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: 550-86694-3
Client Project/Site: Four Corners CCR

For:
Arizona Public Service Company
4801 Cholla Lake Rd
Joseph City, Arizona 86032

Attn: Doug Lavarnway

Authorized for release by:
8/23/2017 9:47:22 AM

Ken Baker, Project Manager II
(602)659-7624
ken.baker@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

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.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Sample Summary 5
Certification Summary 6
Method Summary 7
Subcontract Data 8
Chain of Custody 9
Receipt Checklists 11

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: Four Corners CCR

TestAmerica Job ID: 550-86694-3

Job ID: 550-86694-3

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-86694-3

Comments
No additional comments.

Receipt
The samples were received on 7/25/2017 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 0.8º C, 0.9º C, 2.3º C and 2.5º 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: Four Corners CCR

TestAmerica Job ID: 550-86694-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-86694-1	FC-CCR-MW7-72217	Water	07/22/17 15:46	07/25/17 13:00
550-86694-2	FC-CCR-MW49A-72217	Water	07/22/17 16:35	07/25/17 13:00
550-86694-3	FC-CCR-MW60-72217	Water	07/22/17 14:37	07/25/17 13:00
550-86694-4	FC-CCR-MW61-72217	Water	07/22/17 13:50	07/25/17 13:00
550-86694-5	FC-CCR-MW62-72117	Water	07/21/17 11:49	07/25/17 13:00
550-86694-6	FC-CCR-MW63-72117	Water	07/21/17 11:05	07/25/17 13:00
550-86694-7	FC-CCR-MW64-72117	Water	07/21/17 10:32	07/25/17 13:00
550-86694-8	FC-CCR-MW65-72117	Water	07/21/17 09:42	07/25/17 13:00
550-86694-9	FC-CCR-FD01-72117	Water	07/21/17 09:42	07/25/17 13:00
550-86694-10	FC-CCR-MW66-72117	Water	07/21/17 12:26	07/25/17 13:00
550-86694-11	FC-CCR-MW67-72117	Water	07/21/17 14:46	07/25/17 13:00
550-86694-12	FC-CCR-MW68-72117	Water	07/21/17 15:14	07/25/17 13:00
550-86694-13	FC-CCR-MW69-72117	Water	07/21/17 14:05	07/25/17 13:00
550-86694-14	FC-CCR-MW70-72117	Water	07/21/17 13:16	07/25/17 13:00
550-86694-15	FC-CCR-MW71-72117	Water	07/21/17 16:09	07/25/17 13:00
550-86694-16	FC-CCR-MW72-72117	Water	07/21/17 16:47	07/25/17 13:00
550-86694-17	FC-CCR-MW73-72217	Water	07/22/17 11:36	07/25/17 13:00
550-86694-18	FC-CCR-FD02-72217	Water	07/22/17 11:36	07/25/17 13:00
550-86694-19	FC-CCR-MW74-72217	Water	07/22/17 12:47	07/25/17 13:00
550-86694-20	FC-CCR-MW75-72217	Water	07/22/17 14:27	07/25/17 13:00

Accreditation/Certification Summary

Client: Arizona Public Service Company
Project/Site: Four Corners CCR

TestAmerica Job ID: 550-86694-3

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

Method Summary

Client: Arizona Public Service Company
Project/Site: Four Corners CCR

TestAmerica Job ID: 550-86694-3

Method	Method Description	Protocol	Laboratory
Radium 226/228	General Sub Contract Method	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 (480) 897-9459
Website: www.radsafe.com FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

TestAmerica Analytical Testing Corporation
4645 E. Cotton Center Blvd
Building #3, Suite #189
Phoenix, AZ 85040
Samples Received: July 26, 2017
Analysis Completed: August 07, 2017

Sample ID	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW7-72217 (550-86694-1)	< 0.5	1.9 ± 0.4	1.9 ± 0.4
FC-CCR-MW49A-72217 (550-86694-2)	0.5 ± 0.2	2.1 ± 0.3	2.6 ± 0.4
FC-CCR-MW60-72217 (550-86694-3)	< 0.3	0.8 ± 0.3	0.8 ± 0.3
FC-CCR-MW61-72217 (550-86694-4)	0.5 ± 0.2	< 0.6	0.5 ± 0.2
FC-CCR-MW62-72117 (550-86694-5)	< 0.3	< 0.6	< 0.6
FC-CCR-MW63-72117 (550-86694-6)	< 0.3	0.8 ± 0.3	0.8 ± 0.3
FC-CCR-MW64-72117 (550-86694-7)	< 0.3	< 0.6	< 0.6
FC-CCR-MW65-72117 (550-86694-8)	< 0.3	< 0.6	< 0.6
FC-CCR-FD01-72117 (550-86694-9)	< 0.3	< 0.6	< 0.6
FC-CCR-MW66-72117 (550-86694-10)	< 0.5	1.2 ± 0.3	1.2 ± 0.3
FC-CCR-MW67-72117 (550-86694-11)	< 0.5	< 2.0	< 2.0
FC-CCR-MW68-72117 (550-86694-12)	< 0.5	0.9 ± 0.3	0.9 ± 0.3
FC-CCR-MW69-72117 (550-86694-13)	< 0.5	3.4 ± 0.4	3.4 ± 0.4
FC-CCR-MW70-72117 (550-86694-14)	< 0.5	< 0.7	< 0.7
FC-CCR-MW71-72117 (550-86694-15)	< 0.5	< 0.4	< 0.5
FC-CCR-MW72-72117(550-86694-16)	< 0.5	1.7 ± 0.4	1.7 ± 0.4
FC-CCR-MW73-72217 (550-86694-17)	< 0.5	2.0 ± 0.4	2.0 ± 0.4
FC-CCR-FD02-72217 (550-86694-18)	0.7 ± 0.2	1.1 ± 0.3	1.8 ± 0.4
FC-CCR-MW74-72217 (550-86694-19)	< 0.5	< 0.7	< 0.7
FC-CCR-MW75-72217 (550-86694-20)	< 0.5	< 0.7	< 0.7

8/7/2017
Jeremy Russell BSE Date
Laboratory License Number: AZ0462

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

Chain of Custody Record

86694

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

8/23/2017

Client Contact	Doug Lavarnway	Doug Lavarnway	7/24/2017
APS Four Corners	928-587-0319	Lab Contact:	Carrier:
End of County Road 6675	**Analysis Turnaround Time**		
Fruitland, New Mexico 87416			
(928) 587-0319 Phone	TAT if different from Below _____		
(xxx) xxx-xxxx FAX			
Project Name: CCR			
Site: Cholla			
P O #			

COC No: 5 of 6 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:
-01	FC-CCR-MW7-72217	7/22/2017	1546	G	W	2	N	x	x	
-02	FC-CCR-MW49A-72217	7/22/2017	1635	G	W	2	N	x	x	
-03	FC-CCR-MW60-72217	7/22/2017	1437	G	W	2	N	x	x	
-04	FC-CCR-MW61-72217	7/22/2017	1350	G	W	2	N	x	x	
-05	FC-CCR-MW62-72117	7/21/2017	1149	G	W	2	N	x	x	
-06	FC-CCR-MW63-72117	7/21/2017	1105	G	W	2	N	x	x	
-07	FC-CCR-MW64-72117	7/21/2017	1032	G	W	2	N	x	x	
-08	FC-CCR-MW65-72117	7/21/2017	942	G	W	2	N	x	x	
-09	FC-CCR-FD01-72117	7/21/2017	942	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.

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

Special Instructions/QC Requirements & Comments:

25/23/0.8/0.9

Custody Seals Intact: | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Doug Lavarnway	APS	7/25 849	DRogers	Red J	7/25 8:49 am
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/25/17 13:00

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

Chain of Custody Record

8669 4

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

8/23/2017

Client Contact	Doug Lavarnway	Doug Lavarnway	7/24/2017	COC No:
APS Four Corners	928-587-0319	Lab Contact:	Carrier:	6 of 6 COCs
End of County Road 6675	Analysis Turnaround Time			Sampler:
Fruitland, New Mexico 87416				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				
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	Sample Specific Notes:
-10	FC-CCR-MW66-72117	7/21/2017	1226	G	W	2	N	x	x	
-11	FC-CCR-MW67-72117	7/21/2017	1446	G	W	2	N	x	x	
-12	FC-CCR-MW68-72117	7/21/2017	1514	G	W	2	N	x	x	
-13	FC-CCR-MW69-72117	7/21/2017	1405	G	W	2	N	x	x	
-14	FC-CCR-MW70-72117	7/21/2017	1316	G	W	2	N	x	x	
-15	FC-CCR-MW71-72117	7/21/2017	1609	G	W	2	N	x	x	
-16	FC-CCR-MW72-72117	7/21/2017	1647	G	W	2	N	x	x	
-17	FC-CCR-MW73-72217	7/22/2017	1136	G	W	2	N	x	x	
-18	FC-CCR-FD02-72217	7/22/2017	1136	G	W	2	N	x	x	
-19	FC-CCR-MW74-72217	7/22/2017	1247	G	W	2	N	x	x	
-20	FC-CCR-MW75-72217	7/22/2017	1427	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.

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

Special Instructions/QC Requirements & Comments:

2S/23/08/01

Custody Seals Intact: | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd: 2S/23/08/01 | Therm ID No.:_____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Doug Lavarnway	APS	7/25 8:49	D Rogers	RedJ	7/25 8:49am
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/25/17 1310

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-86694-3

Login Number: 86694
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.