



Tennessee Valley Authority  
Kingston Fossil Plant  
Ash Processing Area

## **GROUNDWATER MONITORING REPORT**

**SEPTEMBER 2015  
QUARTERLY MONITORING EVENT**

Prepared by

Amos L. Smith, PG

Chattanooga, Tennessee  
November 5, 2015

## DOCUMENT CERTIFICATION

I certify under penalty of law that this document was prepared by me or under my supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

 TN 1493  
Nov 16, 2015

Amos L. Smith

Professional Geologist

## TABLE OF CONTENTS

	Page
DOCUMENT CERTIFICATION .....	i
TABLE OF CONTENTS .....	ii
INTRODUCTION.....	1
FACILITY DESCRIPTION .....	1
MONITORING NETWORK DESCRIPTION.....	1
GROUNDWATER SAMPLING METHODS .....	2
SAMPLE ANALYSIS AND RESULTS .....	4
HYDROGEOLOGIC CONDITIONS.....	6
CONCLUSIONS.....	9
REFERENCES.....	9

## LIST OF TABLES

Table 1. Well Construction Details.....	2
Table 2. Summary of September 21-23, 2015 Unfiltered Groundwater Sample Results.	5
Table 3. Groundwater Levels and Conditions September 21-23, 2015.....	7

## LIST OF FIGURES

Figure 1. Groundwater Potentiometric Surface September 21-23, 2015.....	8
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## APPENDICES

- A. Field Data Sheets
- B. Laboratory Analytical Report with Chain-of-Custody Record
- C. Time Series Graphs for Sample Constituents

## **INTRODUCTION**

This report contains groundwater monitoring results for samples collected during September 21-23, 2015, from the three designated compliance monitoring wells (AD-1, AD-2, AD-3) located at the Kingston Fossil Plant (KIF) Ash Processing Area (also referred to as the Ball Field area). Sample collection and laboratory analyses were performed in accordance with TVA KIF groundwater sampling protocols designed to satisfy the US Environmental Protection Agency (US EPA) Region 4 Groundwater Sampling Operating Procedure as detailed in US EPA Document Number SESDPROC-301-R3 (US EPA, 2013) and Tennessee Department of Environment and Conservation (TDEC) Rule 0400-11-01-.04 (TDEC, 2013), except where noted in the groundwater sampling methods section. Groundwater samples were analyzed by Test America (located in Nashville, TN).

## **FACILITY DESCRIPTION**

Construction of the Ash Processing Area was initiated in March 2009 to process recovered ash material from the December 22, 2008 failure of a containment dike of the KIF Dredge Cell Class II Landfill. The current facility overlies a portion of the abandoned Ash Disposal Area which ceased operations in 1972, and the Metal Cleaning Pond which was placed into interim closure in March 2009. Since 2011, the Ash Processing Area facility has been used to receive and store fly ash from daily KIF production. In 2012, wet sluicing operations were ceased, and the site began receiving only dry fly ash. Fly ash was transported by truck from the plant hoppers to the Ash Processing Area, where it was placed and compacted. This activity ceased in September 2015.

## **MONITORING NETWORK DESCRIPTION**

The Ash Processing Area groundwater monitoring network consists of three ASTM Type II monitoring wells installed in March, April, and May 2009. The Ash Processing Area Construction and Operation Plan completed by TVA and submitted to TDEC in February 2009, identified two existing wells (10, 12A) to be utilized for facility monitoring that were later discovered to be abandoned, so new wells were installed. Each new well was constructed of two-inch diameter schedule 40 PVC with threaded/flush-joint casing and screen with 0.010-inch screen slots. Wells were screened in the first water bearing strata encountered in each borehole, with upgradient well AD-1 and downgradient well

AD-2 having approximately 3-meter (10-foot) screens set in residuum, and downgradient well AD-3 having approximately 1.5-meter (5-foot) screen set in residuum. Well construction details are presented in Table 1 below. Wells and wellhead protection features were in good condition during the September 2015 sampling event.

**Table 1. Well Construction Details**

Well No.	Well Diameter (cm)	Depth to Top of Screen (m)	Depth to Bottom of Screen (m)	Total Well Depth (m)	Material Screened
AD-1	5.1	6.5	9.6	9.8	Soil/Residuum
AD-2	5.1	4.2	7.3	7.5	Soil/Residuum
AD-3	5.1	2.8	4.4	4.6	Soil/Residuum

*Depths given are measured below the respective grade surface elevation; m - meters, cm - centimeters.*

The Ash Processing Area facility sampling frequency was changed to monthly beginning October 2009 to monitor potential releases to groundwater and to establish a baseline of natural background constituent concentrations, per the request of US EPA and TVA personnel onsite involved in recovery operations. During July 2010, the monthly sampling frequency was changed to quarterly by US EPA.

## GROUNDWATER SAMPLING METHODS

Groundwater sampling operations were performed from September 21-23, 2015. Sampling was performed in general accordance with KIF site groundwater sampling protocol (TVA-KIF-SOP-02). Depths to water and total well depths were measured and recorded prior to sampling of individual wells. A bladder pump was used to purge and sample groundwater at each monitoring well. Each well was purged according to US EPA Low Stress (low-flow) purging procedures (EPA, 2010) to reduce the likelihood of elevated sample turbidity and produce samples more representative of the groundwater conditions in the aquifer. Sampling collection protocols are based on stabilization of target field parameters, including a turbidity goal of 5 NTUs or less. Stabilization criteria were met for all parameters. Drawdown levels for all three wells exceeded the ideal target of 0.1 meters per TVA-KIF-SOP-02, dropping between 0.4 and 0.2 meters each before reaching stability. Duplicate groundwater samples were collected from AD-2.

Field-measured groundwater quality indicator parameters (i.e., temperature, specific conductance, pH, dissolved oxygen, oxidation-reduction potential, and turbidity) were

monitored during well purging using a flow-through cell and instruments (Hydrolab multi-probe and handheld Hach turbidimeter) that were standardized daily to ensure calibration. Field data sheets for the September 2015 event are included in Appendix A.

After purging, unfiltered groundwater samples were collected directly from the pump discharge tubing into laboratory-supplied, pre-preserved (as appropriate) bottles. The bottleware was certified-clean by the manufacturer, to designated specifications that are acceptable to the analytical laboratory. Samples were sealed, labeled, recorded on a Chain-of-Custody form, and placed in an iced cooler for transport (per TVA-KIF-SOP-07). Samples were delivered to Test America in Nashville, Tennessee for analysis. Copies of the Chain-of-Custody forms for the September 2015 sampling event are attached in Appendix B.

New sample tubing and in-line filters were used for each well. All non-disposable sampling equipment that came into contact with sampled media was decontaminated prior to use, between uses, and after sampling activities had been completed. Decontamination included immersion in, scrubbing with, and pumping decontamination fluids prior to air-drying/wiping and re-use/storage. These fluids include, in order of process: detergent solutions, potable water, organic desorbing agent, potable water, and a de-ionized water rinse. Fluids, disposable decontamination material, and disposable PPE were containerized onsite near the well or in centralized waste storage areas. These decontamination activities were carried out in accordance with the site standard equipment decontamination procedure (TVA-KIF-SOP-08).

## **SAMPLE ANALYSIS AND RESULTS**

Groundwater samples were analyzed for wet chemistry parameters and total (unfiltered) metals, including the 17 required inorganic constituents specified by Appendix I of TDEC Rule 0400-11-01-.04 per commitments made in the Ash Processing Area Construction and Operation Plan (TVA, 2009). Only total (unfiltered) metals results are presented herein, which is consistent with established groundwater reporting at the site. Laboratory analytical results for unfiltered samples associated with the September 2015 groundwater sampling event are summarized in Table 2. The laboratory reports presented in Appendix B include analytical methods and detection limits for each constituent. Reporting limits presented in Table 2 occasionally vary for each parameter by well and by event, due to dilutions required because of matrix interferences or parameters that exceed the calibration range of the instrument; these are explicitly noted by data qualifiers on the laboratory reports in Appendix B. Maximum contaminants levels (MCLs) listed for the constituents of concern are promulgated by either TDEC Solid Waste Processing Rule 0400-11-01-.04 Appendix III levels (TDEC, 2013) or by US EPA National Primary Drinking Water Regulations (EPA, 2009) primary MCLs as indicated on the laboratory results table (see Table 2). A not applicable (N/A) designation is shown for cobalt and vanadium in Table 2 since there is no EPA or TDEC MCL for these constituents.

Constituent concentrations reported for all samples were below US EPA primary MCLs and TDEC MCLs. Time series graphs of the 17 required inorganic constituents specified in Appendix I of TDEC Rule 0400-11-01-.04 are presented in Appendix C of this report; circled values of data presented indicate a value less than the reporting limit. All constituent concentrations appear to be stable or declining, except for cobalt. While concentrations have remained low (<11 ug/l) cobalt concentrations in wells AD-2 and AD-3 trended upward from 2009 to 2012. This corresponds to the time period immediately following intense construction activity at the site and concentrations have been declining since 2012. There is no promulgated federal or TDEC MCL for cobalt.

**Table 2. Summary of September 2015 Unfiltered Groundwater Sample Results**

Parameter	Units	KIF-AD1	KIF-AD1Dup	KIF-AD2	KIF-AD3	MCL	MCL Source
Antimony	µg/L	<2	<2	<2	<2	6	TDEC/EPA
Arsenic	µg/L	<2	1.04	0.859	0.721	10	TDEC/EPA
Barium	µg/L	51.6	25.1	24.9	38	2,000	TDEC/EPA
Beryllium	µg/L	<2	<2	<2	<2	4	TDEC/EPA
Cadmium	µg/L	<1	<1	<1	<1	5	TDEC/EPA
Chromium	µg/L	<2	<2	<2	<2	100	TDEC/EPA
Cobalt	µg/L	<2	5.11	5.04	6.44	--	N/A
Copper	µg/L	<2	<2	<2	<2	1,300	EPA
Fluoride	mg/L	0.242	<0.1	<0.1	0.145	4	TDEC/EPA
Lead	µg/L	<2	<2	<2	<2	15	TDEC/EPA
Mercury	µg/L	<0.2	<0.2	<0.2	<0.2	2	TDEC/EPA
Nickel	µg/L	<2	2.9	5.73	11.1	100	TDEC
Selenium	µg/L	<2	<2	<2	<2	50	TDEC/EPA
Silver	µg/L	<2	<2	<2	<2	100	TDEC
Thallium	µg/L	<2	<2	<2	<2	2	TDEC/EPA
Vanadium	µg/L	0.217	0.203	0.224	0.205	--	N/A
Zinc	µg/L	<25	<25	<25	<25	5,000	EPA
Turbidity	NTU	3.2	2.9		1.5	--	N/A
TSS	mg/L	<1	3.5	<1	<1	5,000	EPA

DUP – Well Sample Duplicate

MCL – Maximum Contaminant Level

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

EPA – US Environmental Protection Agency National Primary Drinking Water Regulations



The September 2015 equipment rinsate blank samples contain less than detectable concentrations for all total-fraction constituents. All analytical testing was performed within recommended sample holding times. Analytical data underwent automated data verification to review the laboratory-reported QA/QC results against project-specific QC limits to determine data usability against the project-specific and data validation guidelines.

## **HYDROGEOLOGIC CONDITIONS**

The KIF plant site is located in the Valley and Ridge physiographic province of the Appalachian Highlands region. This region is characterized by a sequence of long narrow ridges and valleys trending northeast-southwest. In general, ridges are formed by relatively resistant sandstone, limestone, and dolomite units while the valleys are underlain by soluble limestone and easily weathered shale. The controlling structural feature of the site is a series of northeast-striking thrust faults which have forced older Cambrian and Ordovician rocks over younger units. Bedrock dips southeast at angles ranging from a few degrees to about 90 degrees.

The Ash Processing Area is immediately underlain by an ash-fill layer of varying thickness, ranging from 7.4 m to 16.2 m, generally increasing from the northwest perimeter to southeast. In some areas, a thin stratum of clayey soil-fill overlies the ash, typically less than 2 m in thickness. Quaternary alluvium underlies the ash, ranging in thickness from about 3.7 m to 12.0 m. The alluvial deposits are unconsolidated and lenticular, and consist of clay, silt, and sand with occasional gravel. A thin layer of residuum is occasionally present directly above bedrock. The residuum is typically composed of clay and silt with weathered fissile shale fragments.

Bedrock underlying alluvium is primarily represented by the Conasauga Group (middle to upper Cambrian age). The only exception is a small area along the northern margin of the site underlain by the Rome formation (lower Cambrian age). Specific geologic units within the Conasauga Group represented at the site include the Nolichucky, Maryville, Rogersville, Rutledge, and Pumpkin Valley formations. These formations are locally of low water-producing capacity, and predominantly consist of shale with interbedded siltstone, limestone, and conglomerate. Total thickness of the Conasauga Group beneath the site is unknown but is estimated to be approximately 450 meters.

The Rome formation is generally composed of interbedded shale, sandstone, and siltstone. The elevation of the top of rock in the Ash Processing Area is relatively uniform, varying from approximately 213 to 217 m-MSL, based on borings conducted in January and February of 2009. Outside this area, the bedrock surface rises steeply to the west and southwest. The lower bedrock terrace corresponding to the processing area represents an erosional surface associated with the ancestral Emory River.

Groundwater movement at the plant site generally follows topography with groundwater flowing eastward and southeastward from Pine Ridge toward the Emory River. Groundwater originating on, or flowing beneath, the Ash Processing Area ultimately discharges to the KIF Intake Channel.

Groundwater levels measured in site monitoring wells on September 21-23, 2015, before sample collections are presented in Table 3. The shallow groundwater potentiometric surface derived from these measurements is shown on Figure 1; groundwater flow shown is inferred to move generally southeastward across the Ash Processing Area toward the plant Intake Channel. An average hydraulic gradient estimated between the northwestern and southeastern boundaries of the disposal area, the mean horizontal hydraulic conductivity of the alluvial aquifer underlying the Ash Processing Area, and the local Darcy flux are presented in Table 3.

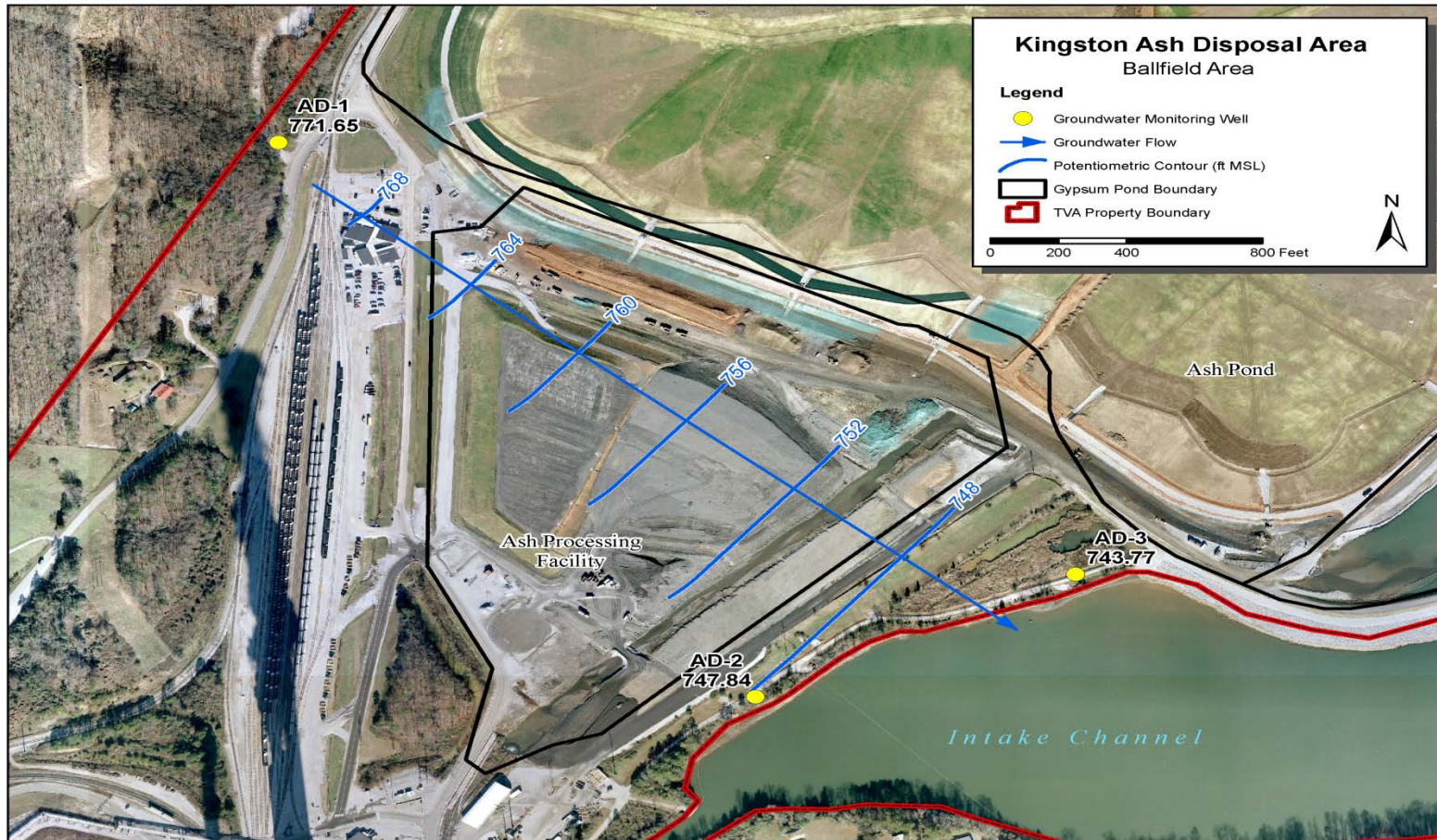
**Table 3. Groundwater Levels and Conditions September 21-23, 2015**

Well No.	Top of Casing Elevation (m)	Depth to Water (m)	Water Elevation (m-msl)*	Well Bottom Depth (m)	Average Hydraulic Gradient	Mean Horizontal Hydraulic Conductivity of Underlying Alluvial Aquifer (m/day)**	Estimated Local Darcy Flux (m/day)***
KIF-AD-1	237.74	2.54	235.20	10.85	0.0095	0.006	5.7E-05
KIF-AD-2	230.63	2.69	227.94	8.02			
KIF-AD-3	229.13	2.43	226.70	5.64			

\*msl – Mean Sea Level.

\*\*Cell fluxes modeled in *Kingston Ash Recovery Project, Groundwater Flow and Transport Model Report*, Document No. EPA-RPT-1002, range from 3.0E-05 to 2.4E-02 m/day, with an average of 8.5E-04 m/day.

Figure 1. Groundwater Potentiometric Surface September 21-23, 2015



## CONCLUSIONS

Groundwater analytical data for the June 2015 monitoring event showed all constituent concentrations were below TDEC MCLs and US EPA primary MCLs. While the concentrations remained low (<12 ug/l), cobalt had displayed an increasing trend at wells AD-2 and AD-3 which corresponds to the time of intense construction activity at the site. Since 2012 cobalt, and all sample constituents, show a stable or declining trend. Cobalt, which does not have an associated US EPA or TDEC promulgated MCL. The facility groundwater monitoring network will be sampled again during December 2015 and results will be reported once the data is available.

## REFERENCES

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- Gilbert, Richard.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*. Van Nostrand Reinhold, New York.
- Tennessee Department of Environment and Conservation (TDEC), Division of Solid Waste Management. *Rule 0400-11-01-.04 Solid Waste Processing and Disposal*. Revised March 2013.
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- TVA, *Addendum to the Kingston Ash Recovery Project, Groundwater Flow and Transport Model Report*, Document No. EPA-RPT-1002A, prepared for the Tennessee Valley Authority, Revision 00, July 3, 2012.
- US EPA Region 1, *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells*, Revision 3. January 2010.
- US EPA Region 4, *Groundwater Sampling Operating Procedure*, Revision 3. Document Number SESDPROC-301-R3. March 2013.
- US EPA, *National Primary Drinking Water Standards, Revision May 2009*. EPA 816-F-09-004. May 2009.

**APPENDIX A**  
**FIELD DATA SHEETS**



## Sheet 1 of 1

## Sheet 1 of /

TVA 30066A [2-2008]



## Sheet 1 of 1

**APPENDIX B**

**LABORATORY DATA SHEETS  
AND  
CHAIN-OF-CUSTODY RECORD**

# 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: 490-88132-1

Client Project/Site: TVA-KIF Groundwater

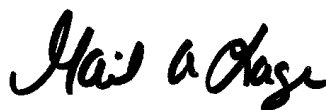
For:

Tennessee Valley Authority

PO BOX 15500

Knoxville, Tennessee 37901

Attn: Amos Smith



Authorized for release by:

10/27/2015 6:01:40 PM

Gail Lage, Senior Project Manager

(615)301-5741

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

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

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Sample Summary . . . . .	3
Case Narrative . . . . .	4
Definitions . . . . .	6
Client Sample Results . . . . .	7
QC Sample Results . . . . .	13
QC Association . . . . .	19
Chronicle . . . . .	22
Method Summary . . . . .	25
Certification Summary . . . . .	26
Chain of Custody . . . . .	28
Receipt Checklists . . . . .	32
Tracer Carrier Summary . . . . .	34

## Sample Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-88132-1	KIF-AD1-GW-092215	Water	09/22/15 10:10	09/25/15 10:15
490-88132-2	KIF-AD2-GW-092115	Water	09/22/15 10:50	09/25/15 10:15
490-88132-3	KIF-AD2-AW-092115	Water	09/22/15 10:50	09/25/15 10:15
490-88132-4	KIF-AD3-GW-092315	Water	09/22/15 10:45	09/25/15 10:15
490-88132-5	KIF-GW01-GW-092215	Water	09/22/15 12:10	09/25/15 10:15
490-88132-6	KIF-6AR-GW-092315	Water	09/22/15 12:10	09/25/15 10:15

# Case Narrative

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Job ID: 490-88132-1**

**Laboratory: TestAmerica Nashville**

## Narrative

### Job Narrative 490-88132-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 9/25/2015 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.1° C and 2.1° C.

#### RAD

Method(s) 903.0: Radium-226 prep batch 160-213602

The barium carrier recovery is outside the upper control limit (100%) at 132% for 490-88132-6 associated with the following samples: KIF-AD1-GW-092215 (490-88132-1), KIF-AD3-GW-092315 (490-88132-4), KIF-GW01-GW-092215 (490-88132-5), KIF-6AR-GW-092315 (490-88132-6), (LCS 160-213602/2-A), (LCSD 160-213602/3-A) and (MB 160-213602/1-A). There was physical evidence of matrix interference apparent during the initial preparation of the sample noted in N.C.M. 160-70353. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.

Method(s) 904.0: Radium-228 Prep Batch 160-213421:

The following sample has a barium carrier recovery above the 110% QC limit; (490-88132-C-6-A; 137%). The LCS and LCSD (laboratory control sample/laboratory control sample duplicate) have acceptable spike recoveries demonstrating acceptable sample preparation and instrument performance. The samples associated with the batch have been truncated to 100% to reduce any potential bias a high carrier recovery may have. The data have been qualified and reported.

KIF-AD1-GW-092215 (490-88132-1), KIF-AD3-GW-092315 (490-88132-4), KIF-GW01-GW-092215 (490-88132-5), KIF-6AR-GW-092315 (490-88132-6), (LCS 160-213421/2-A), (LCSD 160-213421/3-A) and (MB 160-213421/1-A)

Method(s) 904.0: Radium-228 Prep Batch 160-213421:

The absolute value of the negative result for the following sample is outside the three sigma uncertainty: KIF-GW01-GW-092215 (490-88132-5). A recount was not possible due to the passing of a full decay cycle of actinium-228. The data has been qualified and reported.

Method(s) PrecSep-21: Radium-226 Prep Batch 213602 and Radium-228 batch 213421:

Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: KIF-AD1-GW-092215 (490-88132-1), KIF-AD3-GW-092315 (490-88132-4), KIF-GW01-GW-092215 (490-88132-5) and KIF-6AR-GW-092315 (490-88132-6). A laboratory control sample and laboratory control sample duplicate were used instead.

Method(s) PrecSep-21: Radium-228 prep bath 213421 and radium-226 prep batch 213602:

The Barium carrier recovery is outside the upper control limit (110%)for the following sample: KIF-6AR-GW-092315 (490-88132-6). There was physical evidence of matrix interference apparent during the initial preparation of the sample. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.

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

## Narrative

#### HPLC/IC

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

#### Metals

Method(s) 200.8, 6020A: The initial calibration blank (ICB) had detects above the reporting limit (RL) for Nickel and Manganese. The low-level calibration verification check recovered within acceptable limits. The vial that contained the blank standard was re-poured and was reanalyzed with acceptable results. (ICB 490-285877/14)

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

## Case Narrative

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

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### Job ID: 490-88132-1 (Continued)

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#### Laboratory: TestAmerica Nashville (Continued)

##### General Chemistry

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

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2

3

4

5

6

7

8

9

10

11

12

13

14

## Definitions/Glossary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

### Qualifiers

#### HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

#### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

#### General Chemistry

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

#### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
X	Carrier 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: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-AD1-GW-092215**

**Lab Sample ID: 490-88132-1**

**Date Collected: 09/22/15 10:10**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.242		0.100	0.0600	mg/L	-		10/07/15 19:59	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Arsenic	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Barium	0.0516		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Beryllium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 19:33	1
Cadmium	ND		0.00100	0.000400	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Chromium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Cobalt	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Copper	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 19:33	1
Lead	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Nickel	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 19:33	1
Selenium	ND		0.00200	0.000600	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Silver	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Thallium	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Vanadium	0.000217	J	0.00200	0.000100	mg/L	-	09/28/15 13:09	09/29/15 20:23	1
Zinc	ND		0.0250	0.0100	mg/L	-	09/28/15 13:09	09/29/15 20:23	1

## Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L	-	09/28/15 16:31	09/30/15 16:20	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L	-		09/26/15 13:30	1

## Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0676	U	0.0699	0.0702	0.113	pCi/L	09/29/15 13:55	10/23/15 06:15	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	105		40 - 110				09/29/15 13:55	10/23/15 06:15	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.104	U	0.193	0.193	0.367	pCi/L	09/29/15 13:37	10/16/15 11:11	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	105		40 - 110				09/29/15 13:37	10/16/15 11:11	1
Y Carrier	82.2		40 - 110				09/29/15 13:37	10/16/15 11:11	1

TestAmerica Nashville

# Client Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-AD2-GW-092115**

**Lab Sample ID: 490-88132-2**

**Date Collected: 09/22/15 10:50**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND	F1	0.100	0.0600	mg/L			10/07/15 20:23	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:55	1
Arsenic	0.00104	J	0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:55	1
Barium	0.0251		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:55	1
Beryllium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 19:06	1
Cadmium	ND		0.00100	0.000400	mg/L		09/28/15 13:09	09/29/15 19:55	1
Chromium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:55	1
Cobalt	0.00511		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:55	1
Copper	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 19:06	1
Lead	ND		0.00200	0.000200	mg/L		09/28/15 13:09	09/29/15 19:55	1
Nickel	0.00290		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 19:06	1
Selenium	ND		0.00200	0.000600	mg/L		09/28/15 13:09	09/29/15 19:55	1
Silver	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:55	1
Thallium	ND		0.00200	0.000200	mg/L		09/28/15 13:09	09/29/15 19:55	1
Vanadium	0.000203	J	0.00200	0.000100	mg/L		09/28/15 13:09	09/29/15 19:55	1
Zinc	ND		0.0250	0.0100	mg/L		09/28/15 13:09	09/29/15 19:55	1

## Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L		09/28/15 16:31	09/30/15 16:13	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	3.50		1.00	0.700	mg/L			09/26/15 13:30	1

TestAmerica Nashville

# Client Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-AD2-AW-092115**

**Lab Sample ID: 490-88132-3**

**Date Collected: 09/22/15 10:50**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100	0.0600	mg/L			10/07/15 21:35	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 20:29	1
Arsenic	0.000859	J	0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 20:29	1
Barium	0.0249		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 20:29	1
Beryllium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 19:39	1
Cadmium	ND		0.00100	0.000400	mg/L		09/28/15 13:09	09/29/15 20:29	1
Chromium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 20:29	1
Cobalt	0.00504		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 20:29	1
Copper	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 19:39	1
Lead	ND		0.00200	0.000200	mg/L		09/28/15 13:09	09/29/15 20:29	1
Nickel	0.00573		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 19:39	1
Selenium	ND		0.00200	0.000600	mg/L		09/28/15 13:09	09/29/15 20:29	1
Silver	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 20:29	1
Thallium	ND		0.00200	0.000200	mg/L		09/28/15 13:09	09/29/15 20:29	1
Vanadium	0.000224	J	0.00200	0.000100	mg/L		09/28/15 13:09	09/29/15 20:29	1
Zinc	ND		0.0250	0.0100	mg/L		09/28/15 13:09	09/29/15 20:29	1

## Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L		09/28/15 16:31	09/30/15 16:22	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L			09/26/15 13:30	1

# Client Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-AD3-GW-092315**

**Lab Sample ID: 490-88132-4**

**Date Collected: 09/22/15 10:45**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.145		0.100	0.0600	mg/L	-		10/07/15 21:59	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Arsenic	0.000721	J	0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Barium	0.0380		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Beryllium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 19:44	1
Cadmium	ND		0.00100	0.000400	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Chromium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Cobalt	0.00644		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Copper	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 19:44	1
Lead	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Nickel	0.0111		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 19:44	1
Selenium	ND		0.00200	0.000600	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Silver	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Thallium	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Vanadium	0.000205	J	0.00200	0.000100	mg/L	-	09/28/15 13:09	09/29/15 20:35	1
Zinc	ND		0.0250	0.0100	mg/L	-	09/28/15 13:09	09/29/15 20:35	1

## Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L	-	09/28/15 16:31	09/30/15 16:25	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L	-		09/26/15 13:30	1

## Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0636	U	0.0526	0.0529	0.0784	pCi/L	09/29/15 13:55	10/23/15 06:15	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	82.3		40 - 110				09/29/15 13:55	10/23/15 06:15	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.126	U	0.237	0.237	0.405	pCi/L	09/29/15 13:37	10/16/15 11:11	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	82.3		40 - 110				09/29/15 13:37	10/16/15 11:11	1
Y Carrier	83.4		40 - 110				09/29/15 13:37	10/16/15 11:11	1

TestAmerica Nashville

# Client Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-GW01-GW-092215**

**Lab Sample ID: 490-88132-5**

**Date Collected: 09/22/15 12:10**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.893		0.100	0.0600	mg/L	-		10/07/15 22:23	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Arsenic	0.00123	J	0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Barium	0.0649		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Beryllium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 20:01	1
Cadmium	ND		0.00100	0.000400	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Chromium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Cobalt	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Copper	0.00222		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 20:01	1
Lead	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Nickel	0.00360		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 20:01	1
Selenium	ND		0.00200	0.000600	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Silver	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Thallium	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Vanadium	0.000407	J	0.00200	0.000100	mg/L	-	09/28/15 13:09	09/29/15 20:52	1
Zinc	ND		0.0250	0.0100	mg/L	-	09/28/15 13:09	09/29/15 20:52	1

## Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L	-	09/28/15 16:31	09/30/15 16:27	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.40		1.00	0.700	mg/L	-		09/29/15 16:30	1

## Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0682		0.0447	0.0451	0.0580	pCi/L	09/29/15 13:55	10/23/15 06:14	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	97.1		40 - 110				09/29/15 13:55	10/23/15 06:14	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.306	U	0.201	0.203	0.419	pCi/L	09/29/15 13:37	10/16/15 11:11	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	97.1		40 - 110				09/29/15 13:37	10/16/15 11:11	1
Y Carrier	80.0		40 - 110				09/29/15 13:37	10/16/15 11:11	1

TestAmerica Nashville

# Client Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-6AR-GW-092315**

**Lab Sample ID: 490-88132-6**

**Date Collected: 09/22/15 12:10**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100	0.0600	mg/L	-		10/07/15 22:47	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Arsenic	0.000751	J	0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Barium	0.0220		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Beryllium	0.000718	J	0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 20:07	1
Cadmium	0.00264		0.00100	0.000400	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Chromium	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Cobalt	0.119		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Copper	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 20:07	1
Lead	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Nickel	0.0477		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/30/15 20:07	1
Selenium	ND		0.00200	0.000600	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Silver	ND		0.00200	0.000500	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Thallium	ND		0.00200	0.000200	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Vanadium	0.000234	J	0.00200	0.000100	mg/L	-	09/28/15 13:09	09/29/15 20:57	1
Zinc	0.0373	B	0.0250	0.0100	mg/L	-	09/28/15 13:09	09/29/15 20:57	1

## Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L	-	09/28/15 16:31	09/30/15 16:34	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.40		1.00	0.700	mg/L	-		09/29/15 16:30	1

## Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0722		0.0477	0.0482	0.0635	pCi/L	09/29/15 13:55	10/23/15 06:14	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	132	X	40 - 110				09/29/15 13:55	10/23/15 06:14	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0811	U	0.297	0.297	0.515	pCi/L	09/29/15 13:37	10/16/15 11:11	1
Carrier	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Ba Carrier	137	X	40 - 110				09/29/15 13:37	10/16/15 11:11	1
Y Carrier	65.8		40 - 110				09/29/15 13:37	10/16/15 11:11	1

TestAmerica Nashville

# QC Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 490-287987/6  
Matrix: Water  
Analysis Batch: 287987

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	0.0600	mg/L			10/07/15 19:11	1

Lab Sample ID: LCS 490-287987/7  
Matrix: Water  
Analysis Batch: 287987

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	10.0	10.76		mg/L		108	90 - 110

Lab Sample ID: 490-88132-2 MS  
Matrix: Water  
Analysis Batch: 287987

Client Sample ID: KIF-AD2-GW-092115  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	ND	F1	10.0	12.44	F1	mg/L		124	80 - 120

Lab Sample ID: 490-88132-2 MSD  
Matrix: Water  
Analysis Batch: 287987

Client Sample ID: KIF-AD2-GW-092115  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	ND	F1	10.0	11.44		mg/L		114	80 - 120	8	20

## Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 490-285058/1-A  
Matrix: Water  
Analysis Batch: 285487

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 285058

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:44	1
Arsenic	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:44	1
Barium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:44	1
Cadmium	ND		0.00100	0.000400	mg/L		09/28/15 13:09	09/29/15 19:44	1
Chromium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:44	1
Cobalt	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:44	1
Lead	ND		0.00200	0.000200	mg/L		09/28/15 13:09	09/29/15 19:44	1
Selenium	ND		0.00200	0.000600	mg/L		09/28/15 13:09	09/29/15 19:44	1
Silver	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/29/15 19:44	1
Thallium	ND		0.00200	0.000200	mg/L		09/28/15 13:09	09/29/15 19:44	1
Vanadium	ND		0.00200	0.000100	mg/L		09/28/15 13:09	09/29/15 19:44	1
Zinc	0.01342	J	0.0250	0.0100	mg/L		09/28/15 13:09	09/29/15 19:44	1

Lab Sample ID: MB 490-285058/1-A  
Matrix: Water  
Analysis Batch: 285877

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 285058

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 18:54	1

TestAmerica Nashville

# QC Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

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

Lab Sample ID: MB 490-285058/1-A

Matrix: Water

Analysis Batch: 285877

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 285058

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 18:54	1
Nickel	ND		0.00200	0.000500	mg/L		09/28/15 13:09	09/30/15 18:54	1

Lab Sample ID: LCS 490-285058/2-A

Matrix: Water

Analysis Batch: 285487

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 285058

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	0.100	0.1028		mg/L		103	85 - 115
Arsenic	0.100	0.09778		mg/L		98	85 - 115
Barium	0.100	0.09640		mg/L		96	85 - 115
Cadmium	0.100	0.09861		mg/L		99	85 - 115
Chromium	0.100	0.09572		mg/L		96	85 - 115
Cobalt	0.100	0.09408		mg/L		94	85 - 115
Lead	0.100	0.09647		mg/L		96	85 - 115
Selenium	0.100	0.1002		mg/L		100	85 - 115
Silver	0.100	0.09211		mg/L		92	85 - 115
Thallium	0.100	0.09828		mg/L		98	85 - 115
Vanadium	0.100	0.09694		mg/L		97	85 - 115
Zinc	0.100	0.09376		mg/L		94	85 - 115

Lab Sample ID: LCS 490-285058/2-A

Matrix: Water

Analysis Batch: 285877

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 285058

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Beryllium	0.100	0.09878		mg/L		99	85 - 115
Copper	0.100	0.09964		mg/L		100	85 - 115
Nickel	0.100	0.09975		mg/L		100	85 - 115

Lab Sample ID: 490-88132-2 MS

Matrix: Water

Analysis Batch: 285487

Client Sample ID: KIF-AD2-GW-092115

Prep Type: Total/NA

Prep Batch: 285058

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	ND		0.100	0.1054		mg/L		105	70 - 130
Arsenic	0.00104	J	0.100	0.1002		mg/L		99	70 - 130
Barium	0.0251		0.100	0.1197		mg/L		95	70 - 130
Cadmium	ND		0.100	0.09997		mg/L		100	70 - 130
Chromium	ND		0.100	0.09582		mg/L		96	70 - 130
Cobalt	0.00511		0.100	0.09783		mg/L		93	70 - 130
Lead	ND		0.100	0.09497		mg/L		95	70 - 130
Selenium	ND		0.100	0.09380		mg/L		94	70 - 130
Silver	ND		0.100	0.08950		mg/L		90	70 - 130
Thallium	ND		0.100	0.09668		mg/L		97	70 - 130
Vanadium	0.000203	J	0.100	0.09804		mg/L		98	70 - 130
Zinc	ND		0.100	0.09203		mg/L		92	70 - 130

TestAmerica Nashville



# QC Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

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

Lab Sample ID: 490-88132-2 MS

Matrix: Water

Analysis Batch: 285877

Client Sample ID: KIF-AD2-GW-092115

Prep Type: Total/NA

Prep Batch: 285058

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.100	0.09816		mg/L		98	70 - 130
Copper	ND		0.100	0.09778		mg/L		98	70 - 130
Nickel	0.00290		0.100	0.1008		mg/L		98	70 - 130

Lab Sample ID: 490-88132-2 MSD

Matrix: Water

Analysis Batch: 285487

Client Sample ID: KIF-AD2-GW-092115

Prep Type: Total/NA

Prep Batch: 285058

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	ND		0.100	0.1079		mg/L		108	70 - 130	2	20
Arsenic	0.00104	J	0.100	0.1011		mg/L		100	70 - 130	1	20
Barium	0.0251		0.100	0.1218		mg/L		97	70 - 130	2	20
Cadmium	ND		0.100	0.09968		mg/L		100	70 - 130	0	20
Chromium	ND		0.100	0.09786		mg/L		98	70 - 130	2	20
Cobalt	0.00511		0.100	0.09994		mg/L		95	70 - 130	2	20
Lead	ND		0.100	0.09604		mg/L		96	70 - 130	1	20
Selenium	ND		0.100	0.09592		mg/L		96	70 - 130	2	20
Silver	ND		0.100	0.09083		mg/L		91	70 - 130	1	20
Thallium	ND		0.100	0.09814		mg/L		98	70 - 130	1	20
Vanadium	0.000203	J	0.100	0.1006		mg/L		100	70 - 130	3	20
Zinc	ND		0.100	0.09232		mg/L		92	70 - 130	0	20

Lab Sample ID: 490-88132-2 MSD

Matrix: Water

Analysis Batch: 285877

Client Sample ID: KIF-AD2-GW-092115

Prep Type: Total/NA

Prep Batch: 285058

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.100	0.1002		mg/L		100	70 - 130	2	20
Copper	ND		0.100	0.09982		mg/L		100	70 - 130	2	20
Nickel	0.00290		0.100	0.1030		mg/L		100	70 - 130	2	20

## Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 490-285105/1-A

Matrix: Water

Analysis Batch: 285821

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 285105

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000150	mg/L		09/28/15 16:31	09/30/15 16:05	1

Lab Sample ID: LCS 490-285105/2-A

Matrix: Water

Analysis Batch: 285821

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 285105

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00100	0.0009237		mg/L		92	85 - 115

TestAmerica Nashville

# QC Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## Method: 245.1 - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 490-285105/3-A

Matrix: Water

Analysis Batch: 285821

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 285105

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.00100	0.0008779		mg/L		88	85 - 115	5	25

Lab Sample ID: 490-88132-2 MS

Matrix: Water

Analysis Batch: 285821

Client Sample ID: KIF-AD2-GW-092115

Prep Type: Total/NA

Prep Batch: 285105

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0009345		mg/L		93	70 - 130		

Lab Sample ID: 490-88132-2 MSD

Matrix: Water

Analysis Batch: 285821

Client Sample ID: KIF-AD2-GW-092115

Prep Type: Total/NA

Prep Batch: 285105

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0008357		mg/L		84	70 - 130	11	25

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

Lab Sample ID: MB 490-284742/1

Matrix: Water

Analysis Batch: 284742

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L			09/26/15 13:30	1

Lab Sample ID: LCS 490-284742/2

Matrix: Water

Analysis Batch: 284742

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	100	106.5		mg/L		107	90 - 110		

Lab Sample ID: 490-87990-B-2 DU

Matrix: Water

Analysis Batch: 284742

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	11.0		3.333	F3	mg/L		107	20

Lab Sample ID: 490-88101-C-1 DU

Matrix: Water

Analysis Batch: 284742

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	14.2		12.80		mg/L		10	20

TestAmerica Nashville

# QC Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

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

Lab Sample ID: MB 490-285141/1-A

Matrix: Water

Analysis Batch: 285350

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L			09/29/15 16:30	1

Lab Sample ID: MB 490-285350/1

Matrix: Water

Analysis Batch: 285350

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		1.00	0.700	mg/L			09/29/15 16:30	1

Lab Sample ID: LCS 490-285350/2

Matrix: Water

Analysis Batch: 285350

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	100	99.40		mg/L		99	90 - 110

Lab Sample ID: 490-88191-B-3 DU

Matrix: Water

Analysis Batch: 285350

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	1.60		1.700		mg/L		6	20

Lab Sample ID: 490-88209-F-1 DU

Matrix: Water

Analysis Batch: 285350

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	4.83		5.000		mg/L		3	20

## Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-213602/1-A

Matrix: Water

Analysis Batch: 218112

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 213602

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.01918	U	0.0457	0.0457	0.0813	pCi/L	09/29/15 13:55	10/23/15 06:16	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	100		40 - 110	09/29/15 13:55	10/23/15 06:16	1

TestAmerica Nashville

# QC Sample Results

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCS 160-213602/2-A

Matrix: Water

Analysis Batch: 218112

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 213602

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	MDC	Unit	%Rec	%Rec. Limits
Radium-226	11.2	11.06		1.08	0.0741	pCi/L	99	68 - 137

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

Lab Sample ID: LCSD 160-213602/3-A

Matrix: Water

Analysis Batch: 218112

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 213602

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226	11.2	13.31		1.29	0.0836	pCi/L	119	68 - 137	0.95	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	95.6		40 - 110

# QC Association Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## HPLC/IC

### Analysis Batch: 287987

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	300.0	
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	300.0	
490-88132-2 MS	KIF-AD2-GW-092115	Total/NA	Water	300.0	
490-88132-2 MSD	KIF-AD2-GW-092115	Total/NA	Water	300.0	
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	300.0	
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	300.0	
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	300.0	
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	300.0	
LCS 490-287987/7	Lab Control Sample	Total/NA	Water	300.0	
MB 490-287987/6	Method Blank	Total/NA	Water	300.0	

## Metals

### Prep Batch: 285058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	200.8	
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	200.8	
490-88132-2 MS	KIF-AD2-GW-092115	Total/NA	Water	200.8	
490-88132-2 MSD	KIF-AD2-GW-092115	Total/NA	Water	200.8	
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	200.8	
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	200.8	
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	200.8	
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	200.8	
LCS 490-285058/2-A	Lab Control Sample	Total/NA	Water	200.8	
MB 490-285058/1-A	Method Blank	Total/NA	Water	200.8	

### Prep Batch: 285105

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	245.1	
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	245.1	
490-88132-2 MS	KIF-AD2-GW-092115	Total/NA	Water	245.1	
490-88132-2 MSD	KIF-AD2-GW-092115	Total/NA	Water	245.1	
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	245.1	
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	245.1	
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	245.1	
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	245.1	
LCS 490-285105/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 490-285105/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
MB 490-285105/1-A	Method Blank	Total/NA	Water	245.1	

### Analysis Batch: 285487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	200.8	285058
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	200.8	285058
490-88132-2 MS	KIF-AD2-GW-092115	Total/NA	Water	200.8	285058
490-88132-2 MSD	KIF-AD2-GW-092115	Total/NA	Water	200.8	285058
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	200.8	285058
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	200.8	285058
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	200.8	285058
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	200.8	285058

TestAmerica Nashville

# QC Association Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## Metals (Continued)

### Analysis Batch: 285487 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 490-285058/2-A	Lab Control Sample	Total/NA	Water	200.8	285058
MB 490-285058/1-A	Method Blank	Total/NA	Water	200.8	285058

### Analysis Batch: 285821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	245.1	285105
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	245.1	285105
490-88132-2 MS	KIF-AD2-GW-092115	Total/NA	Water	245.1	285105
490-88132-2 MSD	KIF-AD2-GW-092115	Total/NA	Water	245.1	285105
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	245.1	285105
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	245.1	285105
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	245.1	285105
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	245.1	285105
LCS 490-285105/2-A	Lab Control Sample	Total/NA	Water	245.1	285105
LCSD 490-285105/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	285105
MB 490-285105/1-A	Method Blank	Total/NA	Water	245.1	285105

### Analysis Batch: 285877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	200.8	285058
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	200.8	285058
490-88132-2 MS	KIF-AD2-GW-092115	Total/NA	Water	200.8	285058
490-88132-2 MSD	KIF-AD2-GW-092115	Total/NA	Water	200.8	285058
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	200.8	285058
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	200.8	285058
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	200.8	285058
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	200.8	285058
LCS 490-285058/2-A	Lab Control Sample	Total/NA	Water	200.8	285058
MB 490-285058/1-A	Method Blank	Total/NA	Water	200.8	285058

## General Chemistry

### Analysis Batch: 284742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-87990-B-2 DU	Duplicate	Total/NA	Water	SM 2540D	
490-88101-C-1 DU	Duplicate	Total/NA	Water	SM 2540D	
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	SM 2540D	
490-88132-2	KIF-AD2-GW-092115	Total/NA	Water	SM 2540D	
490-88132-3	KIF-AD2-AW-092115	Total/NA	Water	SM 2540D	
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	SM 2540D	
LCS 490-284742/2	Lab Control Sample	Total/NA	Water	SM 2540D	
MB 490-284742/1	Method Blank	Total/NA	Water	SM 2540D	

### Leach Batch: 285141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 490-285141/1-A	Method Blank	Total/NA	Water	D3987-85	

### Analysis Batch: 285350

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	SM 2540D	

TestAmerica Nashville

# QC Association Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## General Chemistry (Continued)

### Analysis Batch: 285350 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	SM 2540D	285141
490-88191-B-3 DU	Duplicate	Total/NA	Water	SM 2540D	
490-88209-F-1 DU	Duplicate	Total/NA	Water	SM 2540D	
LCS 490-285350/2	Lab Control Sample	Total/NA	Water	SM 2540D	
MB 490-285141/1-A	Method Blank	Total/NA	Water	SM 2540D	
MB 490-285350/1	Method Blank	Total/NA	Water	SM 2540D	

## Rad

### Prep Batch: 213421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	PrecSep_0	
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	PrecSep_0	
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	PrecSep_0	
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	PrecSep_0	

### Prep Batch: 213602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-88132-1	KIF-AD1-GW-092215	Total/NA	Water	PrecSep-21	
490-88132-4	KIF-AD3-GW-092315	Total/NA	Water	PrecSep-21	
490-88132-5	KIF-GW01-GW-092215	Total/NA	Water	PrecSep-21	
490-88132-6	KIF-6AR-GW-092315	Total/NA	Water	PrecSep-21	
LCS 160-213602/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-213602/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	
MB 160-213602/1-A	Method Blank	Total/NA	Water	PrecSep-21	

# Lab Chronicle

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-AD1-GW-092215**

**Date Collected: 09/22/15 10:10**

**Date Received: 09/25/15 10:15**

**Lab Sample ID: 490-88132-1**

**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	300.0		1	10 mL		287987	10/07/15 19:59	CLN	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285487	09/29/15 20:23	KKK	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285877	09/30/15 19:33	KKK	TAL NSH
Total/NA	Prep	245.1			30 mL	30 mL	285105	09/28/15 16:31	RDF	TAL NSH
Total/NA	Analysis	245.1		1	30 mL	30 mL	285821	09/30/15 16:20	RDF	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	284742	09/26/15 13:30	SMB	TAL NSH
Total/NA	Prep	PrecSep-21			948.54 mL	1.0 g	213602	09/29/15 13:55	CMC	TAL SL
Total/NA	Analysis	903.0		1	948.54 mL		218112	10/23/15 06:15	MFM	TAL SL
Total/NA	Prep	PrecSep_0			948.55 mL	1.0 g	213421	09/29/15 13:37	JAC	TAL SL
Total/NA	Analysis	904.0		1	948.55 mL		216760	10/16/15 11:11	MFM	TAL SL

**Client Sample ID: KIF-AD2-GW-092115**

**Date Collected: 09/22/15 10:50**

**Date Received: 09/25/15 10:15**

**Lab Sample ID: 490-88132-2**

**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	300.0		1	10 mL		287987	10/07/15 20:23	CLN	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285487	09/29/15 19:55	KKK	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285877	09/30/15 19:06	KKK	TAL NSH
Total/NA	Prep	245.1			30 mL	30 mL	285105	09/28/15 16:31	RDF	TAL NSH
Total/NA	Analysis	245.1		1	30 mL	30 mL	285821	09/30/15 16:13	RDF	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	284742	09/26/15 13:30	SMB	TAL NSH

**Client Sample ID: KIF-AD2-AW-092115**

**Date Collected: 09/22/15 10:50**

**Date Received: 09/25/15 10:15**

**Lab Sample ID: 490-88132-3**

**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	300.0		1	10 mL		287987	10/07/15 21:35	CLN	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285487	09/29/15 20:29	KKK	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285877	09/30/15 19:39	KKK	TAL NSH
Total/NA	Prep	245.1			30 mL	30 mL	285105	09/28/15 16:31	RDF	TAL NSH
Total/NA	Analysis	245.1		1	30 mL	30 mL	285821	09/30/15 16:22	RDF	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	284742	09/26/15 13:30	SMB	TAL NSH

TestAmerica Nashville



# Lab Chronicle

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-AD3-GW-092315**

**Date Collected: 09/22/15 10:45**

**Date Received: 09/25/15 10:15**

**Lab Sample ID: 490-88132-4**

**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	300.0		1	10 mL		287987	10/07/15 21:59	CLN	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285487	09/29/15 20:35	KKK	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285877	09/30/15 19:44	KKK	TAL NSH
Total/NA	Prep	245.1			30 mL	30 mL	285105	09/28/15 16:31	RDF	TAL NSH
Total/NA	Analysis	245.1		1	30 mL	30 mL	285821	09/30/15 16:25	RDF	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	284742	09/26/15 13:30	SMB	TAL NSH
Total/NA	Prep	PrecSep-21			920.99 mL	1.0 g	213602	09/29/15 13:55	CMC	TAL SL
Total/NA	Analysis	903.0		1	920.99 mL		218112	10/23/15 06:15	MFM	TAL SL
Total/NA	Prep	PrecSep_0			920.99 mL	1.0 g	213421	09/29/15 13:37	JAC	TAL SL
Total/NA	Analysis	904.0		1	920.99 mL		216760	10/16/15 11:11	MFM	TAL SL

**Client Sample ID: KIF-GW01-GW-092215**

**Date Collected: 09/22/15 12:10**

**Date Received: 09/25/15 10:15**

**Lab Sample ID: 490-88132-5**

**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	300.0		1	10 mL		287987	10/07/15 22:23	CLN	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285487	09/29/15 20:52	KKK	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285877	09/30/15 20:01	KKK	TAL NSH
Total/NA	Prep	245.1			30 mL	30 mL	285105	09/28/15 16:31	RDF	TAL NSH
Total/NA	Analysis	245.1		1	30 mL	30 mL	285821	09/30/15 16:27	RDF	TAL NSH
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	285350	09/29/15 16:30	SMB	TAL NSH
Total/NA	Prep	PrecSep-21			905.14 mL	1.0 g	213602	09/29/15 13:55	CMC	TAL SL
Total/NA	Analysis	903.0		1	905.14 mL		218112	10/23/15 06:14	MFM	TAL SL
Total/NA	Prep	PrecSep_0			905.14 mL	1.0 g	213421	09/29/15 13:37	JAC	TAL SL
Total/NA	Analysis	904.0		1	905.14 mL		216760	10/16/15 11:11	MFM	TAL SL

**Client Sample ID: KIF-6AR-GW-092315**

**Date Collected: 09/22/15 12:10**

**Date Received: 09/25/15 10:15**

**Lab Sample ID: 490-88132-6**

**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	300.0		1	10 mL		287987	10/07/15 22:47	CLN	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285487	09/29/15 20:57	KKK	TAL NSH
Total/NA	Prep	200.8			50 mL	50 mL	285058	09/28/15 13:09	ZLN	TAL NSH
Total/NA	Analysis	200.8		1	50 mL	50 mL	285877	09/30/15 20:07	KKK	TAL NSH
Total/NA	Prep	245.1			30 mL	30 mL	285105	09/28/15 16:31	RDF	TAL NSH
Total/NA	Analysis	245.1		1	30 mL	30 mL	285821	09/30/15 16:34	RDF	TAL NSH

TestAmerica Nashville

# Lab Chronicle

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

**Client Sample ID: KIF-6AR-GW-092315**

**Lab Sample ID: 490-88132-6**

**Date Collected: 09/22/15 12:10**

**Matrix: Water**

**Date Received: 09/25/15 10:15**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540D		1	1000 mL	1000 mL	285350	09/29/15 16:30	SMB	TAL NSH
Total/NA	Prep	PrecSep-21			949.25 mL	1.0 g	213602	09/29/15 13:55	CMC	TAL SL
Total/NA	Analysis	903.0		1	949.25 mL		218112	10/23/15 06:14	MFM	TAL SL
Total/NA	Prep	PrecSep_0			949.25 mL	1.0 g	213421	09/29/15 13:37	JAC	TAL SL
Total/NA	Analysis	904.0		1	949.25 mL		216760	10/16/15 11:11	MFM	TAL SL

## Laboratory References:

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

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

# Method Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL NSH
200.8	Metals (ICP/MS)	EPA	TAL NSH
245.1	Mercury (CVAA)	EPA	TAL NSH
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL NSH
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL

## Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

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

## Laboratory References:

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

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

# Certification Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## 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	10-09-16
New Jersey	NELAP	2	TN965	10-30-15 *
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	08-31-16
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

## Laboratory: TestAmerica St. Louis

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-16
California	ELAP	9	2886	03-31-16
Connecticut	State Program	1	PH-0241	03-31-17

\* Certification renewal pending - certification considered valid.

TestAmerica Nashville

# Certification Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

## Laboratory: TestAmerica St. Louis (Continued)

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E87689	06-30-16
Illinois	NELAP	5	200023	11-30-15
Iowa	State Program	7	373	12-01-16
Kansas	NELAP	7	E-10236	10-31-15 *
Kentucky (DW)	State Program	4	90125	12-31-15
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-16
Louisiana (DW)	NELAP	6	LA150017	12-31-16
Maryland	State Program	3	310	09-30-16
Missouri	State Program	7	780	06-30-15 *
Nevada	State Program	9	MO000542016-1	07-31-16
New Jersey	NELAP	2	MO002	09-30-15 *
New York	NELAP	2	11616	03-31-16
North Dakota	State Program	8	R207	06-30-16
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-16
Pennsylvania	NELAP	3	68-00540	02-28-16
South Carolina	State Program	4	85002001	06-30-15 *
Texas	NELAP	6	T104704193-15-9	07-31-16
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542015-7	07-31-16
Virginia	NELAP	3	460230	06-14-16
Washington	State Program	10	C592	08-30-16
West Virginia DEP	State Program	3	381	08-31-16

\* Certification renewal pending - certification considered valid.

TestAmerica Nashville

## COOLER RECEIPT FORM



490-88132 Chain of Custody

Cooler Received/Opened On: 9/25/2015 @1015

1. Tracking # 7883 (last 4 digits, FedEx)

Courier: Fed-Ex IR Gun ID: 14740456

2. Temperature of rep. sample or temp blank when opened: 2.1 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) EA

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? 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 # NA

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

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) ECA

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) ECA

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

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



## COOLER RECEIPT FORM

Loc: 490  
88132

Cooler Received/Opened On 9/25/2015 @1015

1. Tracking # 7920 (last 4 digits, FedEx)

Courier: FedEx IR Gun ID 97310166

2. Temperature of rep. sample or temp blank when opened: 0.1 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) HKG

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? 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 # NA

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

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) EZA

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) EZA

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

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

**TestAmerica**  
THE LEADER IN ENVIRONMENTAL TESTING

Page 30 of 34



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

*(continued)*

**TestAmerica**  
THE LEADER IN ENVIRONMENTAL TESTING

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Page 31 of 34

10/27/2015

## Login Sample Receipt Checklist

Client: Tennessee Valley Authority

Job Number: 490-88132-1

Login Number: 88132

List Number: 1

Creator: Abernathy, Eric

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Tennessee Valley Authority

Job Number: 490-88132-1

Login Number: 88132

List Number: 2

Creator: Daniels, Brian J

List Source: TestAmerica St. Louis

List Creation: 09/29/15 10:39 AM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	5.1
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Tracer/Carrier Summary

Client: Tennessee Valley Authority  
Project/Site: TVA-KIF Groundwater

TestAmerica Job ID: 490-88132-1

### Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

#### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)
490-88132-1	KIF-AD1-GW-092215	105
490-88132-4	KIF-AD3-GW-092315	82.3
490-88132-5	KIF-GW01-GW-092215	97.1
490-88132-6	KIF-6AR-GW-092315	132 X
LCS 160-213602/2-A	Lab Control Sample	101
LCSD 160-213602/3-A	Lab Control Sample Dup	95.6
MB 160-213602/1-A	Method Blank	100

#### Tracer/Carrier Legend

Ba = Ba Carrier

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

Matrix: Water

Prep Type: Total/NA

#### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
490-88132-1	KIF-AD1-GW-092215	105	82.2
490-88132-4	KIF-AD3-GW-092315	82.3	83.4
490-88132-5	KIF-GW01-GW-092215	97.1	80.0
490-88132-6	KIF-6AR-GW-092315	137 X	65.8

#### Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

## **APPENDIX C**

### **TIME SERIES GRAPHS FOR APPENDIX I CONSTITUENTS**

