



Tennessee Valley Authority
Bull Run Fossil Plant
Gypsum/Coal-Ash Landfill (IDL 01-0208)

GROUNDWATER ASSESSMENT MONITORING REPORT
AUGUST 2015

Prepared by

Jeffrey Norman

Nashville, Tennessee
October 20, 2015

DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information.



Brian D. Keeling, Bull Run Fossil Plant Manager
October 20, 2015

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INTRODUCTION

This report contains monitoring results for groundwater samples collected August 17-19, 2015 from designated monitoring wells surrounding the Gypsum/Coal-Ash Landfill at Bull Run Fossil Plant (BRF). This data represents the latest set of semi-annual assessment monitoring results for the facility. The facility was placed into Phase III Assessment Monitoring via a letter from the Tennessee Department of Environment and Conservation (TDEC) dated July 17, 2009. In a letter dated October 21, 2009, TDEC moved TVA into Phase II Assessment Monitoring. In a letter from TDEC (David Fugate and Larry Cook) to Lenora Sheffey (TVA) dated May 3, 2010, the required parameter list was reduced and returned to a semi-annual basis. Sample collection and laboratory analyses were performed in accordance with TDEC Rule 0400-11-01-.04 and the approved Facility Operations Plan dated January 11, 2006. Groundwater samples were analyzed by Test America Laboratories in Nashville, TN (TAN), an EPA-certified laboratory.

GROUNDWATER SAMPLING

Groundwater sampling was performed by William Nichols (TVA) at upgradient monitoring well 1 and downgradient wells 47 through 50. All wells were found in acceptable condition, except as previously reported, wells 1 and 50. TVA is currently evaluating options to repair or replace these wells in conjunction with projects associated with the disposal facilities and will confer with TDEC regarding a path forward.

A bladder pump with Teflon interior components was used to purge and sample all wells except well 50 which was purged and sampled using a peristaltic pump. Field parameters (i.e., temperature, specific conductance, pH, dissolved oxygen, and oxidation-reduction potential) were measured using a flow-through cell and calibrated instruments.

Each well was purged utilizing US EPA Low Stress (low-flow) purging procedures¹ to minimize turbidity. Mr. David Fugate (TDEC) authorized the use of low stress purging and sampling procedures during a phone conversation with Mr. Mike Tritapoe (TVA) November 12, 2009. A Quality Control (QC) duplicate sample was collected from well 50. Immediately following collection, samples were transferred to new sample bottles with appropriate preservatives, where applicable. The samples were then sealed and labeled, with sample dates recorded on a chain of custody form. Samples were placed in an iced cooler; and the cooler was delivered to TAN on August 21, 2015. Field data sheets are included in Appendix A and a copy of the sample custody record is provided in Appendix B.

ANALYTICAL RESULTS

In accordance with TDEC Rule 0400-11-01-.04(7)(6) and the May 3, 2010, letter from TDEC mentioned earlier, groundwater samples were analyzed for all required constituents. Laboratory analyses were completed on September 4, 2015. Constituent concentrations reported for all samples were below TDEC maximum contaminant levels (MCLs) or the applicable Ground Water Protection Standard (GWPS). The complete laboratory report presented in Appendix C includes analytical methods, detection limits, and result qualifiers (where applicable) for each sample analyzed. All analytical testing was conducted within recommended sample holding times.

EVALUATION OF ASSESSMENT MONITORING DATA

Groundwater protection standards (GWPS) for comparison to the August 2015 groundwater monitoring data are presented in Table 1 for facility constituents. GWPS are as defined in Section IV(1)(d) of *TDEC Ground Water Monitoring Guidance for Solid Waste Landfill Units Policy*. Per Policy, GWPS requires consideration of the constituent MCL listed in Appendix III of Rule 0400-11-01-.04. For copper, there is no TDEC MCL so the EPA Primary MCL (PMCL) is utilized. Those constituents having neither a TDEC MCL nor an applicable EPA PMCL (cobalt, tin, vanadium, and zinc) have GWPS designated not-available (N/A). Each constituent GWPS shown in Table 1 is equivalent to the MCL.

¹US EPA Region 1, *Low Stress (Low Flow) Purgung and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*, Revision 3. January 2010.

Assessment monitoring data were further evaluated by performing a comparison between the downgradient well (47, 48, 49, and 50) data and the computed background upper prediction limits (UPL). Background constituent concentration limits were estimated from monitoring data collected from the upgradient well (well 1) between August 23, 2006, and August 19, 2015. (Appendix D).

Table 1. BRF Gypsum/Coal-Ash Landfill Facility Groundwater Protection Standards

Parameter	Units	Background UPL ^a	TDEC MCL	GWPS ^b
Antimony	µg/L	2	6	6
Arsenic	µg/L	7.2	10	10
Barium	µg/L	2240	2,000	2,000
Beryllium	µg/L	2	4	4
Cadmium	µg/L	1	5	5
Chromium	µg/L	19	100	100
Cobalt	µg/L	33.5	N/A	N/A
Copper	µg/L	10	N/A	N/A
Lead	µg/L	5	15	15
Mercury	µg/L	0.2	2	2
Nickel	µg/L	20	100	100
Selenium	µg/L	10	50	50
Silver	µg/L	10	100	100
Thallium	µg/L	2	2	2
Tin	µg/L	2	N/A	N/A
Vanadium	µg/L	20	N/A	N/A
Zinc	µg/L	83	N/A	N/A

a - UPL Computed using 08/23/06 to 08/19/15 background data for Well 1.

b - GWPS computed August 2014.

N/A - Not Available - No MCLs exist for cobalt, tin, vanadium and zinc

TDEC - Maximum contaminant limit (MCL) from Rule 0400-11-01-.04, Appendix III (March 2013)

One-sided, upper prediction limits (UPL) were estimated from background data for each constituent using MANAGES 3.4² data management and statistical processing software. This software applies a suitable form of the prediction interval method (i.e., either parametric or nonparametric) based on the normality of constituent background data for well 1. For normally distributed data, the parametric method assumes an individual Type I error rate of 0.01 based

²EPRI, 2013, "MANAGES: Groundwater Data Management and Evaluation Software", Product #1012581, Palo Alto, CA.

On four downgradient monitoring wells, 17 constituents, and no verification resample. The Type I error rate of non-normally distributed data are computed for each individual constituent at each well based on the number of background data with no verification resample. Estimated background UPL values for each constituent are given in Table 1. Detailed statistical output associated with UPL estimates is included in Appendix E.

Comparisons of the August 2015 groundwater monitoring results to GWPS presented in Table 2 indicate arsenic exceedances of the GWPS for the unfiltered sample from Well 47 (11.1 ug/l). However, a filtered sample was also collected/analyzed for Well 47, with resulting arsenic levels of 5.1 ug/l for Well 47 and 4.7 ug/l for Well 47 duplicate. From the field data sheets, it is worth noting that turbidity in Well 47 was initially 298 NTU, eventually dropping to 33 NTU when the sample was pulled, raising a question as to whether sample quality had an impact on total metals values. In addition to arsenic in the unfiltered samples from Well 47, comparisons of the August 2015 groundwater monitoring results to UPL values presented in Table 3 indicates an exception for cobalt at well 48 (39.9 ug/l). The level of cobalt and arsenic reported in the August samples from the site were noted to be within historically reported ranges at the applicable well locations as shown on Figures 1 and 2. Time series graphs for other constituents sampled at the facility are presented in Appendix F.

Examination of the time series plot for cobalt compiled form data over the past 8 years indicates a downward trend becoming more stable over the last 4 years. Cobalt concentrations (Figure 2) have generally been stable or declining during the history of monitoring at well 48, from 2006 to current, including the period before the current Gypsum/Coal-Ash Landfill facility began storage in late 2008.

Concentrations of arsenic, as well as cobalt and other naturally occurring elements, along with elevated levels of turbidity and TSS have been regularly detected in the background well. These are indications soil particulate may be impacting the laboratory results. Included at the bottom of tables 2 and 3 are field turbidity measurements which serve as qualitative indicators of possible sampling bias associated with analyses of total (non-filtered) samples.

Table 2. August 17-19, 2015 Groundwater Monitoring Results (Inter-well)

Analytical Results for Appendix II Inorganic Constituents									Comparison to GWPS ^a				
Parameter	Units	1 (upgradient)	47 (downgradient)	47 - Dup (downgradient)	48 (downgradient)	49 (downgradient)	50 (downgradient)	GWPS ^b	47	47 - Dup	48	49	50
Date Sampled		8/19/2015	8/17/2015	8/17/2015	8/18/2015	8/17/2015	8/19/2015		8/17/2015	8/17/2015	8/18/2015	8/17/2015	8/19/2015
Antimony	µg/L	<2	<2	<2	<2	<2	<2	6	L	L	L	L	L
Arsenic	µg/L	4.47	11.1	11.1	4.97	4.68	2.27	10	G	G	L	L	L
Barium	µg/L	2,240	37.2	41.8	32	118	395	2,000	L	L	L	L	L
Beryllium	µg/L	<2	<2	<2	<2	<2	<2	4	L	L	L	L	L
Cadmium	µg/L	<1	<1	<1	<1	<1	<1	5	L	L	L	L	L
Chromium	µg/L	<2	<2	<2	<2	<2	<2	100	L	L	L	L	L
Cobalt	µg/L	2.54	8.42	8.17	39.9	11.7	3.39	N/A	N/A	N/A	N/A	N/A	N/A
Copper	µg/L	<10	<10	<10	<10	<10	<10	N/A	N/A	N/A	N/A	N/A	N/A
Lead	µg/L	<2	<2	<2	<2	<2	<2	15	L	L	L	L	L
Mercury	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2	L	L	L	L	L
Nickel	µg/L	<2	2.56	2.42	16	<2	2.26	100	L	L	L	L	L
Selenium	µg/L	<2	<2	<2	<2	<2	<2	50	L	L	L	L	L
Silver	µg/L	<5	<5	<5	<5	<5	<5	100	L	L	L	L	L
Thallium	µg/L	<2	<2	<2	<2	<2	<2	2	L	L	L	L	L
Vanadium	µg/L	<2	<2	<2	<2	<2	3.38	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	µg/L	<25	64	65.2	<25	<25	<25	N/A	N/A	N/A	N/A	N/A	N/A
Turbidity	NTU	45	33	--	125	4.9	31						

a "L" = less than or equal to GWPS, "G" = greater than GWPS, "N/A" = Not Applicable

b - Established August 2014

a "L" = less than or equal to GWPS, "G" = greater than GWPS, "N/A" = Not Applicable

b - reported concentrations are averages of duplicate samples

c - Established May 2012

NS - No sample collected due to damage to the well

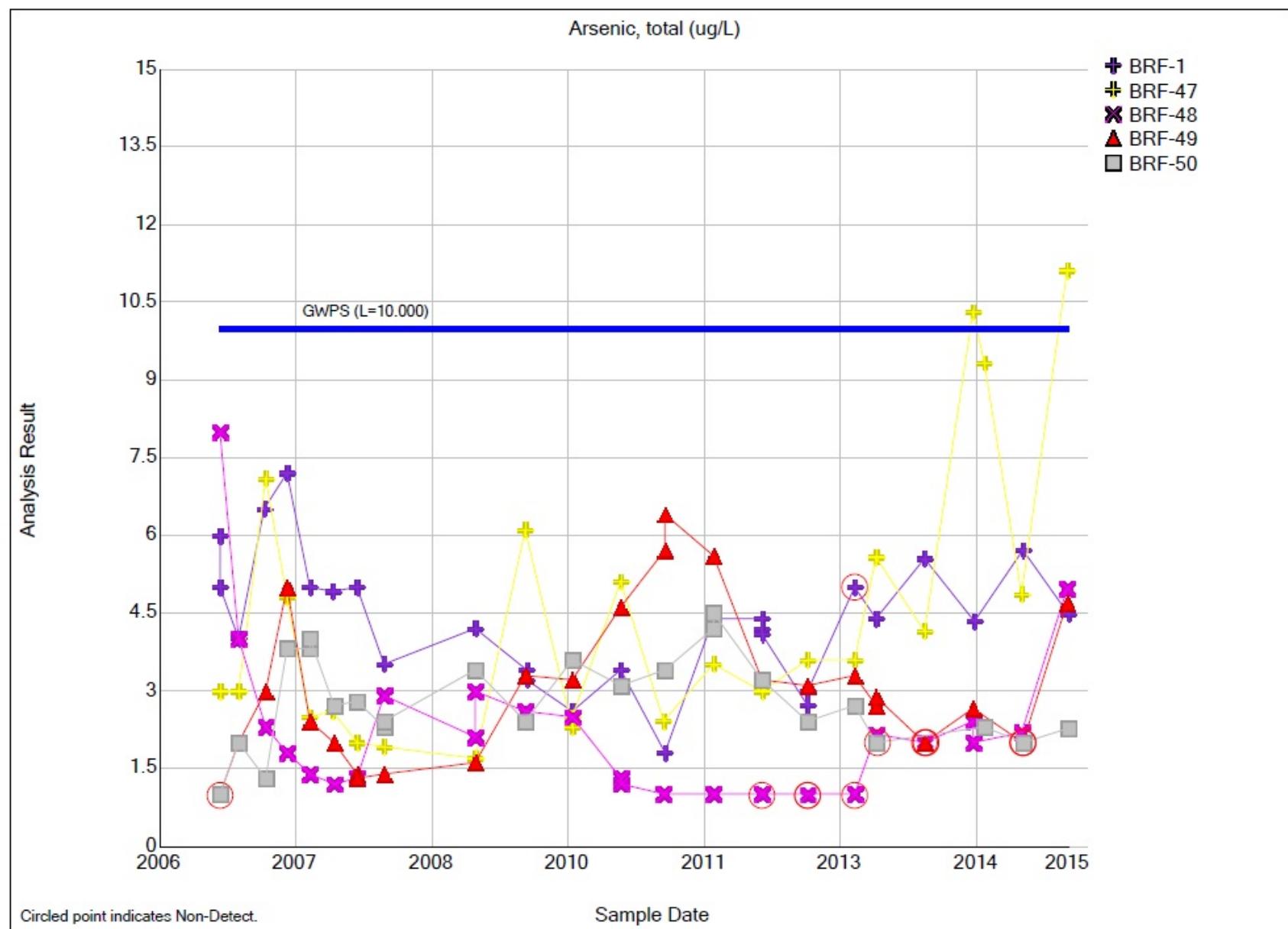
Table 3. August 17-19, 2015 Groundwater Monitoring Results (Inter-well)

Analytical Results for Appendix II Inorganic Constituents									Comparison to UPL ^a				
Parameter	Units	1	47	47 - Dup	48	49	50	UPL ^b	47	47 - Dup	48	49	50
		(upgradient)	(downgradient)	(downgradient)	(downgradient)	(downgradient)	(downgradient)		8/17/2015	8/17/2015	8/18/2015	8/17/2015	8/19/2015
Date Sampled		8/19/2015	8/17/2015	8/17/2015	8/18/2015	8/17/2015	8/19/2015						
Antimony	µg/L	<2	<2	<2	<2	<2	<2	2	L	L	L	L	L
Arsenic	µg/L	4.47	11.1	11.1	4.97	4.68	2.27	7.2	G	G	L	L	L
Barium	µg/L	2240	37.2	41.8	32	118	395	2240	L	L	L	L	L
Beryllium	µg/L	<2	<2	<2	<2	<2	<2	2	L	L	L	L	L
Cadmium	µg/L	<1	<1	<1	<1	<1	<1	1	L	L	L	L	L
Chromium	µg/L	<2	<2	<2	<2	<2	<2	19	L	L	L	L	L
Cobalt	µg/L	2.54	8.42	8.17	39.9	11.7	3.39	33.5	L	L	G	L	L
Copper	µg/L	<10	<10	<10	<10	<10	<10	10	L	L	L	L	L
Lead	µg/L	<2	<2	<2	<2	<2	<2	5	L	L	L	L	L
Mercury	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	L	L	L	L	L
Nickel	µg/L	<2	2.56	2.42	16	<2	2.26	20	L	L	L	L	L
Selenium	µg/L	<2	<2	<2	<2	<2	<2	10	L	L	L	L	L
Silver	µg/L	<5	<5	<5	<5	<5	<5	10	L	L	L	L	L
Thallium	µg/L	<2	<2	<2	<2	<2	<2	2	L	L	L	L	L
Vanadium	µg/L	<2	<2	<2	<2	<2	3.38	20	L	L	L	L	L
Zinc	µg/L	<25	64	65.2	<25	<25	<25	83	L	L	L	L	L
Turbidity	NTU	45	33	--	125	4.9	31						

a "L" = less than or equal to UPL, "G" = greater than UPL, "N/A" = Not Applicable

b - Established October 2015

NS - No sample collected due to damage to the well



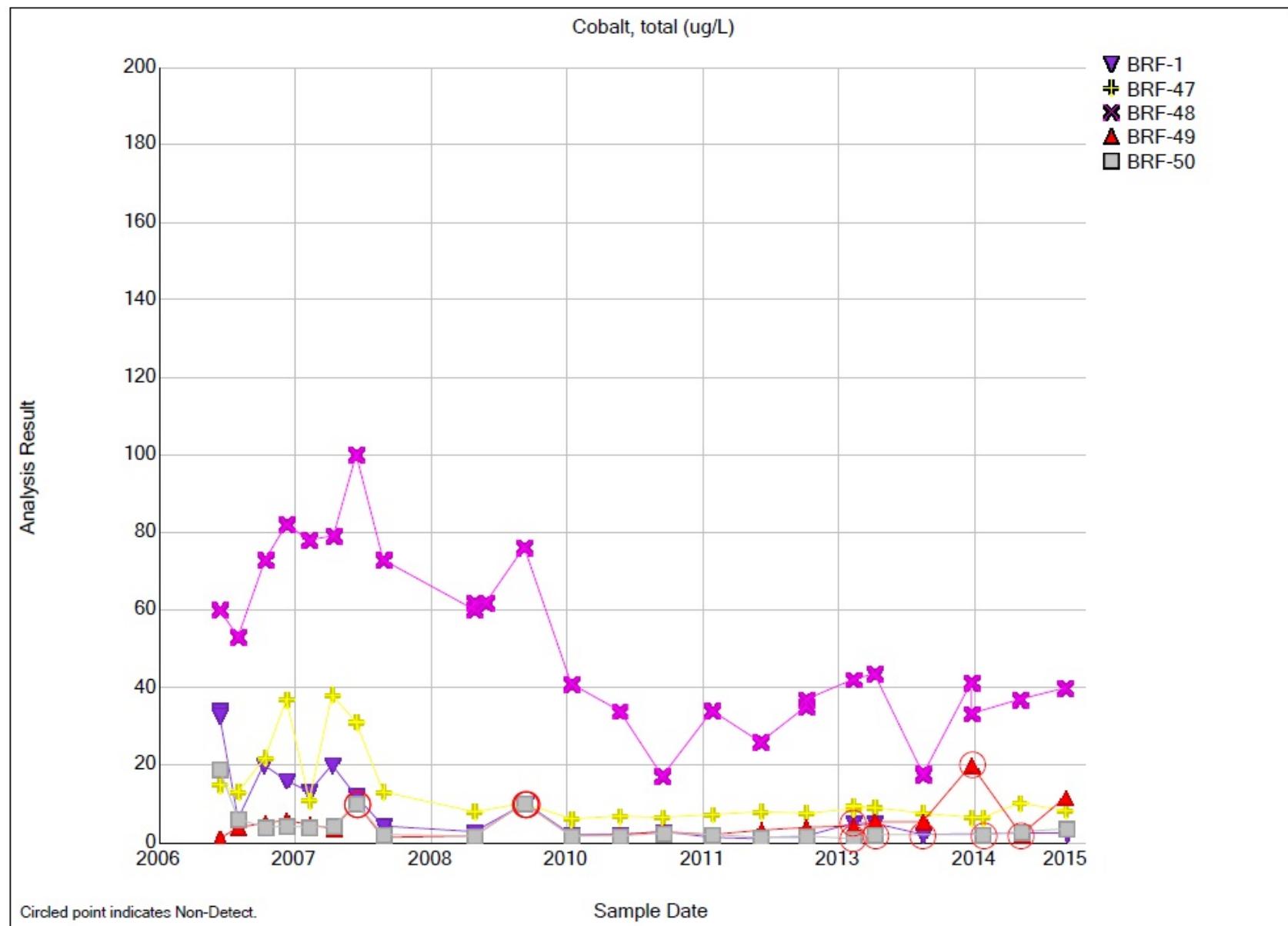


Figure 2. Cobalt Time Series for Gypsum/Coal-Ash Landfill Compliance Wells (2006-2015)

HYDROGEOLOGIC CONDITIONS

Groundwater levels were measured at monitoring wells on August 17 - 19, 2015 (Table 4). The groundwater potentiometric surface derived from these measurements is presented in Figure 3. Groundwater generally flows southwestward across the landfill indicating that well 1 is upgradient and wells 47 to 50 are downgradient of the landfill. The monitored aquifer is a shallow aquifer not utilized for drinking water; downgradient flow is on TVA property and ultimately discharges to the Clinch River. The hydraulic gradient between the eastern and western boundaries of the landfill is approximately 0.0151 feet/feet. The shallow bedrock groundwater system underlying the area exhibits a mean horizontal hydraulic conductivity³ of 3.60 ft/day. Conservatively assuming an effective porosity of 0.10, the local groundwater seepage velocity is estimated to be approximately 0.543 ft/day.

Table 4. August 17-19, 2015 Groundwater Level Measurements

Well No.	Top of Casing Elevation (ft-msl)	Depth to Water (ft)	Water Level Elevation (ft-msl)	Well Depth (ft)
1	830.09	27.17	802.92	42.29
47	808.69	12.86	795.83	39.90
48	808.01	10.30	797.70	39.21
49	802.89	7.58	795.31	37.30
50	802.76	8.76	794.00	38.52

CONCLUSIONS

Groundwater analytical data for the August 2015, assessment monitoring event indicates a groundwater exception issue compared to site GWPS for arsenic in the unfiltered Well 47 sample, but not for the filtered sample, indicating a potential turbidity-related impact/sample quality issue. Comparisons of analytical results to background UPL values indicate exceptions for arsenic in well 47 (again for the unfiltered samples only) and cobalt at well 48.

³ Julian, H. E. and J. M. Boggs. *Bull Run Fossil Plant, Hydrogeologic Evaluation of Coal-Combustion Byproduct Disposal Facility Expansion*, Report No. WR2004-2-49-117, Tennessee Valley Authority, River System Operations & Environment, Research & Technology Applications, Environmental Engineering Services – East, Knoxville, TN.

Examination of the time series plot for cobalt compiled from data over the past 8 years indicates a downward trend becoming more stable over the last 4 years. Cobalt concentrations have generally been stable or declining during the history of monitoring at well 48, from 2006 to current, including the period before the current Gypsum/Coal-Ash Landfill facility began storage in late 2008. There were no upward trends evident in time-series plots generated for the other sample constituents from this sampling event.

Review of historical data from upgradient well 1 shows several naturally occurring elemental constituents, including arsenic, have been detected at upgradient well. This well has also been prone to produce samples with high turbidity and TSS. This is an indication soil particulate matter has the possibility to impact laboratory results of samples collected from this site. TVA will continue to utilize sampling methods to help reduce turbidity in collected samples and will collect filtered samples as companions to regulatory required non-filtered samples. TVA is currently evaluating options to repair or replace wells 1 and 50 in conjunction with projects associated with the disposal facilities and will confer with TDEC regarding a path forward.

The next assessment monitoring event for the Landfill is scheduled for February 2016.

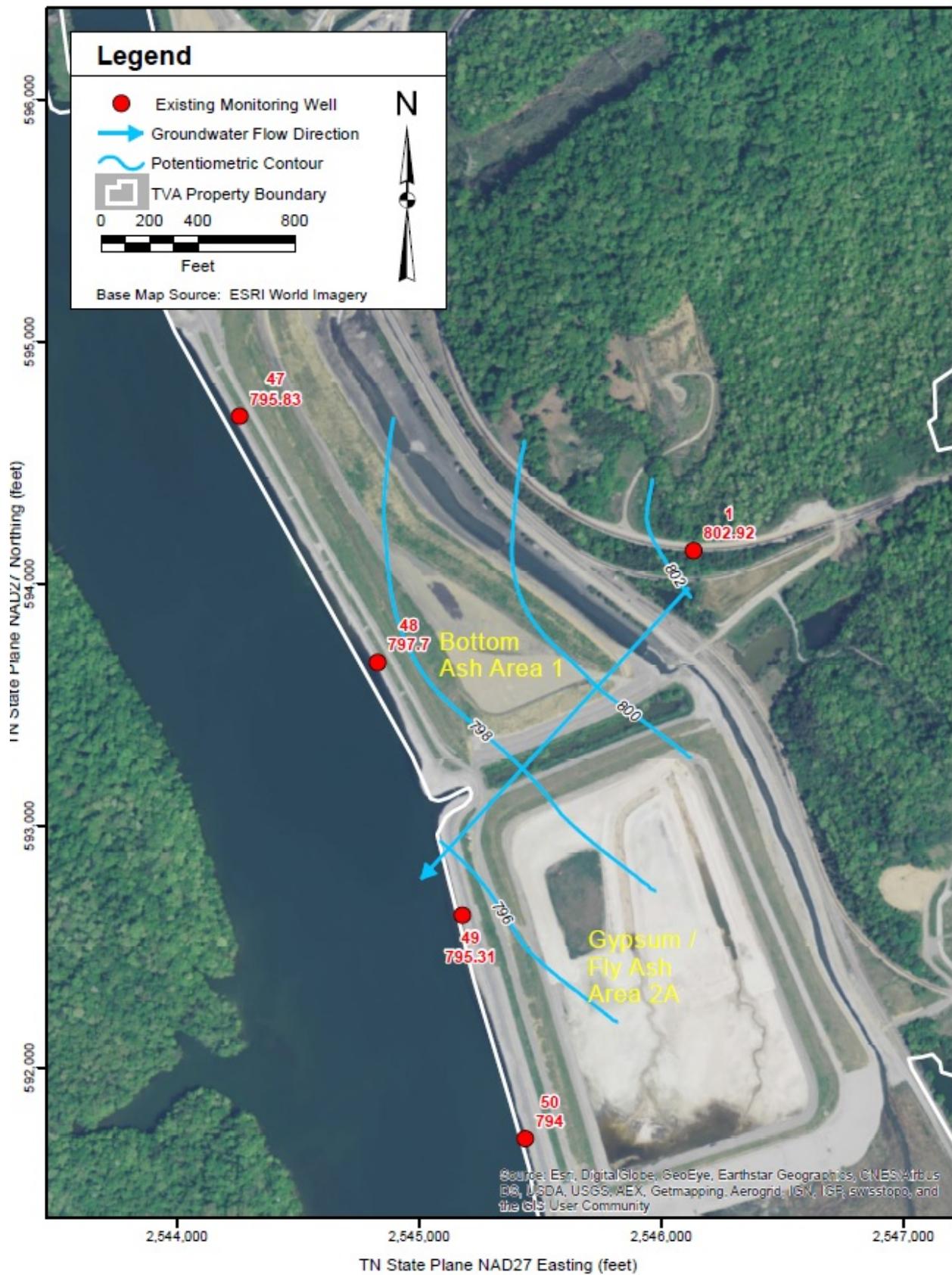


Figure 4. Groundwater Potentiometric Surface on August 17-19, 2015

APPENDIX A
FIELD DATA SHEETS

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Purge Date	Year <u>15</u>	Month <u>8</u>	Day <u>19</u>
------------	-------------------	-------------------	------------------

Project/Site Bull Run Ground Water - Gypsum Disposal Area				Well Number 1	84068	Purge Date 15	Year 8	Month 8	Day 19
Depth to Water (m) 8.19	Bottom of Well (m) 4195	Well Diameter (mm) 12.89	Survey Leader WFN	Field Crew <i>[Signature]</i>					
<input checked="" type="checkbox"/> Depth of Screen		<input type="checkbox"/> Open Bore Hole							
(m) 9.76	To 4191	(m) 12.80	Sample Label BRF-1- 0815	<input checked="" type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Both Filter Type and Size: 0.45 microns inline					
[Bottom of Well - Depth to Water] x Volume Factor =				Well Volume 38.5 (L)	Target Purge Volume N/A (L)		Actual Purge Volume 7.5 (L)		
[(12.89)m - (8.19)m] x (8.107)L/m =									

Purge Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____
Sample Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Remarks: _____

Reviewed By: Willy Niin Date: 8/20/15 Project Leader: Ami Kuhuz Date: 8/27/19
Survey Leader

Sample Collector: <u>WFN</u>			Sample Readings							
Sample Date			Time	11.5	17.3	7.1	0.1	473	151	45
Year	Month	Day	11/35	4192	10	400	300	94	90	
15	8	19	ET CT	Pump Depth (m)	Temp °C	pH (s.u.)	DO (mg/L)	COND (umhos/cm)	(+/-) ORP (mv)	Turbidity (NTU)
Pump Duration: 30 min			72004	Rate (L/min)	EPA 170.1	EPA 150.1	EPA 360.1	EPA 120.1	SM 2580B	EPA 180.1
"999" = 2 days				m/s						

Additional Sample Data									
Analyst:						Well Diameter (mm)	Vol. Factor (L/m)		
Date Analyzed		415	431	436	437	12.7	(0.5 in)	0.127	
Year 15	Month 8	Day 19	Phenol Alkalinity mg/L (EPA 310.1)	Total Alk. mg/L (EPA 310.1)	Mineral Acidity mg/L (EPA 305.1)	CO ₂ Acidity mg/L (EPA 305.1)	51	(2 in)	2.027
Turbidity 1350		<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Highly Turbid	Time: Initial:	Time: Initial:	Time: Initial:	Time: Initial:	76	(3 in)	4.560
		Bottles Required	<input type="checkbox"/> Ferrous <input type="checkbox"/> BOD <input type="checkbox"/> COD	<input type="checkbox"/> Mineral <input checked="" type="checkbox"/> Metals <input type="checkbox"/> TIC	<input type="checkbox"/> Phenol <input type="checkbox"/> Dis. Mineral <input type="checkbox"/> Nutrient	<input type="checkbox"/> Others (list): TOC Filt TIC TSS/TDS	102	(4 in)	8.107
			<input type="checkbox"/> Dis. Metals				127	(5 in)	12.668
							153	(6 in)	18.228
Color: orange									
Odor: none									

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 2

Project/Site Bull Run Ground Water - Gypsum Disposal Area	Well Number 47	84068	Purge Date 15	Year 8	Month 17	Day
--	-------------------	-------	------------------	--------	----------	-----

Depth to Water (m) 3.90	Bottom of Well (m) 4195	Well Diameter (mm) 51	Survey Leader WFN	Field Crew —
<input checked="" type="checkbox"/> Depth of Screen <input type="checkbox"/> Open Bore Hole				
(m) 6.38	To 4191	(m) 10.98	Sample Label BRF-47-0815	<input checked="" type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Both
		4190	BRF-47-0815-DUP	Filter Type and Size: 0.45 micron inline
[Bottom of Well - Depth to Water] x Volume Factor =		Well Volume 16.7 (L)	Target Purge Volume N/A (L)	Actual Purge Volume 36 (L)
[(12.16)m - (3.90)m] x (2.027)L/m =				4186

Purge Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Sample Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Notes and WQ Observations	Time ET CT	Pump Rate mL/min	Depth to Water (m)	Pump Depth (m)	Temp °C	pH (s.u.)	DO (mg/L)	COND (umhos/cm)	(+/-) ORP (mV)	Turbidity (NTU)
Begin Purge →	0940	400	3.90	9.0	20.7	6.6	2.4	1603	201	298
101	0945	400	3.98		18.4	6.8	2.0	1602	163	261
	0950	400	3.99		18.4	6.8	1.2	1606	171	216
	0955	400	3.99		18.3	6.8	0.7	1612	177	157
	1000	400	3.99		18.3	6.8	0.1	1615	180	129
	1005	400	3.99		18.3	6.8	0.1	1621	182	102
	1010	400	3.99		18.6	6.7	0.1	1620	183	90
98	1015	300	3.97		19.1	6.7	0.1	1623	186	86
96	1020	180	3.94		19.2	6.7	0.1	1635	189	116
	1025	180	3.94		19.6	6.8	0.1	1633	189	100
	1030	180	3.94		19.6	6.8	0.1	1635	189	114
101	1035	420	4.00		18.2	6.8	0.1	1634	189	71
	1040	420	4.00		18.2	6.7	0.1	1638	192	47
	1045	420	4.00		18.4	6.7	0.1	1643	193	42
	1050	420	4.00		18.3	6.7	0.1	1649	195	37

Remarks: Duplicates collected at well 47.

Reviewed By: Willie Phil Date 8/26/15 Project Leader Dr. Parker Date 8/27/19

Survey Leader

Date

Sample Collector:		Sample Readings								
		1115	420	9.0	18.2	6.7	0.1	1653	199	33
Year	Month	Day	4193	4192	10	400	300	94	90	
Analysis Time		Pump Rate (L/min)	Pump Depth (m)		Temp °C	pH (s.u.)	DO (mg/L)	COND (umhos/cm)	(+/-) ORP (mV)	Turbidity (NTU)
ET CT		m1	EPA		EPA	EPA	EPA	EPA 120.1	SM 2580B	EPA 180.1
Pump Duration:		90 min	72004		170.1	150.1	360.1			
"999" = 2 days										

Additional Sample Data

Analyst: <u>WFN</u>	/	166	168	/	99	100	Well Diameter (mm)	Vol. Factor (L/m)
Date Analyzed		415	431	436	437		12.7 (0.5 in)	0.127
Year 15	Month 8	Day 17					51 (2 in)	2.027
Turbidity 1350	<input type="checkbox"/> Clear						76 (3 in)	4.560
	<input checked="" type="checkbox"/> Slightly Turbid						102 (4 in)	8.107
	<input type="checkbox"/> Turbid						127 (5 in)	12.668
	<input type="checkbox"/> Highly Turbid						153 (6 in)	18.228
Color: <u>tan</u>		Bottles Required	<input type="checkbox"/> Ferrous	<input checked="" type="checkbox"/> Mineral	<input type="checkbox"/> Phenol	Others (list):		
Odor: <u>none</u>			<input type="checkbox"/> TOC	<input checked="" type="checkbox"/> Metals	<input type="checkbox"/> Dis. Mineral	<input type="checkbox"/> Filt TIC		
			<input type="checkbox"/> COD	<input checked="" type="checkbox"/> TIC	<input type="checkbox"/> Dis. Metals	<input type="checkbox"/> Nutrient	<input type="checkbox"/> TSS/TDS	

Preliminary Groundwater Data Field Worksheet

Project/Site
Bull Run Ground Water - Gypsum Disposal Area

Well Number

Sheet 1 of 2

Depth to Water (m) 3.90 4195	Bottom of Well (m) 12.16 4194	Well Diameter (mm) 51 4188	Survey Leader WFN	Field Crew <u> </u>
<input checked="" type="checkbox"/> Depth of Screen <input type="checkbox"/> Open Bore Hole				
(m) 6.38 4191		To	(m) 10.98 4190	Sample Label BRF-47-0815 BRF-47-0815-DUP
				<input checked="" type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Both Filter Type and Size: 0.45 micron inline
[Bottom of Well - Depth to Water] x Volume Factor =	Well Volume (L)		Target Purge Volume (L)	Actual Purge Volume (L)
[(12.16 - 3.90) m] x (2.027) L/m =	N/A			4186

Purge Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____
Sample Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Remarks: Duplicates collected at well 47.

Reviewed By: Willie Pink Date: 8/20/15 Project Leader _____ Date _____

Additional Sample Data							
Analyst:			166	168		99	100
Date Analyzed		415	431	436	437	Well Diameter (mm)	Vol. Factor (L/m)
Year 15	Month 8	Day 17	Phenol Alkalinity mg/L (EPA 310.1)	Total Alk. mg/L (EPA 310.1)	Mineral Acidity mg/L (EPA 305.1)	CO ₂ Acidity mg/L (EPA 305.1)	12.7 (0.5 in) 0.127
Turbidity 1350	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Highly Turbid		Time: Initial:	Time: 1529 / 1531 Initial: <i>nh nh</i>	Time: Initial:	Time: 11:00 / 16:00 Initial: <i>nh nh</i>	51 (2 in) 2.027 76 (3 in) 4.560 102 (4 in) 8.107 127 (5 in) 12.668 153 (6 in) 18.228
Color: tan	Bottles Required	<input type="checkbox"/> BOD	<input type="checkbox"/> TOC	<input type="checkbox"/> Mineral	<input type="checkbox"/> Phenol	Others (list): _____	
Odor: none		<input type="checkbox"/> COD	<input checked="" type="checkbox"/> TIC	<input checked="" type="checkbox"/> Ferrous	<input type="checkbox"/> Dis. Mineral	<input type="checkbox"/> Filt TIC	
				<input checked="" type="checkbox"/> Metals	<input type="checkbox"/> Nutrient	<input type="checkbox"/> TSS/TDS	
				<input type="checkbox"/> Dis. Metals			

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 2

Project/Site Bull Run Ground Water - Gypsum Disposal Area	Well Number 48	Purge Date 15 8 18
--	-------------------	-----------------------

Depth to Water (m) 3.15	Bottom of Well (m) 4195	Well Diameter (mm) 51	Survey Leader WFN	Field Crew <i>wh</i>
<input checked="" type="checkbox"/> Depth of Screen		<input type="checkbox"/> Open Bore Hole		
(m) 5.99	To 4191	(m) 12.09	Sample Label BRF-48- 08/15	<input checked="" type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Both Filter Type and Size: 0.45 micron inline
[Bottom of Well - Depth to Water] x Volume Factor =		Well Volume 17.8 (L)	Target Purge Volume N/A (L)	Actual Purge Volume 20.3 (L) 4186
[(11.95)m - (3.15)m] x (2.027)L/m =				

Purge Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Sample Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Notes and WQ Observations	Time <i>ET CT</i>	Pump Rate m ³ /min	Depth to Water (m)	Pump Depth (m)	Temp °C	pH (s.u.)	DO (mg/L)	COND (umhos/cm)	(+/-) ORP (mV)	Turbidity (NTU)
Begin Purge →	0930	150	3.15	10.5	20.9	6.3	2.1	2664	218	160
97	0935	150	3.50		20.6	6.1	1.4	2605	230	145
	0940	150	3.74		20.6	6.0	1.1	2673	237	116
	0945	150	3.90		20.4	6.0	1.0	2670	240	101
	0950	150	4.05		20.4	5.9	0.9	2667	242	103
	0955	150	4.25		20.2	5.9	0.8	2670	244	117
	1000	150	4.38		20.2	5.9	0.7	2671	245	139
	1005	150	4.48		20.1	5.9	1.1	2662	248	174
	1010	150	4.59		19.8	5.9	0.7	2661	247	192
	1015	150	4.73		19.5	5.9	0.5	2664	247	198
	1020	150	4.86		19.6	5.9	0.3	2663	245	208
	1025	150	5.00		19.7	5.9	0.4	2657	243	227
	1030	150	5.09		19.8	5.9	0.5	2664	245	223
	1035	150	5.17		20.1	5.9	0.6	2673	241	217
	1040	150			19.9	5.9	0.4	2668	239	213

Remarks: _____

Reviewed By:

Welle-Niel 8/20/15

Survey Leader

Date

Dr. Puhay

8/27/14

Date

Sample Collector:	<i>WFN</i>
Sample Date	Time
Year Month Day	1145 CT
15 8 18	

Pump Duration: 135 min
72004
"999" = 2 days

Sample Readings							
1145	150	10.5	19.8	5.9	0.1	2659	230 125
Analysis Time	4193	4192	10	400	300	94	90
Time	ET CT	Pump Rate m ³ /min	pH	Temp °C	DO mg/L	COND umhos/cm	(+/-) ORP (mv)
		m ³ /min	EPA	EPA	EPA	EPA 120.1	SM 2580B
			170.1	150.1	360.1		EPA 180.1

Additional Sample Data

Analyst:	<i>WFN</i>	268	519	Well Diameter (mm)	Vol. Factor (L/m)
Date Analyzed	415	431	436	437	12.7 (0.5 in) 0.127
Year Month Day	15 8 18				51 (2 in) 2.027
Turbidity 1350	<input type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Highly Turbid	Phenol Alkalinity mg/L (EPA 310.1)	Total Alk. mg/L (EPA 310.1)	Mineral Acidity mg/L (EPA 305.1)	CO ₂ Acidity mg/L (EPA 305.1)
Initial:	Initial: <i>mln</i>	Time: 1438	Time: <i>mln</i>	Time: <i>mln</i>	102 (4 in) 8.107
Bottles Required	<input type="checkbox"/> Ferrous <input type="checkbox"/> BOD <input type="checkbox"/> COD	<input type="checkbox"/> Metals <input type="checkbox"/> TOC <input type="checkbox"/> TIC	<input type="checkbox"/> Mineral <input type="checkbox"/> Dis. Mineral <input type="checkbox"/> Dis. Metals	<input type="checkbox"/> Phenol <input type="checkbox"/> Filt TIC <input type="checkbox"/> Nutrient	Others (list): <input checked="" type="checkbox"/> TSS/TDS

Preliminary Groundwater Data Field Worksheet

Sheet 2 of 2

Project/Site <u>BULL RUN FOSSIL-Gypsum</u>	Well Number <u>48</u>	84068	Purge Date <u>15</u>	Year <u>15</u>	Month <u>8</u>	Day <u>18</u>
---	--------------------------	-------	-------------------------	-------------------	-------------------	------------------

Depth to Water (m) <u>3.15</u>	Bottom of Well (m) <u>4194</u>	Well Diameter (mm) <u>4188</u>	Survey Leader <u>WFN</u>	Field Crew _____	
<input checked="" type="checkbox"/> Depth of Screen <input type="checkbox"/> Open Bore Hole					
<u>5.99</u>	(m) To <u>4191</u>	(m) <u>12.09</u>	4190	Sample Label <u>BRF-48-0815</u>	
			<input type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Both	Filter Type and Size: <u>0.45 micron inline</u>	
[Bottom of Well - Depth to Water] x Volume Factor =			Well Volume <u>17.8</u> (L)	Target Purge Volume <u>N/A</u> (L)	Actual Purge Volume <u>20.3</u> (L)
[(<u>5.99</u>)m - (<u>3.15</u>)m] x (<u>2.027</u>)L/m =					
Purge Pump:	<input checked="" type="checkbox"/> Bladder <input type="checkbox"/> Centrifugal <input type="checkbox"/> Peristaltic <input type="checkbox"/> Dedicated	Other (list): _____			
Sample Pump:	<input checked="" type="checkbox"/> Bladder <input type="checkbox"/> Centrifugal <input type="checkbox"/> Peristaltic <input type="checkbox"/> Dedicated	Other (list): _____			

Notes and WQ Observations	Time (EP CT)	Pump Rate (L/min)	Depth to Water (m)	Pump Depth (m)	Temp °C	pH (s.u.)	DO (mg/L)	COND (umhos/cm)	(+/-) ORP (mV)	Turbidity (NTU)
Begin Purge →	1045	150	5.35	10.5	19.6	5.9	0.2	2666	239	208
	1050	150	5.49	19.6	5.9	0.2	2664	238	209	
	1055	150	5.59	19.6	5.9	0.1	2663	237	198	
	1100	150	5.67	19.7	5.9	0.1	2661	239		
	1105	150	5.76	19.8	5.9	0.1	2659	246	192	
	1110	150		19.7	5.9	0.1	2656	239	185	
	1115	150	5.95	19.5	5.9	0.1	2655	236	171	
	1120	150	6.02	19.5	5.9	0.1	2654	235	163	
	1125	150	6.11	19.5	5.9	0.1	2653	234	146	
	1130	150	6.15	19.6	5.9	0.1	2655	233	137	
	1135	150	6.18	19.7	5.9	0.1	2658	233	128	
	1140	150	6.18	19.7	5.9	0.1	2656	232	122	
	1145	150	6.21	19.8	5.9	0.1	2659	230	125	

Remarks: _____

Reviewed By: Willie Kivil 8/20/15 Project Leader Karen Pukuy 8/27/14
 Survey Leader Date Date

Sample Collector: <u>WFN</u>		Sample Readings										
Sample Date Time		1145	150	4192	10	400	300	94	90	2059	230	125
Year	Month	Day	4193	Pump Rate (L/min)	Temp °C	pH (s.u.)	DO (mg/L)	COND (umhos/cm)	(+/-) ORP (mV)	SM 2580B	Turbidity (NTU)	EPA 120.1
15	8	18	CT									
Pump Duration: 135 min		72004	"999" = 2 days									

Additional Sample Data												
Analyst: <u>WFN</u>			268			519			Well Diameter (mm)		Vol. Factor (L/m)	
Date Analyzed	415	431	436	437	12.7	(0.5 in)	0.127					
Year	15	Month	8	Day	18							
Turbidity 1350	<input type="checkbox"/> Clear	<input type="checkbox"/> Slightly Turbid	<input checked="" type="checkbox"/> Turbid	<input type="checkbox"/> Highly Turbid	Phenol Alkalinity mg/L (EPA 310.1)	Total Alk. mg/L (EPA 310.1)	Mineral Acidity mg/L (EPA 305.1)	CO ₂ Acidity mg/L (EPA 305.1)	51	(2 in)	2.027	
					Time: 1430	Time: 1430	Time: 1430	Time: 1430	76	(3 in)	4.560	
					Initial: <u>uh</u>	Initial: <u>uh</u>	Initial: <u>uh</u>	Initial: <u>uh</u>	102	(4 in)	8.107	
									127	(5 in)	12.668	
									153	(6 in)	18.228	
Color: orange	Bottles Required	<input type="checkbox"/> Ferrous	<input type="checkbox"/> Mineral	<input type="checkbox"/> Phenol	Others (list):							
Odor: none	<input type="checkbox"/> BOD	<input type="checkbox"/> TOC	<input checked="" type="checkbox"/> Metals	<input type="checkbox"/> Dis. Mineral	<input type="checkbox"/> Filt TIC							
	<input type="checkbox"/> COD	<input type="checkbox"/> TIC	<input checked="" type="checkbox"/> Dis. Metals	<input type="checkbox"/> Nutrient	<input checked="" type="checkbox"/> TSS/TDS							

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Project/Site	Well Number	Purge Date	Year	Month	Day
Bull Run Ground Water - Gypsum Disposal Area	49	84068	15	8	17

Depth to Water (m) 2.33	Bottom of Well (m) 4195	Well Diameter (mm) 11.37	Survey Leader WFN	Field Crew _____	
<input checked="" type="checkbox"/> Depth of Screen		<input type="checkbox"/> Open Bore Hole			
(m) 5.20		To	(m) 11.30	Sample Label BRF-49-0815	
4191			4190	<input checked="" type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input type="checkbox"/> Both Filter Type and Size:	
[Bottom of Well - Depth to Water] x Volume Factor =			Well Volume	Target Purge Volume	Actual Purge Volume
[(11.37 - 2.33)m] x (2.027)L/m =			18.3 (L)	N/A (L)	23.1 (L)

Purge Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____
Sample Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Remarks:

Reviewed By:

Willa-Neil

8/20/15 Date

Dimitri Lukhuy
Project Leader

8/27/19 Date

Additional Sample Data							
Analyst:			289		98	Well Diameter (mm)	Vol. Factor (L/m)
Date Analyzed			415	431	436	437	12.7 (0.5 in) 0.127
Year 15	Month 8	Day 17	Phenol Alkalinity mg/L (EPA 310.1)	Total Alk. mg/L (EPA 310.1)	Mineral Acidity mg/L (EPA 305.1)	CO ₂ Acidity mg/L (EPA 305.1)	51 (2 in) 2.027
Turbidity 1350			<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Highly Turbid	Time: 1550	Time: 1556	Time: 1559	76 (3 in) 4.560
			Initial: n/a	Initial: n/a	Initial: n/a	102 (4 in) 8.107	
			Bottles Required	<input type="checkbox"/> Ferrous <input type="checkbox"/> Metals <input type="checkbox"/> Dis. Metals	<input type="checkbox"/> Mineral <input type="checkbox"/> Dis. Mineral <input type="checkbox"/> Nutrient	<input type="checkbox"/> Phenol <input type="checkbox"/> Filt TIC <input type="checkbox"/> TSS/TDS	Others (list): _____
Color: none			<input type="checkbox"/> BOD <input type="checkbox"/> COD	<input type="checkbox"/> TOC <input type="checkbox"/> TIC			
Odor: none							

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Project/Site	Well Number	Purge Date	Year	Month	Day
Bull Run Ground Water - Gypsum Disposal Area	50 84068	15 8 19			

Depth to Water (m) 2.68	Bottom of Well (m) 4195	Well Diameter (mm) 11.74	Survey Leader WFN	Field Crew <i>wa</i>		
<input checked="" type="checkbox"/> Depth of Screen		<input type="checkbox"/> Open Bore Hole				
(m)		To	(m)	Sample Label BRF-50-08/S		
5.64	4191	11.73	4190	<input checked="" type="checkbox"/> Unfiltered <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Both Filter Type and Size: <i>0.45 micron inline</i>		
[Bottom of Well - Depth to Water]	x	Volume Factor	=	Well Volume	Target Purge Volume	Actual Purge Volume
[(11.74 - 2.68) m]	x	(2.027) L/m	=	18.4 (L)	55.1 (L)	68 (L)

Purge Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____
Sample Pump: Bladder Centrifugal Peristaltic Dedicated Other (list): _____

Remarks:

Reviewed By: Weller, Neil 8/26/15
Survey Leader Date

Tim Lukes 8/27/19
Project Leader Date

Sample Collector:	WTFN		
Sample Date			Time
Year 15	Month 8	Day 19	1020 ET CT
Pump Duration:	50		min 72004
"999" = 2 days			

Sample Readings							
1020	1.0	8.0	17.4	7.5	0.1	1117	106
	4193	4192	10	400	300	94	90
Analysis Time ET CT	Pump Rate (ml/min)	Pump Depth (m)	Temp °C EPA	pH (s.u.) EPA	DO (mg/L) EPA	COND (umhos/cm) EPA 120.1	(+/-) ORP (mv) SM 2580B
			170.1	150.1	360.1		Turbidity (NTU) EPA 180.1

Additional Sample Data							
Analyst:			610	169		Well Diameter (mm)	Vol. Factor (L/m)
Date Analyzed			415	431	436	437	12.7 (0.5 in) 0.127
Year 15	Month 8	Day 14	Phenol Alkalinity mg/L (EPA 310.1)	Total Alk. mg/L (EPA 310.1)	Mineral Acidity mg/L (EPA 305.1)	CO ₂ Acidity mg/L (EPA 305.1)	51 (2 in) 2.027
Turbidity 1350	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Highly Turbid		Time: Initial: <i>1515</i>	Time: Initial: <i>1515</i>	Time: Initial: <i>1515</i>	Time: Initial: <i>1515</i>	76 (3 in) 4.560
Color: <i>none</i>			Bottles Required	<input type="checkbox"/> Ferrous <input checked="" type="checkbox"/> Metals <input type="checkbox"/> COD <input type="checkbox"/> TIC	<input type="checkbox"/> Mineral <input checked="" type="checkbox"/> Dis. Mineral <input type="checkbox"/> Nutrient	<input type="checkbox"/> Phenol <input checked="" type="checkbox"/> Filt TIC <input checked="" type="checkbox"/> TSS/TDS	Others (list): _____
Odor: <i>slight sulfur</i>							

APPENDIX B
SAMPLE CUSTODY RECORD

TestAmerica Nashville

2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

9/8/2015

Client Information		Sampler: William Nichols		Lab PM: Lage, Gail		Carrier Tracking No(s):		COC No: 490-41806-8056.1		
Client Contact: Amos Smith		Phone: 865-673-2307		E-Mail: gail.lage@testamericainc.com				Page: Page 1 of 1		
Company: Tennessee Valley Authority								Job #:		
Address: 1101 Market Street		Due Date Requested: Standard				Analysis Requested		Preservation Codes:		
City: Chattanooga		TAT Requested (days):						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 - Na2S2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
State, Zip: Tennessee, 37402		PO #:						Other:		
Phone: 423-751-7636		WO #:								
Email: alsmith3@tva.gov		Project #: 49002462								
Project Name: BRF Gypsum Disposal Area		SSOW#:								
Site: Tennessee										
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab) <small>B=Timeair, A=Air</small>	Matrix (W=water, S=solid, O=waste/oil, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Total Number of containers	Special Instructions/Note:	
BRF-1-0815		8/19/15	11:35	G	Water	X	D N N		6010-Ba, Be, Cu, Ag, V, Zn	
BRF-47-0815		8/17/15	11:15	G	Water	X	X X X X	1	6020 - Sb, As, Be, Cd, Cr, Co, Pb, Ni, Se, Ti, V, Zn	
BRF-48-0815		8/18/15	11:45	G	Water	X	X X X X	2		
BRF-49-0815		8/17/15	13:30	G	Water		X X X X	3		
BRF-50-0815		8/19/15	10:20	G	Water	X	X X X X	4		
BRF-GYPEQ Blank-0815		8/18/15	09:10	G	Water		X X X X	5		
BRF-47-0815-DUP		8/17/15	11:15	G	Water	X	X X X X	6		
Possible Hazard Identification		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)								
<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"/> Radiological		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months								
Deliverable Requested: I, II, III, IV, Other (specify)						Special Instructions/QC Requirements:				
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:				
Relinquished by: <i>William Nichols</i>		Date/Time: 8/20/2015 / 10:00		Company: TVA		Received by: <i>UR HAN 1-7</i>		Date/Time: 08/21/15 09:20		Company: TVA
Relinquished by:		Date/Time:		Company		Received by:		Date/Time:		Company
Relinquished by:		Date/Time:		Company		Received by:		Date/Time:		Company
Custody Seals Intact: △ Yes △ No		Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks: 17				

TestAmerica Nashville

2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL SERVICES

9/8/2015

Client Information		Sampler: William Nichols		Lab PM: Lage, Gail		Carrier Tracking No(s):		COC No: 490-41806-8056.1	
Client Contact: Amos Smith		Phone: 865-673-2307		E-Mail: gail.lage@testamericainc.com				Page: Page 1 of 1	
Company: Tennessee Valley Authority								Job #:	
Address: 1101 Market Street		Due Date Requested: Standard						Preservation Codes:	
City: Chattanooga		TAT Requested (days):						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 - Na2S2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)
State, Zip: Tennessee, 37402		PO #:						Other:	
Phone: 423-751-7636		WO #:							
Email: alsmith3@tva.gov		Project #: 49002462							
Project Name: BRF Gypsum Disposal Area		SSOW#:							
Site: Tennessee									
Sample Identification		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)	Total Number of containers	Special Instructions/Note:
BRF-1-0815		8/19/15	11:35	G	Water	X	X X X	1	6010-Ba, Be, Cu, Ag, V, Zn
BRF-47-0815		8/17/15	11:15	G	Water	X	X X X	2	6020 - Sb, As, Be, Cd, Cr, Co, Pb, Ni, Se, Ti, V, Zn
BRF-48-0815		8/18/15	11:45	G	Water	X	X X X	3	
BRF-49-0815		8/17/15	13:30	G	Water		X X X	4	
BRF-50-0815		8/19/15	10:20	G	Water	X	X X X	5	
BRF-GYPEQ Blank-0815		8/18/15	09:10	G	Water		X X X	6	
BRF-47-0815-DUP		8/17/15	11:15	G	Water	X	X X X	7	
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)			
<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"/> Radiological						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Deliverable Requested: I, II, III, IV, Other (specify)						Special Instructions/QC Requirements:			
Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:					
Relinquished by: <i>Welden-Niel</i>		Date/Time: 8/20/2015 / 10:00	Company TVA	Received by: <i>CO/TAN 12</i>	Date/Time: <i>08/20/15 10:00</i>	Company TAN			
Relinquished by:		Date/Time:	Company	Received by:	Date/Time:	Company			
Relinquished by:		Date/Time:	Company	Received by:	Date/Time:	Company			
Custody Seals Intact: △ Yes △ No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: <i>1.7</i>					

APPENDIX C
LABORATORY DATA SHEETS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Nashville

2960 Foster Creighton Drive

Nashville, TN 37204

Tel: (615)726-0177

TestAmerica Job ID: 490-85759-1

Client Project/Site: BRF Gypsum Disposal Area

For:

Tennessee Valley Authority

PO BOX 15500

Knoxville, Tennessee 37901

Attn: Amos Smith

Gail Lage

Authorized for release by:

9/8/2015 4:49:27 PM

Gail Lage, Senior Project Manager

(615)301-5741

gail.lage@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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Sample Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-85759-1	BRF-1-0815	Water	08/19/15 11:35	08/21/15 09:20
490-85759-2	BRF-47-0815	Water	08/17/15 11:15	08/21/15 09:20
490-85759-3	BRF-48-0815	Water	08/18/15 11:45	08/21/15 09:20
490-85759-4	BRF-49-0815	Water	08/17/15 13:30	08/21/15 09:20
490-85759-5	BRF-50-0815	Water	08/19/15 10:20	08/21/15 09:20
490-85759-6	BRF-GYPEQ Blank-0815	Water	08/18/15 09:10	08/21/15 09:20
490-85759-7	BRF-47-0815-DUP	Water	08/17/15 11:15	08/21/15 09:20

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TestAmerica Nashville

Case Narrative

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Job ID: 490-85759-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-85759-1

Comments

No additional comments.

Receipt

The samples were received on 8/21/2015 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.2° C and 1.7° 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.

Definitions/Glossary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.

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)

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-1-0815

Date Collected: 08/19/15 11:35

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-1

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.108		0.100		mg/L			08/30/15 02:33	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	2.24		0.0100		mg/L		08/26/15 09:30	08/27/15 13:48	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 13:48	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 13:48	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 13:48	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 13:48	1
Zinc	ND		0.0500		mg/L		08/26/15 09:30	08/27/15 13:48	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	2.24		0.0100		mg/L		08/27/15 11:31	08/30/15 00:42	1
Beryllium	ND		0.00400		mg/L		08/27/15 11:31	08/30/15 00:42	1
Copper	ND		0.0100		mg/L		08/27/15 11:31	08/30/15 00:42	1
Silver	ND		0.00500		mg/L		08/27/15 11:31	08/30/15 00:42	1
Vanadium	ND		0.0200		mg/L		08/27/15 11:31	08/30/15 00:42	1
Zinc	ND		0.0500		mg/L		08/27/15 11:31	08/30/15 00:42	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Arsenic	0.00447		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 13:56	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Cobalt	0.00254		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Nickel	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 17:37	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:56	1
Zinc	ND		0.0250		mg/L		08/25/15 11:44	08/26/15 13:56	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Arsenic	0.00317		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Beryllium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Cadmium	ND		0.00100		mg/L		08/26/15 09:20	08/26/15 17:56	1
Chromium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Cobalt	0.00216		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Lead	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Nickel	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Selenium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Thallium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Vanadium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 17:56	1
Zinc	ND		0.0250		mg/L		08/26/15 09:20	08/26/15 17:56	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-1-0815

Date Collected: 08/19/15 11:35

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-1

Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/31/15 16:00	09/01/15 10:48	1

Method: 7470A - Mercury (Dissolved) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/30/15 15:38	08/31/15 20:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	131		4.00		mg/L	D		08/22/15 12:00	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-47-0815

Date Collected: 08/17/15 11:15

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-2

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.233		0.100		mg/L			08/28/15 21:12	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0372		0.0100		mg/L		08/26/15 09:30	08/27/15 13:52	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 13:52	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 13:52	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 13:52	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 13:52	1
Zinc	0.0850		0.0500		mg/L		08/26/15 09:30	08/27/15 13:52	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0405		0.0100		mg/L		08/27/15 11:31	08/30/15 00:47	1
Beryllium	ND		0.00400		mg/L		08/27/15 11:31	08/30/15 00:47	1
Copper	ND		0.0100		mg/L		08/27/15 11:31	08/30/15 00:47	1
Silver	ND		0.00500		mg/L		08/27/15 11:31	08/30/15 00:47	1
Vanadium	ND		0.0200		mg/L		08/27/15 11:31	08/30/15 00:47	1
Zinc	0.0805		0.0500		mg/L		08/27/15 11:31	08/30/15 00:47	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Arsenic	0.0111		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 15:28	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Cobalt	0.00842		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Nickel	0.00256		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 18:13	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:28	1
Zinc	0.0640		0.0250		mg/L		08/25/15 11:44	08/26/15 15:28	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Arsenic	0.00513		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Beryllium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Cadmium	ND		0.00100		mg/L		08/26/15 09:20	08/26/15 18:21	1
Chromium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Cobalt	0.00808		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Lead	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Nickel	0.00229		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Selenium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Thallium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Vanadium	ND		0.00200		mg/L		08/26/15 09:20	08/26/15 18:21	1
Zinc	0.0605		0.0250		mg/L		08/26/15 09:20	08/26/15 18:21	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-47-0815

Lab Sample ID: 490-85759-2

Date Collected: 08/17/15 11:15

Matrix: Water

Date Received: 08/21/15 09:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/31/15 16:00	09/01/15 10:50	1

Method: 7470A - Mercury (Dissolved) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/30/15 15:38	08/31/15 20:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	10.3		1.00		mg/L	D		08/22/15 12:00	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-48-0815

Date Collected: 08/18/15 11:45

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-3

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.158		0.100		mg/L			08/28/15 21:36	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0320		0.0100		mg/L		08/26/15 09:30	08/27/15 13:57	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 13:57	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 13:57	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 13:57	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 13:57	1
Zinc	ND		0.0500		mg/L		08/26/15 09:30	08/27/15 13:57	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0303		0.0100		mg/L		08/27/15 11:31	08/30/15 00:10	1
Beryllium	ND		0.00400		mg/L		08/27/15 11:31	08/30/15 00:10	1
Copper	ND		0.0100		mg/L		08/27/15 11:31	08/30/15 00:10	1
Silver	ND		0.00500		mg/L		08/27/15 11:31	08/30/15 00:10	1
Vanadium	ND		0.0200		mg/L		08/27/15 11:31	08/30/15 00:10	1
Zinc	ND		0.0500		mg/L		08/27/15 11:31	08/30/15 00:10	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Arsenic	0.00497		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 15:33	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Cobalt	0.0399		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Nickel	0.0160		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 18:18	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:33	1
Zinc	ND		0.0250		mg/L		08/25/15 11:44	08/26/15 15:33	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Arsenic	0.00294		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Beryllium	ND		0.00200		mg/L		08/28/15 10:37	09/03/15 12:12	1
Cadmium	ND		0.00100		mg/L		08/28/15 10:37	09/02/15 23:06	1
Chromium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Cobalt	0.0352		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Lead	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Nickel	0.0154		0.00200		mg/L		08/28/15 10:37	09/03/15 12:12	1
Selenium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Thallium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Vanadium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:06	1
Zinc	ND		0.0250		mg/L		08/28/15 10:37	09/02/15 23:06	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-48-0815

Lab Sample ID: 490-85759-3

Date Collected: 08/18/15 11:45

Matrix: Water

Date Received: 08/21/15 09:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/31/15 16:00	09/01/15 10:52	1

Method: 7470A - Mercury (Dissolved) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/31/15 16:08	08/31/15 21:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	58.8		4.00		mg/L	D		08/22/15 12:00	1

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-49-0815

Date Collected: 08/17/15 13:30

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-4

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.01		0.100		mg/L			08/28/15 23:12	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.118		0.0100		mg/L		08/26/15 09:30	08/27/15 14:11	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 14:11	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 14:11	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 14:11	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 14:11	1
Zinc	ND		0.0500		mg/L		08/26/15 09:30	08/27/15 14:11	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Arsenic	0.00468		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 15:38	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Cobalt	0.0117		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Nickel	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 18:23	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:38	1
Zinc	ND		0.0250		mg/L		08/25/15 11:44	08/26/15 15:38	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L		08/31/15 16:00	09/01/15 11:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	5.80		1.00		mg/L			08/22/15 12:00	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-50-0815

Date Collected: 08/19/15 10:20

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-5

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.120		0.100		mg/L			08/30/15 02:57	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.395		0.0100		mg/L		08/26/15 09:30	08/27/15 14:16	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 14:16	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 14:16	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 14:16	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 14:16	1
Zinc	ND		0.0500		mg/L		08/26/15 09:30	08/27/15 14:16	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.357		0.0100		mg/L		08/27/15 11:31	08/30/15 00:51	1
Beryllium	ND		0.00400		mg/L		08/27/15 11:31	08/30/15 00:51	1
Copper	ND		0.0100		mg/L		08/27/15 11:31	08/30/15 00:51	1
Silver	ND		0.00500		mg/L		08/27/15 11:31	08/30/15 00:51	1
Vanadium	ND		0.0200		mg/L		08/27/15 11:31	08/30/15 00:51	1
Zinc	ND		0.0500		mg/L		08/27/15 11:31	08/30/15 00:51	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Arsenic	0.00227		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 15:43	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Cobalt	0.00339		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Nickel	0.00226		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 18:28	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Vanadium	0.00338		0.00200		mg/L		08/25/15 11:44	08/26/15 15:43	1
Zinc	ND		0.0250		mg/L		08/25/15 11:44	08/26/15 15:43	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Arsenic	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Beryllium	ND		0.00200		mg/L		08/28/15 10:37	09/07/15 17:03	1
Cadmium	ND		0.00100		mg/L		08/28/15 10:37	09/02/15 23:11	1
Chromium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Cobalt	0.00218		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Lead	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Nickel	ND		0.00200		mg/L		08/28/15 10:37	09/07/15 17:03	1
Selenium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Thallium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Vanadium	ND		0.00200		mg/L		08/28/15 10:37	09/02/15 23:11	1
Zinc	ND		0.0250		mg/L		08/28/15 10:37	09/02/15 23:11	1

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-50-0815

Date Collected: 08/19/15 10:20

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-5

Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	F1	0.000200		mg/L		08/30/15 15:03	08/31/15 19:19	1

Method: 7470A - Mercury (Dissolved) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L		08/31/15 16:08	08/31/15 21:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	55.4		2.00		mg/L			08/22/15 12:00	1

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-GYPEQ Blank-0815

Date Collected: 08/18/15 09:10

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-6

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100		mg/L			08/29/15 00:00	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 14:21	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 14:21	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 14:21	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 14:21	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 14:21	1
Zinc	ND		0.0500		mg/L		08/26/15 09:30	08/27/15 14:21	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Arsenic	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 15:48	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Cobalt	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Nickel	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 18:33	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:48	1
Zinc	ND		0.0250		mg/L		08/25/15 11:44	08/26/15 15:48	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L		08/30/15 15:03	08/31/15 19:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00		mg/L			08/22/15 12:00	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-47-0815-DUP

Date Collected: 08/17/15 11:15

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-7

Matrix: Water

Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.229		0.100		mg/L			08/29/15 00:24	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0418		0.0100		mg/L		08/26/15 09:30	08/27/15 14:25	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 14:25	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 14:25	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 14:25	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 14:25	1
Zinc	0.0855		0.0500		mg/L		08/26/15 09:30	08/27/15 14:25	1

Method: 6010B - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.0398		0.0100		mg/L		08/27/15 11:31	08/30/15 00:56	1
Beryllium	ND		0.00400		mg/L		08/27/15 11:31	08/30/15 00:56	1
Copper	ND		0.0100		mg/L		08/27/15 11:31	08/30/15 00:56	1
Silver	ND		0.00500		mg/L		08/27/15 11:31	08/30/15 00:56	1
Vanadium	ND		0.0200		mg/L		08/27/15 11:31	08/30/15 00:56	1
Zinc	0.0801		0.0500		mg/L		08/27/15 11:31	08/30/15 00:56	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 08:27	08/26/15 22:28	1
Arsenic	0.0111		0.00200		mg/L		08/25/15 11:44	08/26/15 15:54	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:54	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 15:54	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:54	1
Cobalt	0.00817		0.00200		mg/L		08/25/15 11:44	08/26/15 15:54	1
Lead	ND		0.00200		mg/L		08/25/15 08:27	08/26/15 22:28	1
Nickel	0.00242		0.00200		mg/L		08/25/15 11:44	08/26/15 15:54	1
Selenium	ND		0.00200		mg/L		08/25/15 08:27	08/27/15 16:39	1
Thallium	ND		0.00200		mg/L		08/25/15 08:27	08/26/15 22:28	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 15:54	1
Zinc	0.0652		0.0250		mg/L		08/25/15 11:44	08/26/15 15:54	1

Method: 6020 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Arsenic	0.00471		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Beryllium	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Cadmium	ND		0.00100		mg/L		08/30/15 13:22	09/03/15 11:57	1
Chromium	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Cobalt	0.00897		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Lead	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Nickel	0.00276		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Selenium	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Thallium	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Vanadium	ND		0.00200		mg/L		08/30/15 13:22	09/03/15 11:57	1
Zinc	0.0541		0.0250		mg/L		08/30/15 13:22	09/04/15 19:11	1

TestAmerica Nashville

Client Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-47-0815-DUP

Lab Sample ID: 490-85759-7

Date Collected: 08/17/15 11:15

Matrix: Water

Date Received: 08/21/15 09:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/30/15 15:03	08/31/15 19:33	1

Method: 7470A - Mercury (Dissolved) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L	D	08/31/15 16:08	08/31/15 22:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	11.6		2.00		mg/L	D		08/22/15 12:00	1

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 490-277332/6

Matrix: Water

Analysis Batch: 277332

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100		mg/L			08/28/15 16:24	1

Lab Sample ID: LCS 490-277332/7

Matrix: Water

Analysis Batch: 277332

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Fluoride	10.0	10.86		mg/L		109	80 - 120

Lab Sample ID: LCSD 490-277332/8

Matrix: Water

Analysis Batch: 277332

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.	RPD	Limit
Fluoride	10.0	10.58		mg/L		106	80 - 120	3

Lab Sample ID: MB 490-277474/6

Matrix: Water

Analysis Batch: 277474

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100		mg/L			08/29/15 18:33	1

Lab Sample ID: LCS 490-277474/7

Matrix: Water

Analysis Batch: 277474

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Fluoride	10.0	10.27		mg/L		103	80 - 120

Lab Sample ID: LCSD 490-277474/8

Matrix: Water

Analysis Batch: 277474

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.	RPD	Limit
Fluoride	10.0	10.19		mg/L		102	80 - 120	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 490-276239/1-A

Matrix: Water

Analysis Batch: 276851

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276239

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 12:41	1
Beryllium	ND		0.00400		mg/L		08/26/15 09:30	08/27/15 12:41	1
Copper	ND		0.0100		mg/L		08/26/15 09:30	08/27/15 12:41	1
Silver	ND		0.00500		mg/L		08/26/15 09:30	08/27/15 12:41	1
Vanadium	ND		0.0200		mg/L		08/26/15 09:30	08/27/15 12:41	1

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: MB 490-276239/1-A

Matrix: Water

Analysis Batch: 276851

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							08/26/15 09:30	08/27/15 12:41	1
Zinc	ND		0.0500				mg/L				

Lab Sample ID: LCS 490-276239/2-A

Matrix: Water

Analysis Batch: 276851

Analyte	Spike	LCS	LCS	Result	Qualifier	Unit	D	%Rec.	Limits	9
	Added	Result	Qualifier					%Rec.	Limits	
Beryllium	0.0500	0.05460		mg/L			109	80 - 120		
Copper	0.250	0.2688		mg/L			108	80 - 120		
Silver	0.0500	0.04550		mg/L			91	80 - 120		
Vanadium	0.500	0.5219		mg/L			104	80 - 120		
Zinc	0.500	0.5541		mg/L			111	80 - 120		

Lab Sample ID: LCS 490-276239/2-A

Matrix: Water

Analysis Batch: 276982

Analyte	Spike	LCS	LCS	Result	Qualifier	Unit	D	%Rec.	Limits	12
	Added	Result	Qualifier					%Rec.	Limits	
Barium	2.00	2.158		mg/L			108	80 - 120		

Lab Sample ID: LCSD 490-276239/3-A

Matrix: Water

Analysis Batch: 276851

Analyte	Spike	LCSD	LCSD	Result	Qualifier	Unit	D	%Rec.	RPD	13
	Added	Result	Qualifier					%Rec.	RPD	
Beryllium	0.0500	0.05390		mg/L			108	80 - 120	1	20
Copper	0.250	0.2629		mg/L			105	80 - 120	2	20
Silver	0.0500	0.04480		mg/L			90	80 - 120	2	20
Vanadium	0.500	0.5113		mg/L			102	80 - 120	2	20
Zinc	0.500	0.5464		mg/L			109	80 - 120	1	20

Lab Sample ID: LCSD 490-276239/3-A

Matrix: Water

Analysis Batch: 276982

Analyte	Spike	LCSD	LCSD	Result	Qualifier	Unit	D	%Rec.	RPD	14
	Added	Result	Qualifier					%Rec.	RPD	
Barium	2.00	2.111		mg/L			106	80 - 120	2	20

Lab Sample ID: MB 490-276733/1-A

Matrix: Water

Analysis Batch: 277608

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							08/27/15 11:31	08/29/15 23:57	1
Barium	ND		0.0100		0.0100		mg/L				
Beryllium	ND		0.00400		0.00400		mg/L				
Copper		0.01490	0.01490		0.0100		mg/L				
Silver		ND		0.00500	0.00500		mg/L				
Vanadium		ND		0.0200	0.0200		mg/L				
Zinc		ND		0.0500	0.0500		mg/L				

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 276733

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 490-276733/16-A

Matrix: Water

Analysis Batch: 277608

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 276733

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Silver	0.0500	0.05170		mg/L	103	80 - 120	

Lab Sample ID: LCS 490-276733/2-A

Matrix: Water

Analysis Batch: 277608

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 276733

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Barium	2.00	2.292		mg/L	115	80 - 120	
Beryllium	0.0500	0.05700		mg/L	114	80 - 120	
Copper	0.250	0.2910		mg/L	116	80 - 120	
Vanadium	0.500	0.5503		mg/L	110	80 - 120	
Zinc	0.500	0.5722		mg/L	114	80 - 120	

Lab Sample ID: 490-85759-3 MS

Matrix: Water

Analysis Batch: 277608

Client Sample ID: BRF-48-0815

Prep Type: Dissolved

Prep Batch: 276733

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Barium	0.0303		2.00	2.338		mg/L	115	75 - 125	
Beryllium	ND		0.0500	0.05730		mg/L	115	75 - 125	
Copper	ND		0.250	0.2804		mg/L	112	75 - 125	
Silver	ND		0.0500	0.04620		mg/L	86	75 - 125	
Vanadium	ND		0.500	0.5503		mg/L	110	75 - 125	
Zinc	ND		0.500	0.6153		mg/L	123	75 - 125	

Lab Sample ID: 490-85759-3 MSD

Matrix: Water

Analysis Batch: 277608

Client Sample ID: BRF-48-0815

Prep Type: Dissolved

Prep Batch: 276733

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	RPD	Limit
Barium	0.0303		2.00	2.307		mg/L	114	75 - 125	1	20
Beryllium	ND		0.0500	0.05700		mg/L	114	75 - 125	1	20
Copper	ND		0.250	0.2732		mg/L	109	75 - 125	3	20
Silver	ND		0.0500	0.04570		mg/L	85	75 - 125	1	20
Vanadium	ND		0.500	0.5586		mg/L	112	75 - 125	1	20
Zinc	ND		0.500	0.6069		mg/L	121	75 - 125	1	20

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 490-275892/1-A

Matrix: Water

Analysis Batch: 276615

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 275892

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L	08/25/15 08:27	08/26/15 19:41		1
Lead	ND		0.00200		mg/L	08/25/15 08:27	08/26/15 19:41		1
Thallium	ND		0.00200		mg/L	08/25/15 08:27	08/26/15 19:41		1

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 490-275892/1-A

Matrix: Water

Analysis Batch: 277043

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 275892

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.00200		mg/L		08/25/15 08:27	08/27/15 13:51	1

Lab Sample ID: LCS 490-275892/2-A

Matrix: Water

Analysis Batch: 276615

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 275892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.1007		mg/L		101	80 - 120
Lead	0.100	0.09979		mg/L		100	80 - 120
Thallium	0.100	0.09595		mg/L		96	80 - 120

Lab Sample ID: LCS 490-275892/2-A

Matrix: Water

Analysis Batch: 277043

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 275892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Selenium	0.100	0.1011		mg/L		101	80 - 120

Lab Sample ID: MB 490-275991/1-A

Matrix: Water

Analysis Batch: 276838

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 275991

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Arsenic	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Beryllium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Cadmium	ND		0.00100		mg/L		08/25/15 11:44	08/26/15 13:45	1
Chromium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Cobalt	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Lead	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Nickel	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Thallium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Vanadium	ND		0.00200		mg/L		08/25/15 11:44	08/26/15 13:45	1
Zinc	ND		0.0250		mg/L		08/25/15 11:44	08/26/15 13:45	1

Lab Sample ID: MB 490-275991/1-A

Matrix: Water

Analysis Batch: 277044

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 275991

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.00200		mg/L		08/25/15 11:44	08/27/15 17:27	1

Lab Sample ID: LCS 490-275991/2-A

Matrix: Water

Analysis Batch: 276838

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 275991

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.1114		mg/L		111	80 - 120
Arsenic	0.100	0.1035		mg/L		104	80 - 120

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 490-275991/2-A

Matrix: Water

Analysis Batch: 276838

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 275991

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Beryllium	0.100	0.1194		mg/L		119	80 - 120
Cadmium	0.100	0.1023		mg/L		102	80 - 120
Chromium	0.100	0.1068		mg/L		107	80 - 120
Cobalt	0.100	0.1047		mg/L		105	80 - 120
Lead	0.100	0.1104		mg/L		110	80 - 120
Nickel	0.100	0.1003		mg/L		100	80 - 120
Thallium	0.100	0.1068		mg/L		107	80 - 120
Vanadium	0.100	0.1068		mg/L		107	80 - 120
Zinc	0.100	0.09145		mg/L		91	80 - 120

Lab Sample ID: LCS 490-275991/2-A

Matrix: Water

Analysis Batch: 277044

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 275991

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Selenium	0.100	0.09135		mg/L		91	80 - 120

Lab Sample ID: 490-85759-1 MS

Matrix: Water

Analysis Batch: 276838

Client Sample ID: BRF-1-0815

Prep Type: Total/NA

Prep Batch: 275991

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.1093		mg/L		109	75 - 125
Arsenic	0.00447		0.100	0.09823		mg/L		94	75 - 125
Beryllium	ND		0.100	0.1127		mg/L		113	75 - 125
Cadmium	ND		0.100	0.1016		mg/L		102	75 - 125
Chromium	ND		0.100	0.1017		mg/L		101	75 - 125
Cobalt	0.00254		0.100	0.1101		mg/L		108	75 - 125
Lead	ND		0.100	0.1090		mg/L		109	75 - 125
Nickel	ND		0.100	0.1011		mg/L		101	75 - 125
Thallium	ND		0.100	0.1071		mg/L		106	75 - 125
Vanadium	ND		0.100	0.1038		mg/L		103	75 - 125
Zinc	ND		0.100	0.09362		mg/L		94	75 - 125

Lab Sample ID: 490-85759-1 MS

Matrix: Water

Analysis Batch: 277044

Client Sample ID: BRF-1-0815

Prep Type: Total/NA

Prep Batch: 275991

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Selenium	ND		0.100	0.09175		mg/L		92	75 - 125

Lab Sample ID: 490-85759-1 MSD

Matrix: Water

Analysis Batch: 276838

Client Sample ID: BRF-1-0815

Prep Type: Total/NA

Prep Batch: 275991

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND		0.100	0.1083		mg/L		108	75 - 125	1	20
Arsenic	0.00447		0.100	0.09834		mg/L		94	75 - 125	0	20
Beryllium	ND		0.100	0.1099		mg/L		110	75 - 125	3	20

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 490-85759-1 MSD

Matrix: Water

Analysis Batch: 276838

Client Sample ID: BRF-1-0815

Prep Type: Total/NA

Prep Batch: 275991

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Cadmium	ND		0.100	0.1006		mg/L	101	75 - 125	1	20	
Chromium	ND		0.100	0.1017		mg/L	101	75 - 125	0	20	
Cobalt	0.00254		0.100	0.1103		mg/L	108	75 - 125	0	20	
Lead	ND		0.100	0.1066		mg/L	106	75 - 125	2	20	
Nickel	ND		0.100	0.1007		mg/L	101	75 - 125	0	20	
Thallium	ND		0.100	0.1049		mg/L	104	75 - 125	2	20	
Vanadium	ND		0.100	0.1041		mg/L	103	75 - 125	0	20	
Zinc	ND		0.100	0.09320		mg/L	93	75 - 125	0	20	

Lab Sample ID: 490-85759-1 MSD

Matrix: Water

Analysis Batch: 277044

Client Sample ID: BRF-1-0815

Prep Type: Total/NA

Prep Batch: 275991

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Selenium	ND		0.100	0.09132		mg/L	91	75 - 125	0	20	

Lab Sample ID: MB 490-276235/1-A

Matrix: Water

Analysis Batch: 276838

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 276235

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Antimony	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Arsenic	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Beryllium	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Cadmium	ND		0.00100		mg/L	08/26/15 09:20	08/26/15 17:45		1
Chromium	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Cobalt	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Lead	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Nickel	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Selenium	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Thallium	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Vanadium	ND		0.00200		mg/L	08/26/15 09:20	08/26/15 17:45		1
Zinc	ND		0.0250		mg/L	08/26/15 09:20	08/26/15 17:45		1

Lab Sample ID: LCS 490-276235/2-A

Matrix: Water

Analysis Batch: 276838

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 276235

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Antimony	0.100	0.1057		mg/L	106	80 - 120	
Arsenic	0.100	0.1017		mg/L	102	80 - 120	
Beryllium	0.100	0.1032		mg/L	103	80 - 120	
Cadmium	0.100	0.09743		mg/L	97	80 - 120	
Chromium	0.100	0.09407		mg/L	94	80 - 120	
Cobalt	0.100	0.09953		mg/L	100	80 - 120	
Lead	0.100	0.1014		mg/L	101	80 - 120	
Nickel	0.100	0.09550		mg/L	96	80 - 120	
Selenium	0.100	0.09010		mg/L	90	80 - 120	
Thallium	0.100	0.09776		mg/L	98	80 - 120	

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 490-276235/2-A

Matrix: Water

Analysis Batch: 276838

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 276235

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Vanadium	0.100	0.09564		mg/L	96	80 - 120	
Zinc	0.100	0.08999		mg/L	90	80 - 120	

Lab Sample ID: MB 490-277682/1-A

Matrix: Water

Analysis Batch: 278980

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 277682

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Arsenic	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Beryllium	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Cadmium	ND		0.00100		mg/L	08/30/15 13:22	09/03/15 11:46		1
Chromium	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Cobalt	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Lead	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Nickel	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Selenium	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Thallium	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1
Vanadium	ND		0.00200		mg/L	08/30/15 13:22	09/03/15 11:46		1

Lab Sample ID: MB 490-277682/1-A

Matrix: Water

Analysis Batch: 279593

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 277682

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Cadmium	ND		0.00100		mg/L	08/30/15 13:22	09/04/15 18:59		1
Chromium	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Cobalt	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Lead	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Nickel	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Selenium	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Thallium	ND		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Vanadium	0.002136		0.00200		mg/L	08/30/15 13:22	09/04/15 18:59		1
Zinc	ND		0.0250		mg/L	08/30/15 13:22	09/04/15 18:59		1

Lab Sample ID: LCS 490-277682/2-A

Matrix: Water

Analysis Batch: 278980

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 277682

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.09765		mg/L	98	80 - 120	
Arsenic	0.100	0.09152		mg/L	92	80 - 120	
Beryllium	0.100	0.1102		mg/L	110	80 - 120	
Cadmium	0.100	0.09814		mg/L	98	80 - 120	
Chromium	0.100	0.1025		mg/L	103	80 - 120	
Cobalt	0.100	0.1045		mg/L	105	80 - 120	
Lead	0.100	0.09734		mg/L	97	80 - 120	
Nickel	0.100	0.1051		mg/L	105	80 - 120	

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 490-277682/2-A

Matrix: Water

Analysis Batch: 278980

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 277682

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Selenium	0.100	0.09158		mg/L	92	80 - 120	
Thallium	0.100	0.09578		mg/L	96	80 - 120	
Vanadium	0.100	0.1052		mg/L	105	80 - 120	

Lab Sample ID: LCS 490-277682/2-A

Matrix: Water

Analysis Batch: 279593

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 277682

%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.09441		mg/L	94	80 - 120	
Arsenic	0.100	0.09002		mg/L	90	80 - 120	
Cadmium	0.100	0.09769		mg/L	98	80 - 120	
Chromium	0.100	0.1006		mg/L	101	80 - 120	
Cobalt	0.100	0.1019		mg/L	102	80 - 120	
Lead	0.100	0.09820		mg/L	98	80 - 120	
Nickel	0.100	0.1010		mg/L	101	80 - 120	
Selenium	0.100	0.09043		mg/L	90	80 - 120	
Thallium	0.100	0.09681		mg/L	97	80 - 120	
Vanadium	0.100	0.1038		mg/L	104	80 - 120	
Zinc	0.100	0.08639		mg/L	86	80 - 120	

Lab Sample ID: 490-85759-1 MS

Matrix: Water

Analysis Batch: 276838

Client Sample ID: BRF-1-0815

Prep Type: Dissolved

Prep Batch: 276235

%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.1114		mg/L	111	75 - 125	
Arsenic	0.00317		0.100	0.1041		mg/L	101	75 - 125	
Beryllium	ND		0.100	0.1077		mg/L	108	75 - 125	
Cadmium	ND		0.100	0.1024		mg/L	102	75 - 125	
Chromium	ND		0.100	0.09921		mg/L	99	75 - 125	
Cobalt	0.00216		0.100	0.1090		mg/L	107	75 - 125	
Lead	ND		0.100	0.1065		mg/L	107	75 - 125	
Nickel	ND		0.100	0.1008		mg/L	101	75 - 125	
Selenium	ND		0.100	0.09401		mg/L	94	75 - 125	
Thallium	ND		0.100	0.1034		mg/L	103	75 - 125	
Vanadium	ND		0.100	0.1014		mg/L	101	75 - 125	
Zinc	ND		0.100	0.09733		mg/L	97	75 - 125	

Lab Sample ID: 490-85759-1 MSD

Matrix: Water

Analysis Batch: 276838

Client Sample ID: BRF-1-0815

Prep Type: Dissolved

Prep Batch: 276235

%Rec.

RPD

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND		0.100	0.1085		mg/L	109	75 - 125		3	20
Arsenic	0.00317		0.100	0.1008		mg/L	98	75 - 125		3	20
Beryllium	ND		0.100	0.1026		mg/L	103	75 - 125		5	20
Cadmium	ND		0.100	0.09943		mg/L	99	75 - 125		3	20
Chromium	ND		0.100	0.09794		mg/L	98	75 - 125		1	20

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
 Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 490-85759-1 MSD

Matrix: Water

Analysis Batch: 276838

Client Sample ID: BRF-1-0815

Prep Type: Dissolved

Prep Batch: 276235

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Cobalt	0.00216		0.100	0.1067		mg/L		105	75 - 125	2	20
Lead	ND		0.100	0.1036		mg/L		104	75 - 125	3	20
Nickel	ND		0.100	0.09762		mg/L		98	75 - 125	3	20
Selenium	ND		0.100	0.09279		mg/L		93	75 - 125	1	20
Thallium	ND		0.100	0.1017		mg/L		101	75 - 125	2	20
Vanadium	ND		0.100	0.1009		mg/L		100	75 - 125	0	20
Zinc	ND		0.100	0.09556		mg/L		96	75 - 125	2	20

Lab Sample ID: MB 490-277068/1-B

Matrix: Water

Analysis Batch: 278732

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 277083

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Antimony	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Arsenic	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Cadmium	ND		0.00100		mg/L		08/28/15 10:18	09/02/15 20:41	1
Chromium	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Cobalt	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Lead	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Nickel	ND	^	0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Selenium	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Thallium	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Vanadium	ND		0.00200		mg/L		08/28/15 10:18	09/02/15 20:41	1
Zinc	ND		0.0250		mg/L		08/28/15 10:18	09/02/15 20:41	1

Lab Sample ID: MB 490-277068/1-B

Matrix: Water

Analysis Batch: 279070

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 277083

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Beryllium	ND		0.00200		mg/L		08/28/15 10:18	09/03/15 10:49	1
Nickel	ND		0.00200		mg/L		08/28/15 10:18	09/03/15 10:49	1

Lab Sample ID: LCS 490-277068/2-B

Matrix: Water

Analysis Batch: 278732

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 277083

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Antimony	0.100	0.1072		mg/L		107	80 - 120
Arsenic	0.100	0.1025		mg/L		103	80 - 120
Cadmium	0.100	0.09942		mg/L		99	80 - 120
Chromium	0.100	0.1127		mg/L		113	80 - 120
Cobalt	0.100	0.1075		mg/L		108	80 - 120
Lead	0.100	0.1018		mg/L		102	80 - 120
Selenium	0.100	0.1006		mg/L		101	80 - 120
Thallium	0.100	0.09454		mg/L		95	80 - 120
Vanadium	0.100	0.09639		mg/L		96	80 - 120
Zinc	0.100	0.09600		mg/L		96	80 - 120

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 490-277068/2-B

Matrix: Water

Analysis Batch: 279070

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 277083

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Beryllium	0.100	0.1041		mg/L		104	80 - 120
Nickel	0.100	0.1036		mg/L		104	80 - 120

Lab Sample ID: 490-85759-7 MS

Matrix: Water

Analysis Batch: 278980

Client Sample ID: BRF-47-0815-DUP

Prep Type: Dissolved

Prep Batch: 277682

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.09846		mg/L		98	75 - 125
Arsenic	0.00471		0.100	0.09735		mg/L		93	75 - 125
Beryllium	ND		0.100	0.1025		mg/L		103	75 - 125
Cadmium	ND		0.100	0.1028		mg/L		103	75 - 125
Chromium	ND		0.100	0.1021		mg/L		102	75 - 125
Cobalt	0.00897		0.100	0.1268		mg/L		118	75 - 125
Lead	ND		0.100	0.09531		mg/L		95	75 - 125
Nickel	0.00276		0.100	0.1158		mg/L		113	75 - 125
Selenium	ND		0.100	0.1078		mg/L		108	75 - 125
Thallium	ND		0.100	0.09657		mg/L		96	75 - 125
Vanadium	ND		0.100	0.1083		mg/L		106	75 - 125

Lab Sample ID: 490-85759-7 MS

Matrix: Water

Analysis Batch: 279593

Client Sample ID: BRF-47-0815-DUP

Prep Type: Dissolved

Prep Batch: 277682

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Zinc	0.0541		0.100	0.1409		mg/L		87	75 - 125

Lab Sample ID: 490-85759-7 MSD

Matrix: Water

Analysis Batch: 278980

Client Sample ID: BRF-47-0815-DUP

Prep Type: Dissolved

Prep Batch: 277682

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	ND		0.100	0.09689		mg/L		97	75 - 125	2	20
Arsenic	0.00471		0.100	0.09693		mg/L		92	75 - 125	0	20
Beryllium	ND		0.100	0.1011		mg/L		101	75 - 125	1	20
Cadmium	ND		0.100	0.1046		mg/L		105	75 - 125	2	20
Chromium	ND		0.100	0.1019		mg/L		102	75 - 125	0	20
Cobalt	0.00897		0.100	0.1277		mg/L		119	75 - 125	1	20
Lead	ND		0.100	0.09481		mg/L		95	75 - 125	1	20
Nickel	0.00276		0.100	0.1170		mg/L		114	75 - 125	1	20
Selenium	ND		0.100	0.1098		mg/L		110	75 - 125	2	20
Thallium	ND		0.100	0.09649		mg/L		96	75 - 125	0	20
Vanadium	ND		0.100	0.1082		mg/L		106	75 - 125	0	20

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 490-85759-7 MSD

Matrix: Water

Analysis Batch: 279593

Client Sample ID: BRF-47-0815-DUP

Prep Type: Dissolved

Prep Batch: 277682

Analyte	Sample	Sample	Spike	MSD	MSD	%Rec.	RPD				
	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	Limit
Zinc	0.0541		0.100	0.1396		mg/L		86	75 - 125	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 490-277611/1-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 277611

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier					08/30/15 15:03	08/31/15 19:12	
Mercury	ND		0.000200		mg/L				1

Lab Sample ID: LCS 490-277611/2-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 277611

Analyte	Spike	LCS	LCS	%Rec.				
	Added	Result	Qualifier	Unit	D	%Rec.	Limits	
Mercury	0.00100	0.0009482		mg/L		95	80 - 120	

Lab Sample ID: LCSD 490-277611/3-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 277611

Analyte	Spike	LCSD	LCSD	%Rec.					
	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	Limit
Mercury	0.00100	0.0009038		mg/L		90	80 - 120	5	20

Lab Sample ID: 490-85759-5 MS

Matrix: Water

Analysis Batch: 278012

Client Sample ID: BRF-50-0815

Prep Type: Total/NA

Prep Batch: 277611

Analyte	Sample	Sample	Spike	MS	MS	%Rec.				
	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec.	Limits	
Mercury	ND	F1	0.00100	0.0004821	F1	mg/L		48	75 - 125	

Lab Sample ID: 490-85759-5 MSD

Matrix: Water

Analysis Batch: 278012

Client Sample ID: BRF-50-0815

Prep Type: Total/NA

Prep Batch: 277611

Analyte	Sample	Sample	Spike	MSD	MSD	%Rec.					
	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	Limit
Mercury	ND	F1	0.00100	0.0004965	F1	mg/L		50	75 - 125	3	20

Lab Sample ID: MB 490-277868/1-A

Matrix: Water

Analysis Batch: 278134

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 277868

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier					08/31/15 16:00	09/01/15 10:31	
Mercury	ND		0.000200		mg/L				1

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 490-277868/2-A

Matrix: Water

Analysis Batch: 278134

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 277868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Mercury	0.00100	0.001020		mg/L	102	80 - 120	

Lab Sample ID: LCSD 490-277868/3-A

Matrix: Water

Analysis Batch: 278134

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 277868

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.	RPD	Limit
Mercury	0.00100	0.0009838		mg/L	98	80 - 120	4	20

Method: 7470A - Mercury (Dissolved)

Lab Sample ID: MB 490-277621/1-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 277621

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L		08/30/15 15:38	08/31/15 20:27	1

Lab Sample ID: LCS 490-277621/2-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 277621

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Mercury	0.00100	0.0009498		mg/L	95	80 - 120	

Lab Sample ID: LCSD 490-277621/3-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 277621

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.	RPD	Limit
Mercury	0.00100	0.0009093		mg/L	91	80 - 120	4	20

Lab Sample ID: MB 490-277871/1-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 277871

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200		mg/L		08/31/15 16:08	08/31/15 21:37	1

Lab Sample ID: LCS 490-277871/2-A

Matrix: Water

Analysis Batch: 278012

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 277871

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Mercury	0.00100	0.001001		mg/L	100	80 - 120	

TestAmerica Nashville

QC Sample Results

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 490-275471/1

Matrix: Water

Analysis Batch: 275471

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00		mg/L			08/22/15 12:00	1

Lab Sample ID: LCS 490-275471/2

Matrix: Water

Analysis Batch: 275471

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.	Limits
Total Suspended Solids	100	101.0		mg/L		101		90 - 110

TestAmerica Nashville

QC Association Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

HPLC/IC

Analysis Batch: 277332

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-2	BRF-47-0815	Total/NA	Water	9056	
490-85759-3	BRF-48-0815	Total/NA	Water	9056	
490-85759-4	BRF-49-0815	Total/NA	Water	9056	
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	9056	
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	9056	
LCS 490-277332/7	Lab Control Sample	Total/NA	Water	9056	
LCSD 490-277332/8	Lab Control Sample Dup	Total/NA	Water	9056	
MB 490-277332/6	Method Blank	Total/NA	Water	9056	

Analysis Batch: 277474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	9056	
490-85759-5	BRF-50-0815	Total/NA	Water	9056	
LCS 490-277474/7	Lab Control Sample	Total/NA	Water	9056	
LCSD 490-277474/8	Lab Control Sample Dup	Total/NA	Water	9056	
MB 490-277474/6	Method Blank	Total/NA	Water	9056	

Metals

Prep Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	3010A	
LCS 490-275892/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-275892/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 275991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	3010A	
490-85759-1 MS	BRF-1-0815	Total/NA	Water	3010A	
490-85759-1 MSD	BRF-1-0815	Total/NA	Water	3010A	
490-85759-2	BRF-47-0815	Total/NA	Water	3010A	
490-85759-3	BRF-48-0815	Total/NA	Water	3010A	
490-85759-4	BRF-49-0815	Total/NA	Water	3010A	
490-85759-5	BRF-50-0815	Total/NA	Water	3010A	
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	3010A	
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	3010A	
LCS 490-275991/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 490-275991/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 276235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Dissolved	Water	3005A	
490-85759-1 MS	BRF-1-0815	Dissolved	Water	3005A	
490-85759-1 MSD	BRF-1-0815	Dissolved	Water	3005A	
490-85759-2	BRF-47-0815	Dissolved	Water	3005A	
LCS 490-276235/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-276235/1-A	Method Blank	Total Recoverable	Water	3005A	

TestAmerica Nashville

QC Association Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Metals (Continued)

Prep Batch: 276239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	3010A	5
490-85759-2	BRF-47-0815	Total/NA	Water	3010A	6
490-85759-3	BRF-48-0815	Total/NA	Water	3010A	7
490-85759-4	BRF-49-0815	Total/NA	Water	3010A	8
490-85759-5	BRF-50-0815	Total/NA	Water	3010A	9
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	3010A	10
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	3010A	11
LCS 490-276239/2-A	Lab Control Sample	Total/NA	Water	3010A	12
LCSD 490-276239/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	13
MB 490-276239/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 276615

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	6020	275892
LCS 490-275892/2-A	Lab Control Sample	Total/NA	Water	6020	275892
MB 490-275892/1-A	Method Blank	Total/NA	Water	6020	275892

Prep Batch: 276733

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Dissolved	Water	3005A	
490-85759-2	BRF-47-0815	Dissolved	Water	3005A	
490-85759-3	BRF-48-0815	Dissolved	Water	3005A	
490-85759-3 MS	BRF-48-0815	Dissolved	Water	3005A	
490-85759-3 MSD	BRF-48-0815	Dissolved	Water	3005A	
490-85759-5	BRF-50-0815	Dissolved	Water	3005A	
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	3005A	
LCS 490-276733/16-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCS 490-276733/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-276733/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 276838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Dissolved	Water	6020	276235
490-85759-1	BRF-1-0815	Total/NA	Water	6020	275991
490-85759-1 MS	BRF-1-0815	Dissolved	Water	6020	276235
490-85759-1 MS	BRF-1-0815	Total/NA	Water	6020	275991
490-85759-1 MSD	BRF-1-0815	Dissolved	Water	6020	276235
490-85759-1 MSD	BRF-1-0815	Total/NA	Water	6020	275991
490-85759-2	BRF-47-0815	Dissolved	Water	6020	276235
490-85759-2	BRF-47-0815	Total/NA	Water	6020	275991
490-85759-3	BRF-48-0815	Total/NA	Water	6020	275991
490-85759-4	BRF-49-0815	Total/NA	Water	6020	275991
490-85759-5	BRF-50-0815	Total/NA	Water	6020	275991
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	6020	275991
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	6020	275991
LCS 490-275991/2-A	Lab Control Sample	Total/NA	Water	6020	275991
LCS 490-276235/2-A	Lab Control Sample	Total Recoverable	Water	6020	276235
MB 490-275991/1-A	Method Blank	Total/NA	Water	6020	275991
MB 490-276235/1-A	Method Blank	Total Recoverable	Water	6020	276235

TestAmerica Nashville

QC Association Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Metals (Continued)

Analysis Batch: 276851

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	6010B	276239
490-85759-2	BRF-47-0815	Total/NA	Water	6010B	276239
490-85759-3	BRF-48-0815	Total/NA	Water	6010B	276239
490-85759-4	BRF-49-0815	Total/NA	Water	6010B	276239
490-85759-5	BRF-50-0815	Total/NA	Water	6010B	276239
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	6010B	276239
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	6010B	276239
LCS 490-276239/2-A	Lab Control Sample	Total/NA	Water	6010B	276239
LCSD 490-276239/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	276239
MB 490-276239/1-A	Method Blank	Total/NA	Water	6010B	276239

Analysis Batch: 276982

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 490-276239/2-A	Lab Control Sample	Total/NA	Water	6010B	276239
LCSD 490-276239/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	276239

Analysis Batch: 277043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	6020	275892
LCS 490-275892/2-A	Lab Control Sample	Total/NA	Water	6020	275892
MB 490-275892/1-A	Method Blank	Total/NA	Water	6020	275892

Analysis Batch: 277044

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	6020	275991
490-85759-1 MS	BRF-1-0815	Total/NA	Water	6020	275991
490-85759-1 MSD	BRF-1-0815	Total/NA	Water	6020	275991
490-85759-2	BRF-47-0815	Total/NA	Water	6020	275991
490-85759-3	BRF-48-0815	Total/NA	Water	6020	275991
490-85759-4	BRF-49-0815	Total/NA	Water	6020	275991
490-85759-5	BRF-50-0815	Total/NA	Water	6020	275991
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	6020	275991
LCS 490-275991/2-A	Lab Control Sample	Total/NA	Water	6020	275991
MB 490-275991/1-A	Method Blank	Total/NA	Water	6020	275991

Filtration Batch: 277068

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 490-277068/2-B	Lab Control Sample	Dissolved	Water	Filtration	
MB 490-277068/1-B	Method Blank	Dissolved	Water	Filtration	

Prep Batch: 277083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-3	BRF-48-0815	Dissolved	Water	3005A	
490-85759-5	BRF-50-0815	Dissolved	Water	3005A	
LCS 490-277068/2-B	Lab Control Sample	Dissolved	Water	3005A	277068
MB 490-277068/1-B	Method Blank	Dissolved	Water	3005A	277068

Analysis Batch: 277608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Dissolved	Water	6010B	276733
490-85759-2	BRF-47-0815	Dissolved	Water	6010B	276733

TestAmerica Nashville

QC Association Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Metals (Continued)

Analysis Batch: 277608 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-3	BRF-48-0815	Dissolved	Water	6010B	276733
490-85759-3 MS	BRF-48-0815	Dissolved	Water	6010B	276733
490-85759-3 MSD	BRF-48-0815	Dissolved	Water	6010B	276733
490-85759-5	BRF-50-0815	Dissolved	Water	6010B	276733
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	6010B	276733
LCS 490-276733/16-A	Lab Control Sample	Total Recoverable	Water	6010B	276733
LCS 490-276733/2-A	Lab Control Sample	Total Recoverable	Water	6010B	276733
MB 490-276733/1-A	Method Blank	Total Recoverable	Water	6010B	276733

Prep Batch: 277611

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-5	BRF-50-0815	Total/NA	Water	7470A	10
490-85759-5 MS	BRF-50-0815	Total/NA	Water	7470A	11
490-85759-5 MSD	BRF-50-0815	Total/NA	Water	7470A	12
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	7470A	13
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	7470A	
LCS 490-277611/2-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 490-277611/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	
MB 490-277611/1-A	Method Blank	Total/NA	Water	7470A	

Prep Batch: 277621

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Dissolved	Water	7470A	
490-85759-2	BRF-47-0815	Dissolved	Water	7470A	
LCS 490-277621/2-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 490-277621/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	
MB 490-277621/1-A	Method Blank	Total/NA	Water	7470A	

Prep Batch: 277682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	3005A	
490-85759-7 MS	BRF-47-0815-DUP	Dissolved	Water	3005A	
490-85759-7 MSD	BRF-47-0815-DUP	Dissolved	Water	3005A	
LCS 490-277682/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 490-277682/1-A	Method Blank	Total Recoverable	Water	3005A	

Prep Batch: 277868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	7470A	
490-85759-2	BRF-47-0815	Total/NA	Water	7470A	
490-85759-3	BRF-48-0815	Total/NA	Water	7470A	
490-85759-4	BRF-49-0815	Total/NA	Water	7470A	
LCS 490-277868/2-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 490-277868/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	
MB 490-277868/1-A	Method Blank	Total/NA	Water	7470A	

Prep Batch: 277871

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-3	BRF-48-0815	Dissolved	Water	7470A	
490-85759-5	BRF-50-0815	Dissolved	Water	7470A	
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	7470A	

TestAmerica Nashville

QC Association Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Metals (Continued)

Prep Batch: 277871 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 490-277871/2-A	Lab Control Sample	Total/NA	Water	7470A	
MB 490-277871/1-A	Method Blank	Total/NA	Water	7470A	

Analysis Batch: 278012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Dissolved	Water	7470A	277621
490-85759-2	BRF-47-0815	Dissolved	Water	7470A	277621
490-85759-3	BRF-48-0815	Dissolved	Water	7470A	277871
490-85759-5	BRF-50-0815	Dissolved	Water	7470A	277871
490-85759-5	BRF-50-0815	Total/NA	Water	7470A	277611
490-85759-5 MS	BRF-50-0815	Total/NA	Water	7470A	277611
490-85759-5 MSD	BRF-50-0815	Total/NA	Water	7470A	277611
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	7470A	277611
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	7470A	277871
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	7470A	277611
LCS 490-277611/2-A	Lab Control Sample	Total/NA	Water	7470A	277611
LCS 490-277621/2-A	Lab Control Sample	Total/NA	Water	7470A	277621
LCS 490-277871/2-A	Lab Control Sample	Total/NA	Water	7470A	277871
LCSD 490-277611/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	277611
LCSD 490-277621/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	277621
MB 490-277611/1-A	Method Blank	Total/NA	Water	7470A	277611
MB 490-277621/1-A	Method Blank	Total/NA	Water	7470A	277621
MB 490-277871/1-A	Method Blank	Total/NA	Water	7470A	277871

Analysis Batch: 278134

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	7470A	277868
490-85759-2	BRF-47-0815	Total/NA	Water	7470A	277868
490-85759-3	BRF-48-0815	Total/NA	Water	7470A	277868
490-85759-4	BRF-49-0815	Total/NA	Water	7470A	277868
LCS 490-277868/2-A	Lab Control Sample	Total/NA	Water	7470A	277868
LCSD 490-277868/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	277868
MB 490-277868/1-A	Method Blank	Total/NA	Water	7470A	277868

Analysis Batch: 278732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-3	BRF-48-0815	Dissolved	Water	6020	277083
490-85759-5	BRF-50-0815	Dissolved	Water	6020	277083
LCS 490-277068/2-B	Lab Control Sample	Dissolved	Water	6020	277083
MB 490-277068/1-B	Method Blank	Dissolved	Water	6020	277083

Analysis Batch: 278980

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	6020	277682
490-85759-7 MS	BRF-47-0815-DUP	Dissolved	Water	6020	277682
490-85759-7 MSD	BRF-47-0815-DUP	Dissolved	Water	6020	277682
LCS 490-277682/2-A	Lab Control Sample	Total Recoverable	Water	6020	277682
MB 490-277682/1-A	Method Blank	Total Recoverable	Water	6020	277682

TestAmerica Nashville

QC Association Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Metals (Continued)

Analysis Batch: 279070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-3	BRF-48-0815	Dissolved	Water	6020	277083
LCS 490-277068/2-B	Lab Control Sample	Dissolved	Water	6020	277083
MB 490-277068/1-B	Method Blank	Dissolved	Water	6020	277083

Analysis Batch: 279593

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-7	BRF-47-0815-DUP	Dissolved	Water	6020	277682
490-85759-7 MS	BRF-47-0815-DUP	Dissolved	Water	6020	277682
490-85759-7 MSD	BRF-47-0815-DUP	Dissolved	Water	6020	277682
LCS 490-277682/2-A	Lab Control Sample	Total Recoverable	Water	6020	277682
MB 490-277682/1-A	Method Blank	Total Recoverable	Water	6020	277682

Analysis Batch: 279689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-5	BRF-50-0815	Dissolved	Water	6020	277083

General Chemistry

Analysis Batch: 275471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-85759-1	BRF-1-0815	Total/NA	Water	SM 2540D	
490-85759-2	BRF-47-0815	Total/NA	Water	SM 2540D	
490-85759-3	BRF-48-0815	Total/NA	Water	SM 2540D	
490-85759-4	BRF-49-0815	Total/NA	Water	SM 2540D	
490-85759-5	BRF-50-0815	Total/NA	Water	SM 2540D	
490-85759-6	BRF-GYPEQ Blank-0815	Total/NA	Water	SM 2540D	
490-85759-7	BRF-47-0815-DUP	Total/NA	Water	SM 2540D	
LCS 490-275471/2	Lab Control Sample	Total/NA	Water	SM 2540D	
MB 490-275471/1	Method Blank	Total/NA	Water	SM 2540D	

Lab Chronicle

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-1-0815

Date Collected: 08/19/15 11:35

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1	10 mL		277474	08/30/15 02:33	CLN	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276733	08/27/15 11:31	ZLN	TAL NSH
Dissolved	Analysis	6010B		1	50 mL	50 mL	277608	08/30/15 00:42	NJB	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 13:48	NJB	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276235	08/26/15 09:20	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 17:56	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 13:56	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277044	08/27/15 17:37	KKK	TAL NSH
Dissolved	Prep	7470A			30.0 mL	30.0 mL	277621	08/30/15 15:38	BLG	TAL NSH
Dissolved	Analysis	7470A		1	30.0 mL	30.0 mL	278012	08/31/15 20:41	BLG	TAL NSH
Total/NA	Prep	7470A			30 mL	30 mL	277868	08/31/15 16:00	RDF	TAL NSH
Total/NA	Analysis	7470A		1	30 mL	30 mL	278134	09/01/15 10:48	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	250 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

Client Sample ID: BRF-47-0815

Date Collected: 08/17/15 11:15

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1	10 mL		277332	08/28/15 21:12	JHS	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276733	08/27/15 11:31	ZLN	TAL NSH
Dissolved	Analysis	6010B		1	50 mL	50 mL	277608	08/30/15 00:47	NJB	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 13:52	NJB	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276235	08/26/15 09:20	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 18:21	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 15:28	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277044	08/27/15 18:13	KKK	TAL NSH
Dissolved	Prep	7470A			30.0 mL	30.0 mL	277621	08/30/15 15:38	BLG	TAL NSH
Dissolved	Analysis	7470A		1	30.0 mL	30.0 mL	278012	08/31/15 20:44	BLG	TAL NSH
Total/NA	Prep	7470A			30 mL	30 mL	277868	08/31/15 16:00	RDF	TAL NSH
Total/NA	Analysis	7470A		1	30 mL	30 mL	278134	09/01/15 10:50	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

TestAmerica Nashville

Lab Chronicle

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-48-0815

Date Collected: 08/18/15 11:45

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1	10 mL		277332	08/28/15 21:36	JHS	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276733	08/27/15 11:31	ZLN	TAL NSH
Dissolved	Analysis	6010B		1	50 mL	50 mL	277608	08/30/15 00:10	NJB	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 13:57	NJB	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	277083	08/28/15 10:37	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	278732	09/02/15 23:06	KKK	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	277083	08/28/15 10:37	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	279070	09/03/15 12:12	KKK	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 15:33	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277044	08/27/15 18:18	KKK	TAL NSH
Dissolved	Prep	7470A			30 mL	30 mL	277871	08/31/15 16:08	RDF	TAL NSH
Dissolved	Analysis	7470A		1	30 mL	30 mL	278012	08/31/15 21:57	BLG	TAL NSH
Total/NA	Prep	7470A			30 mL	30 mL	277868	08/31/15 16:00	RDF	TAL NSH
Total/NA	Analysis	7470A		1	30 mL	30 mL	278134	09/01/15 10:52	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	250 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

Client Sample ID: BRF-49-0815

Date Collected: 08/17/15 13:30

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1	10 mL		277332	08/28/15 23:12	JHS	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 14:11	NJB	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 15:38	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277044	08/27/15 18:23	KKK	TAL NSH
Total/NA	Prep	7470A			30 mL	30 mL	277868	08/31/15 16:00	RDF	TAL NSH
Total/NA	Analysis	7470A		1	30 mL	30 mL	278134	09/01/15 11:00	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

Client Sample ID: BRF-50-0815

Date Collected: 08/19/15 10:20

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1	10 mL		277474	08/30/15 02:57	CLN	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276733	08/27/15 11:31	ZLN	TAL NSH
Dissolved	Analysis	6010B		1	50 mL	50 mL	277608	08/30/15 00:51	NJB	TAL NSH

TestAmerica Nashville

Lab Chronicle

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-50-0815

Date Collected: 08/19/15 10:20

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 14:16	NJB	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	277083	08/28/15 10:37	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	278732	09/02/15 23:11	KKK	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	277083	08/28/15 10:37	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	279689	09/07/15 17:03	KKK	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 15:43	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277044	08/27/15 18:28	KKK	TAL NSH
Dissolved	Prep	7470A			30 mL	30 mL	277871	08/31/15 16:08	RDF	TAL NSH
Dissolved	Analysis	7470A		1	30 mL	30 mL	278012	08/31/15 21:59	BLG	TAL NSH
Total/NA	Prep	7470A			30.0 mL	30.0 mL	277611	08/30/15 15:03	BLG	TAL NSH
Total/NA	Analysis	7470A		1	30.0 mL	30.0 mL	278012	08/31/15 19:19	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	500 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

Client Sample ID: BRF-GYPEQ Blank-0815

Date Collected: 08/18/15 09:10

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056			10 mL		277332	08/29/15 00:00	JHS	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 14:21	NJB	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 15:48	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277044	08/27/15 18:33	KKK	TAL NSH
Total/NA	Prep	7470A			30.0 mL	30.0 mL	277611	08/30/15 15:03	BLG	TAL NSH
Total/NA	Analysis	7470A		1	30.0 mL	30.0 mL	278012	08/31/15 19:31	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

Client Sample ID: BRF-47-0815-DUP

Date Collected: 08/17/15 11:15

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056			10 mL		277332	08/29/15 00:24	JHS	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	276733	08/27/15 11:31	ZLN	TAL NSH
Dissolved	Analysis	6010B		1	50 mL	50 mL	277608	08/30/15 00:56	NJB	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	276239	08/26/15 09:30	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	276851	08/27/15 14:25	NJB	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	277682	08/30/15 13:22	ZLN	TAL NSH

TestAmerica Nashville

Lab Chronicle

Client: Tennessee Valley Authority
 Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Client Sample ID: BRF-47-0815-DUP

Date Collected: 08/17/15 11:15

Date Received: 08/21/15 09:20

Lab Sample ID: 490-85759-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6020		1	50 mL	50 mL	278980	09/03/15 11:57	CME	TAL NSH
Dissolved	Prep	3005A			50 mL	50 mL	277682	08/30/15 13:22	ZLN	TAL NSH
Dissolved	Analysis	6020		1	50 mL	50 mL	279593	09/04/15 19:11	KKK	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275892	08/25/15 08:27	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276615	08/26/15 22:28	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275892	08/25/15 08:27	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	277043	08/27/15 16:39	LEG	TAL NSH
Total/NA	Prep	3010A			50 mL	50 mL	275991	08/25/15 11:44	ZLN	TAL NSH
Total/NA	Analysis	6020		1	50 mL	50 mL	276838	08/26/15 15:54	LEG	TAL NSH
Dissolved	Prep	7470A			30 mL	30 mL	277871	08/31/15 16:08	RDF	TAL NSH
Dissolved	Analysis	7470A		1	30 mL	30 mL	278012	08/31/15 22:01	BLG	TAL NSH
Total/NA	Prep	7470A			30.0 mL	30.0 mL	277611	08/30/15 15:03	BLG	TAL NSH
Total/NA	Analysis	7470A		1	30.0 mL	30.0 mL	278012	08/31/15 19:33	BLG	TAL NSH
Total/NA	Analysis	SM 2540D		1	500 mL	1000 mL	275471	08/22/15 12:00	SMB	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

TestAmerica Nashville

Method Summary

Client: Tennessee Valley Authority
Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Method	Method Description	Protocol	Laboratory
9056	Anions, Ion Chromatography	SW846	TAL NSH
6010B	Metals (ICP)	SW846	TAL NSH
6020	Metals (ICP/MS)	SW846	TAL NSH
7470A	Mercury (Dissolved)	SW846	TAL NSH
7470A	Mercury (CVAA)	SW846	TAL NSH
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL NSH

Protocol References:

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

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: Tennessee Valley Authority
 Project/Site: BRF Gypsum Disposal Area

TestAmerica Job ID: 490-85759-1

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	07-24-16
Arizona	State Program	9	AZ0473	05-05-16
Arkansas DEQ	State Program	6	88-0737	04-25-16
California	State Program	9	2938	10-31-16
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-16
Georgia	State Program	4	N/A	06-30-16
Illinois	NELAP	5	200010	12-09-15
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	10-31-15
Kentucky (UST)	State Program	4	19	06-30-16
Kentucky (WW)	State Program	4	90038	12-31-15
Louisiana	NELAP	6	30613	06-30-16
Maryland	State Program	3	316	03-31-16
Massachusetts	State Program	1	M-TN032	06-30-16
Minnesota	NELAP	5	047-999-345	12-31-15
Mississippi	State Program	4	N/A	06-30-16
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-16
New Hampshire	NELAP	1	2963	10-09-15
New Jersey	NELAP	2	TN965	09-30-15
New York	NELAP	2	11342	03-31-16
North Carolina (WW/SW)	State Program	4	387	12-31-15
North Dakota	State Program	8	R-146	06-30-15 *
Ohio VAP	State Program	5	CL0033	07-10-17
Oklahoma	State Program	6	9412	08-31-15 *
Oregon	NELAP	10	TN200001	04-27-16
Pennsylvania	NELAP	3	68-00585	06-30-16
Rhode Island	State Program	1	LAO00268	12-30-15
South Carolina	State Program	4	84009 (001)	02-28-16
South Carolina (Do Not Use - DW)	State Program	4	84009 (002)	12-16-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-16
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-16
Virginia	NELAP	3	460152	06-14-16
Washington	State Program	10	C789	07-19-16
West Virginia DEP	State Program	3	219	02-28-16
Wisconsin	State Program	5	998020430	08-31-16
Wyoming (UST)	A2LA	8	453.07	12-31-15

* Certification renewal pending - certification considered valid.

TestAmerica Nashville



COOLER RECEIPT FORM

Cooler Received/Opened On: 8/21/2015 @0920

1. Tracking # 5480 (last 4 digits, FedEx)Courier: Fed-Ex IR Gun ID: 147404562. Temperature of rep. sample or temp blank when opened: 16.7 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 2 Front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial)7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc.)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # I certify that I unloaded the cooler and answered questions 7-14 (initial)

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial)

17. Were custody papers properly filled out (ink, signed, etc.)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) I certify that I attached a label with the unique LIMS number to each container (initial)

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#

COOLER RECEIPT FORM

Cooler Received/Opened On 8/21/2015 @ 0920

1. Tracking # 5468 (last 4 digits, FedEx)

Courier: FedEx IR Gun ID 94660220

2. Temperature of rep. sample or temp blank when opened: 1.2 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: (2) front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial) WDM

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received?

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

14. Was there a Trip Blank in this cooler? YES NO...NA If multiple coolers, sequence #

I certify that I unloaded the cooler and answered questions 7-14 (initial) ✓

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) ✓

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) ✓

I certify that I attached a label with the unique LIMS number to each container (initial) ✓

21. Were there Non-Conformance issues at login? YES NO Was a NCM generated? YES NO...#

TestAmerica Nashville

2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

9/8/2015

Client Information		Sampler: William Nichols		Lab PM: Lage, Gail		Carrier Tracking No(s):		COC No: 490-41806-8056.1		
Client Contact: Amos Smith		Phone: 865-673-2307		E-Mail: gail.lage@testamericainc.com				Page: Page 1 of 1		
Company: Tennessee Valley Authority								Job #:		
Address: 1101 Market Street		Due Date Requested: Standard				Analysis Requested		Preservation Codes:		
City: Chattanooga		TAT Requested (days):						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 - Na2S2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
State, Zip: Tennessee, 37402		PO #:						Other:		
Phone: 423-751-7636		WO #:								
Email: alsmith3@tva.gov		Project #: 49002462								
Project Name: BRF Gypsum Disposal Area		SSOW#:								
Site: Tennessee										
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=water, S=solid, O=waste/oil, BT=air) (A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Total Number of containers	Special Instructions/Note:	
BRF-1-0815		8/19/15	11:35	G	Water	X	D N N		6010-Ba, Be, Cu, Ag, V, Zn	
BRF-47-0815		8/17/15	11:15	G	Water	X	X X X X	1	6020 - Sb, As, Be, Cd, Cr, Co, Pb, Ni, Se, Ti, V, Zn	
BRF-48-0815		8/18/15	11:45	G	Water	X	X X X X	2		
BRF-49-0815		8/17/15	13:30	G	Water		X X X X	3		
BRF-50-0815		8/19/15	10:20	G	Water	X	X X X X	4		
BRF-GYPEQ Blank-0815		8/18/15	09:10	G	Water		X X X X	5		
BRF-47-0815-DUP		8/17/15	11:15	G	Water	X	X X X X	6		
Possible Hazard Identification		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)								
<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"/> Radiological		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months								
Deliverable Requested: I, II, III, IV, Other (specify)						Special Instructions/QC Requirements:				
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:				
Relinquished by: <i>William Nichols</i>		Date/Time: 8/20/2015 / 10:00		Company TVA		Received by: <i>UR HAN 17</i>		Date/Time: 08/21/15 09:20		Company TVA
Relinquished by:		Date/Time:		Company		Received by:		Date/Time:		Company
Relinquished by:		Date/Time:		Company		Received by:		Date/Time:		Company
Custody Seals Intact: △ Yes △ No		Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks: 17				

TestAmerica Nashville

2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL SERVICES

9/8/2015

Client Information		Sampler: William Nichols		Lab PM: Lage, Gail		Carrier Tracking No(s):		COC No: 490-41806-8056.1	
Client Contact: Amos Smith		Phone: 865-673-2307		E-Mail: gail.lage@testamericainc.com				Page: Page 1 of 1	
Company: Tennessee Valley Authority								Job #:	
Address: 1101 Market Street		Due Date Requested: Standard						Preservation Codes:	
City: Chattanooga		TAT Requested (days):						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 - Na2S2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)
State, Zip: Tennessee, 37402		PO #:						Other:	
Phone: 423-751-7636		WO #:							
Email: alsmith3@tva.gov		Project #: 49002462							
Project Name: BRF Gypsum Disposal Area		SSOW#:							
Site: Tennessee									
Sample Identification		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)	Total Number of containers	Special Instructions/Note:
BRF-1-0815		8/19/15	11:35	G	Water	X	X X X	1	6010-Ba, Be, Cu, Ag, V, Zn
BRF-47-0815		8/17/15	11:15	G	Water	X	X X X	2	6020 - Sb, As, Be, Cd, Cr, Co, Pb, Ni, Se, Ti, V, Zn
BRF-48-0815		8/18/15	11:45	G	Water	X	X X X	3	
BRF-49-0815		8/17/15	13:30	G	Water		X X X	4	
BRF-50-0815		8/19/15	10:20	G	Water	X	X X X	5	
BRF-GYPEQ Blank-0815		8/18/15	09:10	G	Water		X X X	6	
BRF-47-0815-DUP		8/17/15	11:15	G	Water	X	X X X	7	
Possible Hazard Identification		<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"/> Radiological				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)			
Deliverable Requested: I, II, III, IV, Other (specify)						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:					
Relinquished by: <i>Welden-Niel</i>		Date/Time: 8/20/2015 / 10:00		Company TVA	Received by <i>CO/TAN 12</i>	Date/Time: <i>08/20/15 10:00</i>	Company <i>TAN</i>		
Relinquished by:		Date/Time:		Company	Received by:	Date/Time:	Company		
Relinquished by:		Date/Time:		Company	Received by:	Date/Time:	Company		
Custody Seals Intact: △ Yes △ No		Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks:		1.7	

Login Sample Receipt Checklist

Client: Tennessee Valley Authority

Job Number: 490-85759-1

Login Number: 85759

List Source: TestAmerica Nashville

List Number: 1

Creator: Gambill, Shane

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	1.7 / 1.2
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.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX D

BACKGROUND GROUNDWATER DATA FOR MONITORING WELL

Appendix C
Background Groundwater Data for Monitoring Well 1

Sample Date	8/23/2006	8/23/2006	11/6/2006	2/13/2007	5/8/2007	8/7/2007	11/5/2007	2/4/2008	5/21/2008	5/6/2009
Lab ID	AG50509	AG50510	AG57291	AH23710	AH32374	L305972-01	L318678-01	L330859-01	L347120-01	L401645-01
Antimony, total (µg/L)	<3	<3	<3	<1	<1	<1	<1	<1	<1	<1
Arsenic, total (µg/L)	5	6	4	6.5	7.2	5	4.9	5	3.5	4.2
Barium, total (µg/L)	1200	1300	1500	1600	1800	61	1100	1600	1500	1400
Beryllium, total (µg/L)	<1	<1	<1	<2	<1	<1	<2	<2	<1	<2
Cadmium, total (µg/L)	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium, total (µg/L)	12	16	3	19	17	7.7	7.7	2.2	2.7	3.8
Cobalt, total (µg/L)	33	34	6	20	16	13	20	12	4.4	2.9
Copper, total (µg/L)	<10	<10	<10	5.1	3.1	1.2	2.4	1.2	1.6	1.2
Lead, total (µg/L)	2	3	1	2.8	1.9	1.2	1.1	<1	<1	<1
Mercury, total (µg/L)	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel, total (µg/L)	11	14	2	14	10	5.9	6.1	3.4	3.7	3.9
Selenium, total (µg/L)	1	<1	<1	1.7	1.6	<1	<1	<1	<1	<1
Silver, total (µg/L)	<10	<10	<10	<0.5	0.66	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium, total (µg/L)	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1
Tin, total (µg/L)	--	--	--	--	--	--	--	--	--	--
Vanadium, total (µg/L)	<10	<10	<10	17	<10	<10	<10	<10	<10	<10
Zinc, total (µg/L)	10	20	20	170	71	42	62	79	54	69
TSS (mg/L)	110	170	110	160	140	110	86	130	53	58

Sample Date	11/23/2009	11/23/2009	11/23/2009	11/23/2009	5/19/2010	11/24/2010	5/12/2011	5/12/2011	11/17/2011	11/17/2011
Lab ID	L433718-01	L433718-02	L436082-01	L436082-02	L460511-01	L490799-01	L516219-01	L516059-01	L547659-01	L547585-01
Antimony, total (µg/L)	<1	<1	--	--	<1	<1	<1	--	<1	--
Arsenic, total (µg/L)	3.4	3.2	--	--	2.6	3.4	1.8	--	4.4	--
Barium, total (µg/L)	1400	1500	--	--	1700	<2	1600	--	<2	--
Beryllium, total (µg/L)	<1	<1	--	--	<1	<1	<1	--	<1	--
Cadmium, total (µg/L)	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	--	<0.5	--
Chromium, total (µg/L)	<10	<10	--	--	<2	<2	<2	--	<2	--
Cobalt, total (µg/L)	<10	<10	--	--	2.2	2.1	2.9	--	1.2	--
Copper, total (µg/L)	<2	<2	--	--	<2	<2	<2	--	<2	--
Lead, total (µg/L)	<5	<5	--	--	<1	<1	<1	--	<1	--
Mercury, total (µg/L)	<0.2	<0.2	--	--	<0.2	<0.2	<0.2	--	<0.2	--
Nickel, total (µg/L)	<20	<20	1.3	1.4	1.6	1.4	2.1	--	<1	--
Selenium, total (µg/L)	<1	<1	--	--	<1	<1	<1	--	<1	--
Silver, total (µg/L)	10	<10	--	--	<1	<1	<1	--	<1	--
Thallium, total (µg/L)	<1	<1	--	--	<1	<1	<1	--	<1	--
Tin, total (µg/L)	<1	<1	--	--	<1	<1	<1	--	<1	--
Vanadium, total (µg/L)	<10	<10	--	--	<2	<2	<2	--	<2	--
Zinc, total (µg/L)	48	94	--	--	55	83	<10	--	<10	--
TSS (mg/L)	42	38	--	--	66	--	--	56	--	67
Turbidity, field (NTU)	--	--	--	--	67.3	59	46.7	--	53.1	--

Legend: *Bolded, italicized values indicate values screened from the background data set.*

Appendix C
Background Groundwater Data for Monitoring Well 1

Sample Date	5/22/2012	5/22/2012	5/22/2012	11/15/2012	11/15/2012	11/15/2012	11/15/2012	5/14/2013	8/6/2013	2/10/2014
Lab ID	L577143-05	L577143-06	L577143-07	L606809-05	L606809-07	L609342-05	L609342-07	L636242-05	490-32741-5	490-46522-1
Antimony, total (µg/L)	<1	<1	<1	<1	<1	--	--	<1	<2	<2
Arsenic, total (µg/L)	4.2	4.4	4.1	2.7	3	--	--	<5	4.38	5.54
Barium, total (µg/L)	1900	1800	1900	1800	1800	--	--	1800	1690	1940
Beryllium, total (µg/L)	<1	<1	<1	<1	<1	--	--	<1	<2	<2
Cadmium, total (µg/L)	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	<1	<1
Chromium, total (µg/L)	<2	<2	<2	<2	<2	--	--	<10	8.07	11.8
Cobalt, total (µg/L)	1.1	1.2	1	--	--	1.2	1.5	<5	4.95	<2
Copper, total (µg/L)	<2	<2	<2	--	--	<2	<2	<10	5.18	<10
Lead, total (µg/L)	<1	<1	<1	<1	<1	--	--	<1	2.63	<2
Mercury, total (µg/L)	<0.2	<0.2	<0.2	<0.2	<0.2	--	--	<0.2	<0.2	<0.2
Nickel, total (µg/L)	<1	<1	<1	<1	<1	--	--	<5	6.59	<2
Selenium, total (µg/L)	1.7	<1	<1	<1	<1	--	--	<5	<2	<2
Silver, total (µg/L)	<1	<1	<1	<1	<1	--	--	<1	<2	<5
Thallium, total (µg/L)	<1	<1	<1	<1	<1	--	--	<1	<2	<2
Tin, total (µg/L)	<1	<1	<1	--	--	<1	<1	<1	<50	<2
Vanadium, total (µg/L)	<2	<2	<2	--	--	<2	<2	<10	6.89	<20
Zinc, total (µg/L)	64	<10	<10	--	--	<10	<10	<50	<25	<50
TSS (mg/L)	70	69	69	54	49	--	--	62	69.5	32
Turbidity, field (NTU)	24.3	--	--	178	--	--	--	119	25.7	91

Sample Date	8/20/2014	2/25/2015	8/19/2015
Lab ID	490-60010-1	490-73237-4	490-85759-1
Antimony, total (µg/L)	<2	<2	<2
Arsenic, total (µg/L)	4.34	5.72	4.47
Barium, total (µg/L)	2180	2180	2240
Beryllium, total (µg/L)	<4	<2	<2
Cadmium, total (µg/L)	<1	<1	<1
Chromium, total (µg/L)	<2	8.14	<2
Cobalt, total (µg/L)	<20	2.41	2.54
Copper, total (µg/L)	<10	<10	<10
Lead, total (µg/L)	<2	<2	<2
Mercury, total (µg/L)	<0.2	<0.2	<0.2
Nickel, total (µg/L)	<20	<10	<2
Selenium, total (µg/L)	<20	<2	<2
Silver, total (µg/L)	<5	<5	<5
Thallium, total (µg/L)	<2	<2	<2
Tin, total (µg/L)	<2	<2	--
Vanadium, total (µg/L)	<20	2.5	<2
Zinc, total (µg/L)	<50	<25	<25
TSS (mg/L)	67.2	49.2	131
Turbidity, field (NTU)	76	79	45

Legend: *Bolded, italicized values indicate values screened from the background data set.*

APPENDIX E

STATISTICAL ANALYSIS PROCEDURE OUTPUT SUMMARY

Statistical Analysis Procedure

Background Date Range: 08/23/2006 to 08/19/2015

Background Locations: BRF-1, BRF-I

Compliance Date Range: 08/17/2015 to 08/19/2015

Compliance Locations: BRF-47, BRF-48, BRF-49, BRF-50

Comparison Method if all Background Results are Non-Detect:

STmdl = Last MDL

Statistical Test for Parametric Background Data Distributions:

STpar = Parametric Prediction Interval on Background

Statistical Test for Cases with High Percentage of Non-Detect Background Data:

STlow1 = Non-Parametric Prediction Interval on Background (ND Frequency > 55%)

Statistical Test for Cases with High Percentage of Non-Detect Background Data:

STlow2 = Poisson Prediction Interval on Background (ND Frequency > 90%)

Statistical Test for Non-Parametric Background Data Distributions:

STnon = Non-Parametric Prediction Interval on Background

Background Comparison:

Interwell

Number of Verification Samples:

0

Default Type 1 Individual Comparison Error Level

0.01

(False Positive Rate) for tests other than Prediction Interval

Non-Detect Processing (Parametric Tests):

<=55% using MDL * 1.0

>55% using MDL * 1.0

Non-Detect Processing (All Other):

<=55% using MDL * 1.0

>55% using MDL * 1.0

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
BRF-47	Antimony, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
		08/17/2015	42	100.00	No/No		N/A	2.000		<2.000	No	
BRF-47	Arsenic, total, ug/L	08/17/2015	42	47.62	No/No	STnon	91.30	7.200		11.100	Yes	
		08/17/2015	42	47.62	No/No		91.30	7.200		11.100	Yes	
BRF-47	Barium, total, ug/L	08/17/2015	42	4.76	No/No	STnon	91.30	2,240.000		37.200	No	
		08/17/2015	42	4.76	No/No		91.30	2,240.000		41.800	No	
BRF-47	Beryllium, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
		08/17/2015	42	100.00	No/No		N/A	2.000		<2.000	No	
BRF-47	Cadmium, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	1.000		<1.000	No	
		08/17/2015	42	100.00	No/No		N/A	1.000		<1.000	No	
BRF-47	Chromium, total, ug/L	08/17/2015	41	63.41	No/No	STlow1	91.11	19.000		<2.000	No	
		08/17/2015	41	63.41	No/No		91.11	19.000		<2.000	No	
BRF-47	Cobalt, total, ug/L	08/17/2015	40	55.00	No/No	STnon	90.91	33.500		8.420	No	
		08/17/2015	40	55.00	No/No		90.91	33.500		8.170	No	
BRF-47	Copper, total, ug/L	08/17/2015	42	73.81	No/No	STlow1	91.30	10.000		<10.000	No	
		08/17/2015	42	73.81	No/No		91.30	10.000		<10.000	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
BRF-47	Lead, total, ug/L	08/17/2015	41	82.93	No/No	STlow1	91.11	5.000		<2.000	No	
		08/17/2015	41	82.93	No/No		91.11	5.000		<2.000	No	
BRF-47	Mercury, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	0.200		<0.200	No	
		08/17/2015	42	100.00	No/No		N/A	0.200		<0.200	No	
BRF-47	Nickel, total, ug/L	08/17/2015	41	34.15	No/No	STnon	91.11	20.000		2.560	No	
		08/17/2015	41	34.15	No/No		91.11	20.000		2.420	No	
BRF-47	Selenium, total, ug/L	08/17/2015	41	85.37	No/No	STlow1	91.11	10.000		<2.000	No	
		08/17/2015	41	85.37	No/No		91.11	10.000		<2.000	No	
BRF-47	Silver, total, ug/L	08/17/2015	42	95.24	No/No	STlow1	91.30	10.000		<5.000	No	
		08/17/2015	42	95.24	No/No		91.30	10.000		<5.000	No	
BRF-47	Thallium, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
		08/17/2015	42	100.00	No/No		N/A	2.000		<2.000	No	
BRF-47	Vanadium, total, ug/L	08/17/2015	41	90.24	No/No	STlow1	91.11	20.000		<2.000	No	
		08/17/2015	41	90.24	No/No		91.11	20.000		<2.000	No	
BRF-47	Zinc, total, ug/L	08/17/2015	41	63.41	No/No	STlow1	91.11	83.000		64.000	No	
		08/17/2015	41	63.41	No/No		91.11	83.000		65.200	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
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Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance Trend
BRF-48	Antimony, total, ug/L	08/18/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No
BRF-48	Arsenic, total, ug/L	08/18/2015	42	47.62	No/No	STnon	91.30	7.200		4.970	No
BRF-48	Barium, total, ug/L	08/18/2015	42	4.76	No/No	STnon	91.30	2,240.000		32.000	No
BRF-48	Beryllium, total, ug/L	08/18/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No
BRF-48	Cadmium, total, ug/L	08/18/2015	42	100.00	No/No	STmdl	N/A	1.000		<1.000	No
BRF-48	Chromium, total, ug/L	08/18/2015	41	63.41	No/No	STlow1	91.11	19.000		<2.000	No
BRF-48	Cobalt, total, ug/L	08/18/2015	40	55.00	No/No	STnon	90.91	33.500		39.900	Yes
BRF-48	Copper, total, ug/L	08/18/2015	42	73.81	No/No	STlow1	91.30	10.000		<10.000	No
BRF-48	Lead, total, ug/L	08/18/2015	41	82.93	No/No	STlow1	91.11	5.000		<2.000	No
BRF-48	Mercury, total, ug/L	08/18/2015	42	100.00	No/No	STmdl	N/A	0.200		<0.200	No
BRF-48	Nickel, total, ug/L	08/18/2015	41	34.15	No/No	STnon	91.11	20.000		16.000	No

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance Trend
BRF-48	Selenium, total, ug/L	08/18/2015	41	85.37	No/No	STlow1	91.11	10.000	<2.000	No	
BRF-48	Silver, total, ug/L	08/18/2015	42	95.24	No/No	STlow1	91.30	10.000	<5.000	No	
BRF-48	Thallium, total, ug/L	08/18/2015	42	100.00	No/No	STmdl	N/A	2.000	<2.000	No	
BRF-48	Vanadium, total, ug/L	08/18/2015	41	90.24	No/No	STlow1	91.11	20.000	<2.000	No	
BRF-48	Zinc, total, ug/L	08/18/2015	41	63.41	No/No	STlow1	91.11	83.000	<25.000	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
BRF-49	Antimony, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
BRF-49	Arsenic, total, ug/L	08/17/2015	42	47.62	No/No	STnon	91.30	7.200		4.680	No	
BRF-49	Barium, total, ug/L	08/17/2015	42	4.76	No/No	STnon	91.30	2,240.000		118.000	No	
BRF-49	Beryllium, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
BRF-49	Cadmium, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	1.000		<1.000	No	
BRF-49	Chromium, total, ug/L	08/17/2015	41	63.41	No/No	STlow1	91.11	19.000		<2.000	No	
BRF-49	Cobalt, total, ug/L	08/17/2015	40	55.00	No/No	STnon	90.91	33.500		11.700	No	
BRF-49	Copper, total, ug/L	08/17/2015	42	73.81	No/No	STlow1	91.30	10.000		<10.000	No	
BRF-49	Lead, total, ug/L	08/17/2015	41	82.93	No/No	STlow1	91.11	5.000		<2.000	No	
BRF-49	Mercury, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	0.200		<0.200	No	
BRF-49	Nickel, total, ug/L	08/17/2015	41	34.15	No/No	STnon	91.11	20.000		<2.000	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance Trend
BRF-49	Selenium, total, ug/L	08/17/2015	41	85.37	No/No	STlow1	91.11	10.000	<2.000	No	
BRF-49	Silver, total, ug/L	08/17/2015	42	95.24	No/No	STlow1	91.30	10.000	<5.000	No	
BRF-49	Thallium, total, ug/L	08/17/2015	42	100.00	No/No	STmdl	N/A	2.000	<2.000	No	
BRF-49	Vanadium, total, ug/L	08/17/2015	41	90.24	No/No	STlow1	91.11	20.000	<2.000	No	
BRF-49	Zinc, total, ug/L	08/17/2015	41	63.41	No/No	STlow1	91.11	83.000	<25.000	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance	Trend
BRF-50	Antimony, total, ug/L	08/19/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
BRF-50	Arsenic, total, ug/L	08/19/2015	42	47.62	No/No	STnon	91.30	7.200		2.270	No	
BRF-50	Barium, total, ug/L	08/19/2015	42	4.76	No/No	STnon	91.30	2,240.000		395.000	No	
BRF-50	Beryllium, total, ug/L	08/19/2015	42	100.00	No/No	STmdl	N/A	2.000		<2.000	No	
BRF-50	Cadmium, total, ug/L	08/19/2015	42	100.00	No/No	STmdl	N/A	1.000		<1.000	No	
BRF-50	Chromium, total, ug/L	08/19/2015	41	63.41	No/No	STlow1	91.11	19.000		<2.000	No	
BRF-50	Cobalt, total, ug/L	08/19/2015	40	55.00	No/No	STnon	90.91	33.500		3.390	No	
BRF-50	Copper, total, ug/L	08/19/2015	42	73.81	No/No	STlow1	91.30	10.000		<10.000	No	
BRF-50	Lead, total, ug/L	08/19/2015	41	82.93	No/No	STlow1	91.11	5.000		<2.000	No	
BRF-50	Mercury, total, ug/L	08/19/2015	42	100.00	No/No	STmdl	N/A	0.200		<0.200	No	
BRF-50	Nickel, total, ug/L	08/19/2015	41	34.15	No/No	STnon	91.11	20.000		2.260	No	

Compliance Location	Parameter	Sample Date	Count Of Bkg Results	Percent of Non detects	Normal / Lognormal	Test	Confidence Level	Upper Limit	Lower Limit	Analysis Result	Exceedance Trend
BRF-50	Selenium, total, ug/L	08/19/2015	41	85.37	No/No	STlow1	91.11	10.000	<2.000	No	
BRF-50	Silver, total, ug/L	08/19/2015	42	95.24	No/No	STlow1	91.30	10.000	<5.000	No	
BRF-50	Thallium, total, ug/L	08/19/2015	42	100.00	No/No	STmdl	N/A	2.000	<2.000	No	
BRF-50	Vanadium, total, ug/L	08/19/2015	41	90.24	No/No	STlow1	91.11	20.000	3.380	No	
BRF-50	Zinc, total, ug/L	08/19/2015	41	63.41	No/No	STlow1	91.11	83.000	<25.000	No	

APPENDIX F

TIME-SERIES GRAPHS OF SAMPLE CONSTITUENT DATA

