deviation of Log Transformed Data	0.304					
Normal GOF Test Results						
Correlation Coefficient R	0.973					
Shapiro Wilk Test Statistic	0.958					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.567					
Lilliefors Test Statistic	0.164					
Lilliefors Critical (0.05) Value	0.22					
Data appear Normal at (0.05) Significance Level						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results						
Correlation Coefficient R	0.981					
A-D Test Statistic	0.346					
A-D Critical (0.05) Value	0.737					
K-S Test Statistic	0.177					
K-S Critical(0.05) Value	0.221					
Data appear Gamma Distributed at (0.05) Significance Level						
Lognormal GOF Test Results						
Correlation Coefficient R	0.972					
Shapiro Wilk Test Statistic	0.956					
Shapiro Wilk Critical (0.05) Value	0.881					
Approximate Shapiro Wilk P Value	0.539					
Lilliefors Test Statistic	0.199					
Lilliefors Critical (0.05) Value	0.22					
Data appear Lognormal at (0.05) Significance Level						
Thallium (m-50a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	2	12	85.71%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	1.0000E-4	0.002	3.0833E-4	1.0000E-4	5.4516E-4
Statistics (Non-Detects Only)	2	1.1000E-4	1.3000E-4	1.2000E-4	1.2000E-4	1.4142E-5
Statistics (All: NDs treated as DL value)	14	1.0000E-4	0.002	2.8143E-4	1.0000E-4	5.0613E-4
Statistics (All: NDs treated as DL/2 value)	14	5.0000E-5	0.001	1.4929E-4	5.0000E-5	2.5107E-4
Statistics (Normal ROS Imputed Data)	14	-2.457E-5	1.3000E-4	4.9237E-5	4.8000E-5	4.2113E-5
Statistics (Gamma ROS Imputed Data)	14	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	14	3.5747E-5	1.3000E-4	7.0203E-5	6.5538E-5	2.5803E-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)	0.97	0.81	2.9010E-4	-8.773	0.886	-0.101
Statistics (NDs = DL/2)	1.032	0.859	1.4465E-4	-9.367	0.891	-0.0951
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-9.623	0.352	-0.0366
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.622	0.649	0.994		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.416	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.45	0.874	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.989	0.874	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.403	0.226	Data Not Normal			
Lilliefors (NDs = DL/2)	0.349	0.226	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.0865	0.226	Data Appear Normal			

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.846	0.859	0.405		
	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)	3.039	0.761				
Kolmogorov-Smirnov (NDs = DL)	0.41	0.235	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	2.298	0.759				
Kolmogorov-Smirnov (NDs = DL/2)	0.365	0.235	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.733				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.228				
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.751	0.818	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.58	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.677	0.874	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.989	0.874	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.365	0.226	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.369	0.226	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.0865	0.226	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (m-51a)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	8	6	42.86%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	2.0000E-4	0.002	7.1667E-4	4.5000E-4	6.9402E-4
Statistics (Non-Detects Only)	8	1.2000E-4	2.7000E-4	1.8000E-4	1.7500E-4	5.0709E-5
Statistics (All: NDs treated as DL value)	14	1.2000E-4	0.002	4.1000E-4	2.0500E-4	5.1245E-4
Statistics (All: NDs treated as DL/2 value)	14	1.0000E-4	0.001	2.5643E-4	2.0000E-4	2.3683E-4
Statistics (Normal ROS Imputed Data)	14	1.2000E-4	2.7000E-4	1.7192E-4	1.7118E-4	4.0141E-5
Statistics (Gamma ROS Imputed Data)	14	1.2000E-4	0.01	0.0043	2.4000E-4	0.00504
Statistics (Lognormal ROS Imputed Data)	14	1.2000E-4	2.7000E-4	1.7029E-4	1.6566E-4	4.0107E-5
	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Non-Detects Only)	14.91	9.402	1.2073E-5	-8.656	0.277	-0.032
Statistics (NDs = DL)	1.384	1.135	2.9634E-4	-8.202	0.809	-0.0987
Statistics (NDs = DL/2)	2.319	1.87	1.1055E-4	-8.499	0.628	-0.0739
Statistics (Gamma ROS Estimates)	0.435	0.39	0.0101	-6.92	2.09	-0.302
Statistics (Lognormal ROS Estimates)	--	--	--	-8.701	0.22	-0.0253
Normal GOF Test Results						

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	0.955	0.752	0.775	0.955		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.909	0.818	Data Appear Normal			
Shapiro-Wilk (NDs = DL)	0.587	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.625	0.874	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.918	0.874	Data Appear Normal			
Lilliefors (Detects Only)	0.223	0.283	Data Appear Normal			
Lilliefors (NDs = DL)	0.322	0.226	Data Not Normal			
Lilliefors (NDs = DL/2)	0.334	0.226	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.222	0.226	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	0.968	0.92	0.901	0.701		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Anderson-Darling (Detects Only)	0.418	0.716				
Kolmogorov-Smirnov (Detects Only)	0.224	0.294	Detected Data Appear Gamma Distributed			
Anderson-Darling (NDs = DL)	1.477	0.753				
Kolmogorov-Smirnov (NDs = DL)	0.302	0.233	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.049	0.745				
Kolmogorov-Smirnov (NDs = DL/2)	0.242	0.231	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	2.177	0.806				
Kolmogorov-Smirnov (Gamma ROS Est.)	0.34	0.244	Data Not Gamma Distributed			
Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	0.966	0.91	0.933	0.972		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (Detects Only)	0.926	0.818	Data Appear Lognormal			
Shapiro-Wilk (NDs = DL)	0.832	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.878	0.874	Data Appear Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.947	0.874	Data Appear Lognormal			
Lilliefors (Detects Only)	0.204	0.283	Data Appear Lognormal			
Lilliefors (NDs = DL)	0.272	0.226	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.195	0.226	Data Appear Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.222	0.226	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						
Thallium (m-64a)						
	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
FAP ProUCL GOODNESS OF FIT STATISTICS*

The data set for variable Thallium (m-64a) was not processed!						
Thallium (w-123)						
	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	2	14	2	12	85.71%
	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	1.0000E-4	4.0000E-4	1.8333E-4	1.5000E-4	1.1146E-4
Statistics (Non-Detects Only)	2	2.6000E-4	3.0000E-4	2.8000E-4	2.8000E-4	2.8284E-5
Statistics (All: NDs treated as DL value)	14	1.0000E-4	4.0000E-4	1.9714E-4	2.0000E-4	1.0866E-4
Statistics (All: NDs treated as DL/2 value)	14	5.0000E-5	3.0000E-4	1.1857E-4	1.0000E-4	8.5831E-5
Statistics (Normal ROS Imputed Data)	14	2.2931E-6	3.0000E-4	1.3152E-4	1.2575E-4	8.4816E-5
Statistics (Gamma ROS Imputed Data)	14	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Imputed Data)	14	1.0341E-4	3.0000E-4	1.7163E-4	1.6085E-4	5.5475E-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)	3.837	3.062	5.1386E-5	-8.668	0.538	-0.0621
Statistics (NDs = DL/2)	2.409	1.941	4.9216E-5	-9.262	0.675	-0.0729
Statistics (Gamma ROS Estimates)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (Lognormal ROS Estimates)	--	--	--	-8.714	0.303	-0.0348
Normal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Normal RO		
Correlation Coefficient R	1	0.915	0.894	0.986		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.82	0.874	Data Not Normal			
Shapiro-Wilk (NDs = DL/2)	0.788	0.874	Data Not Normal			
Shapiro-Wilk (Normal ROS Estimates)	0.969	0.874	Data Appear Normal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.243	0.226	Data Not Normal			
Lilliefors (NDs = DL/2)	0.3	0.226	Data Not Normal			
Lilliefors (Normal ROS Estimates)	0.118	0.226	Data Appear Normal			
Gamma GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Gamma RO		
Correlation Coefficient R	N/A	0.954	0.959	0.435		
	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)	0.985	0.741				
Kolmogorov-Smirnov (NDs = DL)	0.274	0.23	Data Not Gamma Distributed			
Anderson-Darling (NDs = DL/2)	1.088	0.745				
Kolmogorov-Smirnov (NDs = DL/2)	0.256	0.231	Data Not Gamma Distributed			
Anderson-Darling (Gamma ROS Estimates)	N/A	0.733				
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	0.228				

TABLE B-3
FAP ProUCL GOODNESS OF FIT STATISTICS*

Lognormal GOF Test Results						
	No NDs	NDs = DL	NDs = DL/2	Log ROS		
Correlation Coefficient R	1	0.924	0.922	N/A		
	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)			
Shapiro-Wilk (NDs = DL)	0.83	0.874	Data Not Lognormal			
Shapiro-Wilk (NDs = DL/2)	0.828	0.874	Data Not Lognormal			
Shapiro-Wilk (Lognormal ROS Estimates)	0.969	0.874	Data Appear Lognormal			
Lilliefors (Detects Only)	N/A	N/A				
Lilliefors (NDs = DL)	0.272	0.226	Data Not Lognormal			
Lilliefors (NDs = DL/2)	0.258	0.226	Data Not Lognormal			
Lilliefors (Lognormal ROS Estimates)	0.118	0.226	Data Appear Lognormal			
Note: Substitution methods such as DL or DL/2 are not recommended.						

TABLE B-4
FAP ProUCL OUTLIER TESTING*

User Selected Options		Outlier Tests for Selected Variables excluding nondetects					
Date/Time of Computation	ProUCL 5.110/1/2018 9:44:04 PM						
From File	FlyAshPond_Cholla_AllWells_AssessmentMontSept2018.xls						
Full Precision	OFF						
No Outlier Test for Antimony (m-50a)							
No Outlier Test for Antimony (m-51a)							
No Outlier Test for Antimony (m-64a)							
No Outlier Test for Antimony (w-123)							
Dixon's Outlier Test for Arsenic (m-50a)							
Total N = 15							
Number NDs = 1							
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 0.003 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.667							
For 10% significance level, 0.003 is an outlier.							
For 5% significance level, 0.003 is an outlier.							
For 1% significance level, 0.003 is an outlier.							
2. Data Value 0.0023 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.333							
For 10% significance level, 0.0023 is not an outlier.							
For 5% significance level, 0.0023 is not an outlier.							
For 1% significance level, 0.0023 is not an outlier.							
Dixon's Outlier Test for Arsenic (m-51a)							
Total N = 15							
Number NDs = 0							
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 0.035 is a Potential Outlier (Upper Tail)							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

Test Statistic: 0.316							
For 10% significance level, 0.035 is not an outlier.							
For 5% significance level, 0.035 is not an outlier.							
For 1% significance level, 0.035 is not an outlier.							
2. Data Value 0.0029 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.502							
For 10% significance level, 0.0029 is an outlier.							
For 5% significance level, 0.0029 is not an outlier.							
For 1% significance level, 0.0029 is not an outlier.							
Dixon's Outlier Test for Arsenic (m-64a)							
Total N = 10							
Number NDs = 1							
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 0.0033 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.238							
For 10% significance level, 0.0033 is not an outlier.							
For 5% significance level, 0.0033 is not an outlier.							
For 1% significance level, 0.0033 is not an outlier.							
2. Data Value 0.00094 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.140							
For 10% significance level, 0.00094 is not an outlier.							
For 5% significance level, 0.00094 is not an outlier.							
For 1% significance level, 0.00094 is not an outlier.							
Dixon's Outlier Test for Arsenic (w-123)							
Total N = 15							
Number NDs = 2							
Number Detects = 13							
10% critical value: 0.467							
5% critical value: 0.521							
1% critical value: 0.615							
Note: NDs excluded from Outlier Test							
1. Data Value 0.003 is a Potential Outlier (Upper Tail)							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

Test Statistic: 0.333							
For 10% significance level, 0.003 is not an outlier.							
For 5% significance level, 0.003 is not an outlier.							
For 1% significance level, 0.003 is not an outlier.							
2. Data Value 0.0014 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.231							
For 10% significance level, 0.0014 is not an outlier.							
For 5% significance level, 0.0014 is not an outlier.							
For 1% significance level, 0.0014 is not an outlier.							
Dixon's Outlier Test for Barium (m-50a)							
Total N = 15							
Number NDs = 0							
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 0.018 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.521							
For 10% significance level, 0.018 is an outlier.							
For 5% significance level, 0.018 is not an outlier.							
For 1% significance level, 0.018 is not an outlier.							
2. Data Value 0.0081 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.061							
For 10% significance level, 0.0081 is not an outlier.							
For 5% significance level, 0.0081 is not an outlier.							
For 1% significance level, 0.0081 is not an outlier.							
Dixon's Outlier Test for Barium (m-51a)							
Total N = 15							
Number NDs = 0							
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 0.012 is a Potential Outlier (Upper Tail)							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

Test Statistic: 0.400							
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 0.0089 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.286							
For 10% significance level, 0.0089 is not an outlier.							
For 5% significance level, 0.0089 is not an outlier.							
For 1% significance level, 0.0089 is not an outlier.							
Dixon's Outlier Test for Barium (m-64a)							
Total N = 10							
Number NDs = 0							
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 0.034 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.682							
For 10% significance level, 0.034 is an outlier.							
For 5% significance level, 0.034 is an outlier.							
For 1% significance level, 0.034 is an outlier.							
2. Data Value 0.012 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.000							
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.							
Dixon's Outlier Test for Barium (w-123)							
Total N = 15							
Number NDs = 0							
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 0.012 is a Potential Outlier (Upper Tail)							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

Test Statistic: 0.417								
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 0.0094 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.125								
For 10% significance level, 0.0094 is not an outlier.								
For 5% significance level, 0.0094 is not an outlier.								
For 1% significance level, 0.0094 is not an outlier.								
No Outlier Test for Beryllium (m-50a)								
No Outlier Test for Beryllium (m-51a)								
No Outlier Test for Beryllium (m-64a)								
No Outlier Test for Beryllium (w-123)								
No Outlier Test for Cadmium (m-50a)								
No Outlier Test for Cadmium (m-51a)								
No Outlier Test for Cadmium (m-64a)								
No Outlier Test for Cadmium (w-123)								
Dixon's Outlier Test for Chromium (m-50a)								
Total N = 15								
Number NDs = 6								
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 0.022 is a Potential Outlier (Upper Tail)								
Test Statistic: 0.337								
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 0.001 is a Potential Outlier (Lower Tail)								
Test Statistic: 0.014								
For 10% significance level, 0.001 is not an outlier.								

TABLE B-4
FAP ProUCL OUTLIER TESTING*

For 5% significance level, 0.001 is not an outlier.							
For 1% significance level, 0.001 is not an outlier.							
Dixon's Outlier Test for Chromium (m-51a)							
Total N = 15							
Number NDs = 6							
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 0.07 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.275							
For 10% significance level, 0.07 is not an outlier.							
For 5% significance level, 0.07 is not an outlier.							
For 1% significance level, 0.07 is not an outlier.							
2. Data Value 0.0034 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.095							
For 10% significance level, 0.0034 is not an outlier.							
For 5% significance level, 0.0034 is not an outlier.							
For 1% significance level, 0.0034 is not an outlier.							
Dixon's Outlier Test for Chromium (m-64a)							
Total N = 10							
Number NDs = 7							
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 0.0022 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.143							
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.							
2. Data Value 0.0015 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.857							
For 10% significance level, 0.0015 is not an outlier.							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

For 5% significance level, 0.0015 is not an outlier.							
For 1% significance level, 0.0015 is not an outlier.							
Dixon's Outlier Test for Chromium (w-123)							
Total N = 15							
Number NDs = 1							
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 0.13 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.257							
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.							
2. Data Value 0.00099 is a Potential Outlier (Lower T							
Test Statistic: 0.008							
For 10% significance level, 0.00099 is not an outlier.							
For 5% significance level, 0.00099 is not an outlier.							
For 1% significance level, 0.00099 is not an outlier.							
Dixon's Outlier Test for Cobalt (m-50a)							
Total N = 15							
Number NDs = 3							
Number Detects = 12							
10% critical value: 0.49							
5% critical value: 0.546							
1% critical value: 0.642							
Note: NDs excluded from Outlier Test							
1. Data Value 0.0014 is a Potential Outlier (Upper T							
Test Statistic: 0.562							
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 0.00051 is a Potential Outlier (Lower T							
Test Statistic: 0.095							
For 10% significance level, 0.00051 is not an outlier.							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

For 5% significance level, 0.00051 is not an outlier.							
For 1% significance level, 0.00051 is not an outlier.							
Dixon's Outlier Test for Cobalt (m-51a)							
Total N = 15							
Number NDs = 11							
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 0.0025 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.133							
For 10% significance level, 0.0025 is not an outlier.							
For 5% significance level, 0.0025 is not an outlier.							
For 1% significance level, 0.0025 is not an outlier.							
2. Data Value 0.001 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.533							
For 10% significance level, 0.001 is not an outlier.							
For 5% significance level, 0.001 is not an outlier.							
For 1% significance level, 0.001 is not an outlier.							
Dixon's Outlier Test for Cobalt (m-64a)							
Total N = 10							
Number NDs = 6							
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 0.0015 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.426							
For 10% significance level, 0.0015 is not an outlier.							
For 5% significance level, 0.0015 is not an outlier.							
For 1% significance level, 0.0015 is not an outlier.							
2. Data Value 0.00056 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.128							
For 10% significance level, 0.00056 is not an outlier.							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

For 5% significance level, 0.00056 is not an outlier.							
For 1% significance level, 0.00056 is not an outlier.							
Dixon's Outlier Test for Cobalt (w-123)							
Total N = 15							
Number NDs = 1							
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: 0.273							
For 10% significance level, 0.0025 is not an outlier.							
For 5% significance level, 0.0025 is not an outlier.							
For 1% significance level, 0.0025 is not an outlier.							
2. Data Value 0.0012 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.200							
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.							
Dixon's Outlier Test for Fluoride (m-50a)							
Total N = 16							
Number NDs = 0							
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 2.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.333							
For 10% significance level, 2.6 is not an outlier.							
For 5% significance level, 2.6 is not an outlier.							
For 1% significance level, 2.6 is not an outlier.							
2. Data Value 2 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
For 10% significance level, 2 is not an outlier.							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

For 5% significance level, 2 is not an outlier.							
For 1% significance level, 2 is not an outlier.							
Dixon's Outlier Test for Fluoride (m-51a)							
Total N = 16							
Number NDs = 0							
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 6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.214							
For 10% significance level, 6 is not an outlier.							
For 5% significance level, 6 is not an outlier.							
For 1% significance level, 6 is not an outlier.							
2. Data Value 4.1 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.313							
For 10% significance level, 4.1 is not an outlier.							
For 5% significance level, 4.1 is not an outlier.							
For 1% significance level, 4.1 is not an outlier.							
No Outlier Test for Fluoride (m-64a)							
Dixon's Outlier Test for Fluoride (w-123)							
Total N = 16							
Number NDs = 1							
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 4.3 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.286							
For 10% significance level, 4.3 is not an outlier.							
For 5% significance level, 4.3 is not an outlier.							
For 1% significance level, 4.3 is not an outlier.							
2. Data Value 3.5 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.167							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

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.							
No Outlier Test for Lead (m-50a)							
No Outlier Test for Lead (m-51a)							
No Outlier Test for Lead (m-64a)							
No Outlier Test for Lead (w-123)							
Dixon's Outlier Test for Lithium (m-50a)							
Total N = 15							
Number NDs = 0							
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 0.51 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.167							
For 10% significance level, 0.51 is not an outlier.							
For 5% significance level, 0.51 is not an outlier.							
For 1% significance level, 0.51 is not an outlier.							
2. Data Value 0.43 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.286							
For 10% significance level, 0.43 is not an outlier.							
For 5% significance level, 0.43 is not an outlier.							
For 1% significance level, 0.43 is not an outlier.							
Dixon's Outlier Test for Lithium (m-51a)							
Total N = 15							
Number NDs = 0							
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 0.61 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.250							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

For 10% significance level, 0.61 is not an outlier.							
For 5% significance level, 0.61 is not an outlier.							
For 1% significance level, 0.61 is not an outlier.							
2. Data Value 0.48 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.100							
For 10% significance level, 0.48 is not an outlier.							
For 5% significance level, 0.48 is not an outlier.							
For 1% significance level, 0.48 is not an outlier.							
Dixon's Outlier Test for Lithium (m-64a)							
Total N = 10							
Number NDs = 0							
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 0.28 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.333							
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.							
2. Data Value 0.25 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
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 (w-123)							
Total N = 15							
Number NDs = 0							
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 0.7 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.400							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

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.							
2. Data Value 0.58 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.250							
For 10% significance level, 0.58 is not an outlier.							
For 5% significance level, 0.58 is not an outlier.							
For 1% significance level, 0.58 is not an outlier.							
No Outlier Test for Mercury (m-50a)							
No Outlier Test for Mercury (m-51a)							
No Outlier Test for Mercury (m-64a)							
No Outlier Test for Mercury (w-123)							
Dixon's Outlier Test for Molybdenum (m-50a)							
Total N = 15							
Number NDs = 0							
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 0.028 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.855							
For 10% significance level, 0.028 is an outlier.							
For 5% significance level, 0.028 is an outlier.							
For 1% significance level, 0.028 is an outlier.							
2. Data Value 0.005 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.220							
For 10% significance level, 0.005 is not an outlier.							
For 5% significance level, 0.005 is not an outlier.							
For 1% significance level, 0.005 is not an outlier.							
Dixon's Outlier Test for Molybdenum (m-51a)							
Total N = 15							
Number NDs = 0							
Number Detects = 15							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

10% critical value: 0.472							
5% critical value: 0.525							
1% critical value: 0.616							
Note: NDs excluded from Outlier Test							
1. Data Value 0.057 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.115							
For 10% significance level, 0.057 is not an outlier.							
For 5% significance level, 0.057 is not an outlier.							
For 1% significance level, 0.057 is not an outlier.							
2. Data Value 0.029 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.080							
For 10% significance level, 0.029 is not an outlier.							
For 5% significance level, 0.029 is not an outlier.							
For 1% significance level, 0.029 is not an outlier.							
Dixon's Outlier Test for Molybdenum (m-64a)							
Total N = 10							
Number NDs = 0							
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 0.0061 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.182							
For 10% significance level, 0.0061 is not an outlier.							
For 5% significance level, 0.0061 is not an outlier.							
For 1% significance level, 0.0061 is not an outlier.							
2. Data Value 0.0042 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.471							
For 10% significance level, 0.0042 is an outlier.							
For 5% significance level, 0.0042 is not an outlier.							
For 1% significance level, 0.0042 is not an outlier.							
Dixon's Outlier Test for Molybdenum (w-123)							
Total N = 15							
Number NDs = 0							
Number Detects = 15							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

10% critical value: 0.472							
5% critical value: 0.525							
1% critical value: 0.616							
Note: NDs excluded from Outlier Test							
1. Data Value 0.38 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.400							
For 10% significance level, 0.38 is not an outlier.							
For 5% significance level, 0.38 is not an outlier.							
For 1% significance level, 0.38 is not an outlier.							
2. Data Value 0.3 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.500							
For 10% significance level, 0.3 is an outlier.							
For 5% significance level, 0.3 is not an outlier.							
For 1% significance level, 0.3 is not an outlier.							
Dixon's Outlier Test for Radium (m-50a)							
Total N = 15							
Number NDs = 10							
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 1.1 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.571							
For 10% significance level, 1.1 is an outlier.							
For 5% significance level, 1.1 is not an outlier.							
For 1% significance level, 1.1 is not an outlier.							
2. Data Value 0.4 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.143							
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 Radium (m-51a)							
Total N = 15							
Number NDs = 12							
Number Detects = 3							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

10% critical value: 0.886							
5% critical value: 0.941							
1% critical value: 0.988							
Note: NDs excluded from Outlier Test							
1. Data Value 0.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.000							
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.							
2. Data Value 0.2 is a Potential Outlier (Lower Tail)?							
Test Statistic: 1.000							
For 10% significance level, 0.2 is an outlier.							
For 5% significance level, 0.2 is an outlier.							
For 1% significance level, 0.2 is an outlier.							
Dixon's Outlier Test for Radium (m-64a)							
Total N = 10							
Number NDs = 6							
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 1.6 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.250							
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: 0.500							
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 Radium (w-123)							
Total N = 15							
Number NDs = 10							
Number Detects = 5							

TABLE B-4
FAP ProUCL OUTLIER TESTING*

10% critical value: 0.557							
5% critical value: 0.642							
1% critical value: 0.78							
Note: NDs excluded from Outlier Test							
1. Data Value 0.8 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.333							
For 10% significance level, 0.8 is not an outlier.							
For 5% significance level, 0.8 is not an outlier.							
For 1% significance level, 0.8 is not an outlier.							
2. Data Value 0.5 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.000							
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 Selenium (m-50a)							
Total N = 15							
Number NDs = 0							
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 0.0068 is a Potential Outlier (Upper Tail)?							
Test Statistic: 0.474							
For 10% significance level, 0.0068 is an outlier.							
For 5% significance level, 0.0068 is not an outlier.							
For 1% significance level, 0.0068 is not an outlier.							
2. Data Value 0.0027 is a Potential Outlier (Lower Tail)?							
Test Statistic: 0.130							
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.							
No Outlier Test for Selenium (m-51a)							
No Outlier Test for Selenium (m-64a)							
Dixon's Outlier Test for Selenium (w-123)							

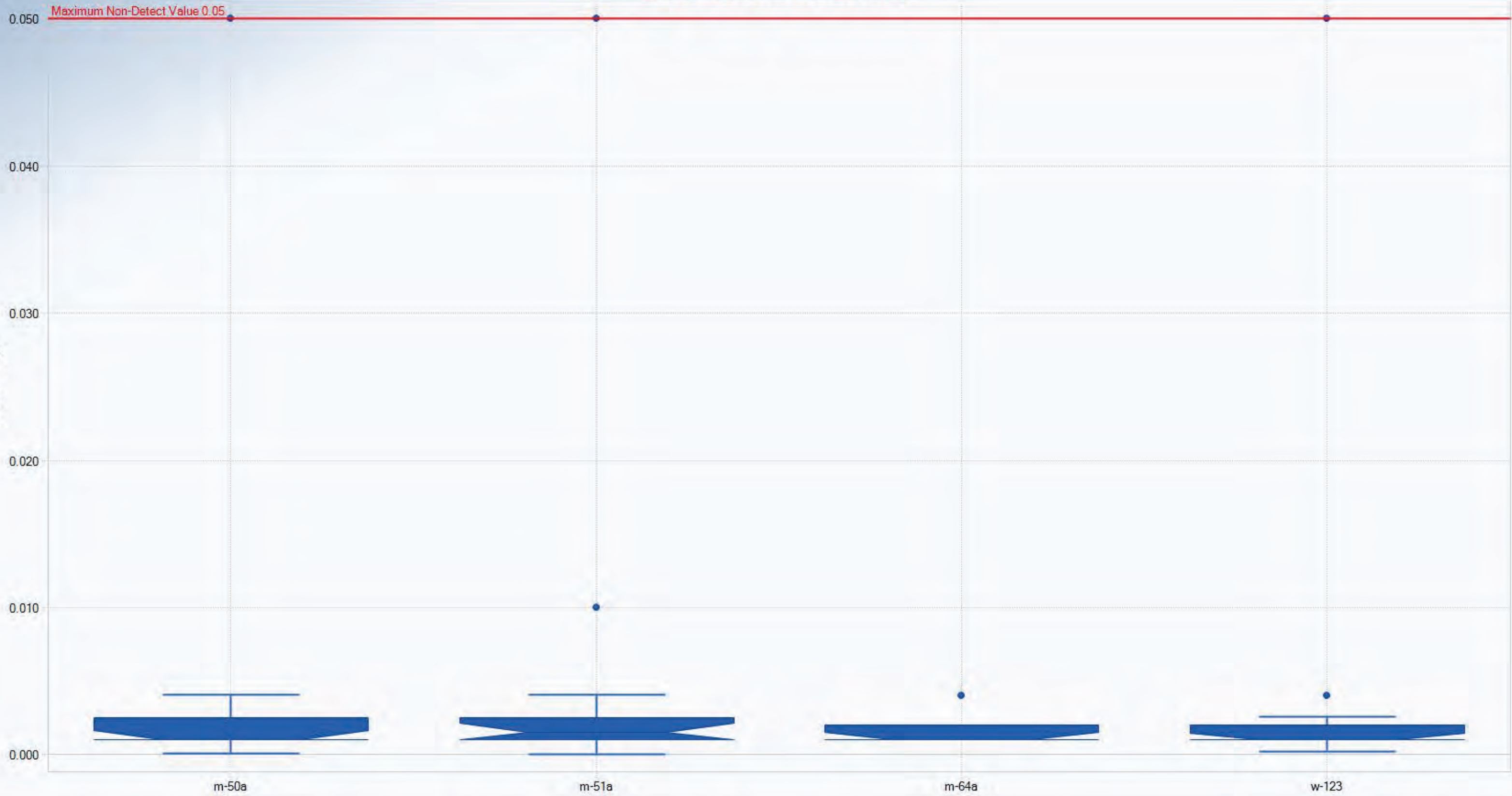
TABLE B-4
FAP ProUCL OUTLIER TESTING*

Total N = 15							
Number NDs = 0							
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 0.0058 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.382							
For 10% significance level, 0.0058 is not an outlier.							
For 5% significance level, 0.0058 is not an outlier.							
For 1% significance level, 0.0058 is not an outlier.							
2. Data Value 0.0017 is a Potential Outlier (Lower Tail)							
Test Statistic: 0.250							
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.							
No Outlier Test for Thallium (m-50a)							
Dixon's Outlier Test for Thallium (m-51a)							
Total N = 14							
Number NDs = 6							
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 0.00027 is a Potential Outlier (Upper Tail)							
Test Statistic: 0.462							
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 Tail)							
Test Statistic: 0.222							
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.							

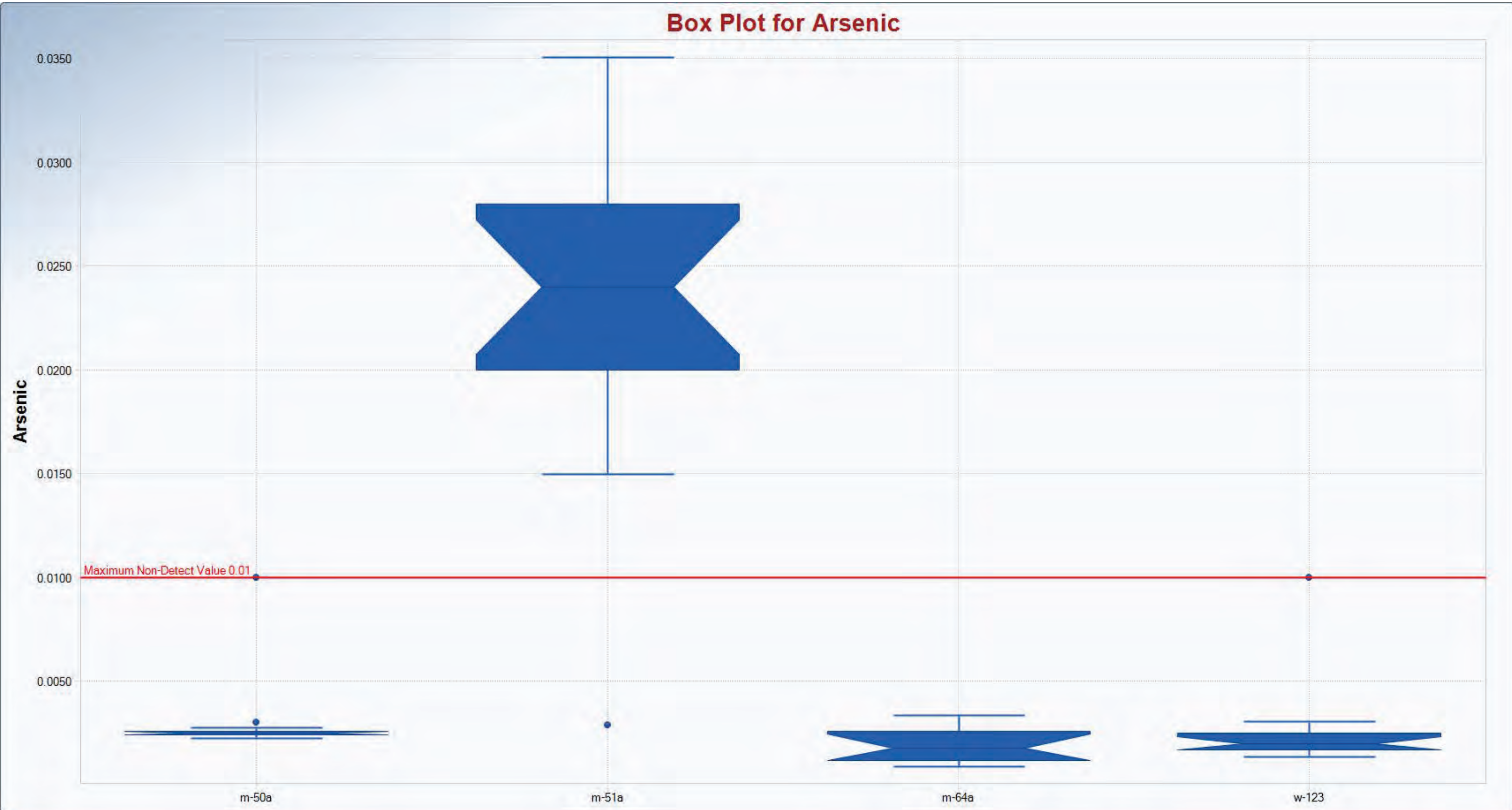
TABLE B-4
FAP ProUCL OUTLIER TESTING*

No Outlier Test for Thallium (m-64a)							
No Outlier Test for Thallium (w-123)							

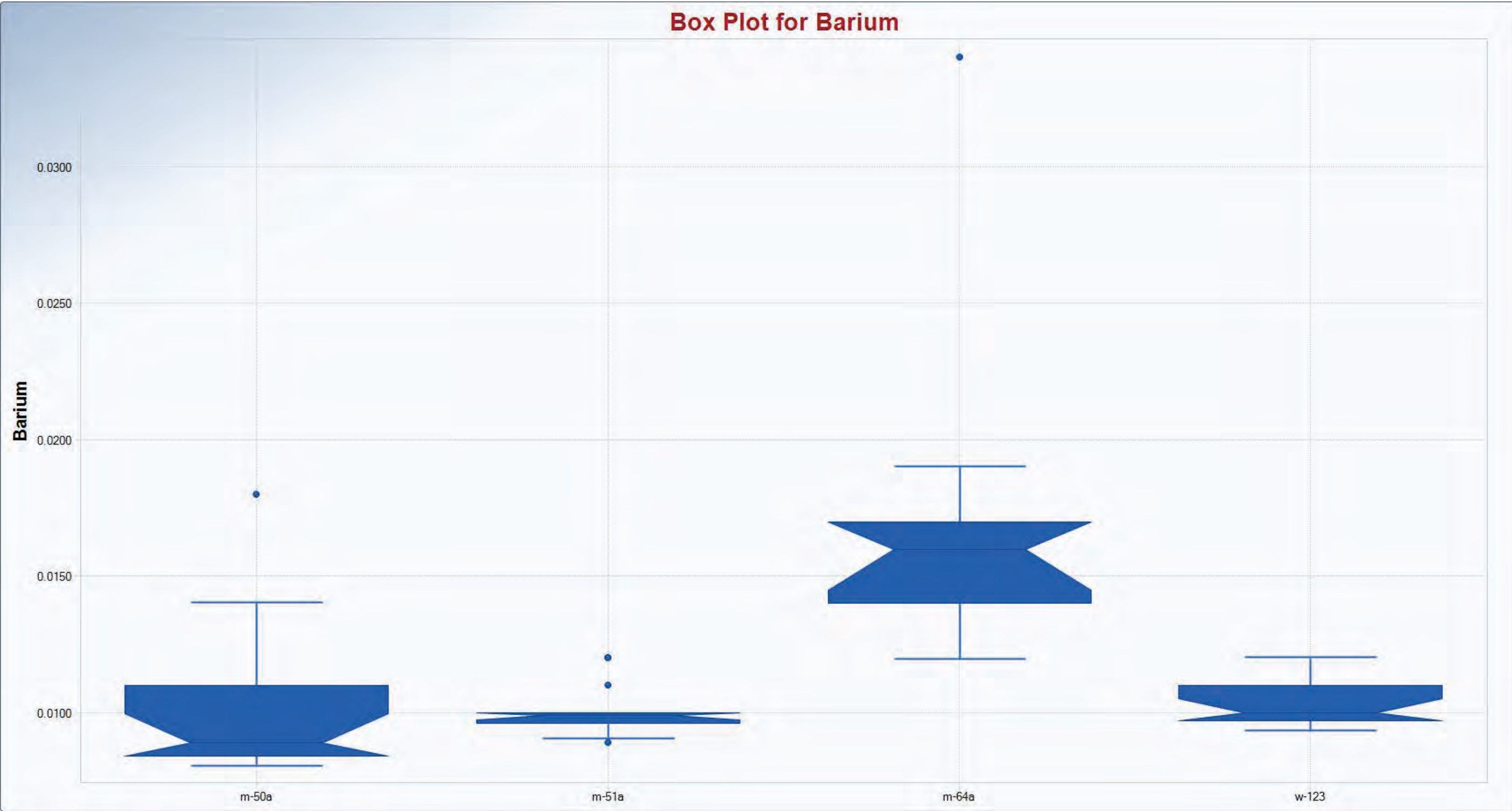
Box Plot for Antimony

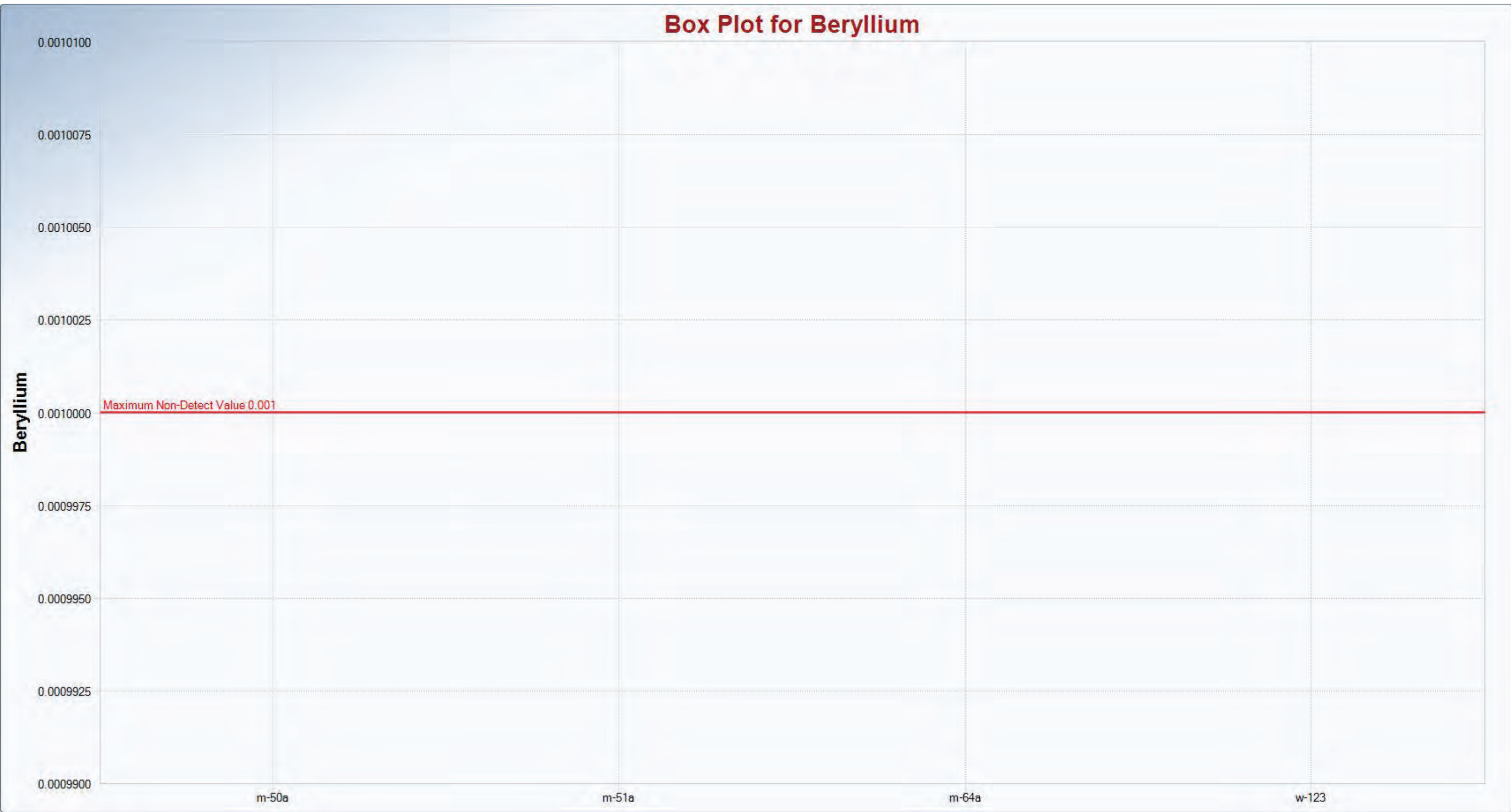


Box Plot for Arsenic



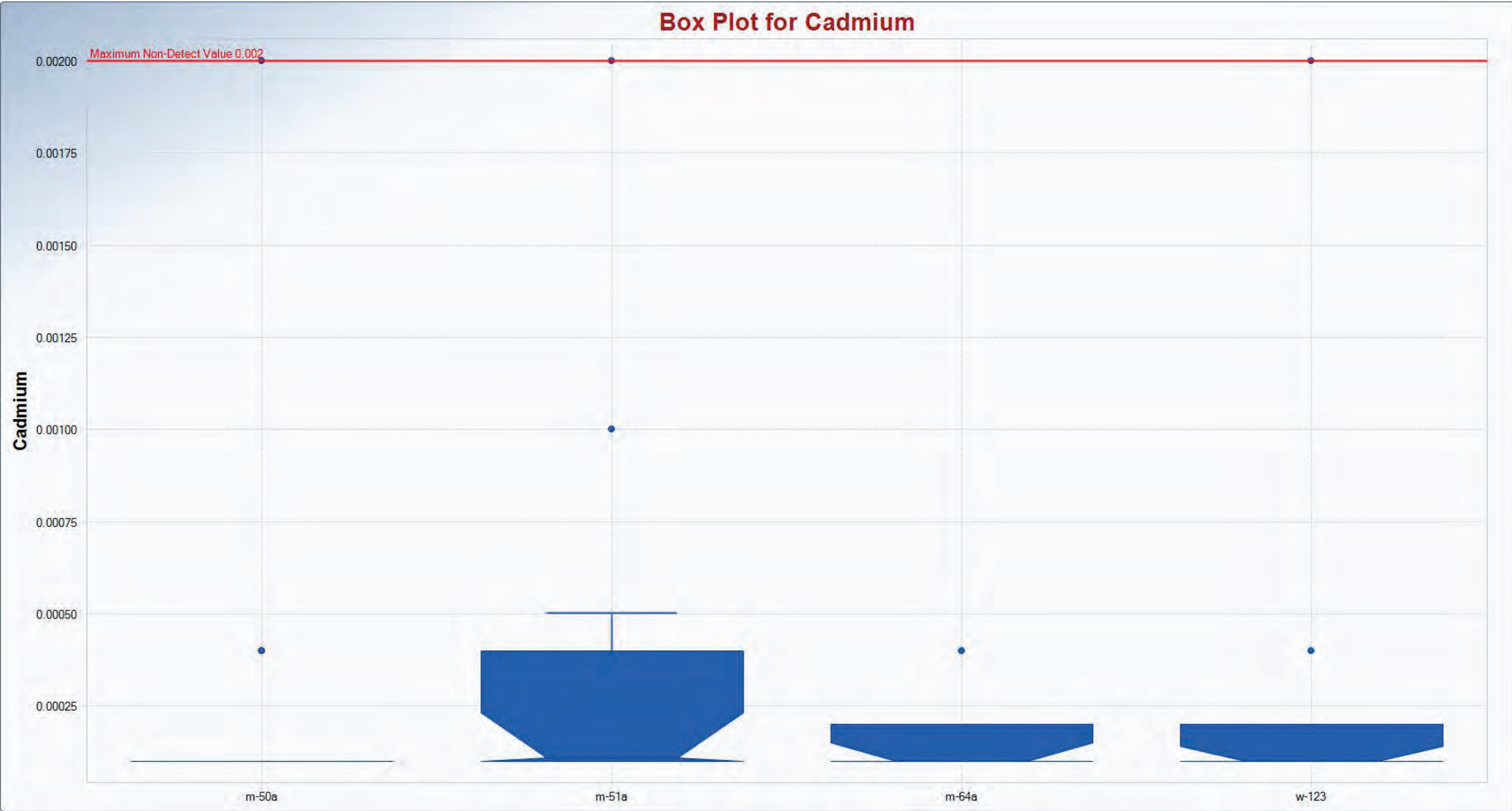
Box Plot for Barium



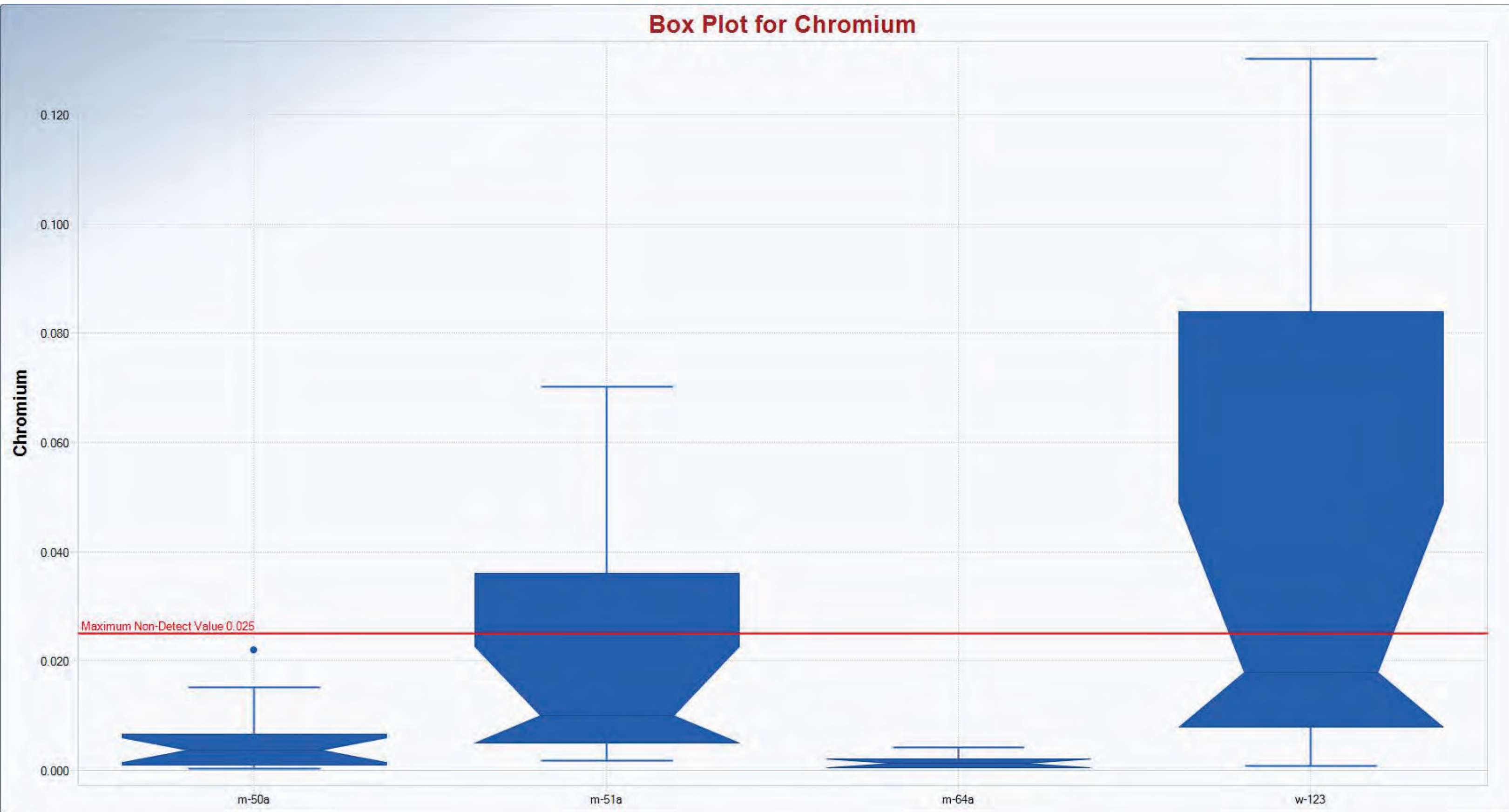


Box Plot for Cadmium

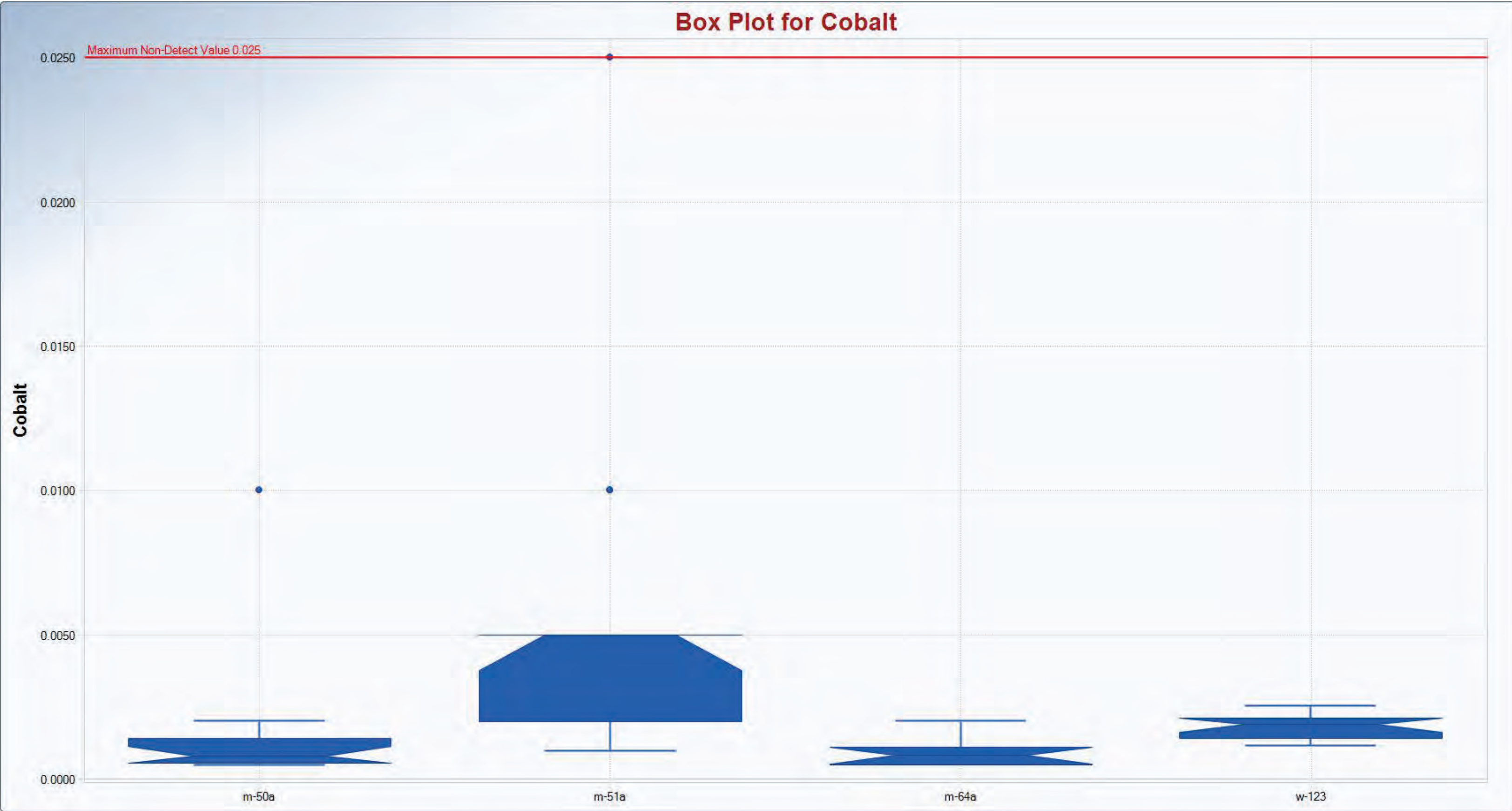
Maximum Non-Detect Value 0.002



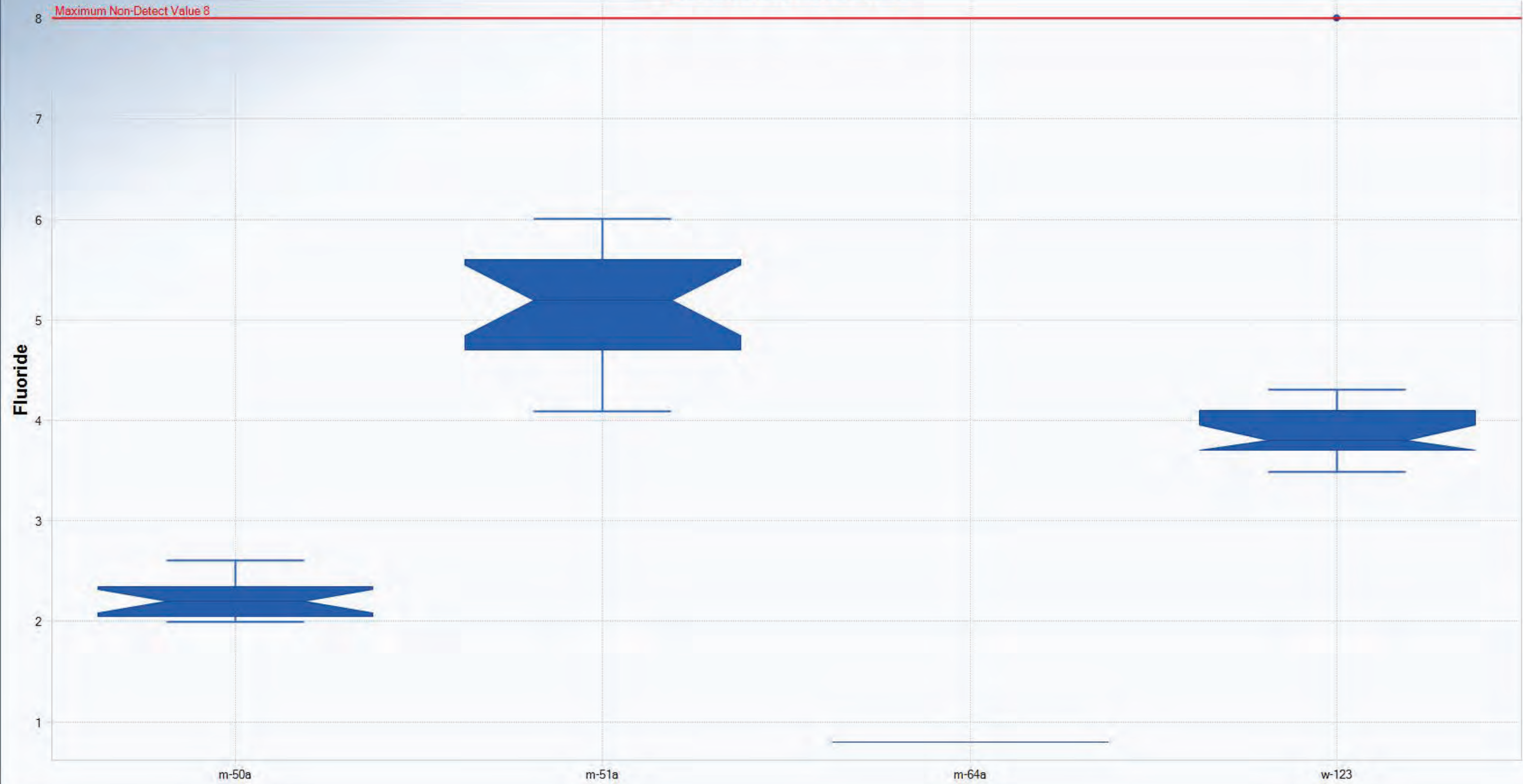
Box Plot for Chromium



Box Plot for Cobalt

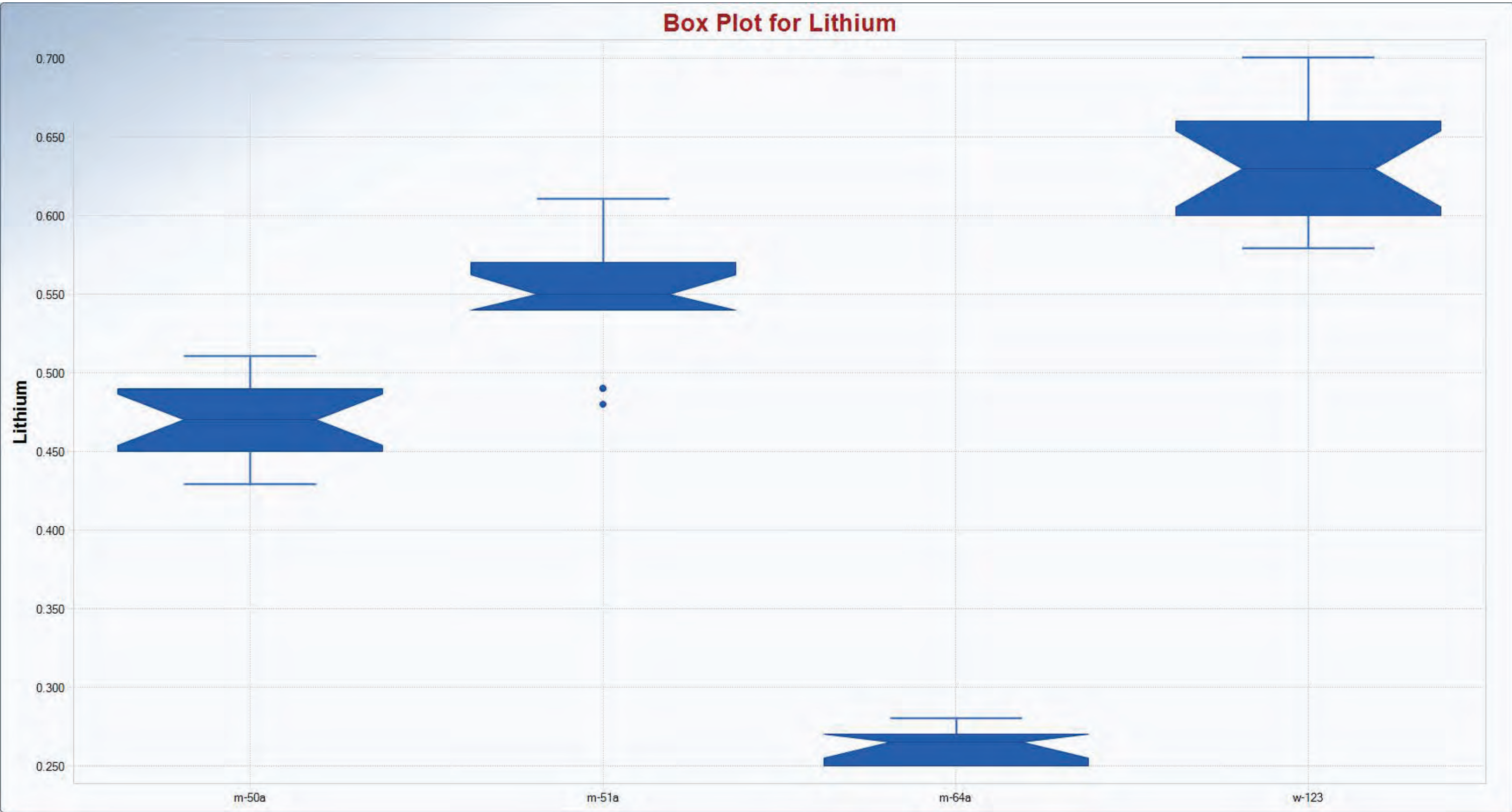


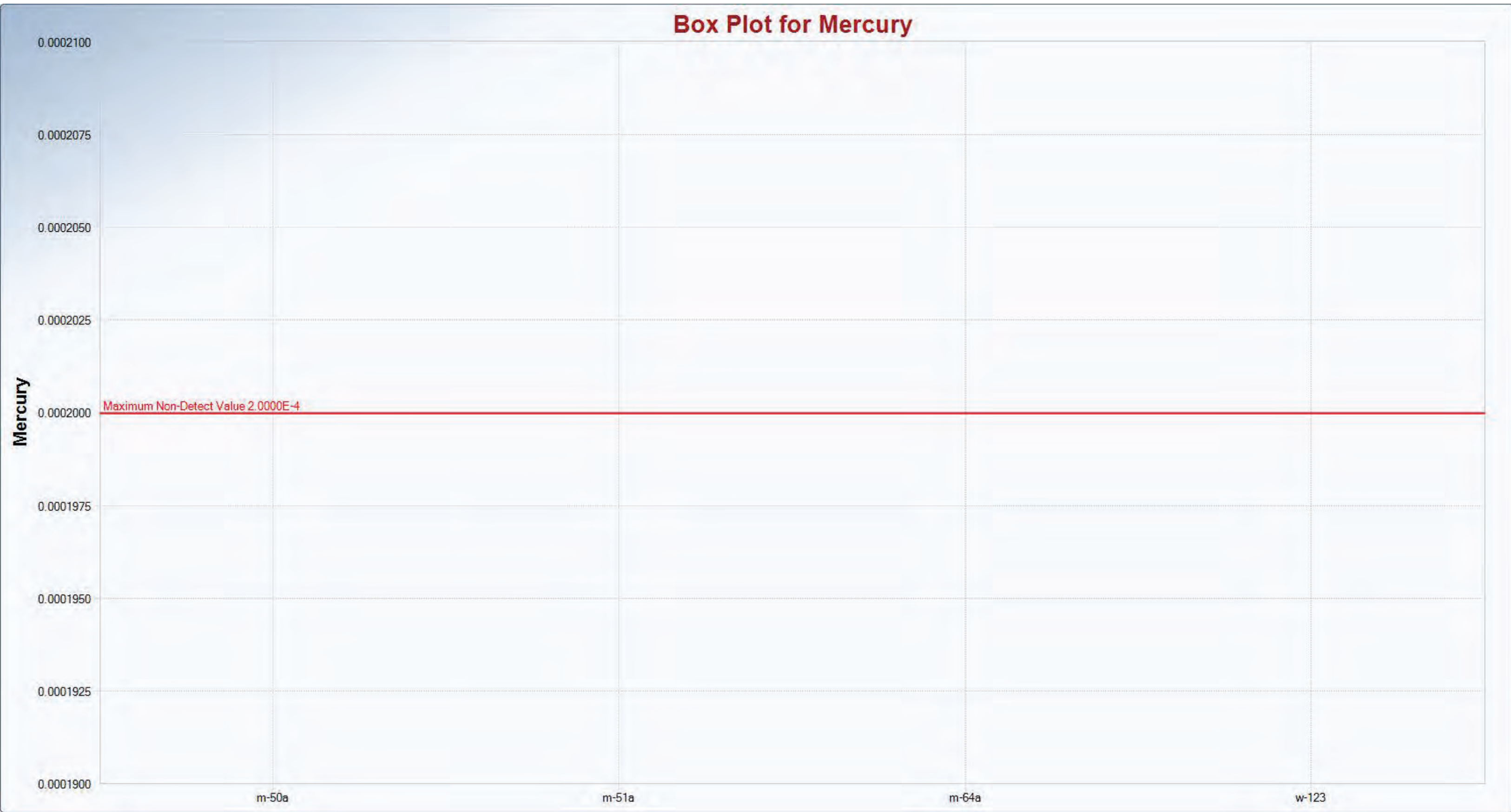
Box Plot for Fluoride



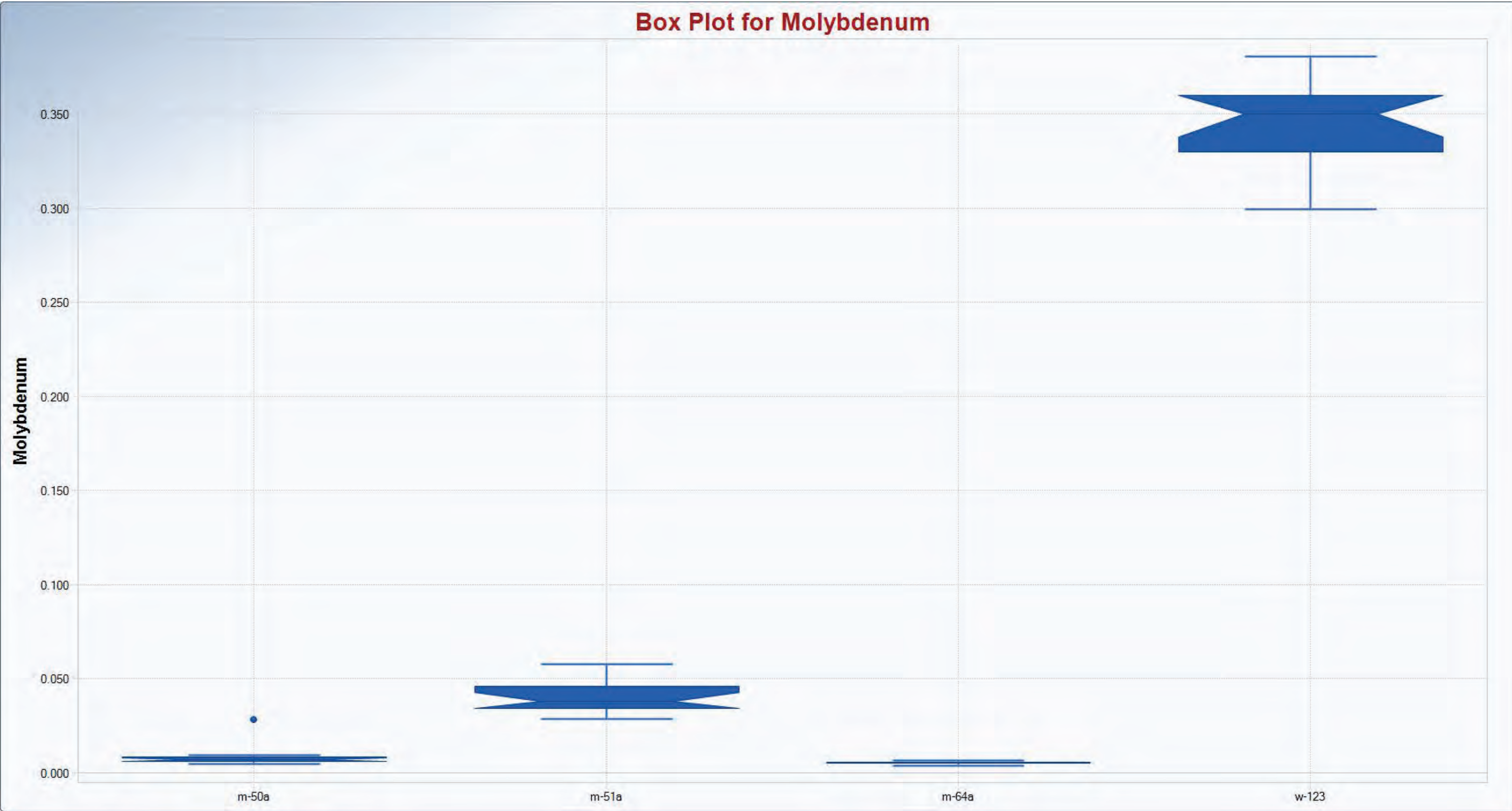


Box Plot for Lithium

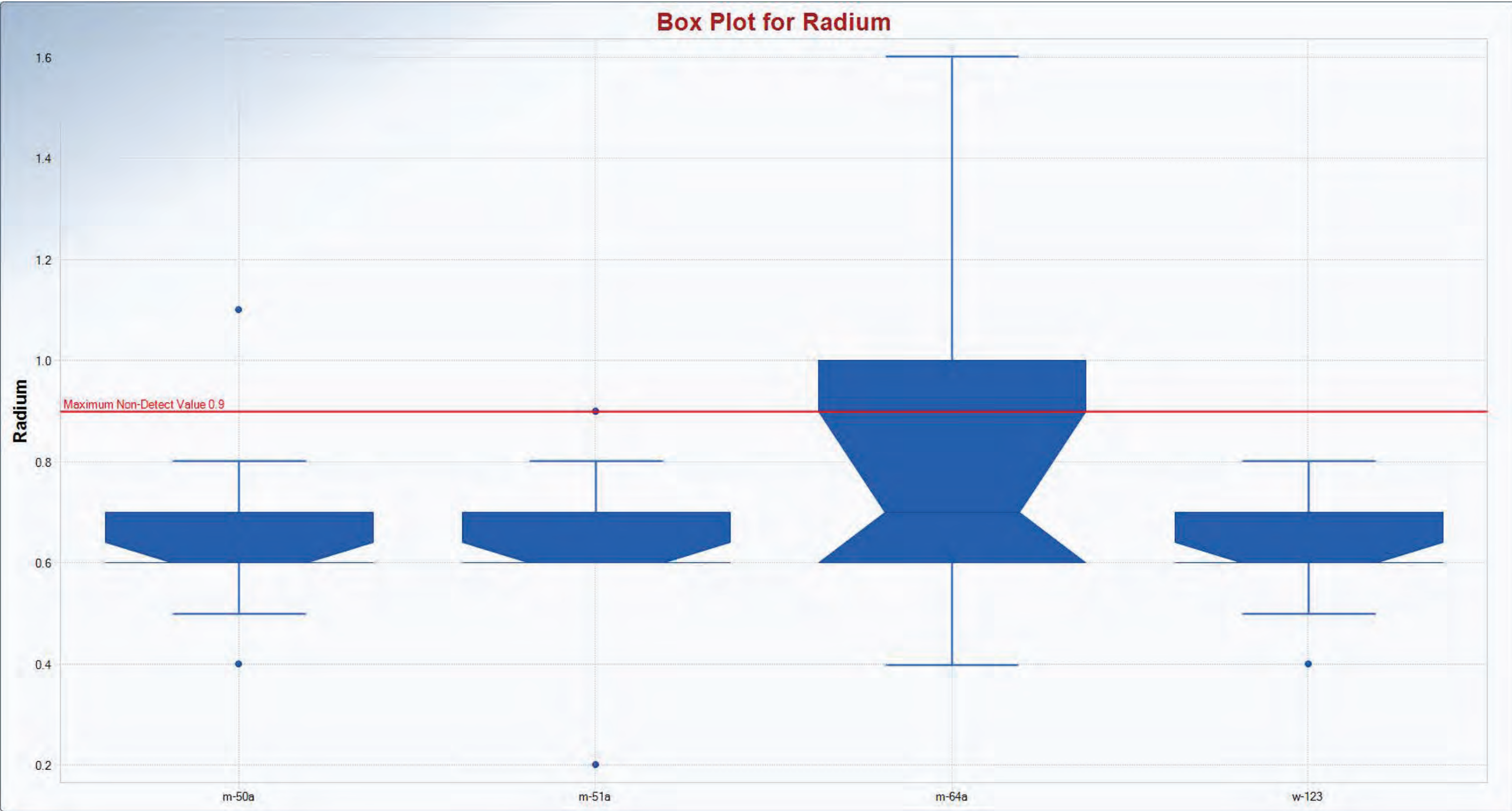




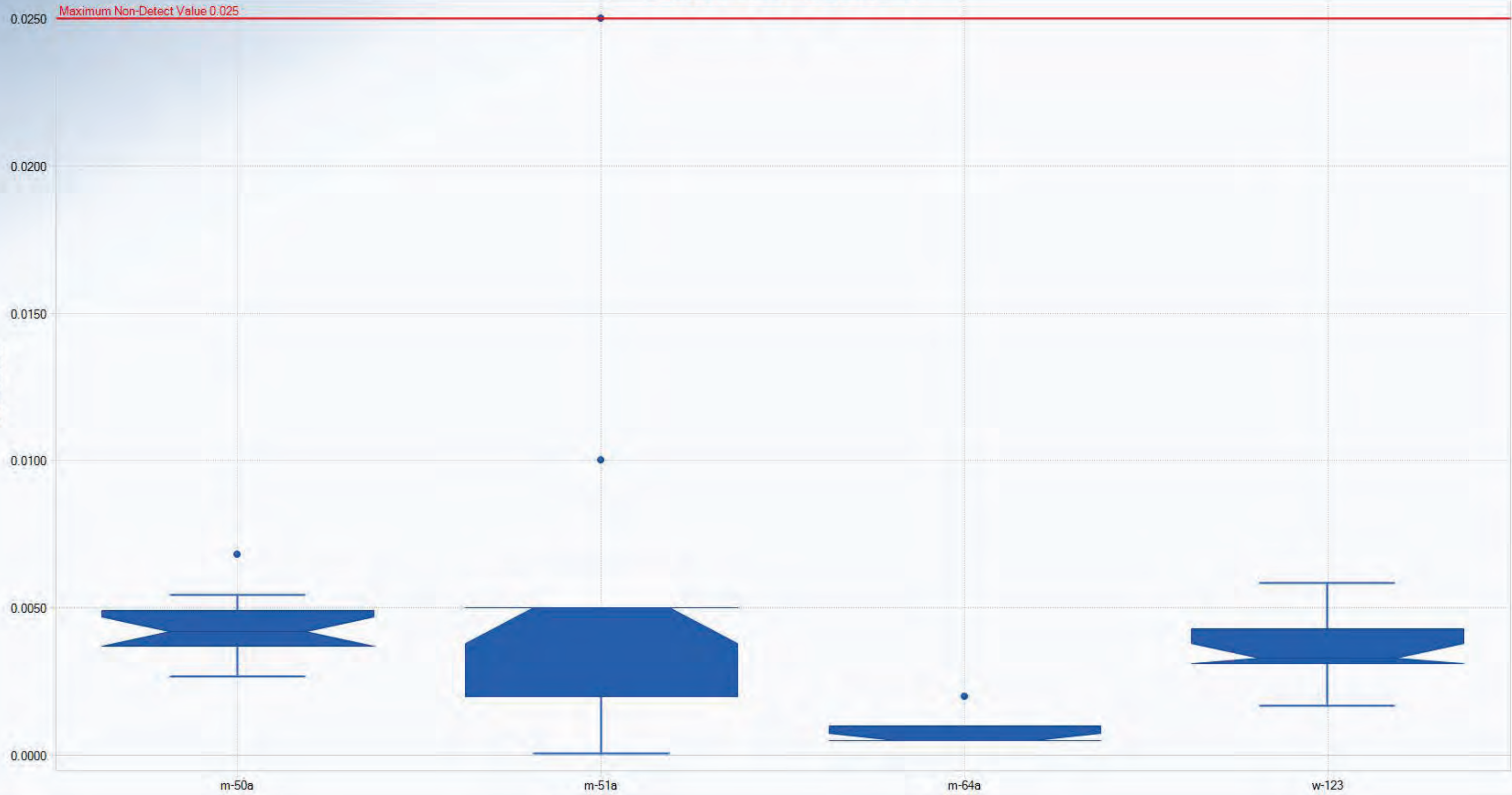
Box Plot for Molybdenum



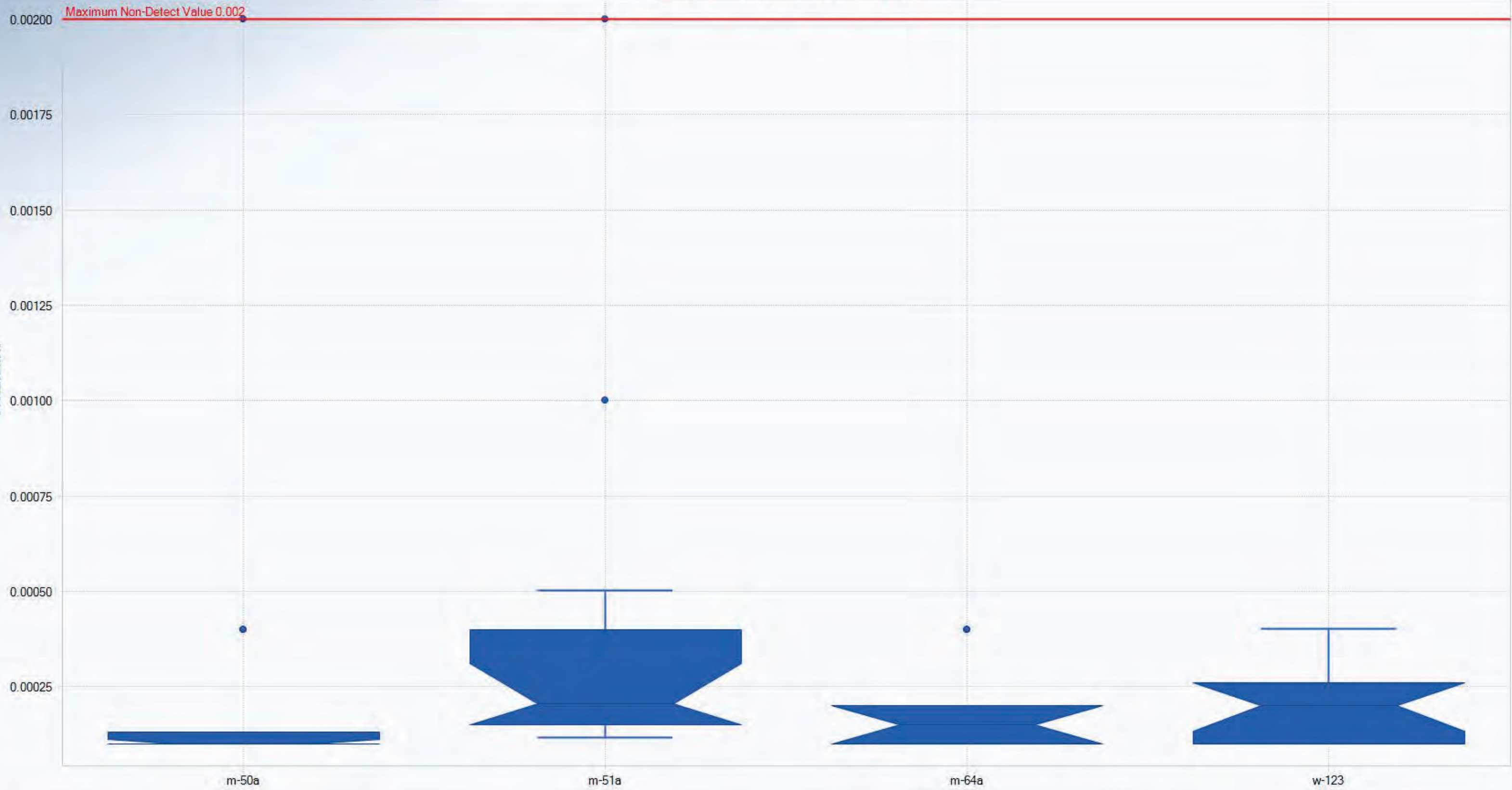
Box Plot for Radium



Box Plot for Selenium



Box Plot for Thallium



APPENDIX I

**WOOD TECHNICAL MEMORANDUM DOCUMENTING THE STATISTICAL ANALYSIS
OF INITIAL ASSESSMENT MONITORING APPENDIX IV CONSTITUENT DATA
COLLECTED FROM THE SEDI**



Technical Memorandum

To: Michele Robertson, RG
Pamela Norris
From: Natalie Chrisman Lazarr, PE
Carla Landrum, PhD
Date: January 14, 2019
File No: 1420162024.4.4
cc: File

**Subject: CCR GROUNDWATER ASSESSMENT MONITORING
STATISTICAL ANALYSIS AND RESULTS FOR THE SEDIMENTATION POND
Arizona Public Service Cholla Power Plant – Navajo County, Arizona**

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 Sedimentation Pond (SEDI) located at the Arizona Public Service (APS) Cholla Power Plant (Cholla) in Navajo County, Arizona. The statistical methods and analysis include the determination of groundwater protection standards (GWPSs) for Appendix IV constituents using either 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 Cholla 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 SEDI groundwater monitoring well network consists of one background monitoring well (M-62A) and three compliance (i.e., downgradient), monitoring wells (M-56A, M-57A and M-58A). The period of evaluation for the SEDI Appendix IV constituent statistical analysis ranges from November 2015 through August 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).

Due principally to 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). For this evaluation, the minimum sample numbers were 14 and 9 for compliance monitoring wells and the background monitoring well, respectively. Assessment monitoring was performed on a quarterly basis and the first round of assessment monitoring at the SEDI was conducted in May 2018; all Appendix IV constituents were evaluated in collected samples during this



monitoring event. During the second round of assessment monitoring conducted in August 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 14 and 14 for compliance monitoring wells and the background monitoring well, 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. Field and split sample duplicates were retracted.

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 (published and pre-published) U.S. EPA 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 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.

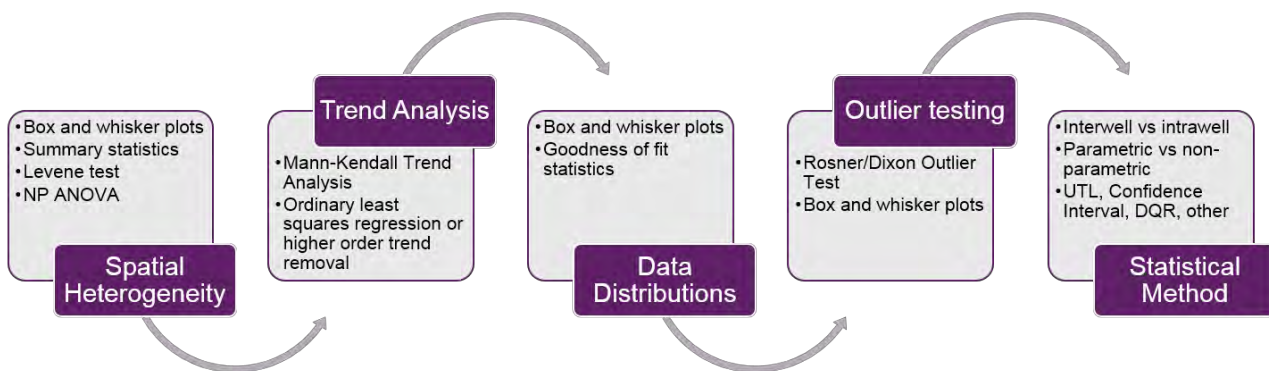


Figure 1. Assessment monitoring EDA and statistical method workflow procedures. Each box represent as separate step in the EDA workflow process. The items listed in each box identifies the statistical method(s) applied for each step. Both quantitative and qualitative methods are listed.

There are a number of different types of tolerance limit 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 SEDI 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 SEDI 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 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 August 2018 sampling period is higher than quarterly in some cases, suggesting the background sample data might not be derived from independent samples and may 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 Cholla. 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 SEDI. 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), 3) structurally-compromised wells that do not produce representative groundwater samples, and 4) background wells that do not adequately represent site-specific activity independent of the CCR unit. 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 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 compute 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 SEDI: 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. For all Appendix IV constituents except antimony and lithium, the U.S. EPA's promulgated MCL, or the risk-based alternative GWPS, is higher than the BTVs.

Table 2 summarizes: 1) compliance well comparisons to 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 insufficient evidence to declare an SSI for monitoring wells M-56A, M-57A and M-58A at the current time. Notably, cobalt in monitoring well M-57A exhibits a parametric lower confidence limit equal to 0.0061 mg/L, which is one ten thousandths above the GWPS of 0.006 mg/L for this constituent. More sampling is necessary to conclude that this level of exceedance is a true SSI.

Several compliance monitoring wells exhibit statistically significant ($p < 0.05$) temporal trends with no SSI declaration, including statistically significant ($p < 0.05$) decreasing trends in: M-56A for barium, cobalt and molybdenum; M-57A for arsenic; and M-58A for molybdenum.

5.0 RECOMMENDATIONS

This statistical analysis results in the following recommendations for the SEDI assessment monitoring statistical analysis:

- There is insufficient evidence to declare an SSI above the GWPS for the SEDI at the current time. Notably, cobalt in monitoring well M-57A exhibits a parametric lower confidence limit equal to 0.0061 mg/L, which is one ten thousandths above the GWPS of 0.006 mg/L for this constituent. More sampling is necessary to conclude that this level of exceedance is a true SSI.
- A lower sampling frequency is necessary to avoid temporal-dependence 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.

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.

U.S. EPA, 2015. *ProUCL (Version 5.1.1) User Guide, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations*. EPA/600/R-07/041. Washington D.C. October 2015.

Wood Environment & Infrastructure Solutions, Inc., 2018. *Statistical Data Analysis Work Plan*. Coal Combustion Residual Rule Groundwater Monitoring System Compliance, Cholla Power Plant, Navajo County, Arizona. Prepared for Arizona Public Service. October, 2018.

wood.

TABLES



Table 1
 GWPS Selection for the Cholla SEDI
 Appendix IV Statistical Comparison

Background Well	Constituent	US EPA MCL	Alternative Risk-Based GWPS	Background Threshold Value (Calculation Method ^{1,2})	Units	GWPS Selection ³
M-62A	Antimony	0.006	---	0.05 (DQR)	mg/L	BTV
M-62A	Arsenic	0.01	---	0.004 (P-UTL)	mg/L	US EPA MCL
M-62A	Barium	2	---	0.08 (P-UTLT)	mg/L	US EPA MCL
M-62A	Beryllium	0.004	---	0.001 (DQR)	mg/L	US EPA MCL
M-62A	Cadmium	0.005	---	0.002 (DQR)	mg/L	US EPA MCL
M-62A	Chromium	0.1	---	0.004 (P-UTL)	mg/L	US EPA MCL
M-62A	Cobalt	---	0.006	0.002 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
M-62A	Fluoride	4	---	0.8 (DQR)	mg/L	US EPA MCL
M-62A	Lead	---	0.015	0.01 (DQR)	mg/L	Alternative Risk-Based GWPS
M-62A	Lithium	---	0.04	0.2 (DQR)	mg/L	BTV
M-62A	Mercury	0.002	---	0.0002 (DQR)	mg/L	US EPA MCL
M-62A	Molybdenum	---	0.1	0.011 (NP-UTL)	mg/L	Alternative Risk-Based GWPS
M-62A	Selenium	0.05	---	0.01 (NP-UTL)	mg/L	US EPA MCL
M-62A	Thallium	0.002	---	0.0004 (NP-UTL)	mg/L	US EPA MCL
M-62A	Combined Radium	5	---	1.1 (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

Table 2
 Statistical Results Summary - Cholla SEDI CCR Unit
 Appendix IV Statistical Comparison

Appendix IV Constituent	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Combined Radium	Selenium	Thallium
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	pCi/L	mg/L	mg/L
GWPS	0.05	0.01	2	0.004	0.005	0.1	0.006	4	0.015	0.2	0.002	0.1	5	0.05	0.002
M-56A	NP-LCL (0.0025)	NP-LCL (0.0019)	P-LCLT (0.048)	NP-LCL (0.0010)	NP-LCL (0.00020)	P-LCL (0.00050)	P-LCLT (0.00)	P-LCL (0.31)	NP-LCL (0.0010)	NP-LCL (0.20)	NP-LCL (0.00020)	P-LCLT (0.0031)	P-LCL (0.053)	NP-LCL (0.0010)	NP-LCL (0.00020)
M-57A	NP-LCL (0.0025)	P-LCLT (0.00)	NP-LCL (0.055)	NP-LCL (0.0010)	NP-LCL (0.00020)	P-LCL (0.00)	P-LCL (0.0061)	NP-LCL (0.40)	NP-LCL (0.0010)	NP-LCL (0.20)	NP-LCL (0.00020)	P-LCL (0.0017)	NP-LCL (0.90)	NP-LCL (0.0010)	NP-LCL (0.00020)
M-58A	NP-LCL (0.0025)	P-LCL (0.0027)	P-LCL (0.041)	NP-LCL (0.0010)	NP-LCL (0.00020)	P-LCL (0.00)	NP-LCL (0.0011)	NP-LCL (0.40)	NP-LCL (0.0010)	NP-LCL (0.20)	NP-LCL (0.00020)	NP-LCL (0.021)	P-LCL (0.21)	NP-LCL (0.0010)	NP-LCL (0.00020)

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



Appendix A
ProUCL Data

StationName	QC_SampleID	SampDate	NumDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium
M-56A	7873_O	11/30/2015 12:08	42338.51	0.0025	0	0.0019	1	0.081	1	0.001	0	0.0001	0	0.00051
M-56A	CH-M-56A-0316_O	3/8/2016 13:40	42437.57	0.05	0	0.01	0	0.084	1	0.001	0	0.002	0	0.01
M-56A	CH-CCR-M56A-05102016_O	5/10/2016 14:11	42500.59	0.0001	0	0.00093	1	0.075	1	0.001	0	0.0001	0	0.0005
M-56A	CH-CCR-M56A-816_O	8/29/2016 9:01	42611.38	0.00013	1	0.00082	1	0.082	1	0.001	0	0.0001	0	0.0005
M-56A	CH-CCR-M56A-916_O	9/21/2016 10:52	42634.45	0.0005	0	0.00083	1	0.076	1	0.001	0	0.0001	0	0.0012
M-56A	CH-CCR-M56A-217_O	2/20/2017 11:21	42786.47	0.001	0	0.00068	1	0.071	1	0.001	0	0.0001	0	0.0093
M-56A	CH-CCR-M56A-41317_O	4/13/2017 7:45	42838.32	0.001	0	0.00076	1	0.07	1	0.001	0	0.0001	0	0.0091
M-56A	CH-CCR-M56A-42517_O	4/25/2017 9:11	42850.38	0.001	0	0.00075	1	0.086	1	0.001	0	0.0001	0	0.0067
M-56A	CH-CCR-M56A-51817_O	5/18/2017 9:21	42873.39	0.001	0	0.0006	1	0.062	1	0.001	0	0.0001	0	0.0063
M-56A	CH-CCR-M56A-52517_O	5/25/2017 10:17	42880.43	0.001	0	0.0007	1	0.073	1	0.001	0	0.0001	0	0.02
M-56A	CH-CCR-M56A-70117_O	7/1/2017 14:43	42917.61	0.001	0	0.00065	1	0.068	1	0.001	0	0.0001	0	0.0034
M-56A	CH-CCR-M56A-72617_O	7/26/2017 14:40	42942.61	0.002	0	0.001	0	0.066	1	0.001	0	0.0002	0	0.0028
M-56A	CH-CCR-M56A-90817_O	9/8/2017 8:35	42986.36	0.004	0	0.002	0	0.07	1	0.001	0	0.0004	0	0.004
M-56A	CH-CCR-M56A-120817_O	12/8/2017 11:15	43077.47											
M-56A	CH-CCR-M-56A-52118_O	5/21/2018 12:01	43241.50	0.001	0	0.00081	1	0.061	1	0.001	0	0.0001	0	0.0046
M-56A	CH-CCR-M56A-082818_O	8/28/2018 14:07	43340.59			0.0013	1	0.065	1					0.0042
M-57A	7874_O	11/30/2015 13:05	42338.55	0.0025	0	0.0048	1	0.072	1	0.001	0	0.0001	0	0.00074
M-57A	CH-M-57A-0316_O	3/8/2016 14:40	42437.61	0.05	0	0.0064	1	0.063	1	0.001	0	0.002	0	0.01
M-57A	CH-CCR-M57A-05112016_O	5/11/2016 8:53	42501.37	0.0001	0	0.0027	1	0.047	1	0.001	0	0.0001	0	0.0005
M-57A	CH-CCR-M57A-816_O	8/25/2016 13:23	42607.56	0.00012	1	0.0042	1	0.055	1	0.001	0	0.0001	0	0.00066
M-57A	CH-CCR-M57A-916_O	9/21/2016 13:59	42634.58	0.0005	0	0.0019	1	0.051	1	0.001	0	0.0001	0	0.016
M-57A	CH-CCR-M57A-217_O	2/20/2017 10:30	42786.44	0.001	0	0.0051	1	0.041	1	0.001	0	0.0001	0	0.042
M-57A	CH-CCR-M57A-41217_O	4/12/2017 18:28	42837.77	0.001	0	0.0042	1	0.042	1	0.001	0	0.0001	0	0.031
M-57A	CH-CCR-M57A-42517_O	4/25/2017 8:39	42850.36	0.001	0	0.0039	1	0.042	1	0.001	0	0.0001	0	0.019
M-57A	CH-CCR-M57A-51817_O	5/18/2017 10:10	42873.42	0.001	0	0.0098	1	0.038	1	0.001	0	0.0001	0	0.024
M-57A	CH-CCR-M57A-52517_O	5/25/2017 8:30	42880.35	0.001	0	0.0066	1	0.044	1	0.001	0	0.0001	0	0.035
M-57A	CH-CCR-M57A-70117_O	7/1/2017 14:11	42917.59	0.001	0	0.0038	1	0.043	1	0.001	0	0.0001	0	0.012
M-57A	CH-CCR-M57A-72617_O	7/26/2017 13:53	42942.58	0.002	0	0.0027	1	0.042	1	0.001	0	0.0002	0	0.028
M-57A	CH-CCR-M57A-90817_O	9/8/2017 8:01	42986.33	0.004	0	0.0027	1	0.045	1	0.001	0	0.0004	0	0.015
M-57A	CH-CCR-M57A-120817_O	12/8/2017 10:54	43077.45											
M-57A	CH-CCR-M-57A-52118_O	5/21/2018 12:33	43241.52	0.002	0	0.0022	1	0.043	1	0.001	0	0.0002	0	0.0023
M-57A	CH-CCR-M57A-082818_O	8/28/2018 13:07	43340.55			0.0021	1	0.045	1					0.0067
M-58A	7876_O	11/30/2015 14:30	42338.60	0.0025	0	0.0032	1	0.1	1	0.001	0	0.0001	0	0.0005
M-58A	CH-M-58A-0316_O	3/8/2016 14:50	42437.62	0.05	0	0.01	0	0.081	1	0.001	0	0.002	0	0.01
M-58A	CH-CCR-M58A-05112016_O	5/11/2016 10:20	42501.43	0.0001	0	0.0025	1	0.055	1	0.001	0	0.0001	0	0.0005
M-58A	CH-CCR-M58A-816_O	8/25/2016 14:11	42607.59	0.0001	0	0.0045	1	0.097	1	0.001	0	0.0001	0	0.00097
M-58A	CH-CCR-M58A-916_O	9/21/2016 13:16	42634.55	0.0005	0	0.0039	1	0.076	1	0.001	0	0.0001	0	0.0018
M-58A	CH-CCR-M58A-217_O	2/20/2017 9:49	42786.41	0.001	0	0.0027	1	0.064	1	0.001	0	0.0001	0	0.0033
M-58A	CH-CCR-M58A-41217_O	4/12/2017 17:41	42837.74	0.001	0	0.0037	1	0.048	1	0.001	0	0.0001	0	0.00091
M-58A	CH-CCR-M58A-42517_O	4/25/2017 8:08	42850.34	0.001	0	0.004	1	0.049	1	0.001	0	0.0001	0	0.001
M-58A	CH-CCR-M58A-51817_O	5/18/2017 10:40	42873.44	0.001	0	0.003	1	0.043	1	0.001	0	0.0001	0	0.00052
M-58A	CH-CCR-M58A-52517_O	5/25/2017 7:48	42880.33	0.001	0	0.0051	1	0.055	1	0.001	0	0.0001	0	0.00055
M-58A	CH-CCR-M58A-70117_O	7/1/2017 13:41	42917.57	0.001	0	0.0047	1	0.063	1	0.001	0	0.0001	0	0.0005
M-58A	CH-CCR-M58A-72617_O	7/26/2017 11:10	42942.47	0.002	0	0.0057	1	0.11	1	0.001	0	0.0002	0	0.003
M-58A	CH-CCR-M58A-90817_O	9/8/2017 7:29	42986.31	0.004	0	0.0048	1	0.08	1	0.001	0	0.0004	0	0.004
M-58A	CH-CCR-M58A-120817_O	12/8/2017 10:22	43077.43											
M-58A	CH-CCR-M-58A-52118_O	5/21/2018 13:18	43241.55	0.002	0	0.0042	1	0.071	1	0.001	0	0.0002	0	0.002

Appendix A
ProUCL Data

StationName	QC_SampleID	SampDate	NumDate	Antimony	D_Antimony	Arsenic	D_Arsenic	Barium	D_Barium	Beryllium	D_Beryllium	Cadmium	D_Cadmium	Chromium
M-58A	CH-CCR-M58A-082818_O	8/28/2018 9:35	43340.40			0.0037	1	0.075	1					0.001
M-62A	7872_O	11/30/2015 10:56	42338.46	0.0025	0	0.002	1	0.082	1	0.001	0	0.0001	0	0.00078
M-62A	CH-M-62A-0316_O	3/8/2016 11:54	42437.50	0.05	0	0.01	0	0.16	1	0.001	0	0.002	0	0.01
M-62A	CH-CCR-MW62A-50516_O	5/5/2016 14:06	42495.59	0.0001	0	0.003	1	0.084	1	0.001	0	0.0001	0	0.0014
M-62A	CH-CCR-M62A-816_O	8/29/2016 10:55	42611.45	0.0001	0	0.0031	1	0.082	1	0.001	0	0.0001	0	0.0005
M-62A	CH-CCR-M62A-916_O	9/21/2016 15:02	42634.63	0.0005	0	0.0028	1	0.075	1	0.001	0	0.0001	0	0.00099
M-62A	CH-CCR-M62A-217_O	2/20/2017 12:04	42786.50	0.001	0	0.0029	1	0.064	1	0.001	0	0.0001	0	0.002
M-62A	CH-CCR-M62A-41317_O	4/13/2017 8:50	42838.37	0.001	0	0.0021	1	0.074	1	0.001	0	0.0001	0	0.0015
M-62A	CH-CCR-M62A-42517_O	4/25/2017 9:58	42850.42	0.001	0	0.0017	1	0.079	1	0.001	0	0.0001	0	0.0017
M-62A	CH-CCR-M62A-51817_O	5/18/2017 11:17	42873.47	0.001	0	0.0016	1	0.072	1	0.001	0	0.0001	0	0.00063
M-62A	CH-CCR-M62A-52517_O	5/25/2017 10:52	42880.45	0.001	0	0.0019	1	0.077	1	0.001	0	0.0001	0	0.00096
M-62A	CH-CCR-M62A-70117_O	7/1/2017 15:13	42917.63	0.001	0	0.0026	1	0.076	1	0.001	0	0.0001	0	0.0011
M-62A	CH-CCR-M62A-72617_O	7/26/2017 15:19	42942.64	0.002	0	0.0024	1	0.075	1	0.001	0	0.0002	0	0.001
M-62A	CH-CCR-M62A-90717_O	9/7/2017 18:34	42985.77	0.004	0	0.0031	1	0.079	1	0.001	0	0.0004	0	0.004
M-62A	CH-CCR-M62A-120817_O	12/8/2017 11:39	43077.49											
M-62A	CH-CCR-M-62A-52118_O	5/21/2018 13:50	43241.58	0.002	0	0.0029	1	0.072	1	0.001	0	0.0002	0	0.002
M-62A	CH-CCR-M62A-082818_O	8/28/2018 14:36	43340.61			0.0029	1	0.074	1					0.001

Appendix A
ProUCL Data

StationName	QC_SampleID	SampDate	NumDate	D_Chromium	Cobalt	D_Cobalt	Fluoride	D_Fluoride	Lead	D_Lead	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum
M-56A	7873_O	11/30/2015 12:08	42338.51	1	0.0012	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0096	1
M-56A	CH-M-56A-0316_O	3/8/2016 13:40	42437.57	0	0.002	1	0.43	1	0.01	0	0.2	0	0.0002	0	0.029	1
M-56A	CH-CCR-M56A-05102016_O	5/10/2016 14:11	42500.59	0	0.0013	1	0.42	1	0.0005	0	0.2	0	0.0002	0	0.023	1
M-56A	CH-CCR-M56A-816_O	8/29/2016 9:01	42611.38	0	0.0013	1	0.46	1	0.0005	0	0.2	0	0.0002	0	0.021	1
M-56A	CH-CCR-M56A-916_O	9/21/2016 10:52	42634.45	1	0.0012	1	0.4	1	0.0001	0	0.2	0	0.0002	0	0.016	1
M-56A	CH-CCR-M56A-217_O	2/20/2017 11:21	42786.47	1	0.00077	1	0.4	1	0.0005	0	0.2	0	0.0002	0	0.013	1
M-56A	CH-CCR-M56A-41317_O	4/13/2017 7:45	42838.32	1	0.00065	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.011	1
M-56A	CH-CCR-M56A-42517_O	4/25/2017 9:11	42850.38	1	0.00061	1	0.8	0	0.0005	0	0.2	0	0.0002	0	0.013	1
M-56A	CH-CCR-M56A-51817_O	5/18/2017 9:21	42873.39	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0095	1
M-56A	CH-CCR-M56A-52517_O	5/25/2017 10:17	42880.43	1	0.00075	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.011	1
M-56A	CH-CCR-M56A-70117_O	7/1/2017 14:43	42917.61	1	0.0005	0	0.41	1	0.0005	0	0.2	0	0.0002	0	0.0098	1
M-56A	CH-CCR-M56A-72617_O	7/26/2017 14:40	42942.61	1	0.001	0	0.4	0	0.001	0	0.2	0	0.0002	0	0.009	1
M-56A	CH-CCR-M56A-90817_O	9/8/2017 8:35	42986.36	0	0.002	0	0.47	1	0.002	0	0.2	0	0.0002	0	0.0093	1
M-56A	CH-CCR-M56A-120817_O	12/8/2017 11:15	43077.47				0.49	1								
M-56A	CH-CCR-M-56A-52118_O	5/21/2018 12:01	43241.50	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0079	1
M-56A	CH-CCR-M56A-082818_O	8/28/2018 14:07	43340.59	1	0.0005	0									0.0057	1
M-57A	7874_O	11/30/2015 13:05	42338.55	1	0.0077	1	0.4	0	0.00086	1	0.2	0	0.0002	0	0.008	1
M-57A	CH-M-57A-0316_O	3/8/2016 14:40	42437.61	0	0.0082	1	0.4	0	0.01	0	0.2	0	0.0002	0	0.004	1
M-57A	CH-CCR-M57A-05112016_O	5/11/2016 8:53	42501.37	0	0.0065	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0011	1
M-57A	CH-CCR-M57A-816_O	8/25/2016 13:23	42607.56	1	0.0078	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.022	1
M-57A	CH-CCR-M57A-916_O	9/21/2016 13:59	42634.58	1	0.0067	1	0.4	0	0.00021	1	0.2	0	0.0002	0	0.0029	1
M-57A	CH-CCR-M57A-217_O	2/20/2017 10:30	42786.44	1	0.0086	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0048	1
M-57A	CH-CCR-M57A-41217_O	4/12/2017 18:28	42837.77	1	0.0087	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0047	1
M-57A	CH-CCR-M57A-42517_O	4/25/2017 8:39	42850.36	1	0.0077	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0042	1
M-57A	CH-CCR-M57A-51817_O	5/18/2017 10:10	42873.42	1	0.0076	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0041	1
M-57A	CH-CCR-M57A-52517_O	5/25/2017 8:30	42880.35	1	0.0083	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0063	1
M-57A	CH-CCR-M57A-70117_O	7/1/2017 14:11	42917.59	1	0.0075	1	0.42	1	0.0005	0	0.2	0	0.0002	0	0.0037	1
M-57A	CH-CCR-M57A-72617_O	7/26/2017 13:53	42942.58	1	0.0088	1	0.4	0	0.001	0	0.2	0	0.0002	0	0.0058	1
M-57A	CH-CCR-M57A-90817_O	9/8/2017 8:01	42986.33	1	0.0082	1	0.4	0	0.002	0	0.2	0	0.0002	0	0.0046	1
M-57A	CH-CCR-M57A-120817_O	12/8/2017 10:54	43077.45				0.4	0								
M-57A	CH-CCR-M-57A-52118_O	5/21/2018 12:33	43241.52	1	0.0058	1	0.4	0	0.001	0	0.2	0	0.0002	0	0.0026	1
M-57A	CH-CCR-M57A-082818_O	8/28/2018 13:07	43340.55	1	0.0057	1									0.003	1
M-58A	7876_O	11/30/2015 14:30	42338.60	0	0.0011	1	0.43	1	0.00056	1	0.2	0	0.0002	0	0.0047	1
M-58A	CH-M-58A-0316_O	3/8/2016 14:50	42437.62	0	0.01	0	0.4	0	0.01	0	0.2	0	0.0002	0	0.01	0
M-58A	CH-CCR-M58A-05112016_O	5/11/2016 10:20	42501.43	0	0.00051	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0018	1
M-58A	CH-CCR-M58A-816_O	8/25/2016 14:11	42607.59	1	0.00079	1	0.4	0	0.00059	1	0.2	0	0.0002	0	0.02	1
M-58A	CH-CCR-M58A-916_O	9/21/2016 13:16	42634.55	1	0.00057	1	0.4	0	0.0001	0	0.2	0	0.0002	0	0.0025	1
M-58A	CH-CCR-M58A-217_O	2/20/2017 9:49	42786.41	1	0.00097	1	0.4	0	0.00078	1	0.2	0	0.0002	0	0.0022	1
M-58A	CH-CCR-M58A-41217_O	4/12/2017 17:41	42837.74	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0017	1
M-58A	CH-CCR-M58A-42517_O	4/25/2017 8:08	42850.34	1	0.0005	0	0.8	0	0.0005	0	0.2	0	0.0002	0	0.0015	1
M-58A	CH-CCR-M58A-51817_O	5/18/2017 10:40	42873.44	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0014	1
M-58A	CH-CCR-M58A-52517_O	5/25/2017 7:48	42880.33	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0016	1
M-58A	CH-CCR-M58A-70117_O	7/1/2017 13:41	42917.57	0	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0018	1
M-58A	CH-CCR-M58A-72617_O	7/26/2017 11:10	42942.47	1	0.001	1	0.4	0	0.0011	1	0.2	0	0.0002	0	0.0021	1
M-58A	CH-CCR-M58A-90817_O	9/8/2017 7:29	42986.31	0	0.002	0	0.4	0	0.002	0	0.2	0	0.0002	0	0.0022	1
M-58A	CH-CCR-M58A-120817_O	12/8/2017 10:22	43077.43				0.4	0								
M-58A	CH-CCR-M-58A-52118_O	5/21/2018 13:18	43241.55	0	0.001	0	0.4	0	0.001	0	0.2	0	0.0002	0	0.0018	1

Appendix A
ProUCL Data

StationName	QC_SampleID	SampDate	NumDate	D_Chromium	Cobalt	D_Cobalt	Fluoride	D_Fluoride	Lead	D_Lead	Lithium	D_Lithium	Mercury	D_Mercury	Molybdenum	D_Molybdenum
M-58A	CH-CCR-M58A-082818_O	8/28/2018 9:35	43340.40	0	0.0005	0									0.0017	1
M-62A	7872_O	11/30/2015 10:56	42338.46	1	0.00054	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.011	1
M-62A	CH-M-62A-0316_O	3/8/2016 11:54	42437.50	0	0.0022	1	0.8	0	0.01	0	0.2	0	0.0002	0	0.0044	1
M-62A	CH-CCR-MW62A-50516_O	5/5/2016 14:06	42495.59	1	0.0012	1	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0026	1
M-62A	CH-CCR-M62A-816_O	8/29/2016 10:55	42611.45	0	0.0005	0	0.8	0	0.0005	0	0.2	0	0.0002	0	0.0023	1
M-62A	CH-CCR-M62A-916_O	9/21/2016 15:02	42634.63	1	0.00046	1	0.8	0	0.0001	0	0.2	0	0.0002	0	0.0022	1
M-62A	CH-CCR-M62A-217_O	2/20/2017 12:04	42786.50	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0019	1
M-62A	CH-CCR-M62A-41317_O	4/13/2017 8:50	42838.37	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0023	1
M-62A	CH-CCR-M62A-42517_O	4/25/2017 9:58	42850.42	1	0.0005	0	0.8	0	0.0005	0	0.2	0	0.0002	0	0.0022	1
M-62A	CH-CCR-M62A-51817_O	5/18/2017 11:17	42873.47	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.002	1
M-62A	CH-CCR-M62A-52517_O	5/25/2017 10:52	42880.45	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0022	1
M-62A	CH-CCR-M62A-70117_O	7/1/2017 15:13	42917.63	1	0.0005	0	0.4	0	0.0005	0	0.2	0	0.0002	0	0.0022	1
M-62A	CH-CCR-M62A-72617_O	7/26/2017 15:19	42942.64	0	0.001	0	0.4	0	0.001	0	0.2	0	0.0002	0	0.0021	1
M-62A	CH-CCR-M62A-90717_O	9/7/2017 18:34	42985.77	0	0.002	0	0.4	0	0.002	0	0.2	0	0.0002	0	0.003	1
M-62A	CH-CCR-M62A-120817_O	12/8/2017 11:39	43077.49				0.4	0								
M-62A	CH-CCR-M-62A-52118_O	5/21/2018 13:50	43241.58	0	0.001	0	0.4	0	0.001	0	0.2	0	0.0002	0	0.0024	1
M-62A	CH-CCR-M62A-082818_O	8/28/2018 14:36	43340.61	0	0.0005	0									0.0023	1

Appendix A
ProUCL Data

StationName	QC_SampleID	SampDate	NumDate	Radium	D_Radium	Selenium	D_Selenium	Thallium	D_Thallium
M-56A	7873_O	11/30/2015 12:08	42338.51	0.9	0	0.00033	1	0.0001	0
M-56A	CH-M-56A-0316_O	3/8/2016 13:40	42437.57	0.4	0	0.01	0	0.002	0
M-56A	CH-CCR-M56A-05102016_O	5/10/2016 14:11	42500.59	0.6	1	0.0005	0	0.0001	0
M-56A	CH-CCR-M56A-816_O	8/29/2016 9:01	42611.38	1.6	1	0.0005	0	0.0001	0
M-56A	CH-CCR-M56A-916_O	9/21/2016 10:52	42634.45	0.6	1	0.0006	0	0.0001	0
M-56A	CH-CCR-M56A-217_O	2/20/2017 11:21	42786.47	1.8	1	0.0005	0	0.0001	0
M-56A	CH-CCR-M56A-41317_O	4/13/2017 7:45	42838.32	1.2	1	0.0005	0	0.0001	0
M-56A	CH-CCR-M56A-42517_O	4/25/2017 9:11	42850.38	1.9	1	0.00056	1	0.0001	0
M-56A	CH-CCR-M56A-51817_O	5/18/2017 9:21	42873.39	1.2	0	0.0005	0	0.0001	0
M-56A	CH-CCR-M56A-52517_O	5/25/2017 10:17	42880.43	1.5	1	0.00057	1	0.0001	0
M-56A	CH-CCR-M56A-70117_O	7/1/2017 14:43	42917.61	0.7	0	0.0005	0	0.0001	0
M-56A	CH-CCR-M56A-72617_O	7/26/2017 14:40	42942.61	1.7	1	0.001	0	0.0002	0
M-56A	CH-CCR-M56A-90817_O	9/8/2017 8:35	42986.36	0.5	1	0.002	0	0.0004	0
M-56A	CH-CCR-M56A-120817_O	12/8/2017 11:15	43077.47						
M-56A	CH-CCR-M-56A-52118_O	5/21/2018 12:01	43241.50	1.4	1	0.0005	0	0.00012	1
M-56A	CH-CCR-M56A-082818_O	8/28/2018 14:07	43340.59	0.5	1			0.0001	0
M-57A	7874_O	11/30/2015 13:05	42338.55	0.9	0	0.00029	1	0.0001	0
M-57A	CH-M-57A-0316_O	3/8/2016 14:40	42437.61	0.4	0	0.01	0	0.002	0
M-57A	CH-CCR-M57A-05112016_O	5/11/2016 8:53	42501.37	0.6	0	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-816_O	8/25/2016 13:23	42607.56	0.6	0	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-916_O	9/21/2016 13:59	42634.58	0.7	0	0.0006	0	0.0001	0
M-57A	CH-CCR-M57A-217_O	2/20/2017 10:30	42786.44	1.1	1	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-41217_O	4/12/2017 18:28	42837.77	0.6	0	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-42517_O	4/25/2017 8:39	42850.36	0.6	0	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-51817_O	5/18/2017 10:10	42873.42	1.5	1	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-52517_O	5/25/2017 8:30	42880.35	0.5	1	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-70117_O	7/1/2017 14:11	42917.59	0.7	0	0.0005	0	0.0001	0
M-57A	CH-CCR-M57A-72617_O	7/26/2017 13:53	42942.58	0.7	0	0.001	0	0.0002	0
M-57A	CH-CCR-M57A-90817_O	9/8/2017 8:01	42986.33	0.6	1	0.002	0	0.0004	0
M-57A	CH-CCR-M57A-120817_O	12/8/2017 10:54	43077.45						
M-57A	CH-CCR-M-57A-52118_O	5/21/2018 12:33	43241.52	0.7	0	0.001	0	0.0002	0
M-57A	CH-CCR-M57A-082818_O	8/28/2018 13:07	43340.55	0.7	1			0.0001	0
M-58A	7876_O	11/30/2015 14:30	42338.60	0.9	0	0.00024	1	0.0001	0
M-58A	CH-M-58A-0316_O	3/8/2016 14:50	42437.62	0.6	0	0.01	0	0.002	0
M-58A	CH-CCR-M58A-05112016_O	5/11/2016 10:20	42501.43	0.9	1	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-816_O	8/25/2016 14:11	42607.59	2.6	1	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-916_O	9/21/2016 13:16	42634.55	1.2	1	0.0006	0	0.0001	0
M-58A	CH-CCR-M58A-217_O	2/20/2017 9:49	42786.41	0.8	1	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-41217_O	4/12/2017 17:41	42837.74	1.9	1	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-42517_O	4/25/2017 8:08	42850.34	0.9	1	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-51817_O	5/18/2017 10:40	42873.44	0.6	0	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-52517_O	5/25/2017 7:48	42880.33	2.2	1	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-70117_O	7/1/2017 13:41	42917.57	0.7	0	0.0005	0	0.0001	0
M-58A	CH-CCR-M58A-72617_O	7/26/2017 11:10	42942.47	0.7	0	0.001	0	0.0002	0
M-58A	CH-CCR-M58A-90817_O	9/8/2017 7:29	42986.31	0.7	0	0.002	0	0.0004	0
M-58A	CH-CCR-M58A-120817_O	12/8/2017 10:22	43077.43						
M-58A	CH-CCR-M-58A-52118_O	5/21/2018 13:18	43241.55	0.7	1	0.001	0	0.0002	0

Appendix A
ProUCL Data

StationName	QC_SampleID	SampDate	NumDate	Radium	D_Radium	Selenium	D_Selenium	Thallium	D_Thallium
M-58A	CH-CCR-M58A-082818_O	8/28/2018 9:35	43340.40	0.6	0			0.0001	0
M-62A	7872_O	11/30/2015 10:56	42338.46	0.7	0	0.00071	1	0.0001	0
M-62A	CH-M-62A-0316_O	3/8/2016 11:54	42437.50	1	1	0.01	0	0.0005	1
M-62A	CH-CCR-MW62A-50516_O	5/5/2016 14:06	42495.59	0.5	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-816_O	8/29/2016 10:55	42611.45	0.9	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-916_O	9/21/2016 15:02	42634.63	2	1	0.00078	1	0.0001	0
M-62A	CH-CCR-M62A-217_O	2/20/2017 12:04	42786.50	1.4	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-41317_O	4/13/2017 8:50	42838.37	1.2	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-42517_O	4/25/2017 9:58	42850.42	0.9	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-51817_O	5/18/2017 11:17	42873.47	1.2	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-52517_O	5/25/2017 10:52	42880.45	1.5	1	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-70117_O	7/1/2017 15:13	42917.63	0.7	0	0.0005	0	0.0001	0
M-62A	CH-CCR-M62A-72617_O	7/26/2017 15:19	42942.64	1.3	1	0.001	0	0.0002	0
M-62A	CH-CCR-M62A-90717_O	9/7/2017 18:34	42985.77	0.9	1	0.002	0	0.0004	0
M-62A	CH-CCR-M62A-120817_O	12/8/2017 11:39	43077.49						
M-62A	CH-CCR-M-62A-52118_O	5/21/2018 13:50	43241.58	0.7	1	0.001	0	0.0002	0
M-62A	CH-CCR-M62A-082818_O	8/28/2018 14:36	43340.61	0.5	1			0.0001	0

APPENDIX B
PROUCL OUTPUT FILES



TABLE B-1
 SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data

Date/Time of Computation ProUCL 5.112/3/2018 9:07:09 PM

User Selected Options

From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF

From File: SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.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 (m-62a)	14	2	0	14	100.00%	1.0000E-4	0.05	N/A	N/A	N/A	N/A
Arsenic (m-62a)	15	1	14	1	6.67%	0.01	0.01	0.0025	2.7000E-7	5.1962E-4	0.208
Barium (m-62a)	15	1	15	0	0.00%	N/A	N/A	0.0817	4.9395E-4	0.0222	0.272
Beryllium (m-62a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-62a)	14	2	0	14	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Chromium (m-62a)	15	1	9	6	40.00%	5.0000E-4	0.01	0.00109	1.9729E-7	4.4417E-4	0.409
Cobalt (m-62a)	15	1	4	11	73.33%	5.0000E-4	0.002	6.36E-04	2.1072E-7	4.5905E-4	0.722
Fluoride (m-62a)	15	1	0	15	100.00%	0.4	0.8	N/A	N/A	N/A	N/A
Lead (m-62a)	14	2	0	14	100.00%	1.0000E-4	0.01	N/A	N/A	N/A	N/A
Lithium (m-62a)	14	2	0	14	100.00%	0.2	0.2	N/A	N/A	N/A	N/A
Mercury (m-62a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-62a)	15	1	15	0	0.00%	N/A	N/A	0.00301	5.25E-06	0.00229	0.762
Radium (m-62a)	15	1	13	2	13.33%	0.7	0.7	1	0.18	0.424	0.424
Selenium (m-62a)	14	2	2	12	85.71%	5.0000E-4	0.01	5.4900E-4	9.8490E-9	9.9242E-5	0.181
Thallium (m-62a)	15	1	1	14	93.33%	1.0000E-4	4.0000E-4	1.2667E-4	9.9556E-9	9.9778E-5	0.788

TABLE B-1
SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

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 (m-62a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic (m-62a)	14	1	0.0016	0.0031	0.0025	0.0027	2.9077E-7	5.3923E-4	5.1890E-4	-0.498	0.216
Barium (m-62a)	15	1	0.064	0.16	0.0817	0.076	4.9395E-4	0.0222	0.00445	3.54	0.272
Beryllium (m-62a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-62a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (m-62a)	9	1	6.3000E-4	0.002	0.00123	0.0011	2.0319E-7	4.5076E-4	4.7443E-4	0.434	0.367
Cobalt (m-62a)	4	1	4.6000E-4	0.0022	0.0011	8.7000E-4	6.4773E-7	8.0482E-4	5.4855E-4	1.144	0.732
Fluoride (m-62a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead (m-62a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lithium (m-62a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-62a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (m-62a)	15	1	0.0019	0.011	0.00301	0.0023	5.2521E-6	0.00229	1.4826E-4	3.471	0.762
Radium (m-62a)	13	1	0.5	2	1.077	1	0.177	0.421	0.445	0.604	0.391
Selenium (m-62a)	2	2	7.1000E-4	7.8000E-4	7.4500E-4	7.4500E-4	2.4500E-9	4.9497E-5	5.1890E-5	N/A	0.0664
Thallium (m-62a)	1	1	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	N/A	N/A	0	N/A	N/A

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
Antimony (m-62a)	14	2	2.2000E-4	8.0000E-4	0.001	0.001	0.002	0.0022	0.00355	0.0201	0.044
Arsenic (m-62a)	15	1	0.00178	0.00198	0.00205	0.0028	0.00295	0.00302	0.0031	0.00517	0.00903
Barium (m-62a)	15	1	0.072	0.0736	0.074	0.076	0.0805	0.082	0.0832	0.107	0.149
Beryllium (m-62a)	14	2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium (m-62a)	14	2	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.7500E-4	2.0000E-4	3.4000E-4	9.6000E-4	0.00179
Chromium (m-62a)	15	1	6.9000E-4	9.2400E-4	9.7500E-4	0.0011	0.00185	0.002	0.0032	0.0058	0.00916
Cobalt (m-62a)	15	1	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	0.001	0.00104	0.00168	0.00206	0.00217
Fluoride (m-62a)	15	1	0.4	0.4	0.4	0.4	0.6	0.8	0.8	0.8	0.8
Lead (m-62a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	8.7500E-4	0.001	0.0017	0.0048	0.00896
Lithium (m-62a)	14	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Mercury (m-62a)	14	2	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4
Molybdenum (m-62a)	15	1	0.00204	0.00218	0.0022	0.0023	0.0025	0.00268	0.00384	0.00638	0.0101
Radium (m-62a)	15	1	0.58	0.7	0.7	0.9	1.25	1.32	1.46	1.65	1.93
Selenium (m-62a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	9.4500E-4	0.001	0.0017	0.0048	0.00896
Thallium (m-62a)	15	1	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.5000E-4	2.0000E-4	3.2000E-4	4.3000E-4	4.8600E-4

TABLE B-1
 SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data

Date/Time of Computation ProUCL 5.112/4/2018 3:48:18 PM

User Selected Options

From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF

From File: SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.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 (m-56a)	14	2	1	13	92.86%	1.0000E-4	0.05	1.1500E-4	2.250E-10	1.5000E-5	0.13
Arsenic (m-56a)	15	1	12	3	20.00%	0.001	0.01	8.8331E-4	1.1462E-7	3.3855E-4	0.383
Barium (m-56a)	15	1	15	0	0.00%	N/A	N/A	0.0727	6.2238E-5	0.00789	0.109
Beryllium (m-56a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-56a)	14	2	0	14	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Chromium (m-56a)	15	1	11	4	26.67%	5.0000E-4	0.01	0.00497	2.4830E-5	0.00498	1.003
Cobalt (m-56a)	15	1	9	6	40.00%	5.0000E-4	0.002	8.7838E-4	1.8281E-7	4.2757E-4	0.487
Fluoride (m-56a)	15	1	8	7	46.67%	0.4	0.8	0.42	8.8571E-4	0.0298	0.0709
Lead (m-56a)	14	2	0	14	100.00%	1.0000E-4	0.01	N/A	N/A	N/A	N/A
Lithium (m-56a)	14	2	0	14	100.00%	0.2	0.2	N/A	N/A	N/A	N/A
Mercury (m-56a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-56a)	15	1	15	0	0.00%	N/A	N/A	0.0132	4.1394E-5	0.00643	0.488
Radium (m-56a)	15	1	11	4	26.67%	0.4	1.2	1.017	0.309	0.556	0.546
Selenium (m-56a)	14	2	3	11	78.57%	5.0000E-4	0.01	3.7700E-4	8.8410E-9	9.4027E-5	0.249
Thallium (m-56a)	15	1	1	14	93.33%	1.0000E-4	0.002	1.0167E-4	3.056E-11	5.5277E-6	0.0544

TABLE B-1
SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

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 (m-56a)	1	2	1.3000E-4	1.3000E-4	1.3000E-4	1.3000E-4	N/A	N/A	0	N/A	N/A
Arsenic (m-56a)	12	1	6.0000E-4	0.0019	8.9417E-4	7.8500E-4	1.3299E-7	3.6468E-4	1.4085E-4	2.296	0.408
Barium (m-56a)	15	1	0.061	0.086	0.0727	0.071	6.2238E-5	0.00789	0.00741	0.264	0.109
Beryllium (m-56a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-56a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (m-56a)	11	1	5.1000E-4	0.02	0.00619	0.0046	2.9206E-5	0.0054	0.00311	1.786	0.873
Cobalt (m-56a)	9	1	6.1000E-4	0.002	0.00109	0.0012	1.9780E-7	4.4475E-4	6.3751E-4	0.955	0.409
Fluoride (m-56a)	8	1	0.4	0.49	0.435	0.425	0.00117	0.0342	0.0371	0.57	0.0787
Lead (m-56a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lithium (m-56a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-56a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (m-56a)	15	1	0.0057	0.029	0.0132	0.011	4.1394E-5	0.00643	0.00297	1.406	0.488
Radium (m-56a)	11	1	0.5	1.9	1.209	1.4	0.309	0.556	0.593	-0.298	0.46
Selenium (m-56a)	3	2	3.3000E-4	5.7000E-4	4.8667E-4	5.6000E-4	1.8433E-8	1.3577E-4	1.4826E-5	-1.721	0.279
Thallium (m-56a)	1	1	1.2000E-4	1.2000E-4	1.2000E-4	1.2000E-4	N/A	N/A	0	N/A	N/A

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
Antimony (m-56a)	14	2	2.4100E-4	8.0000E-4	0.001	0.001	0.00175	0.0022	0.00355	0.0201	0.044
Arsenic (m-56a)	15	1	6.6200E-4	6.9600E-4	7.2500E-4	8.2000E-4	0.00115	0.00142	0.00196	0.0044	0.00888
Barium (m-56a)	15	1	0.0632	0.0658	0.067	0.071	0.0785	0.0812	0.0832	0.0846	0.0857
Beryllium (m-56a)	14	2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium (m-56a)	14	2	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.4000E-4	3.4000E-4	9.6000E-4	0.00179
Chromium (m-56a)	15	1	5.0400E-4	0.00106	0.002	0.0042	0.0079	0.00914	0.00972	0.013	0.0186
Cobalt (m-56a)	15	1	5.0000E-4	5.0000E-4	5.5500E-4	7.7000E-4	0.00125	0.0013	0.00172	0.002	0.002
Fluoride (m-56a)	15	1	0.4	0.4	0.4	0.4	0.445	0.462	0.482	0.583	0.757
Lead (m-56a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	7.0000E-4	0.0017	0.0048	0.00896
Lithium (m-56a)	14	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Mercury (m-56a)	14	2	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4
Molybdenum (m-56a)	15	1	0.00834	0.00924	0.0094	0.011	0.0145	0.017	0.0222	0.0248	0.0282
Radium (m-56a)	15	1	0.5	0.58	0.6	1.2	1.55	1.62	1.76	1.83	1.886
Selenium (m-56a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	5.9250E-4	7.6000E-4	0.0017	0.0048	0.00896
Thallium (m-56a)	15	1	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.1000E-4	1.3600E-4	3.2000E-4	8.8000E-4	0.00178

TABLE B-1
 SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data

Date/Time of Computation ProUCL 5.112/4/2018 3:50:00 PM

User Selected Options

From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF

From File: SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.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 (m-57a)	14	2	1	13	92.86%	1.0000E-4	0.05	1.1000E-4	1.000E-10	1.0000E-5	0.0909
Arsenic (m-57a)	15	1	15	0	0.00%	N/A	N/A	0.00421	4.5592E-6	0.00214	0.508
Barium (m-57a)	15	1	15	0	0.00%	N/A	N/A	0.0475	8.5552E-5	0.00925	0.195
Beryllium (m-57a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-57a)	14	2	0	14	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Chromium (m-57a)	15	1	13	2	13.33%	5.0000E-4	0.01	0.0157	1.7823E-4	0.0134	0.852
Cobalt (m-57a)	15	1	15	0	0.00%	N/A	N/A	0.00759	9.8552E-7	9.9274E-4	0.131
Fluoride (m-57a)	15	1	1	14	93.33%	0.4	0.4	0.401	2.4889E-5	0.00499	0.0124
Lead (m-57a)	14	2	2	12	85.71%	5.0000E-4	0.01	2.7500E-4	3.8025E-8	1.9500E-4	0.709
Lithium (m-57a)	14	2	0	14	100.00%	0.2	0.2	N/A	N/A	N/A	N/A
Mercury (m-57a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-57a)	15	1	15	0	0.00%	N/A	N/A	0.00545	2.3647E-5	0.00486	0.892
Radium (m-57a)	15	1	5	10	66.67%	0.4	0.9	0.598	0.0884	0.297	0.497
Selenium (m-57a)	14	2	1	13	92.86%	5.0000E-4	0.01	2.9000E-4	0	0	N/A
Thallium (m-57a)	15	1	0	15	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A

TABLE B-1
SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

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 (m-57a)	1	2	1.2000E-4	1.2000E-4	1.2000E-4	1.2000E-4	N/A	N/A	0	N/A	N/A
Arsenic (m-57a)	15	1	0.0019	0.0098	0.00421	0.0039	4.5592E-6	0.00214	0.00178	1.356	0.508
Barium (m-57a)	15	1	0.038	0.072	0.0475	0.044	8.5552E-5	0.00925	0.00297	1.759	0.195
Beryllium (m-57a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-57a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (m-57a)	13	1	6.6000E-4	0.042	0.0179	0.016	1.8271E-4	0.0135	0.0178	0.281	0.756
Cobalt (m-57a)	15	1	0.0057	0.0088	0.00759	0.0077	9.8552E-7	9.9274E-4	8.8955E-4	-0.788	0.131
Fluoride (m-57a)	1	1	0.42	0.42	0.42	0.42	N/A	N/A	0	N/A	N/A
Lead (m-57a)	2	2	2.1000E-4	8.6000E-4	5.3500E-4	5.3500E-4	2.1125E-7	4.5962E-4	4.8184E-4	N/A	0.859
Lithium (m-57a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-57a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (m-57a)	15	1	0.0011	0.022	0.00545	0.0042	2.3647E-5	0.00486	0.00178	3.151	0.892
Radium (m-57a)	5	1	0.5	1.5	0.88	0.7	0.172	0.415	0.297	0.971	0.471
Selenium (m-57a)	1	2	2.9000E-4	2.9000E-4	2.9000E-4	2.9000E-4	N/A	N/A	0	N/A	N/A
Thallium (m-57a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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
Antimony (m-57a)	14	2	2.3400E-4	8.0000E-4	0.001	0.001	0.002	0.0022	0.00355	0.0201	0.044
Arsenic (m-57a)	15	1	0.00214	0.0026	0.0027	0.0039	0.00495	0.00536	0.00652	0.00756	0.00935
Barium (m-57a)	15	1	0.0414	0.042	0.042	0.044	0.049	0.0518	0.0598	0.0657	0.0707
Beryllium (m-57a)	14	2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium (m-57a)	14	2	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.7500E-4	2.0000E-4	3.4000E-4	9.6000E-4	0.00179
Chromium (m-57a)	15	1	6.9200E-4	0.00199	0.0045	0.015	0.026	0.0286	0.0334	0.0371	0.041
Cobalt (m-57a)	15	1	0.00608	0.00666	0.0071	0.0077	0.00825	0.00836	0.00866	0.00873	0.00879
Fluoride (m-57a)	15	1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.406	0.417
Lead (m-57a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	9.6500E-4	0.001	0.0017	0.0048	0.00896
Lithium (m-57a)	14	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Mercury (m-57a)	14	2	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4
Molybdenum (m-57a)	15	1	0.00272	0.00298	0.00335	0.0042	0.0053	0.0059	0.00732	0.0122	0.02
Radium (m-57a)	15	1	0.54	0.6	0.6	0.7	0.7	0.74	1.02	1.22	1.444
Selenium (m-57a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	9.0000E-4	0.001	0.0017	0.0048	0.00896
Thallium (m-57a)	15	1	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.5000E-4	2.0000E-4	3.2000E-4	8.8000E-4	0.00178

TABLE B-1
 SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data

Date/Time of Computation ProUCL 5.112/4/2018 3:53:02 PM

User Selected Options

From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF

From File: SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.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 (m-58a)	14	2	0	14	100.00%	1.0000E-4	0.05	N/A	N/A	N/A	N/A
Arsenic (m-58a)	15	1	14	1	6.67%	0.01	0.01	0.00398	8.0597E-7	8.9776E-4	0.226
Barium (m-58a)	15	1	15	0	0.00%	N/A	N/A	0.0711	4.0584E-4	0.0201	0.283
Beryllium (m-58a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-58a)	14	2	0	14	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Chromium (m-58a)	15	1	8	7	46.67%	5.0000E-4	0.01	0.00115	8.6097E-7	9.2788E-4	0.806
Cobalt (m-58a)	15	1	6	9	60.00%	5.0000E-4	0.01	6.5569E-4	4.8914E-8	2.2116E-4	0.337
Fluoride (m-58a)	15	1	1	14	93.33%	0.4	0.8	0.402	5.9694E-5	0.00773	0.0192
Lead (m-58a)	14	2	4	10	71.43%	1.0000E-4	0.01	3.3275E-4	1.1295E-7	3.3609E-4	1.01
Lithium (m-58a)	14	2	0	14	100.00%	0.2	0.2	N/A	N/A	N/A	N/A
Mercury (m-58a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-58a)	15	1	14	1	6.67%	0.01	0.01	0.00327	2.0607E-5	0.00454	1.387
Radium (m-58a)	15	1	8	7	46.67%	0.6	0.9	1.029	0.406	0.637	0.619
Selenium (m-58a)	14	2	1	13	92.86%	5.0000E-4	0.01	2.4000E-4	0	0	N/A
Thallium (m-58a)	15	1	0	15	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A

TABLE B-1
 SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

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 (m-58a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic (m-58a)	14	1	0.0025	0.0057	0.00398	0.00395	8.6797E-7	9.3165E-4	0.00111	0.0908	0.234
Barium (m-58a)	15	1	0.043	0.11	0.0711	0.071	4.0584E-4	0.0201	0.0237	0.475	0.283
Beryllium (m-58a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium (m-58a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (m-58a)	8	1	5.2000E-4	0.0033	0.00151	9.8500E-4	1.1888E-6	0.00109	6.6716E-4	0.999	0.724
Cobalt (m-58a)	6	1	5.1000E-4	0.0011	8.2333E-4	8.8000E-4	5.8547E-8	2.4196E-4	2.5204E-4	-0.364	0.294
Fluoride (m-58a)	1	1	0.43	0.43	0.43	0.43	N/A	N/A	0	N/A	N/A
Lead (m-58a)	4	2	5.6000E-4	0.0011	7.5750E-4	6.8500E-4	6.1625E-8	2.4824E-4	1.6308E-4	1.211	0.328
Lithium (m-58a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury (m-58a)	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molybdenum (m-58a)	14	1	0.0014	0.02	0.00336	0.0018	2.3609E-5	0.00486	4.4477E-4	3.573	1.447
Radium (m-58a)	8	1	0.7	2.6	1.4	1.05	0.531	0.729	0.445	0.761	0.521
Selenium (m-58a)	1	2	2.4000E-4	2.4000E-4	2.4000E-4	2.4000E-4	N/A	N/A	0	N/A	N/A
Thallium (m-58a)	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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
Antimony (m-58a)	14	2	2.2000E-4	8.0000E-4	0.001	0.001	0.002	0.0022	0.00355	0.0201	0.044
Arsenic (m-58a)	15	1	0.00282	0.00316	0.00345	0.004	0.00475	0.00486	0.00546	0.00699	0.0094
Barium (m-58a)	15	1	0.0484	0.0538	0.055	0.071	0.0805	0.0842	0.0988	0.103	0.109
Beryllium (m-58a)	14	2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium (m-58a)	14	2	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.7500E-4	2.0000E-4	3.4000E-4	9.6000E-4	0.00179
Chromium (m-58a)	15	1	5.0000E-4	5.1600E-4	5.3500E-4	0.001	0.0025	0.00306	0.00372	0.0058	0.00916
Cobalt (m-58a)	15	1	5.0000E-4	5.0000E-4	5.0000E-4	5.7000E-4	0.001	0.00102	0.00164	0.0044	0.00888
Fluoride (m-58a)	15	1	0.4	0.4	0.4	0.4	0.4	0.4	0.418	0.541	0.748
Lead (m-58a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.3000E-4	9.4500E-4	0.00104	0.00173	0.0048	0.00896
Lithium (m-58a)	14	2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Mercury (m-58a)	14	2	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4	2.0000E-4
Molybdenum (m-58a)	15	1	0.00154	0.00168	0.0017	0.0018	0.00235	0.00294	0.00788	0.013	0.0186
Radium (m-58a)	15	1	0.6	0.68	0.7	0.8	1.05	1.34	2.08	2.32	2.544
Selenium (m-58a)	14	2	5.0000E-4	5.0000E-4	5.0000E-4	5.0000E-4	9.0000E-4	0.001	0.0017	0.0048	0.00896
Thallium (m-58a)	15	1	1.0000E-4	1.0000E-4	1.0000E-4	1.0000E-4	1.5000E-4	2.0000E-4	3.2000E-4	8.8000E-4	0.00178

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:09:30 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Antimony-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 1.0000E-4
Maximum 0.05
Mean 0.00473
Geometric Mean 0.00114
Median 0.001
Standard Deviation 0.0131
Coefficient of Variation 2.762

Mann-Kendall Test

M-K Test Value (S) 20
Tabulated p-value 0.14
Standard Deviation of S 17.01
Standardized Value of S 1.117
Approximate p-value 0.132

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Antimony-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.05
Mean	0.0048
Geometric Mean	0.00119
Median	0.001
Standard Deviation	0.013
Coefficient of Variation	2.718

Mann-Kendall Test

M-K Test Value (S)	27
Tabulated p-value	0.079
Standard Deviation of S	17.45
Standardized Value of S	1.49
Approximate p-value	0.0681

Insufficient evidence to identify a significant trend at the specified level of significance.

Antimony-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.05
Mean	0.0048
Geometric Mean	0.00118
Median	0.001
Standard Deviation	0.0131
Coefficient of Variation	2.719

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	26
Tabulated p-value	0.079
Standard Deviation of S	17.42
Standardized Value of S	1.435
Approximate p-value	0.0756

Insufficient evidence to identify a significant trend at the specified level of significance.

Antimony-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.05
Mean	0.0048
Geometric Mean	0.00118
Median	0.001
Standard Deviation	0.0131
Coefficient of Variation	2.719

Mann-Kendall Test

M-K Test Value (S)	26
Tabulated p-value	0.079
Standard Deviation of S	17.42
Standardized Value of S	1.435
Approximate p-value	0.0756

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 10:14:30 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Arsenic-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 15
Number Values Reported (n) 16
Number Values Missing 1
Number Values Used 15
Minimum 6.0000E-4
Maximum 0.01
Mean 0.00158
Geometric Mean 0.00107
Median 8.2000E-4
Standard Deviation 0.00237
Coefficient of Variation 1.497

Mann-Kendall Test

M-K Test Value (S) -17
Tabulated p-value 0.218
Standard Deviation of S 20.21
Standardized Value of S -0.792
Approximate p-value 0.214

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Arsenic-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0019
Maximum	0.0098
Mean	0.00421
Geometric Mean	0.00378
Median	0.0039
Standard Deviation	0.00214
Coefficient of Variation	0.508

Mann-Kendall Test

M-K Test Value (S)	-37
Tabulated p-value	0.037
Standard Deviation of S	20.09
Standardized Value of S	-1.792
Approximate p-value	0.0366

Statistically significant evidence of a decreasing trend at the specified level of significance.

Arsenic-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0025
Maximum	0.01
Mean	0.00438
Geometric Mean	0.00413
Median	0.004
Standard Deviation	0.0018
Coefficient of Variation	0.41

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	20
Tabulated p-value	0.164
Standard Deviation of S	20.18
Standardized Value of S	0.941
Approximate p-value	0.173

Insufficient evidence to identify a significant trend at the specified level of significance.

Arsenic-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0016
Maximum	0.01
Mean	0.003
Geometric Mean	0.00268
Median	0.0028
Standard Deviation	0.002
Coefficient of Variation	0.668

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.349
Standard Deviation of S	20.09
Standardized Value of S	-0.398
Approximate p-value	0.345

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 5.112/5/2018 10:35:20 AM
 From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

Barium-m-56a

General Statistics

Number or Reported Events Not Used 0
 Number of Generated Events 15
 Number Values Reported (n) 16
 Number Values Missing 1
 Number Values Used 15
 Minimum 0.061
 Maximum 0.086
 Mean 0.0727
 Geometric Mean 0.0723
 Median 0.071
 Standard Deviation 0.00789
 Coefficient of Variation 0.109

Mann-Kendall Test

M-K Test Value (S) -62
 Tabulated p-value 0.001
 Standard Deviation of S 20.18
 Standardized Value of S -3.022
 Approximate p-value 0.00125

Statistically significant evidence of a decreasing trend at the specified level of significance.

Barium-m-57a

General Statistics

Number or Reported Events Not Used 0
 Number of Generated Events 15
 Number Values Reported (n) 16
 Number Values Missing 1
 Number Values Used 15
 Minimum 0.038
 Maximum 0.072
 Mean 0.0475
 Geometric Mean 0.0468
 Median 0.044
 Standard Deviation 0.00925
 Coefficient of Variation 0.195

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	-32
Tabulated p-value	0.057
Standard Deviation of S	20.07
Standardized Value of S	-1.545
Approximate p-value	0.0612

Insufficient evidence to identify a significant trend at the specified level of significance.

Barium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.043
Maximum	0.11
Mean	0.0711
Geometric Mean	0.0685
Median	0.071
Standard Deviation	0.0201
Coefficient of Variation	0.283

Mann-Kendall Test

M-K Test Value (S)	-10
Tabulated p-value	0.313
Standard Deviation of S	20.18
Standardized Value of S	-0.446
Approximate p-value	0.328

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Barium-m-62a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.064
Maximum	0.16
Mean	0.0817
Geometric Mean	0.0798
Median	0.076
Standard Deviation	0.0222
Coefficient of Variation	0.272

Mann-Kendall Test

M-K Test Value (S)	-42
Tabulated p-value	0.018
Standard Deviation of S	20.08
Standardized Value of S	-2.042
Approximate p-value	0.0206

Statistically significant evidence of a decreasing trend at the specified level of significance.

TABLE B-2
 SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.112/7/2018 1:49:21 PM
 From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

Barium-m-56a

General Statistics

Number or Reported Events Not Used 0
 Number of Generated Events 15
 Number Values Reported (n) 16
 Number Values Missing 1
 Number Values Used 15
 Minimum 0.061
 Maximum 0.086
 Mean 0.0727
 Geometric Mean 0.0723
 Median 0.071
 Standard Deviation 0.00789
 Coefficient of Variation 0.109

Mann-Kendall Test

M-K Test Value (S) -62
 Tabulated p-value 0.001
 Standard Deviation of S 20.18
 Standardized Value of S -3.022
 Approximate p-value 0.00125

Statistically significant evidence of a decreasing trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Barium-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.038
Maximum	0.072
Mean	0.0475
Geometric Mean	0.0468
Median	0.044
Standard Deviation	0.00925
Coefficient of Variation	0.195

Mann-Kendall Test

M-K Test Value (S)	-32
Tabulated p-value	0.057
Standard Deviation of S	20.07
Standardized Value of S	-1.545
Approximate p-value	0.0612

Insufficient evidence to identify a significant trend at the specified level of significance.

Barium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.043
Maximum	0.11
Mean	0.0711
Geometric Mean	0.0685
Median	0.071
Standard Deviation	0.0201
Coefficient of Variation	0.283

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	-10
Tabulated p-value	0.313
Standard Deviation of S	20.18
Standardized Value of S	-0.446
Approximate p-value	0.328

Insufficient evidence to identify a significant trend at the specified level of significance.

Barium-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	0.064
Maximum	0.084
Mean	0.0761
Geometric Mean	0.0759
Median	0.0755
Standard Deviation	0.00512
Coefficient of Variation	0.0673

Mann-Kendall Test

M-K Test Value (S)	-32
Tabulated p-value	0.04
Standard Deviation of S	18.13
Standardized Value of S	-1.71
Approximate p-value	0.0436

Statistically significant evidence of a decreasing trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:19:30 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Beryllium-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 0.001
Maximum 0.001
Mean 0.001
Geometric Mean 0.001
Median 0.001
Standard Deviation 4.501E-19
Coefficient of Variation N/A

Mann-Kendall Test

M-K Test Value (S) 0
Tabulated p-value 0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Beryllium-m-57a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	0.001
Maximum	0.001
Mean	0.001
Geometric Mean	0.001
Median	0.001
Standard Deviation	4.501E-19
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Beryllium-m-58a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	0.001
Maximum	0.001
Mean	0.001
Geometric Mean	0.001
Median	0.001
Standard Deviation	4.501E-19
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Beryllium-m-62a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	0.001
Maximum	0.001
Mean	0.001
Geometric Mean	0.001
Median	0.001
Standard Deviation	4.501E-19
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:23:31 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Cadmium-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 1.0000E-4
Maximum 0.002
Mean 2.6429E-4
Geometric Mean 1.4369E-4
Median 1.0000E-4
Standard Deviation 5.0628E-4
Coefficient of Variation 1.916

Mann-Kendall Test

M-K Test Value (S) 8
Tabulated p-value 0.334
Standard Deviation of S 12.99
Standardized Value of S 0.539
Approximate p-value 0.295

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Cadmium-m-57a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.002
Mean	2.7143E-4
Geometric Mean	1.5099E-4
Median	1.0000E-4
Standard Deviation	5.0449E-4
Coefficient of Variation	1.859

Mann-Kendall Test

M-K Test Value (S)	19
Tabulated p-value	0.165
Standard Deviation of S	14.41
Standardized Value of S	1.249
Approximate p-value	0.106

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Cadmium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.002
Mean	2.7143E-4
Geometric Mean	1.5099E-4
Median	1.0000E-4
Standard Deviation	5.0449E-4
Coefficient of Variation	1.859

Mann-Kendall Test

M-K Test Value (S)	19
Tabulated p-value	0.165
Standard Deviation of S	14.41
Standardized Value of S	1.249
Approximate p-value	0.106

**Insufficient evidence to identify a significant trend at the specified level of significance.
trend at the specified level of significance.**

Cadmium-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.002
Mean	2.7143E-4
Geometric Mean	1.5099E-4
Median	1.0000E-4
Standard Deviation	5.0449E-4
Coefficient of Variation	1.859

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	19
Tabulated p-value	0.165
Standard Deviation of S	14.41
Standardized Value of S	1.249
Approximate p-value	0.106

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
 Date/Time of Computation ProUCL 5.112/5/2018 11:06:22 AM
 From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
 Full Precision OFF
 Confidence Coefficient 0.95
 Level of Significance 0.05

Chromium-m-56a

General Statistics

Number or Reported Events Not Used 0
 Number of Generated Events 15
 Number Values Reported (n) 16
 Number Values Missing 1
 Number Values Used 15
 Minimum 5.0000E-4
 Maximum 0.02
 Mean 0.00554
 Geometric Mean 0.00337
 Median 0.0042
 Standard Deviation 0.00514
 Coefficient of Variation 0.928

Mann-Kendall Test

M-K Test Value (S) 10
 Tabulated p-value 0.313
 Standard Deviation of S 20.18
 Standardized Value of S 0.446
 Approximate p-value 0.328

Insufficient evidence to identify a significant trend at the specified level of significance.

Chromium-m-57a

General Statistics

Number or Reported Events Not Used 0
 Number of Generated Events 15
 Number Values Reported (n) 16
 Number Values Missing 1
 Number Values Used 15
 Minimum 5.0000E-4
 Maximum 0.042
 Mean 0.0162
 Geometric Mean 0.00832
 Median 0.015
 Standard Deviation 0.0134
 Coefficient of Variation 0.828

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	13
Tabulated p-value	0.279
Standard Deviation of S	20.21
Standardized Value of S	0.594
Approximate p-value	0.276

Insufficient evidence to identify a significant trend at the specified level of significance.

Chromium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	5.0000E-4
Maximum	0.01
Mean	0.00204
Geometric Mean	0.00129
Median	0.001
Standard Deviation	0.00248
Coefficient of Variation	1.217

Mann-Kendall Test

M-K Test Value (S)	13
Tabulated p-value	0.279
Standard Deviation of S	20.09
Standardized Value of S	0.597
Approximate p-value	0.275

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Chromium-m-62a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	5.0000E-4
Maximum	0.01
Mean	0.00197
Geometric Mean	0.00139
Median	0.0011
Standard Deviation	0.00238
Coefficient of Variation	1.207

Mann-Kendall Test

M-K Test Value (S)	11
Tabulated p-value	0.313
Standard Deviation of S	20.16
Standardized Value of S	0.496
Approximate p-value	0.31

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 1:43:02 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Cobalt-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 15
Number Values Reported (n) 16
Number Values Missing 1
Number Values Used 15
Minimum 5.0000E-4
Maximum 0.002
Mean 9.8533E-4
Geometric Mean 8.7686E-4
Median 7.7000E-4
Standard Deviation 5.1038E-4
Coefficient of Variation 0.518

Mann-Kendall Test

M-K Test Value (S) -50
Tabulated p-value 0.006
Standard Deviation of S 19.92
Standardized Value of S -2.46
Approximate p-value 0.00694

Statistically significant evidence of a decreasing trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Cobalt-m-57a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0057
Maximum	0.0088
Mean	0.00759
Geometric Mean	0.00752
Median	0.0077
Standard Deviation	9.9274E-4
Coefficient of Variation	0.131

Mann-Kendall Test

M-K Test Value (S)	-11
Tabulated p-value	0.313
Standard Deviation of S	20.16
Standardized Value of S	-0.496
Approximate p-value	0.31

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Cobalt-m-58a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	5.0000E-4
Maximum	0.01
Mean	0.0014
Geometric Mean	8.4257E-4
Median	5.7000E-4
Standard Deviation	0.00241
Coefficient of Variation	1.73

Mann-Kendall Test

M-K Test Value (S)	-19
Tabulated p-value	0.19
Standard Deviation of S	19.47
Standardized Value of S	-0.925
Approximate p-value	0.178

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Cobalt-m-62a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	4.6000E-4
Maximum	0.0022
Mean	8.2667E-4
Geometric Mean	7.0356E-4
Median	5.0000E-4
Standard Deviation	5.6899E-4
Coefficient of Variation	0.688

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	18.49
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of signifi

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:47:58 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Lead-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 1.0000E-4
Maximum 0.01
Mean 0.00129
Geometric Mean 6.4044E-4
Median 5.0000E-4
Standard Deviation 0.00254
Coefficient of Variation 1.967

Mann-Kendall Test

M-K Test Value (S) 12
Tabulated p-value 0.259
Standard Deviation of S 14.45
Standardized Value of S 0.761
Approximate p-value 0.223

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Lead-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	2.1000E-4
Maximum	0.01
Mean	0.00136
Geometric Mean	7.3760E-4
Median	5.0000E-4
Standard Deviation	0.00252
Coefficient of Variation	1.853

Mann-Kendall Test

M-K Test Value (S)	14
Tabulated p-value	0.225
Standard Deviation of S	16.35
Standardized Value of S	0.795
Approximate p-value	0.213

Insufficient evidence to identify a significant trend at the specified level of significance.

Lead-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.01
Mean	0.00137
Geometric Mean	7.1348E-4
Median	5.3000E-4
Standard Deviation	0.00252
Coefficient of Variation	1.848

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	10
Tabulated p-value	0.295
Standard Deviation of S	17.47
Standardized Value of S	0.515
Approximate p-value	0.303

Insufficient evidence to identify a significant trend at the specified level of significance.

Lead-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	1.0000E-4
Maximum	0.01
Mean	0.00133
Geometric Mean	6.7295E-4
Median	5.0000E-4
Standard Deviation	0.00254
Coefficient of Variation	1.908

Mann-Kendall Test

M-K Test Value (S)	22
Tabulated p-value	0.117
Standard Deviation of S	15.51
Standardized Value of S	1.354
Approximate p-value	0.0879

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:53:53 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Lithium-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 0.2
Maximum 0.2
Mean 0.2
Geometric Mean 0.2
Median 0.2
Standard Deviation 0
Coefficient of Variation N/A

Mann-Kendall Test

M-K Test Value (S) 0
Tabulated p-value 0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Lithium-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	0.2
Maximum	0.2
Mean	0.2
Geometric Mean	0.2
Median	0.2
Standard Deviation	0
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

Lithium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	0.2
Maximum	0.2
Mean	0.2
Geometric Mean	0.2
Median	0.2
Standard Deviation	0
Coefficient of Variation	N/A

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

Lithium-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	0.2
Maximum	0.2
Mean	0.2
Geometric Mean	0.2
Median	0.2
Standard Deviation	0
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:55:00 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Mercury-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 2.0000E-4
Maximum 2.0000E-4
Mean 2.0000E-4
Geometric Mean 2.0000E-4
Median 2.0000E-4
Standard Deviation 5.626E-20
Coefficient of Variation N/A

Mann-Kendall Test

M-K Test Value (S) 0
Tabulated p-value 0.5
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.

TABLE B-2
 SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mercury-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	2.0000E-4
Maximum	2.0000E-4
Mean	2.0000E-4
Geometric Mean	2.0000E-4
Median	2.0000E-4
Standard Deviation	5.626E-20
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	2.0000E-4
Maximum	2.0000E-4
Mean	2.0000E-4
Geometric Mean	2.0000E-4
Median	2.0000E-4
Standard Deviation	5.626E-20
Coefficient of Variation	N/A

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	2.0000E-4
Maximum	2.0000E-4
Mean	2.0000E-4
Geometric Mean	2.0000E-4
Median	2.0000E-4
Standard Deviation	5.626E-20
Coefficient of Variation	N/A

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
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.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 1:56:16 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Molybdenum-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 15
Number Values Reported (n) 16
Number Values Missing 1
Number Values Used 15
Minimum 0.0057
Maximum 0.029
Mean 0.0132
Geometric Mean 0.012
Median 0.011
Standard Deviation 0.00643
Coefficient of Variation 0.488

Mann-Kendall Test

M-K Test Value (S) -77
Tabulated p-value 0
Standard Deviation of S 20.16
Standardized Value of S -3.77
Approximate p-value 8.1536E-5

Statistically significant evidence of a decreasing trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Molybdenum-m-57a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0011
Maximum	0.022
Mean	0.00545
Geometric Mean	0.00438
Median	0.0042
Standard Deviation	0.00486
Coefficient of Variation	0.892

Mann-Kendall Test

M-K Test Value (S)	-19
Tabulated p-value	0.19
Standard Deviation of S	20.21
Standardized Value of S	-0.891
Approximate p-value	0.187

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Molybdenum-m-58a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0014
Maximum	0.02
Mean	0.0038
Geometric Mean	0.00256
Median	0.0018
Standard Deviation	0.00499
Coefficient of Variation	1.312

Mann-Kendall Test

M-K Test Value (S)	-36
Tabulated p-value	0.037
Standard Deviation of S	20.07
Standardized Value of S	-1.744
Approximate p-value	0.0406

Statistically significant evidence of a decreasing trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Molybdenum-m-62a

General Statistics

Number of Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.0019
Maximum	0.011
Mean	0.00301
Geometric Mean	0.00264
Median	0.0023
Standard Deviation	0.00229
Coefficient of Variation	0.762

Mann-Kendall Test

M-K Test Value (S)	-24
Tabulated p-value	0.12
Standard Deviation of S	19.9
Standardized Value of S	-1.156
Approximate p-value	0.124

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 2:30:25 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Radium-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 15
Number Values Reported (n) 16
Number Values Missing 1
Number Values Used 15
Minimum 0.4
Maximum 1.9
Mean 1.1
Geometric Mean 0.97
Median 1.2
Standard Deviation 0.529
Coefficient of Variation 0.481

Mann-Kendall Test

M-K Test Value (S) 4
Tabulated p-value 0.423
Standard Deviation of S 20.13
Standardized Value of S 0.149
Approximate p-value 0.441

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Radium-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.4
Maximum	1.5
Mean	0.727
Geometric Mean	0.691
Median	0.7
Standard Deviation	0.269
Coefficient of Variation	0.37

Mann-Kendall Test

M-K Test Value (S)	13
Tabulated p-value	0.279
Standard Deviation of S	19.36
Standardized Value of S	0.62
Approximate p-value	0.268

Insufficient evidence to identify a significant trend at the specified level of significance.

Radium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.6
Maximum	2.6
Mean	1.067
Geometric Mean	0.94
Median	0.8
Standard Deviation	0.638
Coefficient of Variation	0.598

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	-31
Tabulated p-value	0.07
Standard Deviation of S	19.81
Standardized Value of S	-1.515
Approximate p-value	0.0649

Insufficient evidence to identify a significant trend at the specified level of significance.

Radium-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	16
Number Values Missing	1
Number Values Used	15
Minimum	0.5
Maximum	2
Mean	1.027
Geometric Mean	0.954
Median	0.9
Standard Deviation	0.411
Coefficient of Variation	0.401

Mann-Kendall Test

M-K Test Value (S)	-11
Tabulated p-value	0.313
Standard Deviation of S	19.97
Standardized Value of S	-0.501
Approximate p-value	0.308

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Trend Test Analysis

User Selected Options
Date/Time of Computation ProUCL 5.112/5/2018 9:57:02 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF
Confidence Coefficient 0.95
Level of Significance 0.05

Selenium-m-56a

General Statistics

Number or Reported Events Not Used 0
Number of Generated Events 14
Number Values Reported (n) 16
Number Values Missing 2
Number Values Used 14
Minimum 3.3000E-4
Maximum 0.01
Mean 0.00133
Geometric Mean 7.1904E-4
Median 5.0000E-4
Standard Deviation 0.00253
Coefficient of Variation 1.909

Mann-Kendall Test

M-K Test Value (S) 18
Tabulated p-value 0.165
Standard Deviation of S 17.01
Standardized Value of S 0.999
Approximate p-value 0.159

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Selenium-m-57a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	2.9000E-4
Maximum	0.01
Mean	0.00135
Geometric Mean	7.3564E-4
Median	5.0000E-4
Standard Deviation	0.00253
Coefficient of Variation	1.872

Mann-Kendall Test

M-K Test Value (S)	24
Tabulated p-value	0.096
Standard Deviation of S	16.35
Standardized Value of S	1.407
Approximate p-value	0.0798

Insufficient evidence to identify a significant trend at the specified level of significance.

Selenium-m-58a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	16
Number Values Missing	2
Number Values Used	14
Minimum	2.4000E-4
Maximum	0.01
Mean	0.00135
Geometric Mean	7.2577E-4
Median	5.0000E-4
Standard Deviation	0.00253
Coefficient of Variation	1.878

TABLE B-2
SEDI ProUCL MANN-KENDALL TREND ANALYSIS*

*Outputs do not reflect the exploration of outlier exclusion

Mann-Kendall Test

M-K Test Value (S)	24
Tabulated p-value	0.096
Standard Deviation of S	16.35
Standardized Value of S	1.407
Approximate p-value	0.0798

Insufficient evidence to identify a significant trend at the specified level of significance.

Selenium-m-62a

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	15
Number Values Missing	1
Number Values Used	14
Minimum	5.0000E-4
Maximum	0.01
Mean	0.00139
Geometric Mean	7.9906E-4
Median	5.0000E-4
Standard Deviation	0.00251
Coefficient of Variation	1.804

Mann-Kendall Test

M-K Test Value (S)	8
Tabulated p-value	0.334
Standard Deviation of S	16.35
Standardized Value of S	0.428
Approximate p-value	0.334

Insufficient evidence to identify a significant trend at the specified level of significance.

TABLE B-3
SEDI ProUCL GENERAL STATISTICS*

*Outputs do not reflect the exploration of outlier exclusion

General Statistics on Uncensored Data											
Date/Time of Computation	ProUCL 5.112/4/2018 3:48:18 PM										
User Selected Options											
From File	SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls										
Full Precision	OFF										
From File: SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.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 (m-56a)	14	2	1	13	92.86%	1.0000E-4	0.05	1.1500E-4	2.250E-10	1.5000E-5	0.13
Arsenic (m-56a)	15	1	12	3	20.00%	0.001	0.01	8.8331E-4	1.1462E-7	3.3855E-4	0.383
Barium (m-56a)	15	1	15	0	0.00%	N/A	N/A	0.0727	6.2238E-5	0.00789	0.109
Beryllium (m-56a)	14	2	0	14	100.00%	0.001	0.001	N/A	N/A	N/A	N/A
Cadmium (m-56a)	14	2	0	14	100.00%	1.0000E-4	0.002	N/A	N/A	N/A	N/A
Chromium (m-56a)	15	1	11	4	26.67%	5.0000E-4	0.01	0.00497	2.4830E-5	0.00498	1.003
Cobalt (m-56a)	15	1	9	6	40.00%	5.0000E-4	0.002	8.7838E-4	1.8281E-7	4.2757E-4	0.487
Fluoride (m-56a)	15	1	8	7	46.67%	0.4	0.8	0.42	8.8571E-4	0.0298	0.0709
Lead (m-56a)	14	2	0	14	100.00%	1.0000E-4	0.01	N/A	N/A	N/A	N/A
Lithium (m-56a)	14	2	0	14	100.00%	0.2	0.2	N/A	N/A	N/A	N/A
Mercury (m-56a)	14	2	0	14	100.00%	2.0000E-4	2.0000E-4	N/A	N/A	N/A	N/A
Molybdenum (m-56a)	15	1	15	0	0.00%	N/A	N/A	0.0132	4.1394E-5	0.00643	0.488
Radium (m-56a)	15	1	11	4	26.67%	0.4	1.2	1.017	0.309	0.556	0.546
Selenium (m-56a)	14	2	3	11	78.57%	5.0000E-4	0.01	3.7700E-4	8.8410E-9	9.4027E-5	0.249
Thallium (m-56a)	15	1	1	14	93.33%	1.0000E-4	0.002	1.0167E-4	3.056E-11	5.5277E-6	0.0544

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 9:29:10 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Arsenic (m-56a)

Total N = 15
Number NDs = 3
Number Detects = 12
10% critical value: 0.49
5% critical value: 0.546
1% critical value: 0.642
Note: NDs excluded from Outlier Test

1. Data Value 0.0019 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.776

For 10% significance level, 0.0019 is an outlier.
For 5% significance level, 0.0019 is an outlier.
For 1% significance level, 0.0019 is 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 Arsenic (m-57a)

Total N = 15
Number NDs = 0
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 0.0098 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.447

For 10% significance level, 0.0098 is not an outlier.

For 5% significance level, 0.0098 is not an outlier.

For 1% significance level, 0.0098 is not an outlier.

2. Data Value 0.0019 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.067

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 Arsenic (m-58a)

Total N = 15

Number NDs = 1

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 0.0057 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.333

For 10% significance level, 0.0057 is not an outlier.

For 5% significance level, 0.0057 is not an outlier.

For 1% significance level, 0.0057 is not an outlier.

2. Data Value 0.0025 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.217

For 10% significance level, 0.0025 is not 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 Arsenic (m-62a)

Total N = 15
Number NDs = 1
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 0.0031 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.083

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 0.0016 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.214

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.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 9:46:16 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Barium (m-56a)

Total N = 15
Number NDs = 0
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 0.086 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.190

For 10% significance level, 0.086 is not an outlier.
For 5% significance level, 0.086 is not an outlier.
For 1% significance level, 0.086 is not an outlier.

2. Data Value 0.061 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.190

For 10% significance level, 0.061 is not an outlier.
For 5% significance level, 0.061 is not an outlier.
For 1% significance level, 0.061 is not an outlier.

Dixon's Outlier Test for Barium (m-57a)

Total N = 15
Number NDs = 0
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 0.072 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.567

For 10% significance level, 0.072 is an outlier.
For 5% significance level, 0.072 is an outlier.
For 1% significance level, 0.072 is not an outlier.

2. Data Value 0.038 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.235

For 10% significance level, 0.038 is not an outlier.
For 5% significance level, 0.038 is not an outlier.
For 1% significance level, 0.038 is not an outlier.

Dixon's Outlier Test for Barium (m-58a)

Total N = 15
Number NDs = 0
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 0.11 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.213

For 10% significance level, 0.11 is not an outlier.
For 5% significance level, 0.11 is not an outlier.
For 1% significance level, 0.11 is not an outlier.

2. Data Value 0.043 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.111

For 10% significance level, 0.043 is not an outlier.
For 5% significance level, 0.043 is not an outlier.
For 1% significance level, 0.043 is not an outlier.

Dixon's Outlier Test for Barium (m-62a)

Total N = 15
Number NDs = 0
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 0.16 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.886

For 10% significance level, 0.16 is an outlier.
For 5% significance level, 0.16 is an outlier.
For 1% significance level, 0.16 is an outlier.

2. Data Value 0.064 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.444

For 10% significance level, 0.064 is not an outlier.
For 5% significance level, 0.064 is not an outlier.
For 1% significance level, 0.064 is not an outlier.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 9:57:41 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Barium (m-56a)

Total N = 15
Number NDs = 0
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 0.086 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.190

For 10% significance level, 0.086 is not an outlier.
For 5% significance level, 0.086 is not an outlier.
For 1% significance level, 0.086 is not an outlier.

2. Data Value 0.061 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.190

For 10% significance level, 0.061 is not an outlier.
For 5% significance level, 0.061 is not an outlier.
For 1% significance level, 0.061 is not an outlier.

Dixon's Outlier Test for Barium (m-57a)

Total N = 14
Number NDs = 0
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 0.063 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.571

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 not an outlier.

2. Data Value 0.038 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.308

For 10% significance level, 0.038 is not an outlier.
For 5% significance level, 0.038 is not an outlier.
For 1% significance level, 0.038 is not an outlier.

Dixon's Outlier Test for Barium (m-58a)

Total N = 15
Number NDs = 0
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 0.11 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.213

For 10% significance level, 0.11 is not an outlier.
For 5% significance level, 0.11 is not an outlier.
For 1% significance level, 0.11 is not an outlier.

2. Data Value 0.043 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.111

For 10% significance level, 0.043 is not an outlier.
For 5% significance level, 0.043 is not an outlier.
For 1% significance level, 0.043 is not an outlier.

Dixon's Outlier Test for Barium (m-62a)

Total N = 14
Number NDs = 0
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 0.084 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.167

For 10% significance level, 0.084 is not an outlier.
For 5% significance level, 0.084 is not an outlier.
For 1% significance level, 0.084 is not an outlier.

2. Data Value 0.064 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.444

For 10% significance level, 0.064 is not an outlier.
For 5% significance level, 0.064 is not an outlier.
For 1% significance level, 0.064 is not an outlier.

#VALUE! Outlier Tests for Selected Variables excluding nondetects

User Selected Options #VALUE!

Date/Time of Computation ProUCL 5.112/7/2018 10:04:42 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Barium (m-56a)

Total N = 15
Number NDs = 0
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 0.086 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.190

For 10% significance level, 0.086 is not an outlier.
For 5% significance level, 0.086 is not an outlier.
For 1% significance level, 0.086 is not an outlier.

2. Data Value 0.061 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.190

For 10% significance level, 0.061 is not an outlier.
For 5% significance level, 0.061 is not an outlier.
For 1% significance level, 0.061 is not an outlier.

Dixon's Outlier Test for Barium (m-57a)

Total N = 13
Number NDs = 0
Number Detects = 13
10% critical value: 0.467
5% critical value: 0.521
1% critical value: 0.615
Note: NDs excluded from Outlier Test

1. Data Value 0.055 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.571

For 10% significance level, 0.055 is an outlier.
For 5% significance level, 0.055 is an outlier.
For 1% significance level, 0.055 is not an outlier.

2. Data Value 0.038 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.308

For 10% significance level, 0.038 is not an outlier.
For 5% significance level, 0.038 is not an outlier.
For 1% significance level, 0.038 is not an outlier.

Dixon's Outlier Test for Barium (m-58a)

Total N = 15
Number NDs = 0
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 0.11 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.213

For 10% significance level, 0.11 is not an outlier.
For 5% significance level, 0.11 is not an outlier.
For 1% significance level, 0.11 is not an outlier.

2. Data Value 0.043 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.111

For 10% significance level, 0.043 is not an outlier.
For 5% significance level, 0.043 is not an outlier.
For 1% significance level, 0.043 is not an outlier.

Dixon's Outlier Test for Barium (m-62a)

Total N = 14
Number NDs = 0
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 0.084 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.167

For 10% significance level, 0.084 is not an outlier.
For 5% significance level, 0.084 is not an outlier.
For 1% significance level, 0.084 is not an outlier.

2. Data Value 0.064 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.444

For 10% significance level, 0.064 is not an outlier.
For 5% significance level, 0.064 is not an outlier.
For 1% significance level, 0.064 is not an outlier.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 10:32:47 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Chromium (m-56a)

Total N = 15
Number NDs = 4
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: 0.580

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 not an outlier.

2. Data Value 0.00051 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.261

For 10% significance level, 0.00051 is not an outlier.
For 5% significance level, 0.00051 is not an outlier.
For 1% significance level, 0.00051 is not an outlier.

Dixon's Outlier Test for Chromium (m-57a)

Total N = 15
Number NDs = 2
Number Detects = 13
10% critical value: 0.467
5% critical value: 0.521
1% critical value: 0.615
Note: NDs excluded from Outlier Test

1. Data Value 0.042 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.267

For 10% significance level, 0.042 is not an outlier.
For 5% significance level, 0.042 is not an outlier.
For 1% significance level, 0.042 is not an outlier.

2. Data Value 0.00066 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.048

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 Chromium (m-58a)

Total N = 15
Number NDs = 7
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 0.0033 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.109

For 10% significance level, 0.0033 is not an outlier.
For 5% significance level, 0.0033 is not an outlier.
For 1% significance level, 0.0033 is not an outlier.

2. Data Value 0.00052 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.012

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 (m-62a)

Total N = 15
Number NDs = 6
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 0.002 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.246

For 10% significance level, 0.002 is not an outlier.
For 5% significance level, 0.002 is not an outlier.
For 1% significance level, 0.002 is not an outlier.

2. Data Value 0.00063 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.140

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.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 11:51:07 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Cobalt (m-56a)

Total N = 15
Number NDs = 6
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 0.002 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.519

For 10% significance level, 0.002 is an outlier.
For 5% significance level, 0.002 is an outlier.
For 1% significance level, 0.002 is not an outlier.

2. Data Value 0.00061 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.058

For 10% significance level, 0.00061 is not an outlier.
For 5% significance level, 0.00061 is not an outlier.
For 1% significance level, 0.00061 is not an outlier.

Dixon's Outlier Test for Cobalt (m-57a)

Total N = 15
Number NDs = 0
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 0.0088 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.087

For 10% significance level, 0.0088 is not an outlier.
For 5% significance level, 0.0088 is not an outlier.
For 1% significance level, 0.0088 is not an outlier.

2. Data Value 0.0057 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.276

For 10% significance level, 0.0057 is not an outlier.
For 5% significance level, 0.0057 is not an outlier.
For 1% significance level, 0.0057 is not an outlier.

Dixon's Outlier Test for Cobalt (m-58a)

Total N = 15
Number NDs = 9
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 0.0011 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.169

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 0.00051 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.102

For 10% significance level, 0.00051 is not an outlier.
For 5% significance level, 0.00051 is not an outlier.
For 1% significance level, 0.00051 is not an outlier.

Dixon's Outlier Test for Cobalt (m-52a)

Total N = 15
Number NDs = 11
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 0.0022 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.575

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.

2. Data Value 0.00046 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.046

For 10% significance level, 0.00046 is not an outlier.
For 5% significance level, 0.00046 is not an outlier.
For 1% significance level, 0.00046 is not an outlier.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 11:54:44 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Fluoride (m-56a)

Total N = 15
Number NDs = 7
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 0.49 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.222

For 10% significance level, 0.49 is not an outlier.
For 5% significance level, 0.49 is not an outlier.
For 1% significance level, 0.49 is not an outlier.

2. Data Value 0.4 is a Potential Outlier (Lower Tail)?

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.

No Outlier Test for Fluoride (m-57a)

No Outlier Test for Fluoride (m-58a)

No Outlier Test for Fluoride (m-62a)

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 1:00:18 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

No Outlier Test for Lead (m-56a)

No Outlier Test for Lead (m-57a)

Dixon's Outlier Test for Lead (m-58a)

Total N = 14
Number NDs = 10
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 0.0011 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.593

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 0.00056 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.056

For 10% significance level, 0.00056 is not an outlier.
For 5% significance level, 0.00056 is not an outlier.
For 1% significance level, 0.00056 is not an outlier.

No Outlier Test for Lead (m-62a)

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 11:56:30 AM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Molybdenum (m-56a)

Total N = 15
Number NDs = 0
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 0.029 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.400

For 10% significance level, 0.029 is not an outlier.
For 5% significance level, 0.029 is not an outlier.
For 1% significance level, 0.029 is not an outlier.

2. Data Value 0.0057 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.216

For 10% significance level, 0.0057 is not an outlier.
For 5% significance level, 0.0057 is not an outlier.
For 1% significance level, 0.0057 is not an outlier.

Dixon's Outlier Test for Molybdenum (m-57a)

Total N = 15
Number NDs = 0
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 0.022 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.822

For 10% significance level, 0.022 is an outlier.
For 5% significance level, 0.022 is an outlier.
For 1% significance level, 0.022 is an outlier.
#VALUE!

2. Data Value 0.0011 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.346

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.

Dixon's Outlier Test for Molybdenum (m-58a)

Total N = 15
Number NDs = 1
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 0.02 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.951

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 0.0014 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.182

For 10% significance level, 0.0014 is not an outlier.
For 5% significance level, 0.0014 is not an outlier.
For 1% significance level, 0.0014 is not an outlier.

Dixon's Outlier Test for Molybdenum (m-62a)

Total N = 15
Number NDs = 0
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 0.011 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.899

For 10% significance level, 0.011 is an outlier.
For 5% significance level, 0.011 is an outlier.
For 1% significance level, 0.011 is an outlier.

2. Data Value 0.0019 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.182

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.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 12:02:41 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Radium (m-56a)

Total N = 15
Number NDs = 4
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 1.9 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.143

For 10% significance level, 1.9 is not an outlier.
For 5% significance level, 1.9 is not an outlier.
For 1% significance level, 1.9 is not an outlier.

2. Data Value 0.5 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.077

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 Radium (m-57a)

Total N = 15
Number NDs = 10
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 1.5 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.400

For 10% significance level, 1.5 is not an outlier.
For 5% significance level, 1.5 is not an outlier.
For 1% significance level, 1.5 is not an outlier.

2. Data Value 0.5 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.100

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 Radium (m-58a)

Total N = 15
Number NDs = 7
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 2.6 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.222

For 10% significance level, 2.6 is not an outlier.
For 5% significance level, 2.6 is not an outlier.
For 1% significance level, 2.6 is not an outlier.

2. Data Value 0.7 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.067

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 Radium (m-62a)

Total N = 15
Number NDs = 2
Number Detects = 13
10% critical value: 0.467
5% critical value: 0.521
1% critical value: 0.615
Note: NDs excluded from Outlier Test

1. Data Value 2 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.400

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. Data Value 0.5 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.200

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.

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 12:03:52 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

Dixon's Outlier Test for Selenium (m-56a)

Total N = 14
Number NDs = 11
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 0.00057 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.042

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 0.00033 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.958

#VALUE!

For 10% significance level, 0.00033 is an outlier.

For 5% significance level, 0.00033 is an outlier.

For 1% significance level, 0.00033 is not an outlier.

No Outlier Test for Selenium (m-57a)

No Outlier Test for Selenium (m-58a)

No Outlier Test for Selenium (m-62a)

Outlier Tests for Selected Variables excluding nondetects

User Selected Options

Date/Time of Computation ProUCL 5.112/7/2018 12:16:14 PM
From File SEDIPond_Cholla_AllWells_AssessmentMontSept2018_a.xls
Full Precision OFF

No Outlier Test for Thallium (m-56a)

No Outlier Test for Thallium (m-57a)

No Outlier Test for Thallium (m-58a)

No Outlier Test for Thallium (m-62a)

