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: 550-68451-1
Client Project/Site: CCR

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

Attn: Doug Lavarnway

Authorized for release by:
9/14/2016 10:07:55 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 11
Receipt Checklists 13

Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-68451-1

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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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: 550-68451-1

Job ID: 550-68451-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-68451-1

Comments
No additional comments.

Receipt
The samples were received on 8/23/2016 9:56 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 5 coolers at receipt time were 0.1º C, 0.4º C, 0.7º C, 1.6º C and 3.1º 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: 550-68451-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-68451-1	FC-CCR-MW7-816	Water	08/21/16 13:36	08/23/16 09:56
550-68451-2	FC-CCR-MW8-816	Water	08/21/16 12:42	08/23/16 09:56
550-68451-3	FC-CCR-MW49A-816	Water	08/21/16 14:38	08/23/16 09:56
550-68451-4	FC-CCR-MW60-816	Water	08/21/16 10:47	08/23/16 09:56
550-68451-5	FC-CCR-MW61-816	Water	08/21/16 11:45	08/23/16 09:56
550-68451-6	FC-CCR-MW62-816	Water	08/20/16 16:36	08/23/16 09:56
550-68451-7	FC-CCR-MW63-816	Water	08/20/16 10:58	08/23/16 09:56
550-68451-8	FC-CCR-MW64-816	Water	08/20/16 12:45	08/23/16 09:56
550-68451-9	FC-CCR-MW65-816	Water	08/20/16 15:50	08/23/16 09:56
550-68451-10	FC-CCR-MW66-816	Water	08/20/16 13:53	08/23/16 09:56
550-68451-11	FC-CCR-MW67-816	Water	08/20/16 19:27	08/23/16 09:56
550-68451-12	FC-CCR-MW68-816	Water	08/20/16 17:20	08/23/16 09:56
550-68451-13	FC-CCR-MW69-816	Water	08/21/16 15:41	08/23/16 09:56
550-68451-14	FC-CCR-MW70-816	Water	08/20/16 14:55	08/23/16 09:56
550-68451-15	FC-CCR-MW71-816	Water	08/21/16 09:37	08/23/16 09:56
550-68451-16	FC-CCR-MW72-816	Water	08/21/16 08:49	08/23/16 09:56
550-68451-17	FC-CCR-MW100-816	Water	08/20/16 19:27	08/23/16 09:56
550-68451-18	FC-CCR-MW101-816	Water	08/21/16 09:37	08/23/16 09:56

Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-68451-1

Laboratory: TestAmerica Phoenix

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arizona	State Program	9	AZ0728	06-09-17

Method Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-68451-1

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: August 24, 2016
Analysis Completed: August 31, 2016

Sample ID	Radium 226 Activity Method 903.1 (pCi/L)	Radium 228 Activity Method 904 (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW7-816 (550-68451-1)	< 0.4	0.7 ± 0.4	0.7 ± 0.4
FC-CCR-MW8-816 (550-68451-2)	< 0.3	1.3 ± 0.5	1.3 ± 0.5
FC-CCR-MW49A-816 (550-68451-3)	0.4 ± 0.1	3.1 ± 0.7	3.5 ± 0.7
FC-CCR-MW60-816 (550-68451-4)	< 0.2	< 0.7	< 0.7
FC-CCR-MW61-816 (550-68451-5)	0.4 ± 0.1	1.0 ± 0.5	1.4 ± 0.5
FC-CCR-MW62-816 (550-68451-6)	< 0.2	1.4 ± 0.5	1.4 ± 0.5
FC-CCR-MW63-816 (550-68451-7)	0.3 ± 0.1	1.8 ± 0.6	2.1 ± 0.6
FC-CCR-MW64-816 (550-68451-8)	< 0.3	< 0.7	< 0.7
FC-CCR-MW65-816 (550-68451-9)	< 0.3	< 0.4	< 0.4
FC-CCR-MW66-816 (550-68451-10)	0.4 ± 0.1	< 0.7	0.4 ± 0.1
FC-CCR-MW67-816 (550-68451-11)	0.7 ± 0.1	1.6 ± 0.5	2.3 ± 0.5
FC-CCR-MW68-816 (550-68451-12)	0.5 ± 0.1	1.4 ± 0.5	1.9 ± 0.5
FC-CCR-MW69-816 (550-68451-13)	1.2 ± 0.1	2.7 ± 0.4	3.9 ± 0.4
FC-CCR-MW70-816 (550-68451-14)	< 0.3	1.5 ± 0.5	1.5 ± 0.5
FC-CCR-MW71-816 (550-68451-15)	0.6 ± 0.1	1.0 ± 0.5	1.6 ± 0.5
FC-CCR-MW72-816 (550-68451-16)	0.5 ± 0.1	2.7 ± 0.5	3.2 ± 0.5
FC-CCR-MW100-816 (550-68451-17)	0.9 ± 0.1	2.1 ± 0.5	3.0 ± 0.5
FC-CCR-MW101-816 (550-68451-18)	0.3 ± 0.1	0.8 ± 0.4	1.1 ± 0.4

8/31/2016
Robert L. Metzger, Ph.D., C.H.P. Date

Laboratory License Number: AZ0462

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

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Baker, Ken	Carrier Tracking No(s):	COC No: 550-14398.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: ken.baker@testamericainc.com		Page: Page 1 of 2
Company: Radiation Safety Eng., Inc.				Job #: 550-68451-1
Address: 3245 North Washington Street,	Due Date Requested: 9/2/2016			
City: Chandler	TAT Requested (days):			
State, Zip: AZ, 85225				
Phone:	PO #:			
Email:	WO #:			
Project Name: CCR	Project #: 55002330			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	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:
			Preservation Code:						
FC-CCR-MW7-816 (550-68451-1)	8/21/16	13:36 Arizona		Water			X	2	55928
FC-CCR-MW8-816 (550-68451-2)	8/21/16	12:42 Arizona		Water			X	2	55929
FC-CCR-MW49A-816 (550-68451-3)	8/21/16	14:38 Arizona		Water			X	2	55930
FC-CCR-MW60-816 (550-68451-4)	8/21/16	10:47 Arizona		Water			X	2	55931
FC-CCR-MW61-816 (550-68451-5)	8/21/16	11:45 Arizona		Water			X	2	55932
FC-CCR-MW62-816 (550-68451-6)	8/20/16	16:36 Arizona		Water			X	2	55933
FC-CCR-MW63-816 (550-68451-7)	8/20/16	10:58 Arizona		Water			X	2	55934
FC-CCR-MW64-816 (550-68451-8)	8/20/16	12:45 Arizona		Water			X	2	55935
FC-CCR-MW65-816 (550-68451-9)	8/20/16	15:50 Arizona		Water			X	2	55936
FC-CCR-MW66-816 (550-68451-10)	8/20/16	13:53 Arizona		Water			X	2	55937
FC-CCR-MW67-816 (550-68451-11)	8/20/16	19:27 Arizona		Water			X	2	55938

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*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:		Method of Shipment:	
Relinquished by: LOUIE BATEMAN	Date/Time: 8/24/16 12:50	Company T.A	Received by: AMIK HAERI	Date/Time: 8/24/16 12:50	Company RSE
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

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

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Baker, Ken	Carrier Tracking No(s):	COC No: 550-14398.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: ken.baker@testamericainc.com		Page: Page 2 of 2
Company: Radiation Safety Eng., Inc.				Job #: 550-68451-1
Address: 3245 North Washington Street,	Due Date Requested: 9/2/2016			
City: Chandler	TAT Requested (days):			
State, Zip: AZ, 85225				
Phone:	PO #:			
Email:	WO #:			
Project Name: CCR	Project #: 55002330			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	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:
Preservation Codes:									
FC-CCR-MW68-816 (550-68451-12)	8/20/16	17:20 Arizona		Water			X	2	55939
FC-CCR-MW69-816 (550-68451-13)	8/21/16	15:41 Arizona		Water			X	2	55940
FC-CCR-MW70-816 (550-68451-14)	8/20/16	14:55 Arizona		Water			X	2	55941
FC-CCR-MW71-816 (550-68451-15)	8/21/16	09:37 Arizona		Water			X	2	55942
FC-CCR-MW72-816 (550-68451-16)	8/21/16	08:49 Arizona		Water			X	2	55943
FC-CCR-MW100-816 (550-68451-17)	8/20/16	19:27 Arizona		Water			X	2	55944
FC-CCR-MW101-816 (550-68451-18)	8/21/16	09:37 Arizona		Water			X	2	55945

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*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
LOUIE BATEMAN	8/24/16 12:45	T.A	AMIR HAERI	8/24/16 12:45	RSE
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal 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

68451

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarnway	Doug Lavarnway	Date:
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: Four Corners (FC) Power Plant			
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-MW7-816	8/21/16	1336	G	W	6	N	x	x	
-02	FC-CCR-MW8-816	8/21/16	1242	G	W	6	N	x	x	
-03	FC-CCR-MW49A-816	8/21/16	1438	G	W	6	N	x	x	
-04	FC-CCR-MW60-816	8/21/16	1047	G	W	6	N	x	x	
-05	FC-CCR-MW61-816	8/21/16	1145	G	W	6	N	x	x	
-06	FC-CCR-MW62-816	8/20/16	1636	G	W	6	N	x	x	
-07	FC-CCR-MW63-816	8/20/16	1058	G	W	6	N	x	x	
-08	FC-CCR-MW64-816	8/20/16	1245	G	W	6	N	x	x	
-09	FC-CCR-MW65-816	8/20/16	1550	G	W	6	N	x	x	
-10	FC-CCR-MW66-816	8/20/16	1353	G	W	6	N	x	x	
-11	FC-CCR-MW67-816	8/20/16	1927	G	W	6	N	x	x	
-12	FC-CCR-MW68-816	8/20/16	1720	G	W	6	N	x	x	

550-68451 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.

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

Special Instructions/QC Requirements & Comments:

Method 200.8 with collision cell

3.1°C, 1.6°C, 0.4°C, 0.1°C, 0.7°C

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	8/22/16 1520	Jeff Cabing	APS	8/22/16 1520
Jeff Cabing	APS	8/23/16 0930			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
					8-23-16 0930

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

Chain of Custody Record

68451

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

9/14/2016

Client Contact	Doug Lavarnway	Doug Lavarnway	Date:	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: Four Corners (FC) Power Plant				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:
-13	FC-CCR-MW69-816	8/21/16	1541	G	W	6	N	x	x	
-14	FC-CCR-MW70-816	8/20/16	1455	G	W	6	N	x	x	
-15	FC-CCR-MW71-816	8/21/16	937	G	W	6	N	x	x	
-16	FC-CCR-MW72-816	8/21/16	849	G	W	6	N	x	x	
-17	FC-CCR-MW100-816	8/20/16	1927	G	W	6	N	x	x	
-18	FC-CCR-MW101-816	8/21/16	937	G	W	6	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:

Method 200.8 with collision cell

3, 1, 1.6, 0.4, 0.1 0.7

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	8/22/16 1520	Jeff Cooley	APS	8/22/16 1520
Jeff Cooley	APS	8/22/16 0997			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
			BFC		8-22-16 0958

cto

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-68451-1

Login Number: 68451
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?	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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	Check done at department level as required.