Green, Michelle

From: Miller, Scott
Sent: Friday, November 06, 2015 7:13 AM
To: Saskowski, Ronald
Subject: FW: Smokey Mtn Smelters Revised Report
Attachments: Revision 1_Smokey Mountain Smelters Final Report 15-0346.pdf

Good morning, Ron,
Please save this to SEMS for Smokey Mountain Smelters.
Thank you,
Scott

From: Simmons, Kevin
Sent: Wednesday, November 04, 2015 12:49 PM
To: Miller, Scott <Miller.Scott@epa.gov>
Cc: Ackerman, Laura <Ackerman.Laura@epa.gov>
Subject: Smokey Mtn Smelters Revised Report

Scott,

Attached is the revised report for Smokey Mountain Smelters that contains the requested data comparison to the ROD cleanup levels. Contact me with any questions or comments.

Kevin Simmons
Superfund and Air Section
SESD Field Services Branch

706.355.8730 Desk
706.248.3531 Cell

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
Science and Ecosystem Support Division
Field Services Branch
980 College Station Road
Athens, Georgia 30605-2720

November 04, 2015

4SESD-EIB

MEMORANDUM

SUBJECT: Revised Report for Smokey Mountain Smelters
Groundwater Sampling
Knoxville, TN
SESD Project #15-0346

FROM: Kevin Simmons, Life Scientist
Superfund and Air Section

THRU: Laura Ackerman, Chief
Superfund and Air Section

TO: Scott Miller, RPM
Superfund Division

Attached is the revised groundwater sampling report for the Smokey Mountain Smelters site, which was conducted the week of July 13, 2015 in Knoxville, Tennessee. This revision incorporates the addition of the Record of Decision (ROD) defined cleanup levels in Tables 4, 5, and 6. The Analytical Results section of the report was also revised to reflect the addition of the ROD cleanup levels. This report supersedes the original report dated October 19, 2015. Please send questions or comments to Kevin Simmons at simmons.kevin@epa.gov or call 706.355.8730.

Attachment

United States Environmental Protection Agency
Region 4
Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

Sampling Investigation Report Revision 1

Smokey Mountain Smelters

Knoxville, Tennessee
Conducted July 14-15, 2015

Report Issued November 04, 2015 SESD

Project Identification Number: 15-0346

Requestor: Scott Miller, RPM
Superfund Division
61 Forsyth St. SW
Atlanta, Georgia 30303-8960

SESD Project Leader: Kevin Simmons
Superfund & Air Section
980 College Station Road
Athens, Georgia 30605-2720

Title and Approval Sheet

Title: Revised Sampling Investigation Report Smokey Mountain Smelters

Approving Official:

Laura Ackerman, Chief
Superfund & Air Section
Field Services Branch

11/04/15
Date

SESD Project Leader:

Kevin Simmons, Life Scientist
Superfund & Air Section
Field Services Branch

11/4/15
Date

REPORT REVISION

This revision incorporates the addition of the Record of Decision (ROD) defined cleanup levels in Tables 4, 5, and 6. The "Analytical Results" section of the report was also revised to reflect the addition of the ROD cleanup levels. This report supersedes the original report dated October 19, 2015.

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Sampling Investigation Report for Smokey Mountain Smelters
SESD Project ID Number: 15-0346
Conducted July 14-15, 2015

INTRODUCTION

During the week of July 14, 2015 representatives of the US EPA Region 4 Science and Ecosystem Support Division (SESD) and Alion Science conducted groundwater sampling at the Smokey Mountain Smelters site in Knoxville, Tennessee. The investigation was requested by Scott Miller, Remedial Project Manager (RPM), Region 4 Superfund Division. The following personnel participated in the investigation:

NAME	ORGANIZATION	DUTIES
Kevin Simmons	US EPA SESD	Project Leader
Art Masters	US EPA SESD	Sampler
Tim Slagle	US EPA SESD	Sampler
Brian Striggow	US EPA SESD	Sampler
Don Fortson	Alion Science-ESAT	Sampler/ Instrument Calibration
Louie Pounds	Alion Science-ESAT	Field Chemist/ Instrument Calibration

BACKGROUND

The background and site status information below is taken from the EPA Region 4 Superfund website (see link below).
(http://www.epa.gov/region4/superfund/sites/npl/tennessee/smokmtsmtn.html#progress)

The site is located at 1508 Maryville Pike in Knoxville, Tennessee, four miles south of downtown Knoxville in a mixed industrial, commercial and residential area. A low-income apartment complex (Montgomery Village) is located to the south, within 75 feet of the site. The complex houses about 560 residents. Some single-family homes are also located nearby. The apartment complex includes recreational and playground areas and a daycare facility. Undeveloped property is located west of the site. Additional single-family homes are located to the east of the site and commercial and industrial properties are located to the north. The site is fenced and graded. EPA is working to establish grass on the site.

A series of fertilizer and agricultural chemical companies operated at the site from the 1920s to the 1960s. Smokey Mountain Smelters, also known as Rotary Furnace, Inc., operated at the site from 1979 to 1994. The facility was a secondary aluminum smelting operation. The process involved the melting of scrap aluminum and aluminum dross, a smelting waste by-product, and casting the molten aluminum metal bars. Raw materials at the facility primarily consisted of scrap aluminum and aluminum dross. Waste material from the operation was primarily saltcake, a residue with high salt and low metal content from dross smelting. Other waste materials included baghouse dust and discarded aluminum dross.

In 1983, the State of Tennessee's Division of Solid Waste Management issued a notice to Smokey Mountain Smelters after concluding that the site was "unsuitable for use as an industrial landfill." However, landfilling continued to occur on site for several years. In addition, the Knox County Department for Air Pollution Control documented numerous citizen complaints regarding excessive air emissions from the site and cited Smokey Mountain Smelters for several air quality violations in the 1980s.

Current Information

EPA contractors have conducted groundwater sampling of the monitoring wells in June 2012, November 2013, March 2014, and June 2014. Metals data from those events were downloaded from the EQuIS database and used as a reference for determining proper disposal of investigation derived waste (IDW).

Objectives

The following objectives for this sampling event were provided by Tennessee Department of Environment and Conservation (TDEC) Division of Remediation personnel.

TDEC is interested in additional analysis of the ground water at this site in order to determine the natural buffering capacity of the aquifer. One of the proposed remedies for the metals contamination in the ground water is to inject sodium bicarbonate. However, TDEC feels that the requirement for this remedial action might not be necessary if the ground water is sufficiently buffered by the limestone bedrock of the aquifer. Therefore we have requested the CaCO3, hardness & alkalinity analysis to provide data on the natural conditions of the aquifer. Also, ammonia is present in aluminum dross which is in the wastes that were disposed of at this site; and ammonia breaks down into nitrate nitrite. Furthermore, past industrial practices at this site included the manufacture of fertilizers. TDEC believed that this included ammonium nitrate and phosphorous orthophosphate fertilizers. Therefore, analysis for these constituents is appropriate. Additionally, the aluminum salt cake waste that was generated at this site by the reprocessing of the aluminum dross contains elevated chlorides.

SUMMARY

Fifteen groundwater samples were collected and analyzed for total metals, alkalinity, ammonia, chloride, hardness, nitrate nitrite, total kjeldahl nitrogen, total organic carbon, total phosphorus, sulfate, and sulfide from the wells listed in **Table 2**, page 10. The sulfide analyses were conducted on site utilizing a field chemist from Alion Science. The sulfide results are listed in **Table 3**. Four surface water samples were also collected from two streams near the southwest end of the site at the request of the RPM. These samples were collected to determine if contaminants were being released from the capped area of the site. The surface water samples were analyzed for total metals only. See **Figure 1** for sample locations. Prior to sample collection, wells were monitored for turbidity, pH, conductivity, dissolved oxygen, oxidation reduction potential (ORP) and temperature. Water quality parameter measurements were recorded until the following conditions were met for three successive readings: conductivity within 5%, pH within 0.1 standard units and turbidity less than 10 NTU or as close as reasonably achievable. Groundwater field parameter measurements and sulfide results are listed in **Table 3**.

Table 4 summarizes the metals results for groundwater; **Table 5**, the nutrients results for groundwater, and **Table 6**, the metals results for surface water. **Appendix A** contains copies of the field logbooks and **Appendix B** contains the laboratory analytical data sheets.

DISCUSSION

Well Condition

Wells and pads were in generally good condition. High turbidity was encountered in wells MW01A, MW03B, and MW12B with results of 41, 85.3, and 22.8 respectively. An effort was made to reduce the turbidity by purging additional volume and reducing the purge rate. High pH was encountered in wells MW02A, MW08A, and MW11B with results of 9.85, 8.57, and 8.53 respectively. These samples effervesced when acidified.

Sampling

All groundwater sampling was done in accordance with the SESD Groundwater Sampling Procedure SESDPROC-301-R3. The wells were purged with peristaltic, and or Grundfos Redi-Flo II pumps depending on depth to water and volume of water to be purged. The wells were sampled for metals and nutrients by direct filling the sample containers using peristaltic or Grundfos Redi-flo II pumps according to groundwater sampling procedure SESDPROC301-R3.

All groundwater sampling was done in accordance with the SESD Surface Water Sampling Procedure SESDPROC-201-R3. The four surface water samples were collected by dipping the container into the stream and filling it directly. See **Table 2** for well and sample ID information plus additional comments.

Investigation Derived Waste

Analytical results from past sampling events indicated that IDW, purge water from monitoring well SMSMW10A may contain hazardous levels of contaminants, particularly cadmium. The IDW from well SMSMW10A was containerized until analytical results were obtained, which indicate that cadmium was detected at 880µg L. The result for cadmium exceeded the Drinking Water RSL maximum contaminant level (MCL) of 5µg L, but not the maximum concentration for the toxicity characteristic of cadmium, which is 1000µg L, found in Table 1 of CFR 261.24. The purge water was left on site and will be disposed of on the ground during the next sampling event in the spring of 2016, since the maximum concentration for toxicity characteristic for cadmium was not exceeded.

Analytical Results

No metals results exceeded established hazardous waste regulatory levels per Table 1 in CFR 261.24. However, all of the groundwater samples exceeded the Regional Screening Level (RSLs) MCLs and or the Record of Decision (ROD) defined cleanup levels for one or more metal analytes. **Table 4** summarizes the results and highlights the exceedences of each standard.

SMSSW01 was the only surface water sample to have an exceedence of the ROD cleanup levels for manganese (43 µg L) with a result of 390 µg L. **Table 6** summarizes the surface water results for metals.

Twelve of the 15 groundwater stations exceeded the ROD defined cleanup goals for ammonia and or nitrate nitrite. Nutrient results are summarized in **Table 5**. The high pH of some samples caused them to be diluted for analysis which resulted in qualification of some of the data.

METHODOLOGY

Field activities were conducted in accordance with SESD's Field Branches Management and Quality System Procedures and the following SESD field measurement and sampling operating procedures:

Field Sampling Quality Control	SESDPROC-011-R4
Field pH Measurement	SESDPROC-100-R3
Field Specific Conductance Measurement	SESDPROC-101-R5
Field Temperature Measurement	SESDPROC-102-R4
Field Turbidity Measurement	SESDPROC-103-R3
Groundwater Level and Well Depth Measurement	SESDPROC-105-R2
Field Measurement of Dissolved Oxygen	SESDPROC-106-R3
Global Positioning System	SESDPROC-110-R4
Field Measurement of Oxidation Reduction Potential	SESDPROC-113-R1
Surface Water Sampling	SESDPROC-201-R3
Management of Investigation Derived Waste	SESDPROC-202-R3
Pump Operation	SESDPROC-203-R3
Field Equipment Cleaning and Decontamination	SESDPROC-205-R2
Groundwater Sampling	SESDPROC-301-R3

All field measurement and sampling procedures were performed by the SESD Field Services Branch and Alion personnel. Chain of custody documents were prepared and signed by Kevin Simmons. Samples were delivered by EPA personnel to the SESD laboratory for analysis.

FIELD QUALITY CONTROL

Well SMSMW02A was designated as a duplicate location. The duplicate was designated MW02AD0715. The analytical results for the sample and the respective duplicate sample showed excellent correlation, with the exception of lead. The lead results are still below the MCL and do not adversely impact the data. Overall, the results indicate proper sample collection and handling procedures as shown in **Table 1**.

Table 1
Duplicate Sample Results

	Station ID	**SMSMW02A**	**SMSMW02A**
	Sample ID	MW02A0715	MW02AD0715
	Sample Date	7/14/2015 14:30	7/14/2015 14:40
Analyte	**Units**		
Alkalinity, Total (as CaCO3)	mg/L	1200	1100
Ammonia as N	mg/L	97	99
Chloride	mg/L	2400 CRc	2400 CRb
Sulfate as SO4	mg/L	8.3 CRc	6.0 CRb
Total Kjeldahl Nitrogen	mg/L	94	99
Total Organic Carbon	mg/L	290	280 P-4
Total Phosphorus	mg/L	1.5	1.5
Aluminum	ug/L	3000	2000
Antimony	ug/L	14	12
Arsenic	ug/L	3.0	3.0
Lead	ug/L	7.0	3.9
Molybdenum	ug/L	80	74
Potassium	ug/L	77000	74000
Sodium	ug/L	1900000	1900000

ANALYTICAL DATA QUALIFIERS

CRC & CRb Sample diluted prior to analysis due to high pH.

P-4 Sample received at pH >2.

One matrix/matrix spike duplicate (MS/MSD) was collected at station SMSMW13B.

CONCLUSION

These results will be evaluated by the RPM, the Superfund Scientific Services Section, and Tennessee Department of Environment and Conservation (TDEC) Division of Remediation personnel to determine the next course of action. The RPM has requested another round of sampling in the March/April timeframe in 2016.

REFERENCES

United States Environmental Protection Agency Science and Ecosystem Support Division, "Field Branches Quality System and Technical Procedures". Most recent versions: http://www.epa.gov/region4/sesd/fbqstp

United States Environmental Protection Agency Science and Ecosystem Support Division, Analytical Support Branch Laboratory Operations and Quality Assurance Manual. April 2015

United States Environmental Protection Agency Science and Ecosystem Support Division, Quality Assurance Project Plan for Smokey Mountain Smelters. July 2015

Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites. RSL Maximum Contaminant Level. June 2015

Record of Decision. Smokey Mountain Smelters Superfund Site. September 2015

Final Report for Smokey Mountain Smelters. Groundwater Sampling. October 2015

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Table 2
Well Information Smokey Mountain Smelters

Well ID	Well Dia (in)	Geology of Screened Interval	Total Depth (July 2015) (ft bgs)	Water Level July 2015 TOC(ft)	Screen Interval (ft bgs)	Additional Field Notes
MW01A**	2	Clayey silt	40.0	28.84	30 - 40	Turbid, odorless groundwater
MW02A*	2	Waste material	25.08	14.38	15 - 25	Clear, champagne colored, odorless groundwater; high pH
MW03B**	2	Shale and limestone	65.11	33.12	55.8 - 65.8	Turbid, odorless groundwater
MW04A*	2	Silty clay	42.84	35.15	33 - 43	Clear, odorless groundwater
MW07A*	2	Sandy clay with gravel	23.2	15.37	13 - 23	Clear, light yellow colored, odorless groundwater
MW07B*	2	Dolomitic limestone	39.8	16.73	28.8 - 39.8	Clear, odorless groundwater
MW08A*	2	Sandy clay with gravel	34.4	21.37	20 - 35	Clear, odorless groundwater; high pH
MW10A*	2	Clay with chert gravel	29.88	21.02	20 - 30	Clear, odorless groundwater
MW10B*	2	Limestone with shale	69.7	20.45	59.8 - 69.8	Clear, odorless groundwater
MW11A*	2	Weathered sandstone	30.4	4.53	15.4 - 30.4	Clear, light yellow colored, odorless groundwater
MW11B*	2	Sandy shaley limestone & sandstone	56.95	6.91	41.93 - 56.93	Clear, odorless groundwater; effervesced when acidified; high pH
MW12A**	2	sandy clay and limestone	39.43	30.71	23.27 - 39.27	Clear, odorless groundwater
MW12B**	2	limestone with shale	61.75	30.63	46.69 - 61.69	Turbid, odorless groundwater
MW13A*	2	clay with shale	29.95	26.91	14.97 - 29.97	Clear, odorless groundwater
MW13B*	2	Shaley limestone	71.8	28.99	56.17 - 71.17	Clear, odorless groundwater

Notes

* Purged and sampled with peristaltic pump

**Purged and sampled with Grundfos pump

ft = feet

bgs = below ground surface

TOC - top of casing

Table 3
Field Parameter Results

			Analyte	Dissolved Oxygen	Oxidation Reduction Potential	pH	Specific Conductivity	Sulfide (S2, H2S, HS)	Temperature	Turbidity
			Units	mg/l	mV Ag/AgCl ref	pH Units	us/cm	mg/l	Deg C	NTU
Station ID	**Sample ID**	**Sample Date**	**Sample Time**							
SMSMW01A	MW01A0715	07/15/2015	09:35	0.08	-180	6.56	38030	< 0.007 U	23.1	41
SMSMW02A	MW02A0715	07/14/2015	14:30	0.3	-200	9.85	10110	0.023	18.9	3.92
SMSMW03B	MW03B0715	07/15/2015	12:10	0.37	-120	5.69	100.9	< 0.007 U	21	85.3
SMSMW04A	MW04A0715	07/15/2015	11:37	0.1	-190	5.81	33860	< 0.007 U	24.4	7.94
SMSMW07A	MW07A0715	07/15/2015	15:57	0.11	-170	6.49	43820	0.009	17.3	6.67
SMSMW07B	MW07B0715	07/15/2015	17:10	0.59	-160	6.53	79060	0.024	18.1	6.04
SMSMW08A	MW08A0715	07/15/2015	09:12	0.22	-180	8.67	5733	< 0.007 U	17.5	5.23
SMSMW10A	MW10A0715	07/14/2015	11:20	3.45	130	3.74	6868	0.007	17.8	0.48
SMSMW10B	MW10B0715	07/14/2015	13:30	0.66	-100	6.26	2112	0.015	21.3	9.01
SMSMW11A	MW11A0715	07/15/2015	14:50	0.26	-190	8.5	6840	< 0.007 U	17.2	4.56
SMSMW11B	MW11B0715	07/15/2015	14:02	0.13	-190	8.53	12080	< 0.007 U	16.5	1.08
SMSMW12A	MW12A0715	07/15/2015	16:10	0.36	-100	6.65	2999	0.007	26	10.1
SMSMW12B	MW12B0715	07/15/2015	18:00	0.28	-130	6.4	13180	< 0.007 U	19.3	22.8
SMSMW13A	MW13A0715	07/14/2015	13:15	1.97	-100	4.56	1634	0.007	18.7	3.02
SMSMW13B	MW13B0715	07/14/2015	11:46	0.59	-160	6.99	709.2	0.017	17.2	6.91
SMSSW01	SMSSW010715	07/15/2015	08:10	-	-	7.36	1098	-	-	24.9
SMSSW02	SMSSW020715	07/15/2015	08:24	-	-	7.66	294.3	-	-	31.8
SMSSW03	SMSSW030715	07/15/2015	08:29	-	-	7.54	447.3	-	-	30.8
SMSSW04	SMSSW040715	07/15/2015	08:35	-	-	7.17	715.8	-	-	19.2

U Analyte not detected above the minimum reporting limit

- Not measured

Table 4
Metals Results for Groundwater Samples

		Station ID	SMSMW01A	SMSMW02A	SMSMW02A	SMSMW03B	SMSMW04A	SMSMW07A	SMSMW07B	SMSMW08A
		Sample ID	MW01A0715	MW02A0715	MW02AD0715	MW03B0715	MW04A0715	MW07A0715	MW07B0715	MW08A0715
		Sample Date	7/15/2015 9:35	7/14/2015 14:30	7/14/2015 14:40	7/15/2015 12:10	7/15/2015 11:37	7/15/2015 15:57	7/15/2015 17:10	7/15/2015 9:12
Analyte	**Units**	**Comparison Standards**								
Aluminum	ug/L	SMS ROD Cleanup Levels (Sept 2015): 1997	< 2000 U	3000 ^	2000 ^	< 5000 U	< 1500 U	< 2000 U	< 3500 U	< 500 U
Antimony	ug/L	RSL MCL (June 2015): 6	< 5.0 U	14 ^	12 ^	< 5.0 U,J,QI-1	< 5.0 U	< 5.0 U	< 5.0 U,J,QI-1	< 5.0 U
Arsenic	ug/L	RSL MCL (June 2015): 10 SMS ROD Cleanup Levels (Sept 2015): 10	< 5.0 U	3.0	3.0	< 10 U,J,QI-1	< 5.0 U	< 5.0 U	< 5.0 U,J,QI-1	< 5.0 U
Barium	ug/L	RSL MCL (June 2015): 2000	110	< 25 U	< 25 U	< 250 U	83	< 100 U	< 180 U	< 25 U
Cadmium	ug/L	RSL MCL (June 2015): 5	19 ^	< 1.2 U	< 1.2 U	< 5.0 U	26 ^	4.1	< 5.0 U	< 2.5 U
Calcium	ug/L	-	280000 J,QM-2	< 1200 U	< 1200 U	2500000	1000000	150000	230000	< 1200 U
Chromium	ug/L	SMS ROD Cleanup Levels (Sept 2015): 100 RSL MCL (June 2015): 100	< 100 U	< 25 U	< 25 U	< 250 U	< 75 U	< 100 U	< 180 U	< 25 U
Cobalt	ug/L	SMS ROD Cleanup Levels (Sept 2015): 0.6	< 100 U	< 25 U	< 25 U	< 250 U	< 75 U	< 100 U	< 180 U	< 25 U
Iron	ug/L	-	< 2000 U	< 500 U	< 500 U	< 5000 U	< 1500 U	< 2000 U	< 3500 U	< 500 U
Lead	ug/L	RSL MCL (June 2015): 15	< 5.0 U	7.0	3.9	7.0	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Magnesium	ug/L	-	29000	< 1200 U	< 1200 U	140000	110000	20000	27000	1400
Manganese	ug/L	SMS ROD Cleanup Levels (Sept 2015): 43	15000 J,QM-2^	< 25 U	< 25 U	65000 ^	25000 ^	10000 ^	14000 ^	190 ^
Molybdenum	ug/L	-	< 200 U	80	74	< 500 U	< 150 U	< 200 U	< 350 U	< 50 U
Nickel	ug/L	SMS ROD Cleanup Levels (Sept 2015): 39	< 200 U	< 50 U	< 50 U	< 500 U	170 ^	< 200 U	< 350 U	< 50 U
Potassium	ug/L	-	840000 J,QM-2	77000	74000	71000	170000	270000	540000	46000
Selenium	ug/L	RSL MCL (June 2015): 50	< 10 U	< 20 U	< 10 U	< 1000 U,J,D-2,QI-1	< 28 U,J,D-2	< 64 U,J,D-2	< 280 U,J,D-2	< 10 U
Sodium	ug/L	-	5700000	1900000	1900000	14000000	4300000	6900000	12000000	1100000
Strontium	ug/L	-	520	< 25 U	< 25 U	4500	1600	270	580	< 25 U
Tin	ug/L	-	< 300 U	< 75 U	< 75 U	< 750 U	< 220 U	< 300 U	< 520 U	< 75 U
Yttrium	ug/L	-	< 60 U	< 15 U	< 15 U	< 150 U	< 45 U	210	< 100 U	< 15 U
Zinc	ug/L	SMS ROD Cleanup Levels (Sept 2015): 600	< 200 U	< 50 U	< 50 U	< 500 U	< 150 U	< 200 U	< 350 U	< 50 U

ANALYTICAL DATA QUALIFIERS

U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
D-2	Due to matrix interference, the sample cannot be accurately quantified. The reported result is estimated.
QI-1	Internal standard was outside of method control limits.
QM-2	Matrix spike recovery greater than method control limits.
	Result exceeds one or more comparison standards.
	Detection, result shown.

Table 4
Metals Results for Groundwater Samples

		Station ID	SMSMW10A	SMSMW10B	SMSMW11A	SMSMW11B	SMSMW12A	SMSMW12B	SMSMW13A	SMSMW13B
		Sample ID	MW10A0715	MW10B0715	MW11A0715	MW11B0715	MW12A0715	MW12B0715	MW13A0715	MW13B0715
		Sample Date	7/14/2015 11:20	7/14/2015 13:30	7/15/2015 14:50	7/15/2015 14:02	7/15/2015 16:10	7/15/2015 18:00	7/14/2015 13:15	7/14/2015 11:46
Analyte	**Units**	**Comparison Standards**								
Aluminum	ug/L	SMS ROD Cleanup Levels (Sept 2015): 1997	200000 ^	6900 ^	< 500 U	< 500 U	< 500 U	3600 ^	1400	< 200 U
Antimony	ug/L	RSL MCL (June 2015): 6	< 5.0 U	< 2.5 U	< 2.5 U	< 2.5 U	< 1.0 U	< 2.5 U	< 1.0 U	< 1.0 U
Arsenic	ug/L	RSL MCL (June 2015): 10 SMS ROD Cleanup Levels (Sept 2015): 10	11 ^ ^	< 2.5 U	100 J,QM-1,CR ^ ^	6.2	< 1.0 U	3.3	< 1.0 U	< 1.0 U
Barium	ug/L	RSL MCL (June 2015): 2000	< 120 U	28	< 25 U	< 25 U	210	160	25	42
Cadmium	ug/L	RSL MCL (June 2015): 5	880 ^	3.9	< 1.2 U	< 1.2 U	< 0.50 U	1.5	16 ^	1.9
Calcium	ug/L	-	380000	350000	2900	2600	1200000 J,QC-4	850000	37000	120000
Chromium	ug/L	SMS ROD Cleanup Levels (Sept 2015): 100 RSL MCL (June 2015): 100	< 120 U	< 25 U	< 25 U	< 25 U	73	< 50 U	7.5	< 10 U
Cobalt	ug/L	SMS ROD Cleanup Levels (Sept 2015): 0.6	1600 ^	29 ^	< 25 U	< 25 U	< 25 U	< 50 U	53 ^	< 10 U
Iron	ug/L	-	< 2500 U	< 500 U	< 500 U	< 500 U	1100	6800	< 100 U	< 200 U
Lead	ug/L	RSL MCL (June 2015): 15	< 5.0 U,J,QI-1	< 2.5 U	< 2.5 U	< 2.5 U	< 1.0 U	4.0	< 1.0 U	< 1.0 U
Magnesium	ug/L	-	110000	44000	< 1200 U	< 1200 U	110000	67000	13000	9500
Manganese	ug/L	SMS ROD Cleanup Levels (Sept 2015): 43	110000 ^	8800 ^	< 25 U	74 ^	380 ^	1700 ^	3400 ^	870 ^
Molybdenum	ug/L	-	< 250 U	< 50 U	< 50 U	58	< 50 U	< 100 U	< 10 U	< 20 U
Nickel	ug/L	SMS ROD Cleanup Levels (Sept 2015): 39	880 ^	< 50 U	< 50 U	< 50 U	53 ^	< 100 U	35	< 20 U
Potassium	ug/L	-	< 25000 U	< 5000 U	65000	42000	59000	43000	5200	< 2000 U
Selenium	ug/L	RSL MCL (June 2015): 50	54 J,CR^	53 ^	< 5.0 U	< 5.0 U	< 2.0 U	< 5.0 U	20	4.8
Sodium	ug/L	-	430000	54000	1300000	1100000	1700000	1500000	260000	17000
Strontium	ug/L	-	610	650	< 25 U	< 25 U	1800	1500	100	230
Tin	ug/L	-	< 380 U	< 75 U	< 75 U,J,QM-1	< 75 U	110	< 150 U	< 15 U	< 30 U
Yttrium	ug/L	-	7000	15	< 15 U	< 15 U	< 15 U	< 30 U	44	< 6.0 U
Zinc	ug/L	SMS ROD Cleanup Levels (Sept 2015): 600	48000 ^	63	< 50 U	< 50 U	< 50 U	< 100 U	970 ^	< 20 U

ANALYTICAL DATA QUALIFIERS

U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
CR	May be biased high due to complex matrix.
QC-4	Result greater than highest point on the calibration curve.
QI-1	Internal standard was outside of method control limits.
QM-1	Matrix spike recovery less than method control limits.
	Result exceeds one or more comparison standards.
	Detection, result shown.

Table 5
Nutrient Results for Groundwater Samples

		Station ID	SMSMW01A	SMSMW02A	SMSMW02A	SMSMW03B	SMSMW04A	SMSMW07A
		Sample ID	MW01A0715	MW02A0715	MW02AD0715	MW03B0715	MW04A0715	MW07A0715
		Sample Date	7/15/2015 9:35	7/14/2015 14:30	7/14/2015 14:40	7/15/2015 12:10	7/15/2015 11:37	7/15/2015 15:57
Analyte	**Units**	**Comparison Standard**						
Alkalinity, Total (as CaCO3)	mg/L	-	680	1200	1100	580	330	1200
Ammonia as N	mg/L	SMS ROD Cleanup Levels (Sept 2015): 30	220 ^	97 ^	99 ^	110 ^	65 ^	190 ^
Chloride	mg/L	-	13000	2400 CRc	2400 CRb	46000	13000	16000
Hardness (as CaCO3)	mg/L	-	830	< 8.3 U	< 8.3 U	6900	2900	450
Nitrate/Nitrite as N	mg/L	SMS ROD Cleanup Levels (Sept 2015): 10	51	< 0.050 U,J,H-1	< 0.050 U	< 0.050 U	20	2.8
Sulfate as SO4	mg/L	-	780	8.3 CRc	6.0 CRb	1600	640	1100
Total Kjeldahl Nitrogen	mg/L	-	200	94	99	81	62	190
Total Organic Carbon	mg/L	-	8.0	290	280 P-4	1.2	1.8	21
Total Phosphorus	mg/L	-	0.074	1.5	1.5	0.059	0.030 J,QR-1	0.12

		Station ID	SMSMW07B	SMSMW08A	SMSMW10A	SMSMW10B	SMSMW11A	SMSMW11B
		Sample ID	MW07B0715	MW08A0715	MW10A0715	MW10B0715	MW11A0715	MW11B0715
		Sample Date	7/15/2015 17:10	7/15/2015 9:12	7/14/2015 11:20	7/14/2015 13:30	7/15/2015 14:50	7/15/2015 14:02
Analyte	**Units**	**Comparison Standard**						
Alkalinity, Total (as CaCO3)	mg/L	-	1300	740	< 1.0 NA-12	390	730	1300
Ammonia as N	mg/L	SMS ROD Cleanup Levels (Sept 2015): 30	500 ^	41 ^	< 0.050 U	0.070	43 ^	80 ^
Chloride	mg/L	-	32000	1200 CRb	1300	91	1600 CRb	3000 CRb
Hardness (as CaCO3)	mg/L	-	700	8.4	1400	1100	9.6	11
Nitrate/Nitrite as N	mg/L	SMS ROD Cleanup Levels (Sept 2015): 10	3.4	0.82	24	3.6	5.8	0.31
Sulfate as SO4	mg/L	-	920	67 CRb	2900	750	110 CRb	120 CRb
Total Kjeldahl Nitrogen	mg/L	-	440	35	0.34	0.33	34	66
Total Organic Carbon	mg/L	-	38	15	1.5	2.5	11	25
Total Phosphorus	mg/L	-	0.26	1.5	0.058	< 0.010 U,J,QR-1	1.2	0.26

Table 5
Nutrient Results for Groundwater Samples

		Station ID	SMSMW12A	SMSMW12B	SMSMW13A	SMSMW13B
		Sample ID	MW12A0715	MW12B0715	MW13A0715	MW13B0715
		Sample Date	7/15/2015 16:10	7/15/2015 18:00	7/14/2015 13:15	7/14/2015 11:46
Analyte	**Units**	**Comparison Standard**				
Alkalinity, Total (as CaCO3)	mg/L	-	440	410	4.3	270
Ammonia as N	mg/L	SMS ROD Cleanup Levels (Sept 2015): 30	1.4	14	< 0.050 U	< 0.050 U
Chloride	mg/L	-	560	3900	280	23
Hardness (as CaCO3)	mg/L	-	3400	2400	140	340
Nitrate/Nitrite as N	mg/L	SMS ROD Cleanup Levels (Sept 2015): 10	20	63	8.6	1.9
Sulfate as SO4	mg/L	-	220	350	280	73
Total Kjeldahl Nitrogen	mg/L	-	1.6	10	0.30	0.087 J,QR-1
Total Organic Carbon	mg/L	-	1.8	2.8	1.5	< 1.0 U
Total Phosphorus	mg/L	-	0.014 J,QR-1	0.13	< 0.010 U,J,QR-1	< 0.010 U,J,QR-1

ANALYTICAL DATA QUALIFIERS

U	The analyte was not detected at or above the reporting limit.
J	The identification of the analyte is acceptable; the reported value is an estimate.
CRc	Sample diluted prior to analysis due to high pH.
CRb	Sample diluted prior to analysis due to high pH.
H-1	Recommended holding time exceeded.
NA-12	Sample has no measureable alkalinity. Original sample pH is less than 4.5.
P-4	Sample received at pH >2.
QR-1	MRL verification recovery less than lower control limits.
	Result exceeds the comparison standard.
	Detection, result shown.

Table 6
Metals Results for Surface Water Samples

		Station ID	SMSSW01	SMSSW02	SMSSW03	SMSSW04
		Sample ID	SMSSW010715	SMSSW020715	SMSSW030715	SMSSW040715
		Sample Date	7/15/2015 8:10	7/15/2015 8:24	7/15/2015 8:29	7/15/2015 8:35
Analyte	**Units**	**Comparison Standard**				
Aluminum	ug/L	SMS ROD Cleanup Levels (Sept 2015): 1997	1200	1400	1700	630
Arsenic	ug/L	RSL MCL (June 2015): 10 SMS ROD Cleanup Levels (Sept 2015): 10	2.4	2.3	2.4	< 1.0 U
Barium	ug/L	RSL MCL (June 2015): 2000	31	18	20	31
Calcium	ug/L	-	34000	32000	32000	40000
Copper	ug/L	RSL MCL (June 2015): 1300	30	19	23	62
Iron	ug/L	-	1100	1700	1700	700
Lead	ug/L	RSL MCL (June 2015): 15	1.6	1.7	1.7	1.0
Magnesium	ug/L	-	6500	4800	4800	7500
Manganese	ug/L	SMS ROD Cleanup Levels (Sept 2015): 43	390 ^	16	41	38
Potassium	ug/L	-	16000	8500	9600	13000
Sodium	ug/L	-	170000	15000	47000	86000
Strontium	ug/L	-	87	84	79	120
Titanium	ug/L	-	11	12	13	6.3
Zinc	ug/L	SMS ROD Cleanup Levels (Sept 2015): 600	17	< 10 U	12	10

ANALYTICAL DATA QUALIFIERS

U	The analyte was not detected at or above the reporting limit.
	Results exceeds one or more comparison standards.
	Detection, result shown.

Figure 1
Smokey Mountain Smelters
Sample Locations

Appendix A

Field Logbooks

Field Measurement & Sampling Logbook 1 of 2	**16 pages**
Field Measurement & Sampling Logbook 2 of 2	**15 pages**
Field Instrument Calibration Logbook 1 of 1	**8 pages**
Sulfide Field Chemistry Logbook 1 of 1	**7 pages**
Total	**46 pages**

United States Environmental Protection Agency
Region 4
Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

Project Name: Smokey Mountain Smelters
Project Location: Knoxville, Tennessee
Project ID Number: 15-0346

Project Leader: Kevin Simmons

Field Measurement and Sampling Logbook

Book 1 **of** 2

Inclusive Dates: July 13 – 16 , 2015

List of personnel in logbook:

Name	Initials	Organization/Duties
Art Masters	AM	SESD
Don Fortson	DF	ESAT / SAMPLER
Kevin Simmons	KS	EPA SESD
Louie Pounds	LP	ESAT / sampler

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Instrument Information	3
Table 1 Sample IDs and Well Details	4
Figure 1 Well Location Map	5
Field Samples and Measurements	6-16
Additional Notes	17-18

The following procedures will be used unless otherwise stated in the field logbooks:

SESDPROC-010-R5, Logbooks
SESDPROC-011-R4, Field Sampling Quality Control
SESDPROC-100-R3, Field pH Measurement
SESDPROC-101-R5, Field Specific Conductance Measurement
SESDPROC-102-R4, Field Temperature Measurement
SESDPROC-103-R3, Field Turbidity Measurement
SESDPROC-105-R2, Groundwater Level and Well Depth Measurement
SESDPROC-106-R3, Field Dissolved Oxygen Measurement
SESDPROC-113-R1, Surface Water Sampling
SESDPROC-201-R3, Management of Investigation
SESDPROC-202-R2, Management of Investigation Derived Waste
SESDPROC-203-R3, Pump Operation
SESDPROC-205-R2, Field Equipment Cleaning and Decontamination
SESDPROC-209-R3, Packing, Marking, Labeling & Shipping of Environmental & Waste Samples
SESDPROC-301-R3, Groundwater Sampling

Site Notes:

- Groundwater samples were not filtered.
- Well details are listed in Table 1.

Groundwater instruments used:

		SESD ID#		SESD ID#
#4	pH/Conductivity	020314-03	pH/Conductivity	
#6	DO/ORP	013114-03	DO/ORP	
#5	Turbidity	090310-03	Turbidity	

NOTE: Instrument calibration information is maintained in separate instrument calibration logbook.

Additional notes:

All sample containers will be 500ml poly.

Table 1
Smokey Mountain Smelters Well Construction Details

WL	Station ID	Sample ID	Well Dia (in)	Geology of Screened Interval	TD (TOC)	Reported Total Depth (ft bgs)	Water Level Range TOC (ft)	Screen Interval (ft bgs)
28.84	SMSMW01A	MW01A0715	2	Clayey silt	40.3'	40	28.94 - 36.91	30 - 40
14.38	SMSMW02A	MW02A0715	2	Waste material	25.08'	28	14.05 - 16.59	15 - 25
33.12	SMSMW03B	MW03B0715	2	Shale and limestone	65.11'	66	31.75 - 37.77	55.8 - 65.8
35.15	SMSMW04A	MW04A0715	2	Silty clay	42.84'	43	34.41 - 40.85	33 - 43
15.37	SMSMW07A	MW07A0715	2	Sandy clay with gravel	23.2'	23.5	14.75 - 21.47	13 - 23
16.73	SMSMW07B	MW07B0715	2	Dolomitic limestone	39.8'	40	16.48 - 23.00	28.8 - 39.8
21.37	SMSMW08A	MW08A0715	2	Sandy clay with gravel	34.4'	37.5	20.01 - 26.00	20 - 35
21.02	SMSMW10A	MW10A0715	2	Clay with chert gravel	29.88'	32	18.51 - 29.46	20 - 30
20.45	SMSMW10B	MW10B0715	2	Limestone with shale	69.7'	70	18.04 - 29.41	59.8 - 69.8
4.53	SMSMW11A	MW11A0715	2	Weathered sandstone	30.4'	30.4	3.58 - 7.71	15.4 - 30.4
6.91	SMSMW11B	MW11B0715	2	Sandy shaley limestone & sandstone	56.95'	57	5.64 - 6.91	41.93 - 56.93
30.71	SMSMW12A	MW12A0715	2	sandy clay and limestone	39.43'	40	30.48 - 37.00	23.27 - 39.27
30.63	SMSMW12B	MW12B0715	2	limestone with shale	61.75'	62	30.29 - 36.92	46.69 - 61.69
	SMSMW13A	MW13A0715	2	clay with shale	29.95 ~~29.85'~~ 7/13/15	30.5	20.10 - 30.00	14.97 - 29.97
	SMSMW13B	MW13B0715	2	Shaley limestone	71.8'	72	25.79 - 43.07	56.17 - 71.17
				TD Values recorded 7/13/15 by AM				

TD recorded w/ Testwell Instr. SESD ID 072908-02
Verification Date 1/5/15

Figure 1

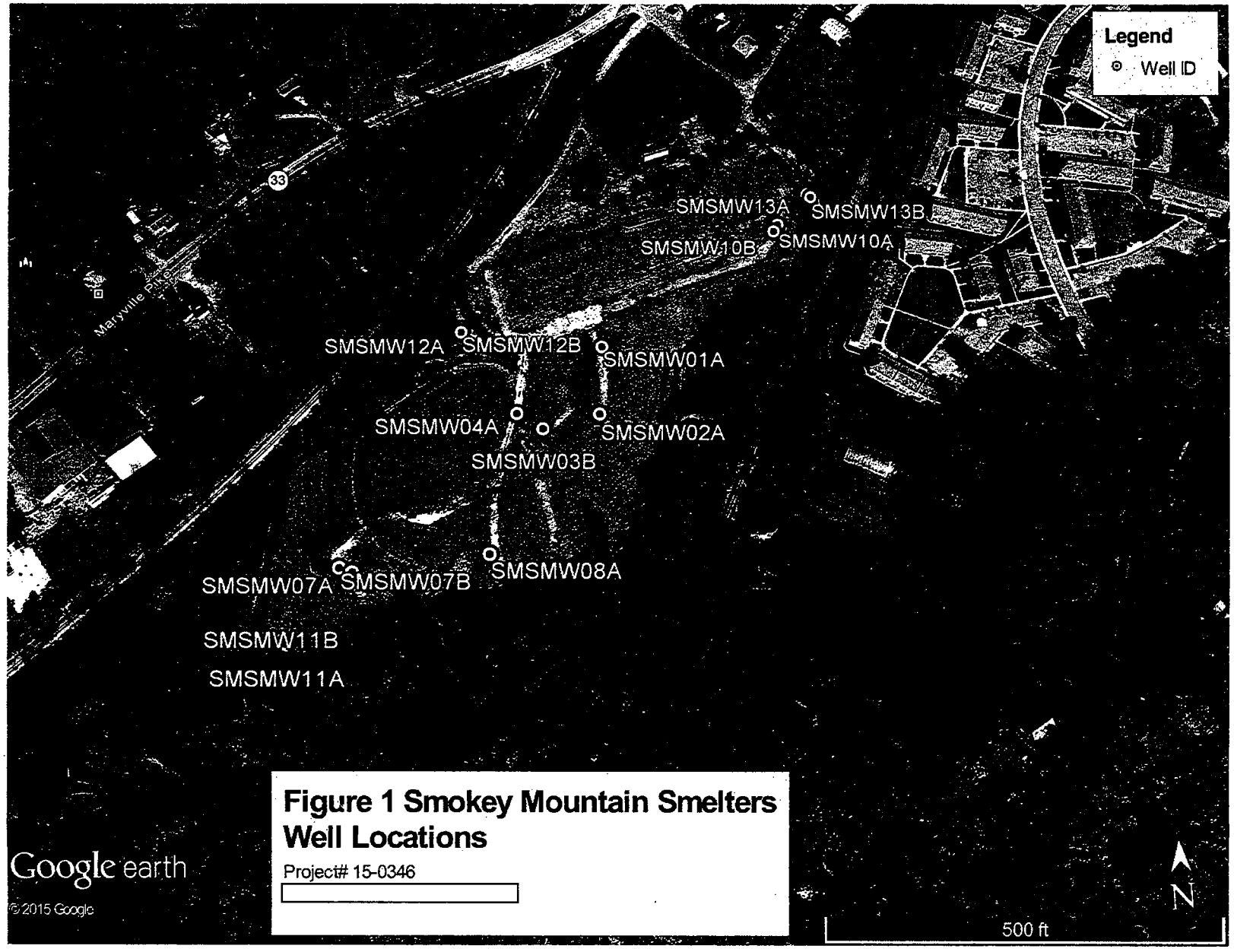

Figure 1 Smokey Mountain Smelters Well Locations

Project# 15-0346

Date: 7/14/15 **Station ID:** SMSMW13A **Sample ID:** MW13A0715

Sampler Art Masters **or Init** + Kevin Simmons

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	29.95	0.5times water column length	
Water Level (ft)	27.23	Purge Volume Calculations	
Water Column (ft)	2.72	Purge Volume (gal)	—
Purge Start Time	0848	**Sample Collection Time**	13:15

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
10:09	28.16	0.8	4.52	17.7	1642	2.54	127.1	5.88
10:49	28.89	1.75	4.56	18.7	1634	197	-101.8	23.4
13:20	—	—	—	—	—	—	—	3.02

Field Split: *Yes or* (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes or* (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly ~~-1~~ 500mL	[✓]	HNO_3	pres by KS
Nutrients + TOC	1L poly - 1 500mL	[✓]	H_2SO_4	pres by DF
Sulfate + Chloride + Alkalinity	1L poly – 1 500mL	[✓]	**Ice**	No Headspace
Sulfide (field chemistry)	**500ml poly**	[✓]	**Ice**	**Zero headspace, analyze ASAP**

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: At ≈ 0900 there was heavy rain and lightning. Halted all operations except we left the pump running. Lightning resumed around 10:20. Well pumped dry.

Sample media description: Clear, odorless groundwater.

Procedure deviations/comments: Used lowflow/low volume method but only raised the tubing about 1ft off the bottom because of the water column was only 2.72 ft. A turbidity reading was taken after the total metals sample was collected.

Date: 7/14/15 **Station ID:** SMSW13B **Sample ID:** MW13B0715

Sampler Art Masters **or Init** + Kevin Simmons

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	71.8	0.5times water column length	
Water Level (ft)	29.15	Purge Volume Calculations	
Water Column (ft)	42.65	Purge Volume (gal)	—
Purge Start Time	11:15	**Sample Collection Time**	11:46

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
11:20	29.24	0.1	6.98	17.5	708.2	1.85	-141.5	92.3
11:25	29.24	0.2	6.99	17.2	708.4	1.44	-149.1	50.7
11:30	29.24	0.35	6.97	17.1	707.8	0.93	-153.9	15.6
11:35	29.22	0.5	6.98	17.1	708.2	0.74	-156.8	~~15.4~~ DJ 7/14/15 7.67
11:42	29.23	0.7	6.99	17.2	709.2	0.59	-158.9	~~11.0~~ DJ 7/14/15 6.91
								Vial fogged

Field Split: *Yes* or *No* **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes* or *No*

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	~~1L~~ poly - 1 500mL	[✓]	HNO_3	pres. by KS ½ vial
Nutrients + TOC	~~1L~~ poly - 1 500mL	[✓]	H_2SO_4	pres. by DJ ½ vial
Sulfate + Chloride + Alkalinity	~~1L~~ poly – 1 500mL	[✓]	**Ice**	No headspace
Sulfide (field chemistry)	**500ml poly**	[✓]	**Ice**	**Zero headspace, analyze ASAP**

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Cloudy, some rain

Sample media description: Clear, odorless GW

Procedure deviations/comments: Tubing set mid-screen. Used low flow/low vol. method with peristaltic pump.

Date: 7/14/15 **Station ID:** SMSMW02A **Sample ID:** MW02A0715

Sampler Art Masters **or Init**

Sampler DON FORTSON **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or
Well Depth (total ft)	25.08	0.5times water column length
Water Level (ft)	14.37	Purge Volume Calculations
Water Column (ft)	10.71	Purge Volume (gal) —
Purge Start Time	14:05	**Sample Collection Time** 14:30

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
14:10	14.37	0.4	9.86	19.1	10,090	0.73	-201.4	17.7
14:17	14.38	1.0	9.86	18.7	10,130	0.34	-201.1	6.26
14:22	14.38	1.4	9.85	18.8	10,120	0.36	-200.8	4.85
14:28	14:38	1.9	9.85	18.9	10,110	0.30	-201.7	3.92

Field Split: (Yes) or No **Split Sample ID, Date and Time:** MW02AD0715 14:40 7/14/15

MS/MSD: Yes or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1+1 500mL	[✓]	HNO_3	pres by KS
Nutrients + TOC	1L poly - 1+1 500mL	[✓]	H_2SO_4	pres by KS
Sulfate + Chloride + Alkalinity	1L poly – 1+1 500mL	[✓]	Ice	No H-S
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Hot, cloudy

Sample media description: Clear, champagne colored, odorless groundwater

Procedure deviations/comments: Low flow/Low vol. method w/ peristaltic pump

Date: 7/15/15 **Station ID:** SMSMW08A **Sample ID:** MW08A0715

Sampler Art Masters **or Init**

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or
Well Depth (total ft)	34.4	0.5times water column length
Water Level (ft)	21.05	Purge Volume Calculations
Water Column (ft)	13.35	Purge Volume (gal) —

Purge Start Time 0845 **Sample Collection Time** 0912

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
08:50	21.33	0.2	8.62	17.9	5561	0.53	-179.1	20.2
09:00	21.42	0.8	8.67	17.4	5653	0.25	-179.8	10.2
09:05	21.46	1.3	8.67	17.4	5693	0.21	-182.9	6.92
09:10	21.48	1.75	8.67	17.5	5733	0.22	-184.1	5.23

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500mL	[✓]	HNO_3	pres by DF
Nutrients + TOC	1L poly - 1 500mL	[✓]	H_2SO_4	pres by DF
Sulfate + Chloride + Alkalinity	1L poly – 1 500mL	[✓]	Ice	No headspace
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Cloudy

Sample media description: Clear, odorless groundwater

Procedure deviations/comments: Low flow/low vol. w/peristaltic pump.

Date: 7/15/15 **Station ID:** SMSMW04A **Sample ID:** MW04A0715

Sampler Art Masters **or Init**

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in) 2

Well Depth (total ft) 42.84

Water Level (ft) ~~34.82~~ RT 7/15/15

Water Column (ft) 35.2 7.84

2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or 0.5times water column length

Purge Volume Calculations

Purge Volume (gal) —

Purge Start Time 10:05 **Sample Collection Time** 11:37

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
10:15	35.35	0.2	5.83	21.1	33,460	0.53	-174.6	283
10:25	35.40	0.5	5.81	23.2	33,080	0.56	-196.0	120
10:35	35.42	0.8	5.79	24.6	32,980	0.42	-188.2	65.9
10:45	35.46	1.2	5.78	25.8	33,200	0.33	-189.5	41.2
10:55	35.45	1.5	5.78	25.8	33,290	0.28	-193.7	22.2
11:05	35.72	1.9	5.78	26.0	33,360	0.20	-194.6	62.2
11:20	35.45	3.1	5.82	23.6	33,900	0.11	-194.7	21.8
11:35	35.52	3.8	5.81	24.4	33,860	0.10	-188.7	10.8
11:48	—	—	—	—	—	—	—	7.94

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500mL	[✓]	HNO_3	pres by KS
Nutrients + TOC	1L poly - 1 500mL	[✓]	H_2SO_4	pres by KS
Sulfate + Chloride + Alkalinity	1L poly – 1 500mL	[✓]	Ice	NO Headspace
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Cloudy

Sample media description: Clear, odorless groundwater

Procedure deviations/comments: Low flow/low vol method w/ submersible pump. Pump rate rose w/out any adjustment at 1105. Pump rate was adjusted
A final turdidity reading was taken before the total metals sample was collected

Date: 7/15/15 **Station ID:** SMSMW11B **Sample ID:** MW11B0715

Sampler Art Masters **or Init**

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	56.95	0.5times water column length	
Water Level (ft)	5.42	Purge Volume Calculations	
Water Column (ft)	51.53	Purge Volume (gal)	—
Purge Start Time	13:25	**Sample Collection Time**	14:02

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
13:30	7.43	0.7	8.53	16.2	12,220	0.26	-182.0	1.26
13:40	7.10	1.7	8.52	16.5	12,130	0.16	-185.7	~~5.20~~ 7/15/15 2.04 VIAL FOG
13:50	7.01	2.6	8.54	16.5	11,980	0.15	-188.6	1.58
14:00	7.01	3.6	8.53	16.5	12,080	0.13	-190.3	1.08

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	~~1L~~ poly - 1 500 mL	[✓]	HNO_3	pres. by KS
Nutrients + TOC	~~1L~~ poly - 1 500 mL	[✓]	H_2SO_4	pres by KS
Sulfate + Chloride + Alkalinity	~~1L~~ poly – 1 500 mL	[✓]	Ice	No Headspace
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Hot, cloudy

Sample media description: Clear, odorless groundwater. Sample effervesced when HNO_3 was added.

Procedure deviations/comments: Low flow/low vol. method w/ peristaltic pump.

Date: 7/15/15 **Station ID:** SMSMW11A **Sample ID:** MW11A0715

Sampler Art Masters **or Init**

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	30.4	0.5times water column length	
Water Level (ft)	1.82	Purge Volume Calculations	
Water Column (ft)	28.58	Purge Volume (gal)	—
Purge Start Time	14:23	**Sample Collection Time**	14:50

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
14:30	1.91	0.6	8.51	17.4	6,869	0.27	-188.6	8.79
14:38	1.94	1.25	8.50	17.3	6,856	0.27	-191.9	7.89
14:43	1.94	1.8	8.50	17.2	6,825	0.24	-192.6	8.04
14:48	1.95	2.3	8.50	17.2	6,840	0.26	-193.2	4.56

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500mL	[✓]	HNO_3	pres by KS
Nutrients + TOC	1L poly - 1 500mL	[✓]	H_2SO_4	pres by KS
Sulfate + Chloride + Alkalinity	1L poly – 1 500mL	[✓]	**Ice**	No headspace
Sulfide (field chemistry)	**500ml poly**	[✓]	**Ice**	**Zero headspace, analyze ASAP**

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Hot, sunny

Sample media description: Clear, light yellow color, odorless groundwater.

Procedure deviations/comments: Low flow/low vol. method w/ peristaltic pump

Date: 7/15/15 **Station ID:** SMSMW07A **Sample ID:** MW07A

Sampler Art Masters **or Init**_____

Sampler Don Fortson **or Init**_____

See Table 1, page 4 for well data.

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	23.2	0.5times water column length	
Water Level (ft)	14.63	Purge Volume Calculations	
Water Column (ft)	8.57	Purge Volume (gal)	—
Purge Start Time	15:25	**Sample Collection Time**	15:57

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
15:30	14.85	0.4	6.18	18.0	43,070	1.30	-159.0	14.7
15:35	14.88	0.8	6.32	17.4	45,070	0.40	-163.3	44.7
15:45	14.88	1.5	6.43	17.3	44,620	0.14	-167.8	21.4
15:50	14.84	1.8	6.46	17.3	44,120	0.12	-168.4	10.0
15:55	14.84	2.25	6.49	17.3	43,820	0.11	-170.1	6.67

Field Split: *Yes or* (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes or* (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	~~1L~~ poly - 1 500 mL	[✓]	HNO_3	pres by KS
Nutrients + TOC	~~1L~~ poly - 1 500 mL	[✓]	H_2SO_4	pres by KS
Sulfate + Chloride + Alkalinity	~~1L~~ poly – 1 500 mL	[✓]	Ice	No headspace
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Hot, sunny

Sample media description: Clear, very light yellow color, odorless groundwater

Procedure deviations/comments: Low flow/low vol. w/ peristaltic pump.

Date: 7/15/15 **Station ID:** SMSMW07B **Sample ID:** MW07B0715

Sampler Art Masters **or Init**

Sampler Don Fortson **or Init**

See Table 1, page 4 for well data.

Well Diameter (in) 2

Well Depth (total ft) 39.8

Water Level (ft) 16.15

Water Column (ft) 23.65

2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or 0.5times water column length

Purge Volume Calculations

Purge Volume (gal) —

Purge Start Time 16:24

Sample Collection Time 17:10

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
16:34	16.4	0.7	6.53	18.2	80,110	0.29	-168.5	227
16:46	16.38	1.5	6.54	18.0	79,140	0.65	-161.4	35.1
16:56	16.35	2.2	6.51	18.2	79,140	0.16	-165.6	16.4
17:06	16.35	2.9	6.53	18.1	79,060	0.59	-160.8	6.04

Field Split: *Yes or* (No) **Split Sample ID, Date and Time:** — —

MS/MSD: *Yes or* (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500mL	[✓]	HNO_3	pres by KS
Nutrients + TOC	1L poly - 1 500mL	[✓]	H_2SO_4	pres by KS
Sulfate + Chloride + Alkalinity	1L poly – 1 500mL	[✓]	Ice	No headspace
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Hot, sunny

Sample media description: Clear, odorless groundwater

Procedure deviations/comments: Low flow/low vol. method w/ peristaltic pump.

Date: _____ **Station ID:** _____ **Sample ID:** _____

Sampler _____ **or Init**_____

Sampler_____ **or Init**_____

See Table 1, page 4 for well data.

Well Diameter (in) _____

Well Depth (total ft) _____

Water Level (ft) _____

Water Column (ft) _____

2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or 0.5times water column length

Purge Volume Calculations

Purge Volume (gal) _____

Purge Start Time _____ **Sample Collection Time** _____

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU

Field Split: *Yes or No* **Split Sample ID, Date and Time:**_____ _____

MS/MSD: *Yes or No*

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1	[ ]	HNO_3	
Nutrients + TOC	1L poly - 1	[ ]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1	[ ]	Ice	
Sulfide (field chemistry)	500ml poly	[ ]	Ice	Zero headspace, analyze ASAP

[ ] Samples placed on ice as required [ ] Cooler(s) checked for ice/water

Environmental conditions:

Sample media description:

Procedure deviations/comments:

Additional information:

7/15/15 0810

Surface water sample from water running from the cap. Metals only, 1 container; collected among concrete riprap; still water

Station ID: SMS SW01 0715 pH 7.36

Sample ID: SMS SW01 Cond 1098

N 35.91747 ±18' NTU 24.9

W 83.92770

7/15/15 0824

Surface water from flowing stream adjacent to runoff from cap. Metals only; 1 container: collected among rock riprap, flowing water.

Station ID: SMS SW02 pH 7.66

Sample ID: SMS SW02 0715 Cond 294.3

N 35.91742 ±15' NTU 31.8

W 83.92770

7/15/15 0829

Surface water collected at confluence of 2 previous streams; flowing water; metals only, 1 container

N 35.91734 ±15' pH 7.54

W 83.92784 Cond 447.3

Station ID: SMS SW03 NTU 30.8

Sample ID: SMS SW03 0715

7/15/15 0835

Surface water from stream on west side of cap. Still water. Metals only; 1 container; collected among stone riprap with scrap metal pieces nearby

Station ID: SMS SW04 Sample ID: SMS SW04 0715

N 35.91785 ±13' pH 7.17

W 83.92841 Cond 715.8

NTU 19.2

United States Environmental Protection Agency
Region 4
Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

Project Name: Smokey Mountain Smelters
Project Location: Knoxville, Tennessee
Project ID Number: 15-0346

Project Leader: Kevin Simmons

Field Measurement and Sampling Logbook

Book 2 **of** 2

Inclusive Dates: July 13 - 16 , 2015

List of personnel in logbook:

Name	Initials	Organization/Duties
Brian Striggow		Team Leader
Stephen Camp		Sampler

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Instrument Information	3
Table 1 Sample IDs and Well Details	4
Figure 1 Well Location Map	5
Field Samples and Measurements	6-16
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The following procedures will be used unless otherwise stated in the field logbooks:

SESDPROC-010-R5, Logbooks
SESDPROC-011-R4, Field Sampling Quality Control
SESDPROC-100-R3, Field pH Measurement
SESDPROC-101-R5, Field Specific Conductance Measurement
SESDPROC-102-R4, Field Temperature Measurement
SESDPROC-103-R3, Field Turbidity Measurement
SESDPROC-105-R2, Groundwater Level and Well Depth Measurement
SESDPROC-106-R3, Field Dissolved Oxygen Measurement
SESDPROC-113-R1, Surface Water Sampling
SESDPROC-201-R3, Management of Investigation
SESDPROC-202-R2, Management of Investigation Derived Waste
SESDPROC-203-R3, Pump Operation
SESDPROC-205-R2, Field Equipment Cleaning and Decontamination
SESDPROC-209-R3, Packing, Marking, Labeling & Shipping of Environmental & Waste Samples
SESDPROC-301-R3, Groundwater Sampling

Site Notes:

- Groundwater samples were not filtered.
- Well details are listed in Table 1.

Groundwater instruments used:

	SESD ID#		SESD ID#
pH/Conductivity	1	pH/Conductivity	
DO/ORP	2	DO/ORP	
Turbidity	3	Turbidity	

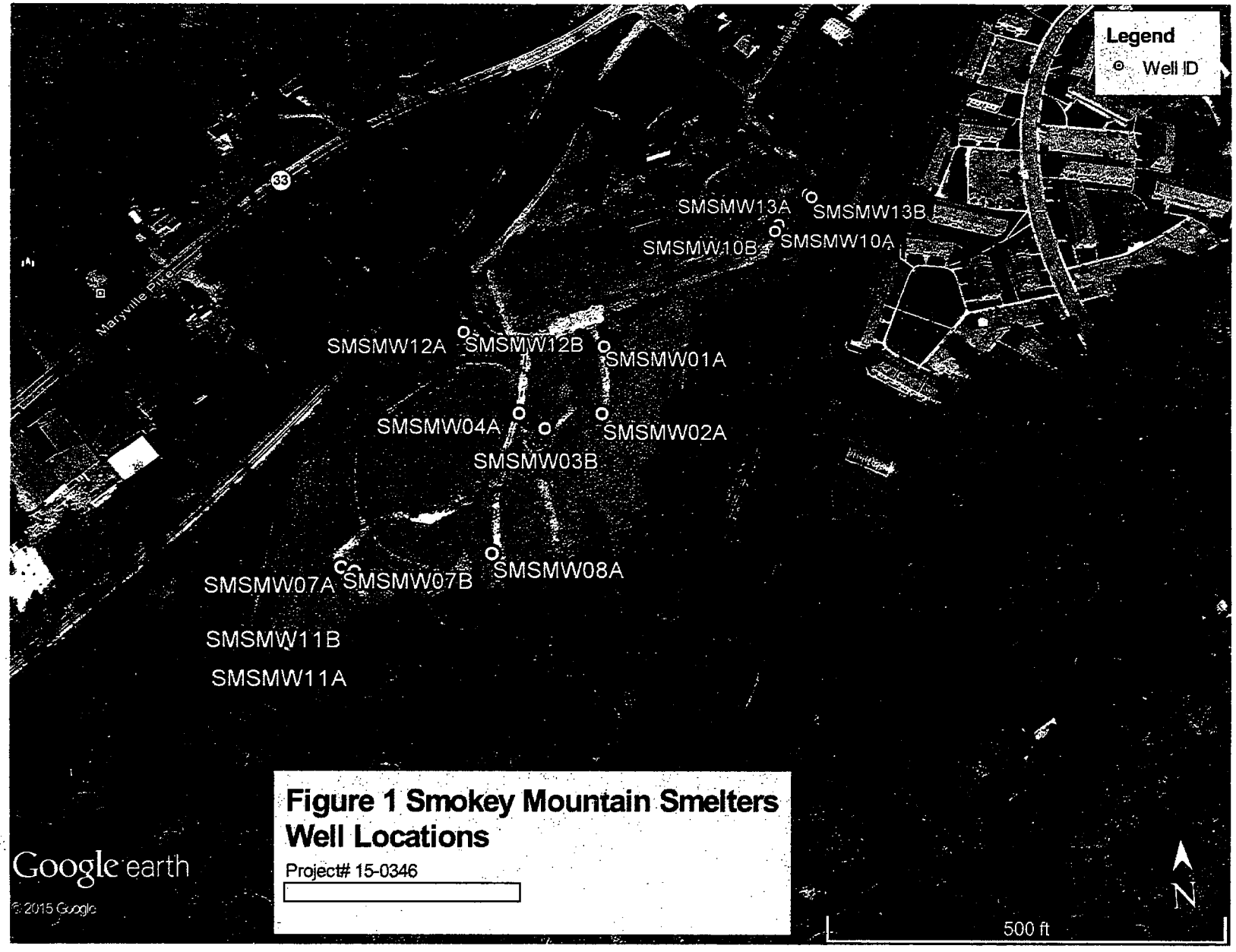
NOTE: Instrument calibration information is maintained in separate instrument calibration logbook.

Additional notes:

Table 1
Smokey Mountain Smelters Well Construction Details

Station ID	Sample ID	Well Dia (in)	Geology of Screened Interval 7/13/15 TD (TOC)	Reported Total Depth (ft bgs)	Water Level Range TOC (ft)	Screen Interval (ft bgs)
SMSMW01A	MW01A0715	2	Clayey silt 40.3'	40	28.94 - 36.91	30 - 40
SMSMW02A	MW02A0715	2	Waste material 25.08'	28	14.05 - 16.59	15 - 25
SMSMW03B	MW03B0715	2	Shale and limestone 65.11'	66	31.75 - 37.77	55.8 - 65.8
SMSMW04A	MW04A0715	2	Silty clay 42.84'	43	34.41 - 40.85	33 - 43
SMSMW07A	MW07A0715	2	Sandy clay with gravel 23.2'	23.5	14.75 - 21.47	13 - 23
SMSMW07B	MW07B0715	2	Dolomitic limestone 39.8'	40	16.48 - 23.00	28.8 - 39.8
SMSMW08A	MW08A0715	2	Sandy clay with gravel 34.4'	37.5	20.01 - 26.00	20 - 35
SMSMW10A	MW10A0715	2	Clay with chert gravel 29.88'	32	18.51 - 29.46	20 - 30
SMSMW10B	MW10B0715	2	Limestone with shale 69.7'	70	18.04 - 29.41	59.8 - 69.8
SMSMW11A	MW11A0715	2	Weathered sandstone 30.4'	30.4	3.58 - 7.71	15.4 - 30.4
SMSMW11B	MW11B0715	2	Sandy shaley limestone & sandstone 56.96'	57	5.64 - 6.91	41.93 - 56.93
SMSMW12A	MW12A0715	2	sandy clay and limestone 39.43'	40	30.48 - 37.00	23.27 - 39.27
SMSMW12B	MW12B0715	2	limestone with shale 61.75'	62	30.29 - 36.92	46.69 - 61.69
SMSMW13A	MW13A0715	2	clay with shale 29.95'	30.5	20.10 - 30.00	14.97 - 29.97
SMSMW13B	MW13B0715	2	Shaley limestone 71.8'	72	25.79 - 43.07	56.17 - 71.17

Figure 1


Legend
Well ID
SMSMW13A
SMSMW13B
SMSMW10B
SMSMW10A
SMSMW12A
SMSMW12B
SMSMW01A
SMSMW04A
SMSMW02A
SMSMW03B
SMSMW08A
SMSMW07A
SMSMW07B
SMSMW11B
SMSMW11A
Maryville Pike
33
Google earth
© 2015 Google
500 ft
N
Figure 1 Smokey Mountain Smelters
Well Locations
Project# 15-0346

Date: 7-14-15 **Station ID:** SMS MW10A **Sample ID:** MW10A0715

Sampler B. Strigoul **or Init**

Sampler S. Camp **or Init**

See Table 1, page 4 for well data.

Screen 20-30

Well Diameter (in)	2"	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	29.88	0.5times water column length	
Water Level (ft)	21.02	Purge Volume Calculations	
Water Column (ft)	8.86	Purge Volume (gal)	
Purge Start Time	8:55	**Sample Collection Time**	11:20

Time 7-14 BCS	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
10:05 ~~8:55~~	23.13	3.25	3.88	17.9	5921	4.93	169	2.85
10:45	23.60	5.5	3.78	17.6	6506	3.69	142.5	1.11
10:55	23.82	6.0	3.79	17.4	6488	4.17	146.4	0.57
11:05	23.90	~~6.25~~ BCS 6.25	3.77	17.3	6624	3.94	141.1	0.67
11:15	23.90	6.5	3.74	17.8	6868	3.45	134.0	0.48
~~11:20~~ 7-14 BCS								

Field Split: *Yes or* (No) **Split Sample ID, Date and Time:**

MS/MSD: *Yes or* (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500ml	[✓]	HNO_3	
Nutrients + TOC	1L poly - 1 500ml	[✓]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500ml	[✓]	Ice	~~pH~~ hd
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Cloudy, intermittent heavy rain. Clearing @ sample collection time

Sample media description: Clear odorless water

Procedure deviations/comments: Low-flow. Tubing inlet ~5' fm bottom. Very slow pump rate to stabilize

Date: 7-14-15 **Station ID:** SMSMW10B **Sample ID:** MW10B0715

Sampler B. Stringer **or Init**

Sampler S. Camp **or Init**

See Table 1, page 4 for well data.

10' Screen

Well Diameter (in)	2	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or
Well Depth (total ft)	69.7	0.5times water column length
Water Level (ft)	20.45	Purge Volume Calculations
Water Column (ft)	49.25	Purge Volume (gal)
Purge Start Time	11:50	**Sample Collection Time** 13:30

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU	
12:05	21.01	1 gal	6.45	17.4	1871	0.30	-95.0	60.1	
12:15	21.00	1.5 gal	6.35	17.8	1953	0.27	-121.7	22.8	
12:25	~~19.93~~ 20.35	2 gal	6.30	18.4	2015	0.29	-130.9	28.4	Slow pump
12:35	~~19.90~~ 20.40	2.5 gal	6.28	19.1	2049	0.41	-123.3	18.7	
12:45	20.90	2.9 gal	6.26	19.5	2076	0.35	-125.7	19.3	
12:55	20.81	3.2	6.25	20.6	2092	0.60	-110.9	15.5	
13:05	20.80	3.5 gal	6.26	20.9	2082	0.81	-105.4	13.7	
13:15	20.80	3.8 gal	6.25	21.1	2097	0.52	-115.5	10.6	
13:25	20.80	4 gal	6.26	21.3	2112	0.66	-101.3	9.01	

Field Split: *Yes or* (No) **Split Sample ID, Date and Time:**

MS/MSD: *Yes or* (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500ml	[✓]	HNO_3	
Nutrients + TOC	1L poly - 1 500ml	[✓]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500ml	[✓]	Ice	Ø hd
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Previous rain, now clear

Sample media description: Clear odorless water

Procedure deviations/comments: Low flow, Tubing inlet ~ 5' fm bottom, ¼" Teflon tubing (new) & peristaltic pump.

No Sample

Date: 7-14-15 **Station ID:** SMSMW01A **Sample ID:** MW01A0715

Sampler B. Stringer **or Init**

Sampler S. Camp **or Init**

See Table 1, page 4 for well data.

Screened 30-40

Well Diameter (in)	2"	2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	40.3	0.5times water column length	
Water Level (ft)	28.84	Purge Volume Calculations	
Water Column (ft)	11.46	Purge Volume (gal)	BCS 7-14 No Sample
Purge Start Time	14:30	**Sample Collection Time**	15:35

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
14:50	30.02	2.4	6.56	19.0	30,110	0.11	-206.5	54.6
15:00	30.05	3.6	6.59	19.8	31,12	0.08	-228.5	26.2
15:10	30.11	4.9	6.58	19.9	32,700	0.11	-230.1	14.6
15:20	30.18	6.3	6.56	19.9	34,140	0.07	-239.4	10.5
15:30	30.00	7.1	6.54	20.8	36,200	0.10	-234.9	39.5
15:40	29.75	8.0	6.52	22.3	37,700	0.14	-228.1	20.3
Pump loses pressure!				Restart tomorrow				

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:**

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500ml	[ ]	HNO_3	
Nutrients + TOC	1L poly - 1 500ml	[ ]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500ml	[ ]	Ice	ph hol
Sulfide (field chemistry)	500ml poly	[ ]	Ice	Zero headspace, analyze ASAP

[ ] Samples placed on ice as required [ ] Cooler(s) checked for ice/water

Environmental conditions: Cloudy - Storm approaching @ sample time

Sample media description: BCS 7-14-15 Clear odorless water

Procedure deviations/comments: Low flow. Marginal output w/ peristaltic, switch to Grundfos 15:45 Pump fails

Restart from Prev. Page

Date: 7-15-15 Station ID: SMS MW01A Sample ID: MW01A0715

Sampler B. Stringfellow or Init

Sampler S. Camp or Init

See Table 1, page 4 for well data.

Well Diameter (in) 2

Well Depth (total ft) 40.3

Water Level (ft) 28.84

Water Column (ft) 11.46

2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or 0.5times water column length

Purge Volume Calculations

Purge Volume (gal)

Purge Start Time 08:25 (28.30 start)

Sample Collection Time 9:35

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
8:40	30.62	4.0	6.57	18.8	31,530	0.08	-40.8	94.4
8:50	31.10	6.60	6.58	19.8	34,230	0.08	-84.2	41.4
9:00	30.28	8.59	6.59	20.7	37,800	0.12	-125.7	42.3
9:10	29.88	8.0	6.58	21.6	38,370	0.17	-144.2	30.4
9:20	29.74	8.6	6.56	22.5	38,270	0.10	-161.4	27.4
9:30	29.70	9.2	6.56	23.1	38,030	0.08	-177.2	46.0

slow pump

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:**

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500 ml	[✓]	HNO_3	
Nutrients + TOC	1L poly - 1 500 ml	[✓]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500 ml	[✓]	Ice	∅ headspace
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Cloudy, mild

Sample media description: slightly turbid odorless water

Procedure deviations/comments: Restart purge w/ Grundfos pump @ 5' above bottom

Date: 7-15-15 Station ID: SMSMW03B Sample ID: MW03B0715

Sampler B. Striggow or Init

Sampler S. Camp or Init

See Table 1, page 4 for well data.

Well Diameter (in)	2"	10' screen 2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	65.11	0.5times water column length	
Water Level (ft)	33.12	Purge Volume Calculations	
Water Column (ft)	21.99	Purge Volume (gal)	
Purge Start Time	10:25	**Sample Collection Time**	12:10

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
10:35	39.50	1.8	5.75	21.0	88.9	0.20	-292.5	over range
10:45	39.42	2.7	5.68	21.7	101.2	0.23	-247.3	over range
10:55	39.23	3.2	5.69	22.0	100.1	0.23	-236.6	539
11:05	38.18	3.7	5.68	21.2	104.2	0.33	-170.8	440
11:15	37.35	4.0	5.69	22.0	103.4	0.41	-143.0	410
11:25	36.74	4.2	5.69	22.0	102.7	0.40	-136.5	201
11:35	36.32	4.5	5.69	22.2	101.5	0.46	-125.8	154
11:45	35.98	4.7	5.69	22.2	101.0	0.40	-125.9	114
11:55	35.80	4.8	5.69	22.0	100.7	0.39	-125.8	97.2

Field Split: *Yes* or (No) Split Sample ID, Date and Time:

MS/MSD: *Yes* or (No)

Last Meas → 12:05 35.58 5.1 5.69 21.0 100.9 0.37 -117.3 85.3

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500ml	[✓]	HNO_3	
Nutrients + TOC	1L poly - 1 500ml	[✓]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500ml	[✓]	Ice	Ø hd
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Partly cloudy, warm

Sample media description: Slightly turbid odorless water

Procedure deviations/comments: low flow w/ Grundfos new teflon tubing; Pump ~ 5' fm bottom.

Date: 7-15-15 **Station ID:** SMSMW12A **Sample ID:** MW12A07:15

Sampler B. Stringham **or Init**

Sampler S. Camp **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)		2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	39.43	0.5times water column length	
Water Level (ft)	30.71 7-13-15	Purge Volume Calculations	
Water Column (ft)	8.72	Purge Volume (gal)	
Purge Start Time	13:50	**Sample Collection Time**	16:10

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU	
14:05	30.73	0.8	6.67	23.9	3,019	0.41	-94.4	68.2	
14:20	32.01	2.3	6.65	25.6	2,900	0.15	-127.6	46.2	Change pump
14:45	30.68	2.8	6.68	23.3	2,901	1.03	-90.4	67.4	
15:00	30.56	3.4	6.66	25.8	2888	0.38	-104.5	59.5	
15:15	30.50	3.8	6.66	26.3	2926	0.37	-107.0	50.4	
15:25	30.40	4.1	6.66	26.8	2937	0.46	-92.2	33.9	
15:35	30.34	4.3	6.66	28.2	2945	0.47	-95.8	25.9	
15:45	30.50	~~5.7~~ 4.7	6.66	28.5	2952	0.34	-104.5	22.3	
15:55	30.71	5.2	6.65	26.6	2984	0.33	-105.6	14.8	

Field Split: *Yes or* (No) **Split Sample ID, Date and Time:**

last meas. **MS/MSD:** *Yes or* (No)

16:05 30.81 5.6 6.65 26.0 2999 0.36 -102.2 (10.1) Slow pump

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500ml	[ ]	HNO_3	
Nutrients + TOC	1L poly - 1 500ml	[ ]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500ml	[ ]	Ice	
Sulfide (field chemistry)	500ml poly	[ ]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: Mostly cloudy, warm/mild

Sample media description: Clear odorless water

Procedure deviations/comments: Low flow w/ Grundfos & new Teflon tubing. Pump @ 4' from bottom

3/4

Date: 7-15-15 **Station ID:** SMSMW12B **Sample ID:** MW120715

Sampler B. Strigyow **or Init**

Sampler S. Camp **or Init**

See Table 1, page 4 for well data.

Well Diameter (in)	2	15' 2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or	
Well Depth (total ft)	61.75	0.5times water column length	
Water Level (ft)	30.63	Purge Volume Calculations	
Water Column (ft)	31.12	Purge Volume (gal)	
Purge Start Time	16:40	**Sample Collection Time**	18:00

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU
16:55	29.74	2.9	6.38	18.1	15,890	0.26	-36.2	336
17:10	29.75	5.5	6.36	18.1	14,910	0.12	-126.2	238
17:25	29.70	6.0	6.38	18.8	14,060	0.11	-134.7	244
17:40	29.68	7.5	6.39	18.9	13,480	0.11	-143.6	221
17:55	29.65	8.2	6.40	19.3	13,180	0.28	-130.6	228

Field Split: *Yes* or (No) **Split Sample ID, Date and Time:**

MS/MSD: *Yes* or (No)

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1 500 ml	[ ]	HNO_3	
Nutrients + TOC	1L poly - 1 500 ml	[ ]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1 500 ml	[ ]	Ice	
Sulfide (field chemistry)	500ml poly	[✓]	Ice	Zero headspace, analyze ASAP

[✓] Samples placed on ice as required [✓] Cooler(s) checked for ice/water

Environmental conditions: warm, partly cloudy

Sample media description: turbid odorless water

Procedure deviations/comments: Low Flow w/ Grundfos pump. Pump ~ 4' fm bottom.

Date: _____ **Station ID:** _____ **Sample ID:** _____

Sampler _____ **or Init** _____

Sampler _____ **or Init** _____

See Table 1, page 4 for well data.

Well Diameter (in) _____ 2" diameter well - 1 well vol = .17gals/ft; 3 vols = .51gals/ft or

Well Depth (total ft) _____ 0.5times water column length

Water Level (ft) _____ Purge Volume Calculations

Water Column (ft) _____ Purge Volume (gal) _____

Purge Start Time _____ **Sample Collection Time** _____

Time	Depth to Water (ft)	Cumulative Vol (Gal)	pH (S.U.)	Temp (°C)	Spec Cond (µS/cm)	DO (mg/L)	ORP (mV)	NTU

BCS 7-16-15
End of Logbook

Field Split: *Yes or No* **Split Sample ID, Date and Time:** _____ _____

MS/MSD: *Yes or No*

Analyses	Container Type	Collected	Preservation	Comments
Total Metals	1L poly - 1	[ ]	HNO_3	
Nutrients + TOC	1L poly - 1	[ ]	H_2SO_4	
Sulfate + Chloride + Alkalinity	1L poly – 1	[ ]	Ice	
Sulfide (field chemistry)	500ml poly	[ ]	Ice	Zero headspace, analyze ASAP

[ ] Samples placed on ice as required [ ] Cooler(s) checked for ice/water

Environmental conditions:

Sample media description:

Procedure deviations/comments:

Additional information:

7-13-15

15:30 Sound wells for W.L. w/ sounder 062309-01, used 7-13-15

Well	Time	WL BTOC	Comment
SMSMW10A	15:40	21.02	ID tag in flush vault
SMSMW10B	15:45	20.45	ID tag in flush vault
~~SMSMW13~~ BCS 7-13 SMSMW13A	15:50	26.91	ID tag in flush vault
SMSMW13B	15:55	28.99	ID tag in flush vault
SMSMW01A	16:05	28.84	Flush Vault 2" PVC w/ illegible ID tag
SMSMW02A	16:10	14.38	Flush vault 2" PVC w/ ID tag
SMSMW03B	16:15	33.12	Flush vault 2" PVC w/ illegible tag
SMSMW04A	16:20	35.15	Flush vault 2" PVC w tag - ~~'MW04'~~ BCS 4 'MW-4'
SMSMW08A	16:30	21.37	Flush vault 2" PVC w/tag - 'MW08'
SMSMW07A	16:35	15.37	Flush vault 2" PVC ~~w/tag~~ & paint on pad
SMSMW07B	16.40	16.73	Flush vault 2" PVC w/ tag
SMS MW 11A	16:45	4.53	Easternmost of flush vault pair 2" PVC w/ ID
SMSMW11B	16:50	6.91	Westernmost of pair, 2" PVC w/ ID
SMSMW12A	16:55	30.71	NWern most of pair tag in vault 2" PVC
SMSMW12B	17:00	30.63	S.Bern most of pair, tag in vault 2" PVC

Additional information:

End of Logbook

United States Environmental Protection Agency
Region 4
Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

Smokey Mountain Smelters
Knoxville, Tennessee

SESD Project ID# 15-0346

Kevin Simmons, Project Leader

Field Instrument Calibration Logbook

Book 1 of 1

Inclusive Dates: 7/14/15 – 7/15/15

List of personnel:

Name/Affiliation	Initials
Stephen Camp / ESAT	SC
Don Fortson / ESAT	DF
Louie Pounds - ESAT	LP

Instrument Calibration Log Date:_____ Calibrator's Init._____

Instrument #	SESD ID#	pH	µS	NTU	°C	DO	ORP
1	020314-02	X	X		X		
2	090310-01			X			
3	013114-02					X	X
4	020314-03	X	X		X		
5	090310-03			X			
6	013114-03					X	X
7							
8							
9							
10							
11							
12							

Calibration Standards:

Standard	Value	Manufacturer	Lot #	Expiration
pH	4	Oakton / Fisher	146934	10/2016
pH	7	Oakton / Fisher	143308	05/2016
pH	10	Oakton / Fisher	137687	11/2015
Conductivity low	1413µS	Thermo Orion	5P1A	11/2016
Turbidity set #	10	Hach	A4104	Jul-15
Turbidity set #	20	Hach	A4091	Jul-15
Turbidity set #	100	Hach	A4104	Jul-15
Turbidity set #	800	Hach	A4100	Jul-15
NIST Thermometer	pH/cond	Fisher Scientific	111413-04	11-25-15
NIST Thermometer	DO/ORP	Fisher Scientific	111413-05	11-25-15
NIST Thermometer	—	Fisher Scientific	—	—
ORP – Zobell Solution	ORP	YSI 3682	13J100027	09/2015
ORP – Zobell Solution	—	YSI	—	—

Notes:

Ambient temperature: _____ Time: _____ Ambient temperature: _____ Time: _____

Calibration: Date _____ **Cal Time** _____ **End Check Time** _____ Calibrator's Init._____

Instrument #	Parameter	Standard Value	Pre-cal Reading:	Calibration/ Verification:	Post-cal Reading:	End of Day Check:
1	pH	4				
1	pH	7				
1	pH	10				
1	Cond	1413µS				
1	Temp	NIST:	X		X	NIST: Instr.:
2	Turbidity	0	X		X	
2	Turbidity	10	X		X	
2	Turbidity	20	X		X	
2	Turbidity	100	X		X	
3	DO					
3 Instr: / NIST	ORP @ °C					°C STD: Meter:
4	pH	4				
4	pH	7				
4	pH	10	D			
4	Cond	1413µS	Rec			
4	Temp	NIST:	X		X	NIST: Instr.:
5	Turbidity	0	X	Text	X	
5	Turbidity	10	X		X	
5	Turbidity	20	X		X	
5	Turbidity	100	X	Blank	X	
6	DO					
6 Instr: / NIST	ORP @ °C		-0.2			°C STD: Meter:
	pH	4	7/14/15			
	pH	7				
	pH	10				
	Cond	1413µS				
	Temp	NIST:	X		X	NIST: Instr.:
	Turbidity	0	X		X	
	Turbidity	10	X		X	
	Turbidity	20	X		X	
	Turbidity	100	X		X	
	DO					
Instr: / NIST	ORP @ °C					°C STD: Meter:
	pH	4				
	pH	7				
	pH	10				
	Cond	1413µS				
	Temp	NIST:	X		X	NIST: Instr.:
	Turbidity	0	X		X	
	Turbidity	10	X		X	
	Turbidity	20	X		X	
	Turbidity	100	X		X	
	DO					
Instr: / NIST	ORP @ °C					°C STD: Meter:

Instrument Calibration Log Date: 7/14/15 Calibrator's Init. DF

Instrument #	SESD ID#	pH	µS	NTU	°C	DO	ORP
1	see PAGE 2	X	X		X		
2				X			
3						X	X
4		X	X		X		
5				X			
6						X	X
7							
8							
9							
10							
11							
12							

Calibration Standards:

see PAGE 2 for Reference STDs USED

Standard	Value	Manufacturer	Lot #	Expiration
pH	4	Oakton / Fisher		
pH	7	Oakton / Fisher		
pH	10	Oakton / Fisher		
Conductivity low	1413µS	Thermo Orion		
Turbidity set #		Hach		
Turbidity set #		Hach		
Turbidity set #		Hach		
Turbidity set #		Hach		
NIST Thermometer		Fisher Scientific		
NIST Thermometer		Fisher Scientific		
NIST Thermometer		Fisher Scientific		
ORP – Zobell Solution		YSI		
ORP – Zobell Solution		YSI		

Notes:

Ambient temperature: 24.3°C Time: 0800 Ambient temperature: 26.4°C Time: 1602

Calibration: Date 7/14/15 **Cal Time** 0745 **End Check Time** 16:07 Calibrator's Init. SQ

Instrument #	Parameter	Standard Value	Pre-cal Reading:	Calibration/ Verification:	Post-cal Reading:	End of Day Check:
1	pH	4	3.98	4.01	3.98	4.01
1	pH	7	7.04	6.99	6.96	7.01
1	pH	10	10.08	98.6	10.04	10.05
1	Cond	1413µS	1323	1413	1410	1412
1	Temp	NIST: 26.6	X	26.0	X	NIST: 25.6 Instr.: 26.0
2	Turbidity	0	X	0.15	X	0.39
2	Turbidity	10	X	10.4	X	10.3
2	Turbidity	20	X	20.7	X	20.3
2	Turbidity	100	X	96.7	X	96.1
3	DO	100.0	99.3	100.0	100.0	99.9
3 Instr: / NIST	ORP @23 °C	233.6	220.1	233.6	233.9	27 °C STD: 228.4 Meter: 230.4
4	pH	4	4.02	4.01	3.99	4.00
4	pH	7	7.03	6.99	6.99	6.96
4	pH	10	10.10	97.9	10.06	10.03
4	Cond	1413µS	1271	1413	1410	1394
4	Temp	NIST: 26.9	X	26.2	X	NIST: 25.7 Instr.: 25.1
5	Turbidity	0	X	0.17	X	0.78
5	Turbidity	10	X	9.71	X	9.70
5	Turbidity	20	X	20.3	X	20.0
5	Turbidity	100	X	99.9	X	101
6	DO	100.0	99.6	100.0	100.0	100.7
6 Instr: / NIST	ORP @26 °C	229.7	220.8	229.7	230.3	27 °C STD: 228.4 Meter: 228.9
	pH	4				
	pH	7				
	pH	10				
	Cond	1413µS				
	Temp	NIST:	X		X	NIST: Instr.:
	Turbidity	0	X		X	
	Turbidity	10	X		X	
	Turbidity	20	X		X	
	Turbidity	100	X		X	
	DO					
Instr: / NIST	ORP @ °C					°C STD: Meter:
	pH	4				
	pH	7				
	pH	10				
	Cond	1413µS				
	Temp	NIST:	X		X	NIST: Instr.:
	Turbidity	0	X		X	
	Turbidity	10	X		X	
	Turbidity	20	X		X	
	Turbidity	100	X		X	
	DO					
Instr: / NIST	ORP @ °C					°C STD: Meter:

Instrument Calibration Log Date: 7/15/15 Calibrator's Init. DF/SC

Instrument #	SESD ID#	pH	µS	NTU	°C	DO	ORP
1	see PAGE 2	X	X		X		
2				X			
3						X	X
4		X	X		X		
5				X			
6						X	X
7							
8							
9							
10							
11							
12							

Calibration Standards:

See PAGE 2 for Reference STDs USED

Standard	Value	Manufacturer	Lot #	Expiration
pH	4	Oakton / Fisher		
pH	7	Oakton / Fisher		
pH	10	Oakton / Fisher		
Conductivity low	1413µS	Thermo Orion		
Turbidity set #		Hach		
Turbidity set #		Hach		
Turbidity set #		Hach		
Turbidity set #		Hach		
NIST Thermometer		Fisher Scientific		
NIST Thermometer		Fisher Scientific		
NIST Thermometer		Fisher Scientific		
ORP – Zobell Solution		YSI		
ORP – Zobell Solution		YSI		

Notes:

Ambient temperature: 22.1°C Time: 0758 Ambient temperature: 27.9 Time: 17:43

Calibration: Date 7/15/15 **Cal Time** 0800 **End Check Time** 17:44 Calibrator's Init. DP/SC

Instrument #	Parameter	Standard Value	Pre-cal Reading:	Calibration/ Verification:	Post-cal Reading:	End of Day Check:
1	pH	4	3.99	4.01	4.02	4.03
1	pH	7	6.99	7.01	7.01	7.03
1	pH	10	10.04	SLP 98.5	10.11	10.07
1	Cond	1413µS	1413	1413	1420	1415
1	Temp	NIST: 22.5	X	22.1	X	NIST: 27.8 Instr.: 27.5
2	Turbidity	0	X	0.41	X	0.38
2	Turbidity	10	X	10.5	X	10.4
2	Turbidity	20	X	21.2	X	20.9
2	Turbidity	100	X	99.9	X	97.6
3	DO	100	100.5	100	100.0	100.0
3 Instr: / NIST	ORP @ 23 °C	233.4	237.7	233.6	233.8	28 °C STD: 227.1 Meter: 222.8
4	pH	4	4.03	4.01	4.00	4.01
4	pH	7	7.02	7.01	7.00	6.98
4	pH	10	10.11	SLP 97.8%	10.10	10.02
4	Cond	1413µS	1401	1413	1421	1409
4	Temp	NIST: 22.3	X	22.0	X	NIST: 28.6 Instr.: 28.1
5	Turbidity	0	X	0.33	X	0.34
5	Turbidity	10	X	9.75	X	9.97
5	Turbidity	20	X	20.6	X	20.1
5	Turbidity	100	X	102	X	100
6	DO	100	100.5	100	~~100.0~~ 99.9	99.0
6 Instr: / NIST	ORP @ 22 °C	234.9	237.2	234.9	234.4	29 °C STD: 225.8 Meter: 220.8
	pH	4				
	pH	7				
	pH	10				
	Cond	1413µS				
	Temp	NIST:	X		X	NIST: Instr.:
	Turbidity	0	X		X	
	Turbidity	10	X		X	
	Turbidity	20	X		X	
	Turbidity	100	X		X	
	DO					
Instr: / NIST	ORP @ °C					°C STD: Meter:
	pH	4				
	pH	7				
	pH	10				
	Cond	1413µS				
	Temp	NIST:	X		X	NIST: Instr.:
	Turbidity	0	X		X	
	Turbidity	10	X		X	
	Turbidity	20	X		X	
	Turbidity	100	X		X	
	DO					
Instr: / NIST	ORP @ °C					°C STD: Meter:

Instrument Calibration Log Date:_____ Calibrator's Init._____

Instrument #	SESD ID#	pH	µS	NTU	°C	DO	ORP
1		X	X		X		
2				X			
3						X	X
4							
5							
6							
7							
8							
9							
10							
11							
12							

Calibration Standards:

END OF LOG BOOK

Standard	Value	Manufacturer	Lot #	Expiration
pH	4	Oakton / Fisher		
pH	7	Oakton / Fisher		
pH	10	Oakton / Fisher		
Conductivity low	1413µS	Thermo Orion		
Turbidity set #		Hach		
Turbidity set #		Hach		
Turbidity set #		Hach		
Turbidity set #		Hach		
NIST Thermometer		Fisher Scientific		
NIST Thermometer		Fisher Scientific		
NIST Thermometer		Fisher Scientific		
ORP – Zobell Solution		YSI		
ORP – Zobell Solution		YSI		

Notes:

Ambient temperature: _____ Time: _____ Ambient temperature: _____ Time: _____

United States Environmental Protection Agency

Region 4

Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

Sunday Mountain Smelters
7/21/15 KS ~~FCX, Inc., SITE INVESTIGATION~~
7/21/15 KS ~~Washington, NC~~ Knoxville, TN

SESD PROJECT # 15-0346

Kevin Simmons, PROJECT LEADER

LOGBOOK for FIELD ANALYSIS of:

Sulfide

HACH Method 8131

Book 1 **of** 1

Inclusive Dates: July 14 → 15, 2015

List of calibration/analysis personnel:

Name/Affiliation	Initials
Louie Pounds / ESAT	LP

Daily CCS Calibration Check Standard:

$$\%\text{Difference} = ABS\left|\frac{Observed - True\ Value}{True\ Value}\right| \times 100$$

Example CCS01 07-14-15 obs = 0.420 TV = 0.400 $\%DIFF = \left[\frac{0.420-0.400}{0.400}\right] \times 100 = 5.0$

5.0 %DIFF

Analytical Duplicate Relative Percent Difference (RPD):

$$\text{RPD} = ABS\left(\frac{Sample - Sample\ Duplicate}{(Sample + Sample\ Duplicate)/2}\right) \times 100$$

Example MW02A 07-14-15 Sample obs = 0.023 Sample Dup = 0.022

$$RPD = \left[\frac{0.023-0.022}{(0.023+0.022)/2}\right] \times 100 = 4.4\ RPD$$

MS/MSD:

$$\%\ \text{Recovery} = \left(\frac{Observed\ from\ instrument}{True\ Value}\right) \times 100$$

$$\text{RPD between MS/MSD} = ABS\left(\frac{MS - MSD}{(MS + MSD)/2}\right) \times 100$$

Example

MW01A 07-14-15 obs = 0.007 mg/L spiked = 0.080 mg/L NET = 0.087 mg/L

MS = 0.088 $\%Rec_{MS} = 0.088/0.087 \times 100 =$ 101 %Rec

MSD = 0.089 $\%Rec_{MSD} = 0.089/0.087 \times 100 =$ 102 %Rec

$$RPD_{MS/MSD} = \left[\frac{0.088-0.089}{(0.088+0.089)/2}\right] \times 100 = 1.1\ RPD$$

Acceptable Dilutions

All dilutions will be performed by these guidelines unless otherwise noted.

Dilutions required in a 10mL volumetric flask

A **2X** dilution requires 5mL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
5mL

A **4X** dilution requires 2.5mL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
2mL + 500µL = 2.5mL

A **5X** dilution requires 5mL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
2mL

An **8X** dilution requires 1.25mL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
1mL + 250µL = 1.25mL

A **10X** dilution requires 1mL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
1mL

A **20X** dilution requires 500µL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
500µL

A **25X** dilution requires 400µL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
400µL

A **50X** dilution requires 200µL of sample taken to the correct volume indicator in a 10mL volumetric flask using DI water.
200µL

Dilutions required in a 100mL volumetric flask

A **100X** dilution requires 1mL of sample taken to the correct volume indicator in a 100mL volumetric flask using DI water.
A **200X** dilution requires that 500µL of sample taken to the correct volume indicator in a 100mL volumetric flask using DI water.
A **400X** dilution requires that 250µL of sample taken to the correct volume indicator in a 100mL volumetric flask using DI water.
An **800X** dilution requires that 125µL of sample taken to the correct volume indicator in a 100mL volumetric flask using DI water.

Certified Pipettes

100µL – 1mL	Pipette: *Eppendorf Series 2000*	Serial #: ***363742***	Cal / re-Cert: 05-29-15 /08-29-15 ✓
50, 75, 100µL	Pipette: *Eppendorf Series 4700*	Serial #: ***048989***	Cal / re-Cert: 05-29-15 /08-29-15 ✓
20, 25, ~~50~~ µL	Pipette: *Eppendorf Series 4700*	Serial #: ***041337***	Cal / re-Cert: 05-29-15 /08-29-15 ✓

Sulfide

QC Requirements

1ppm = 1mg/L, or 1ppb = 1µg/L

IB – Instrument blank (First and last measurement) (IB< reporting limit)

Use 10 mL of Lab DI water.

CCS – Calibration Check Standard (One per 20 field samples) (CCS +/- 10%)

Use 40µL of 10,000 NSI© QCI-147 in 50 mL standard to make **8.0mg/L** Stock Solution.
CCS is made by using 500 µL of this 8.0 mg/L Stock Solution spiked into the 10 mL Cell (*remove equal volume of spike prior*)

CRD – Second Source Quantitation (Once per week) (CRD +/- 20%)

Use 20µL of 1,000 NSI© QCI-147 in 50 mL standard to make **0.400mg/L** CRD solution.

AMB – Analytical Method Blank (One per 20 field samples) (AMB < reporting limit)

Use 10mL cell containing "blank solution w/ preservative" with both sulfide reagents added.

AD – Analytical Duplicate (One per 10 field samples) (AD < 20%RPD)

Use another 10mL cell with sample to duplicate a reading.

MS/MSD – Spike (One per 10 field samples) (MS/MSD 60-125% recovery)

Add 100µL of the **8mg/L** Stock Solution, made from 40µL of 10,000mg/L NSI© QCI-147 standard in 50mL, into 10mL cell with sample to obtain an effective spike of **0.08mg/L**.

Preservation Preparation

6N NaOH → 24g diluted in 100mL DI water Fisher Lot # 122989 Prep. 08-28-14 Exp. Oct /15
2N Zinc Acetate → 22g diluted in 100mL DI water Fisher Lot # 036687 Prep. 08-28-14 Exp. Oct /15

Preservative Solutions (*use just before analysis or prior to sampling in container to store over-night @4°C up-to-24 hours*)

NaOH → 100µL / place in 100mL of Sample. Prepare Blank Bottle 500µL / 0.5 Liter (Blank solution to be use in dilutions)
Zinc Acetate → 200µL / place in 100mL of Sample. Prepare Blank Bottle 500µL / 0.5 Liter (Blank solution to be use in dilutions)

QC solutions

Sulfide standards are added to pre-preserved containers at the beginning of each day for the CCS, CRD and Matrix solutions. The CCS and Matrix solution use the same standard, NSI© QCI-147 which is the 10,000ppm equal Primary standard. The CRD solution is made from NSI© QCI-147L which is the 1,000ppm equal 2nd Source standard.

Sample Collection

Samples are collected in 500mL or 250mL poly containers with no headspace.

FASP Sulfide Log

SESD Project # 15-0346 DART Project ID: 15-0346 Date 07-14-15 Analyst L. Pounds

Working Range: 0.005 to 0.800 *mg/L*: MDL report as U < 0.007 *mg/L* Instrument (**Program # 690**) 665nm

HACH© Sulfide Reagent 1: Lot # A4136 EXP. Date Jan-18 HACH© Sulfide Reagent 2: Lot # A2048 EXP. Date Feb-17 Method: **HACH 8131** ☐ HACH© DR2010 (s/n: 971200006531)

☒ 10mL cell 10,000 NSI© QCI-147 Lot # 042214 EXP. Date 04-30-16 1,000 NSI© QCI-147L Lot # 103114 EXP. Date 10-31-15 Sample Matrix: Groundwater ☒ HACH© DR2800 (s/n: 1401579 /SESD ID: 090611-DR01)

QC/ or Run ☑/ #	Sample @[*time*]	SMS + Station ID	Sample Volume (ml)	Dilution Factor	Time	Sulfide Concentration (mg/L)	Comments / Notes
☒/	IB01 07-14-15	NA	10	1	11:05	0.000	DI H_2O BLANK
☒/	RB01 07-14-15	NA	10	1	11:15	0.008	DI + Reagent 1 & 2 Before Zero off-set
☒/	CCS01 07-14-15	NA	10	1	11:30	0.420	TV = 0.400 mg/L %DIFF = 5.0
☒/	CRD01 07-14-15	NA	10	1	11:45	0.413	TV = 0.400 mg/L %DIFF = 3.25
☒/	LOD01 07-14-15	NA	10	1	12:00	0.017	TV = 0.016 mg/L %DIFF = 6.25
☐/1	MW01A0715 [11:20] 07-14-15	MW10A	10	1	12:03	0.007	Reported
☑/AD	MW01A0715 [11:20]	MW10A	10	1	12:09	0.008	Analytical Duplicate RPD = 13.3
☑/MS	MW01A0715 [11:20]	MW10A	10	1	12:20	0.088	Spiked w/ 0.080 mg/L %Rec = 101
☑/MSD	MW01A0715 [11:20]	MW10A	10	1	12:30	0.089	Spiked w/ 0.080 mg/L %Rec = 102 RPD = 1.1 %DIFF 07-14-15
☐/2	MW13B0715 [11:46]	MW13B	10	1	13:15	0.017	Reported
☐/3	MW13A0715 [13:15]	MW13A	10	1	14:15	0.007	Reported
☐/4	MW10B0715 [13:30]	MW10B	10	1	14:45	0.015	Reported
☐/5	MW02A0715 [14:30]	MW02A	10	1	15:15	0.023	Reported
☑/AD	MW02A0715 [14:30]	MW02A	10	1	15:35	0.022	Analytical Duplicate RPD = 4.4
☑/	CCS02 07-14-15	NA	10	1	16:45	0.412	TV = 0.400 mg/L %DIFF = 3.0
☑/	IB02 07-14-15	NA	10	1	16:50	0.000	Close-out BLANK
☐/							
☐/							
☐/							
☐/					END of Samples		
☐/					07-14-15		
☐/							

FASP Sulfide Log

SESD Project # **15-0346** DART Project ID: **15-0346** Date 07-15-15 Analyst L. Pounds

Working Range: **0.005 to 0.800** *mg/L*: MDL report as **U < 0.007 *mg/L*** Instrument (**Program # *690***) 665nm

HACH© Sulfide Reagent 1: Lot # A4136 EXP. Date Jan-18 **HACH© Sulfide Reagent 2:** Lot # A2048 EXP. Date Feb-17 Method: **HACH 8131**

☒ 10mL cell 10,000 NSI© QCI-147 Lot # 042214 EXP. Date 04-30-16 1,000 NSI© QCI-147L Lot # 103114 EXP. Date 10-31-15 Sample Matrix: Groundwater

☐ HACH© DR2010 (s/n: 971200006531)

☒ HACH© DR2800 (s/n: 1401579 /SESD ID: 090611-DR01)

QC/ or Run ☑/ #	Sample @[time]	Station ID	Sample Volume (ml)	Dilution Factor	Time	Sulfide Concentration (mg/L)	Comments / Notes
☑/	IB03 07-15-15	NA	10	1	09:00	0.000	DI BLANK
☑/	CCS03 07-15-15	NA	10	1	09:10	0.411	TV = 0.400 mg/L %DIFF = 2.75
☑/	LOD02 07-15-15	NA	10	1	09:25	0.017	TV = 0.016 mg/L %DIFF = 6.25
☐/ 6	MW01A0715 [09:35]	MW01A	10	1	10:25	0.003	Report U < 0.007 mg/L
☐/ 7	MW08A0715 [09:12]	MW08A	10	1	10:45	0.004	Report U < 0.007 "
☐/ 8	MW04A0715 [11:37]	MW04A	10	1	12:15	0.004	Report U < 0.007 "
☐/ 9	MW03B0715 [12:10]	MW03B	10	1	14:10	0.002	Report U < 0.007 "
☐/ 10	MW11B0715 [14:02]	MW11B	10	1	14:35	0.003	Report U < 0.007 "
☐/ 11	MW11A0715 [14:50]	MW11A	10	1	15:25	0.004	Report U < 0.007 "
☐/ 12	MW07A0715 [15:57]	MW07A	10	1	16:45	0.009	Reported
☐/ 13	MW12A0715 [16:10]	MW12A	10	1	17:15	0.007	Reported
☐/ 14	MW07B0715 [17:10]	MW07B	10	1	18:00	0.024	Reported
☑/ AD	MW07B0715 [17:10]	MW07B	10	1	18:05	0.025	Analytical Duplicate RPD ~~%DIFF~~ = 4.08
☑/ MS	MW07B0715 [17:10]	MW07B	10	1	18:10	0.103	spiked w/0.080 mg/L %Rec = 99
☑/ MSD	MW07B0715 [17:10]	MW07B	10	1	18:15	0.105	spiked w/0.080 mg/L %Rec = 101 RPD = 1.9
☐/ 15	MW12B0715 [18:00]	MW12B	10	1	18:30	0.006	Report U < 0.007 mg/L
☑/	CCS04 07-15-15	NA	10	1	18:40	0.418	TV = 0.400 mg/L %DIFF = 4.5
☑/	IB04 07-15-15	NA	10	1	18:45	0.000	Close-out BLANK
☐/							
☐/				END of SAMPLES			
☐/					07-15-15		
☐/							

FASP Sulfide Log

SESD Project # **15-0346**
DART Project ID: **15-0346**
Date 07-15-15 Analyst L. Pounds
Working Range: **0.005 to 0.800** *mg/L*:
MDL report as **U < 0.007** ***mg/L***
Instrument (**Program # *690***) 665nm

HACH© Sulfide Reagent 1: Lot #_____ EXP. Date_____
HACH© Sulfide Reagent 2: Lot #_____ EXP. Date_____

☐ 10mL cell
10,000 NSI© QCI-147 Lot #_____ EXP. Date_____
1,000 NSI© QCI-147L Lot #_____ EXP. Date_____

Method: **HACH 8131**
Sample Matrix: Groundwater

☐ HACH© DR2010 (s/n: 971200006531)
☐ HACH© DR2800 (s/n: 1401579 /SESD ID: 090611-DR01)

QC/ or Run ☑/ #	Sample @[*time*]	Station ID	Sample Volume (ml)	Dilution Factor	Time	Sulfide Concentration (mg/L)	Comments / Notes
☐/							
☐/							
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END of Logbook
LP 07-15-15

Appendix B

Analytical Data Sheets

Analysis	Pages
Metals Nutrients	69
Total Pages	**69**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

September 2, 2015

4SESD-ASB

MEMORANDUM

SUBJECT: FINAL Analytical Report
Project: 15-0346, Smokey Mountain Smelters
Superfund Remedial

FROM: Jeffrey Hendel
ASB Inorganic Chemistry Section Chief

THRU: Danny France, Chief
Analytical Support Branch

TO: Kevin Simmons

This data report is being reissued. Some or all of these results were previously reported. Please substitute the corrected results for those results previously reported. Please refer to the Report Narrative for more details.

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and have been qualified by this laboratory if the applicable quality control criteria were not met. Verification is defined in Section 5.2 of the ASB LOQAM. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:	Method Used:	Accreditations:
Classical/Nutrient Analyses (CNA)		
Ammonia/TKN	EPA 350.1 (Water)	ISO
Ammonia/TKN	EPA 351.2 (Water)	ISO
Classical/Nutrients	EPA 300.0 (Water)	ISO
Classical/Nutrients	SM 2320B (Water)	ISO
Classical/Nutrients	SM 5310B (Water)	ISO
Hardness as CaCO3	SM 2340B (Water)	ISO
Nitrate and/or Nitrite	EPA 353.2 (Water)	ISO
Phosphorous	EPA 365.1 (Water)	ISO
Total Metals (TMTL)		

Total Metals	EPA 200.8 (Water)	ISO
Total Metals	EPA 6010 (Water)	ISO

Report Narrative for Work Order: E152903

Due to problems encountered in the laboratory while performing the analyses of these samples, the laboratory and the project team conducted a conference call on August 7, 2015. Prior to the call, the following information was provided to the laboratory from the Quality Assurance Project Plan. "...Ammonia is present in Aluminum Dross which is in the wastes that were disposed of at this site; and Ammonia breaks down into Nitrate/Nitrite. Furthermore, past practices at this site included the manufacture of fertilizers. We believe that this included Ammonium Nitrate and Phosphorous/Orthophosphate fertilizers. Therefore, we also feel that analysis for these constituents is appropriate. Additionally, the Aluminum Salt Cake waste that was generated at this site by the reprocessing of the Alumium Dross contains elevated Chlorides." This information confirms the matrix problems that the laboratory encountered during sample analysis. All problems encountered in the laboratory yielding QC results outside of control limits were properly qualified.

Ion Chromatography
In accordance with the analytical method, samples E152903-04, 05, 10, 13, and 14 were diluted due to sample pH prior to analysis for Chloride and Sulfate. The reporting limits are adjusted for the dilutions.

Due to matrix interferences as described above, a comprehensive confirmation of diluted samples was performed. A comparison of the analytical results from the multiple dilutions was performed for determining the most reliable analytical value to report for Chloride and Sulfate.

TKN and Ammonia
For TKN values greater than Ammonia, matrix interferences is suspected.

This report being re-released due to a format issue associated with the narrative, no analytical results were affected. This report replaces E152903 CNA TMTL FINAL 08 27 15 1625.

Sample Disposal Policy

Because of the laboratory's limited space for long term sample storage, our policy is to dispose of samples on a periodic schedule. Please note that within 60 days of this memo, the original samples and all sample extracts and/or sample digestates will be disposed of in accordance with applicable regulations. The 60-day sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time if you have a special project need. If you wish for the laboratory to hold samples beyond the 60-day period, please contact our Sample Control Coordinator by e-mail at R4SampleCustody@epa.gov, and provide a reason for holding samples beyond 60 days

cc: Nardina Turner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

SAMPLES INCLUDED IN THIS REPORT

Project: 15-0346, Smokey Mountain Smelters

Sample ID	Laboratory ID	Matrix	Date Collected	Date Received
BB010715	E152903-01	Bottle Blank	7/15/15 17:00	7/17/15 7:55
OFW010715	E152903-02	Organic Free Water Blank	7/15/15 16:50	7/17/15 7:55
MW01A0715	E152903-03	Groundwater	7/15/15 09:35	7/17/15 7:55
MW02A0715	E152903-04	Groundwater	7/14/15 14:30	7/17/15 7:55
MW02AD0715	E152903-05	Groundwater	7/14/15 14:40	7/17/15 7:55
MW03B0715	E152903-06	Groundwater	7/15/15 12:10	7/17/15 7:55
MW04A0715	E152903-07	Groundwater	7/15/15 11:37	7/17/15 7:55
MW07A0715	E152903-08	Groundwater	7/15/15 15:57	7/17/15 7:55
MW07B0715	E152903-09	Groundwater	7/15/15 17:10	7/17/15 7:55
MW08A0715	E152903-10	Groundwater	7/15/15 09:12	7/17/15 7:55
MW10A0715	E152903-11	Groundwater	7/14/15 11:20	7/17/15 7:55
MW10B0715	E152903-12	Groundwater	7/14/15 13:30	7/17/15 7:55
MW11A0715	E152903-13	Groundwater	7/15/15 14:50	7/17/15 7:55
MW11B0715	E152903-14	Groundwater	7/15/15 14:02	7/17/15 7:55
MW12A0715	E152903-15	Groundwater	7/15/15 16:10	7/17/15 7:55
MW12B0715	E152903-16	Groundwater	7/15/15 18:00	7/17/15 7:55
MW13A0715	E152903-17	Groundwater	7/14/15 13:15	7/17/15 7:55
MW13B0715	E152903-18	Groundwater	7/14/15 11:46	7/17/15 7:55
SMSSW010715	E152903-19	Surface Water	7/15/15 08:10	7/17/15 7:55
SMSSW020715	E152903-20	Surface Water	7/15/15 08:24	7/17/15 7:55
SMSSW030715	E152903-21	Surface Water	7/15/15 08:29	7/17/15 7:55
SMSSW040715	E152903-22	Surface Water	7/15/15 08:35	7/17/15 7:55

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
CR	May be biased high due to complex matrix.
CRb	Sample diluted prior to analysis due to high pH
CRc	Sample diluted prior to analysis due to high pH.
D-2	Due to Matrix Interference, the sample cannot be accurately quantified. The reported result is estimated.
H-1	Recommended holding time exceeded
J	The identification of the analyte is acceptable; the reported value is an estimate.
NA-12	Sample has no measureable alkalinity. Original sample pH is less than 4.5.
P-4	Sample received at pH > 2.
QC-4	Result greater than the highest point on the calibration curve
QI-1	Internal standard was outside of method control limits.
QM-1	Matrix Spike Recovery less than method control limits
QM-2	Matrix Spike Recovery greater than method control limits
QR-1	MRL verification recovery less than lower control limits.

ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

ACCREDITATIONS:

ISO The test, if analyzed after June 26, 2012, is accredited under the EPA Region 4 ASB's ISO/IEC 17025 accreditation issued by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1691.

NR The EPA Region 4 Laboratory has not requested accreditation for this test.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: BB010715 **Lab ID:** E152903-01
Station ID: **Matrix:** Bottle Blank

Date Collected: 7/15/15 17:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	100	U	ug/L	100	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:31	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:31	EPA 200.8
7440-39-3	Barium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:14	8/18/15 19:31	EPA 200.8
7440-70-2	Calcium	250	U	ug/L	250	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-47-3	Chromium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-48-4	Cobalt	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-50-8	Copper	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:21	EPA 6010
7439-89-6	Iron	100	U	ug/L	100	7/29/15 8:12	8/03/15 12:21	EPA 6010
7439-92-1	Lead	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:31	EPA 200.8
7439-95-4	Magnesium	250	U	ug/L	250	7/29/15 8:12	8/03/15 12:21	EPA 6010
7439-96-5	Manganese	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-02-0	Nickel	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-09-7	Potassium	1000	U	ug/L	1000	7/29/15 8:12	8/03/15 12:21	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:14	8/18/15 19:31	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-23-5	Sodium	1000	U	ug/L	1000	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-24-6	Strontium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:31	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-32-6	Titanium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-65-5	Yttrium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:21	EPA 6010
7440-66-6	Zinc	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:21	EPA 6010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: OFW010715 **Lab ID:** E152903-02

Station ID: **Matrix:** Organic Free Water Blank

Date Collected: 7/15/15 16:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	100	U	ug/L	100	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:37	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:37	EPA 200.8
7440-39-3	Barium	80		ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:14	8/18/15 19:37	EPA 200.8
7440-70-2	Calcium	460		ug/L	250	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-47-3	Chromium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-48-4	Cobalt	5.6		ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-50-8	Copper	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:23	EPA 6010
7439-89-6	Iron	100	U	ug/L	100	7/29/15 8:12	8/03/15 12:23	EPA 6010
7439-92-1	Lead	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:37	EPA 200.8
7439-95-4	Magnesium	250	U	ug/L	250	7/29/15 8:12	8/03/15 12:23	EPA 6010
7439-96-5	Manganese	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-02-0	Nickel	24		ug/L	10	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-09-7	Potassium	1000	U	ug/L	1000	7/29/15 8:12	8/03/15 12:23	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:14	8/18/15 19:37	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-23-5	Sodium	1000	U	ug/L	1000	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-24-6	Strontium	34		ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:37	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-32-6	Titanium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-65-5	Yttrium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:23	EPA 6010
7440-66-6	Zinc	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:23	EPA 6010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW01A0715 **Lab ID:** E152903-03
Station ID: SMSMW01A **Matrix:** Groundwater

Date Collected: 7/15/15 9:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	2000	U	ug/L	2000	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-36-0	Antimony	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:18	EPA 200.8
7440-38-2	Arsenic	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:18	EPA 200.8
7440-39-3	Barium	110		ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-41-7	Beryllium	60	U	ug/L	60	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-43-9	Cadmium	19		ug/L	5.0	7/29/15 8:09	8/18/15 21:32	EPA 200.8
7440-70-2	Calcium	280000	J, QM-2	ug/L	5000	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-47-3	Chromium	100	U	ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-48-4	Cobalt	100	U	ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-50-8	Copper	200	U	ug/L	200	7/29/15 8:04	8/04/15 12:58	EPA 6010
7439-89-6	Iron	2000	U	ug/L	2000	7/29/15 8:04	8/04/15 12:58	EPA 6010
7439-92-1	Lead	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:18	EPA 200.8
7439-95-4	Magnesium	29000		ug/L	5000	7/29/15 8:04	8/04/15 12:58	EPA 6010
7439-96-5	Manganese	15000	J, QM-2	ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7439-98-7	Molybdenum	200	U	ug/L	200	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-02-0	Nickel	200	U	ug/L	200	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-09-7	Potassium	840000	J, QM-2	ug/L	20000	7/29/15 8:04	8/04/15 12:58	EPA 6010
7782-49-2	Selenium	10	U	ug/L	10	7/29/15 8:09	8/19/15 0:18	EPA 200.8
7440-22-4	Silver	100	U	ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-23-5	Sodium	5700000		ug/L	20000	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-24-6	Strontium	520		ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:18	EPA 200.8
7440-31-5	Tin	300	U	ug/L	300	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-32-6	Titanium	100	U	ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-62-2	Vanadium	100	U	ug/L	100	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-65-5	Yttrium	60	U	ug/L	60	7/29/15 8:04	8/04/15 12:58	EPA 6010
7440-66-6	Zinc	200	U	ug/L	200	7/29/15 8:04	8/04/15 12:58	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW01A0715 **Lab ID:** E152903-03
Station ID: SMSMW01A **Matrix:** Groundwater

Date Collected: 7/15/15 9:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	220		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	200		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	680		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	13000		mg/L	100	7/23/15 12:46	7/28/15 22:22	EPA 300.0
14808-79-8	Sulfate as SO4	780		mg/L	100	7/23/15 12:46	7/28/15 22:22	EPA 300.0
E701250	Total Organic Carbon	8.0		mg/L	1.0	8/04/15 9:45	8/04/15 17:26	SM 5310B
E1640424	Hardness (as CaCO3)	830		mg/L	33	7/29/15 8:04	8/04/15 12:58	SM 2340B
E701177	Nitrate/Nitrite as N	51		mg/L	5.0	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.074		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW02A0715 **Lab ID:** E152903-04
Station ID: SMSMW02A **Matrix:** Groundwater

Date Collected: 7/14/15 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	3000		ug/L	500	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-36-0	Antimony	14		ug/L	2.5	7/29/15 8:09	8/19/15 0:24	EPA 200.8
7440-38-2	Arsenic	3.0		ug/L	2.5	7/29/15 8:09	8/19/15 0:24	EPA 200.8
7440-39-3	Barium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-43-9	Cadmium	1.2	U	ug/L	1.2	7/29/15 8:09	8/19/15 0:24	EPA 200.8
7440-70-2	Calcium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-47-3	Chromium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-48-4	Cobalt	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:06	EPA 6010
7439-89-6	Iron	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:06	EPA 6010
7439-92-1	Lead	7.0		ug/L	2.5	7/29/15 8:09	8/19/15 0:24	EPA 200.8
7439-95-4	Magnesium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:06	EPA 6010
7439-96-5	Manganese	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7439-98-7	Molybdenum	80		ug/L	50	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-02-0	Nickel	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-09-7	Potassium	77000		ug/L	5000	7/29/15 8:04	8/04/15 13:06	EPA 6010
7782-49-2	Selenium	20	U	ug/L	20	7/29/15 8:09	8/18/15 21:51	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-23-5	Sodium	1900000		ug/L	5000	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-24-6	Strontium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-28-0	Thallium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 0:24	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-65-5	Yttrium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:06	EPA 6010
7440-66-6	Zinc	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:06	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW02A0715 **Lab ID:** E152903-04
Station ID: SMSMW02A **Matrix:** Groundwater

Date Collected: 7/14/15 14:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	97		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	94		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	1200		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	2400	CRc	mg/L	5.0	7/23/15 12:46	7/27/15 21:47	EPA 300.0
14808-79-8	Sulfate as SO4	8.3	CRc	mg/L	5.0	7/23/15 12:46	7/27/15 21:47	EPA 300.0
E701250	Total Organic Carbon	290		mg/L	4.0	8/04/15 9:45	8/05/15 23:30	SM 5310B
E1640424	Hardness (as CaCO3)	8.3	U	mg/L	8.3	7/29/15 8:04	8/04/15 13:06	SM 2340B
E701177	Nitrate/Nitrite as N	0.050	U, J, H-1	mg/L	0.050	8/12/15 14:21	8/12/15 14:21	EPA 353.2
7723-14-0	Total Phosphorus	1.5		mg/L	0.10	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW02AD0715 **Lab ID:** E152903-05
Station ID: SMSMW02A **Matrix:** Groundwater

Date Collected: 7/14/15 14:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	2000		ug/L	500	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-36-0	Antimony	12		ug/L	2.5	7/29/15 8:09	8/19/15 0:31	EPA 200.8
7440-38-2	Arsenic	3.0		ug/L	2.5	7/29/15 8:09	8/19/15 0:31	EPA 200.8
7440-39-3	Barium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-43-9	Cadmium	1.2	U	ug/L	1.2	7/29/15 8:09	8/19/15 0:31	EPA 200.8
7440-70-2	Calcium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-47-3	Chromium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-48-4	Cobalt	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:09	EPA 6010
7439-89-6	Iron	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:09	EPA 6010
7439-92-1	Lead	3.9		ug/L	2.5	7/29/15 8:09	8/19/15 0:31	EPA 200.8
7439-95-4	Magnesium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:09	EPA 6010
7439-96-5	Manganese	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7439-98-7	Molybdenum	74		ug/L	50	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-02-0	Nickel	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-09-7	Potassium	74000		ug/L	5000	7/29/15 8:04	8/04/15 13:09	EPA 6010
7782-49-2	Selenium	10	U	ug/L	10	7/29/15 8:09	8/18/15 21:58	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-23-5	Sodium	1900000		ug/L	5000	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-24-6	Strontium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-28-0	Thallium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 0:31	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-65-5	Yttrium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:09	EPA 6010
7440-66-6	Zinc	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:09	EPA 6010

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW02AD0715 **Lab ID:** E152903-05
Station ID: SMSMW02A **Matrix:** Groundwater

Date Collected: 7/14/15 14:40

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	99		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	99		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	1100		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	2400	CRb	mg/L	5.0	7/23/15 12:46	7/27/15 22:08	EPA 300.0
14808-79-8	Sulfate as SO4	6.0	CRb	mg/L	5.0	7/23/15 12:46	7/27/15 22:08	EPA 300.0
E701250	Total Organic Carbon	280	P-4	mg/L	4.0	8/04/15 9:45	8/05/15 23:53	SM 5310B
E1640424	Hardness (as CaCO3)	8.3	U	mg/L	8.3	7/29/15 8:04	8/04/15 13:09	SM 2340B
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	1.5		mg/L	0.10	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW03B0715 **Lab ID:** E152903-06
Station ID: SMSMW03B **Matrix:** Groundwater

Date Collected: 7/15/15 12:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	5000	U	ug/L	5000	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-36-0	Antimony	5.0	U, J, QI-1	ug/L	5.0	7/29/15 8:09	8/19/15 0:37	EPA 200.8
7440-38-2	Arsenic	10	U, J, QI-1	ug/L	10	7/29/15 8:09	8/18/15 22:04	EPA 200.8
7440-39-3	Barium	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-41-7	Beryllium	150	U	ug/L	150	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-43-9	Cadmium	5.0	U	ug/L	5.0	7/29/15 8:09	8/18/15 22:04	EPA 200.8
7440-70-2	Calcium	2500000		ug/L	12000	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-47-3	Chromium	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-48-4	Cobalt	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-50-8	Copper	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:11	EPA 6010
7439-89-6	Iron	5000	U	ug/L	5000	7/29/15 8:04	8/04/15 13:11	EPA 6010
7439-92-1	Lead	7.0		ug/L	5.0	7/29/15 8:09	8/19/15 0:37	EPA 200.8
7439-95-4	Magnesium	140000		ug/L	12000	7/29/15 8:04	8/04/15 13:11	EPA 6010
7439-96-5	Manganese	65000		ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7439-98-7	Molybdenum	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-02-0	Nickel	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-09-7	Potassium	71000		ug/L	50000	7/29/15 8:04	8/04/15 13:11	EPA 6010
7782-49-2	Selenium	1000	U, J, D-2, QI-1	ug/L	1000	7/29/15 8:09	8/18/15 22:04	EPA 200.8
7440-22-4	Silver	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-23-5	Sodium	1.4E7		ug/L	50000	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-24-6	Strontium	4500		ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:37	EPA 200.8
7440-31-5	Tin	750	U	ug/L	750	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-32-6	Titanium	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-62-2	Vanadium	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-65-5	Yttrium	150	U	ug/L	150	7/29/15 8:04	8/04/15 13:11	EPA 6010
7440-66-6	Zinc	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:11	EPA 6010

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Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW03B0715 **Lab ID:** E152903-06
Station ID: SMSMW03B **Matrix:** Groundwater

Date Collected: 7/15/15 12:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	110		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	81		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	580		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	46000		mg/L	100	7/23/15 12:46	7/28/15 22:43	EPA 300.0
14808-79-8	Sulfate as SO4	1600		mg/L	100	7/23/15 12:46	7/28/15 22:43	EPA 300.0
E701250	Total Organic Carbon	1.2		mg/L	1.0	8/04/15 9:45	8/04/15 19:45	SM 5310B
E1640424	Hardness (as CaCO3)	6900		mg/L	83	7/29/15 8:04	8/04/15 13:11	SM 2340B
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.059		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW04A0715 **Lab ID:** E152903-07
Station ID: SMSMW04A **Matrix:** Groundwater

Date Collected: 7/15/15 11:37

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	1500	U	ug/L	1500	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-36-0	Antimony	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:44	EPA 200.8
7440-38-2	Arsenic	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:44	EPA 200.8
7440-39-3	Barium	83		ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-41-7	Beryllium	45	U	ug/L	45	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-43-9	Cadmium	26		ug/L	5.0	7/29/15 8:09	8/18/15 22:23	EPA 200.8
7440-70-2	Calcium	1000000		ug/L	3800	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-47-3	Chromium	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-48-4	Cobalt	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-50-8	Copper	150	U	ug/L	150	7/29/15 8:04	8/04/15 13:14	EPA 6010
7439-89-6	Iron	1500	U	ug/L	1500	7/29/15 8:04	8/04/15 13:14	EPA 6010
7439-92-1	Lead	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:44	EPA 200.8
7439-95-4	Magnesium	110000		ug/L	3800	7/29/15 8:04	8/04/15 13:14	EPA 6010
7439-96-5	Manganese	25000		ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7439-98-7	Molybdenum	150	U	ug/L	150	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-02-0	Nickel	170		ug/L	150	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-09-7	Potassium	170000		ug/L	15000	7/29/15 8:04	8/04/15 13:14	EPA 6010
7782-49-2	Selenium	28	U, J, D-2	ug/L	28	7/29/15 8:09	8/18/15 22:23	EPA 200.8
7440-22-4	Silver	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-23-5	Sodium	4300000		ug/L	15000	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-24-6	Strontium	1600		ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:44	EPA 200.8
7440-31-5	Tin	220	U	ug/L	220	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-32-6	Titanium	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-62-2	Vanadium	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-65-5	Yttrium	45	U	ug/L	45	7/29/15 8:04	8/04/15 13:14	EPA 6010
7440-66-6	Zinc	150	U	ug/L	150	7/29/15 8:04	8/04/15 13:14	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW04A0715 **Lab ID:** E152903-07
Station ID: SMSMW04A **Matrix:** Groundwater

Date Collected: 7/15/15 11:37

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	65		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	62		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	330		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	13000		mg/L	100	7/23/15 12:46	7/28/15 23:04	EPA 300.0
14808-79-8	Sulfate as SO4	640		mg/L	100	7/23/15 12:46	7/28/15 23:04	EPA 300.0
E701250	Total Organic Carbon	1.8		mg/L	1.0	8/04/15 9:45	8/04/15 20:15	SM 5310B
E1640424	Hardness (as CaCO3)	2900		mg/L	25	7/29/15 8:04	8/04/15 13:14	SM 2340B
E701177	Nitrate/Nitrite as N	20		mg/L	5.0	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.030	J, QR-1	mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW07A0715 **Lab ID:** E152903-08
Station ID: SMSMW07A **Matrix:** Groundwater

Date Collected: 7/15/15 15:57

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	2000	U	ug/L	2000	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-36-0	Antimony	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:50	EPA 200.8
7440-38-2	Arsenic	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:50	EPA 200.8
7440-39-3	Barium	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-41-7	Beryllium	60	U	ug/L	60	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-43-9	Cadmium	4.1		ug/L	2.5	7/29/15 8:09	8/19/15 0:50	EPA 200.8
7440-70-2	Calcium	150000		ug/L	5000	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-47-3	Chromium	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-48-4	Cobalt	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-50-8	Copper	200	U	ug/L	200	7/29/15 8:04	8/04/15 13:17	EPA 6010
7439-89-6	Iron	2000	U	ug/L	2000	7/29/15 8:04	8/04/15 13:17	EPA 6010
7439-92-1	Lead	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:50	EPA 200.8
7439-95-4	Magnesium	20000		ug/L	5000	7/29/15 8:04	8/04/15 13:17	EPA 6010
7439-96-5	Manganese	10000		ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7439-98-7	Molybdenum	200	U	ug/L	200	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-02-0	Nickel	200	U	ug/L	200	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-09-7	Potassium	270000		ug/L	20000	7/29/15 8:04	8/04/15 13:17	EPA 6010
7782-49-2	Selenium	64	U, J, D-2	ug/L	64	7/29/15 8:09	8/18/15 22:30	EPA 200.8
7440-22-4	Silver	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-23-5	Sodium	6900000		ug/L	20000	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-24-6	Strontium	270		ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:50	EPA 200.8
7440-31-5	Tin	300	U	ug/L	300	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-32-6	Titanium	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-62-2	Vanadium	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-65-5	Yttrium	210		ug/L	60	7/29/15 8:04	8/04/15 13:17	EPA 6010
7440-66-6	Zinc	200	U	ug/L	200	7/29/15 8:04	8/04/15 13:17	EPA 6010

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Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW07A0715 **Lab ID:** E152903-08
Station ID: SMSMW07A **Matrix:** Groundwater

Date Collected: 7/15/15 15:57

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	190		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	190		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	1200		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	16000		mg/L	100	7/23/15 12:46	7/28/15 23:25	EPA 300.0
14808-79-8	Sulfate as SO4	1100		mg/L	100	7/23/15 12:46	7/28/15 23:25	EPA 300.0
E701250	Total Organic Carbon	21		mg/L	1.0	8/04/15 9:45	8/04/15 20:43	SM 5310B
E1640424	Hardness (as CaCO3)	450		mg/L	33	7/29/15 8:04	8/04/15 13:17	SM 2340B
E701177	Nitrate/Nitrite as N	2.8		mg/L	0.50	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.12		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW07B0715 **Lab ID:** E152903-09
Station ID: SMSMW07B **Matrix:** Groundwater

Date Collected: 7/15/15 17:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	3500	U	ug/L	3500	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-36-0	Antimony	5.0	U, J, QI-1	ug/L	5.0	7/29/15 8:09	8/19/15 0:56	EPA 200.8
7440-38-2	Arsenic	5.0	U, J, QI-1	ug/L	5.0	7/29/15 8:09	8/19/15 0:56	EPA 200.8
7440-39-3	Barium	180	U	ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-41-7	Beryllium	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-43-9	Cadmium	5.0	U	ug/L	5.0	7/29/15 8:09	8/18/15 22:36	EPA 200.8
7440-70-2	Calcium	230000		ug/L	8800	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-47-3	Chromium	180	U	ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-48-4	Cobalt	180	U	ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-50-8	Copper	350	U	ug/L	350	7/29/15 8:04	8/04/15 13:19	EPA 6010
7439-89-6	Iron	3500	U	ug/L	3500	7/29/15 8:04	8/04/15 13:19	EPA 6010
7439-92-1	Lead	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:56	EPA 200.8
7439-95-4	Magnesium	27000		ug/L	8800	7/29/15 8:04	8/04/15 13:19	EPA 6010
7439-96-5	Manganese	14000		ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7439-98-7	Molybdenum	350	U	ug/L	350	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-02-0	Nickel	350	U	ug/L	350	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-09-7	Potassium	540000		ug/L	35000	7/29/15 8:04	8/04/15 13:19	EPA 6010
7782-49-2	Selenium	280	U, J, D-2	ug/L	280	7/29/15 8:09	8/18/15 22:36	EPA 200.8
7440-22-4	Silver	180	U	ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-23-5	Sodium	1.2E7		ug/L	35000	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-24-6	Strontium	580		ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 0:56	EPA 200.8
7440-31-5	Tin	520	U	ug/L	520	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-32-6	Titanium	180	U	ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-62-2	Vanadium	180	U	ug/L	180	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-65-5	Yttrium	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:19	EPA 6010
7440-66-6	Zinc	350	U	ug/L	350	7/29/15 8:04	8/04/15 13:19	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW07B0715 **Lab ID:** E152903-09
Station ID: SMSMW07B **Matrix:** Groundwater

Date Collected: 7/15/15 17:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	500		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	440		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	1300		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	32000		mg/L	100	7/23/15 12:46	7/28/15 23:46	EPA 300.0
14808-79-8	Sulfate as SO4	920		mg/L	100	7/23/15 12:46	7/28/15 23:46	EPA 300.0
E701250	Total Organic Carbon	38		mg/L	1.0	8/04/15 9:45	8/04/15 21:11	SM 5310B
E1640424	Hardness (as CaCO3)	700		mg/L	58	7/29/15 8:04	8/04/15 13:19	SM 2340B
E701177	Nitrate/Nitrite as N	3.4		mg/L	0.50	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.26		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW08A0715 **Lab ID:** E152903-10
Station ID: SMSMW08A **Matrix:** Groundwater

Date Collected: 7/15/15 9:12

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-36-0	Antimony	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:03	EPA 200.8
7440-38-2	Arsenic	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:03	EPA 200.8
7440-39-3	Barium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-43-9	Cadmium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:03	EPA 200.8
7440-70-2	Calcium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-47-3	Chromium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-48-4	Cobalt	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:22	EPA 6010
7439-89-6	Iron	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:22	EPA 6010
7439-92-1	Lead	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:03	EPA 200.8
7439-95-4	Magnesium	1400		ug/L	1200	7/29/15 8:04	8/04/15 13:22	EPA 6010
7439-96-5	Manganese	190		ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7439-98-7	Molybdenum	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-02-0	Nickel	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-09-7	Potassium	46000		ug/L	5000	7/29/15 8:04	8/04/15 13:22	EPA 6010
7782-49-2	Selenium	10	U	ug/L	10	7/29/15 8:09	8/19/15 1:03	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-23-5	Sodium	1100000		ug/L	5000	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-24-6	Strontium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:03	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-65-5	Yttrium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:22	EPA 6010
7440-66-6	Zinc	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:22	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW08A0715 **Lab ID:** E152903-10
Station ID: SMSMW08A **Matrix:** Groundwater

Date Collected: 7/15/15 9:12

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	41		mg/L	0.50	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	35		mg/L	0.50	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	740		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	1200	CRb	mg/L	5.0	7/23/15 12:46	7/27/15 23:54	EPA 300.0
14808-79-8	Sulfate as SO4	67	CRb	mg/L	5.0	7/23/15 12:46	7/27/15 23:54	EPA 300.0
E701250	Total Organic Carbon	15		mg/L	1.0	8/04/15 9:45	8/04/15 21:37	SM 5310B
E1640424	Hardness (as CaCO3)	8.4		mg/L	8.3	7/29/15 8:04	8/04/15 13:22	SM 2340B
E701177	Nitrate/Nitrite as N	0.82		mg/L	0.25	8/12/15 14:21	8/12/15 14:21	EPA 353.2
7723-14-0	Total Phosphorus	1.5		mg/L	0.10	7/22/15 16:55	7/23/15 16:29	EPA 365.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW10A0715 **Lab ID:** E152903-11
Station ID: SMSMW10A **Matrix:** Groundwater

Date Collected: 7/14/15 11:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	200000		ug/L	2500	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-36-0	Antimony	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:09	EPA 200.8
7440-38-2	Arsenic	11		ug/L	5.0	7/29/15 8:09	8/19/15 1:09	EPA 200.8
7440-39-3	Barium	120	U	ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-41-7	Beryllium	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-43-9	Cadmium	880		ug/L	5.0	7/29/15 8:09	8/18/15 22:49	EPA 200.8
7440-70-2	Calcium	380000		ug/L	6200	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-47-3	Chromium	120	U	ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-48-4	Cobalt	1600		ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-50-8	Copper	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:25	EPA 6010
7439-89-6	Iron	2500	U	ug/L	2500	7/29/15 8:04	8/04/15 13:25	EPA 6010
7439-92-1	Lead	5.0	U, J, QI-1	ug/L	5.0	7/29/15 8:09	8/19/15 1:09	EPA 200.8
7439-95-4	Magnesium	110000		ug/L	6200	7/29/15 8:04	8/04/15 13:25	EPA 6010
7439-96-5	Manganese	110000		ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7439-98-7	Molybdenum	250	U	ug/L	250	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-02-0	Nickel	880		ug/L	250	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-09-7	Potassium	25000	U	ug/L	25000	7/29/15 8:04	8/04/15 13:25	EPA 6010
7782-49-2	Selenium	54	J, CR	ug/L	20	7/29/15 8:09	8/18/15 22:49	EPA 200.8
7440-22-4	Silver	120	U	ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-23-5	Sodium	430000		ug/L	25000	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-24-6	Strontium	610		ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-28-0	Thallium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:09	EPA 200.8
7440-31-5	Tin	380	U	ug/L	380	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-32-6	Titanium	120	U	ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-62-2	Vanadium	120	U	ug/L	120	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-65-5	Yttrium	7000		ug/L	75	7/29/15 8:04	8/04/15 13:25	EPA 6010
7440-66-6	Zinc	48000		ug/L	250	7/29/15 8:04	8/04/15 13:25	EPA 6010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW10A0715 **Lab ID:** E152903-11
Station ID: SMSMW10A **Matrix:** Groundwater

Date Collected: 7/14/15 11:20

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.050	U	mg/L	0.050	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	0.34		mg/L	0.050	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3):		NA-12		1.0	7 24, 15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	1300		mg/L	5.0	7/23/15 12:46	7/29/15 0:07	EPA 300.0
14808-79-8	Sulfate as SO4	2900		mg/L	5.0	7/23/15 12:46	7/29/15 0:07	EPA 300.0
E701250	Total Organic Carbon	1.5		mg/L	1.0	8/04/15 9:45	8/04/15 21:56	SM 5310B
E1640424	Hardness (as CaCO3)	1400		mg/L	41	7/29/15 8:04	8/04/15 13:25	SM 2340B
E701177	Nitrate/Nitrite as N	24		mg/L	5.0	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.058		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW10B0715 **Lab ID:** E152903-12
Station ID: SMSMW10B **Matrix:** Groundwater

Date Collected: 7/14/15 13:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	6900		ug/L	500	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-36-0	Antimony	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:16	EPA 200.8
7440-38-2	Arsenic	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:16	EPA 200.8
7440-39-3	Barium	28		ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-43-9	Cadmium	3.9		ug/L	1.2	7/29/15 8:09	8/19/15 1:16	EPA 200.8
7440-70-2	Calcium	350000		ug/L	1200	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-47-3	Chromium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-48-4	Cobalt	29		ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:27	EPA 6010
7439-89-6	Iron	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:27	EPA 6010
7439-92-1	Lead	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:16	EPA 200.8
7439-95-4	Magnesium	44000		ug/L	1200	7/29/15 8:04	8/04/15 13:27	EPA 6010
7439-96-5	Manganese	8800		ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7439-98-7	Molybdenum	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-02-0	Nickel	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-09-7	Potassium	5000	U	ug/L	5000	7/29/15 8:04	8/04/15 13:27	EPA 6010
7782-49-2	Selenium	53		ug/L	20	7/29/15 8:09	8/18/15 22:55	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-23-5	Sodium	54000		ug/L	5000	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-24-6	Strontium	650		ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-28-0	Thallium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:16	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-65-5	Yttrium	15		ug/L	15	7/29/15 8:04	8/04/15 13:27	EPA 6010
7440-66-6	Zinc	63		ug/L	50	7/29/15 8:04	8/04/15 13:27	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW10B0715 **Lab ID:** E152903-12
Station ID: SMSMW10B **Matrix:** Groundwater

Date Collected: 7/14/15 13:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.070		mg/L	0.050	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	0.33		mg/L	0.050	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	390		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	91		mg/L	0.10	7/23/15 12:46	7/28/15 2:42	EPA 300.0
14808-79-8	Sulfate as SO4	750		mg/L	0.10	7/23/15 12:46	7/28/15 2:42	EPA 300.0
E701250	Total Organic Carbon	2.5		mg/L	1.0	8/04/15 9:45	8/04/15 22:20	SM 5310B
E1640424	Hardness (as CaCO3)	1100		mg/L	8.3	7/29/15 8:04	8/04/15 13:27	SM 2340B
E701177	Nitrate/Nitrite as N	3.6		mg/L	1.0	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.010	U, J, QR-1	mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW11A0715 **Lab ID:** E152903-13
Station ID: SMSMW11A **Matrix:** Groundwater

Date Collected: 7/15/15 14:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-36-0	Antimony	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:35	EPA 200.8
7440-38-2	Arsenic	100	J, QM-1, CR	ug/L	10	7/29/15 8:09	8/18/15 23:01	EPA 200.8
7440-39-3	Barium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-43-9	Cadmium	1.2	U	ug/L	1.2	7/29/15 8:09	8/19/15 1:35	EPA 200.8
7440-70-2	Calcium	2900		ug/L	1200	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-47-3	Chromium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-48-4	Cobalt	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:43	EPA 6010
7439-89-6	Iron	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:43	EPA 6010
7439-92-1	Lead	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:35	EPA 200.8
7439-95-4	Magnesium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:43	EPA 6010
7439-96-5	Manganese	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7439-98-7	Molybdenum	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-02-0	Nickel	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-09-7	Potassium	65000		ug/L	5000	7/29/15 8:04	8/04/15 13:43	EPA 6010
7782-49-2	Selenium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:35	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-23-5	Sodium	1300000		ug/L	5000	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-24-6	Strontium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-28-0	Thallium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:35	EPA 200.8
7440-31-5	Tin	75	U, J, QM-1	ug/L	75	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-65-5	Yttrium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:43	EPA 6010
7440-66-6	Zinc	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:43	EPA 6010

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW11A0715 **Lab ID:** E152903-13
Station ID: SMSMW11A **Matrix:** Groundwater

Date Collected: 7/15/15 14:50

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	43		mg/L	0.50	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	34		mg/L	0.50	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	730		mg/L	1.0	7/29/15 14:00	7/29/15 14:22	SM 2320B
16887-00-6	Chloride	1600	CRb	mg/L	5.0	7/23/15 12:46	7/28/15 3:03	EPA 300.0
14808-79-8	Sulfate as SO4	110	CRb	mg/L	5.0	7/23/15 12:46	7/28/15 3:03	EPA 300.0
E701250	Total Organic Carbon	11		mg/L	1.0	8/04/15 9:45	8/04/15 23:30	SM 5310B
E1640424	Hardness (as CaCO3)	9.6		mg/L	8.3	7/29/15 8:04	8/04/15 13:43	SM 2340B
E701177	Nitrate/Nitrite as N	5.8		mg/L	1.0	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	1.2		mg/L	0.10	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW11B0715 **Lab ID:** E152903-14
Station ID: SMSMW11B **Matrix:** Groundwater

Date Collected: 7/15/15 14:02

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-36-0	Antimony	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:41	EPA 200.8
7440-38-2	Arsenic	6.2		ug/L	2.5	7/29/15 8:09	8/19/15 1:41	EPA 200.8
7440-39-3	Barium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-43-9	Cadmium	1.2	U	ug/L	1.2	7/29/15 8:09	8/19/15 1:41	EPA 200.8
7440-70-2	Calcium	2600		ug/L	1200	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-47-3	Chromium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-48-4	Cobalt	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:51	EPA 6010
7439-89-6	Iron	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:51	EPA 6010
7439-92-1	Lead	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:41	EPA 200.8
7439-95-4	Magnesium	1200	U	ug/L	1200	7/29/15 8:04	8/04/15 13:51	EPA 6010
7439-96-5	Manganese	74		ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7439-98-7	Molybdenum	58		ug/L	50	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-02-0	Nickel	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-09-7	Potassium	42000		ug/L	5000	7/29/15 8:04	8/04/15 13:51	EPA 6010
7782-49-2	Selenium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:41	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-23-5	Sodium	1100000		ug/L	5000	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-24-6	Strontium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-28-0	Thallium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:41	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-65-5	Yttrium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:51	EPA 6010
7440-66-6	Zinc	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:51	EPA 6010

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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW11B0715 **Lab ID:** E152903-14
Station ID: SMSMW11B **Matrix:** Groundwater

Date Collected: 7/15/15 14:02

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	80		mg/L	5.0	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	66		mg/L	5.0	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	1300		mg/L	1.0	7/29/15 14:00	7/29/15 14:33	SM 2320B
16887-00-6	Chloride	3000	CRb	mg/L	5.0	7/23/15 12:46	7/28/15 3:24	EPA 300.0
14808-79-8	Sulfate as SO4	120	CRb	mg/L	5.0	7/23/15 12:46	7/28/15 3:24	EPA 300.0
E701250	Total Organic Carbon	25		mg/L	1.0	8/04/15 9:45	8/04/15 23:57	SM 5310B
E1640424	Hardness (as CaCO3)	11		mg/L	8.3	7/29/15 8:04	8/04/15 13:51	SM 2340B
E701177	Nitrate/Nitrite as N	0.31		mg/L	0.050	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.26		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW12A0715 **Lab ID:** E152903-15
Station ID: SMSMW12A **Matrix:** Groundwater

Date Collected: 7/15/15 16:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	500	U	ug/L	500	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 1:47	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 1:47	EPA 200.8
7440-39-3	Barium	210		ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-41-7	Beryllium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:09	8/19/15 1:47	EPA 200.8
7440-70-2	Calcium	1200000	J, QC-4	ug/L	1200	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-47-3	Chromium	73		ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-48-4	Cobalt	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-50-8	Copper	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:54	EPA 6010
7439-89-6	Iron	1100		ug/L	500	7/29/15 8:04	8/04/15 13:54	EPA 6010
7439-92-1	Lead	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 1:47	EPA 200.8
7439-95-4	Magnesium	110000		ug/L	1200	7/29/15 8:04	8/04/15 13:54	EPA 6010
7439-96-5	Manganese	380		ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7439-98-7	Molybdenum	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-02-0	Nickel	53		ug/L	50	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-09-7	Potassium	59000		ug/L	5000	7/29/15 8:04	8/04/15 13:54	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:09	8/19/15 1:47	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-23-5	Sodium	1700000		ug/L	5000	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-24-6	Strontium	1800		ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 1:47	EPA 200.8
7440-31-5	Tin	110		ug/L	75	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-32-6	Titanium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-62-2	Vanadium	25	U	ug/L	25	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-65-5	Yttrium	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:54	EPA 6010
7440-66-6	Zinc	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:54	EPA 6010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW12A0715 **Lab ID:** E152903-15
Station ID: SMSMW12A **Matrix:** Groundwater

Date Collected: 7/15/15 16:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	1.4		mg/L	0.050	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	1.6		mg/L	0.050	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	440		mg/L	1.0	7/29/15 14:00	7/29/15 14:45	SM 2320B
16887-00-6	Chloride	560		mg/L	0.10	7/23/15 12:46	7/28/15 3:45	EPA 300.0
14808-79-8	Sulfate as SO4	220		mg/L	0.10	7/23/15 12:46	7/28/15 3:45	EPA 300.0
E701250	Total Organic Carbon	1.8		mg/L	1.0	8/04/15 9:45	8/05/15 0:21	SM 5310B
E1640424	Hardness (as CaCO3)	3400		mg/L	8.3	7/29/15 8:04	8/04/15 13:54	SM 2340B
E701177	Nitrate/Nitrite as N	20		mg/L	5.0	8/12/15 14:21	8/12/15 14:21	EPA 353.2
7723-14-0	Total Phosphorus	0.014	J, QR-1	mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW12B0715 **Lab ID:** E152903-16
Station ID: SMSMW12B **Matrix:** Groundwater

Date Collected: 7/15/15 18:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	3600		ug/L	1000	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-36-0	Antimony	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:54	EPA 200.8
7440-38-2	Arsenic	3.3		ug/L	2.5	7/29/15 8:09	8/19/15 1:54	EPA 200.8
7440-39-3	Barium	160		ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-41-7	Beryllium	30	U	ug/L	30	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-43-9	Cadmium	1.5		ug/L	1.2	7/29/15 8:09	8/19/15 1:54	EPA 200.8
7440-70-2	Calcium	850000		ug/L	2500	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-47-3	Chromium	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-48-4	Cobalt	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-50-8	Copper	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:56	EPA 6010
7439-89-6	Iron	6800		ug/L	1000	7/29/15 8:04	8/04/15 13:56	EPA 6010
7439-92-1	Lead	4.0		ug/L	2.5	7/29/15 8:09	8/19/15 1:54	EPA 200.8
7439-95-4	Magnesium	67000		ug/L	2500	7/29/15 8:04	8/04/15 13:56	EPA 6010
7439-96-5	Manganese	1700		ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7439-98-7	Molybdenum	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-02-0	Nickel	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-09-7	Potassium	43000		ug/L	10000	7/29/15 8:04	8/04/15 13:56	EPA 6010
7782-49-2	Selenium	5.0	U	ug/L	5.0	7/29/15 8:09	8/19/15 1:54	EPA 200.8
7440-22-4	Silver	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-23-5	Sodium	1500000		ug/L	10000	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-24-6	Strontium	1500		ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-28-0	Thallium	2.5	U	ug/L	2.5	7/29/15 8:09	8/19/15 1:54	EPA 200.8
7440-31-5	Tin	150	U	ug/L	150	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-32-6	Titanium	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-62-2	Vanadium	50	U	ug/L	50	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-65-5	Yttrium	30	U	ug/L	30	7/29/15 8:04	8/04/15 13:56	EPA 6010
7440-66-6	Zinc	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:56	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW12B0715 **Lab ID:** E152903-16
Station ID: SMSMW12B **Matrix:** Groundwater

Date Collected: 7/15/15 18:00

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	14		mg/L	0.50	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	10		mg/L	0.50	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	410		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	3900		mg/L	0.10	7/23/15 12:46	7/28/15 4:06	EPA 300.0
14808-79-8	Sulfate as SO4	350		mg/L	0.10	7/23/15 12:46	7/28/15 4:06	EPA 300.0
E701250	Total Organic Carbon	2.8		mg/L	1.0	8/04/15 9:45	8/05/15 0:47	SM 5310B
E1640424	Hardness (as CaCO3)	2400		mg/L	17	7/29/15 8:04	8/04/15 13:56	SM 2340B
E701177	Nitrate/Nitrite as N	63		mg/L	5.0	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.13		mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW13A0715 **Lab ID:** E152903-17
Station ID: SMSMW13A **Matrix:** Groundwater

Date Collected: 7/14/15 13:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	1400		ug/L	100	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:00	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:00	EPA 200.8
7440-39-3	Barium	25		ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-43-9	Cadmium	16		ug/L	0.50	7/29/15 8:09	8/19/15 2:00	EPA 200.8
7440-70-2	Calcium	37000		ug/L	250	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-47-3	Chromium	7.5		ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-48-4	Cobalt	53		ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-50-8	Copper	10	U	ug/L	10	7/29/15 8:04	8/04/15 13:59	EPA 6010
7439-89-6	Iron	100	U	ug/L	100	7/29/15 8:04	8/04/15 13:59	EPA 6010
7439-92-1	Lead	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:00	EPA 200.8
7439-95-4	Magnesium	13000		ug/L	250	7/29/15 8:04	8/04/15 13:59	EPA 6010
7439-96-5	Manganese	3400		ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-02-0	Nickel	35		ug/L	10	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-09-7	Potassium	5200		ug/L	1000	7/29/15 8:04	8/04/15 13:59	EPA 6010
7782-49-2	Selenium	20		ug/L	2.0	7/29/15 8:09	8/19/15 2:00	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-23-5	Sodium	260000		ug/L	1000	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-24-6	Strontium	100		ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:00	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-32-6	Titanium	5.0	U	ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-65-5	Yttrium	44		ug/L	3.0	7/29/15 8:04	8/04/15 13:59	EPA 6010
7440-66-6	Zinc	970		ug/L	10	7/29/15 8:04	8/04/15 13:59	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW13A0715 **Lab ID:** E152903-17
Station ID: SMSMW13A **Matrix:** Groundwater

Date Collected: 7/14/15 13:15

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.050	U	mg/L	0.050	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	0.30		mg/L	0.050	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	4.3		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	280		mg/L	0.10	7/23/15 12:46	7/28/15 4:27	EPA 300.0
14808-79-8	Sulfate as SO4	280		mg/L	0.10	7/23/15 12:46	7/28/15 4:27	EPA 300.0
E701250	Total Organic Carbon	1.5		mg/L	1.0	8/04/15 9:45	8/05/15 1:04	SM 5310B
E1640424	Hardness (as CaCO3)	140		mg/L	1.7	7/29/15 8:04	8/04/15 13:59	SM 2340B
E701177	Nitrate/Nitrite as N	8.6		mg/L	0.50	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.010	U, J, QR-1	mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW13B0715 **Lab ID:** E152903-18
Station ID: SMSMW13B **Matrix:** Groundwater

Date Collected: 7/14/15 11:46

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	200	U	ug/L	200	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:07	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:07	EPA 200.8
7440-39-3	Barium	42		ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-41-7	Beryllium	6.0	U	ug/L	6.0	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-43-9	Cadmium	1.9		ug/L	0.50	7/29/15 8:09	8/19/15 2:07	EPA 200.8
7440-70-2	Calcium	120000		ug/L	500	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-47-3	Chromium	10	U	ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-48-4	Cobalt	10	U	ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-50-8	Copper	20	U	ug/L	20	7/29/15 8:04	8/04/15 14:02	EPA 6010
7439-89-6	Iron	200	U	ug/L	200	7/29/15 8:04	8/04/15 14:02	EPA 6010
7439-92-1	Lead	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:07	EPA 200.8
7439-95-4	Magnesium	9500		ug/L	500	7/29/15 8:04	8/04/15 14:02	EPA 6010
7439-96-5	Manganese	870		ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7439-98-7	Molybdenum	20	U	ug/L	20	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-02-0	Nickel	20	U	ug/L	20	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-09-7	Potassium	2000	U	ug/L	2000	7/29/15 8:04	8/04/15 14:02	EPA 6010
7782-49-2	Selenium	4.8		ug/L	2.0	7/29/15 8:09	8/19/15 2:07	EPA 200.8
7440-22-4	Silver	10	U	ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-23-5	Sodium	17000		ug/L	2000	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-24-6	Strontium	230		ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:09	8/19/15 2:07	EPA 200.8
7440-31-5	Tin	30	U	ug/L	30	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-32-6	Titanium	10	U	ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-62-2	Vanadium	10	U	ug/L	10	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-65-5	Yttrium	6.0	U	ug/L	6.0	7/29/15 8:04	8/04/15 14:02	EPA 6010
7440-66-6	Zinc	20	U	ug/L	20	7/29/15 8:04	8/04/15 14:02	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses

Project: 15-0346, Smokey Mountain Smelters

Sample ID: MW13B0715 **Lab ID:** E152903-18
Station ID: SMSMW13B **Matrix:** Groundwater

Date Collected: 7/14/15 11:46

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.050	U	mg/L	0.050	7/21/15 11:00	7/22/15 14:53	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	0.087	J, QR-1	mg/L	0.050	7/21/15 10:39	8/05/15 15:33	EPA 351.2
E1640192	Alkalinity, Total (as CaCO3)	270		mg/L	1.0	7/24/15 10:56	7/24/15 16:48	SM 2320B
16887-00-6	Chloride	23		mg/L	0.10	7/23/15 12:46	7/28/15 4:48	EPA 300.0
14808-79-8	Sulfate as SO4	73		mg/L	0.10	7/23/15 12:46	7/28/15 4:48	EPA 300.0
E701250	Total Organic Carbon	1.0	U	mg/L	1.0	8/04/15 9:45	8/05/15 1:21	SM 5310B
E1640424	Hardness (as CaCO3)	340		mg/L	3.3	7/29/15 8:04	8/04/15 14:02	SM 2340B
E701177	Nitrate/Nitrite as N	1.9		mg/L	0.50	7/22/15 17:41	7/22/15 17:41	EPA 353.2
7723-14-0	Total Phosphorus	0.010	U, J, QR-1	mg/L	0.010	7/22/15 16:55	7/23/15 16:29	EPA 365.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: SMSSW010715 **Lab ID:** E152903-19
Station ID: SMSSW01 **Matrix:** Surface Water

Date Collected: 7/15/15 8:10

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	1200		ug/L	100	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:50	EPA 200.8
7440-38-2	Arsenic	2.4		ug/L	1.0	7/29/15 8:14	8/18/15 19:50	EPA 200.8
7440-39-3	Barium	31		ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:14	8/18/15 19:50	EPA 200.8
7440-70-2	Calcium	34000		ug/L	250	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-47-3	Chromium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-48-4	Cobalt	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-50-8	Copper	30		ug/L	10	7/29/15 8:12	8/03/15 12:26	EPA 6010
7439-89-6	Iron	1100		ug/L	100	7/29/15 8:12	8/03/15 12:26	EPA 6010
7439-92-1	Lead	1.6		ug/L	1.0	7/29/15 8:14	8/18/15 19:50	EPA 200.8
7439-95-4	Magnesium	6500		ug/L	250	7/29/15 8:12	8/03/15 12:26	EPA 6010
7439-96-5	Manganese	390		ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-02-0	Nickel	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-09-7	Potassium	16000		ug/L	1000	7/29/15 8:12	8/03/15 12:26	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:14	8/18/15 19:50	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-23-5	Sodium	170000		ug/L	1000	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-24-6	Strontium	87		ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 19:50	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-32-6	Titanium	11		ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-65-5	Yttrium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:26	EPA 6010
7440-66-6	Zinc	17		ug/L	10	7/29/15 8:12	8/03/15 12:26	EPA 6010

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: SMSSW020715 **Lab ID:** E152903-20
Station ID: SMSSW02 **Matrix:** Surface Water

Date Collected: 7/15/15 8:24

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	1400		ug/L	100	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:22	EPA 200.8
7440-38-2	Arsenic	2.3		ug/L	1.0	7/29/15 8:14	8/18/15 20:22	EPA 200.8
7440-39-3	Barium	18		ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:14	8/18/15 20:22	EPA 200.8
7440-70-2	Calcium	32000		ug/L	250	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-47-3	Chromium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-48-4	Cobalt	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-50-8	Copper	19		ug/L	10	7/29/15 8:12	8/03/15 12:34	EPA 6010
7439-89-6	Iron	1700		ug/L	100	7/29/15 8:12	8/03/15 12:34	EPA 6010
7439-92-1	Lead	1.7		ug/L	1.0	7/29/15 8:14	8/18/15 20:22	EPA 200.8
7439-95-4	Magnesium	4800		ug/L	250	7/29/15 8:12	8/03/15 12:34	EPA 6010
7439-96-5	Manganese	16		ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-02-0	Nickel	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-09-7	Potassium	8500		ug/L	1000	7/29/15 8:12	8/03/15 12:34	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:14	8/18/15 20:22	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-23-5	Sodium	15000		ug/L	1000	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-24-6	Strontium	84		ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:22	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-32-6	Titanium	12		ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-65-5	Yttrium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:34	EPA 6010
7440-66-6	Zinc	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:34	EPA 6010

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: SMSSW030715 **Lab ID:** E152903-21
Station ID: SMSSW03 **Matrix:** Surface Water

Date Collected: 7/15/15 8:29

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	1700		ug/L	100	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:35	EPA 200.8
7440-38-2	Arsenic	2.4		ug/L	1.0	7/29/15 8:14	8/18/15 20:35	EPA 200.8
7440-39-3	Barium	20		ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:14	8/18/15 20:35	EPA 200.8
7440-70-2	Calcium	32000		ug/L	250	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-47-3	Chromium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-48-4	Cobalt	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-50-8	Copper	23		ug/L	10	7/29/15 8:12	8/03/15 12:36	EPA 6010
7439-89-6	Iron	1700		ug/L	100	7/29/15 8:12	8/03/15 12:36	EPA 6010
7439-92-1	Lead	1.7		ug/L	1.0	7/29/15 8:14	8/18/15 20:35	EPA 200.8
7439-95-4	Magnesium	4800		ug/L	250	7/29/15 8:12	8/03/15 12:36	EPA 6010
7439-96-5	Manganese	41		ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-02-0	Nickel	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-09-7	Potassium	9600		ug/L	1000	7/29/15 8:12	8/03/15 12:36	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:14	8/18/15 20:35	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-23-5	Sodium	47000		ug/L	1000	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-24-6	Strontium	79		ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:35	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-32-6	Titanium	13		ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-65-5	Yttrium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:36	EPA 6010
7440-66-6	Zinc	12		ug/L	10	7/29/15 8:12	8/03/15 12:36	EPA 6010

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Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals

Project: 15-0346, Smokey Mountain Smelters

Sample ID: SMSSW040715 **Lab ID:** E152903-22
Station ID: SMSSW04 **Matrix:** Surface Water

Date Collected: 7/15/15 8:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7429-90-5	Aluminum	630		ug/L	100	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-36-0	Antimony	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:48	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:48	EPA 200.8
7440-39-3	Barium	31		ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-41-7	Beryllium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-43-9	Cadmium	0.50	U	ug/L	0.50	7/29/15 8:14	8/18/15 20:48	EPA 200.8
7440-70-2	Calcium	40000		ug/L	250	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-47-3	Chromium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-48-4	Cobalt	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-50-8	Copper	62		ug/L	10	7/29/15 8:12	8/03/15 12:39	EPA 6010
7439-89-6	Iron	700		ug/L	100	7/29/15 8:12	8/03/15 12:39	EPA 6010
7439-92-1	Lead	1.0		ug/L	1.0	7/29/15 8:14	8/18/15 20:48	EPA 200.8
7439-95-4	Magnesium	7500		ug/L	250	7/29/15 8:12	8/03/15 12:39	EPA 6010
7439-96-5	Manganese	38		ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7439-98-7	Molybdenum	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-02-0	Nickel	10	U	ug/L	10	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-09-7	Potassium	13000		ug/L	1000	7/29/15 8:12	8/03/15 12:39	EPA 6010
7782-49-2	Selenium	2.0	U	ug/L	2.0	7/29/15 8:14	8/18/15 20:48	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-23-5	Sodium	86000		ug/L	1000	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-24-6	Strontium	120		ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-28-0	Thallium	1.0	U	ug/L	1.0	7/29/15 8:14	8/18/15 20:48	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-32-6	Titanium	6.3		ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-62-2	Vanadium	5.0	U	ug/L	5.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-65-5	Yttrium	3.0	U	ug/L	3.0	7/29/15 8:12	8/03/15 12:39	EPA 6010
7440-66-6	Zinc	10		ug/L	10	7/29/15 8:12	8/03/15 12:39	EPA 6010

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507083 - M 200.2 Metals Water										
Blank (1507083-BLK1)				Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	U	100	ug/L							U
Barium	U	5.0	"							U
Beryllium	U	3.0	"							U
Calcium	U	250	"							U
Chromium	U	5.0	"							U
Cobalt	U	5.0	"							U
Copper	U	10	"							U
Iron	U	100	"							U
Magnesium	U	250	"							U
Manganese	U	5.0	"							U
Molybdenum	U	10	"							U
Nickel	U	10	"							U
Potassium	U	1000	"							U
Silver	U	5.0	"							U
Sodium	U	1000	"							U
Strontium	U	5.0	"							U
Tin	U	15	"							U
Titanium	U	5.0	"							U
Vanadium	U	5.0	"							U
Yttrium	U	3.0	"							U
Zinc	U	10	"							U
LCS (1507083-BS1)				Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	4886.3	100	ug/L	5000.0		97.7	85-115			
Barium	193.89	5.0	"	200.00		96.9	85-115			
Beryllium	48.861	3.0	"	50.000		97.7	85-115			
Calcium	4620.5	250	"	5000.0		92.4	85-115			
Chromium	197.42	5.0	"	200.00		98.7	85-115			
Cobalt	97.120	5.0	"	100.00		97.1	85-115			
Copper	103.76	10	"	100.00		104	85-115			
Iron	4921.7	100	"	5000.0		98.4	85-115			
Magnesium	5048.6	250	"	5000.0		101	85-115			
Manganese	489.27	5.0	"	500.00		97.9	85-115			
Molybdenum	98.082	10	"	100.00		98.1	85-115			
Nickel	194.11	10	"	200.00		97.1	85-115			
Potassium	9549.9	1000	"	10000		95.5	85-115			
Silver	96.805	5.0	"	100.00		96.8	85-115			
Sodium	10584	1000	"	10000		106	85-115			

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D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507083 - M 200.2 Metals Water										
LCS (1507083-BS1)				Prepared: 07/29/15 Analyzed: 08/04/15						
Strontium	104.14	5.0	ug/L	100.00		104	85-115			
Tin	94.053	15	"	100.00		94.1	85-115			
Titanium	106.09	5.0	"	100.00		106	85-115			
Vanadium	99.209	5.0	"	100.00		99.2	85-115			
Yttrium	99.968	3.0	"	100.00		100	85-115			
Zinc	194.58	10	"	200.00		97.3	85-115			
Matrix Spike (1507083-MS1)		**Source: E152903-03**		Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	99657	2000	ug/L	100000	1799.0	97.9	80-120			X-PDS
Barium	4101.9	100	"	4000.0	109.27	99.8	80-120			X-PDS
Beryllium	949.93	60	"	1000.0	U	95.0	80-120			X-PDS
Calcium	447800	5000	"	100000	284630	163	80-120			X-PDS, QM-2
Chromium	3762.6	100	"	4000.0	U	94.1	80-120			X-PDS
Cobalt	1796.7	100	"	2000.0	U	89.8	80-120			X-PDS
Copper	2003.5	200	"	2000.0	U	100	80-120			X-PDS
Iron	101850	2000	"	100000	1635.2	100	80-120			X-PDS
Magnesium	139810	5000	"	100000	29303	111	80-120			X-PDS
Manganese	28673	100	"	10000	15310	134	80-120			X-PDS, QM-2
Molybdenum	1824.1	200	"	2000.0	U	91.2	80-120			X-PDS
Nickel	3572.8	200	"	4000.0	29.909	88.6	80-120			X-PDS
Potassium	1300000	20000	"	200000	843220	228	80-120			X-PDS, QM-2
Silver	1989.1	100	"	2000.0	U	99.5	80-120			X-PDS
Sodium	7388900	20000	"	200000	5715400	837	80-120			X-PDS, XM-1
Strontium	2596.1	100	"	2000.0	519.75	104	80-120			X-PDS
Tin	1658.1	300	"	2000.0	U	82.9	80-120			X-PDS
Titanium	2124.7	100	"	2000.0	8.3571	106	80-120			X-PDS
Vanadium	1877.9	100	"	2000.0	U	93.9	80-120			X-PDS
Yttrium	1931.0	60	"	2000.0	43.425	94.4	80-120			X-PDS
Zinc	3744.4	200	"	4000.0	U	93.6	80-120			X-PDS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507083 - M 200.2 Metals Water										
Matrix Spike (1507083-MS2)		**Source: E152903-13**		Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	4808.3	500	ug/L	5000.0	218.91	91.8	75-125			
Barium	183.05	25	"	200.00	5.1113	89.0	75-125			
Beryllium	43.563	15	"	50.000	U	87.1	75-125			
Calcium	7502.1	1200	"	5000.0	2934.9	91.3	75-125			
Chromium	173.92	25	"	200.00	U	87.0	75-125			
Cobalt	82.135	25	"	100.00	U	82.1	75-125			
Copper	89.610	50	"	100.00	U	89.6	75-125			
Iron	4699.8	500	"	5000.0	U	94.0	75-125			
Magnesium	5317.0	1200	"	5000.0	543.78	95.5	75-125			
Manganese	483.34	25	"	500.00	18.833	92.9	75-125			
Molybdenum	122.80	50	"	100.00	35.815	87.0	75-125			
Nickel	170.98	50	"	200.00	5.6072	82.7	75-125			
Potassium	76122	5000	"	10000	64848	113	75-125			
Silver	94.087	25	"	100.00	U	94.1	75-125			
Sodium	1307500	5000	"	10000	1285300	222	75-125			XM-1
Strontium	99.300	25	"	100.00	7.2404	92.1	75-125			
Tin	74.202	75	"	100.00	U	74.2	75-125			QM-1, U
Titanium	96.601	25	"	100.00	U	96.6	75-125			
Vanadium	83.700	25	"	100.00	U	83.7	75-125			
Yttrium	87.867	15	"	100.00	U	87.9	75-125			
Zinc	174.40	50	"	200.00	U	87.2	75-125			
Matrix Spike Dup (1507083-MSD1)		**Source: E152903-03**		Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	99658	2000	ug/L	100000	1799.0	97.9	80-120	0.000196	20	X-PDS
Barium	4181.3	100	"	4000.0	109.27	102	80-120	1.92	20	X-PDS
Beryllium	993.21	60	"	1000.0	U	99.3	80-120	4.45	20	X-PDS
Calcium	454990	5000	"	100000	284630	170	80-120	1.59	20	X-PDS, QM-2
Chromium	3912.8	100	"	4000.0	U	97.8	80-120	3.91	20	X-PDS
Cobalt	1864.4	100	"	2000.0	U	93.2	80-120	3.70	20	X-PDS
Copper	2008.9	200	"	2000.0	U	100	80-120	0.271	20	X-PDS
Iron	102840	2000	"	100000	1635.2	101	80-120	0.960	20	X-PDS
Magnesium	139060	5000	"	100000	29303	110	80-120	0.540	20	X-PDS
Manganese	29036	100	"	10000	15310	137	80-120	1.26	20	X-PDS, QM-2
Molybdenum	1921.5	200	"	2000.0	U	96.1	80-120	5.20	20	X-PDS
Nickel	3728.9	200	"	4000.0	29.909	92.5	80-120	4.27	20	X-PDS
Potassium	1295400	20000	"	200000	843220	226	80-120	0.354	20	X-PDS, QM-2

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Total Metals (TMTL) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507083 - M 200.2 Metals Water										
Matrix Spike Dup (1507083-MSD1)		**Source: E152903-03**		Prepared: 07/29/15 Analyzed: 08/04/15						
Silver	2046.8	100	ug/L	2000.0	U	102	80-120	2.86	20	X-PDS
Sodium	7457900	20000	"	200000	5715400	871	80-120	0.929	20	X-PDS, XM-1
Strontium	2607.8	100	"	2000.0	519.75	104	80-120	0.449	20	X-PDS
Tin	1723.5	300	"	2000.0	U	86.2	80-120	3.87	20	X-PDS
Titanium	2145.3	100	"	2000.0	8.3571	107	80-120	0.965	20	X-PDS
Vanadium	1946.1	100	"	2000.0	U	97.3	80-120	3.57	20	X-PDS
Yttrium	2014.8	60	"	2000.0	43.425	98.6	80-120	4.25	20	X-PDS
Zinc	3916.4	200	"	4000.0	U	97.9	80-120	4.49	20	X-PDS
Matrix Spike Dup (1507083-MSD2)		**Source: E152903-13**		Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	4641.4	500	ug/L	5000.0	218.91	88.5	75-125	3.53	20	
Barium	182.22	25	"	200.00	5.1113	88.6	75-125	0.458	20	
Beryllium	42.325	15	"	50.000	U	84.6	75-125	2.88	20	
Calcium	7390.8	1200	"	5000.0	2934.9	89.1	75-125	1.49	20	
Chromium	167.94	25	"	200.00	U	84.0	75-125	3.50	20	
Cobalt	79.035	25	"	100.00	U	79.0	75-125	3.85	20	
Copper	91.895	50	"	100.00	U	91.9	75-125	2.52	20	
Iron	4601.4	500	"	5000.0	U	92.0	75-125	2.12	20	
Magnesium	5115.1	1200	"	5000.0	543.78	91.4	75-125	3.87	20	
Manganese	473.19	25	"	500.00	18.833	90.9	75-125	2.12	20	
Molybdenum	121.04	50	"	100.00	35.815	85.2	75-125	1.44	20	
Nickel	169.16	50	"	200.00	5.6072	81.8	75-125	1.07	20	
Potassium	73250	5000	"	10000	64848	84.0	75-125	3.85	20	
Silver	91.007	25	"	100.00	U	91.0	75-125	3.33	20	
Sodium	1299300	5000	"	10000	1285300	139	75-125	0.635	20	XM-1
Strontium	96.968	25	"	100.00	7.2404	89.7	75-125	2.38	20	
Tin	65.266	75	"	100.00	U	65.3	75-125	12.8	20	QM-1, U
Titanium	94.034	25	"	100.00	U	94.0	75-125	2.69	20	
Vanadium	79.672	25	"	100.00	U	79.7	75-125	4.93	20	
Yttrium	84.045	15	"	100.00	U	84.0	75-125	4.45	20	
Zinc	167.80	50	"	200.00	U	83.9	75-125	3.86	20	

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507083 - M 200.2 Metals Water										
MRL Verification (1507083-PS1)				Prepared: 07/29/15 Analyzed: 08/04/15						
EPA 6010										
Aluminum	0.10551		mg/L	0.10000		106	70-130			MRL-2
Barium	4.7276		ug/L	5.0000		94.6	70-130			MRL-2
Beryllium	2.6064		"	3.0000		86.9	70-130			MRL-2
Calcium	0.24121		mg/L	0.25000		96.5	70-130			MRL-2
Chromium	4.8998		ug/L	5.0000		98.0	70-130			MRL-2
Cobalt	4.2563		"	5.0000		85.1	70-130			MRL-2
Copper	9.6786		"	10.000		96.8	70-130			MRL-2
Iron	0.10640		mg/L	0.10000		106	70-130			MRL-2
Magnesium	0.24976		"	0.25000		99.9	70-130			MRL-2
Manganese	0.0048701		"	0.0050000		97.4	70-130			MRL-2
Molybdenum	8.9720		ug/L	10.000		89.7	70-130			MRL-2
Nickel	9.5833		"	10.000		95.8	70-130			MRL-2
Potassium	0.90098		mg/L	1.0000		90.1	70-130			MRL-2
Silver	4.6826		ug/L	5.0000		93.7	70-130			MRL-2
Sodium	1.0331		mg/L	1.0000		103	70-130			MRL-2
Strontium	5.2786		ug/L	5.0000		106	70-130			MRL-2
Tin	13.172		"	15.000		87.8	70-130			MRL-2
Titanium	5.0396		"	5.0000		101	70-130			MRL-2
Vanadium	4.3846		"	5.0000		87.7	70-130			MRL-2
Yttrium	2.8396		"	3.0000		94.7	70-130			MRL-2
Zinc	10.675		"	10.000		107	70-130			MRL-2
Batch 1507084 - M 200.2 Metals Water										
Blank (1507084-BLK1)				Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	U	1.0	ug/L							U
Arsenic	U	1.0	"							U
Beryllium	U	0.50	"							U
Cadmium	U	0.50	"							U
Lead	U	1.0	"							U
Selenium	U	2.0	"							U
Thallium	U	1.0	"							U

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Total Metals (TMTL) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507084 - M 200.2 Metals Water										
LCS (1507084-BS1)				Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	199.27	10	ug/L	200.00		99.6	85-115			
Arsenic	202.35	10	"	200.00		101	85-115			
Beryllium	49.322	5.0	"	50.000		98.6	85-115			
Cadmium	50.308	5.0	"	50.000		101	85-115			
Lead	204.68	10	"	200.00		102	85-115			
Selenium	211.52	20	"	200.00		106	85-115			
Thallium	201.46	10	"	200.00		101	85-115			
Matrix Spike (1507084-MS1)		**Source: E152903-03**		Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	199.42	10	ug/L	200.00	U	99.7	70-130			
Arsenic	207.09	10	"	200.00	3.6952	104	70-130			
Beryllium	48.842	5.0	"	50.000	0.42814	97.7	70-130			
Cadmium	67.630	5.0	"	50.000	17.746	99.8	70-130			
Lead	181.76	10	"	200.00	2.3310	89.7	70-130			
Selenium	196.26	20	"	200.00	U	98.1	70-130			
Thallium	178.92	10	"	200.00	1.1405	88.9	70-130			
Matrix Spike (1507084-MS2)		**Source: E152903-13**		Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	200.84	10	ug/L	200.00	U	100	70-130			
Arsenic	220.53	10	"	200.00	101.31	59.6	70-130			QM-1
Beryllium	45.742	5.0	"	50.000	U	91.5	70-130			
Cadmium	49.573	5.0	"	50.000	U	99.1	70-130			
Lead	192.22	10	"	200.00	U	96.1	70-130			
Selenium	212.48	20	"	200.00	U	106	70-130			
Thallium	189.35	10	"	200.00	U	94.7	70-130			
Matrix Spike Dup (1507084-MSD1)		**Source: E152903-03**		Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	197.87	10	ug/L	200.00	U	98.9	70-130	0.780	20	
Arsenic	208.78	10	"	200.00	3.6952	104	70-130	0.817	20	
Beryllium	49.316	5.0	"	50.000	0.42814	98.6	70-130	0.965	20	
Cadmium	67.213	5.0	"	50.000	17.746	98.9	70-130	0.618	20	
Lead	181.27	10	"	200.00	2.3310	89.5	70-130	0.269	20	
Selenium	199.66	20	"	200.00	U	99.8	70-130	1.72	20	
Thallium	178.79	10	"	200.00	1.1405	88.8	70-130	0.0736	20	

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507084 - M 200.2 Metals Water										
Matrix Spike Dup (1507084-MSD2)		**Source: E152903-13**		Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	201.75	10	ug/L	200.00	U	101	70-130	0.454	20	
Arsenic	217.01	10	"	200.00	101.31	57.9	70-130	1.61	20	QM-1
Beryllium	45.455	5.0	"	50.000	U	90.9	70-130	0.629	20	
Cadmium	49.513	5.0	"	50.000	U	99.0	70-130	0.122	20	
Lead	190.38	10	"	200.00	U	95.2	70-130	0.960	20	
Selenium	207.83	20	"	200.00	U	104	70-130	2.21	20	
Thallium	188.87	10	"	200.00	U	94.4	70-130	0.250	20	
MRL Verification (1507084-PS1)				Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	0.52071	1.0	ug/L	0.50000		104	65-135			MRL-2, U
Arsenic	1.0746	1.0	"	1.0000		107	65-135			MRL-2
Beryllium	0.48693	0.50	"	0.50000		97.4	65-135			MRL-2, U
Cadmium	0.53597	0.50	"	0.50000		107	65-135			MRL-2
Lead	1.1259	1.0	"	1.0000		113	65-135			MRL-2
Selenium	2.2181	2.0	"	2.0000		111	65-135			MRL-2
Thallium	0.52412	1.0	"	0.50000		105	65-135			MRL-2, U
Batch 1507085 - M 200.2 Metals Water										
Blank (1507085-BLK1)				Prepared: 07/29/15 Analyzed: 08/03/15						
EPA 6010										
Aluminum	U	100	ug/L							U
Barium	U	5.0	"							U
Beryllium	U	3.0	"							U
Calcium	U	250	"							U
Chromium	U	5.0	"							U
Cobalt	U	5.0	"							U
Copper	U	10	"							U
Iron	U	100	"							U
Magnesium	U	250	"							U
Manganese	U	5.0	"							U
Molybdenum	U	10	"							U
Nickel	U	10	"							U
Potassium	U	1000	"							U
Silver	U	5.0	"							U
Sodium	U	1000	"							U

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507085 - M 200.2 Metals Water										
Blank (1507085-BLK1)				Prepared: 07/29/15 Analyzed: 08/03/15						
Strontium	U	5.0	ug/L							U
Tin	U	15	"							U
Titanium	U	5.0	"							U
Vanadium	U	5.0	"							U
Yttrium	U	3.0	"							U
Zinc	U	10	"							U
LCS (1507085-BS1)				Prepared: 07/29/15 Analyzed: 08/03/15						
EPA 6010										
Aluminum	4849.0	100	ug/L	5000.0		97.0	85-115			
Barium	186.31	5.0	"	200.00		93.2	85-115			
Beryllium	48.388	3.0	"	50.000		96.8	85-115			
Calcium	4555.2	250	"	5000.0		91.1	85-115			
Chromium	194.31	5.0	"	200.00		97.2	85-115			
Cobalt	95.811	5.0	"	100.00		95.8	85-115			
Copper	104.63	10	"	100.00		105	85-115			
Iron	4868.5	100	"	5000.0		97.4	85-115			
Magnesium	5009.2	250	"	5000.0		100	85-115			
Manganese	481.73	5.0	"	500.00		96.3	85-115			
Molybdenum	97.024	10	"	100.00		97.0	85-115			
Nickel	192.17	10	"	200.00		96.1	85-115			
Potassium	9465.6	1000	"	10000		94.7	85-115			
Silver	96.360	5.0	"	100.00		96.4	85-115			
Sodium	10280	1000	"	10000		103	85-115			
Strontium	103.48	5.0	"	100.00		103	85-115			
Tin	92.620	15	"	100.00		92.6	85-115			
Titanium	106.04	5.0	"	100.00		106	85-115			
Vanadium	98.207	5.0	"	100.00		98.2	85-115			
Yttrium	98.098	3.0	"	100.00		98.1	85-115			
Zinc	191.88	10	"	200.00		95.9	85-115			

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Total Metals (TMTL) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507085 - M 200.2 Metals Water										
Matrix Spike (1507085-MS1)		**Source: E152903-19**		Prepared: 07/29/15 Analyzed: 08/03/15						
EPA 6010										
Aluminum	6262.7	100	ug/L	5000.0	1210.2	101	75-125			
Barium	226.29	5.0	"	200.00	30.871	97.7	75-125			
Beryllium	48.111	3.0	"	50.000	U	96.2	75-125			
Calcium	39521	250	"	5000.0	34188	107	75-125			
Chromium	189.18	5.0	"	200.00	1.4408	93.9	75-125			
Cobalt	92.403	5.0	"	100.00	2.0147	90.4	75-125			
Copper	138.20	10	"	100.00	29.703	108	75-125			
Iron	6017.3	100	"	5000.0	1058.7	99.2	75-125			
Magnesium	11988	250	"	5000.0	6505.2	110	75-125			
Manganese	884.50	5.0	"	500.00	388.34	99.2	75-125			
Molybdenum	99.158	10	"	100.00	5.6250	93.5	75-125			
Nickel	184.10	10	"	200.00	4.8010	89.6	75-125			
Potassium	26314	1000	"	10000	16256	101	75-125			
Silver	96.394	5.0	"	100.00	U	96.4	75-125			
Sodium	180550	1000	"	10000	169080	115	75-125			XM-1
Strontium	187.98	5.0	"	100.00	87.303	101	75-125			
Tin	88.322	15	"	100.00	U	88.3	75-125			
Titanium	119.25	5.0	"	100.00	10.595	109	75-125			
Vanadium	98.314	5.0	"	100.00	2.6813	95.6	75-125			
Yttrium	96.188	3.0	"	100.00	0.64893	95.5	75-125			
Zinc	203.38	10	"	200.00	16.886	93.2	75-125			
Matrix Spike Dup (1507085-MSD1)		**Source: E152903-19**		Prepared: 07/29/15 Analyzed: 08/03/15						
EPA 6010										
Aluminum	6227.1	100	ug/L	5000.0	1210.2	100	75-125	0.570	20	
Barium	224.65	5.0	"	200.00	30.871	96.9	75-125	0.725	20	
Beryllium	47.618	3.0	"	50.000	U	95.2	75-125	1.03	20	
Calcium	39747	250	"	5000.0	34188	111	75-125	0.569	20	
Chromium	188.95	5.0	"	200.00	1.4408	93.8	75-125	0.121	20	
Cobalt	92.687	5.0	"	100.00	2.0147	90.7	75-125	0.306	20	
Copper	135.62	10	"	100.00	29.703	106	75-125	1.89	20	
Iron	5977.7	100	"	5000.0	1058.7	98.4	75-125	0.661	20	
Magnesium	11974	250	"	5000.0	6505.2	109	75-125	0.117	20	
Manganese	884.49	5.0	"	500.00	388.34	99.2	75-125	0.000600	20	
Molybdenum	99.894	10	"	100.00	5.6250	94.3	75-125	0.740	20	
Nickel	183.92	10	"	200.00	4.8010	89.6	75-125	0.0955	20	
Potassium	26329	1000	"	10000	16256	101	75-125	0.0571	20	
Silver	96.947	5.0	"	100.00	U	96.9	75-125	0.572	20	
Sodium	180460	1000	"	10000	169080	114	75-125	0.0484	20	XM-1

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507085 - M 200.2 Metals Water										
Matrix Spike Dup (1507085-MSD1)		**Source: E152903-19**		Prepared: 07/29/15 Analyzed: 08/03/15						
Strontium	187.60	5.0	ug/L	100.00	87.303	100	75-125	0.204	20	
Tin	85.506	15	"	100.00	U	85.5	75-125	3.24	20	
Titanium	112.39	5.0	"	100.00	10.595	102	75-125	5.93	20	
Vanadium	98.279	5.0	"	100.00	2.6813	95.6	75-125	0.0360	20	
Yttrium	95.195	3.0	"	100.00	0.64893	94.5	75-125	1.04	20	
Zinc	203.98	10	"	200.00	16.886	93.5	75-125	0.299	20	
MRL Verification (1507085-PS1)				Prepared: 07/29/15 Analyzed: 08/03/15						
EPA 6010										
Aluminum	97.632	100	ug/L	100.00		97.6	70-130			MRL-2, U
Barium	5.0864	5.0	"	5.0000		102	70-130			MRL-2
Beryllium	2.8466	3.0	"	3.0000		94.9	70-130			MRL-2, U
Calcium	229.16	250	"	250.00		91.7	70-130			MRL-2, U
Chromium	4.7768	5.0	"	5.0000		95.5	70-130			MRL-2, U
Cobalt	4.6726	5.0	"	5.0000		93.5	70-130			MRL-2, U
Copper	9.4684	10	"	10.000		94.7	70-130			MRL-2, U
Iron	101.35	100	"	100.00		101	70-130			MRL-2
Magnesium	251.82	250	"	250.00		101	70-130			MRL-2
Manganese	4.7509	5.0	"	5.0000		95.0	70-130			MRL-2, U
Molybdenum	9.8450	10	"	10.000		98.4	70-130			MRL-2, U
Nickel	10.249	10	"	10.000		102	70-130			MRL-2
Potassium	892.50	1000	"	1000.0		89.2	70-130			MRL-2, U
Silver	5.1272	5.0	"	5.0000		103	70-130			MRL-2
Sodium	999.46	1000	"	1000.0		99.9	70-130			MRL-2, U
Strontium	5.1027	5.0	"	5.0000		102	70-130			MRL-2
Tin	15.740	15	"	15.000		105	70-130			MRL-2
Titanium	5.3932	5.0	"	5.0000		108	70-130			MRL-2
Vanadium	4.9224	5.0	"	5.0000		98.4	70-130			MRL-2, U
Yttrium	3.1550	3.0	"	3.0000		105	70-130			MRL-2
Zinc	10.026	10	"	10.000		100	70-130			MRL-2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507086 - M 200.2 Metals Water										
Blank (1507086-BLK1)				Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	U	1.0	ug/L							U
Arsenic	U	1.0	"							U
Beryllium	U	0.50	"							U
Cadmium	U	0.50	"							U
Lead	U	1.0	"							U
Selenium	U	2.0	"							U
Thallium	U	1.0	"							U
LCS (1507086-BS1)				Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	193.30	10	ug/L	200.00		96.7	85-115			
Arsenic	195.81	10	"	200.00		97.9	85-115			
Beryllium	46.930	5.0	"	50.000		93.9	85-115			
Cadmium	50.134	5.0	"	50.000		100	85-115			
Lead	203.82	10	"	200.00		102	85-115			
Selenium	203.52	20	"	200.00		102	85-115			
Thallium	199.92	10	"	200.00		100	85-115			
Matrix Spike (1507086-MS1)		**Source: E152903-19**		Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	197.88	10	ug/L	200.00	0.77394	98.6	70-130			
Arsenic	200.85	10	"	200.00	2.4022	100	70-130			
Beryllium	51.625	5.0	"	50.000	0.070768	103	70-130			
Cadmium	49.293	5.0	"	50.000	0.066340	98.6	70-130			
Lead	195.37	10	"	200.00	1.5785	96.9	70-130			
Selenium	199.37	20	"	200.00	U	99.7	70-130			
Thallium	191.95	10	"	200.00	U	96.0	70-130			
Matrix Spike Dup (1507086-MSD1)		**Source: E152903-19**		Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	199.99	10	ug/L	200.00	0.77394	99.6	70-130	1.06	20	
Arsenic	200.10	10	"	200.00	2.4022	100	70-130	0.373	20	
Beryllium	49.769	5.0	"	50.000	0.070768	99.5	70-130	3.66	20	
Cadmium	49.760	5.0	"	50.000	0.066340	99.5	70-130	0.944	20	
Lead	195.65	10	"	200.00	1.5785	97.0	70-130	0.144	20	
Selenium	207.33	20	"	200.00	U	104	70-130	3.91	20	
Thallium	193.55	10	"	200.00	U	96.8	70-130	0.831	20	

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Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507086 - M 200.2 Metals Water										
MRL Verification (1507086-PS1)				Prepared: 07/29/15 Analyzed: 08/18/15						
EPA 200.8										
Antimony	0.50028	1.0	ug/L	0.50000		100	65-135			MRL-2, U
Arsenic	1.1182	1.0	"	1.0000		112	65-135			MRL-2
Beryllium	0.50450	0.50	"	0.50000		101	65-135			MRL-2
Cadmium	0.54438	0.50	"	0.50000		109	65-135			MRL-2
Lead	1.2840	1.0	"	1.0000		128	65-135			MRL-2
Selenium	2.0847	2.0	"	2.0000		104	65-135			MRL-2
Thallium	0.52073	1.0	"	0.50000		104	65-135			MRL-2, U

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Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507038 - C 353.2 NO3-NO2										
Blank (1507038-BLK1)				Prepared & Analyzed: 07/22/15						
EPA 353.2										
Nitrate/Nitrite as N	U	0.050	mg/L							U
Blank (1507038-BLK2)				Prepared & Analyzed: 08/12/15						
EPA 353.2										
Nitrate/Nitrite as N	U	0.050	mg/L							U
LCS (1507038-BS1)				Prepared & Analyzed: 07/22/15						
EPA 353.2										
Nitrate/Nitrite as N	0.49360	0.050	mg/L	0.50000		98.7	90-110			
LCS (1507038-BS2)				Prepared & Analyzed: 08/12/15						
EPA 353.2										
Nitrate/Nitrite as N	0.50330	0.050	mg/L	0.50000		101	90-110			
Matrix Spike (1507038-MS1)		**Source: E152903-10**		Prepared & Analyzed: 08/12/15						
EPA 353.2										
Nitrate/Nitrite as N	1.3175	0.25	mg/L	0.50000	0.81500	100	90-110			
Matrix Spike (1507038-MS2)		**Source: E152903-18**		Prepared & Analyzed: 07/22/15						
EPA 353.2										
Nitrate/Nitrite as N	2.0770	0.50	mg/L	0.50000	1.8680	41.8	90-110			XM-1
Matrix Spike Dup (1507038-MSD1)		**Source: E152903-10**		Prepared & Analyzed: 08/12/15						
EPA 353.2										
Nitrate/Nitrite as N	1.3290	0.25	mg/L	0.50000	0.81500	103	90-110	0.869	10	
Matrix Spike Dup (1507038-MSD2)		**Source: E152903-18**		Prepared & Analyzed: 07/22/15						
EPA 353.2										
Nitrate/Nitrite as N	2.0850	0.50	mg/L	0.50000	1.8680	43.4	90-110	0.384	10	XM-1
MRL Verification (1507038-PS1)				Prepared & Analyzed: 07/22/15						
EPA 353.2										
Nitrate/Nitrite as N	0.043700	0.050	mg/L	0.050000		87.4	70-130			MRL-2, U
MRL Verification (1507038-PS2)				Prepared & Analyzed: 08/12/15						

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507038 - C 353.2 NO3-NO2										
MRL Verification (1507038-PS2)				Prepared & Analyzed: 08/12/15						
EPA 353.2										
Nitrate/Nitrite as N	0.042900	0.050	mg/L	0.050000		85.8	70-130			MRL-2, U
Batch 1507041 - C 365.1 TPhos										
Blank (1507041-BLK1)				Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
LCS (1507041-BS1)				Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	0.32460	0.010	mg/L	0.32700		99.3	90-110			
Matrix Spike (1507041-MS1)		**Source: E152903-10**		Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	1.9120	0.10	mg/L	0.50100	1.4600	90.2	90-110			
Matrix Spike (1507041-MS2)		**Source: E152903-18**		Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	0.50980	0.010	mg/L	0.50100	U	102	90-110			
Matrix Spike (1507041-MS3)		**Source: E153002-10**		Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	6.9460	0.10	mg/L	0.50100	6.3970	110	90-110			XM-1
Matrix Spike Dup (1507041-MSD1)		**Source: E152903-10**		Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	1.9240	0.10	mg/L	0.50100	1.4600	92.6	90-110	0.626	10	
Matrix Spike Dup (1507041-MSD2)		**Source: E152903-18**		Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	0.51130	0.010	mg/L	0.50100	U	102	90-110	0.294	10	
Matrix Spike Dup (1507041-MSD3)		**Source: E153002-10**		Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	6.9510	0.10	mg/L	0.50100	6.3970	111	90-110	0.0720	10	XM-1

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507041 - C 365.1 TPhos										
MRL Verification (1507041-PS1)				Prepared: 07/22/15 Analyzed: 07/23/15						
EPA 365.1										
Total Phosphorus	0.0069000	0.010	mg/L	0.010000		69.0	70-130			MRL-2, QR-1, U
Batch 1507046 - C 351.2 TKN										
Blank (1507046-BLK1)				Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	U	0.050	mg/L							U
LCS (1507046-BS1)				Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	2.1000	0.050	mg/L	2.0600		102	90-110			
Matrix Spike (1507046-MS1)		**Source: E152903-12**		Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	1.2462	0.050	mg/L	1.0000	0.33160	91.5	90-110			
Matrix Spike (1507046-MS2)		**Source: E152903-18**		Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	1.0174	0.050	mg/L	1.0000	0.087000	93.0	90-110			
Matrix Spike (1507046-MS3)		**Source: E153002-10**		Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	18.296	0.50	mg/L	1.0000	19.118	-82.2	90-110			QM-1
Matrix Spike Dup (1507046-MSD1)		**Source: E152903-12**		Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	1.2988	0.050	mg/L	1.0000	0.33160	96.7	90-110	4.13	20	
Matrix Spike Dup (1507046-MSD2)		**Source: E152903-18**		Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	1.0510	0.050	mg/L	1.0000	0.087000	96.4	90-110	3.25	20	
Matrix Spike Dup (1507046-MSD3)		**Source: E153002-10**		Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	18.990	0.50	mg/L	1.0000	19.118	-12.8	90-110	3.72	20	QM-1

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507046 - C 351.2 TKN										
Matrix Spike Dup (1507046-MSD3)		**Source: E153002-10**		Prepared: 07/21/15 Analyzed: 08/05/15						
MRL Verification (1507046-PS1)				Prepared: 07/21/15 Analyzed: 08/05/15						
EPA 351.2										
Total Kjeldahl Nitrogen	0.017700	0.050	mg/L	0.20000		8.85	70-130			MRL-2, QR-1, U
Batch 1507047 - C 350.1 Ammonia										
Blank (1507047-BLK1)				Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	U	0.050	mg/L							U
LCS (1507047-BS1)				Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	0.96100	0.050	mg/L	1.0000		96.1	90-110			
Matrix Spike (1507047-MS1)		**Source: E152903-11**		Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	0.94600	0.050	mg/L	1.0000	U	94.6	90-110			
Matrix Spike (1507047-MS2)		**Source: E152903-15**		Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	2.3490	0.050	mg/L	1.0000	1.3900	95.9	90-110			
Matrix Spike Dup (1507047-MSD1)		**Source: E152903-11**		Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	0.90800	0.050	mg/L	1.0000	U	90.8	90-110	4.10	10	
Matrix Spike Dup (1507047-MSD2)		**Source: E152903-15**		Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	2.3730	0.050	mg/L	1.0000	1.3900	98.3	90-110	1.02	10	
MRL Verification (1507047-PS1)				Prepared: 07/21/15 Analyzed: 07/22/15						
EPA 350.1										
Ammonia as N	0.044000	0.050	mg/L	0.050000		88.0	70-130			MRL-2, U

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507053 - C 415 TOC Wtr										
Blank (1507053-BLK1)				Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	U	1.0	mg/L							U
LCS (1507053-BS1)				Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	48.650	1.0	mg/L	50.000		97.3	90-110			
LCS (1507053-BS2)				Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	4.9090	1.0	mg/L	5.0000		98.2	90-110			
LCS Dup (1507053-BSD1)				Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	48.790	1.0	mg/L	50.000		97.6	90-110	0.287	10	
Matrix Spike (1507053-MS1)		**Source: E152903-03**		Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	55.770	1.0	mg/L	50.000	7.9920	95.6	86.7-107			
Matrix Spike Dup (1507053-MSD1)		**Source: E152903-03**		Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	56.370	1.0	mg/L	50.000	7.9920	96.8	86.7-107	1.07	10	
MRL Verification (1507053-PS1)				Prepared & Analyzed: 08/04/15						
SM 5310B										
Total Organic Carbon	1.0750	1.0	mg/L	1.0000		108	70-130			MRL-2
Batch 1507055 - C 415 TOC Wtr										
Blank (1507055-BLK1)				Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	U	1.0	mg/L							U
LCS (1507055-BS1)				Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	48.070	1.0	mg/L	50.000		96.1	90-110			

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507055 - C 415 TOC Wtr										
LCS (1507055-BS2)				Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	4.8970	1.0	mg/L	5.0000		97.9	90-110			
LCS Dup (1507055-BSD1)				Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	47.950	1.0	mg/L	50.000		95.9	90-110	0.250	10	
Matrix Spike (1507055-MS1)		**Source: E153003-04**		Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	49.650	1.0	mg/L	50.000	2.6550	94.0	86.7-107			
Matrix Spike Dup (1507055-MSD1)		**Source: E153003-04**		Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	48.030	1.0	mg/L	50.000	2.6550	90.8	86.7-107	3.32	10	
MRL Verification (1507055-PS1)				Prepared & Analyzed: 08/05/15						
SM 5310B										
Total Organic Carbon	1.0380	1.0	mg/L	1.0000		104	70-130			MRL-2
Batch 1507068 - C 300.0 Ion Chromat										
Blank (1507068-BLK1)				Prepared: 07/23/15 Analyzed: 07/27/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Blank (1507068-BLK2)				Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Blank (1507068-BLK3)				Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507068 - C 300.0 Ion Chromat										
Blank (1507068-BLK4)				Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Blank (1507068-BLK5)				Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Blank (1507068-BLK6)				Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Blank (1507068-BLK7)				Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Blank (1507068-BLK8)				Prepared: 07/23/15 Analyzed: 07/29/15						
EPA 300.0										
Chloride	U	0.10	mg/L							U
Sulfate as SO4	U	0.10	"							U
Duplicate (1507068-DUP1)		**Source: E152903-03**		Prepared: 07/23/15 Analyzed: 07/27/15						
EPA 300.0										
Chloride	12399	0.10	mg/L		12404			0.0348	10	
Sulfate as SO4	429.78	0.10	"		424.91			1.14	10	
Duplicate (1507068-DUP2)		**Source: E152903-11**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	1269.0	0.10	mg/L		1273.3			0.334	10	
Sulfate as SO4	U	0.10	"		U				10	U
Duplicate (1507068-DUP3)		**Source: E153001-02**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	3.0990	0.10	mg/L		3.1040			0.161	10	

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507068 - C 300.0 Ion Chromat										
Duplicate (1507068-DUP3)		**Source: E153001-02**		Prepared: 07/23/15 Analyzed: 07/28/15						
Sulfate as SO4	6.8480	0.10	mg/L		6.8410			0.102	10	
Duplicate (1507068-DUP4)		**Source: E153001-09**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	7.8740	0.10	mg/L		7.9000			0.330	10	
Sulfate as SO4	1.9870	0.10	"		2.0000			0.652	10	
Duplicate (1507068-DUP5)		**Source: E153003-03**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	16.915	0.10	mg/L		17.322			2.38	10	
Sulfate as SO4	6.1660	0.10	"		15.507			86.2	10	QM-4
Duplicate (1507068-DUP6)		**Source: E153003-08**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	4.9630	0.10	mg/L		4.9620			0.0201	10	
Sulfate as SO4	0.15500	0.10	"		0.15800			1.92	10	
Matrix Spike (1507068-MS1)		**Source: E152903-03**		Prepared: 07/23/15 Analyzed: 07/27/15						
EPA 300.0										
Chloride	12288	0.10	mg/L	10.000	12404	-1160	90-110			XM-1
Sulfate as SO4	432.07	0.10	"	10.000	424.91	71.5	90-110			XM-1
Matrix Spike (1507068-MS2)		**Source: E152903-03**		Prepared: 07/23/15 Analyzed: 07/27/15						
EPA 300.0										
Chloride	12189	0.10	mg/L	20.000	12404	-1080	90-110			XM-1
Sulfate as SO4	429.34	0.10	"	20.000	424.91	22.2	90-110			XM-1
Matrix Spike (1507068-MS3)		**Source: E152903-11**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	1268.2	0.10	mg/L	10.000	1273.3	-50.8	90-110			XM-1
Sulfate as SO4	U	0.10	"	10.000	U		90-110			X-2, U
Matrix Spike (1507068-MS4)		**Source: E152903-11**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	1264.9	0.10	mg/L	20.000	1273.3	-41.8	90-110			XM-1
Sulfate as SO4	U	0.10	"	20.000	U		90-110			X-2, U

Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507068 - C 300.0 Ion Chromat										
Matrix Spike (1507068-MS5)		**Source: E153001-02**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	13.081	0.10	mg/L	10.000	3.1040	99.8	90-110			
Sulfate as SO4	17.318	0.10	"	10.000	6.8410	105	90-110			
Matrix Spike (1507068-MS6)		**Source: E153001-02**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	23.143	0.10	mg/L	20.000	3.1040	100	90-110			
Sulfate as SO4	27.907	0.10	"	20.000	6.8410	105	90-110			
Matrix Spike (1507068-MS7)		**Source: E153001-09**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	17.869	0.10	mg/L	10.000	7.9000	99.7	90-110			
Sulfate as SO4	12.470	0.10	"	10.000	2.0000	105	90-110			
Matrix Spike (1507068-MS8)		**Source: E153001-09**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	27.884	0.10	mg/L	20.000	7.9000	99.9	90-110			
Sulfate as SO4	23.087	0.10	"	20.000	2.0000	105	90-110			
Matrix Spike (1507068-MS9)		**Source: E153003-03**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	26.735	0.10	mg/L	10.000	17.322	94.1	90-110			
Sulfate as SO4	33.779	0.10	"	10.000	15.507	183	90-110			QM-2
Matrix Spike (1507068-MSA)		**Source: E153003-03**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	36.581	0.10	mg/L	20.000	17.322	96.3	90-110			
Sulfate as SO4	46.624	0.10	"	20.000	15.507	156	90-110			QM-2
Matrix Spike (1507068-MSB)		**Source: E153003-08**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	14.930	0.10	mg/L	10.000	4.9620	99.7	90-110			
Sulfate as SO4	10.565	0.10	"	10.000	0.15800	104	90-110			
Matrix Spike (1507068-MSC)		**Source: E153003-08**		Prepared: 07/23/15 Analyzed: 07/28/15						
EPA 300.0										
Chloride	24.903	0.10	mg/L	20.000	4.9620	99.7	90-110			

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 15-0346
Project: 15-0346, Smokey Mountain Smelters - Reported by Jeffrey Hendel

Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507068 - C 300.0 Ion Chromat										
Matrix Spike (1507068-MSC)		**Source: E153003-08**		Prepared: 07/23/15 Analyzed: 07/28/15						
Sulfate as SO4	21.173	0.10	mg/L	20.000	0.15800	105	90-110			
MRL Verification (1507068-PS1)				Prepared: 07/23/15 Analyzed: 07/27/15						
EPA 300.0										
Chloride	0.10100	0.10	mg/L	0.10000		101	70-130			MRL-2
Sulfate as SO4	0.087000	0.10	"	0.10000		87.0	70-130			MRL-2
Batch 1507071 - C Alkalinity										
Blank (1507071-BLK1)				Prepared & Analyzed: 07/24/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	U	1.0	mg/L							U
LCS (1507071-BS1)				Prepared & Analyzed: 07/24/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	53.785	1.0	mg/L	50.000		108	92-115			
LCS Dup (1507071-BSD1)				Prepared & Analyzed: 07/24/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	53.888	1.0	mg/L	50.000		108	92-115	0.191	10	
Duplicate (1507071-DUP1)		**Source: E152903-11**		Prepared & Analyzed: 07/24/15						
SM 2320B										
Alkalinity, Total (as CaCO3)		1.0	mg/L						10	NA-12
MRL Verification (1507071-PS1)				Prepared & Analyzed: 07/24/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	0.99100	1.0	mg/L	1.0000		99.1	72-135			MRL-2, U
Batch 1507083 - M 200.2 Metals Water										
Blank (1507083-BLK1)				Prepared: 07/29/15 Analyzed: 08/04/15						
SM 2340B										
Hardness (as CaCO3)	U	1.7	mg/L							U

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Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1507087 - C Alkalinity										
Blank (1507087-BLK1)				Prepared & Analyzed: 07/29/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	U	1.0	mg/L							U
LCS (1507087-BS1)				Prepared & Analyzed: 07/29/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	53.621	1.0	mg/L	50.000		107	92-115			
LCS Dup (1507087-BSD1)				Prepared & Analyzed: 07/29/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	54.069	1.0	mg/L	50.000		108	92-115	0.832	10	
Duplicate (1507087-DUP1)		**Source: E152903-15**		Prepared & Analyzed: 07/29/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	436.50	1.0	mg/L		437.80			0.297	10	
MRL Verification (1507087-PS1)				Prepared & Analyzed: 07/29/15						
SM 2320B										
Alkalinity, Total (as CaCO3)	1.0800	1.0	mg/L	1.0000		108	72-135			MRL-2

Notes and Definitions for QC Samples

U	The analyte was not detected at or above the reporting limit.
CRa	Not reporting.
MRL-2	MRL verification for Non-Potable Water matrix
NA-12	Sample has no measureable alkalinity. Original sample pH is less than 4.5.
QM-1	Matrix Spike Recovery less than method control limits
QM-2	Matrix Spike Recovery greater than method control limits
QM-4	Matrix Precision outside method control limits
QR-1	MRL verification recovery less than lower control limits.
X-2	Matrix interference precludes recovery calculation
XM-1	Sample background/spike ratio higher than method evaluation criteria
X-PDS	Post Digest Spike

End of Report