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: 550-71661-1
TestAmerica SDG: Four Corners (FC) Power Plant
Client Project/Site: CCR

For:
Arizona Public Service Company
County Road 6675, Stn 4915
Fruitland, New Mexico 87416

Attn: Arnold Slowman

Authorized for release by:
11/23/2016 10:40:51 AM

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

LINKS

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

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

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Definitions/Glossary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-71661-1
SDG: Four Corners (FC) Power Plant

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: 550-71661-1
SDG: Four Corners (FC) Power Plant

Job ID: 550-71661-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-71661-1

Comments
No additional comments.

Receipt
The samples were received on 10/22/2016 10:51 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 2.1º C, 2.6º C, 2.6º C and 2.6º 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: 550-71661-1
SDG: Four Corners (FC) Power Plant

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-71661-1	FC-CCR-MW7-1016	Water	10/20/16 10:43	10/22/16 10:51
550-71661-2	FC-CCR-MW49A-1016	Water	10/20/16 08:17	10/22/16 10:51
550-71661-3	FC-CCR-MW60-1016	Water	10/20/16 09:45	10/22/16 10:51
550-71661-4	FC-CCR-MW61-1016	Water	10/20/16 09:07	10/22/16 10:51
550-71661-5	FC-CCR-MW62-1016	Water	10/19/16 16:41	10/22/16 10:51
550-71661-6	FC-CCR-MW63-1016	Water	10/19/16 12:29	10/22/16 10:51
550-71661-7	FC-CCR-MW64-1016	Water	10/19/16 11:58	10/22/16 10:51
550-71661-8	FC-CCR-MW65-1016	Water	10/19/16 15:46	10/22/16 10:51
550-71661-9	FC-CCR-MW66-1016	Water	10/19/16 17:22	10/22/16 10:51
550-71661-10	FC-CCR-MW67-1016	Water	10/20/16 12:51	10/22/16 10:51
550-71661-11	FC-CCR-MW68-1016	Water	10/20/16 13:41	10/22/16 10:51
550-71661-12	FC-CCR-MW69-1016	Water	10/20/16 14:16	10/22/16 10:51
550-71661-13	FC-CCR-MW70-1016	Water	10/19/16 14:29	10/22/16 10:51
550-71661-14	FC-CCR-MW71-1016	Water	10/20/16 11:30	10/22/16 10:51
550-71661-15	FC-CCR-MW72-1016	Water	10/20/16 12:07	10/22/16 10:51
550-71661-16	FC-CCR-MW100-1016	Water	10/20/16 09:07	10/22/16 10:51
550-71661-17	FC-CCR-MW101-1016	Water	10/19/16 12:29	10/22/16 10:51

Certification Summary

Client: Arizona Public Service Company
Project/Site: CCR

TestAmerica Job ID: 550-71661-1
SDG: Four Corners (FC) Power Plant

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: 550-71661-1
SDG: Four Corners (FC) Power Plant

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
Website: www.radsafe.com

(480) 897-9459
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: October 24, 2016
Analysis Completed: November 10, 2016

Sample ID	Radium 226 Activity Method 903.1 (pCi/L)	Radium 228 Activity Method 904 (pCi/L)	Total Radium (pCi/L)
FC-CCR-MW7-1016 (550-71661-1)	0.4 ± 0.1	0.6 ± 0.4	1.0 ± 0.4
FC-CCR-MW49A-1016 (550-71661-2)	0.4 ± 0.1	1.7 ± 0.4	2.1 ± 0.4
FC-CCR-MW60-1016 (550-71661-3)	< 0.3	1.0 ± 0.4	1.0 ± 0.4
FC-CCR-MW61-1016 (550-71661-4)	< 0.3	0.7 ± 0.4	0.7 ± 0.4
FC-CCR-MW62-1016(550-71661-5)	< 0.4	0.9 ± 0.4	0.9 ± 0.4
FC-CCR-MW63-1016 (550-71661-6)	< 0.2	< 0.7	< 0.7
FC-CCR-MW64-1016 (550-71661-7)	< 0.3	< 0.5	< 0.5
FC-CCR-MW65-1016 (550-71661-8)	< 0.3	< 0.5	< 0.5
FC-CCR-MW66-1016 (550-71661-9)	0.9 ± 0.1	2.1 ± 0.5	3.0 ± 0.5
FC-CCR-MW67-1016 (550-71661-10)	1.2 ± 0.1	2.9 ± 0.6	4.1 ± 0.6
FC-CCR-MW68-1016 (550-71661-11)	0.5 ± 0.1	0.9 ± 0.5	1.4 ± 0.5
FC-CCR-MW69-1016 (550-71661-12)	1.8 ± 0.2	3.7 ± 0.6	5.5 ± 0.6
FC-CCR-MW70-1016 (550-71661-13)	0.6 ± 0.1	1.0 ± 0.5	1.6 ± 0.5
FC-CCR-MW71-1016 (550-71661-14)	0.4 ± 0.1	< 0.7	0.4 ± 0.1
FC-CCR-MW72-1016 (550-71661-15)	0.7 ± 0.1	3.5 ± 0.7	4.2 ± 0.7
FC-CCR-MW100-1016 (550-71661-16)	0.4 ± 0.1	1.4 ± 0.5	1.8 ± 0.5
FC-CCR-MW101-1016 (550-71661-17)	< 0.2	< 0.4	< 0.4

11/10/2016
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: 550-15035.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: ken.baker@testamericainc.com	State of Origin: New Mexico	Page: Page 1 of 2
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona		Job #: 550-71661-1
Address: 3245 North Washington Street, ,	Due Date Requested: 11/3/2016			
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-MW7-1016 (550-71661-1)	10/20/16	10:43 Arizona		Water			X	2	56487
FC-CCR-MW49A-1016 (550-71661-2)	10/20/16	08:17 Arizona		Water			X	2	56488
FC-CCR-MW60-1016 (550-71661-3)	10/20/16	09:45 Arizona		Water			X	2	56489
FC-CCR-MW61-1016 (550-71661-4)	10/20/16	09:07 Arizona		Water			X	2	56490
FC-CCR-MW62-1016 (550-71661-5)	10/19/16	16:41 Arizona		Water			X	2	56491
FC-CCR-MW63-1016 (550-71661-6)	10/19/16	12:29 Arizona		Water			X	2	56492
FC-CCR-MW64-1016 (550-71661-7)	10/19/16	11:58 Arizona		Water			X	2	56493
FC-CCR-MW65-1016 (550-71661-8)	10/19/16	15:46 Arizona		Water			X	2	56494
FC-CCR-MW66-1016 (550-71661-9)	10/19/16	17:22 Arizona		Water			X	2	56495

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/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 complicance to TestAmerica Laboratories, Inc.

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: 10/24/16 13:30	Company T.A	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: Amik Baeri	Date/Time: 10/24/16 13:30	Company RSE
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: 550-15035.2
Client Contact: Shipping/Receiving	Phone:	E-Mail: ken.baker@testamericainc.com	State of Origin: New Mexico	Page: Page 2 of 2
Company: Radiation Safety Eng., Inc.		Accreditations Required (See note): State Program - Arizona		Job #: 550-71661-1
Address: 3245 North Washington Street, ,	Due Date Requested: 11/3/2016			
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-MW67-1016 (550-71661-10)	10/20/16	12:51 Arizona		Water			X	2	56496
FC-CCR-MW68-1016 (550-71661-11)	10/20/16	13:41 Arizona		Water			X	2	56497
FC-CCR-MW69-1016 (550-71661-12)	10/20/16	14:16 Arizona		Water			X	2	56498
FC-CCR-MW70-1016 (550-71661-13)	10/19/16	14:29 Arizona		Water			X	2	56499
FC-CCR-MW71-1016 (550-71661-14)	10/20/16	11:30 Arizona		Water			X	2	56500
FC-CCR-MW72-1016 (550-71661-15)	10/20/16	12:07 Arizona		Water			X	2	56501
FC-CCR-MW100-1016 (550-71661-16)	10/20/16	09:07 Arizona		Water			X	2	56502
FC-CCR-MW101-1016 (550-71661-17)	10/19/16	12:29 Arizona		Water			X	2	56503

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. I

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: 10/24/16 13:30	Company: T.A	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: ANIK MAERI	Date/Time: 10/24/16 13:30	Company: KSR
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

71661

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarnway	Doug Lavarnway	Date: 10/21/16	COC No:
APS Four Corners	928-587-0319	Lab Contact:	Carrier:	5 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:
FC-CCR-MW7-1016	10/20/16	1043	G	W	5	N	x	x	
FC-CCR-MW49A-1016	10/20/16	817	G	W	5	N	x	x	
FC-CCR-MW60-1016	10/20/16	945	G	W	5	N	x	x	
FC-CCR-MW61-1016	10/20/16	907	G	W	5	N	x	x	
FC-CCR-MW62-1016	10/19/16	1641	G	W	5	N	x	x	
FC-CCR-MW63-1016	10/19/16	1229	G	W	5	N	x	x	
FC-CCR-MW64-1016	10/19/16	1158	G	W	5	N	x	x	
FC-CCR-MW65-1016	10/19/16	1546	G	W	5	N	x	x	
FC-CCR-MW66-1016	10/19/16	1722	G	W	5	N	x	x	
FC-CCR-MW67-1016	10/20/16	1251	G	W	5	N	x	x	
FC-CCR-MW68-1016	10/20/16	1341	G	W	5	N	x	x	

550-71661 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

2.6°C, 2.6°C, 2.6°C, 2.1°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	10/21 12:45	[illegible]	Red T	10/21/16 12:45
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by: [illegible]	Company: RED T	Date/Time: 10:51	Received in Laboratory by: [illegible]	Company:	Date/Time: 10/22/16 1051

P.C.

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

Chain of Custody Record

71661

11/23/2016

Regulatory Program: CCR

TestAmerica Laboratories, Inc.

Client Contact	Doug Lavarnway	Doug Lavarnway	Date: 10/21/16	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:
FC-CCR-MW69-1016	10/20/16	1416	G	W	5	N	x	x	
FC-CCR-MW70-1016	10/19/16	1429	G	W	5	N	x	x	
FC-CCR-MW71-1016	10/20/16	1130	G	W	5	N	x	x	
FC-CCR-MW72-1016	10/20/16	1207	G	W	5	N	x	x	
FC-CCR-MW100-1016	10/20/16	907	G	W	5	N	x	x	
FC-CCR-MW101-1016	10/19/16	1229	G	W	5	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

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	10/21 1245	D Rogers	Red J	10/21/16 12:45
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
[illegible]	RED J	10:51	[illegible]	TA	10-22-16 1051

PiC

Login Sample Receipt Checklist

Client: Arizona Public Service Company

Job Number: 550-71661-1
SDG Number: Four Corners (FC) Power Plant

Login Number: 71661
List Number: 1
Creator: Doerr, Bret C

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.	False	