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Env. Document Type: Solid Waste Correspondence

November 9, 2004

Mr. David Fugate, P.G.
Geologist
Knoxville Environmental Field Office
Division of Solid Waste Management
Tennessee Department of Environment
and Conservation
2700 Middlebrook Pike, Suite 220
Knoxville, Tennessee 37921-5602

TENNESSEE VALLEY AUTHORITY – KINGSTON FOSSIL PLANT – ASH DISPOSAL AREA – IDL 73-0094 – SEPTEMBER 2004 BASELINE GROUNDWATER MONITORING REPORT

Dear Mr. Fugate:

Please find enclosed the quarterly baseline groundwater monitoring report for samples collected September 14-16, 2004 at designated compliance wells surrounding the subject facility. Statistical testing will begin following completion of two years of quarterly baseline monitoring, i.e., after the March 2005 sampling event.

If you have questions regarding the report, please contact Amos Smith at (423) 751-3522 or Linda Campbell at (865) 717-2157.

I certify this information was prepared by a system designed to ensure 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.

Gordon G. Park
Manager of Permitted Programs
Environmental Affairs
5D Lookout Place

ALS
ALS:SMF
Enclosures
cc (Enclosures):
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EDM, WT CA-K
Prepared by J. Mark Boggs, reviewed by Amos L. Smith

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Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

November 9, 2004

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Manager of Permitted Programs
Environmental Affairs
5D Lookout Place

Enclosures

Tennessee Valley Authority
Kingston Fossil Plant
Ash Disposal Area (IDL 73-0094)

GROUNDWATER MONITORING REPORT
SEPTEMBER 2004 SAMPLING EVENT

Prepared by

J. Mark Boggs, P.G.

Tennessee Valley Authority
Knoxville, Tennessee

November 8, 2004

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INTRODUCTION

This report contains quarterly baseline monitoring results for groundwater samples collected on September 14-16, 2004 from the four designated compliance monitoring wells surrounding the Kingston Fossil Plant (KIF) ash disposal area. These data represent the sixth set of quarterly baseline monitoring data for the facility which began in June 2003. Groundwater samples were analyzed by the TVA Environmental Chemistry Laboratory, an EPA-certified laboratory. Sample collection and laboratory analyses were performed in accordance with Tennessee Department of Conservation and Environment (TDEC) Rule 1200-1-7-.04 and the facility groundwater monitoring plan approved by TDEC (August 1996). Since baseline data are collected for the purpose of establishing statistical testing limits, no statistical evaluation the current monitoring data was performed. Statistical testing will begin following completion of two years of quarterly baseline monitoring, i.e., after the March 2005 sampling event.

GROUNDWATER SAMPLING

Groundwater sampling was conducted by S.A. Grindstaff and J. E. Stockburger on September 14 and 16, 2004 at upgradient well 16A and downgradient wells 4B, 6A and 13B. Samples were collected from wells 6A, 13B and 16A were collected on September 14; however, because a bee infestation sampling at well 4B was delayed until September 16. A Grundfos Rediflow submersible pump was used for purging and sampling wells 13B and 16A, whereas wells 4B and 6A were purged until dry with the submersible pump and sampled with disposable bailers following recovery. Duplicate samples were collected from well 16A, and an equipment blank was collected between wells 13B and 16A. Field parameters (i.e., temperature, specific conductance, pH, dissolved oxygen, and oxidation-reduction potential) were monitored during well purging using a flow-through cell and calibrated instruments. Each well was considered properly evacuated when field parameters remained stable during purging a minimum of two well volumes or the well was purged to dryness. Field data sheets are included in Appendix A.

Please note that no samples of leachate were collected from the disposal facility. As described in the Facility Operations Manual, engineering measures incorporated in the facility design should result in minimal ash leachate production. Therefore, leachate sampling is not included in the approved groundwater monitoring plan.

Immediately following collection, samples were transferred to new sample bottles provided by the laboratory with appropriate preservatives, where applicable. The samples were then sealed, labeled, recorded on a custody form, and placed in an iced cooler for transport. Samples from wells 6A, 13B and 16A were delivered to the TVA Environmental Chemistry Laboratory on September 16, whereas samples from 4B were delivered on September 17. A copy of the sample custody record is given in Appendix B.

ANALYTICAL RESULTS

Groundwater samples were analyzed for the 17 required inorganic constituents specified in Appendix I of TDEC Rule 1200-1-7. Laboratory results completed on October 12, 2004 are summarized in Table 1. The laboratory report presented in Appendix C includes analytical methods and detection limits for each constituent. Constituent concentrations reported for all samples were below drinking water maximum contaminant limits (MCL) with the exception of a silver exceedence at the well 6A.

All analytical testing was conducted within recommended sample holding times. There were no detections of the required 17 inorganic constituents in the equipment blank.

HYDROGEOLOGIC CONDITIONS

The Kingston 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 pond area is immediately underlain by Quaternary alluvium ranging in thickness from about 1.5 m along a portion of the northern perimeter of the site to maximum of 20 m on the western boundary. 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 beneath the alluvial deposits at the disposal site 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 pond area is relatively uniform, varying from approximately 213 to 218 m-MSL. Outside this area the bedrock surface rises steeply to the west and southwest. The lower bedrock terrace corresponding to the disposal area represents an erosion surface associated with the ancestral Emory River.

Table 1. September 14-16, 2004 Baseline Groundwater Monitoring Data

Analytical Results for Appendix I Inorganic Constituents						MCL	Comparison to MCL[b]			
Constituent	Units	Well No.					Well No.			
		4B downgradient	6A downgradient	13B downgradient	16A[a] upgradient		4B	6A	13B	16A
Antimony	µg/L	<3	<3	4	<3	6	L	L	L	L
Arsenic	µg/L	1	13	2	<1.5	50	L	L	L	L
Barium	µg/L	40	160	330	50	2,000	L	L	L	L
Beryllium	µg/L	<1	<1	<1	<1	4	L	L	L	L
Cadmium	µg/L	0.1	<0.1	<0.1	<0.1	5	L	L	L	L
Chromium	µg/L	1	1	<1	<1	100	L	L	L	L
Cobalt	µg/L	5	10	6	2	--	--	--	--	--
Copper	µg/L	<10	<10	<10	<10	1,000	L	L	L	L
Fluoride	µg/L	<100	<100	190	500	4,000	L	L	L	L
Lead	µg/L	<1	<1	<1	<1	50	L	L	L	L
Mercury	µg/L	<0.1	<0.1	<0.1	<0.1	2	L	L	L	L
Nickel	µg/L	<1	3	<1	<1	100	L	L	L	L
Selenium	µg/L	<1	<1	<1	<1	50	L	L	L	L
Silver	µg/L	<10	190	<10	<10	100	L	G	L	L
Thallium	µg/L	<2	<2	<2	<2	2	L	L	L	L
Vanadium	µg/L	<10	150	<10	<10	--	--	--	--	--
Zinc	µg/L	<10	<10	<10	<10	5,000	L	L	L	L

[a] *reported concentrations are averages of duplicate samples.*

[b] *"L" = less than or equal to MCL, "G" = greater than MCL.*

Groundwater movement at the site generally follows topography with groundwater flowing eastward and southeastward from Pine Ridge toward the reservoir. Groundwater originating on, or flowing beneath, the ash pond area ultimately discharges to the reservoir without traversing private property.

Groundwater levels measured in site monitoring wells on September 13 prior to sample collection are presented in Table 2. The groundwater potentiometric surface derived from these measurements is shown on Figure 1. Groundwater generally flows eastward across the ash disposal area toward the reservoir. An average hydraulic gradient of approximately 0.011 is estimated between the western and eastern boundaries of the disposal area. The shallow alluvial aquifer underlying the ash disposal area exhibits a mean horizontal hydraulic conductivity of 0.006 m/d. The local Darcy flux is therefore estimated to be approximately 6.6×10^{-5} m/d.

Table 2. Groundwater Levels Measured on September 13, 2004

Well No.	Well Depth (m)	Depth to Water (m)	Top of Casing Elevation (m)	Water Elevation (m)
4B	12.79	4.04	230.72	226.68
6A	8.89	3.34	230.13	226.79
13B	25.70	3.10	234.85	231.75
16A	20.20	1.41	234.26	232.85

CONCLUSIONS

Groundwater analytical data for the September 14-16, 2004 baseline sampling event show a secondary MCL exceedence for silver at well 6A. Otherwise, concentrations of the 17 Appendix I inorganic constituents were below MCLs in all samples.

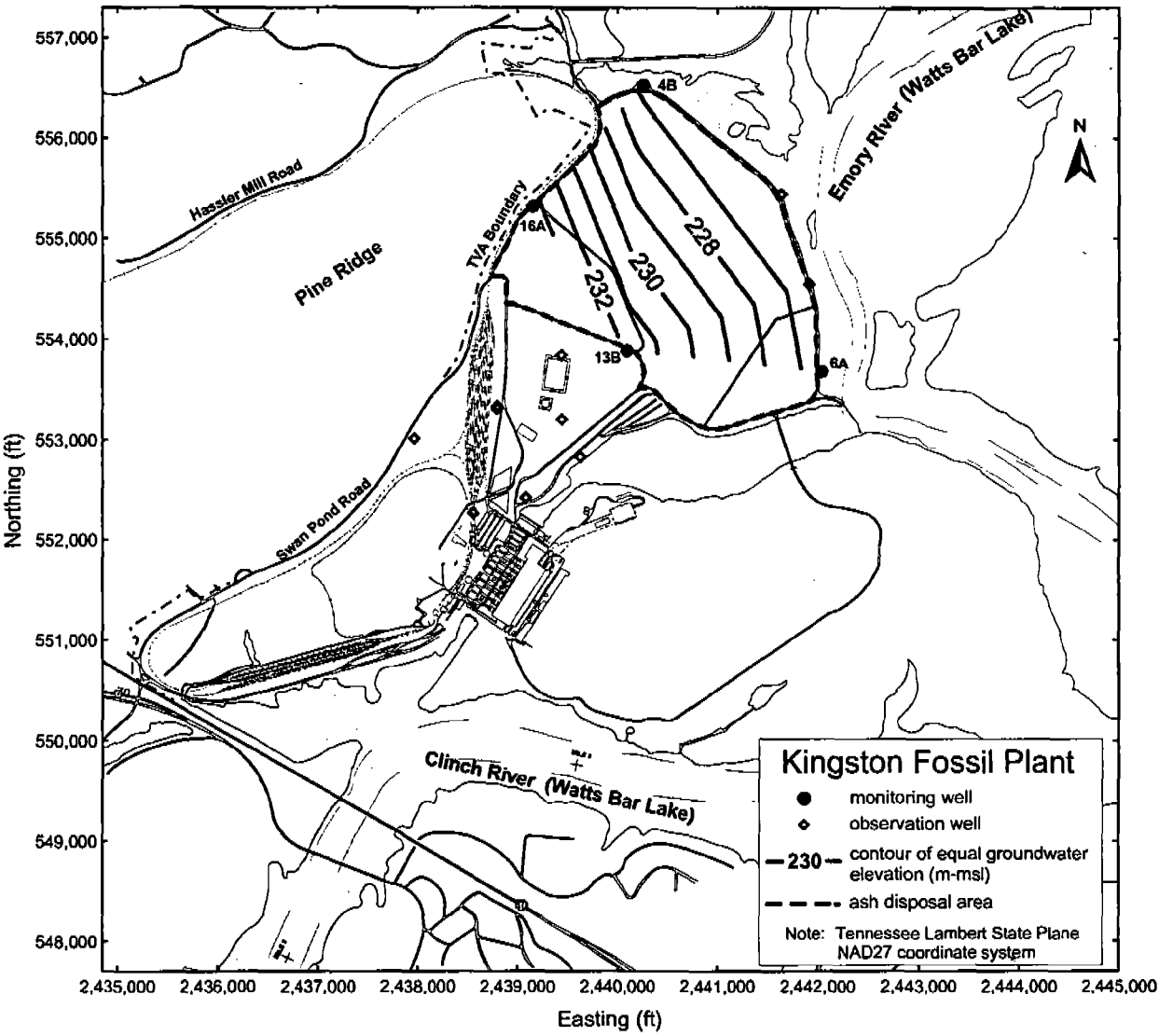

Figure 1. Groundwater Potentiometric Surface on September 13, 2004

APPENDIX A

FIELD DATA SHEETS

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Project/Site	Well Number	Purge Date	Year	Month	Day
KINGSTON	4B 84068		04	09	16

Depth to Water (m)	Bottom of Well (m)	Well Diameter (mm)	Survey Leader	Field Crew
4.32 4195	12.72 4194	102 4188	JES	

☑ Depth of Screen ☐ Open Bore Hole

(m)	To	(m)	Sample Label	
12.37 4191	To	12.82 4190	KIF-4B-091604	☑ Unfiltered ☐ Filtered ☐ Both Filter Type and Size:

[Bottom of Well - Depth to Water] x Volume Factor =	Well Volume	Target Purge Volume	Actual Purge Volume
[(12.72)m - (4.32)m] x (8.107)L/m=	68.1 (L)	136.2 (L)	95 (L) 4186

Purge Pump: ☐ Bladder ☐ Centrifugal ☐ Peristaltic ☐ Dedicated Other (list): REDIFLO

Sample Pump: ☐ Bladder ☐ Centrifugal ☐ Peristaltic ☐ Dedicated Other (list): REDIFLO

Notes and WQ Observations	Time (ET) 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 40HZ →	0756	3.0	4.32	12.5						
6	0758	3.0	5.62		17.4	6.3	1.9	793	579	
12	0800	3.75	—		17.4	6.3	1.9	793	579	
19.5	0802	3.0	7.04		17.4	6.3	1.9	793	579	
25.5	0804	2.25	—		16.8	6.6	0.3	776	554	
31	0806	2.75	—		17.1	6.6	0.2	777	550	
36.5 (70HZ)	0808	5.0	8.71		17.3	6.6	0.2	777	544	
51.5	0811	4.0	9.77		17.5	6.6	0.2	777	540	
67.5	0815	3.5	11.56		17.5	6.5	0.2	778	535	
	0817	3.5	—		17.7	6.5	0.2	781	533	
85	0820	3.5	12.3	12.5	17.9	6.6	0.3	778	528	
30HZ	0900	2.0	07.51							
	0902	2.0	—		17.0	6.6	0.5	734	510	
	0903	2.0	0834		17.2	6.6	0.4	737	503	
+10	0905	2.0	0857	12.5	17.2	6.6	0.4	738	500	

Remarks: DID COMPLETE PURGE - ALLOWED TO RECHARGE 40 MINUTES - RESUMED PUMPING AT SLOWER RATE - WAS ABLE TO AVOID DISTURBING YELLOW JACKETS.

Reviewed By: [signature] Survey Leader 9/16/04 Date [signature] Project Leader 9/20/04 Date

Sample Collector: JES

Sample Date Year	Month	Day	Time
04	09	16	0905 (ET) CT

Pump Duration 29 min 72004 "999" = 2 days

Sample Readings

Analysis Time (ET)/CT	Pump Rate (L/min) 4193	Depth to Water (m)	Pump Depth (m) 4192	Temp °C 10 EPA 170.1	pH (s.u.) 400 EPA 150.1	DO (mg/L) 300 EPA 360.1	COND (umhos/cm) 94 EPA 120.1	(+/-) ORP (mV) 90 SM 2580B	Turbidity (NTU) EPA 180.1
0905	2.0	8.57	12.5	17.2	6.6	0.4	738	500	—

Additional Sample Data

Analyst: JES	415 Phenol Alkalinity mg/L (EPA 310.1)	431 Total Alk. mg/L (EPA 310.1)	436 Mineral Acidity mg/L (EPA 305.1)	437 CO_2 Acidity mg/L (EPA 305.1)
Value		242		76
Time		1444		1431
Initial		JES		JES

Date Analyzed: Year 04 Month 09 Day 16

Turbidity 1350 ☑ Clear ☐ Turbid ☐ Slightly Turbid ☐ Highly Turbid

Color: —

Odor: —

Well Diameter (mm)		Vol. Factor (L/m)
12.7	(0.5 in)	0.127
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

Bottles Required ☐ Ferrous ☑ Mineral ☐ Phenol ☐ BOD ☐ TOC ☑ Metals ☐ Dis. Mineral ☐ Filt TIC ☐ COD ☑ TIC ☐ Dis. Metals ☑ Nutrient ☐ TSS/TDS Others (list): F

TVA 30066A (9-1999)

Distribution: (1) Original - Data Mgmt. (2) Pink - Survey Leader (3) Blue - Project Manager (4) Green - Customer (5) Yellow - ERS Files

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Project/Site	Well Number	Purge Date: Year	Month	Day
KINGSTON	6A 84066	04	09	14

Depth to Water (m)	Bottom of Well (m)	Well Diameter (mm)	Survey Leader	Field Crew
3.34 4195	8.88 4194	102 4188	SAG	

☑ Depth of Screen ☐ Open Bore Hole

(m)	To	(m)	Sample Label	☑ Unfiltered ☐ Filtered ☐ Both
8.47 4191		8.92 4190	KIF-6A-091404	Filter Type and Size:

[Bottom of Well − Depth to Water] x Volume Factor =	Well Volume (L)	Target Purge Volume (L)	Actual Purge Volume (L)
[(8.88)m − (3.34)m] x (8.107)L/m =	44.9	89.8	43 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 (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 →	0924	5.4	3.34	8.6	17.6	5.8	6.7	4243	258	
" 1.40 M	0926				17.6	5.8	0.1	4245	244	
"	0928		6.1		17.6	5.8	0.1	4247	244	
"	0930		7.4		17.9	5.8	0.1	4198	244	
10 OUT OF H2O	0932	↓	8.6	↓	18.2	5.6	0.1	4198	278	
RESTART	1250	1.2	5.60	8.6						
GL = SAMPLED	1255	↓	7.0	↓	19.5	5.7	0.5	4161	300	

Remarks:

Reviewed By: Survey Leader 9-15-04 Date Project Leader Date

Sample Collector: SAG

Sample Date			Time
Year 04	Month 09	Day 14	1255 (ET) CT

Pump Duration 8 min 72004

"999" = 2 days

Sample Readings

1255	1.2	7.0	8.6	19.5	5.7	0.5	4161	300	
Analysis Time (ET) CT	Pump Rate (L/min) 4193	Depth to Water (m)	Pump Depth (m) 4192	Temp °C 10 EPA 170.1	pH (s.u.) 400 EPA 150.1	DO (mg/L) 300 EPA 360.1	COND (umhos/cm) 94 EPA 120.1	(+/-) ORP (mV) 90 SM 2580B	Turbidity (NTU) EPA 180.1

Additional Sample Data

Analyst: SAG

Date Analyzed: Year 04 Month 09 Day 15

Turbidity 1350: ☐ Clear ☐ Turbid ☑ Slightly Turbid ☐ Highly Turbid

Color: BROWNISH

Odor: —

415 Phenol Alkalinity mg/L (EPA 310.1)	431 Total Alk. mg/L (EPA 310.1)	436 Mineral Acidity mg/L (EPA 305.1)	437 CO_2 Acidity mg/L (EPA 305.1)
	199		182
Time:	Time: 0951	Time:	Time: 1004
Initial:	Initial: SAG	Initial:	Initial: SAG

Bottles Required: ☐ BOD ☐ COD ☐ TOC ☑ TIC ☐ Ferrous ☑ Metals ☐ Dis. Metals ☑ Mineral ☐ Dis. Mineral ☑ Nutrient ☐ Phenol ☐ Filt TIC ☐ TSS/TDS

Others (list): FA

Well Diameter (mm)		Vol. Factor (L/m)
12.7	(0.5 in)	0.127
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

Distribution: (1) Original - Data Mgmt. (2) Pink - Survey Leader (3) Blue - Project Manager (4) Green - Customer (5) Yellow - ERS Files

TVA 30066A (9-1999)

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Project/Site	Well Number	Purge Date: Year	Month	Day
KINGSTON	138 84088	04	9	14

Depth to Water (m)	Bottom of Well (m)	Well Diameter (mm)	Survey Leader	Field Crew
3.10 4195	25.68 4194	51 4188	SAG	

☑ Depth of Screen ☐ Open Bore Hole

(m)	To	(m)	Sample Label	Filter Type and Size
22.29 4191		25.34 4190	KIF-138-091404	☑ Unfiltered ☐ Filtered ☐ Both

[Bottom of Well - Depth to Water] x Volume Factor =	Well Volume	Target Purge Volume	Actual Purge Volume
[(25.68)m - (3.10)m] x (2.027)L/m=	45.8 (L)	91.6 (L)	95 (L) 4186

Purge Pump: ☐ Bladder ☐ Centrifugal ☐ Peristaltic ☐ Dedicated Other (list): REDI-FLO

Sample Pump: ☐ Bladder ☐ Centrifugal ☐ Peristaltic ☐ Dedicated Other (list): REDI-FLO

Notes and WQ Observations	Time ET 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 1443hz →	1128	4.5	3.10	10.0						
	1129		4.45		17.7	7.8	0.01	325	401	
15L	1131		7.56		17.4	7.9	0.00	325	313	
	1133		8.28		17.4	7.9	0.00	325	282	
15L	1135		8.52		17.4	7.9	0.00	330	259	
13L	1137		8.60		17.4	7.9	0.00	332	234	
	1139				17.3	7.9	0.00	330	208	
13L	1141		8.74		17.3	7.9	0.00	330	196	
13L	1143		8.78		17.3	7.9	0.00	330	184	
	1145				17.3	7.9	0.00	330	176	
13L	1147		8.84		17.3	7.9	0.00	328	167	
13L	1149	↓	8.90	↓	17.3	7.9	0.00	328	165	

Remarks:

Reviewed By: _____ Survey Leader 9-15-04 Date _____ Project Leader _____ Date

Sample Collector: SAG	Sample Date			Time
	Year 04	Month 09	Day 14	1149 ☑ CT
Pump Duration 21 min 72004				

"999" = 2 days

Sample Readings

1149	4.5	8.9	10.0	17.3	7.9	0.00	328	165	
Analysis Time ET CT	4193 Pump Rate (L/min)	Depth to Water (m)	4192 Pump Depth (m)	10 Temp °C EPA 170.1	400 pH (s.u.) EPA 150.1	300 DO (mg/L) EPA 360.1	94 COND (umhos/cm) EPA 120.1	90 (+/-) ORP (mV) SM 2580B	Turbidity (NTU) EPA 180.1

Additional Sample Data

Analyst: SAG		190		6	Well Diameter (mm)	Vol. Factor (L/m)
Date Analyzed: Year 04 Month 09 Day 15	415 Phenol Alkalinity mg/L (EPA 310.1)	431 Total Alk. mg/L (EPA 310.1)	436 Mineral Acidity mg/L (EPA 305.1)	437 CO_2 Acidity mg/L (EPA 305.1)	12.7 (0.5 in)	0.127
Turbidity 1350 ☑ Clear ☐ Turbid ☐ Slightly Turbid ☐ Highly Turbid					51 (2 in)	2.027
					76 (3 in)	4.560
					102 (4 in)	8.107
	Time: -	Time: 0955	Time:	Time: 1010	127 (5 in)	12.668
	Initial:	Initial: SAG	Initial:	Initial: SAG	153 (6 in)	18.228

Bottles Required: ☐ Ferrous ☑ Mineral ☐ Phenol Others (list): FQ

☐ BOD ☐ TOC ☑ Metals ☐ Dis. Mineral ☐ Filt TIC

☐ COD ☑ TIC ☐ Dis. Metals ☑ Nutrient ☐ TSS/TDS

Color: —

Odor: —

Distribution: (1) Original - Data Mgmt. (2) Pink - Survey Leader (3) Blue - Project Manager (4) Green - Customer (5) Yellow - ERS Files

TVA 30066A (9-1999)

Preliminary Groundwater Data Field Worksheet

Sheet 1 of 1

Project/Site	Well Number	Purge Date: Year	Month	Day
KINGSTON	16A 84088	04	09	14

Depth to Water (m)	Bottom of Well (m)	Well Diameter (mm)	Survey Leader	Field Crew
1.41 4195	20.16 4184	51 4188	SAG	

☑ Depth of Screen ☐ Open Bore Hole

(m)	To	(m)	Sample Label	Filter Type and Size
16.98 4191		20.03 4190	KIF-16A-091404-DUP KIF-16A-091404	☑ Unfiltered ☐ Filtered ☐ Both

[Bottom of Well - Depth to Water] x Volume Factor =	Well Volume (L)	Target Purge Volume (L)	Actual Purge Volume (L)
[(20.16)m - (1.41)m] x (2.027)L/m =	38	76	79 4186

Purge Pump: ☐ Bladder ☐ Centrifugal ☐ Peristaltic ☐ Dedicated Other (list): REDI-FLO

Sample Pump: ☐ Bladder ☐ Centrifugal ☐ Peristaltic ☐ Dedicated Other (list): REDI-FLO

Notes and WQ Observations	Time (ET) 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 140 HR →	1215	6.1	1.41	6.0						
	1216		2.60		20.0	6.9	0.3	325	474	
15L	1218		3.53		18.2	6.9	0.2	313	471	
15L	1220		4.30		17.7	6.9	0.4	311	394	
15L	1222				17.5	7.0	0.3	313	326	
15L	1224		5.0		17.5	7.0	0.3	313	306	
15L	1226				17.5	7.0	0.3	314	287	
4L	1228	↓	5.55	↓	17.4	7.0	0.2	314	280	

Remarks:

Reviewed By: _____ 9.15.04 _____ _____

Survey Leader Date Project Leader Date

Sample Collector: SAG

Sample Date			Time
Year	Month	Day	
04	09	14	(ET) CT

Pump Duration 13 min 72004

"999" = 2 days

Sample Readings

1228	6.1	5.55	6.0	17.4	7.0	0.2	314	280	
Analysis Time ET CT	4193 Pump Rate (L/min)	Depth to Water (m)	4192 Pump Depth (m)	10 Temp °C EPA 170.1	400 pH (s.u.) EPA 150.1	300 DO (mg/L) EPA 360.1	94 COND (umhos/cm) EPA 120.1	90 (+/-) ORP (mV) SM 2580B	Turbidity (NTU) EPA 180.1

Additional Sample Data

Analyst:

Date Analyzed: Year 04 Month 09 Day 15

Turbidity 1350: ☑ Clear ☐ Turbid ☐ Slightly Turbid ☐ Highly Turbid

Color:

Odor:

415 Phenol Alkalinity mg/L (EPA 310.1)	431 Total Alk. mg/L (EPA 310.1)	436 Mineral Acidity mg/L (EPA 305.1)	437 CO_2 Acidity mg/L (EPA 305.1)
	144/145		15/15
Time:	Time: 1009/1008	Time:	Time: 1017/1016
Initial:	Initial: SAG/SAG	Initial:	Initial: SAG/SAG

Bottles Required: ☐ Ferrous ☑ Mineral ☐ Phenol

☐ BOD ☐ TOC ☑ Metals ☐ Dis. Mineral ☐ Filt TIC

☐ COD ☑ TIC ☐ Dis. Metals ☑ Nutrient ☐ TSS/TDS

Others (list): FQ

Well Diameter (mm)		Vol. Factor (L/m)
12.7	(0.5 in)	0.127
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

Distribution: (1) Original - Data Mgmt. (2) Pink - Survey Leader (3) Blue - Project Manager (4) Green - Customer (5) Yellow - ERS Files

TVA 30066A (9-1999)

APPENDIX B

SAMPLE CUSTODY RECORD

KIF
RCRA
100

TENNESSEE VALLEY AUTHORITY WATER MANAGEMENT
ENVIRONMENTAL CHEMISTRY ANALYSIS REQUEST AND CUSTODY RECORD

FORM CONTROL # 18059

PROJECT ID: KINGSTON G.W.

REFERENCE: ☑ WORKPLAN ☐ OTHER

ACCT NO.:

DATE REQUIRED: 10-5-04

RESULTS TO: MARK BOGGS
WT 9C-K
865-632-6941

LAB USE ONLY

TEST IDC'S:
$ICPW1 $ICPW2 DIGICP K.W NAW DIGCVA HG... $TDS $TDS
CLW FLW SO4W $TKN TICW NO2NO3W NH3W
DIGHGA ASW CDW SBW CRW COW PBW NIW SEW TLW

$ICPW2 - scratch Si, Sn, Ti

DATE RECEIVED: 9/16/04

DAYS DUE: 10/1/04

PROJECT LEADER: RCB

KIF-040902.25

NO. LABELS:

LAB USE ONLY LAB ID	FIELD ID	SAMPLE DESCRIPTION	SAMPLE MATRIX	DATE/TIME COLLECTED	NO. OF BOTTLES	ADDITIONAL IDC'S
AE15256	KIF-6A-091404	GROUNDWATER M, MIN, W, TIC	H2O	9-14 1255	4	
15257	KIF-15B-091404			9-14 1147	4	
15258	KIF-16A-091404			9-14 1228	4	
15259	KIF-16A-091404-DUP			9-14 1228	4	
15260	KIF-BLANK-091404			9-14	4	

FIELD COMMENTS:

ANALYSIS REQUESTED: PER WORKPLAN

SUBMITTED BY: [signature] DATE/TIME: 9-15-04 1100

LABORATORY COMMENTS: LWS SEP 16'04 10:12

RECEIVED BY: DATE/TIME:

DISTRIBUTION OF COPIES
1 - LABORATORY 2 - RETURN TO REQUESTOR 3 - RETAINED BY REQUESTOR

TVA 30488 (RG-WM 3-94)

PAGE 1 OF 1

TVA-00026696

KIF
RCRA
100

TENNESSEE VALLEY AUTHORITY WATER MANAGEMENT
ENVIRONMENTAL CHEMISTRY ANALYSIS REQUEST AND CUSTODY RECORD

FORM CONTROL # 18060

PROJECT ID: KINGSTON GROUND WATER

REFERENCE: ☑ WORKPLAN ☐ OTHER

ACCT NO.:

DATE REQUIRED: 10-07-04

RESULTS TO: MARK BOGGS WT9C-K

LAB USE ONLY

TEST IDC'S: [illegible]

DATE RECEIVED: 9/17/04

DAYS DUE: [illegible]

PROJECT LEADER: [illegible]

NO. LABELS:

KIF-040917-35

LAB USE ONLY LAB ID	FIELD ID	SAMPLE DESCRIPTION	SAMPLE MATRIX	DATE/TIME COLLECTED	NO. OF BOTTLES	ADDITIONAL IDC'S
AE15289	KIF-4B-091604	GROUNDWATER - M - MIN - N - TIC	H2O WATER	9/16 0905	4	

FIELD COMMENTS

ANALYSIS REQUESTED: per WORKPLAN

SUBMITTED BY: [signature] DATE/TIME: 9-16-04

LABORATORY COMMENTS: [signature] SEP 17 '04 8:26

RECEIVED BY ____ DATE/TIME ____

DISTRIBUTION OF COPIES
1 - LABORATORY 2 - RETURN TO REQUESTOR 3 - RETAINED BY REQUESTOR

TVA 30488 (RG-WM 3-94)

PAGE 1 OF 1

APPENDIX C

LABORATORY DATA SHEETS

Data Report Number: 041012-90325
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
Jack Milligan, CST17B-C
Phone: Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM

Location Code: KIF-4B
Field ID: KIF-4B-091604
Sample Description: GROUNDWATER

Sample ID: AE15289 **LRF ID:** 04090235
Matrix: Water **Reg:** RCRA
Date Collected: 09/16/2004
Time Collected: 9:05 EST
Date Received: 09/17/2004
Time Received: 8:26
Project Manager: Randall L. Howell

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Aluminum, Total	7429-90-5	0.37	mg/L	0.05	09/21/2004	12:32	LMJ	EPA 6010B
Ammonia as N	7664-41-7	0.34	mg/L	0.01	09/27/2004	12:32	ADP	EPA 350.1
Antimony,Total	7440-36-0	< MDL	mg/L	0.003	09/29/2004	12:37	BRJ	EPA 7041A
Arsenic, Total	7440-38-2	0.001	mg/L	0.001	10/04/2004	23:39	BRJ	EPA 7060A
Barium, Total	7440-39-3	0.04	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B
Beryllium, Total	7440-41-7	< MDL	mg/L	0.001	09/21/2004	12:32	LMJ	EPA 6010B
Boron, Total	7440-42-8	< MDL	mg/L	0.2	09/21/2004	12:32	LMJ	EPA 6010B
Cadmium, Total	7440-43-9	0.0001	mg/L	0.0001	10/02/2004	1:25	BRJ	EPA 7131A
Calcium, Total	7440-70-2	150	mg/L	0.1	09/21/2004	12:32	LMJ	EPA 6010B
Chloride, Total	16887-00-6	4.3	mg/L	1.	09/30/2004	10:51	GMP	EPA 325.2
Chromium, Total	7440-47-3	0.001	mg/L	0.001	09/30/2004	12:46	BRJ	EPA 7191
Cobalt, Total	7440-48-4	0.005	mg/L	0.001	10/01/2004	21:55	BRJ	EPA 7201
Copper, Total	7440-50-8	< MDL	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B
Filterable Residue		570.	mg/L	10.	09/20/2004	14:08	AJH	EPA 160.1
Fluoride, Total	16984-48-8	< MDL	mg/L	0.1	10/01/2004	10:00	GMP	EPA 340.2
Inorganic Carbon, Total		78	mg/L	1.	09/23/2004	19:39	ADP	ASTM477988
Iron, Total	7439-89-6	0.92	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B
Lead , Total	7439-92-1	< MDL	mg/L	0.001	09/30/2004	15:53	BRJ	EPA 7421
Magnesium, Total	7439-95-4	13	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B
Manganese, Total	7439-96-5	1.2	mg/L	0.005	09/21/2004	12:32	LMJ	EPA 6010B
Mercury, Total	7439-97-6	<MDL	mg/L	0.0001	10/05/2004	14:48	CLS	EPA 7470A
Molybdenum, Total	7439-98-7	< MDL	mg/L	0.02	09/21/2004	12:32	LMJ	EPA 6010B
Nickel, Total	7440-02-0	< MDL	mg/L	0.001	10/01/2004	11:21	BRJ	EPA 7521
Nitrate-Nitrite as N		< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 353.2
Non-Filterable Residue		6.	mg/L	1.	09/20/2004	13:08	AJH	EPA 160.2
Potassium, Total	7440-09-7	4.1	mg/L	0.1	09/28/2004	10:33	BRJ	EPA 7610
Selenium, Total	7782-49-2	< MDL	mg/L	0.001	10/05/2004	11:54	BRJ	EPA 7740
Silver, Total	7440-22-4	< MDL	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B
Sodium, Total	7440-23-5	7.2	mg/L	0.1	09/27/2004	11:48	BRJ	EPA 7770
Strontium, Total	7440-24-6	0.31	mg/L	0.05	09/21/2004	12:32	LMJ	EPA 6010B
Sulfate, Total	14808-79-8	230	mg/L	1.	10/05/2004	11:30	GMP	EPA 375.4
Thallium, Total	7440-28-0	< MDL	mg/L	0.002	09/29/2004	19:37	BRJ	EPA 7841
Tin, Total	7440-31-5	< MDL	mg/L	0.05	09/21/2004	12:32	LMJ	EPA 6010B
Titanium, Total	7440-32-6	< MDL	mg/L	0.005	09/21/2004	12:32	LMJ	EPA 6010B
Total Kjeldahl Nitrogen		0.44	mg/L	0.02	09/28/2004	14:23	GMP	EPA 351.2

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041012-90325
Report of Results: Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
Jack Milligan, CST17B-C
Phone: Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-4B
Field ID: KIF-4B-091604
Sample Description: GROUNDWATER

Sample ID: AE15289 **LRF ID:** 04090235
Matrix: Water **Reg:** RCRA
Date Collected: 09/16/2004
Time Collected: 9:05 EST
Date Received: 09/17/2004
Time Received: 8:26
Project Manager: Randall L. Howell

Analyte	CAS Number[1]	Result	Units	MDL[2]	Analysis Date	Analysis Time	Analyst	Method Reference
Vanadium, Total	7440-62-2	< MDL	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B
Zinc, Total	7440-66-6	< MDL	mg/L	0.01	09/21/2004	12:32	LMJ	EPA 6010B

Sample Comments: Results confirmed for Cd, Cr, As

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Central Laboratories Services data report number 041012-90324 was electronically approved using Labworks Enterprise Version 5.7, Build 255 on **10/07/2004 at 5:13:00 PM by Lisa D. Ortiz**

Vanessa L. Ramey, Lab Director
Lisa D. Ortiz, Department Manager
Randall L. Howell, Product Manager
Ricardo I. Gilbert, Senior Analytical Chemist

This report contains sample results for the following samples, Login Reference File number: 04090235
AE15289

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041004-144331
Report of Results Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga
Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-6A
Field ID: KIF-6A-091404
Sample Description GROUNDWATER

Sample ID: AE15256 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 12:55 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Aluminum, Total	7429-90-5	< MDL	mg/L	0.05	09/23/2004	23:40	LMJ	EPA 6010B
Ammonia as N	7664-41-7	19	mg/L	0.01	09/27/2004	12:32	ADP	EPA 350.1
Antimony,Total	7440-36-0	< MDL	mg/L	0.003	09/29/2004	5:06	BRJ	EPA 7041A
Arsenic, Total	7440-38-2	0.013	mg/L	0.001	10/01/2004	12:22	BRJ	EPA 7060A
Barium, Total	7440-39-3	0.16	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B
Beryllium, Total	7440-41-7	< MDL	mg/L	0.001	09/23/2004	23:40	LMJ	EPA 6010B
Boron, Total	7440-42-8	0.6	mg/L	0.2	09/23/2004	23:40	LMJ	EPA 6010B
Cadmium, Total	7440-43-9	< MDL	mg/L	0.0001	09/28/2004	2:50	BRJ	EPA 7131A
Calcium, Total	7440-70-2	250	mg/L	0.1	09/23/2004	23:40	LMJ	EPA 6010B
Chloride, Total	16887-00-6	9.2	mg/L	1.	09/30/2004	10:51	GMP	EPA 325.2
Chromium, Total	7440-47-3	0.001	mg/L	0.001	09/27/2004	16:56	BRJ	EPA 7191
Cobalt, Total	7440-48-4	0.01	mg/L	0.001	09/28/2004	17:56	BRJ	EPA 7201
Copper, Total	7440-50-8	< MDL	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B
Filterable Residue		6000.	mg/L	10.	09/20/2004	14:05	AJH	EPA 160.1
Fluoride, Total	16984-48-8	< MDL	mg/L	0.1	10/01/2004	10:00	GMP	EPA 340.2
Inorganic Carbon, Total		98	mg/L	1.	09/27/2004	14:35	ADP	ASTM477988
Iron, Total	7439-89-6	1500	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B
Lead , Total	7439-92-1	< MDL	mg/L	0.001	09/27/2004	20:59	BRJ	EPA 7421
Magnesium, Total	7439-95-4	100	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B
Manganese, Total	7439-96-5	200	mg/L	0.005	09/23/2004	23:40	LMJ	EPA 6010B
Mercury, Total	7439-97-6	<MDL	mg/L	0.0001	09/29/2004	14:13	CLS	EPA 7470A
Molybdenum, Total	7439-98-7	< MDL	mg/L	0.02	09/23/2004	23:40	LMJ	EPÂ 6010B
Nickel, Total	7440-02-0	0.003	mg/L	0.001	09/28/2004	20:20	BRJ	EPA 7521
Nitrate-Nitrite as N		< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 353.2
Non-Filterable Residue		71.	mg/L	1.	09/17/2004	10:28	AJH	EPA 160.2
Potassium, Total	7440-09-7	6.2	mg/L	0.1	09/28/2004	10:35	BRJ	EPA 7610
Selenium, Total	7782-49-2	< MDL	mg/L	0.001	09/29/2004	10:56	BRJ	EPA 7740
Silver, Total	7440-22-4	0.19	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B
Sodium, Total	7440-23-5	11.	mg/L	0.1	09/27/2004	11:49	BRJ	EPA 7770
Strontium, Total	7440-24-6	0.80	mg/L	0.05	09/23/2004	23:40	LMJ	EPA 6010B
Sulfate, Total	14808-79-8	4000.	mg/L	1.	10/01/2004	13:00	GMP	EPA 375.4
Thallium, Total	7440-28-0	< MDL	mg/L	0.002	09/29/2004	15:07	BRJ	EPA 7841
Tin, Total	7440-31-5	< MDL	mg/L	0.05	09/23/2004	23:40	LMJ	EPA 6010B
Titanium, Total	7440-32-6	< MDL	mg/L	0.005	09/23/2004	23:40	LMJ	EPA 6010B
Total Kjeldahl Nitrogen		19	mg/L	0.02	09/28/2004	15:53	GMP	EPA 351.2

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041004-144331
Report of Results Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga
Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-6A
Field ID: KIF-6A-091404
Sample Description GROUNDWATER

Sample ID: AE15256 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 12:55 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Vanadium, Total	7440-62-2	0.15	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B
Zinc, Total	7440-66-6	< MDL	mg/L	0.01	09/23/2004	23:40	LMJ	EPA 6010B

Sample Comments: Manganese and Silver results confirmed by reanalysis.

So4w result is confirmed by reanalysis.

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041004-144331
Report of Results Environmental

TENNESSEE VALLEY AUTHORITY
CENTRAL LABORATORIES SERVICES
1101 Market Street, PSC 1B-C
Chattanooga, Tennessee 37402-2801
Phone: (423) 876 - 4318 • Fax: (423) 876 - 4137

Shipping Address:
Chickamauga Power Service Center
North Side Chickamauga
Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-13B
Field ID: KIF-13B-091404
Sample Description GROUNDWATER

Sample ID: AE15257 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 11:49 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Aluminum, Total	7429-90-5	< MDL	mg/L	0.05	09/20/2004	17:14	LMJ	EPA 6010B
Ammonia as N	7664-41-7	0.16	mg/L	0.01	09/27/2004	12:32	ADP	EPA 350.1
Antimony,Total	7440-36-0	0.004	mg/L	0.003	09/29/2004	5:15	BRJ	EPA 7041A
Arsenic, Total	7440-38-2	0.002	mg/L	0.001	10/01/2004	12:29	BRJ	EPA 7060A
Barium, Total	7440-39-3	0.33	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B
Beryllium, Total	7440-41-7	< MDL	mg/L	0.001	09/20/2004	17:14	LMJ	EPA 6010B
Boron, Total	7440-42-8	< MDL	mg/L	0.2	09/20/2004	17:14	LMJ	EPA 6010B
Cadmium, Total	7440-43-9	< MDL	mg/L	0.0001	09/28/2004	2:57	BRJ	EPA 7131A
Calcium, Total	7440-70-2	14	mg/L	0.1	09/20/2004	17:14	LMJ	EPA 6010B
Chloride, Total	16887-00-6	2.5	mg/L	1.	09/30/2004	10:51	GMP	EPA 325.2
Chromium, Total	7440-47-3	< MDL	mg/L	0.001	09/27/2004	17:03	BRJ	EPA 7191
Cobalt, Total	7440-48-4	0.006	mg/L	0.001	09/28/2004	18:02	BRJ	EPA 7201
Copper, Total	7440-50-8	< MDL	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B
Filterable Residue		240.	mg/L	10.	09/20/2004	14:05	AJH	EPA 160.1
Fluoride, Total	16984-48-8	0.19	mg/L	0.1	10/01/2004	10:00	GMP	EPA 340.2
Inorganic Carbon, Total		44	mg/L	1.	09/23/2004	19:02	ADP	ASTM477988
Iron, Total	7439-89-6	0.07	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B
Lead , Total	7439-92-1	< MDL	mg/L	0.001	09/27/2004	21:06	BRJ	EPA 7421
Magnesium, Total	7439-95-4	1.8	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B
Manganese, Total	7439-96-5	0.068	mg/L	0.005	09/20/2004	17:14	LMJ	EPA 6010B
Mercury, Total	7439-97-6	<MDL	mg/L	0.0001	09/29/2004	14:15	CLS	EPA 7470A
Molybdenum, Total	7439-98-7	< MDL	mg/L	0.02	09/20/2004	17:14	LMJ	EPA 6010B
Nickel, Total	7440-02-0	< MDL	mg/L	0.001	09/28/2004	20:27	BRJ	EPA 7521
Nitrate-Nitrite as N		< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 353.2
Non-Filterable Residue		3.	mg/L	1.	09/17/2004	10:28	AJH	EPA 160.2
Potassium, Total	7440-09-7	1.6	mg/L	0.1	09/28/2004	10:36	BRJ	EPA 7610
Selenium, Total	7782-49-2	< MDL	mg/L	0.001	09/29/2004	11:03	BRJ	EPA 7740
Silver, Total	7440-22-4	< MDL	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B
Sodium, Total	7440-23-5	74.	mg/L	0.1	09/27/2004	11:50	BRJ	EPA 7770
Strontium, Total	7440-24-6	0.27	mg/L	0.05	09/20/2004	17:14	LMJ	EPA 6010B
Sulfate, Total	14808-79-8	2.7	mg/L	1.	10/01/2004	13:00	GMP	EPA 375.4
Thallium, Total	7440-28-0	< MDL	mg/L	0.002	09/29/2004	15:14	BRJ	EPA 7841
Tin, Total	7440-31-5	< MDL	mg/L	0.05	09/20/2004	17:14	LMJ	EPA 6010B
Titanium, Total	7440-32-6	< MDL	mg/L	0.005	09/20/2004	17:14	LMJ	EPA 6010B
Total Kjeldahl Nitrogen		0.10	mg/L	0.02	09/28/2004	14:23	GMP	EPA 351.2

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041004-144331
Report of Results Environmental

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North Side Chickamauga
Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-13B
Field ID: KIF-13B-091404
Sample Description GROUNDWATER

Sample ID: AE15257 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 11:49 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Vanadium, Total	7440-62-2	< MDL	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B
Zinc, Total	7440-66-6	< MDL	mg/L	0.01	09/20/2004	17:14	LMJ	EPA 6010B

Sample Comments: Calcium results confirmed by reanalysis.

Chloride results confirmed by reanalysis.

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041004-144331
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Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-16A
Field ID: KIF-16A-091404
Sample Description GROUNDWATER

Sample ID: AE15258 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 12:28 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Aluminum, Total	7429-90-5	0.11	mg/L	0.05	09/20/2004	17:19	LMJ	EPA 6010B
Ammonia as N	7664-41-7	0.48	mg/L	0.01	09/27/2004	12:32	ADP	EPA 350.1
Antimony,Total	7440-36-0	< MDL	mg/L	0.003	09/29/2004	5:25	BRJ	EPA 7041A
Arsenic, Total	7440-38-2	0.002	mg/L	0.001	10/01/2004	12:58	BRJ	EPA 7060A
Barium, Total	7440-39-3	0.05	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B
Beryllium, Total	7440-41-7	< MDL	mg/L	0.001	09/20/2004	17:19	LMJ	EPA 6010B
Boron, Total	7440-42-8	< MDL	mg/L	0.2	09/20/2004	17:19	LMJ	EPA 6010B
Cadmium, Total	7440-43-9	< MDL	mg/L	0.0001	09/28/2004	3:03	BRJ	EPA 7131A
Calcium, Total	7440-70-2	42	mg/L	0.1	09/20/2004	17:19	LMJ	EPA 6010B
Chloride, Total	16887-00-6	< MDL	mg/L	1.	09/30/2004	10:51	GMP	EPA 325.2
Chromium, Total	7440-47-3	< MDL	mg/L	0.001	09/27/2004	17:10	BRJ	EPA 7191
Cobalt, Total	7440-48-4	0.002	mg/L	0.001	09/28/2004	18:14	BRJ	EPA 7201
Copper, Total	7440-50-8	< MDL	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B
Filterable Residue		190.	mg/L	10.	09/20/2004	14:06	AJH	EPA 160.1
Fluoride, Total	16984-48-8	0.50	mg/L	0.1	10/01/2004	10:00	GMP	EPA 340.2
Inorganic Carbon, Total		37	mg/L	1.	09/23/2004	19:09	ADP	ASTM477988
Iron, Total	7439-89-6	0.86	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B
Lead , Total	7439-92-1	< MDL	mg/L	0.001	09/27/2004	21:12	BRJ	EPA 7421
Magnesium, Total	7439-95-4	8.7	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B
Manganese, Total	7439-96-5	1.2	mg/L	0.005	09/20/2004	17:19	LMJ	EPA 6010B
Mercury, Total	7439-97-6	<MDL	mg/L	0.0001	09/29/2004	14:17	CLS	EPA 7470A
Molybdenum, Total	7439-98-7	< MDL	mg/L	0.02	09/20/2004	17:19	LMJ	EPA 6010B
Nickel, Total	7440-02-0	< MDL	mg/L	0.001	09/28/2004	20:33	BRJ	EPA 7521
Nitrate-Nitrite as N		< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 353.2
Non-Filterable Residue		6.	mg/L	1.	09/17/2004	10:28	AJH	EPA 160.2
Potassium, Total	7440-09-7	1.2	mg/L	0.1	09/28/2004	10:38	BRJ	EPA 7610
Selenium, Total	7782-49-2	< MDL	mg/L	0.001	09/29/2004	11:09	BRJ	EPA 7740
Silver, Total	7440-22-4	< MDL	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B
Sodium, Total	7440-23-5	16.	mg/L	0.1	09/27/2004	11:52	BRJ	EPA 7770
Strontium, Total	7440-24-6	0.27	mg/L	0.05	09/20/2004	17:19	LMJ	EPA 6010B
Sulfate, Total	14808-79-8	36	mg/L	1.	10/01/2004	13:00	GMP	EPA 375.4
Thallium, Total	7440-28-0	< MDL	mg/L	0.002	09/29/2004	15:21	BRJ	EPA 7841
Tin, Total	7440-31-5	< MDL	mg/L	0.05	09/20/2004	17:19	LMJ	EPA 6010B
Titanium, Total	7440-32-6	< MDL	mg/L	0.005	09/20/2004	17:19	LMJ	EPA 6010B
Total Kjeldahl Nitrogen		0.46	mg/L	0.02	09/28/2004	14:23	GMP	EPA 351.2

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

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Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-16A
Field ID: KIF-16A-091404
Sample Description GROUNDWATER

Sample ID: AE15258 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 12:28 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Vanadium, Total	7440-62-2	< MDL	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B
Zinc, Total	7440-66-6	< MDL	mg/L	0.01	09/20/2004	17:19	LMJ	EPA 6010B

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

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Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-16A
Field ID: KIF-16A-091404-DUP
Sample Description GROUNDWATER

Sample ID: AE15259 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 12:28 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Aluminum, Total	7429-90-5	0.13	mg/L	0.05	09/20/2004	17:24	LMJ	EPA 6010B
Ammonia as N	7664-41-7	0.48	mg/L	0.01	09/27/2004	12:32	ADP	EPA 350.1
Antimony,Total	7440-36-0	< MDL	mg/L	0.003	09/29/2004	5:34	BRJ	EPA 7041A
Arsenic, Total	7440-38-2	< MDL	mg/L	0.001	10/01/2004	13:04	BRJ	EPA 7060A
Barium, Total	7440-39-3	0.05	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B
Beryllium, Total	7440-41-7	< MDL	mg/L	0.001	09/20/2004	17:24	LMJ	EPA 6010B
Boron, Total	7440-42-8	< MDL	mg/L	0.2	09/20/2004	17:24	LMJ	EPA 6010B
Cadmium, Total	7440-43-9	< MDL	mg/L	0.0001	09/28/2004	3:10	BRJ	EPA 7131A
Calcium, Total	7440-70-2	42	mg/L	0.1	09/20/2004	17:24	LMJ	EPA 6010B
Chloride, Total	16887-00-6	< MDL	mg/L	1.	09/30/2004	10:51	GMP	EPA 325.2
Chromium, Total	7440-47-3	< MDL	mg/L	0.001	09/27/2004	17:18	BRJ	EPA 7191
Cobalt, Total	7440-48-4	0.002	mg/L	0.001	09/28/2004	18:20	BRJ	EPA 7201
Copper, Total	7440-50-8	< MDL	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B
Filterable Residue		210.	mg/L	10.	09/20/2004	14:06	AJH	EPA 160.1
Fluoride, Total	16984-48-8	0.50	mg/L	0.1	10/01/2004	10:00	GMP	EPA 340.2
Inorganic Carbon, Total		38	mg/L	1.	09/23/2004	19:15	ADP	ASTM477988
Iron, Total	7439-89-6	0.87	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B
Lead , Total	7439-92-1	< MDL	mg/L	0.001	09/27/2004	21:18	BRJ	EPA 7421
Magnesium, Total	7439-95-4	8.8	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B
Manganese, Total	7439-96-5	1.3	mg/L	0.005	09/20/2004	17:24	LMJ	EPA 6010B
Mercury, Total	7439-97-6	<MDL	mg/L	0.0001	09/29/2004	14:19	CLS	EPA 7470A
Molybdenum, Total	7439-98-7	< MDL	mg/L	0.02	09/20/2004	17:24	LMJ	EPA 6010B
Nickel, Total	7440-02-0	< MDL	mg/L	0.001	09/28/2004	20:39	BRJ	EPA 7521
Nitrate-Nitrite as N		< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 353.2
Non-Filterable Residue		7.	mg/L	1.	09/17/2004	10:28	AJH	EPA 160.2
Potassium, Total	7440-09-7	1.1	mg/L	0.1	09/28/2004	10:42	BRJ	EPA 7610
Selenium, Total	7782-49-2	< MDL	mg/L	0.001	09/29/2004	13:14	BRJ	EPA 7740
Silver, Total	7440-22-4	< MDL	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B
Sodium, Total	7440-23-5	16.	mg/L	0.1	09/27/2004	11:53	BRJ	EPA 7770
Strontium, Total	7440-24-6	0.27	mg/L	0.05	09/20/2004	17:24	LMJ	EPA 6010B
Sulfate, Total	14808-79-8	33	mg/L	1.	10/01/2004	13:00	GMP	EPA 375.4
Thallium, Total	7440-28-0	< MDL	mg/L	0.002	09/29/2004	15:41	BRJ	EPA 7841
Tin, Total	7440-31-5	< MDL	mg/L	0.05	09/20/2004	17:24	LMJ	EPA 6010B
Titanium, Total	7440-32-6	< MDL	mg/L	0.005	09/20/2004	17:24	LMJ	EPA 6010B
Total Kjeldahl Nitrogen		0.44	mg/L	0.02	09/28/2004	14:23	GMP	EPA 351.2

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Data Report Number: 041004-144331
Report of Results Environmental

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North Side Chickamauga
Reservation
Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF-16A
Field ID: KIF-16A-091404-DUP
Sample Description GROUNDWATER

Sample ID: AE15259 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 12:28 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Vanadium, Total	7440-62-2	< MDL	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B
Zinc, Total	7440-66-6	< MDL	mg/L	0.01	09/20/2004	17:24	LMJ	EPA 6010B

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

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WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM

Location Code: KIF

Field ID: KIF-BLANK-091404

Sample Description EQUIPMENT BLANK

Sample ID: AE15260 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 0:00 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Aluminum, Total	7429-90-5	< MDL	mg/L	0.05	09/20/2004	17:30	LMJ	EPA 6010B
Ammonia as N	7664-41-7	< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 350.1
Antimony,Total	7440-36-0	< MDL	mg/L	0.003	09/29/2004	6:01	BRJ	EPA 7041A
Arsenic, Total	7440-38-2	< MDL	mg/L	0.001	10/01/2004	13:11	BRJ	EPA 7060A
Barium, Total	7440-39-3	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B
Beryllium, Total	7440-41-7	< MDL	mg/L	0.001	09/20/2004	17:30	LMJ	EPA 6010B
Boron, Total	7440-42-8	< MDL	mg/L	0.2	09/20/2004	17:30	LMJ	EPA 6010B
Cadmium, Total	7440-43-9	< MDL	mg/L	0.0001	09/28/2004	3:16	BRJ	EPA 7131A
Calcium, Total	7440-70-2	< MDL	mg/L	0.1	09/20/2004	17:30	LMJ	EPA 6010B
Chloride, Total	16887-00-6	< MDL	mg/L	1.	09/30/2004	10:51	GMP	EPA 325.2
Chromium, Total	7440-47-3	< MDL	mg/L	0.001	09/27/2004	17:25	BRJ	EPA 7191
Cobalt, Total	7440-48-4	< MDL	mg/L	0.001	09/28/2004	18:27	BRJ	EPA 7201
Copper, Total	7440-50-8	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B
Filterable Residue		< MDL	mg/L	10.	09/20/2004	14:07	AJH	EPA 160.1
Fluoride, Total	16984-48-8	< MDL	mg/L	0.1	10/01/2004	10:00	GMP	EPA 340.2
Inorganic Carbon, Total		< MDL	mg/L	1.	09/23/2004	19:21	ADP	ASTM477988
Iron, Total	7439-89-6	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B
Lead , Total	7439-92-1	< MDL	mg/L	0.001	09/27/2004	21:25	BRJ	EPA 7421
Magnesium, Total	7439-95-4	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B
Manganese, Total	7439-96-5	< MDL	mg/L	0.005	09/20/2004	17:30	LMJ	EPA 6010B
Mercury, Total	7439-97-6	<MDL	mg/L	0.0001	09/29/2004	14:23	CLS	EPA 7470A
Molybdenum, Total	7439-98-7	< MDL	mg/L	0.02	09/20/2004	17:30	LMJ	EPA 6010B
Nickel, Total	7440-02-0	< MDL	mg/L	0.001	09/28/2004	20:46	BRJ	EPA 7521
Nitrate-Nitrite as N		< MDL	mg/L	0.01	09/27/2004	12:32	ADP	EPA 353.2
Non-Filterable Residue		< MDL	mg/L	1.	09/17/2004	10:28	AJH	EPA 160.2
Potassium, Total	7440-09-7	< MDL	mg/L	0.1	09/28/2004	10:44	BRJ	EPA 7610
Selenium, Total	7782-49-2	< MDL	mg/L	0.001	09/29/2004	11:28	BRJ	EPA 7740
Silver, Total	7440-22-4	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B
Sodium, Total	7440-23-5	< MDL	mg/L	0.1	09/27/2004	11:55	BRJ	EPA 7770
Strontium, Total	7440-24-6	< MDL	mg/L	0.05	09/20/2004	17:30	LMJ	EPA 6010B
Sulfate, Total	14808-79-8	< MDL	mg/L	1.	10/01/2004	13:00	GMP	EPA 375.4
Thallium, Total	7440-28-0	< MDL	mg/L	0.002	09/29/2004	15:48	BRJ	EPA 7841
Tin, Total	7440-31-5	< MDL	mg/L	0.05	09/20/2004	17:30	LMJ	EPA 6010B
Titanium, Total	7440-32-6	< MDL	mg/L	0.005	09/20/2004	17:30	LMJ	EPA 6010B
Total Kjeldahl Nitrogen		< MDL	mg/L	0.02	09/28/2004	14:23	GMP	EPA 351.2

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

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Chattanooga, Tennessee 37415

Customer Address: Mark Boggs, LAB 2C-N
WT 9C-K
Phone Debbie Nunn, HB 2A-C
Fax : Not Available
E-Mail: GroundwaterWells; EDM
Location Code: KIF
Field ID: KIF-BLANK-091404
Sample Description EQUIPMENT BLANK

Sample ID: AE15260 **LRF ID:** 04090225
Matrix: Water **Reg** RCRA
Date Collected: 09/14/2004
Time Collected: 0:00 EST
Date Received: 09/16/2004
Time Received: 10:12
Project Manager: Randall L. Howell

Analyte	CAS Number	Result	Units	MDL[2]	Analysis Date	Analysis	Analyst	Method Reference
Vanadium, Total	7440-62-2	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B
Zinc, Total	7440-66-6	< MDL	mg/L	0.01	09/20/2004	17:30	LMJ	EPA 6010B

Sample Comments: None

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit

Central Laboratories Services data report number 041004-144331 was electronically approved using Labworks Enterprise Version 5.7, Build 255 on **10/04/2004 at 2:13:00 PM by Randall L. Howell**

Vanessa L. Ramey, Lab Director
Lisa D. Ortiz, Department Manager
Randall L. Howell, Product Manager
Ricardo I. Gilbert, Senior Analytical Chemist

This report contains sample results for the following samples, Login Reference File number: 04090225

AE15256
AE15257
AE15258
AE15259
AE15260

[1] Chemical Abstracts Service Registry Number [2] Method Detection Limit