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June 27, 2014 DCN No.: TL01-13-02-005-DCN704

Mr. Rich Rupert, OSC
US EPA Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

RE: Summary Letter Report: *2013 EPA Monitoring Well Construction, Groundwater Sampling and Kiskiminetas River Sediment Sampling*; Kiskimere Groundwater Well Investigation Site, Vandergrift, Armstrong County, Pennsylvania; Technical Direction Document No. TL01-13-02-005, EPA Contract Number EP-S3-10-04

Dear Mr. Rupert:

This letter report provides a summary of well construction, groundwater and river sediment sampling activities and laboratory data related to July 2013 and September 2013 removal site evaluation events at the Kiskimere Groundwater Well Investigation Site (Site), Vandergrift, Armstrong County, Pennsylvania. Five monitoring wells were constructed on private properties in the community of Kiskimere during July 2013 and were sampled during September 2013 to evaluate occurrence and extent of volatile and semi-volatile organics, metals and radionuclide contaminants in groundwater. Additionally during September 2013, fifty-four (54) sediment samples were collected from the Kiskiminetas River to evaluate occurrence of metals and radionuclides. The sediment samples were collected from four distinct areas of the river: a background area upstream of Apollo, PA; locally upstream from Carnahan Run; across from the SLDA; and downstream from the SLDA near Leechburg, PA.

The work was directed by the U.S. Environmental Protection Agency Region III (EPA) and performed by Superfund Technical Assessment and Response Team (START) contractor TechLaw, Inc. (TechLaw) to evaluate environmental concerns in areas adjacent to the Shallow Land Disposal Area (SLDA) and Parks Township active remediation sites. Sampling was conducted in accordance with the EPA-approved Sampling QA/QC Work Plan (SQAP) dated March 29, 2013 as amended by Addendum 2 dated September 4, 2013. Water and sediment samples collected during the event were analyzed at offsite laboratories scheduled through the EPA Region III Client Services Team (CST).

The following paragraphs summarize the field work and sample collection activities conducted at the Site and provide a brief synopsis of the sample analyses performed and the associated

analytical results. Activities are described in chronological order. Site and sample location maps, monitoring well logs, data summary tables, data validation reports and technical review comments are attached at the end of this report.

MONITORING WELL CONSTRUCTION

During July 15-29, 2013, five monitoring wells were installed at locations designated by EPA in the community of Kiskimere to evaluate groundwater for the presence of chemical constituents that could be attributed to an off-site release from the SLDA. The wells were constructed on private residential properties. Access was granted by property owners to EPA and their contractors prior to well installation.

EPA monitoring wells were constructed to tap three of the five water bearing zones observed during prior SLDA investigations. These hydrostratigraphic zones are described in the SLDA Remedial Investigation Report (USACE 2005). Monitoring wells EPA02, EPA03S, and EPA04 were screened in the first shallow bedrock. Monitoring well EPA03D was screened in the Upper Freeport Coal (UF). Historically, the UF coal was extensively mined in room and pillar fashion beneath Kiskimere. EPA03D is likely screened in a pillar of coal because there was a lack of encountering a void during drilling activities. Lastly, EPA01 was screened in Deep Bedrock.

Chatfield Drilling, Inc. was hired by START to construct the monitoring wells. Drilling was conducted by a Pennsylvania-licensed driller assisted by one or two helpers in accordance with an EPA-approved statement of work. The EPA On-Scene Coordinator (OSC) and Site Administrative Officer were on site during drilling activities. Oversight was provided by one TechLaw START member. Well boreholes were initially advanced through the overburden and into competent bedrock with a CME 75 drill rig equipped with 8.25-inch ID augers. Overburden was sealed off with 6.25-inch ID steel casing that was grouted in place. A 5.875-inch air rotary hammer was then used to reach target depth in bedrock. Dust suppression was managed by piping cuttings into an open-top 55-gallon drum equipped with a Tornado Jumbo Vacuum (TJV) and bag filters. A tee-pipe was installed in the piping to allow periodic samples of cuttings to be collected by TechLaw. This provided intermittent general stratigraphic information which is illustrated on well logs provided in Attachment 1.

Screens were installed in the bottom intervals of the wells and were 10 feet in length, except EPA04 which was 20 feet in length; and comprised of 0.010-inch slotted Schedule 40 poly-vinyl chloride (PVC). Borehole advancement difficulties were encountered at EPA04 where several thin wet zones were encountered between 42 and 57 feet below ground surface. The wet zones were considered individually unable to provide sufficient yield for sampling. Borehole advancement continued in order to reach a more productive water bearing zone, however the thin

wet zones were not sealed off and contributed to formation bridging and up-hole air velocity loss. The borehole was advanced to a total depth of 82 feet bgs without encountering a sufficient water-bearing zone. The borehole was stabilized and backfilled with bentonite and sand to 60 feet bgs and a 20-foot screen was installed between 40 and 60 feet bgs across the thin wet zones.

Following grout set up, wells were developed by alternating pumping and surging action with a submersible pump until water clarity was established or ten well volumes were evacuated. Wells EPA03D and EPA04 went dry during well development and were relatively slow to recharge. Monitoring well construction logs are provided in Attachment 1 of this report.

TechLaw conducted periodic monitoring for gamma radiation and volatile organic compounds (VOC) using a Ludlum Model 19 micro-R meter and MultiRae Plus with photo-ionization detector (PID), respectively. Background gamma radiation typically fluctuated between 7 and 10 micro-roentgen per hour (uR/hr) and VOC background was non-detect (registered zero). Air monitoring concentrations did not exceed background levels throughout the field event nor in worker breathing zones during drilling activities.

Down-hole equipment was decontaminated with a steam power wash between drilling locations. All investigative derived waste (IDW) including drill cuttings, development water and wash water was contained in 46 55-gallon drums and staged on plastic in an area next to the west side fence line of the SLDA near River Road. The IDW was sampled for waste characterization by START on 9/25/13 and was determined to be non-hazardous. The IDW was transported from the site on February 18, 2014 for disposal by Valicor Environmental Services, LLC.

Well elevations and coordinates were surveyed on March 20, 2014 by START subcontractor Pedersen & Pedersen, Inc. Figure 6, attached, is a plot of the wells and associated survey information. Well construction information is provided in Table I.

Table I
Well Construction Measurements

Well/Sample ID	Latitude [1]	Longitude [1]	Hydro Unit [2]	TOIC Elevation [3] (ft amsl)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Total Well Depth (ft bgs)
EPA01	[redacted]	[redacted]	DB	825.40	22	32	33.2
EPA02	[redacted]	[redacted]	1S	921.34	24.2	34.2	34.2
EPA03S	[redacted]	[redacted]	1S	922.23	36	46	47
EPA03D	[redacted]	[redacted]	UF	922.68	85.2	95.2	97.1
EPA04 [4]	[redacted]	[redacted]	1S	945.01	40	60	62.4
HW15 [5]	[redacted]	[redacted]	DB	833.15	Unknown	Unknown	105

1 – Datum PA State Plane South - NAD83
2 – Hydro Unit: 1S=First Shallow Bedrock; UF=Upper Freeport Coal; DB=Deep Bedrock (from USACE 2005)
3 – Vertical Control – NAVD 88. All wells are flush mounted having inner casings at approximately ground surface.
4 – EPA04 was drilled to 82 ft bgs and sloughed in to 75 ft bgs. Hole plug bentonite was added from approx.75 ft to 62.4 ft bgs.
5 – HW15 is a non-use home well. Specific construction details are not available. Total depth and casing diameter were measured by START.
TOIC = Top of inner casing; amsl = above mean sea level; bgs = below ground surface

Home Well - HW15

On July 15, 2013, the OSC and START assessed HW15 for the purposes of sampling. The well was in a small well house and had been historically attached to a jet pump but was found to be disconnected and without any electrical hookup at the well head. A short "L" of black conduit was sticking up from the 6-inch diameter well cap which was loosely attached and easily removed. A rusted and flaking 6-inch diameter corroded steel casing was observed to be flush to the concrete floor slab and black plastic conduit was observed hanging in the well.

On July 22, 2013, the conduit was pulled from the well. START measured the conduit length to be 99.2 feet and observed on the conduit heavy caking of orange rust between 20.5 and 27 feet and staining from 7.3 to 20.6 feet below the cap; presumed to be caused by the corroded outer steel casing. The depth to well bottom was measured to be approximately 105 feet below the top of casing. The well had a soft bottom indicative of silt accumulation.

RIVER SEDIMENT SAMPLING

During September 16-19, 2014, three START personnel under oversight by the EPA OSC collected 53 sediment samples from 47 locations in the Kiskiminetas River to assess for metals and radionuclide constituents that could be attributed to an off-site release from the SLDA. The work was conducted in general accordance with the SQAP with several modifications being made during implementation to adjust to field conditions and as directed by the EPA OSC. Field modifications are discussed in the paragraph below.

Field Modifications to the SQAP

During initial planning and development of the SQAP, three areas of the river were selected for sample collection. These included an area upstream of Carnahan Run (background), an area across from the site, and another area downstream from the SLDA and Parks Township

remediation sites but upstream of Guffy Run. During implementation, the actual area of study was expanded in both upstream and downstream directions; however the quantity of samples did not need to be adjusted due to general difficulty in locating sediment availability. Upstream, the purpose of expanding the study was to assess a more-definitive background of riverine sediment in a location upstream from the influence of the former NUMEC nuclear fuel facility in Apollo, PA (Area D). The additional background data would also supplement the upstream sample set collected above the Carnahan Run confluence located nearer to the site (Area C). Downstream, sample locations were added transecting the river at the Hyde Park Foot Bridge in Leechburg, PA to assess the more-distal downstream river sediment in a more-populated area of the river (Area A). Upstream from Guffy Run and across from the site the two areas that were originally planned to be sampled separately were combined into one area (Area B) for both discussion purposes and from a practical sense. An overview of the sampled areas is provided in Figure 4. Area-specific sample location maps are provided in Figures 4A to 4D.

Kiskiminetas River Sediment and Bedload Observations

START observed that the river bottom contained a rocky bedload predominantly consisting of boulders, cobbles, and gravel with fine gravel or coarse sand in the interstices. The presence of concrete, steel and other anthropogenic detritus was evident in the river and along the banks but was not unexpected considering the former commercial and industrial nature of the region. The coarse bottom is consistent with a typical uplands section of a shallow river with constant moderate to moderately-swift current velocity where fines remain entrained and have few places to settle out. Most of the river could be waded with water depths typically 1.5 - 4 feet and a few pools or channels were encountered exceeding 6-8 feet which were accessible only by boat.

Eddies on the downstream side of large boulders and sometimes along the shoreline represented the predominant, currently subaqueous, slack water deposits found in the river channel. The sediment contained silt, sand and fine gravel of varying amounts with many samples generally lacking any binding material such as clay. A few samples contained organic matter. Bivalves were abundant and efforts were made during sample homogenization to remove them from the sampled sediment. Coarse sediments contained coal, black shale and red fragments suggestive of red dog and/or iron staining in addition to sub-rounded quartz. Marginal sediment collection success was found in larger river eddies such as where tributary deltas have advanced into the river creating eddies upstream and/or downstream of the delta bar (e.g. Carnahan Run). Sediment depth along the shorelines was often a thin veneer of mud covering rocky colluvium, alluvium and/or detritus sometimes difficult or impossible to manually penetrate to any significant depth. Deeper pools in the river channel were often associated with similar relatively moderate to high energy river velocities (e.g. cut banks) and lacked fine sediment bottoms. In general, the river in the study area was not conducive for collecting samples of good thick

deposits of fine-grained sediments that may otherwise represent timelines of sediment scour and historical deposition.

Sediment Sampling Activities

Four designated areas of the river were sampled from downstream to upstream; sequentially, from Area A to Area D. At each area, START conducted a reconnaissance of the riverbed accessing locations via jon boat and canoe, or by wading, and moving from bank to bank in a general 'S' pattern down the length of the section to identify sediment sampling locations. Potential sample locations were marked with a buoy. The sampling team then proceeded to collect the samples within the area from downstream to upstream using a dedicated scoop, ponar dredge, or lined sediment core sampler as applicable. Scoops were most effective in the shallow sections of river and in thin sediments on the banks above the waterline. The ponar dredge had very limited success in the deeper pools. The sediment corer had good but rare success where thick sediment deposits were encountered along the banks.

Sediment samples were collected into doubled plastic zipping bags that were immediately marked with a sample number, time, date, and sampler and placed in a cooler. START marked the associated buoy with the sample ID before proceeding to the next location. After collecting all of the samples in an area, START returned to each sample location and obtained GPS coordinates with a Trimble ProXH GPS receiver, then removed the buoy. Individual samples were homogenized in a dedicated aluminum tray and placed in clean sample containers. Table II below summarizes the location and sample identifiers, sample type, and analyses performed on each river sediment sample.

Table II
Sample Identification, Type, and Analyses

Location IDs	Sample IDs	Sample Type	Total Metals/ Hg/U	Am-241 (Alpha Spec)	Pu (Alpha Spec)	Th (Alpha Spec)	U (Alpha Spec)	Gamma Spec
FIELD SAMPLES								
005 – 052	SD05 – SD58	River Sediment	X	X	X	X	X	X
BLANK SAMPLES								
Z	RB02 –RB05	Rinsate Blanks	X	X	X	X	X	X

Table III below lists the progression of sampling activities providing the dates that samples were collected and the respective river area from which they were collected. Sample locations are also listed to indicate how many locations were sampled. In all, 54 samples were collected from 48 sampling locations.

Table III
Sediment Samples – Sample Dates, Location IDs and Areas

Date	Sample IDs (No. Collected)	Location IDs (No. Collected)	Area
9/16/13	SD05 – SD09 (5)	005 – 008 (4)	A - Downstream
9/17/13	SD10 – SD22 (13)	009 – 020 (12)	B – Across from Site
9/18/13	SD23 – SD44 (22)	021 – 040 (20)	B – Across from Site
9/19/13	SD45 – SD52 (8)	041 – 047 (7)	C – Upstream of Carnahan Run
	SD53 – SD58 (6)	048 – 052 (5)	D – Upstream of Apollo, PA

The START sampling team demobilized from the site following completion of sediment sampling activities on the morning of 9/20/14.

GROUNDWATER SAMPLING – EPA WELLS

On September 23, 2013, two START members returned to the site to collect the first round of groundwater samples from the five EPA monitoring wells recently constructed in the community of Kiskimere and from non-operating home well HW15. The purpose of the sampling was to evaluate groundwater for the presence of constituents that could be attributed to an off-site release from the SLDA. Samples were collected to assess the presence of volatile organic compounds, semi-volatile organic compounds, metals, and radionuclides. The descriptions of activities are presented below in order of occurrence.

START conducted a full round of static water level measurements upon arriving at the site and prior to start of sampling. Depths to water were recorded from the top of the inner casing measured at each well using a Solinst 101 Water Level Meter. The measured depths to water are provided in Table IV below and are also shown on the well logs in Attachment 1.

Table IV
Water Level Measurements in EPA Monitoring Wells – 9/23/13

Well ID	Date	Time	DTW (ft btoc)	Total Depth (ft bgs)	Water Column Height (ft)
EPA01	9/23/13	10:36	14.34	33.2	18.8
EPA02	9/23/13	10:44	13.53	34.2	20.7
EPA03S	9/23/13	10:54	31.55	47	15.5
EPA03D	9/23/13	10:52	90.50	97.1	6.6
EPA04	9/23/13	11:02	21.49	62.4	40.9

btoc – below top of inner casing.

Low-Flow Sampling Process

Low-flow sampling proceeded at each well with the exception of EPA03D which was bailed. Low-flow pumping was conducted using a 1.75-inch QED SamplePro bladder pump connected to Teflon-lined poly tubing that was slowly lowered in an effort to not increase turbidity until the intake reached the mid-point of the screen. At EPA04 which has a 20-foot screen, the pump was lowered to 5 feet above the well bottom to maximize pumping volume as a result of the well having a slow recharge. During purging, START monitored drawdown with a water level meter while adjusting the flow rate to stabilize drawdown. START monitored flow rate with a graduated cylinder. Temperature, specific conductance, dissolved oxygen, pH, oxidation/reduction potential, and turbidity were measured with a Hydrolab Quanta with flow-through cell and logged by START at 3-5 minute intervals on field data sheets. When parameters stabilized, the water line was disconnected from the flow-through cell and used to fill clean sample containers. A standard field sample volume was slightly greater than 3 gallons for this event. VOA vials were pre-preserved with hydrochloric acid to pH<2 and placed in the trip blank cooler on ice. The portion of sample scheduled for dissolved metals analysis was filtered in the field using a dedicated 0.45 micron barrel filter prior to nitric acid preservation. In accordance with EPA sampling guidance, the dissolved metals portion of a sample requires a unique identifier; for this project designated as an "F" prefix added to the sample number. *(In this report, an "(F)" prefix on a sample number is understood to include both the non-filtered and filtered aliquots (e.g. GW01(F) = GW01 and GW01F))*. Nitric acid was added to preserve metals and radionuclide analyses samples to pH<2.

Groundwater Sampling

On September 23, 2013, START collected the full round of water level measurements then collected trip blank TB04 using ASTM Type II deionized, ultra-filtered water (DIUF) and placed it on ice in the volatile organics (VOA) sample cooler. A general summary of sampling activity is provided below for each well.

EPA01

The sampling team set up at EPA01 (screened in deep bedrock) and purged the well of 2.5 gallons to achieve stabilization. EPA01 provided good yield for low-flow sampling and had slightly turbid water. START collected sample GW01(F) from EPA01 and rinsate blank RB06 following decontamination of the pump and water level tape.

EPA02

EPA02 (screened in the 1st shallow bedrock) was purged of 2 gallons prior to achieving stabilization. EPA02 provided fair yield for low-flow sampling and the water was a little

turbid. Duplicate samples GW02(F) and GW03(F) were collected. START also collected field blank FB02 using DIUF water.

EPA03D

EPA03D (screened in the Upper Freeport coal) had 6.6 feet of water in the well on September 23, 2013 and was purged 2.5 gallons using a bailer (purged to near-dry). It was determined that due to the short water column and slow recharge, EPA03D could not sustain a low-flow pumping rate. It was determined that the sample from EPA03D would be collected with a bailer. The well was allowed to recharge overnight before sample collection. On September 24, 2014, the water level was measured in EPA03D at 92.96 feet which corresponded to a recharge rate of approximately 2 feet in 12 hours. The water level was 2.46 feet lower than static level measured on the previous day. START used a bailer and collected the VOA and SVOA sample volumes of GW04(F) before the well went dry. The well was again allowed to recharge. START returned to EPA03D that evening and water depth was 93.9 feet btoc. Additional sample volume was collected (total metals) before the well went dry. The well was allowed to recharge overnight.

On September 25, 2013, at 1320 hours, EPA03D depth to water was 92.6 feet btoc. START collected approximately 1 gallon of groundwater via bailer before the well went dry. The volume was included with sample GW04(F) and was sent to the lab as a 'short-volume' which combined alpha and gamma spec analyses (e.g. only 1 gallon was collected instead of 2 gallons). The sample, having been collected with a bailer, was highly turbid with an obvious dark grey cast likely influenced by the coal seam. Filtration was accomplished by drawing the dissolved metals volume through a Nalgene 0.45 micron filter using a vacuum pump. The representativeness of sample GW04(F) is considered reduced because of the questionable viability of the well due to very low yield and volume from which to collect a sample within a feasible time frame using minimal stress-inducing methods. It is recommended that analytical data from sample GW04(F) be considered as screening level data instead of definitive data based on the above mentioned reasons.

EPA03S

EPA03S (screened in the 1st shallow bedrock) provided a fair yield during low-flow sampling and the water was moderately turbid. Static water depth was unchanged from the previous day; 31.55 feet btoc. Sample GW05(F) was collected from EPA03S after water quality parameters stabilized. Rinsate blank RB07 was collected after equipment decontamination and field blank FB03 was collected on location; both using DIUF water.

EPA04

EPA04 (screened in the 1st shallow bedrock) had a water level of 20.57 feet btoc; a drop of 0.92 feet from the static level measured the previous day. The pump intake was set at 5 feet above the well bottom. The well yield was low and considerable drawdown was encountered. The water was moderately turbid. Sample GW06(F) was collected from EPA04 after water quality parameters stabilized. START decontaminated the equipment before proceeding to HW15.

HW15

HW15 (total depth is in deep bedrock) depth to water was measured at 49.54 btoc. Water was observed to be moving when observed down the well with a flashlight. This could possibly be caused by leakage from other water zones through a corroded casing. The sample pump intake was lowered to 99 feet btoc, the same depth as the former intake on the bottom of the conduit before it was pulled from the well. The well had a good yield for sampling. At 1725 hours, during sample collection, a hole developed in the air line of the bladder pump at a point 23 feet above the pump intake (76 feet btoc). Approximately 2/3 of the sample had already been collected; including the VOC and SVOC volumes. START pulled and cleaned the pump which was coated in red-orange iron oxidation and replaced the tubing. Collection of sample GW07(F) resumed following a short purge duration. Although the burst air line resulted in a short period of aeration of the upper half of the water column, it is unlikely that significant adverse effects occurred on the radionuclide and inorganics sample volumes being collected at the time considering the substantial height of the break above the intake and the good yield of the well. Aeration could affect volatile metals such as mercury and oxidize some dissolved metals into less soluble forms. Aeration could agitate corrosion on the steel casing which could flake off or otherwise enter the water column. The condition of the casing at depth, or whether it is even present, is unknown.

Table V below provides the pump intake depth, flow rate during the purging process, water quality parameters and overall drawdown recorded at the time of stabilization for each well, where applicable. Wells EPA03D and EPA04 were low yield. Consideration is being given to fully evacuating EPA04 and allowing it to recharge before collecting a grab sample during future sampling events, similar to the sampling method used at EPA03D.

Table V
Pump Depth, Purge Flow Rate and Water Quality Parameters at Stabilization

Well ID	Intake Depth (ft btoc)	Flow Rate (ml/min)	Temp (°C)	Specific Cond. (mS/cm)	DO (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Drawdown (ft)
EPA01	27	240	12.66	0.315	0.21	7.33	2.0	39.5	0.46
EPA02	29	220	13.58	0.586	0.25	7.23	-51	60.4	0.11
EPA03S	41	170	12.75	0.419	0.42	7.56	-104	183	0.02
EPA03D [1]	Bailed	NA	14.91	0.255	8.68	4.22	349	1021	Bailed to 6”
EPA04	55 [1]	150	12.46	0.362	0.68	7.84	41	220	2.85
HW15	99	300	12.45	0.806	0.46	7.38	-41	80.2	0.23

btoc – below top of inner casing | ml/min – milliliters per minute | °C – Degrees Celsius | mS/cm – millisiemens/centimeter
DO – dissolved oxygen | mg/L – milligrams per liter | ORP – oxidation/reduction potential | mv – millivolts | NTU – nephelometric turbidity unit.
1 – Water quality parameters were measured one time on a grab sample volume from EPA03D.

Investigative Derived Waste Sampling

On September 25, 2013, START collected waste characterization samples from 46 drums containing IDW generated during drilling and groundwater sampling activities. Sample IDW01 was collected from drums containing water; sample IDW02 was collected from drums containing shallow cuttings; and sample IDW03 was collected from drums containing deeper cuttings. The sampling team demobilized from the site at 13:50 hours.

Decontamination

Non-dedicated equipment such as the sediment core sampler, ponar dredge, bladder pump and water meter tape were decontaminated between sample locations using Alconox and water followed by distilled water rinse.

Quality Assurance Samples

Field duplicate samples were collected at a rate of 10% per matrix to assess reproducibility of laboratory and field procedures and to check for non-homogeneity. Field duplicate samples were collected from the water and sediment matrices. One trip blank, two field blanks, and two rinsate blanks were collected using analyte-free DIUF water during groundwater sampling. Four rinsate blanks were collected during sediment sampling. The trip blank was placed in the VOA cooler to assess contamination introduced during shipping and field handling procedures. The field blanks were collected to assess contamination from field conditions during water sampling activities. Rinsate blanks were collected from the non-dedicated sampling equipment to test the adequacy of the decontamination process. Rinsate and field blank samples did not include a dissolved metals portion because of inherently low turbidity <10 NTU in the DIUF water.

Sample Packaging, Shipment and Laboratories

Water and sediment samples were preserved and placed on ice in coolers immediately following collection. Sample documentation, including labels, tags, and chain-of-custody, was produced using SCRIBE® sample management software. Samples were packaged and shipped to off-site laboratories scheduled through the EPA Region III CST and in accordance with EPA Region III sample shipping guidelines. Table VI below lists the respective Case Nos., laboratories, analytical methods, parameters and matrices associated with the samples.

Table VI
Off-Site Laboratories, Analytical Methods, Parameters and Matrices

Case No.	Laboratory	Method	M.A.	Parameters	Matrix
43811	MITKEM	CLP SOM01.2	-	TCL Trace Volatiles + TICs	Groundwater
			1564.8	TCL SVOCs + 1,4-Dioxane + TICs	
			1722.3 1723.2 1689.7 1690.6	TCLP VOA, SVOA, Pest, Herb	Soil (IDW)
			1722.3 1723.2 1689.7 1690.6	TCLP VOA, VOA, Pest, Herb	Water (IDW)
	BONNER	ISM01.3	2183.1	ICP MS TAL Metals+Hg+U	Groundwater & wastewater (including filtered groundwater)
			2183.1	ICP MS TAL Metals+Hg+U	Sediment & Sediment Rinsate
			-	ICP AES TAL Metals+Hg+U	
			2024.1 2025.1	ICP AES - TCLP RCRA Metals+Hg	Soil (IDW)
			2024.1 2025.1	ICP AES - TCLP RCRA Metals+Hg	Water (IDW)
R34243 (DAS)	NAREL	Alpha Spec - Actinides (Americium-241) by Extraction Chromatography NAREL AM-EICHROM	-	AM241	Groundwater & Sediment
		Alpha Spec - Actinides (Plutonium) by Extraction Chromatography NAREL PU-EICHROM	-	Pu238, Pu239, Pu240, Pu242	
		Alpha Spec - Actinides (Thorium) by Extraction Chromatography – NAREL TH-EICHROM	-	Th227, Th228, Th230, Th232	
		Alpha Spec - Actinides (Uranium) by Extraction Chromatography	-	U234, U235, U238	
		Gamma Spectrometry NAREL GAM-01	-	Co60, Cs137, Th234, Bi212, Pb212, Pb214, K40, Ra226, Ra-228	Groundwater
		Gamma-ray Spectrometry - Sealed Radium Cans NAREL GAM-01-RA	-	Co60, Cs137, Th234, Bi212, Pb212, Pb214, K40, Ra226, Ra228	Sediment

DAS – Superfund Delivery of Analytical Services
M.A. – Modified Analysis
NAREL - EPA's National Analytical Radiation Environmental Laboratory
TAL – Target Analyte List
TCL – Target Compound List

Analytical Results

Validated data packages and associated electronic data deliverables (EDDs) were received during the time period of November 12, 2013 through March 6, 2014. Laboratory data received from BONNER and MITKEM were validated by the EPA Region III Environmental Services Assistance Team (ESAT) according to National Functional Guidelines for Validation of Organic Data utilizing the Environmental Data Exchange and Evaluation System (EXES). EPA NAREL conducted internal data validation and reported the findings in case narratives included with the respective data reports. The validated organic, inorganic and radiological data packages for all matrices including the respective sample results as reported by the laboratories may be found in Attachment 3- Data Validation Reports.

The groundwater VOC, SVOC, and TAL metals results were compared to drinking water benchmarks established under the *National Primary Drinking Water Regulations Maximum Contaminant Levels* (MCL) and the *Pennsylvania Medium-Specific Concentrations for Residential Used Aquifers with Total Dissolved Solids (TDS) Less Than 2,500 mg/L* (MSC, 1/8/2011). In addition to State and Federal benchmarks, the chemical data were also screened using the *EPA Regional Screening Levels for Tap Water* (RSLs, 5/2014). Consistent with EPA Region 3 screening procedures, the RSL table considered a 1E-6 cancer risk and target hazard quotient of 0.1 to account for chemicals that may have additive effects. Sediment inorganic results were compared with background concentrations found in Area D samples and with *EPA Region III Biological Technical Assistance Team Freshwater Screening Benchmarks* (BTAG 2006).

The basis for using the benchmark comparisons for the groundwater samples is due to the presence of residential private-use wells in Kiskimere and an apparent lack of well construction data available. Although it is unclear if the new monitoring wells tap the specific water bearing zones that provide water to Kiskimere's population via private wells, based on current knowledge it is not unreasonable to think that they may, or that there could be hydraulic communication between the aquifers some of which are used for consumption. The risk-based benchmarks are appropriately applied to establish conservative evaluation of contaminants in the groundwater system from which groundwater is consumed, especially considering the potential for an offsite release from the nearby remediation sites. The benchmark comparisons for chemical data (not radionuclide) are provided in Attachment 2 – Data Summary Tables, Tables 1, 2 and 3. A general discussion regarding the laboratory results is provided in the sections below.

A summary of radiochemical laboratory results are provided in Attachment 2, Tables 4 and 7 for groundwater and sediment matrices, respectively. The summaries include the result, uncertainty and minimum detectable concentration (MDC) values as reported by NAREL for the respective

sample-specific isotope or method. Radiochemical data review comments from an EPA Health Physicist are provided in Attachment 4.

Groundwater Results

Volatile Organic Compounds

In the EPA monitoring well samples, there were no VOC compounds detected at a concentration level greater than or equal to the level of the Contract Required Quantitation Limit (CRQL). The data is summarized in Table 1 which provides the Target Compound List, results, CRQL and qualifiers. Attachment 3 provides the data validation report(s) including the results and qualifiers as reported by the laboratory and as validated by ESAT.

Semivolatile Organic Compounds

Naphthalene was detected at a concentration of 1.8 J ug/L in EPA03D. The concentration exceeds the RSL benchmark of 0.17 ug/L, but is considerably less than the MSC of 100 ug/L. Naphthalene was the only SVOC compound that exceeded a benchmark and it was detected only in EPA3D which also had trace levels of 2-methylnaphthalene, di-n-butylphthalate and bis(2-ethylhexyl)phthalate. EPA04 also contained trace detections of di-n-butylphthalate and bis(2-ethylhexyl)phthalate. None of these low-level detections are considered particularly significant. As previously discussed, it is recommended that analytical results from samples collected from EPA3D should be considered against screening levels only. The well was sampled by bailer over an extended duration to obtain the needed sample volume. Recharge is extremely slow and samples were very turbid with dark particulate or coal fines evident. Naphthalene is a polycyclic aromatic hydrocarbon and is a main ingredient in mothballs. It is abundant in coal tar and can be released to the air from the burning of coal and oil. The SVOC data set is summarized in Table 2 of Attachment 2. Data validation report(s) may be found in Attachment 3. Table VII below tabulates the SVOCs detected in EPA03D and EPA04.

Table VII
SVOC Detections in EPA Monitoring Wells

				Sample #:	GW04		GW06	
				Sampling Location:	EPA03D		EPA04	
				Units:	ug/L		ug/L	
Parameter	CAS No.	MSC (U_nres)	MCL	RSL tap (5/2014)	Result	Q	Result	Q
2-Methylnaphthalene	91-57-6	150		3.6	2.4	J		
Bis(2-ethylhexyl)phthalate	117-81-7	6	6	5.6	1.7	J	1.3	J
Di-n-butylphthalate	84-74-2	3700		90	5.2		6	
Naphthalene	91-20-3	100		0.17	**1.8**	J		

Only detections are listed.
A shaded cell indicates the value exceeds one or more benchmarks. Shading is applied in the following order: MCL (pink), MSC (yellow); RSL (cyan)
1 - Pennsylvania Median-Specific Concentration for Residential Used Aquifers with Total Dissolved Solids (TDS) Less Than 2,500 mg/L (MSC, 1/8/2011).
2 - National Primary Drinking Water Regulations Maximum Contaminant Levels (MCL)
3 - EPA Regional Screening Level for Tap Water, May 2014 (carcinogens 10E-6, THQ=0.1)

Metals, Mercury and Uranium

Benchmark exceedances of both total and dissolved metals samples are presented in Table VIII below. Many of the exceedances and highest concentrations were found in EPA03D; including arsenic and beryllium, the only metals exceeding the MCL. Cobalt, lead, manganese, and nickel exceeded the MSC but fell within ranges previously reported in the Remedial Investigation Report (RI). The exceedances often occurred in both total and filtered metals samples.

Table VIII
Metal Exceedances in EPA Monitoring Wells

				Sample #:	GW01		GW01F		GW02		GW02F		GW03		GW03F		GW04		GW04F	
				Sampling Location:	EPA01		EPA01		EPA02		EPA02		EPA02		EPA02		EPA03D		EPA03D	
				Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Parameter	CAS No.	MSC (U_nres)	MCL	RSL tap 5/2014	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5			2000	31.3												**53700**		**19400**	
Arsenic	7440-38-2	10	10	0.052													**1230**		**340**	
Barium	7440-39-3	2000	2000	380	**386**		364		159		162		164		162		171		18.2	
Beryllium	7440-41-7	4	4	2.5													**18**		**12.1**	
Cobalt	7440-48-4	11		0.6	**1.7**		**1.8**										**96.2**		**92.4**	
Iron	7439-89-6			1400	137	J	121	J	612		550		625		542		**322000**		**255000**	
Lead	7439-92-1	5	15														**12.5**		**5.3**	
Manganese	7439-96-5	300		43	**1750**		**1840**		**275**		**272**		**282**		**274**		**962**		**1400**	
Nickel	7440-02-0	100		39	1.9		2.1										**171**		**182**	
Thallium	7440-28-0	2	2	0.02													**1.9**			
Vanadium	7440-62-2	260		8.6													**13**			

				Sample #:	GW05		GW05F		GW06		GW06F		GW07		GW07F	
				Sampling Location:	EPA03S		EPA03S		EPA04		EPA04		HW15		HW15	
				Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Parameter	CAS No.	MSC (U_nres)	MCL	RSL tap 5/2014	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5			2000	56.9				266				671			
Arsenic	7440-38-2	10	10	0.052												
Barium	7440-39-3	2000	2000	380	359		340		308		278		119		78.7	
Beryllium	7440-41-7	4	4	2.5									0.17	J		
Cobalt	7440-48-4	11		0.6									**4.2**			
Iron	7439-89-6			1400	1240		921		334				**4000**			
Lead	7439-92-1	5	15										**9.9**			
Manganese	7439-96-5	300		43	**91.1**		**73.3**		21.3		14.4		**331**		39.6	
Nickel	7440-02-0	100		39					1.9	J+	1.4	J+	15.8		2.8	
Thallium	7440-28-0	2	2	0.02												
Vanadium	7440-62-2	260		8.6												

1 - Pennsylvania Median-Specific Concentration for Residential Used Aquifers with Total Dissolved Solids (TDS) Less Than 2,500 mg/L (MSC, 1/8/2011).
2 - National Primary Drinking Water Regulations Maximum Contaminant Levels (MCL)
3 - EPA Regional Screening Level for Tap Water, May 2014 (carcinogens 10E-6, THQ=0.1)

Arsenic and beryllium concentrations in EPA03D(F) were 1,230 ug/L and 18 ug/L, respectively for total metals, and 340 ug/L and 12.1 ug/L, respectively for dissolved metals. The elevated detection of arsenic is significant in EPA03D even for a sample considered to provide screening level data. The concentration exceeds the MCL by two orders of magnitude and also exceeds the maximum concentration found in groundwater during the SLDA RI (166 ug/L). It is important to note that drinking water samples collected from private domestic wells in Kiskimere during 2011 and from mine effluent surface water samples collected near Carnahan Run did not have significant arsenic concentrations. Filtering the water from EPA03D(F) reduced the arsenic concentration to less than a third of that found in the unfiltered sample. The filtered water arsenic concentration is significant. Reductive desorption or dissolution processes could increase dissolved metals including arsenic concentrations in the coal seam groundwater and has been observed in other SLDA samples. At EPA03D(F), however, water quality parameters indicate oxidizing conditions are present in the groundwater (see Table V). Arsenic is a persistent toxin that occurs naturally in trace amounts in rocks, sediments, and coal. Arsenic in bituminous coal occurs primarily in pyrite and, to a lesser extent, in organic portions of the coal.

As discussed in previous reports (TechLaw 2013a), beryllium appears to be associated with groundwater in the Upper Freeport Coal. The concentration is within the upper range of beryllium concentrations found in groundwater samples during the RI (1 – 20 ug/L). According to the Remedial Investigation Report (RI), beryllium wastes from the Apollo nuclear fuel fabrication facility were buried in the SLDA and included beryllium-uranium scrap solutions and zirconium-beryllium waste. However, other metals that would normally accompany, or have greater transport potential than beryllium are not present at high concentrations. A complete data summary of inorganic parameters found in groundwater is presented in Table 3, Attachment 2. Data validation reports are provided in Attachment 3.

Radionuclides

A summary of radiochemical laboratory results are provided in Table 4, Attachment 2. The summary includes the result, uncertainty and minimum detectable concentration (MDC) values as reported by NAREL for the respective sample-specific isotope or method. A Health Physicist reviewed the data and reported that the data indicated the radioisotope results were within expected ranges typically found in the environment and no amounts were significant. The review comments are provided in Attachment 4 of this report.

Sediment Results

Sediment samples were analyzed for metals, including uranium and mercury, and for radionuclides potentially associated with the SLDA.

Metals, Mercury and Uranium

Data summaries for evaluating inorganic concentrations in river sediments are presented in Tables 5 and 6 in Attachment 2.

Table 5 compares sample-specific concentrations to three times (3x) the analyte-specific average background concentration derived from the six samples collected upstream of the Apollo NUMEC facility designated as Area D. In instances where a background result was not detected above the CRQL (e.g. U or UJ qualified results), one-half of the CRQL was used in computation of the average concentration across the sample set for the respective analyte. Results that exceeded 3x background concentrations are highlighted in yellow. The purpose of the comparison is to identify anomalies that may be significantly above background concentrations in the study area. Comparison with the background samples indicate that calcium, barium, chromium, cobalt, lead, silver, and mercury were found at concentrations above 3x background concentrations; but not exceedingly so. Table IX

below summarizes and highlights the instances where sediment concentrations exceeded 3x average background concentrations.

Table IX
Metals Exceedance >3x Average Background in River Sediments

Sample #:			SD07		SD11		SD18		SD19		SD27		SD33	
Sampling Location:			7		10		16		17		25		30	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Parameter	CAS No.	3X Avg Background	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Calcium	7440-70-2	4352.5	4690		1860		3390		5570		1890		5740	
Barium	7440-39-3	603	149	J+	145	J+	798	J+	284	J+	262		160	
Chromium	7440-47-3	75.1	29.1	J+	85.7	J+	105	J+	45.3	J+	122	J	53.3	J
Cobalt	7440-48-4	120.1	48.4	J+	13.3	J+	140	J+	31.6	J+	64.6		56.3	
Lead	7439-92-1	125.15	179		88.4		56.1		32.1		94.1	J	39.9	J
Silver	7440-22-4	0.204	5.2	U	4.2	U	3.9	U	3.2	U	0.046	J	0.041	J
Mercury	7439-97-6	0.2865	0.094	J-	0.5	J-	0.068	J-	0.0081	J-	0.019	J-	0.015	J-

Sample #:			SD39		SD40		SD41		SD44		SD45	
Sampling Location:			35		36		37		40		41	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Parameter	CAS No.	3X Avg Background	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Calcium	7440-70-2	4352.5	3150	J	1530	J	4990	J	5290	J	6350	J
Barium	7440-39-3	603	167		158		189		223		239	
Chromium	7440-47-3	75.1	33.1		42.4		28		34.4		42.5	
Cobalt	7440-48-4	120.1	33.8		29.3		45.7		33.5		40.9	
Lead	7439-92-1	125.15	38.2		42.6		40.8		44.2		64.3	
Silver	7440-22-4	0.204	0.3	J	0.28	J	0.14	J	0.099	J	0.15	J
Mercury	7439-97-6	0.2865	0.26		0.19	J	0.13	J	0.16	J	0.16	J

Table 6 in Attachment 2 compares the river sediment sample results to the EPA Biological Technical Assistance Group (BTAG) July 2006 Freshwater Sediment Screening Benchmarks. There were significant numbers of inorganic exceedances of BTAG benchmarks throughout the river sediment sample set, including the background samples, and with many of the analytes. As demonstrated in Table IX above, inorganic concentrations were generally in the same range when comparing background samples with samples collected at downstream locations and across from the site.

BTAG comments related to the sediment data may be found in Attachment 4 of this report. In general, the consistency of BTAG and 3x-background exceedances across the sediment dataset, including the background area, indicate many of the constituents are natively elevated above the BTAG levels in the sampled areas of the Kiski. The concentrations of inorganic compounds appear to reflect the composition of the sediment matrix rather than chemical contamination when comparing background concentrations to downstream concentrations. There is potential for low level ecological risk; however, the concentrations are not elevated enough to present an acute or imminent risk. Several locations located in Area B are suggested for further evaluation based on the quantity of benchmark exceedances relative to other locations.

Radionuclides

A summary of radiochemical laboratory results are provided in Table 7, Attachment 2. The summary includes the result, uncertainty and minimum detectable concentration (MDC) values as reported by NAREL for the respective sample-specific isotope or method. Radiological data validation reports are provided in Attachment 3. As with the groundwater data, the radioisotope results for sediment were found to be within expected ranges typically found in the environment and no amounts were significant. Health Physicist review comments are provided in Attachment 4 of this report.

References

USACE, 2005. Shallow Land Disposal Area Remedial Investigation Report, Final. October 2005.

TechLaw, 2012. Kiskimere Groundwater Well Investigation Site Trip Report/Site Inspection. November 30, 2012.

TechLaw, 2013. Draft Summary Letter Report: Groundwater Seep, Spring, Outfall and Sediment Sampling Event. June 25, 2013.

TechLaw, 2013a. Summary Letter Report: Groundwater Split Sampling Event. Kiskimere Groundwater Well Investigation Site, Vandergrift, Armstrong County, Pennsylvania. May 21-22, 2013.

If you have any questions or comments regarding this document, please contact me at [redacted] or [redacted] (mobile).

Sincerely,

[redacted]

[redacted]
START Site Leader

Enclosures:

Figures

Figure 1 – Site Location Map
Figure 2 – Site Topographic Map
Figure 3 – Site Aerial Map

Figure 4 – Sediment Sample Areas Overview
Figure 4A – Area A – Downstream Sediment Sample Locations
Figure 4B – Area B – Proximate to Site Sediment Sample Locations
Figure 4C – Area C – Upstream of Carnahan Run Sediment Sample Locations
Figure 4D – Area D – Background Sediment Sample Locations
Figure 5 – EPA Monitoring Wells Location Map
Figure 6 – Survey Plat, EPA Monitoring Wells

Attachment 1 – Monitoring Well Logs

EPA01
EPA02
EPA03S
EPA03D
EPA04

Attachment 2 – Data Summary Tables

Table 1 – Groundwater Samples from EPA Monitoring Wells, Volatile Organic Compounds
Table 2 – Groundwater Samples from EPA Monitoring Wells, Semi-Volatile Organic Compounds
Table 3 – Groundwater Samples from EPA Monitoring Wells, Total and Dissolved Metals
Table 4 – Groundwater Samples from EPA Monitoring Wells, Radionuclides
Table 5 – Kiskiminetas River Sediments, Inorganics
Table 6 – Kiskiminetas River Sediments, Inorganics in Background Samples - BTAG Comparison
Table 7 – Kiskiminetas River Sediments, Radiological Data
Table 8 – Investigation-Derived Waste Samples (IDW), TCLP Analysis of Drummed Soil Cuttings and Purge/Decon Water
Table 9 – Blank Samples, Organic and Inorganic Compounds and Analytes
Table 10 – Blank Samples, Radionuclides

Attachment 3 – Data Validation Reports

Case 43811, SDG C0AJ2 - Trace Volatile Organic and Semivolatile Compounds plus 1,4-Dioxane, Groundwater and Blank Aqueous Samples
Case 43811, SDG C0AK5 – TCLP Volatile, Semivolatile, and Pesticide Compounds; IDW Samples
Case 43811, SDG C0AK6 – TCLP Herbicide Compounds, IDW Samples
Case 43811, SDG MC0AD4 – Metals by ICP MS and Uranium, Sediment Samples
Case 43811, SDG MC0AD5 – Metals by ICP AES and Mercury, Sediment Samples
Case 43811, SDG MC0AD9 – Metals by ICP AES and Mercury, Sediment Samples

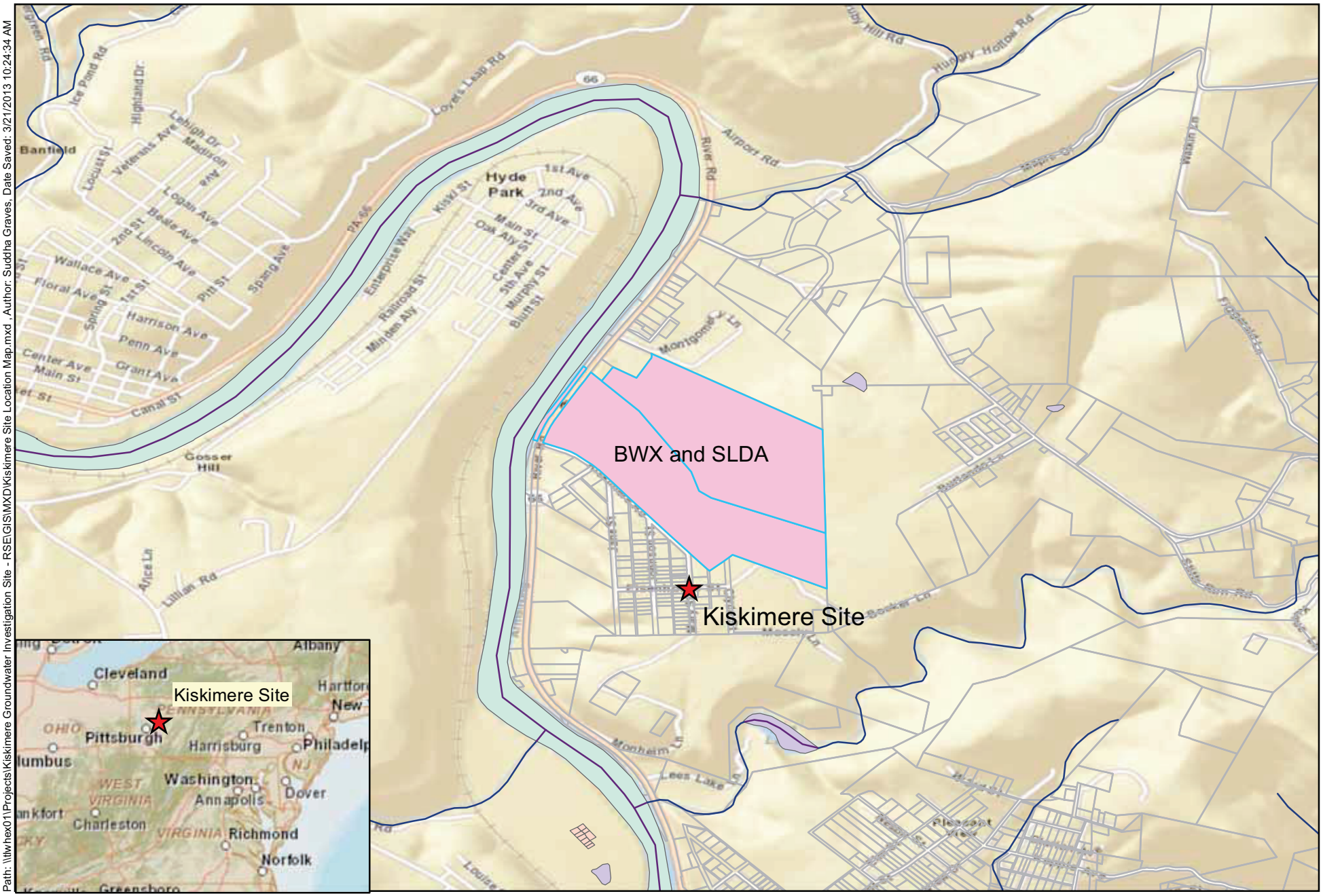
Case 43811, SDG MC0AF7 – Metals by ICP MS and Uranium, Sediment Samples
Case 43811, SDG MC0AF8 – Metals by ICP AES and Mercury, Sediment Samples
Case 43811, SDG MC0AH7 – Metals by ICP MS and Uranium, Sediment Samples
Case 43811, SDG MC0AH8 – Total and Dissolved Metals by ICP MS and Uranium, Aqueous Blanks and Groundwater Filtrate Samples
Case 43811, SDG MC0AH9 – Total and Dissolved Mercury, Aqueous Blanks and Groundwater Filtrate Samples
Case 43811, SDG MC0AJ2 – Total and Dissolved Metals by ICP MS and Uranium, Groundwater and Groundwater Filtrate Samples
Case 43811, SDG MC0AJ3 – Total and Dissolved Mercury, Groundwater Samples
Case 43811, SDG MC0AK7 – TCLP Metals by ICP AES, IDW Water
Case 43811, SDG MC1KR5 – TCLP Metals by ICP AES, IDW Solids
Case 43811, SDG MC1KR6 – TCLP Mercury, IDW Solids
Case 43811, SDG MC1KR9 – TCLP Mercury, IDW Water
Case R34243, SDGs 1300084-AM to 1300087-AM, Actinides (Americium-241) by Extraction Chromatography
Case R34243, SDGs 1300084-PU to 1300087-PU, Actinides (Plutonium) by Extraction Chromatography
Case R34243, SDGs 1300084-TH to 1300087-TH, Actinides (Thorium) by Extraction Chromatography
Case R34243, SDGs 1300084-U to 1300087-U, Actinides (Uranium) by Extraction Chromatography
Case R34243, SDGs 1300084-GAMMA to1300087-GAMMA, Gamma Spectrometry (water); Gamma-ray Spectrometry – Sealed Radium Cans (sediment)

Attachment 4 – Technical Review Comments

EPA Biological Technical Assistance Group (BTAG) Comments
EPA Health Physicist – Radiological Data Review Comments

cc: TL Central Files

FIGURES



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Contract No. EP-S3-10-04
TDD: TL01-13-02-005

Figure 1 – Site Location Map
Kiskimere Groundwater Well Investigation Site
Vandergrift, Armstrong County, Pennsylvania

0 650 1,300 2,600 Feet
ESRI Online World Street Map Layer

TechLaw
Contract No. EP-S3-10-04
TDD: TL01-13-02-005

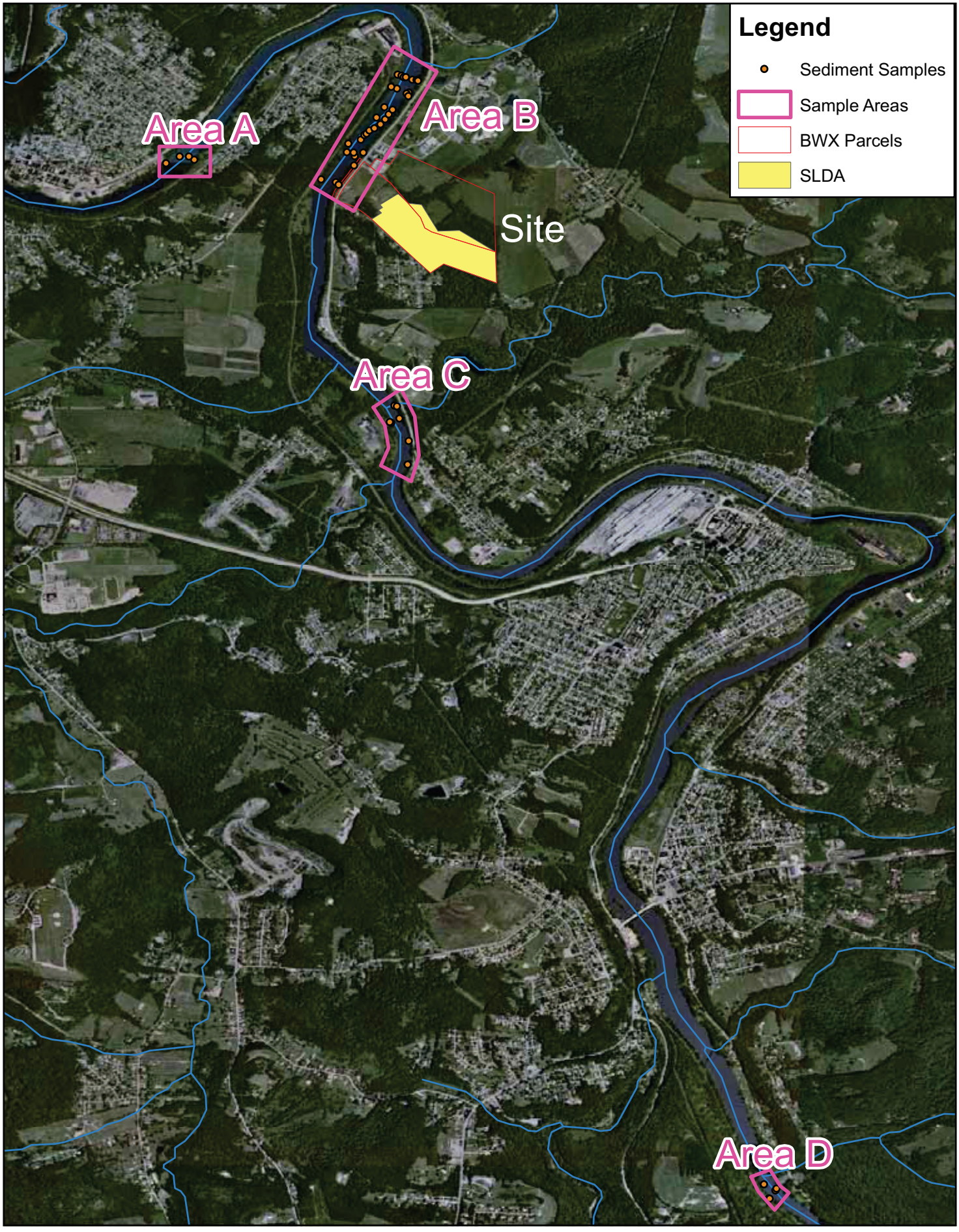
Figure 2 – Site Topographic Map
Kiskimere Groundwater Well Investigation Site
Vandergrift, Armstrong County, Pennsylvania

0 650 1,300 2,600 Feet
ESRI USA Topo Map

TechLaw
Contract No. EP-S3-10-04
TDD: TL01-13-02-005

Figure 3 – Site Aerial Map
Kiskimere Groundwater Well Investigation Site
Vandergrift, Armstrong County, Pennsylvania

0 650 1,300 2,600 Feet
ESRI Online World Imagery Layer



File: \\tlwhex01\projects\Kiskimere Groundwater Investigation Site - RSE\GIS\MXD\Fig 4_SedSampleAreasOverview.mxd, Feb 13, 2014 3:07:30 PM, Copyright TechLaw, Inc.

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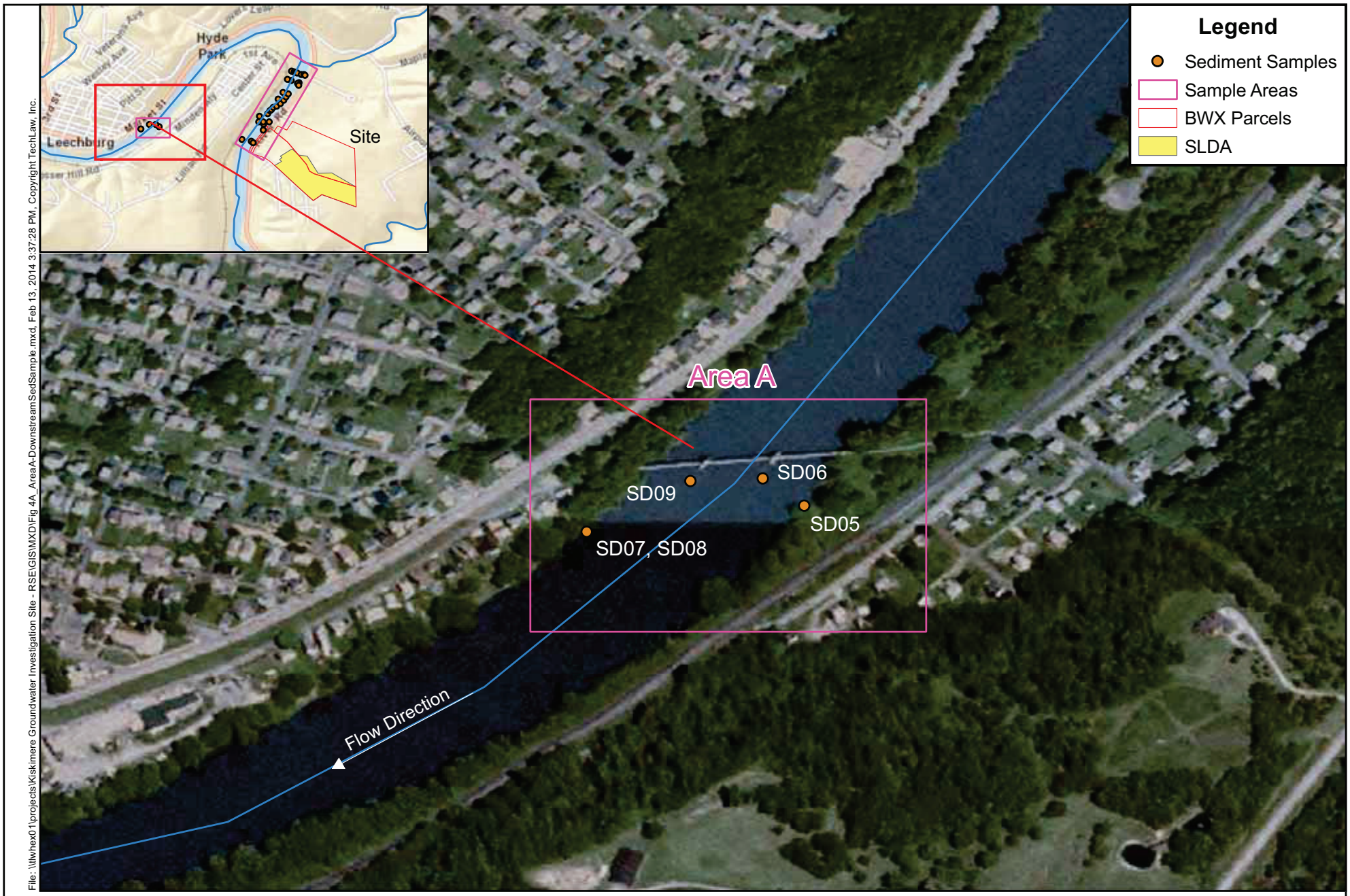
TDD No. TL01-13-02-005

Figure 4 - Sediment Sample Areas Overview
Kiskimere Groundwater Well Investigation Site
Vandergift, Armstrong County, Pennsylvania

N W E S

0 1,000 2,000 4,000 Feet

ESRI Imagery



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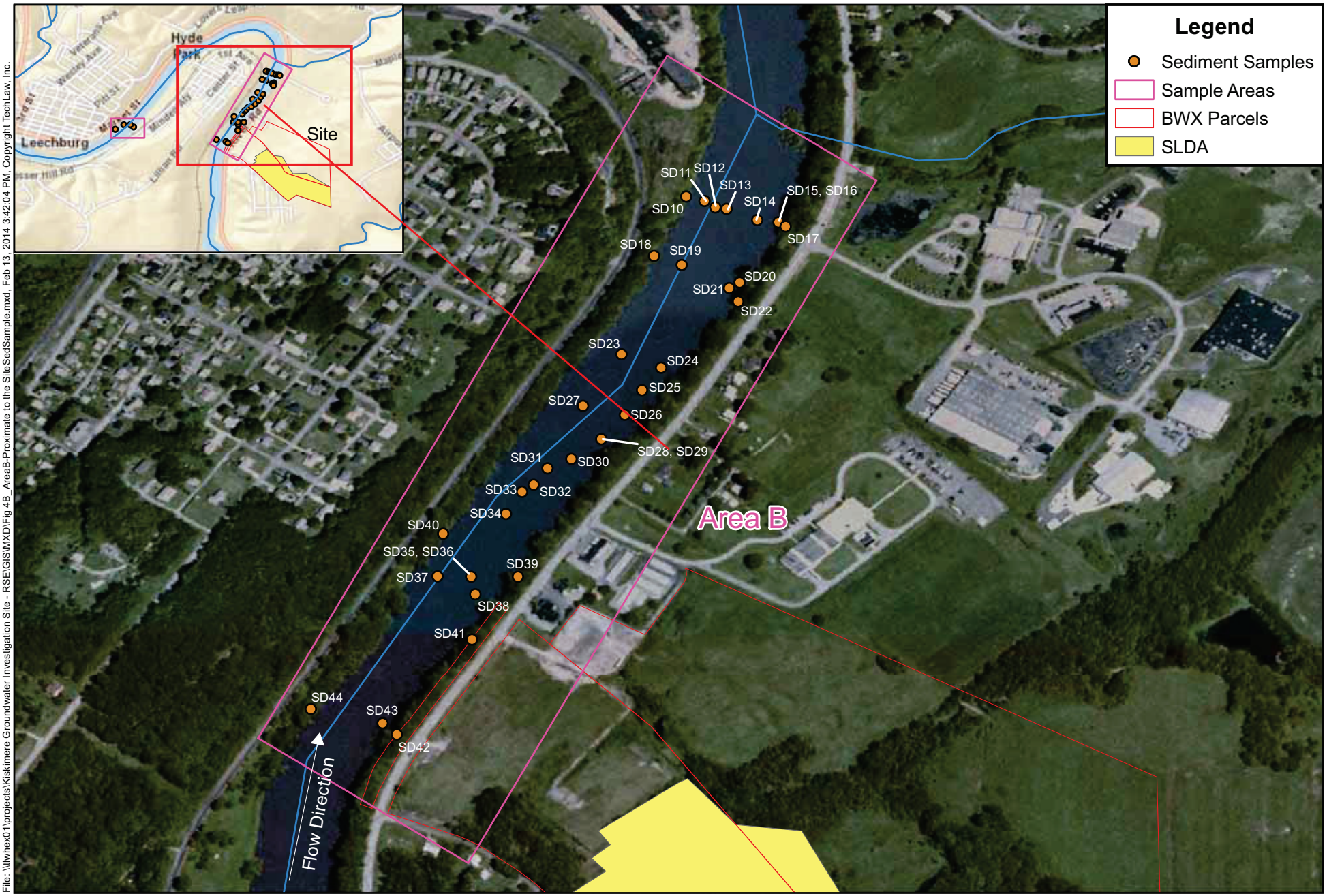
TDD: TL01-13-02-005

Figure 4A - Area A - Downstream Sediment Sample Locations
Kiskimere Groundwater Well Investigation Site
Vandergift, Armstrong County, Pennsylvania

0 100 200 400 Feet
ESRI Imagery



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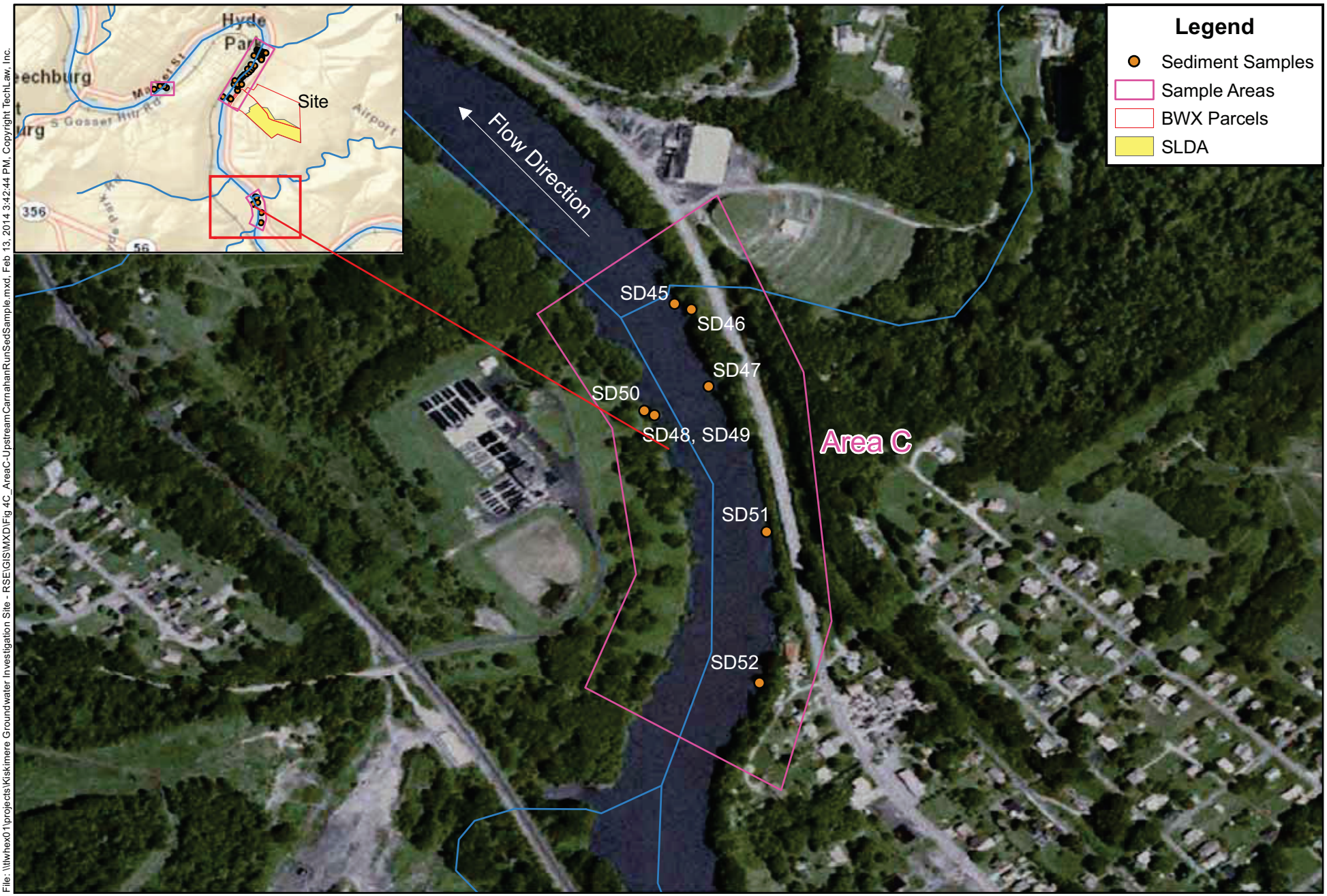
TDD: TL01-13-02-005

Figure 4B - Area B - Proximate to the Site Sediment Sample Locations
Kiskimere Groundwater Well Investigation Site
Vandergift, Armstrong County, Pennsylvania

0 235 470 940 Feet
ESRI Imagery



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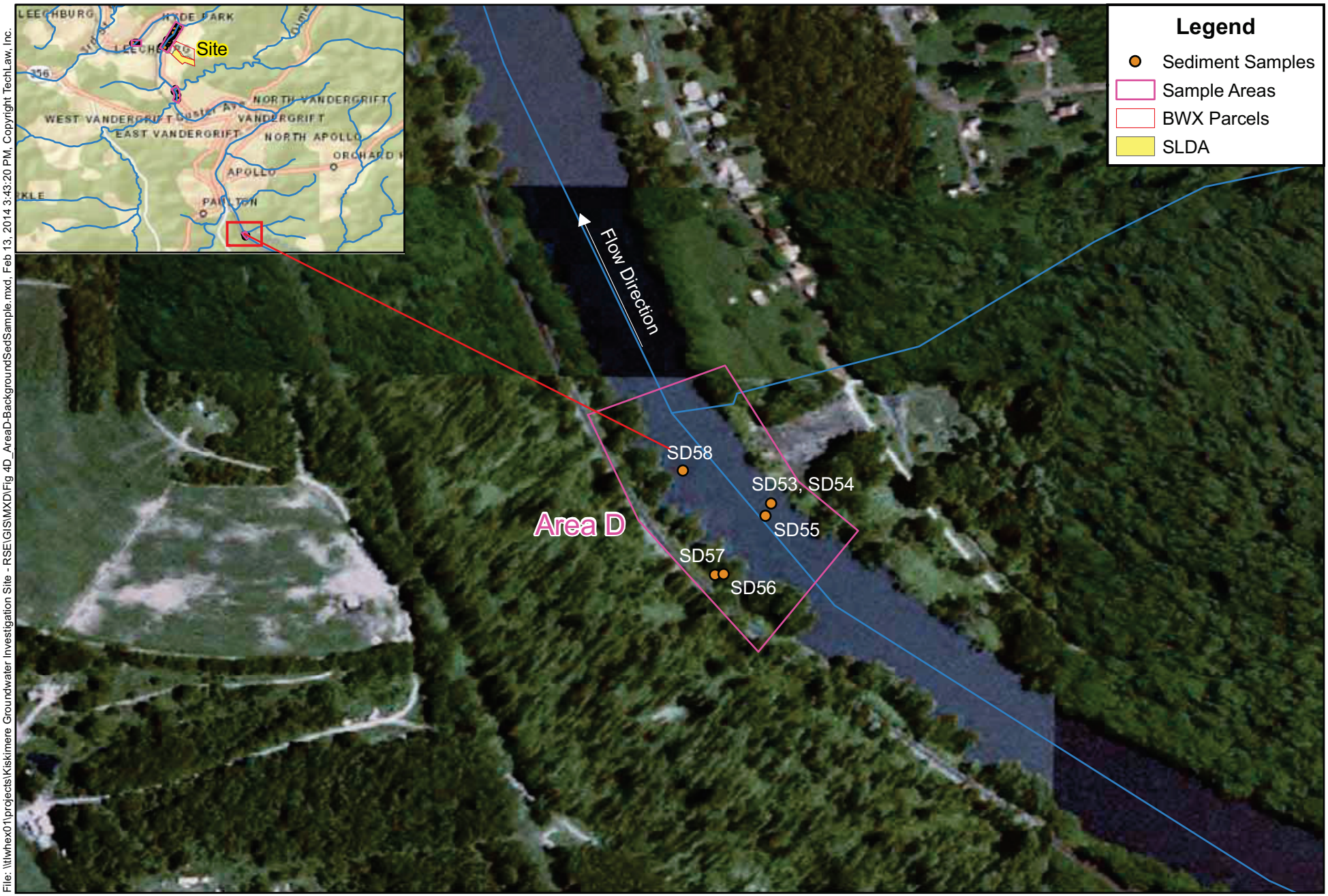
TDD: TL01-13-02-005

Figure 4C - Area C - Upstream of Carnahan Run Sediment Sample Locations
Kiskimere Groundwater Well Investigation Site
Vandergift, Armstrong County, Pennsylvania

0 120 240 480 Feet
ESRI Imagery



File: \\tlwhex01\projects\Kiskimere Groundwater Investigation Site - RSE\GIS\MXD\Fig 4D_AreaD-BackgroundSedSample.mxd, Feb 13, 2014 3:43:20 PM, Copyright TechLaw, Inc.

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TDD: TL01-13-02-005

Figure 4D - Area D - Background Sediment Sample Locations
Kiskimere Groundwater Well Investigation Site
Vandergift, Armstrong County, Pennsylvania

0 105 210 420 Feet
ESRI Imagery

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UNITED STATES EPA REGION III EMERGENCY RESPONSE TEAM ENVIRONMENTAL PROTECTION AGENCY

TechLaw

TDD #TL01-13-02-005
EPA/START Contract No. EP-S3-10-04

Figure 5: EPA Monitoring Wells Location Map

Kiskimere Groundwater Well Investigation Site
Vandergrift, Armstrong County, PA

Map by: jc

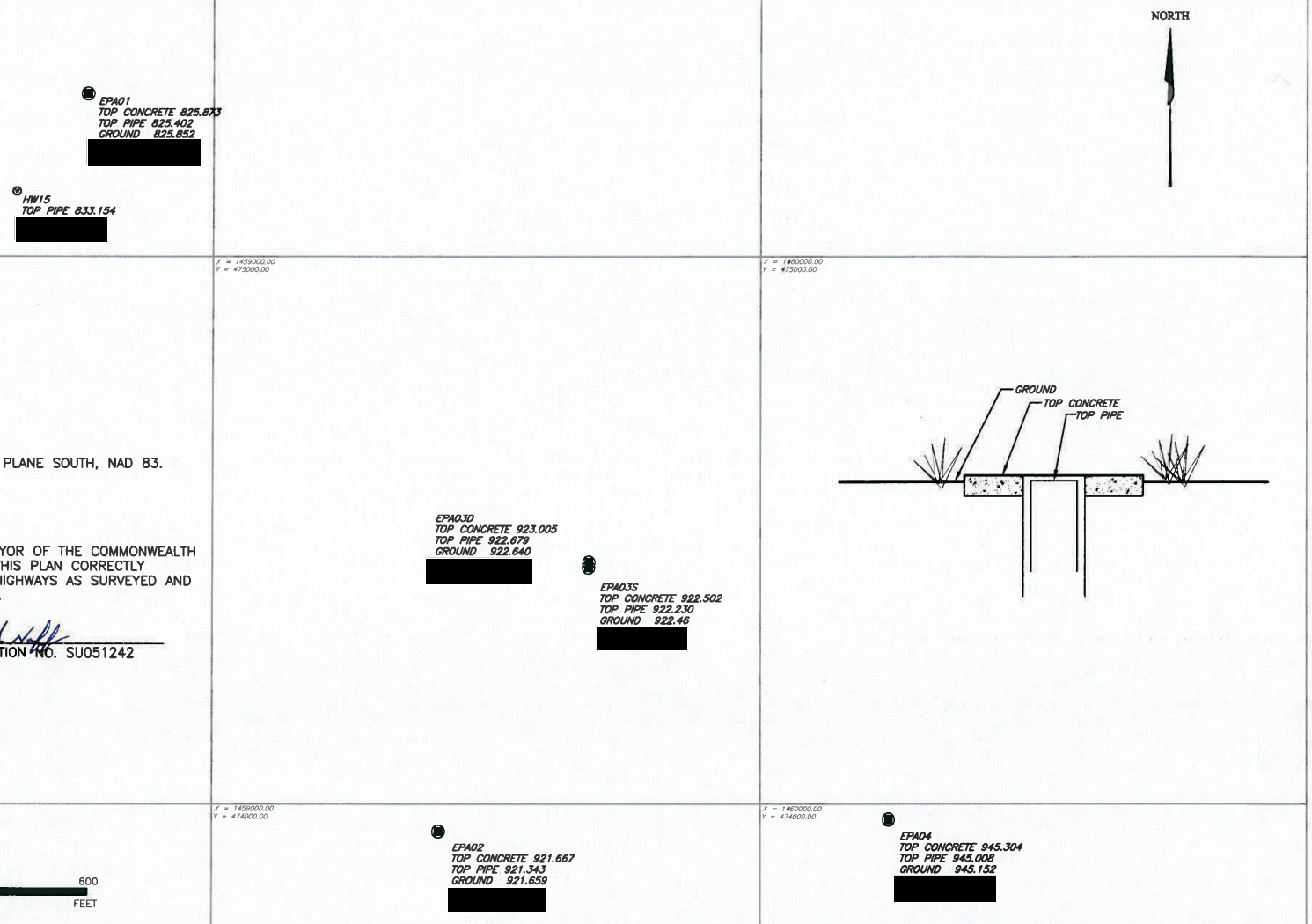
Date modified: 5/6/14

N

Source: Base map from © Google Earth Aerial Imagery Date 8/29/12

SCALE IN FEET
0 246 493

FIGURE 6



NOTES:

HORIZONTAL CONTROL: PENNSYLVANIA STATE PLANE SOUTH, NAD 83.
VERTICAL CONTROL: NAVD 88

INSTRUMENT: TRIMBLE R-8 GPS UNIT

I, PAUL J. NEFF, A REGISTERED SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THIS PLAN CORRECTLY REPRESENTS THE LOTS, LANDS STREETS AND HIGHWAYS AS SURVEYED AND PLOTTED BY ME FOR THE OWNERS OR AGENTS.

4-18-14
DATE

REGISTRATION NO. SU051242

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PAUL J. NEFF
LAND SURVEYOR
SU051242

REFERENCES

REV.	REVISION DESCRIPTION	DATE	BY	CHKD	APPR

REVISIONS

REV.	REVISION DESCRIPTION	DATE	BY	CHKD	APPR
2	REVISED TEXT PER CLIENT	04/18/14	BJE	PJN	PJN
1	REVISED TEXT PER CLIENT	04/09/14	BJE	PJN	PJN

PEDERSEN &PEDERSEN
Civil and Environmental Engineering/Surveying
441 Mars-Valencia Road, Suite 200
Valencia, PA 16059
724-898-3300
FAX 724-625-1329

CLIENT: TechLaw, INC.
2208 WARWOOD AVENUE, WHEELING, WEST VIRGINIA 26003

PROJECT: KISKIMERE GROUNDWATER WELL INVESTIGATION SITE
VANDERGRIFT, ARMSTRONG COUNTY, PENNSYLVANIA

SHEET TITLE: WELL LOCATIONS AND ELEVATIONS
March 20, 2014

DRAWN	BJE
CHECKED	PJN
APPROVED	PJN
DATE	04/02/14
ISSUE DATE	04/18/14
REV. #	2
PROJECT #	14-014
SCALE	1"=200'
DWG #	ES-1
SHEET	1 OF 1

ATTACHMENT 1
MONITORING WELL LOGS

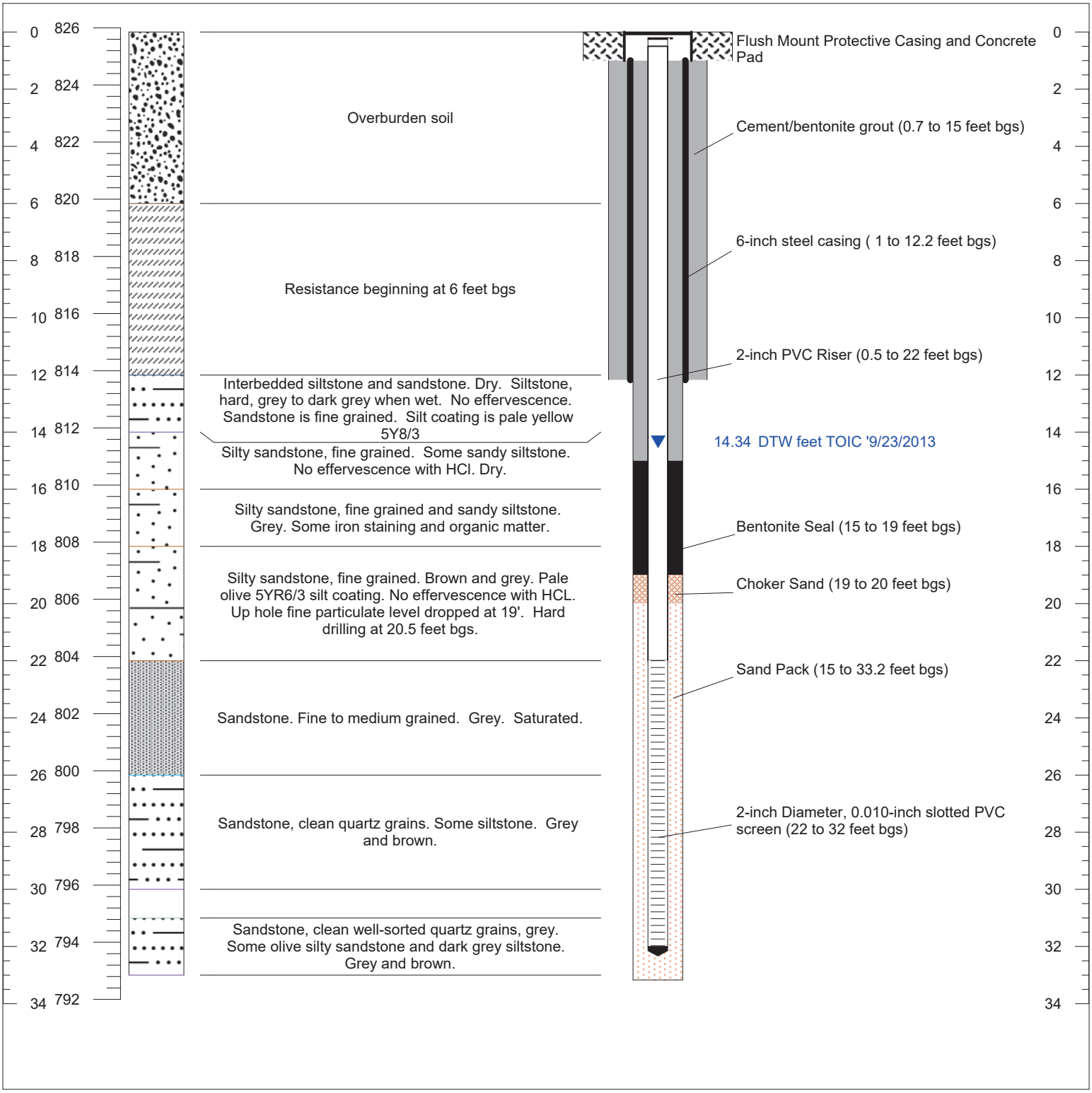
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By: [redacted]

Longitude: [redacted]
Latitude: [redacted]
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 825.85
Borehole Depth: 33.20
Hydrostratigraphic Unit: Deep Bedrock

Well ID: EPA01

TOIC Elev: 825.40
Well Depth (ft bgs): 33.2
Top of Screen (ft.bgs): 22.0
Bot. of Screeen (ft bgs): 32.0
Drilling Start Date: 7/15/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 60 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

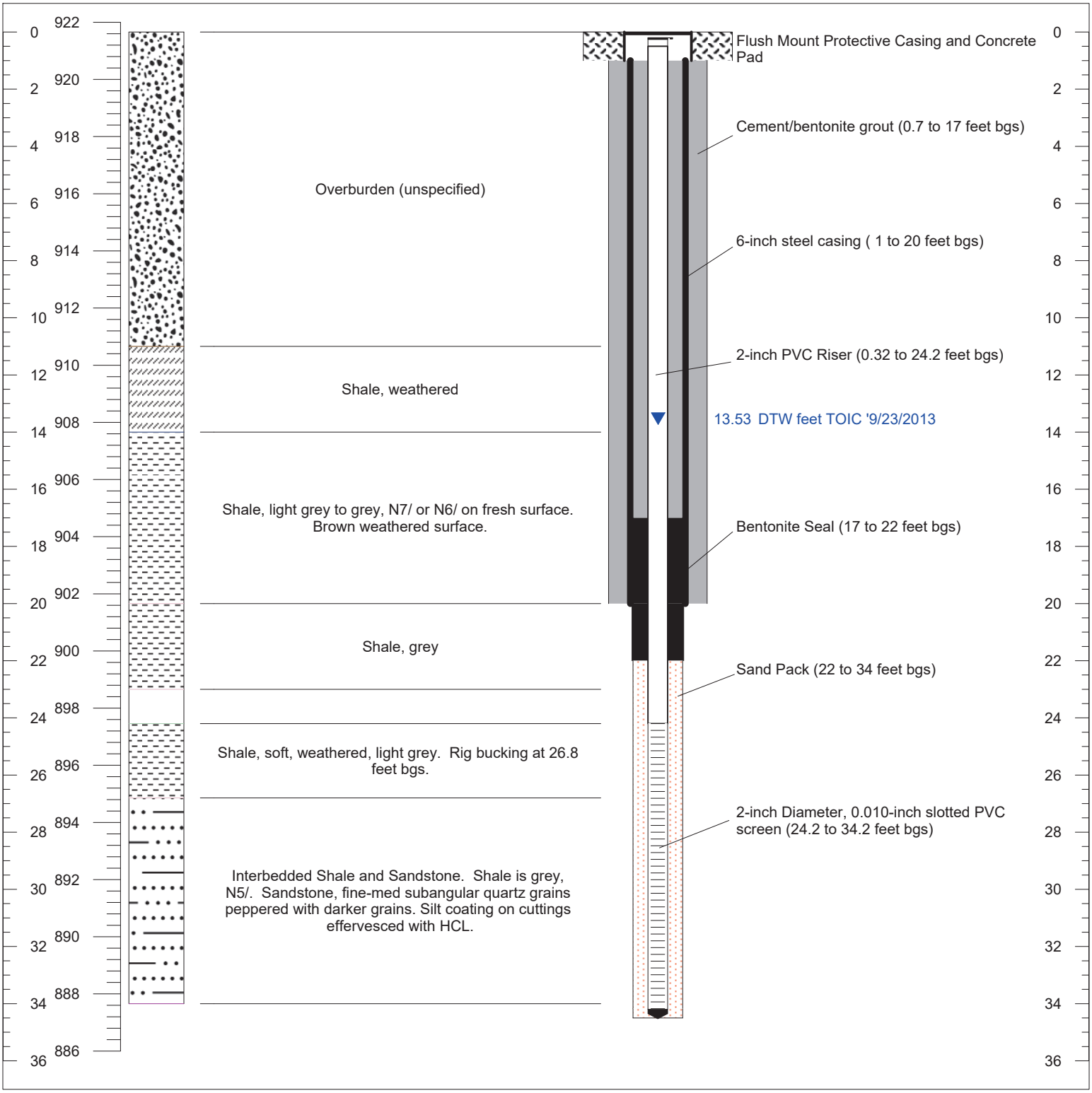
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By: [redacted]

Longitude: [redacted]
Latitude: [redacted]
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 921.66
Borehole Depth: 34.20
Hydrostratigraphic Unit: 1st Shallow Bedrock

Well ID: EPA02

TOIC Elev: 921.34
Well Depth (ft bgs): 34.2
Top of Screen (ft.bgs): 24.2
Bot. of Screeen (ft bgs): 34.2
Drilling Start Date: 7/16/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 40 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

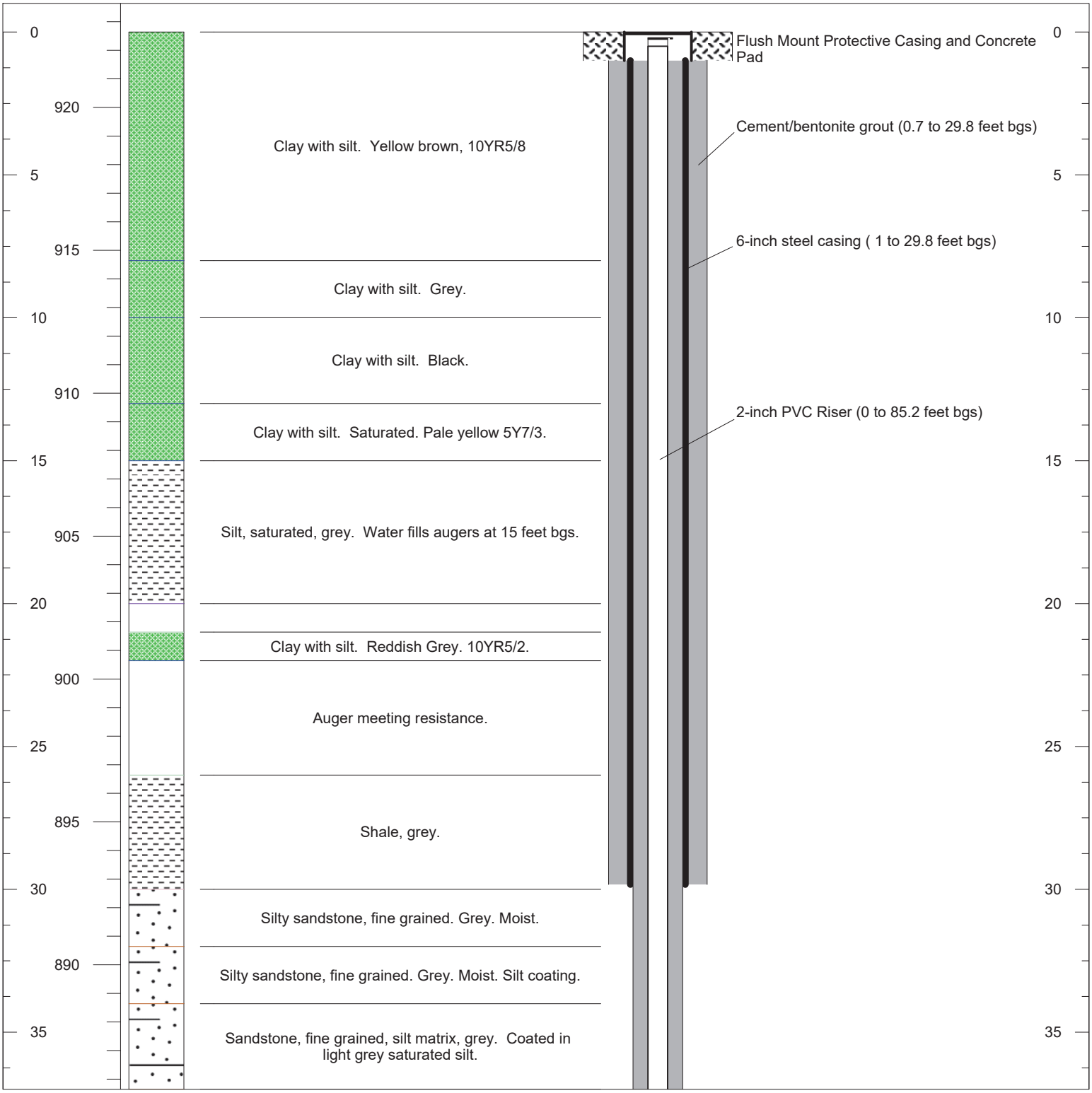
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By: [redacted]

Longitude: [redacted]
Latitude: [redacted]
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 922.64
Borehole Depth: 97.08
Hydrostratigraphic Unit: Upper Freeport Coal

Well ID: EPA03D

TOIC Elev: 922.68
Well Depth (ft bgs): 97.1
Top of Screen (ft.bgs): 85.2
Bot. of Screeen (ft bgs): 95.2
Drilling Start Date: 7/17/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 5 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

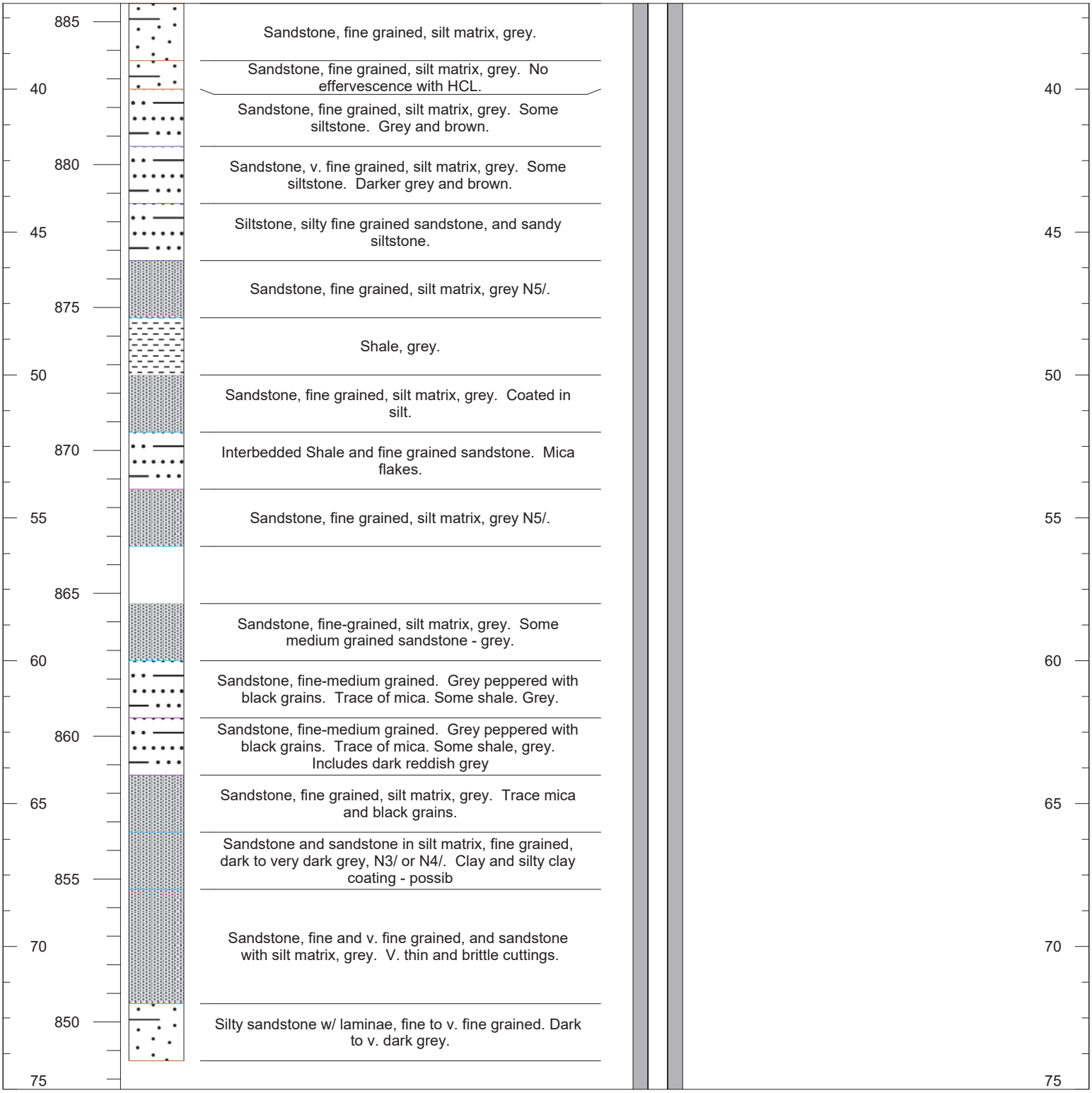
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By:

Longitude: [redacted]
Latitude:
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 922.64
Borehole Depth: 97.08
Hydrostratigraphic Unit: Upper Freeport Coal

Well ID: EPA03D

TOIC Elev: 922.68
Well Depth (ft bgs): 97.1
Top of Screen (ft.bgs): 85.2
Bot. of Screeen (ft bgs): 95.2
Drilling Start Date: 7/17/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 5 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

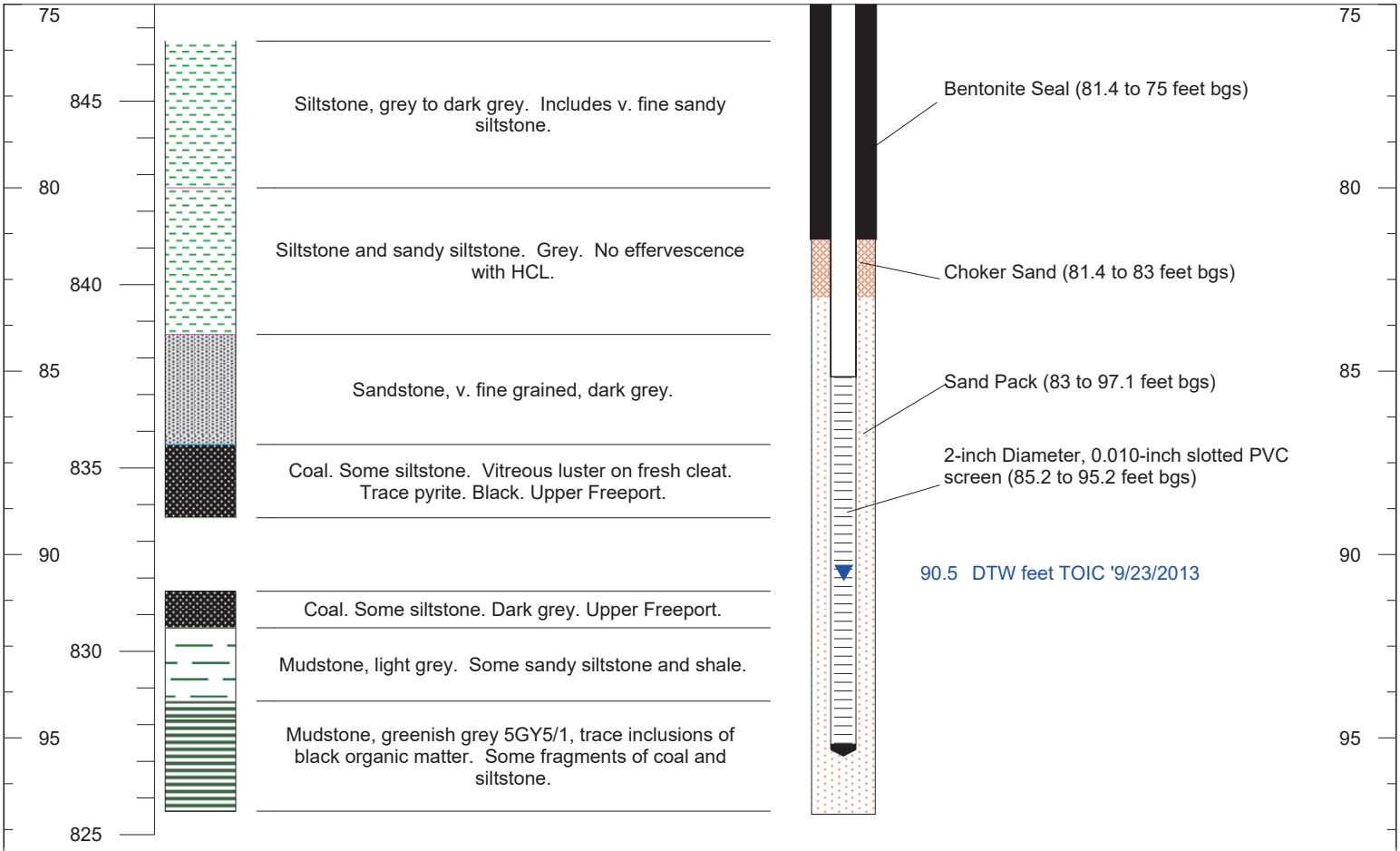
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By:

Longitude: [redacted]
Latitude:
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 922.64
Borehole Depth: 97.08
Hydrostratigraphic Unit: Upper Freeport Coal

Well ID: EPA03D

TOIC Elev: 922.68
Well Depth (ft bgs): 97.1
Top of Screen (ft.bgs): 85.2
Bot. of Screeen (ft bgs): 95.2
Drilling Start Date: 7/17/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 5 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

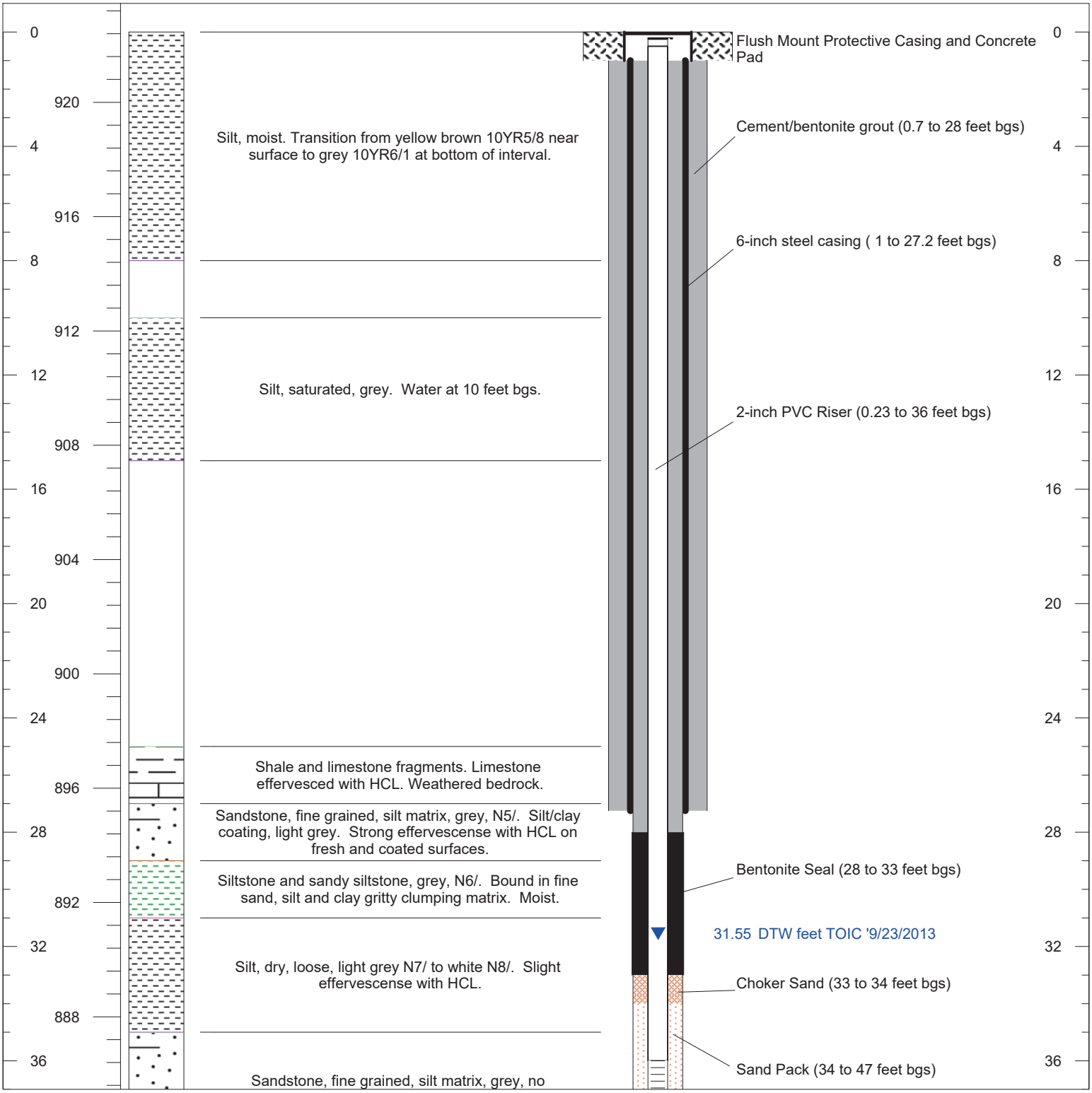
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By: [redacted]

Longitude: [redacted]
Latitude: [redacted]
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 922.46
Borehole Depth: 47.00
Hydrostratigraphic Unit: 1st Shallow Bedrock

Well ID: EPA03S

TOIC Elev: 922.23
Well Depth (ft bgs): 47.0
Top of Screen (ft.bgs): 36.0
Bot. of Screeen (ft bgs): 46.0
Drilling Start Date: 7/16/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 40 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

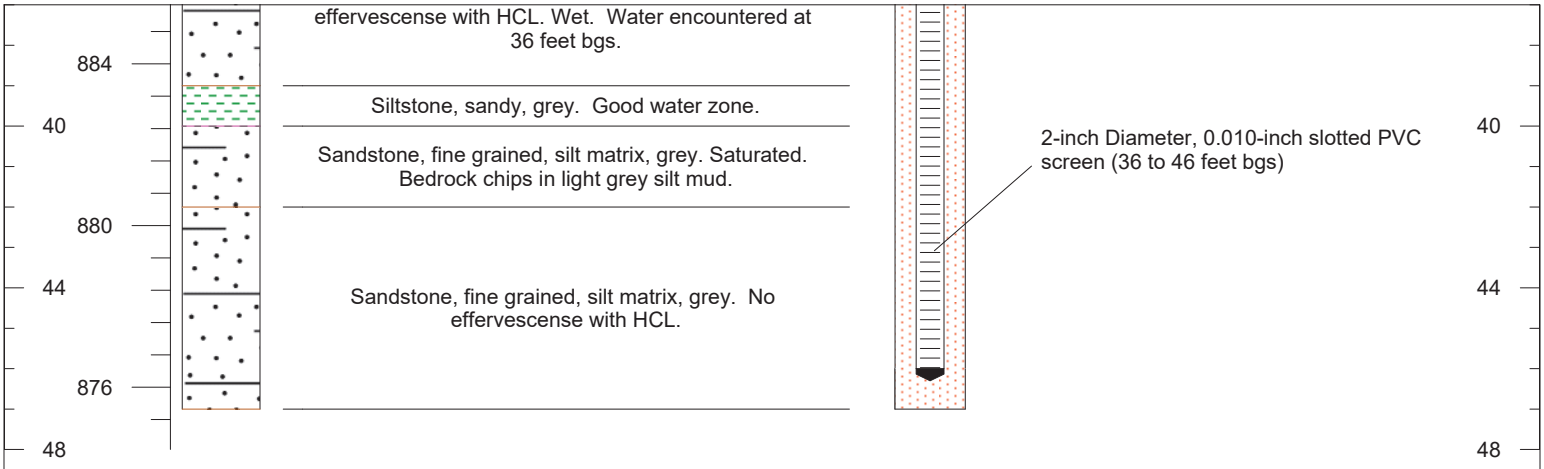
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By:

Longitude: [redacted]
Latitude:
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 922.46
Borehole Depth: 47.00
Hydrostratigraphic Unit: 1st Shallow Bedrock

Well ID: EPA03S

TOIC Elev: 922.23
Well Depth (ft bgs): 47.0
Top of Screen (ft.bgs): 36.0
Bot. of Screeen (ft bgs): 46.0
Drilling Start Date: 7/16/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 40 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

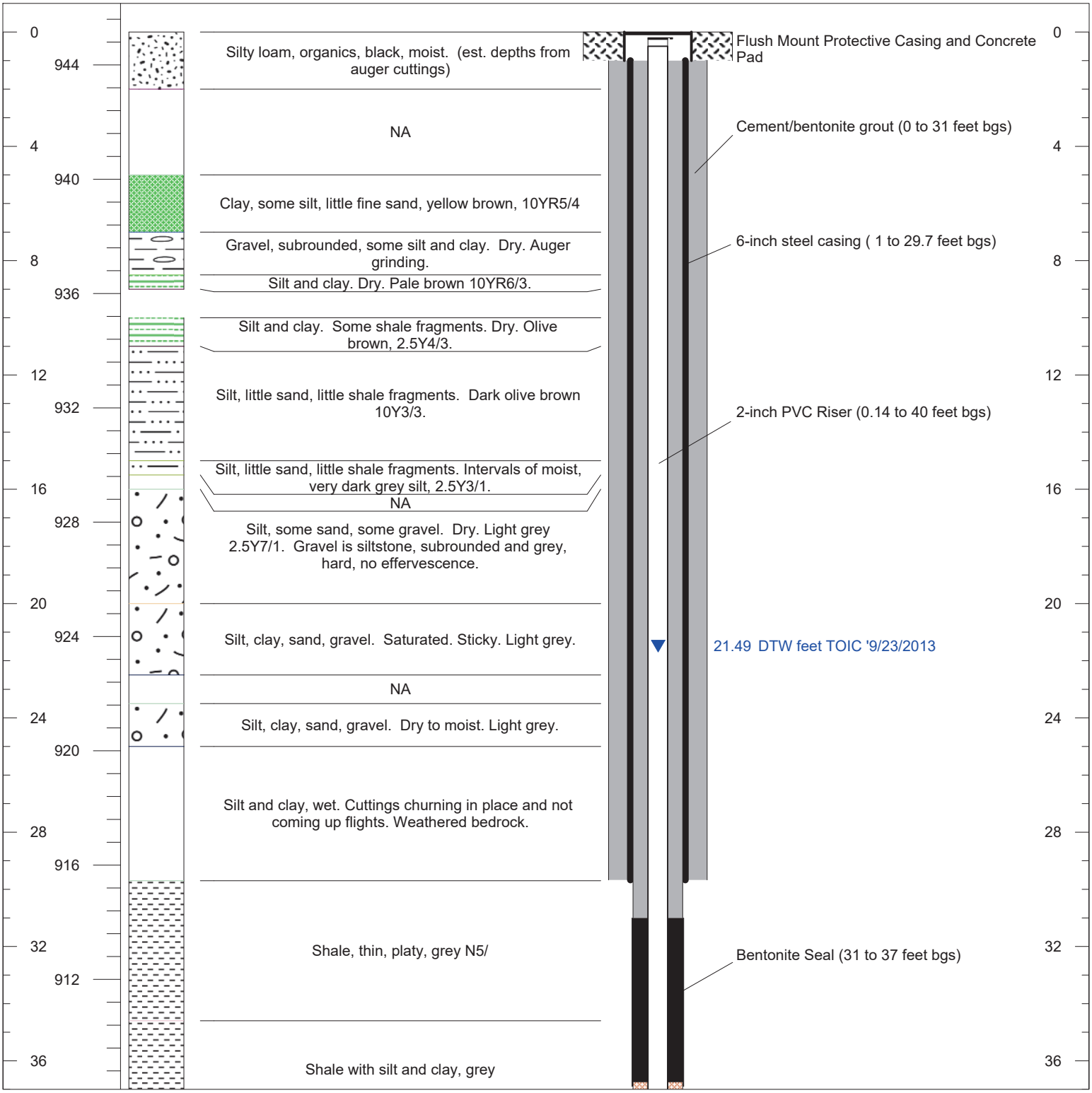
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By: [redacted]

Longitude: [redacted]
Latitude: [redacted]
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 945.15
Borehole Depth: 82.00
Hydrostratigraphic Unit: 1st Shallow Bedrock

Well ID: EPA04

TOIC Elev: 945.01
Well Depth (ft bgs): 82.0
Top of Screen (ft.bgs): 40.0
Bot. of Screeen (ft bgs): 60.0
Drilling Start Date: 7/18/13
Well Completion Date: 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 36 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

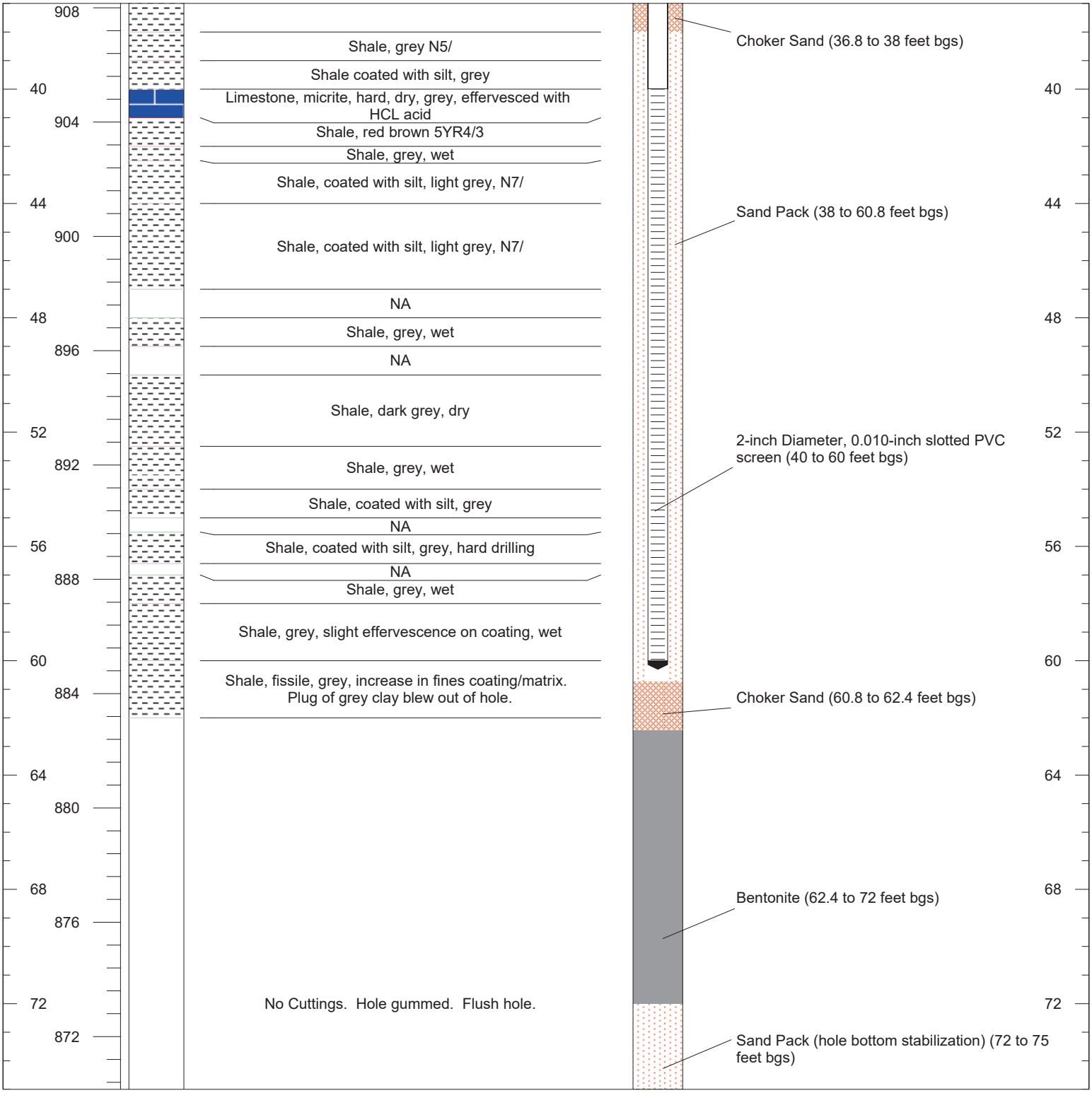
Project Name: Kiskimere Groundwater Well Investigation Site

Location: Kiskimere, PA 15690
Client: U.S. EPA Region III - START IV
Oversight: TechLaw, Inc.
Drilling Company: Chatfield Drilling Co., Inc.
Driller's Name: [redacted]
Logged By:

Longitude: [redacted]
Latitude:
Datum: PA State Plane South, NAD 83
Vertical Control: NAVD 88
Ground Surface Elevation: 945.15
Borehole Depth: 82.00
Hydrostratigraphic Unit: 1st Shallow Bedrock

Well ID: EPA04

TOIC Elev: 945.01
Well Depth (ft bgs): 82.0
Top of Screen (ft.bgs): 40.0
Bot. of Screeen (ft bgs): 60.0
Drilling Start Date: 7/18/13
Well Completion Date: 7/26/13

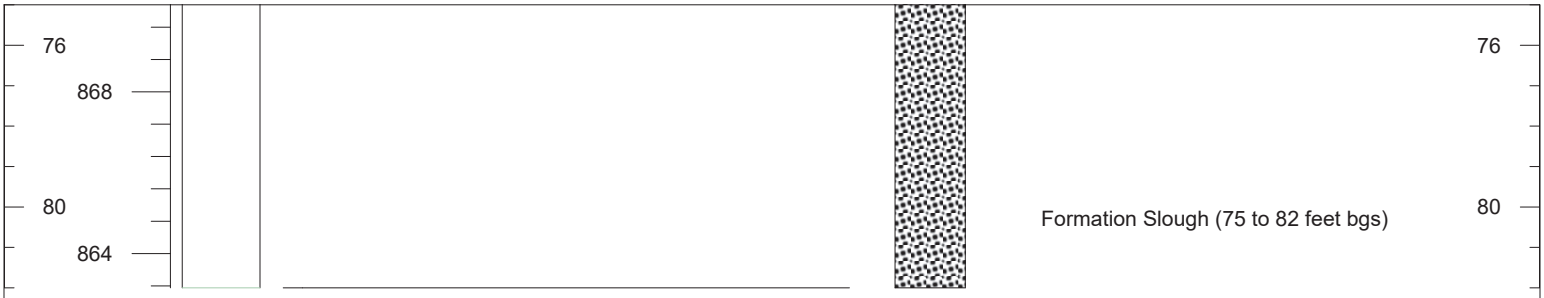


Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 36 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

Project Name: Kiskimere Groundwater Well Investigation Site **Location:** Kiskimere, PA 15690 **Client:** U.S. EPA Region III - START IV **Oversight:** TechLaw, Inc. **Drilling Company:** Chatfield Drilling Co., Inc. **Driller's Name:** [redacted] **Logged By:**	**Longitude:** [redacted] **Latitude:** **Datum:** PA State Plane South, NAD 83 **Vertical Control:** NAVD 88 **Ground Surface Elevation:** 945.15 **Borehole Depth:** 82.00 **Hydrostratigraphic Unit:** 1st Shallow Bedrock	**Well ID: EPA04** **TOIC Elev:** 945.01 **Well Depth (ft bgs):** 82.0 **Top of Screen (ft.bgs):** 40.0 **Bot. of Screeen (ft bgs):** 60.0 **Drilling Start Date:** 7/18/13 **Well Completion Date:** 7/26/13



Type of Drill Rig: CME 75
Drilling Method: Auger/Air Rotary
Auger Size: 8.25-inch ID
Air Rotary OD: 5.875
Overburden Sampling Method: NA
Development Method: Submersible Pump w/Surge
Development Volume: 36 gallons
Development Date: 7/29/13

TechLaw

Contract: EP-S3-10-04
TDD#: TL01-13-02-005
EPA Removal Site Evaluation

ATTACHMENT 2
DATA SUMMARY TABLES

Table 1 - Groundwater Samples from EPA Monitoring Wells
Volatile Organic Compounds

Result Exceeds MSC
Result Exceeds MCL
Result Exceeds RSL

				CLP Sample Number:	C0AJ2		C0AJ3		C0AJ4		C0AJ5		C0AJ6		C0AJ7		C0AJ8	
				Sample #:	GW01		GW02		GW03		GW04		GW05		GW06		GW07	
				Sampling Location:	EPA01		EPA02		EPA02		EPA03D		EPA03S		EPA04		HW15	
				Matrix:	Water		Water		Water		Water		Water		Water		Water	
				Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
				Date Sampled:	9/23/2013		9/23/2013		9/23/2013		9/24/2013		9/24/2013		9/24/2013		9/24/2013	
				Date Analyzed:	10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013	
Parameter	CAS No.	MSC (U_res)	MCL	RSL tap (5/2014)	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1,1-Trichloroethane	71-55-6	200	200	800	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	0.84		0.076	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	63000		5500	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	5	5	0.041	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	31		2.7	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	75-35-4	7	7	28	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	87-61-6			0.7	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	70	70	0.4	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-chloropropane	96-12-8	0.2	0.2	0.00033	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	0.05	0.05	0.0075	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	600	600	30	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	5	5	0.17	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	5	5	0.44	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	600			0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	75	75	0.48	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	78-93-3	4000		560	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	591-78-6	11		3.8	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	108-10-1	2900		120	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	67-64-1	33000		1400	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	71-43-2	5	5	0.45	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	74-97-5	90		8.3	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	75-27-4	80	80	0.13	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	75-25-2	80	80	9.2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	74-83-9	10		0.75	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon disulfide	75-15-0	1500		81	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon tetrachloride	56-23-5	5	5	0.45	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	108-90-7	100	100	7.8	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	75-00-3	230		2100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	67-66-3	80	80	0.22	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	74-87-3	30		19	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	70	70	3.6	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	10061-01-5				0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	110-82-7	13000		1300	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	124-48-1	80	80	0.17	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	1000		20	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4	700	700	1.5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	98-82-8	840		45	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
m,p-Xylene	179601-23-1				0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl acetate	79-20-9	37000		2000	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert-butyl ether	1634-04-4	20		14	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 1 - Groundwater Samples from EPA Monitoring Wells
Volatile Organic Compounds

Result Exceeds MSC
Result Exceeds MCL
Result Exceeds RSL

				CLP Sample Number:	C0AJ2		C0AJ3		C0AJ4		C0AJ5		C0AJ6		C0AJ7		C0AJ8	
				Sample #:	GW01		GW02		GW03		GW04		GW05		GW06		GW07	
				Sampling Location:	EPA01		EPA02		EPA02		EPA03D		EPA03S		EPA04		HW15	
				Matrix:	Water		Water		Water		Water		Water		Water		Water	
				Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
				Date Sampled:	9/23/2013		9/23/2013		9/23/2013		9/24/2013		9/24/2013		9/24/2013		9/24/2013	
				Date Analyzed:	10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013	
Parameter	CAS No.	MSC (U_res)	MCL	RSL tap (5/2014)	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Methylcyclohexane	108-87-2				0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene chloride	75-09-2	5	5	11	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene	95-47-6			19	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	100-42-5	100	100	120	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	127-18-4	5	5	4.1	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	108-88-3	1000	1000	110	0.5	U	0.5	U	0.5	U	0.7	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	156-60-5	100	100	36	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6				0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	79-01-6	5	5	0.28	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichlorofluoromethane	75-69-4	2000		110	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl chloride	75-01-4	2	2	0.019	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 2 - Groundwater Samples from EPA Monitoring Wells
Semi-Volatile Organic Compounds

Result Exceeds MSC
Result Exceeds MCL
Result Exceeds RSL

Parameter	CAS No.	MSC (U_res)	MCL	RSL tap (5/2014)	CLP Sample Number: C0AJ2		C0AJ3		C0AJ4		C0AJ5		C0AJ6		C0AJ7		C0AJ8	
					Sample #: GW01		GW02		GW03		GW04		GW05		GW06		GW07	
					Sampling Location: EPA01		EPA02		EPA02		EPA03D		EPA03S		EPA04		HW15	
					Matrix: Water		Water		Water		Water		Water		Water		Water	
					Units: ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
					Date Sampled: 9/23/2013		9/23/2013		9/23/2013		9/24/2013		9/24/2013		9/24/2013		9/24/2013	
					Date Analyzed: 10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013	
					Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,1'-Biphenyl	92-52-4	1800		0.083	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
1,2,4,5-Tetrachlorobenzene	95-94-3	11		0.17	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
1,4-Dioxane	123-91-1	6.4		0.78	2.5	UJ	2.5	UJ	2.5	UJ	2.5	U	2.5	U	2.5	U	2.5	U
2,2'-Oxybis(1-chloropropane)	108-60-1	300		0.36	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,3,4,6-Tetrachlorophenol	58-90-2	1100		24	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,4,5-Trichlorophenol	95-95-4	3700		120	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,4,6-Trichlorophenol	88-06-2	37		1.2	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,4-Dichlorophenol	120-83-2	20		4.6	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,4-Dimethylphenol	105-67-9	730		36	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,4-Dinitrophenol	51-28-5	73		3.9	10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
2,4-Dinitrotoluene	121-14-2	2.1		0.24	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2,6-Dinitrotoluene	606-20-2	37		0.048	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2-Chloronaphthalene	91-58-7	2900		75	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2-Chlorophenol	95-57-8	40		9.1	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2-Methylnaphthalene	91-57-6	150		3.6	5	UJ	5	UJ	5	UJ	2.4	J	5	U	5	U	5	U
2-Methylphenol	95-48-7	1800		93	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
2-Nitroaniline	88-74-4	110		19	10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
2-Nitrophenol	88-75-5	290			5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
3,3'-Dichlorobenzidine	91-94-1	1.5		0.12	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
3-Nitroaniline	99-09-2	11			10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	534-52-1	3.7		0.15	10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
4-Bromophenyl-phenylether	101-55-3				5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
4-Chloro-3-methylphenol	59-50-7	180		140	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
4-Chloroaniline	106-47-8	3.3		0.36	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
4-Chlorophenyl-phenylether	7005-72-3				5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
4-Methylphenol	106-44-5	180		190	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
4-Nitroaniline	100-01-6	33		3.8	10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
4-Nitrophenol	100-02-7	60			10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
Acenaphthene	83-32-9	2200		53	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Acenaphthylene	208-96-8	2200			5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Acetophenone	98-86-2	3700		190	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Anthracene	120-12-7	66		180	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Atrazine	1912-24-9	3	3	0.3	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Benzaldehyde	100-52-7			190	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Benzo(a)anthracene	56-55-3	0.29		0.034	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Benzo(a)pyrene	50-32-8	0.2	0.2	0.0034	5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U
Benzo(b)fluoranthene	205-99-2	0.29		0.034	5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U
Benzo(g,h,i)perylene	191-24-2	0.26			5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U

Table 2 - Groundwater Samples from EPA Monitoring Wells
Semi-Volatile Organic Compounds

Result Exceeds MSC
Result Exceeds MCL
Result Exceeds RSL

Parameter	CAS No.	MSC (U_res)	MCL	RSL tap (5/2014)	CLP Sample Number:		C0AJ2		C0AJ3		C0AJ4		C0AJ5		C0AJ6		C0AJ7		C0AJ8	
					Sample #:		GW01		GW02		GW03		GW04		GW05		GW06		GW07	
					Sampling Location:		EPA01		EPA02		EPA02		EPA03D		EPA03S		EPA04		HW15	
					Matrix:		Water		Water		Water		Water		Water		Water		Water	
					Units:		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
					Date Sampled:		9/23/2013		9/23/2013		9/23/2013		9/24/2013		9/24/2013		9/24/2013		9/24/2013	
					Date Analyzed:		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013	
						Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Benzo(k)fluoranthene	207-08-9	0.55		0.34	5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Bis(2-chloroethoxy)methane	111-91-1	110		5.9	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Bis(2-chloroethyl)ether	111-44-4	0.15		0.014	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Bis(2-ethylhexyl)phthalate	117-81-7	6	6	5.6	5	UJ	5	UJ	5	UJ	1.7	J	5	U	1.3	J	5	U	5	U
Butylbenzylphthalate	85-68-7	350		16	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Caprolactam	105-60-2			990	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Carbazole	86-74-8	33			5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Chrysene	218-01-9	1.9		3.4	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Dibenzo(a,h)anthracene	53-70-3	0.029		0.0034	5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Dibenzofuran	132-64-9	37		0.79	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Diethylphthalate	84-66-2	29000		1500	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Dimethylphthalate	131-11-3				5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Di-n-butylphthalate	84-74-2	3700		90	5	UJ	5	UJ	5	UJ	5.2		5	U	6		5	U	5	U
Di-n-octylphthalate	117-84-0	1500		20	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Fluoranthene	206-44-0	260		80	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Fluorene	86-73-7	1500		29	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Hexachlorobenzene	118-74-1	1	1	0.049	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Hexachlorobutadiene	87-68-3	8.5		0.3	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Hexachlorocyclopentadiene	77-47-4	50	50	3.1	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Hexachloroethane	67-72-1	1		0.69	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.29		0.034	5	UJ	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U
Isophorone	78-59-1	100		78	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Naphthalene	91-20-3	100		0.17	5	UJ	5	UJ	5	UJ	**1.8**	J	5	U	5	U	5	U	5	U
Nitrobenzene	98-95-3	73		0.14	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
N-Nitroso-di-n-propylamine	621-64-7	0.094		0.011	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
N-Nitrosodiphenylamine	86-30-6	130		12	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Pentachlorophenol	87-86-5	1	1	0.04	10	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U	10	U
Phenanthrene	85-01-8	1100			5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Phenol	108-95-2	2000		580	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U
Pyrene	129-00-0	130		12	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	U	5	U

Table 3 – Groundwater Samples from EPA Monitoring Wells
Total and Dissolved Metals

Shading Key
Result Exceeds MSC
Result Exceeds MCL
Result Exceeds RSL

Parameter	CAS No.	MSC (U_res)	MCL	RSL tap 5/2014	CLP Sample Number:	MC0AJ2		MC0AK8		MC0AJ3		MC0AK9		MC0AJ4		MC0AL4		MC0AJ5		MC0AL0	
					Sample #:	GW01		GW01F		GW02		GW02F		GW03		GW03F		GW04		GW04F	
					Sampling Location:	EPA01		EPA01		EPA02		EPA02		EPA02		EPA02		EPA03D		EPA03D	
					Sample Type:	Field Sample		Field Sample		Field Sample		Field Sample		Duplicate of GW02		Duplicate of GW02F		Field Sample		Field Sample	
					Total or Dissolved Metals:	Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals	
					Matrix:	Water		Water		Water		Water		Water		Water		Water		Water	
					Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
					Date Sampled:	9/23/2013		9/23/2013		9/23/2013		9/23/2013		9/23/2013		9/23/2013		9/24/2013		9/24/2013	
					Date Analyzed:	10/10/2013		10/10/2013		10/10/2013		10/10/2013		10/10/2013		10/10/2013		10/10/2013		10/10/2013	
Parameter	CAS No.	MSC (U_res)	MCL	RSL tap 5/2014		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5			2000		31.3		20	U	20	U	20	U	20	U	20	U	**53700**		**19400**	
Antimony	7440-36-0	6	6	0.78		2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Arsenic	7440-38-2	10	10	0.052		1	U	1	U	1	U	1	U	1	U	1	U	**1230**		**340**	
Barium	7440-39-3	2000	2000	380		**386**		364		159		162		164		162		171		18.2	
Beryllium	7440-41-7	4	4	2.5		1	U	1	U	1	U	1	U	1	U	1	U	**18**		**12.1**	
Cadmium	7440-43-9	5	5	0.92		1	U	0.042	J	1	U	1	U	1	U	1	U	1	U	1	U
Calcium	7440-70-2					39600		37000		70300		71800		72500		72900		172000		286000	
Chromium	7440-47-3	100	100			1	U	2	U	2	U	2	U	2	U	2	U	30.8		2.4	
Cobalt	7440-48-4	11		0.6		**1.7**		**1.8**		1	U	1	U	1	U	1	U	**96.2**		**92.4**	
Copper	7440-50-8	1000	1300	80		0.44	J	0.35	J	2	U	2	U	2	U	2	U	33.3		24.9	
Iron	7439-89-6			1400		137	J	121	J	612		550		625		542		**322000**		**255000**	
Lead	7439-92-1	5	15			1	U	1	U	1	U	1	U	1	U	1	U	**12.5**		**5.3**	
Magnesium	7439-95-4					9480		9230		17800		18200		18300		18100		50300		72100	
Manganese	7439-96-5	300		43		**1750**		**1840**		**275**		**272**		**282**		**274**		**962**		**1400**	
Nickel	7440-02-0	100		39		1.9		2.1		1	U	1	U	1	U	1	U	**171**		**182**	
Potassium	9440-09-7					3670		2820		1280		1320		1330		1360		14000		25200	
Selenium	7782-49-2	50	50	10		5	U	0.24	J	5	U	5	U	5	U	5	U	5	U	2	U
Silver	7440-22-4	100		9.4		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Sodium	7440-23-5					4400		3790		11400		11500		11700		11500		54700		103000	
Thallium	7440-28-0	2	2	0.02		1	U	1	U	1	U	1	U	1	U	1	U	**1.9**		1	U
Uranium	7440-61-1					1	U	0.26	U	1	U	0.049	U	1	U	1	U	2.6		1.3	
Vanadium	7440-62-2	260		8.6		5	U	5	U	5	U	5	U	5	U	5	U	**13**		5	U
Zinc	7440-66-6	2000		600		8	UJ	8	UJ	8	UJ	8	UJ	8	UJ	8	UJ	500	J	437	J
Mercury	7439-97-6	2	2	0.063		0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ

Table 3 – Groundwater Samples from EPA Monitoring Wells
Total and Dissolved Metals

Shading Key
Result Exceeds MSC
Result Exceeds MCL
Result Exceeds RSL

				CLP Sample Number:	MC0AJ6		MC0AL1		MC0AJ7		MC0AL2		MC0AJ8		MC0AL3	
				Sample #:	GW05		GW05F		GW06		GW06F		GW07		GW07F	
				Sampling Location:	EPA03S		EPA03S		EPA04		EPA04		HW15		HW15	
				Sample Type:	Field Sample		Field Sample		Field Sample		Field Sample		Field Sample		Field Sample	
				Total or Dissolved Metals:	Total Metals		Dissolved Metals		Total Metals		Dissolved Metals		Total Metals		Dissolved Metals	
				Matrix:	Water		Water		Water		Water		Water		Water	
				Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
				Date Sampled:	9/24/2013		9/24/2013		9/24/2013		9/24/2013		9/24/2013		9/24/2013	
				Date Analyzed:	10/10/2013		10/10/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013	
Parameter	CAS No.	MSC (U_res)	MCL	RSL tap 5/2014	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5			2000	56.9		20	U	266		20	U	671		20	U
Antimony	7440-36-0	6	6	0.78	2.3	U	2	U	2	U	2	U	2	U	2	U
Arsenic	7440-38-2	10	10	0.052	1	U	1	U	1	U	1	U	1	U	1	U
Barium	7440-39-3	2000	2000	380	359		340		308		278		119		78.7	
Beryllium	7440-41-7	4	4	2.5	1	U	1	U	1	U	1	U	0.17	J	1	U
Cadmium	7440-43-9	5	5	0.92	1	U	1	U	1	U	1	U	1	U	1	U
Calcium	7440-70-2				52000		53800		43500		39000		2610		2710	
Chromium	7440-47-3	100	100		2	U	2	U	2	U	2	U	3.1		2	U
Cobalt	7440-48-4	11		0.6	1	U	1	U	1	U	1	U	**4.2**		1	U
Copper	7440-50-8	1000	1300	80	2	U	2	U	2	U	2	U	6		2	U
Iron	7439-89-6			1400	1240		921		334		200	U	**4000**		200	U
Lead	7439-92-1	5	15		1	U	1	U	1	U	1	U	**9.9**		1	U
Magnesium	7439-95-4				10300		10200		8580		8340		1460		1460	
Manganese	7439-96-5	300		43	**91.1**		**73.3**		21.3		14.4		**331**		39.6	
Nickel	7440-02-0	100		39	1.1	U	1.1	U	1.9	J+	1.4	J+	15.8		2.8	
Potassium	9440-09-7				1820		1820		9640		14500		1580		1430	
Selenium	7782-49-2	50	50	10	5	U	5	U	5	U	5	U	5	U	5	U
Silver	7440-22-4	100		9.4	1	U	1	U	1	U	1	U	1	U	1	U
Sodium	7440-23-5				9270		10200		12700		14100		168000		154000	
Thallium	7440-28-0	2	2	0.02	1	U	1	U	1	U	1	U	1	U	1	U
Uranium	7440-61-1				1	U	1	U	1.1		1		1	U	1	U
Vanadium	7440-62-2	260		8.6	5	U	5	U	5	U	5	U	5	U	5	U
Zinc	7440-66-6	2000		600	44.6	UJ	44.6	UJ	90.1		96.2		74.4		44.6	U
Mercury	7439-97-6	2	2	0.063	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ

Table 4 – Groundwater Samples from EPA Monitoring Wells
Radionuclides

CLP Sample Number:		R34243-59				R34243-60				R34243-61				R34243-69				R34243-62			
Sample #:		GW01				GW02				GW03				GW04				GW05			
Sampling Location:		EPA01				EPA02				EPA02				EPA03D				EPA03S			
Matrix:		WATER-GROUND				WATER-GROUND				WATER-GROUND				WATER-GROUND				WATER-GROUND			
Sample Type:		Lab QC				Field Sample				Field Duplicate of GW02				Field Sample				Field Sample			
Units:		PCI/L				PCI/L				PCI/L				PCI/L				PCI/L			
Date Sampled:		9/23/2013				9/23/2013				9/23/2013				9/24/2013				9/24/2013			
Date Analyzed:		12/9/2013				12/9/2013				12/9/2013				12/9/2013				12/9/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0269		0.0568	0.102	0.0243		0.0523	0.09	0.031		0.0546	0.0908	0.112		0.14	0.189	0.0503		0.064	0.0952
Ba140	NAREL GAM-01	-279		10800	1050	479		849	1410	14.6		616	1030	-148		962	1550	-501		3230	1830
Bi214	NAREL GAM-01													3.22	J	1.79	2.77		J		
Co60	NAREL GAM-01	0.488		0.548	0.895	-0.102		10.6	1.03	-0.071		30.4	0.944	0.209		0.704	1.2	-0.132		5.28	1
Cs137	NAREL GAM-01	-0.108		0.575	0.967	-0.478		6.73	1.48	0.232		0.62	1.03	-0.22		3.42	1.51	0.00454		0.885	1.52
I131	NAREL GAM-01																				
K40	NAREL GAM-01	-11.7		19.8	11.7	-0.289		13.1	19.3	-8.29		11.5	11.6	61		17.6	20.3	-1.79		11.3	17.6
Pb212	NAREL GAM-01													4.4	J	1.79	2.63				
Pb214	NAREL GAM-01													2.47	J	1.82	2.79				
Ra226	NAREL GAM-01	3.01	J	13.4	22.5	-5.91	J	21.7	33.7	-10.9	J	42	26.6	17.9	J	23.1	36.4	-8.65	J	48.3	50.5
Ra228	NAREL GAM-01	-0.436		4.85	3.62	0.111		3.66	5.57	2.37		3.07	4.4	2.19		3.06	5.11	-1.98		5.21	5.79
Tl208	NAREL GAM-01													1.1	J	0.986	1.5				
Pu238	NAREL PU-EICHROM	0.0836		0.0852	0.109	0.0648		0.083	0.128	0.056		0.0776	0.123	-0.0407		0.076	0.248	0.0244		0.0527	0.0903
Pu239	NAREL PU-EICHROM	-0.0261		0.0544	0.154	0.0249		0.0639	0.121	-0.03		0.0534	0.154	0.0509		0.11	0.188	-0.0049		0.0469	0.119
Th227	NAREL TH-EICHROM	0.0647		0.0876	0.108	-0.0248	J	0.0596	0.187	0.025		0.0738	0.127	0.0343		0.1	0.172	0.026		0.0755	0.13
Th228	NAREL TH-EICHROM	0.0441		0.0675	0.114	0.0368	J	0.0651	0.112	-0.014		0.066	0.158	0.842		0.267	0.173	-0.0048		0.0571	0.137
Th230	NAREL TH-EICHROM	-0.004		0.0266	0.0741	0.00921	J	0.0412	0.085	-0.005		0.0313	0.0873	0.294		0.16	0.133	0		0.0453	0.11
Th232	NAREL TH-EICHROM	0.02		0.0431	0.074	-0.0046	J	0.0305	0.085	-0.005		0.0452	0.115	0.351		0.173	0.133	-0.0048		0.032	0.0891
U234	NAREL U-EICHROM	0.323		0.153	0.11	0.0647		0.0823	0.122	0.048		0.0828	0.144	2.26		0.398	0.194	0.11		0.097	0.119
U235	NAREL U-EICHROM	0.0127		0.0568	0.117	0.0258		0.0708	0.134	-0.006		0.0421	0.117	0.0872		0.104	0.162	0.069		0.0865	0.116
U238	NAREL U-EICHROM	0.191		0.116	0.0797	0.0324		0.0683	0.122	0.069		0.0802	0.11	1.1		0.259	0.126	0.0942		0.0916	0.119

Table 4 – Groundwater Samples from EPA Monitoring Wells
Radionuclides

	CLP Sample Number:	R34243-63				R34243-64			
	Sample #:	GW06				GW07			
	Sampling Location:	EPA04				HW15			
	Matrix:	WATER-GROUND				WATER-GROUND			
	Sample Type:	Field Sample				Field Sample			
	Units:	PCI/L				PCI/L			
	Date Sampled:	9/24/2013				9/24/2013			
	Date Analyzed:	12/9/2013				12/9/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.00881		0.0394	0.081	0.025		0.0435	0.0618
Ba140	NAREL GAM-01	176		986	1690	-218		13000	1710
Bi214	NAREL GAM-01	4.71	J	2.71	3.63	4.05	J	2.59	3.56
Co60	NAREL GAM-01	0.29		0.64	1.11	0.11		0.682	1.2
Cs137	NAREL GAM-01	-0.147		0.919	1.56	0.24		0.89	1.5
I131	NAREL GAM-01								
K40	NAREL GAM-01	8.2		10.2	17	-14.7		20	18.9
Pb212	NAREL GAM-01								
Pb214	NAREL GAM-01								
Ra226	NAREL GAM-01	-15.4	J	73.9	50	-12.5	J	60.1	49.4
Ra228	NAREL GAM-01	-2.71		7.15	6.17	-1.28		4.46	5.98
Tl208	NAREL GAM-01								
Pu238	NAREL PU-EICHROM	0.00422		0.0485	0.109	0.043		0.0674	0.112
Pu239	NAREL PU-EICHROM	-0.0042		0.028	0.078	0.043		0.0603	0.0904
Th227	NAREL TH-EICHROM	-0.009		0.0598	0.167	0.028		0.0798	0.138
Th228	NAREL TH-EICHROM	0.156		0.106	0.105	0.153		0.108	0.116
Th230	NAREL TH-EICHROM	0.0503		0.0697	0.105	0.026		0.055	0.0944
Th232	NAREL TH-EICHROM	0.0301		0.0531	0.076	0.015		0.0445	0.0767
U234	NAREL U-EICHROM	0.828		0.222	0.138	0.165		0.0993	0.0803
U235	NAREL U-EICHROM	0.0148		0.055	0.112	0.021		0.0571	0.108
U238	NAREL U-EICHROM	0.651		0.191	0.1	0.065		0.0647	0.0654

Table 5 - Kiskiminetas River Sediments
Inorganics

			CLP Sample No.	MC0AC4		MC0AC5		MC0AC6		MC0AC7		MC0AC8		MC0AC9		MC0AD0		MC0AD1	
			Sample #:	SD05		SD06		SD07		SD08		SD09		SD10		SD11		SD12	
			Sampling Location:	5		6		7		7		8		9		10		11	
			Matrix:	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
			Date Sampled:	9/16/2013		9/16/2013		9/16/2013		9/16/2013		9/16/2013		9/17/2013		9/17/2013		9/17/2013	
Yellow > 3x Avg. Background			Date Analyzed:	10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013	
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	33000	E200.7	14200		15300		17300		17300		10700		11200		12200		10500	
Calcium	7440-70-2	4352.5	E200.7	1840		3710		4690		3640		1300		1170		1860		2320	
Iron	7439-89-6	209950	E200.7	41000		50200		47700		47600		81900		103000		128000		95700	
Magnesium	7439-95-4	3442.5	E200.7	1910		2640		2240		2390		1830		1720		1470		1600	
Manganese	7439-96-5	7550	E200.7	1410		3660		1730		2020		6430		5980		647		3890	
Potassium	7440-09-7	3440	E200.7	1620	J	2050	J	1980	J	1900	J	1220	J	1060	J	1100	J	1270	J
Sodium	7440-23-5	3000.65	E200.7	747	U	1010	U	1040	U	998	U	669	U	649	U	849	U	659	U
Antimony	7440-36-0	13.35	E200.8	7.5	UJ	10.1	UJ	10.4	UJ	10	UJ	6.7	UJ	6.5	UJ	8.5	UJ	6.6	UJ
Arsenic	7440-38-2	86.2	E200.8	12.5	J+	19.8	J+	16.6	J+	16.8	J+	31.5	J+	27.8	J+	59.5	J+	28.4	J+
Barium	7440-39-3	603	E200.8	129	J+	165	J+	149	J+	146	J+	295	J+	203	J+	145	J+	149	J+
Beryllium	7440-41-7	5.25	E200.8	1.5	J	2.1	J	2.4	J	2.7	J	2.7	J	2.3	J	1.1	J	1.9	J
Cadmium	7440-43-9	5.8	E200.8	0.3	J	0.82	J	1.5	J	1.1	J	0.46	J	0.58	J	0.61	J	0.44	J
Chromium	7440-47-3	75.1	E200.8	25.8	J+	31	J+	29.1	J+	35	J+	35.4	J+	53.3	J+	85.7	J+	57.5	J+
Cobalt	7440-48-4	120.1	E200.8	30.3	J+	54.5	J+	48.4	J+	51.5	J+	86	J+	96.3	J+	13.3	J+	62.7	J+
Copper	7440-50-8	84	E200.8	20.5	J+	37.8	J+	35.1	J+	32.5	J+	49.1	J+	37.5	J+	48.3	J+	39.3	J+
Lead	7439-92-1	125.15	E200.8	24.4		36.7		179		45.2		58.3		35.6		88.4		36.9	
Nickel	7440-02-0	174	E200.8	52.1	J+	83.2	J+	81.1	J+	87	J+	110	J+	111	J+	42.5	J+	86.1	J+
Selenium	7782-49-2	5.6	E200.8	18.7	U	25.2	U	26.1	U	25	U	16.7	U	16.2	U	21.2	U	16.5	U
Silver	7440-22-4	0.204	E200.8	3.7	U	5	U	5.2	U	5	U	3.3	U	3.2	U	4.2	U	3.3	U
Thallium	7440-28-0	5.8	E200.8	3.7	U	5	U	5.2	U	5	U	3.3	U	3.2	U	4.2	U	3.3	U
Uranium	7440-61-1	3.35	E200.8	0.85	J	1.2	J	1.2	J	1.3	J	1.5	J	1.1	J	0.95	J	0.95	J
Vanadium	7440-62-2	73.475	E200.8	25.9	J+	29	J+	29.8	J+	32.3	J+	36.8	J+	32.7	J+	33.9	J+	28.1	J+
Zinc	7440-66-6	529.5	E200.8	148	J+	235	J+	408	J+	272	J+	312	J+	283	J+	148	J+	244	J+
Mercury	7439-97-6	0.2865	E245.5	0.039	J-	0.15	J-	0.094	J-	0.095	J-	0.045	J-	0.034	J-	0.5	J-	0.0073	J-

Table 5 - Kiskiminetas River Sediments
Inorganics

			CLP Sample No.	MC0AD2		MC0AD3		MC0AD4		MC0AD5		MC0AD6		MC0AD7		MC0AD8		MC0AD9	
			Sample #:	SD13		SD14		SD15		SD16		SD17		SD18		SD19		SD20	
			Sampling Location:	12		13		14		14		15		16		17		18	
			Matrix:	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
			Date Sampled:	9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013	
Yellow > 3x Avg. Background			Date Analyzed:	10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/14/2013	
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	33000	E200.7	8770		8570		9660		11200		16600		14500		10200		8460	
Calcium	7440-70-2	4352.5	E200.7	1670		822		1350		1510		1970		3390		5570		688	
Iron	7439-89-6	209950	E200.7	84700		91400		60200		56000		30400		107000		133000		115000	J
Magnesium	7439-95-4	3442.5	E200.7	1260		1090		1220		1750		2270		1820		2060		887	J
Manganese	7439-96-5	7550	E200.7	4230		2660		2400		2130		894		7230		2200		1020	J
Potassium	7440-09-7	3440	E200.7	860	J	971	J	1060	J	1430	J	1830	J	1300	J	1010	J	915	
Sodium	7440-23-5	3000.65	E200.7	661	U	654	U	678	U	689	U	936	U	786	U	635	U	41.1	J
Antimony	7440-36-0	13.35	E200.8	6.6	UJ	6.5	UJ	6.8	UJ	6.9	UJ	9.4	UJ	7.9	UJ	6.4	UJ	6.5	R
Arsenic	7440-38-2	86.2	E200.8	25.2	J+	35.7	J+	22.7	J+	21	J+	13	J+	22.3	J+	20.5	J+	16.6	
Barium	7440-39-3	603	E200.8	161	J+	202	J+	164	J+	231	J+	209	J+	798	J+	284	J+	177	
Beryllium	7440-41-7	5.25	E200.8	2	J	2.6	J	2.1	J	2.2	J	1.7	J	3.3	J	1.6	J	3.2	U
Cadmium	7440-43-9	5.8	E200.8	0.48	J	0.66	J	0.38	J	0.41	J	0.56	J	0.9	J	0.29	J	3.2	U
Chromium	7440-47-3	75.1	E200.8	28.3	J+	47.6	J+	46.8	J+	30.8	J+	31.9	J+	105	J+	45.3	J+	19.1	J
Cobalt	7440-48-4	120.1	E200.8	63.4	J+	75.1	J+	55.3	J+	54.6	J+	22.7	J+	140	J+	31.6	J+	22.8	
Copper	7440-50-8	84	E200.8	32	J+	53.2	J+	28.4	J+	29.6	J+	28.6	J+	41.3	J+	35.3	J+	25.5	J
Lead	7439-92-1	125.15	E200.8	34.7		52.9		33.2		35.4		32.3		56.1		32.1		27.9	J
Nickel	7440-02-0	174	E200.8	79.3	J+	101	J+	78.4	J+	71.7	J+	45.2	J+	183	J+	48.3	J+	41.7	J
Selenium	7782-49-2	5.6	E200.8	16.5	U	16.3	U	16.9	U	17.2	U	23.4	U	19.7	U	15.9	U	0.94	J
Silver	7440-22-4	0.204	E200.8	3.3	U	3.3	U	3.4	U	3.4	U	4.7	U	3.9	U	3.2	U	3.2	U
Thallium	7440-28-0	5.8	E200.8	3.3	U	3.3	U	3.4	U	3.4	U	4.7	U	3.9	U	3.2	U	3.2	U
Uranium	7440-61-1	3.35	E200.8	0.92	J	1.3	J	0.95	J	1.1	J	1.4	J	1.6	J	0.73	J	0.92	J
Vanadium	7440-62-2	73.475	E200.8	26.4	J+	40.8	J+	27.9	J+	32.6	J+	41.4	J+	42.1	J+	24.6	J+	24.3	J-
Zinc	7440-66-6	529.5	E200.8	231	J+	350	J+	221	J+	235	J+	145	J+	413	J+	195	J+	155	J
Mercury	7439-97-6	0.2865	E245.5	0.013	J-	0.022	J-	0.047	J-	0.032	J-	0.056	J-	0.068	J-	0.0081	J-	0.018	J-

Table 5 - Kiskiminetas River Sediments
Inorganics

				MC0AE0		MC0AE1		MC0AE2		MC0AE3		MC0AE4		MC0AE5		MC0AE6		MC0AE7	
			CLP Sample No.																
			Sample #:	SD21		SD22		SD23		SD24		SD25		SD26		SD27		SD28	
			Sampling Location:	19		20		21		22		23		24		25		26	
			Matrix:	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
			Date Sampled:	9/17/2013		9/17/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013	
Yellow > 3x Avg. Background			Date Analyzed:	10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013	
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	33000	E200.7	9680		17300		14700		10200		11000		12000		11100		13000	
Calcium	7440-70-2	4352.5	E200.7	1680		1480		1310		775		1280		1020		1890		1170	
Iron	7439-89-6	209950	E200.7	62500	J	29300	J	126000	J	139000	J	97000	J	112000	J	78000	J	86000	J
Magnesium	7439-95-4	3442.5	E200.7	1090	J	2200	J	1710	J	1120	J	1320	J	1740	J	1680	J	1600	J
Manganese	7439-96-5	7550	E200.7	2550	J	818	J	4370	J	2650	J	4060	J	2980	J	3430	J	4030	J
Potassium	7440-09-7	3440	E200.7	1330		2080		1560		1310		1390		1530		1490		1550	
Sodium	7440-23-5	3000.65	E200.7	76.4	J	133	J	149	J	58	J	77.1	J	71	J	138	J	82.2	J
Antimony	7440-36-0	13.35	E200.8	6.7	R	7.2	R	6.5	R	6.6	R	6.5	R	6.4	R	6.3	R	6.5	R
Arsenic	7440-38-2	86.2	E200.8	19.7		6		27.6		38.6		24.2		20.4		20.8		17.2	
Barium	7440-39-3	603	E200.8	143		148		168		154		142		164		262		184	
Beryllium	7440-41-7	5.25	E200.8	3.4	U	3.6	U	3.3	U	3.3	U	3.3	U	3.2	U	3.2	U	3.2	U
Cadmium	7440-43-9	5.8	E200.8	3.4	U	3.6	U	3.3	U	3.3	U	3.3	U	3.2	U	3.2	U	3.2	U
Chromium	7440-47-3	75.1	E200.8	26.7	J	19.5	J	34.1	J	23.5	J	29.9	J	25.2	J	122	J	22	J
Cobalt	7440-48-4	120.1	E200.8	51.7		11.1		89.7		52.4		66.9		60		64.6		57.6	
Copper	7440-50-8	84	E200.8	26.9	J	12.2	J	35.8	J	31.4	J	31.5	J	29.8	J	47.3	J	26.8	J
Lead	7439-92-1	125.15	E200.8	31.8	J	14.2	J	40.2	J	38.2	J	33.1	J	34.6	J	94.1	J	28.6	J
Nickel	7440-02-0	174	E200.8	65.1	J	19.7	J	105	J	67.6	J	79.3	J	74.5	J	77.7	J	71.9	J
Selenium	7782-49-2	5.6	E200.8	1.1	J	0.63	J	1.2	J	1.1	J	1.2	J	1.1	J	1.1	J	0.99	J
Silver	7440-22-4	0.204	E200.8	3.4	U	3.6	U	0.033	J	0.043	J	0.041	J	0.031	J	0.046	J	0.025	J
Thallium	7440-28-0	5.8	E200.8	3.4	U	3.6	U	3.3	U	3.3	U	3.3	U	3.2	U	3.2	U	3.2	U
Uranium	7440-61-1	3.35	E200.8	0.96	J	0.98	J	1.7	J	1.1	J	1.1	J	1.1	J	1.1	J	0.94	J
Vanadium	7440-62-2	73.475	E200.8	21.9		27.4		30.9		27.7		26.1		26.3		39		23.9	
Zinc	7440-66-6	529.5	E200.8	203	J	55.9	J	333	J	232	J	236	J	244	J	280	J	203	J
Mercury	7439-97-6	0.2865	E245.5	0.02	J-	0.044	J	0.088	J	0.024	J	0.027	J	0.0094	J-	0.019	J-	0.02	J-

Table 5 - Kiskiminetas River Sediments
Inorganics

			CLP Sample No.	MC0AE8		MC0AE9		MC0AF0		MC0AF1		MC0AF2		MC0AF3		MC0AF5		MC0AF6	
			Sample #:	SD29		SD30		SD31		SD32		SD33		SD34		SD36		SD37	
			Sampling Location:	26		27		28		29		30		31		32		33	
			Matrix:	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
			Date Sampled:	9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013	
Yellow > 3x Avg. Background			Date Analyzed:	10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013		10/14/2013	
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	33000	E200.7	11900		9210		11400		10200		10400		10400		9970		11500	
Calcium	7440-70-2	4352.5	E200.7	1130		708		1310		1360		5740		1200		926		1770	
Iron	7439-89-6	209950	E200.7	88200	J	73200	J	100000	J	94000	J	81600	J	82700	J	86900	J	96000	J
Magnesium	7439-95-4	3442.5	E200.7	1790	J	1150	J	1570	J	1220	J	1410	J	1210	J	1300	J	1600	J
Manganese	7439-96-5	7550	E200.7	3760	J	2420	J	3900	J	3820	J	4150	J	3110	J	3000	J	3640	J
Potassium	7440-09-7	3440	E200.7	1480		1390		1460		1250		1320		1330		1360		1430	
Sodium	7440-23-5	3000.65	E200.7	73.8	J	60.8	J	63.5	J	62.3	J	103	J	82.8	J	63.1	J	98.5	J
Antimony	7440-36-0	13.35	E200.8	6.4	R	6.4	R	6.5	R	6.7	R	1.2	J-	0.46	J-	0.79	J-	0.5	J-
Arsenic	7440-38-2	86.2	E200.8	21.3		26.1		20.3		28		23.1		22		35.1		39.9	
Barium	7440-39-3	603	E200.8	175		144		258		207		160		143		148		167	
Beryllium	7440-41-7	5.25	E200.8	3.2	U	3.2	U	3.2	U	3.3	U	3.2	U	3.3	U	3.2	U	3.1	U
Cadmium	7440-43-9	5.8	E200.8	3.2	U	3.2	U	3.2	U	3.3	U	3.2	U	3.3	U	3.2	U	3.1	U
Chromium	7440-47-3	75.1	E200.8	20.7	J	42	J	39.9	J	25.5	J	53.3	J	27	J	36.6	J	24.1	J
Cobalt	7440-48-4	120.1	E200.8	58.6		57		54		75.9		56.3		56.6		61		49.3	
Copper	7440-50-8	84	E200.8	36.2	J	38.9	J	38.1	J	30.2	J	28.2	J	26.9	J	33.3	J	28.3	J
Lead	7439-92-1	125.15	E200.8	35.3	J	38.7	J	41.5	J	36.2	J	39.9	J	30.2	J	42.7	J	43	J
Nickel	7440-02-0	174	E200.8	76.5	J	71.4	J	67.6	J	85.8	J	75.8	J	70.2	J	72.9	J	63.2	J
Selenium	7782-49-2	5.6	E200.8	1.4	J	1.2	J	0.98	J	1.3	J	1.3	J	1.3	J	1.5	J	1.2	J
Silver	7440-22-4	0.204	E200.8	0.038	J	0.03	J	0.032	J	0.034	J	0.041	J	0.036	J	0.035	J	0.036	J
Thallium	7440-28-0	5.8	E200.8	3.2	U	3.2	U	3.2	U	3.3	U	3.2	U	3.3	U	3.2	U	3.1	U
Uranium	7440-61-1	3.35	E200.8	1.2	J	1.3	J	1.2	J	1.1	J	1	J	0.98	J	1.2	J	1	J
Vanadium	7440-62-2	73.475	E200.8	29.3		31.3		34.5		26.2		26.8		26.6		37.3		32.5	
Zinc	7440-66-6	529.5	E200.8	220	J	230	J	234	J	246	J	237	J	213	J	239	J	206	J
Mercury	7439-97-6	0.2865	E245.5	0.023	J	0.093	J	0.098	J	0.019	J-	0.015	J-	0.024	J	0.019	J-	0.02	J

Table 5 - Kiskiminetas River Sediments
Inorganics

			CLP Sample No.	MC0AF7		MC0AF8		MC0AF9		MC0AG0		MC0AG1		MC0AG2		MC0AG3		MC0AG4	
			Sample #:	SD38		SD39		SD40		SD41		SD42		SD43		SD44		SD45	
			Sampling Location:	34		35		36		37		38		39		40		41	
			Matrix:	Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
			Date Sampled:	9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/19/2013	
Yellow > 3x Avg. Background			Date Analyzed:	10/13/2013		10/13/2013		10/15/2013		10/15/2013		10/15/2013		10/13/2013		10/15/2013		10/13/2013	
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	33000	E200.7	11500	J	30600	J	29500	J	16100	J	15900	J	11400	J	23000	J	20300	J
Calcium	7440-70-2	4352.5	E200.7	2170	UJ	3150	J	1530	J	4990	J	1880	J	2020	UJ	5290	J	6350	J
Iron	7439-89-6	209950	E200.7	86800	J	86700	J	64600	J	33900	J	49900	J	88600	J	42200	J	39900	J
Magnesium	7439-95-4	3442.5	E200.7	2170	UJ	3260	J	1920	J	2290	J	1560	J	2020	UJ	3440	J	4970	UJ
Manganese	7439-96-5	7550	E200.7	3310	J	1520	J	227	J	3290	J	1120	J	3800	J	3310	J	3130	J
Potassium	7440-09-7	3440	E200.7	2170	UJ	2990	J	2100	J	2150	J	1460	J	2020	UJ	3130	J	4970	UJ
Sodium	7440-23-5	3000.65	E200.7	2170	U	2860	U	1160	U	1220	U	882	U	2020	U	1260	U	4970	U
Antimony	7440-36-0	13.35	E200.8	7.2	UJ	9.5	UJ	11.6	UJ	12.2	UJ	8.8	UJ	6.7	UJ	12.6	UJ	16.6	UJ
Arsenic	7440-38-2	86.2	E200.8	23		17		16.7		13.1		16.7		30.8		16.4		16.3	
Barium	7440-39-3	603	E200.8	197		167		158		189		170		197		223		239	
Beryllium	7440-41-7	5.25	E200.8	3.6	U	4.8	U	5.8	U	6.1	U	4.4	U	3.4	U	6.3	U	8.3	U
Cadmium	7440-43-9	5.8	E200.8	3.6	U	4.8	U	5.8	U	6.1	U	4.4	U	3.4	U	6.3	U	8.3	U
Chromium	7440-47-3	75.1	E200.8	25.9		33.1		42.4		28		34.4		33.9		34.4		42.5	
Cobalt	7440-48-4	120.1	E200.8	56.5		33.8		29.3		45.7		30.3		50.8		33.5		40.9	
Copper	7440-50-8	84	E200.8	28.3	J	34.9	J	41.7	J	32.4	J	30.6	J	41.5	J	33	J	41.3	J
Lead	7439-92-1	125.15	E200.8	28.6		38.2		42.6		40.8		35		50.7		44.2		64.3	
Nickel	7440-02-0	174	E200.8	69.1	J	60.6	J	51.3	J	71.8	J	56.3	J	65.6	J	56.5	J	72.1	J
Selenium	7782-49-2	5.6	E200.8	1.5	J	2	J	2.8	J	1.6	J	1.5	J	1.7	J	1.8	J	1.9	J
Silver	7440-22-4	0.204	E200.8	0.027	J	0.3	J	0.28	J	0.14	J	0.077	J	0.041	J	0.099	J	0.15	J
Thallium	7440-28-0	5.8	E200.8	3.6	U	4.8	U	5.8	U	6.1	U	4.4	U	3.4	U	6.3	U	8.3	U
Uranium	7440-61-1	3.35	E200.8	0.95		1.5		2.3		1.4		2		1.3		1.5		1.7	
Vanadium	7440-62-2	73.475	E200.8	26.6		33.9		38.9		30.6	U	26.3		46.4		37.4		42.7	
Zinc	7440-66-6	529.5	E200.8	223	J	215	J	239	J	203	J	213	J	231	J	178	J	244	J
Mercury	7439-97-6	0.2865	E245.5	0.049	J	0.26		0.19	J	0.13	J	0.093	J	0.048	J	0.16	J	0.16	J

Table 5 - Kiskiminetas River Sediments
Inorganics

			CLP Sample No.	MC0AG5		MC0AG6		MC0AG7		MC0AG8		MC0AG9		MC0AH0		MC0AH1	
			Sample #:	SD46		SD47		SD48		SD49		SD50		SD51		SD52	
			Sampling Location:	42		43		44		44		45		46		47	
			Matrix:	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
			Units:	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
			Date Sampled:	9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013	
Yellow > 3x Avg. Background			Date Analyzed:	10/13/2013		10/13/2013		10/15/2013		10/15/2013		10/17/2013		10/15/2013		10/15/2013	
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	33000	E200.7	25200	J	10800	J	15400	J	17400	J	15100	J	19600	J	10300	J
Calcium	7440-70-2	4352.5	E200.7	2440	UJ	2120	UJ	3160	J	3480	J	1760	J	2290	J	1920	J
Iron	7439-89-6	209950	E200.7	59200	J	57100	J	35000	J	39100	J	40300	J	24300	J	40600	J
Magnesium	7439-95-4	3442.5	E200.7	2440	UJ	2400	J	2280	J	2610	J	1780	J	2540	J	1300	J
Manganese	7439-96-5	7550	E200.7	289	J	2340	J	1420	J	1540	J	1110	J	525	J	2080	J
Potassium	7440-09-7	3440	E200.7	2440	UJ	2120	UJ	1940	J	2270	J	1680	J	2420	J	1270	J
Sodium	7440-23-5	3000.65	E200.7	2440	U	2120	U	1200	U	1310	U	896	U	1010	U	935	U
Antimony	7440-36-0	13.35	E200.8	16.3	UJ	7.1	UJ	12	UJ	13.1	UJ	9	UJ	10.1	UJ	9.3	UJ
Arsenic	7440-38-2	86.2	E200.8	20.6		21.4		14.5		14.8		16.6		8.3		10.6	
Barium	7440-39-3	603	E200.8	206	J+	129		173		164		138		169		109	
Beryllium	7440-41-7	5.25	E200.8	8.1	U	3.5	U	6	U	6.6	U	4.5	U	5.1	U	1.4	J
Cadmium	7440-43-9	5.8	E200.8	8.1	U	3.5	U	6	U	6.6	U	4.5	U	5.1	U	4.7	U
Chromium	7440-47-3	75.1	E200.8	35.5		31.3		46.1		47.2		39.9		25.7		15.2	
Cobalt	7440-48-4	120.1	E200.8	28.3	J+	70.9		38.6		43.3		20.3		18.4		33.2	
Copper	7440-50-8	84	E200.8	44	J+	30	J	30.3	J	32.7	J	31.3	J	16.2	J	19.8	J
Lead	7439-92-1	125.15	E200.8	70.8		35.2		40.7		42.9		52.9		17.7		26.6	
Nickel	7440-02-0	174	E200.8	45.2	J+	85.3	J	67.3	J	73.6	J	39.1	J	28.6	J	46.9	J
Selenium	7782-49-2	5.6	E200.8	2.2	J	1.5	J	1.7	J	1.7	J	1.7	J	1.2	J	0.43	J
Silver	7440-22-4	0.204	E200.8	0.15	J+	0.038	J	0.098	J	0.11	J	0.18	J	0.066	J	0.047	J
Thallium	7440-28-0	5.8	E200.8	4.1	U	3.5	U	6	U	6.6	U	4.5	U	5.1	U	4.7	U
Uranium	7440-61-1	3.35	E200.8	0.33	J	1.1		1.4		1.6		1.3		1.3		0.75	
Vanadium	7440-62-2	73.475	E200.8	33.2		26.6		36.8		41.5		30		35.5		23.4	UJ
Zinc	7440-66-6	529.5	E200.8	246	J+	238	J	221	J	239	J	141	J	72.2	J	147	J
Mercury	7439-97-6	0.2865	E245.5	0.12	J	0.039	J	0.1	J	0.12	J	0.12	J	0.068	J	0.093	J

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				CLP Sample No.		MC0AH2		MC0AH3		MC0AH4		MC0AH5		MC0AH6		MC0AH7		
				Sample #:		SD53		SD54		SD55		SD56		SD57		SD58		
				Sampling Location:		48 (Backgrnd)		48 (Backgrnd)		49 (Backgrnd)		50 (Backgrnd)		51 (Backgrnd)		52 (Backgrnd)		Average
				Matrix:		Soil		Soil		Soil		Soil		Soil		Soil		Background
				Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg
				Date Sampled:		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		
Yellow > 3x Avg. Background				Date Analyzed:		10/13/2013		10/13/2013		10/13/2013		10/13/2013		10/13/2013		10/17/2013		
Parameter	CAS No.	3X Avg Background	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result
Aluminum	7429-90-5	33000	E200.7	9580	J	10200	J	11200	J	13200	J	14800	J	7020		11000		
Calcium	7440-70-2	4352.5	E200.7	2210	UJ	2300	UJ	2040	UJ	2760	UJ	2640	J	1410		1451		
Iron	7439-89-6	209950	E200.7	64000	J	70000	J	88500	J	65900	J	82100	J	49400	J	69983		
Magnesium	7439-95-4	3442.5	E200.7	2210	UJ	2300	UJ	2040	UJ	2760	UJ	2540	UJ	960	J	1148		
Manganese	7439-96-5	7550	E200.7	2420	J	2210	J	1560	J	1900	J	2790	J	4220	J	2517		
Potassium	7440-09-7	3440	E200.7	2210	UJ	2300	UJ	2040	UJ	2760	UJ	2540	UJ	955		1147		
Sodium	7440-23-5	3000.65	E200.7	2210	U	2300	U	2040	U	2760	U	2540	U	76.3	J	1000		
Antimony	7440-36-0	13.35	E200.8	7.4	UJ	7.7	UJ	6.8	UJ	9.2	UJ	8.5	UJ	6.9	R	4		
Arsenic	7440-38-2	86.2	E200.8	18.5		32.3		44.8		26.1		36.6		14.1		29		
Barium	7440-39-3	603	E200.8	220		281		129		173		300		103		201		
Beryllium	7440-41-7	5.25	E200.8	1.4	J	3.8	U	3.4	U	4.6	U	4.2	U	1.1	J	2		
Cadmium	7440-43-9	5.8	E200.8	3.7	U	3.8	U	3.4	U	4.6	U	4.2	U	3.5	U	2		
Chromium	7440-47-3	75.1	E200.8	17.5		31.8		29.6		30.5		31.5		9.3		25		
Cobalt	7440-48-4	120.1	E200.8	27.3		65.4		39.7		48.4		25.6		33.8		40		
Copper	7440-50-8	84	E200.8	21.3	J	38.5	J	30.5	J	28.3	J	32.2	J	17.2		28		
Lead	7439-92-1	125.15	E200.8	25.3		33.3		46.3		36.8		92.7		15.9		42		
Nickel	7440-02-0	174	E200.8	44.5	J	87.4	J	61.4	J	70.2	J	39.7	J	44.8		58		
Selenium	7782-49-2	5.6	E200.8	2.1	J	1.8	J	1.4	J	1.8	J	3.1	J	1	J	2		
Silver	7440-22-4	0.204	E200.8	0.041	J	0.036	J	0.037	J	0.061	J	0.21	J	0.023	J	0		
Thallium	7440-28-0	5.8	E200.8	3.7	U	3.8	U	3.4	U	4.6	U	4.2	U	3.5	U	2		
Uranium	7440-61-1	3.35	E200.8	1.5		1.2		1.2		1.1		1.2		0.5	J-	1		
Vanadium	7440-62-2	73.475	E200.8	18.4	UJ	32.1		35.8		27.7		33.5		17.3	U	24		
Zinc	7440-66-6	529.5	E200.8	123	J	246	J	191	J	221	J	148	J	130		177		
Mercury	7439-97-6	0.2865	E245.5	0.028	J	0.052	J	0.018	J	0.19		0.23		0.055	J	0		

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

	CLP Sample No.		MC0AC4		MC0AC5		MC0AC6		MC0AC7		MC0AC8		MC0AC9		MC0AD0		MC0AD1	
	Sample #:		SD05		SD06		SD07		SD08		SD09		SD10		SD11		SD12	
	Sampling Location:		5		6		7		7		8		9		10		11	
	Matrix:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Date Sampled:		9/16/2013		9/16/2013		9/16/2013		9/16/2013		9/16/2013		9/17/2013		9/17/2013		9/17/2013	
	Date Analyzed:		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5		14200		15300		17300		17300		10700		11200		12200		10500	
Calcium	7440-70-2		1840		3710		4690		3640		1300		1170		1860		2320	
Iron	7439-89-6	20000	**41000**		**50200**		**47700**		**47600**		**81900**		**103000**		**128000**		**95700**	
Magnesium	7439-95-4		1910		2640		2240		2390		1830		1720		1470		1600	
Manganese	7439-96-5	460	**1410**		**3660**		**1730**		**2020**		**6430**		**5980**		**647**		**3890**	
Potassium	9440-09-7		1620	J	2050	J	1980	J	1900	J	1220	J	1060	J	1100	J	1270	J
Sodium	7440-23-5																	
Antimony	7440-36-0	2																
Arsenic	7440-38-2	9.8	**12.5**	J+	**19.8**	J+	**16.6**	J+	**16.8**	J+	**31.5**	J+	**27.8**	J+	**59.5**	J+	**28.4**	J+
Barium	7440-39-3		129	J+	165	J+	149	J+	146	J+	295	J+	203	J+	145	J+	149	J+
Beryllium	7440-41-7		1.5	J	2.1	J	2.4	J	2.7	J	2.7	J	2.3	J	1.1	J	1.9	J
Cadmium	7440-43-9	0.99	0.3	J	0.82	J	**1.5**	J	**1.1**	J	0.46	J	0.58	J	0.61	J	0.44	J
Chromium	7440-47-3	43.4	25.8	J+	31	J+	29.1	J+	35	J+	35.4	J+	**53.3**	J+	**85.7**	J+	**57.5**	J+
Cobalt	7440-48-4	50	30.3	J+	**54.5**	J+	48.4	J+	**51.5**	J+	**86**	J+	**96.3**	J+	13.3	J+	**62.7**	J+
Copper	7440-50-8	31.6	20.5	J+	**37.8**	J+	**35.1**	J+	**32.5**	J+	**49.1**	J+	**37.5**	J+	**48.3**	J+	**39.3**	J+
Lead	7439-92-1	35.8	24.4		**36.7**		**179**		**45.2**		**58.3**		35.6		**88.4**		**36.9**	
Nickel	7440-02-0	22.7	**52.1**	J+	**83.2**	J+	**81.1**	J+	**87**	J+	**110**	J+	**111**	J+	**42.5**	J+	**86.1**	J+
Selenium	7782-49-2	2																
Silver	7440-22-4	1																
Thallium	7440-28-0																	
Uranium	7440-61-1		0.85	J	1.2	J	1.2	J	1.3	J	1.5	J	1.1	J	0.95	J	0.95	J
Vanadium	7440-62-2		25.9	J+	29	J+	29.8	J+	32.3	J+	36.8	J+	32.7	J+	33.9	J+	28.1	J+
Zinc	7440-66-6	121	**148**	J+	**235**	J+	**408**	J+	**272**	J+	**312**	J+	**283**	J+	**148**	J+	**244**	J+
Mercury	7439-97-6	0.18	0.039	J-	0.15	J-	0.094	J-	0.095	J-	0.045	J-	0.034	J-	**0.5**	J-	0.0073	J-

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

CLP Sample No.			MC0AD2		MC0AD3		MC0AD4		MC0AD5		MC0AD6		MC0AD7		MC0AD8		MC0AD9	
Sample #:			SD13		SD14		SD15		SD16		SD17		SD18		SD19		SD20	
Sampling Location:			12		13		14		14		15		16		17		18	
Matrix:			Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units:			mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Date Sampled:			9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013		9/17/2013	
Date Analyzed:			10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/8/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5		8770		8570		9660		11200		16600		14500		10200		8460	
Calcium	7440-70-2		1670		822		1350		1510		1970		3390		5570		688	
Iron	7439-89-6	20000	**84700**		**91400**		**60200**		**56000**		**30400**		**107000**		**133000**		**115000**	J
Magnesium	7439-95-4		1260		1090		1220		1750		2270		1820		2060		887	J
Manganese	7439-96-5	460	**4230**		**2660**		**2400**		**2130**		**894**		**7230**		**2200**		**1020**	J
Potassium	9440-09-7		860	J	971	J	1060	J	1430	J	1830	J	1300	J	1010	J	915	
Sodium	7440-23-5																41.1	J
Antimony	7440-36-0	2															**6.5**	R
Arsenic	7440-38-2	9.8	**25.2**	J+	**35.7**	J+	**22.7**	J+	**21**	J+	**13**	J+	**22.3**	J+	**20.5**	J+	**16.6**	
Barium	7440-39-3		161	J+	202	J+	164	J+	231	J+	209	J+	798	J+	284	J+	177	
Beryllium	7440-41-7		2	J	2.6	J	2.1	J	2.2	J	1.7	J	3.3	J	1.6	J		
Cadmium	7440-43-9	0.99	0.48	J	0.66	J	0.38	J	0.41	J	0.56	J	0.9	J	0.29	J		
Chromium	7440-47-3	43.4	28.3	J+	**47.6**	J+	**46.8**	J+	30.8	J+	31.9	J+	**105**	J+	**45.3**	J+	19.1	J
Cobalt	7440-48-4	50	**63.4**	J+	**75.1**	J+	**55.3**	J+	**54.6**	J+	22.7	J+	**140**	J+	31.6	J+	22.8	
Copper	7440-50-8	31.6	**32**	J+	**53.2**	J+	28.4	J+	29.6	J+	28.6	J+	**41.3**	J+	**35.3**	J+	25.5	J
Lead	7439-92-1	35.8	34.7		**52.9**		33.2		35.4		32.3		**56.1**		32.1		27.9	J
Nickel	7440-02-0	22.7	**79.3**	J+	**101**	J+	**78.4**	J+	**71.7**	J+	**45.2**	J+	**183**	J+	**48.3**	J+	**41.7**	J
Selenium	7782-49-2	2															0.94	J
Silver	7440-22-4	1																
Thallium	7440-28-0																	
Uranium	7440-61-1		0.92	J	1.3	J	0.95	J	1.1	J	1.4	J	1.6	J	0.73	J	0.92	J
Vanadium	7440-62-2		26.4	J+	40.8	J+	27.9	J+	32.6	J+	41.4	J+	42.1	J+	24.6	J+	24.3	J-
Zinc	7440-66-6	121	**231**	J+	**350**	J+	**221**	J+	**235**	J+	**145**	J+	**413**	J+	**195**	J+	**155**	J
Mercury	7439-97-6	0.18	0.013	J-	0.022	J-	0.047	J-	0.032	J-	0.056	J-	0.068	J-	0.0081	J-	0.018	J-

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

	CLP Sample No.		MC0AE0		MC0AE1		MC0AE2		MC0AE3		MC0AE4		MC0AE5		MC0AE6		MC0AE7	
	Sample #:		SD21		SD22		SD23		SD24		SD25		SD26		SD27		SD28	
	Sampling Location:		19		20		21		22		23		24		25		26	
	Matrix:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Date Sampled:		9/17/2013		9/17/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013	
	Date Analyzed:		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5		9680		17300		14700		10200		11000		12000		11100		13000	
Calcium	7440-70-2		1680		1480		1310		775		1280		1020		1890		1170	
Iron	7439-89-6	20000	**62500**	J	**29300**	J	**126000**	J	**139000**	J	**97000**	J	**112000**	J	**78000**	J	**86000**	J
Magnesium	7439-95-4		1090	J	2200	J	1710	J	1120	J	1320	J	1740	J	1680	J	1600	J
Manganese	7439-96-5	460	**2550**	J	**818**	J	**4370**	J	**2650**	J	**4060**	J	**2980**	J	**3430**	J	**4030**	J
Potassium	9440-09-7		1330		2080		1560		1310		1390		1530		1490		1550	
Sodium	7440-23-5		76.4	J	133	J	149	J	58	J	77.1	J	71	J	138	J	82.2	J
Antimony	7440-36-0	2	**6.7**	R	**7.2**	R	**6.5**	R	**6.6**	R	**6.5**	R	**6.4**	R	**6.3**	R	**6.5**	R
Arsenic	7440-38-2	9.8	**19.7**		6		**27.6**		**38.6**		**24.2**		**20.4**		**20.8**		**17.2**	
Barium	7440-39-3		143		148		168		154		142		164		262		184	
Beryllium	7440-41-7																	
Cadmium	7440-43-9	0.99																
Chromium	7440-47-3	43.4	26.7	J	19.5	J	34.1	J	23.5	J	29.9	J	25.2	J	**122**	J	22	J
Cobalt	7440-48-4	50	**51.7**		11.1		**89.7**		**52.4**		**66.9**		**60**		**64.6**		**57.6**	
Copper	7440-50-8	31.6	26.9	J	12.2	J	**35.8**	J	31.4	J	31.5	J	29.8	J	**47.3**	J	26.8	J
Lead	7439-92-1	35.8	31.8	J	14.2	J	**40.2**	J	**38.2**	J	33.1	J	34.6	J	**94.1**	J	28.6	J
Nickel	7440-02-0	22.7	**65.1**	J	19.7	J	**105**	J	**67.6**	J	**79.3**	J	**74.5**	J	**77.7**	J	**71.9**	J
Selenium	7782-49-2	2	1.1	J	0.63	J	1.2	J	1.1	J	1.2	J	1.1	J	1.1	J	0.99	J
Silver	7440-22-4	1					0.033	J	0.043	J	0.041	J	0.031	J	0.046	J	0.025	J
Thallium	7440-28-0																	
Uranium	7440-61-1		0.96	J	0.98	J	1.7	J	1.1	J	1.1	J	1.1	J	1.1	J	0.94	J
Vanadium	7440-62-2		21.9		27.4		30.9		27.7		26.1		26.3		39		23.9	
Zinc	7440-66-6	121	**203**	J	55.9	J	**333**	J	**232**	J	**236**	J	**244**	J	**280**	J	**203**	J
Mercury	7439-97-6	0.18	0.02	J-	0.044	J	0.088	J	0.024	J	0.027	J	0.0094	J-	0.019	J-	0.02	J-

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

	CLP Sample No.		MC0AE8		MC0AE9		MC0AF0		MC0AF1		MC0AF2		MC0AF3		MC0AF5		MC0AF6		MC0AF7	
	Sample #:		SD29		SD30		SD31		SD32		SD33		SD34		SD36		SD37		SD38	
	Sampling Location:		26		27		28		29		30		31		32		33		34	
	Matrix:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Date Sampled:		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013	
	Date Analyzed:		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013		10/13/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5		11900		9210		11400		10200		10400		10400		9970		11500		11500	J
Calcium	7440-70-2		1130		708		1310		1360		5740		1200		926		1770			
Iron	7439-89-6	20000	**88200**	J	**73200**	J	**100000**	J	**94000**	J	**81600**	J	**82700**	J	**86900**	J	**96000**	J	**86800**	J
Magnesium	7439-95-4		1790	J	1150	J	1570	J	1220	J	1410	J	1210	J	1300	J	1600	J		
Manganese	7439-96-5	460	**3760**	J	**2420**	J	**3900**	J	**3820**	J	**4150**	J	**3110**	J	**3000**	J	**3640**	J	**3310**	J
Potassium	9440-09-7		1480		1390		1460		1250		1320		1330		1360		1430			
Sodium	7440-23-5		73.8	J	60.8	J	63.5	J	62.3	J	103	J	82.8	J	63.1	J	98.5	J		
Antimony	7440-36-0	2	**6.4**	R	**6.4**	R	**6.5**	R	**6.7**	R	1.2	J-	0.46	J-	0.79	J-	0.5	J-		
Arsenic	7440-38-2	9.8	**21.3**		**26.1**		**20.3**		**28**		**23.1**		**22**		**35.1**		**39.9**		**23**	
Barium	7440-39-3		175		144		258		207		160		143		148		167		197	
Beryllium	7440-41-7																			
Cadmium	7440-43-9	0.99																		
Chromium	7440-47-3	43.4	20.7	J	42	J	39.9	J	25.5	J	**53.3**	J	27	J	36.6	J	24.1	J	25.9	
Cobalt	7440-48-4	50	**58.6**		**57**		**54**		**75.9**		**56.3**		**56.6**		**61**		49.3		**56.5**	
Copper	7440-50-8	31.6	**36.2**	J	**38.9**	J	**38.1**	J	30.2	J	28.2	J	26.9	J	**33.3**	J	28.3	J	28.3	J
Lead	7439-92-1	35.8	35.3	J	**38.7**	J	**41.5**	J	**36.2**	J	**39.9**	J	30.2	J	**42.7**	J	**43**	J	28.6	
Nickel	7440-02-0	22.7	**76.5**	J	**71.4**	J	**67.6**	J	**85.8**	J	**75.8**	J	**70.2**	J	**72.9**	J	**63.2**	J	**69.1**	J
Selenium	7782-49-2	2	1.4	J	1.2	J	0.98	J	1.3	J	1.3	J	1.3	J	1.5	J	1.2	J	1.5	J
Silver	7440-22-4	1	0.038	J	0.03	J	0.032	J	0.034	J	0.041	J	0.036	J	0.035	J	0.036	J	0.027	J
Thallium	7440-28-0																			
Uranium	7440-61-1		1.2	J	1.3	J	1.2	J	1.1	J	1	J	0.98	J	1.2	J	1	J	0.95	
Vanadium	7440-62-2		29.3		31.3		34.5		26.2		26.8		26.6		37.3		32.5		26.6	
Zinc	7440-66-6	121	**220**	J	**230**	J	**234**	J	**246**	J	**237**	J	**213**	J	**239**	J	**206**	J	**223**	J
Mercury	7439-97-6	0.18	0.023	J	0.093	J	0.098	J	0.019	J-	0.015	J-	0.024	J	0.019	J-	0.02	J	0.049	J

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

	CLP Sample No.		MC0AF8		MC0AF9		MC0AG0		MC0AG1		MC0AG2		MC0AG3		MC0AG4		MC0AG5		MC0AG6	
	Sample #:		SD39		SD40		SD41		SD42		SD43		SD44		SD45		SD46		SD47	
	Sampling Location:		35		36		37		38		39		40		41		42		43	
	Matrix:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Date Sampled:		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/18/2013		9/19/2013		9/19/2013		9/19/2013	
	Date Analyzed:		10/13/2013		10/15/2013		10/15/2013		10/15/2013		10/13/2013		10/15/2013		10/13/2013		10/13/2013		10/13/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5		30600	J	29500	J	16100	J	15900	J	11400	J	23000	J	20300	J	25200	J	10800	J
Calcium	7440-70-2		3150	J	1530	J	4990	J	1880	J			5290	J	6350	J				
Iron	7439-89-6	20000	**86700**	J	**64600**	J	**33900**	J	**49900**	J	**88600**	J	**42200**	J	**39900**	J	**59200**	J	**57100**	J
Magnesium	7439-95-4		3260	J	1920	J	2290	J	1560	J			3440	J					2400	J
Manganese	7439-96-5	460	**1520**	J	227	J	**3290**	J	**1120**	J	**3800**	J	**3310**	J	**3130**	J	289	J	**2340**	J
Potassium	9440-09-7		2990	J	2100	J	2150	J	1460	J			3130	J						
Sodium	7440-23-5																			
Antimony	7440-36-0	2																		
Arsenic	7440-38-2	9.8	**17**		**16.7**		**13.1**		**16.7**		**30.8**		**16.4**		**16.3**		**20.6**		**21.4**	
Barium	7440-39-3		167		158		189		170		197		223		239		206	J+	129	
Beryllium	7440-41-7																			
Cadmium	7440-43-9	0.99																		
Chromium	7440-47-3	43.4	33.1		42.4		28		34.4		33.9		34.4		42.5		35.5		31.3	
Cobalt	7440-48-4	50	33.8		29.3		45.7		30.3		**50.8**		33.5		40.9		28.3	J+	**70.9**	
Copper	7440-50-8	31.6	**34.9**	J	**41.7**	J	**32.4**	J	30.6	J	**41.5**	J	**33**	J	**41.3**	J	**44**	J+	30	J
Lead	7439-92-1	35.8	**38.2**		**42.6**		**40.8**		35		**50.7**		**44.2**		**64.3**		**70.8**		35.2	
Nickel	7440-02-0	22.7	**60.6**	J	**51.3**	J	**71.8**	J	**56.3**	J	**65.6**	J	**56.5**	J	**72.1**	J	**45.2**	J+	**85.3**	J
Selenium	7782-49-2	2	**2**	J	**2.8**	J	1.6	J	1.5	J	1.7	J	1.8	J	1.9	J	**2.2**	J	1.5	J
Silver	7440-22-4	1	0.3	J	0.28	J	0.14	J	0.077	J	0.041	J	0.099	J	0.15	J	0.15	J+	0.038	J
Thallium	7440-28-0																			
Uranium	7440-61-1		1.5		2.3		1.4		2		1.3		1.5		1.7		0.33	J	1.1	
Vanadium	7440-62-2		33.9		38.9				26.3		46.4		37.4		42.7		33.2		26.6	
Zinc	7440-66-6	121	**215**	J	**239**	J	**203**	J	**213**	J	**231**	J	**178**	J	**244**	J	**246**	J+	**238**	J
Mercury	7439-97-6	0.18	**0.26**		**0.19**	J	0.13	J	0.093	J	0.048	J	0.16	J	0.16	J	0.12	J	0.039	J

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

	CLP Sample No.		MC0AG7		MC0AG8		MC0AG9		MC0AH0		MC0AH1		MC0AH2		MC0AH3		MC0AH4		MC0AH5	
	Sample #:		SD48		SD49		SD50		SD51		SD52		SD53		SD54		SD55		SD56	
	Sampling Location:		44		44		45		46		47		48 (Backgrnd)		48(Backgrnd)		49(Backgrnd)		50(Backgrnd)	
	Matrix:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
	Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Date Sampled:		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013		9/19/2013	
	Date Analyzed:		10/15/2013		10/15/2013		10/17/2013		10/15/2013		10/15/2013		10/13/2013		10/13/2013		10/13/2013		10/13/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5		15400	J	17400	J	15100	J	19600	J	10300	J	9580	J	10200	J	11200	J	13200	J
Calcium	7440-70-2		3160	J	3480	J	1760	J	2290	J	1920	J								
Iron	7439-89-6	20000	**35000**	J	**39100**	J	**40300**	J	**24300**	J	**40600**	J	**64000**	J	**70000**	J	**88500**	J	**65900**	J
Magnesium	7439-95-4		2280	J	2610	J	1780	J	2540	J	1300	J								
Manganese	7439-96-5	460	**1420**	J	**1540**	J	**1110**	J	**525**	J	**2080**	J	**2420**	J	**2210**	J	**1560**	J	**1900**	J
Potassium	9440-09-7		1940	J	2270	J	1680	J	2420	J	1270	J								
Sodium	7440-23-5																			
Antimony	7440-36-0	2																		
Arsenic	7440-38-2	9.8	**14.5**		**14.8**		**16.6**		8.3		**10.6**		**18.5**		**32.3**		**44.8**		**26.1**	
Barium	7440-39-3		173		164		138		169		109		220		281		129		173	
Beryllium	7440-41-7										1.4	J	1.4	J						
Cadmium	7440-43-9	0.99																		
Chromium	7440-47-3	43.4	**46.1**		**47.2**		39.9		25.7		15.2		17.5		31.8		29.6		30.5	
Cobalt	7440-48-4	50	38.6		43.3		20.3		18.4		33.2		27.3		**65.4**		39.7		48.4	
Copper	7440-50-8	31.6	30.3	J	**32.7**	J	31.3	J	16.2	J	19.8	J	21.3	J	**38.5**	J	30.5	J	28.3	J
Lead	7439-92-1	35.8	**40.7**		**42.9**		**52.9**		17.7		26.6		25.3		33.3		**46.3**		**36.8**	
Nickel	7440-02-0	22.7	**67.3**	J	**73.6**	J	**39.1**	J	**28.6**	J	**46.9**	J	**44.5**	J	**87.4**	J	**61.4**	J	**70.2**	J
Selenium	7782-49-2	2	1.7	J	1.7	J	1.7	J	1.2	J	0.43	J	**2.1**	J	1.8	J	1.4	J	1.8	J
Silver	7440-22-4	1	0.098	J	0.11	J	0.18	J	0.066	J	0.047	J	0.041	J	0.036	J	0.037	J	0.061	J
Thallium	7440-28-0																			
Uranium	7440-61-1		1.4		1.6		1.3		1.3		0.75		1.5		1.2		1.2		1.1	
Vanadium	7440-62-2		36.8		41.5		30		35.5						32.1		35.8		27.7	
Zinc	7440-66-6	121	**221**	J	**239**	J	**141**	J	72.2	J	**147**	J	**123**	J	**246**	J	**191**	J	**221**	J
Mercury	7439-97-6	0.18	0.1	J	0.12	J	0.12	J	0.068	J	0.093	J	0.028	J	0.052	J	0.018	J	**0.19**	

Table 6 - Kiskiminetas River Sediments
Inorganics - BTAG Comparison

		CLP Sample No.	MC0AH6		MC0AH7	
		Sample #:	SD57		SD58	
		Sampling Location:	51(Backgrnd)		52(Backgrnd)	
		Matrix:	Soil		Soil	
		Units:	mg/kg		mg/kg	
		Date Sampled:	9/19/2013		9/19/2013	
		Date Analyzed:	10/13/2013		10/8/2013	
Parameter	CAS No.	BTAG Sed	Result	Q	Result	Q
Aluminum	7429-90-5		14800	J	7020	
Calcium	7440-70-2		2640	J	1410	
Iron	7439-89-6	20000	**82100**	J	**49400**	J
Magnesium	7439-95-4				960	J
Manganese	7439-96-5	460	**2790**	J	**4220**	J
Potassium	9440-09-7				955	
Sodium	7440-23-5				76.3	J
Antimony	7440-36-0	2			**6.9**	R
Arsenic	7440-38-2	9.8	**36.6**		**14.1**	
Barium	7440-39-3		300		103	
Beryllium	7440-41-7				1.1	J
Cadmium	7440-43-9	0.99				
Chromium	7440-47-3	43.4	31.5		9.3	
Cobalt	7440-48-4	50	25.6		33.8	
Copper	7440-50-8	31.6	**32.2**	J	17.2	
Lead	7439-92-1	35.8	**92.7**		15.9	
Nickel	7440-02-0	22.7	**39.7**	J	**44.8**	
Selenium	7782-49-2	2	**3.1**	J	1	J
Silver	7440-22-4	1	0.21	J	0.023	J
Thallium	7440-28-0					
Uranium	7440-61-1		1.2		0.5	J-
Vanadium	7440-62-2		33.5			
Zinc	7440-66-6	121	**148**	J	**130**	
Mercury	7439-97-6	0.18	**0.23**		0.055	J

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-01				R34243-02				R34243-03				R34243-04				R34243-05			
	Sample #:	SD05				SD06				SD07				SD08				SD09			
	Sampling Location:	5				6				7				7				8			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Sample				Field Sample				Field Duplicate of SD07				Field Sample			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/16/2013				9/16/2013				9/16/2013				9/16/2013				9/16/2013			
	Date Analyzed:	12/12/2013				12/12/2013				12/12/2013				12/12/2013				12/12/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0274		0.0484	0.0689	0.0149		0.0409	0.0779	0.0253		0.0448	0.0637	0.0523		0.0562	0.0694	0.0285		0.0504	0.0718
Be7	NAREL GAM-01-RA	0.394		0.205	0.273	1.07		0.265	0.312	1.38		0.37	0.402	1.59		0.405	0.428	0.268		0.247	0.403
Bi212	NAREL GAM-01-RA	1.02	J	0.193	0.176	1.24	J	0.23	0.2	1.24	J	0.254	0.241	1.52	J	0.309	0.276	1.41	J	0.282	0.253
Bi214	NAREL GAM-01-RA	0.798	J	0.093	0.0337	0.902	J	0.107	0.0394	0.933	J	0.11	0.0408	0.926	J	0.111	0.0446	1.32	J	0.15	0.0407
Cs137	NAREL GAM-01-RA	0.0273		0.00951	0.0121	0.0607		0.0152	0.0165	0.0738		0.0174	0.0229	0.085		0.0215	0.0214	0.0265		0.0127	0.0199
K40	NAREL GAM-01-RA	8.08		0.911	0.152	10.1		1.14	0.191	12.6		1.41	0.199	13.3		1.49	0.206	12.8		1.42	0.178
Pa234m	NAREL GAM-01-RA					1.62	J	1.26	2.04					1.8	J	1.38	2.23				
Pb210	NAREL GAM-01-RA																				
Pb212	NAREL GAM-01-RA	0.836	J	0.0964	0.0343	0.943	J	0.11	0.0395	1.08	J	0.127	0.0482	1.12	J	0.131	0.0485	1.22	J	0.139	0.0428
Pb214	NAREL GAM-01-RA	0.933	J	0.108	0.039	1.06	J	0.124	0.0401	1.13	J	0.135	0.0515	1.16	J	0.138	0.0514	1.45	J	0.163	0.0436
Ra228	NAREL GAM-01-RA	0.908		0.112	0.053	1.16		0.144	0.0677	1.23		0.151	0.071	1.23		0.157	0.0757	1.52		0.184	0.0742
Th234	NAREL GAM-01-RA	0.911	J	0.767	1.18	0.838	J	0.421	0.602	0.98	J	0.467	0.665	0.932	J	0.523	0.743	0.868	J	0.765	1.18
Tl208	NAREL GAM-01-RA	0.288	J	0.0358	0.0178	0.319	J	0.0401	0.0191	0.372	J	0.0475	0.0234	0.364	J	0.0476	0.0248	0.413	J	0.0485	0.0188
U235	NAREL GAM-01-RA									0.106	J	0.101	0.165	0.0905	J	0.105	0.172		J		
Pu238	NAREL PU-EICHROM	0.0235		0.0496	0.0893	-0.0152		0.0235	0.0785	0.0173		0.0374	0.0643	0.023		0.0412	0.0688	0.0329		0.0572	0.0996
Pu239	NAREL PU-EICHROM	0.0313		0.0484	0.0727	0.0455		0.0499	0.0691	0.0104		0.0386	0.079	0.0296		0.0402	0.0497	0.0219		0.0463	0.0833
Th227	NAREL TH-EICHROM	0		0.0432	0.103	0.0675		0.0768	0.085	0.0429		0.0768	0.128	0.0497		0.0776	0.126	0.0931		0.1	0.123
Th228	NAREL TH-EICHROM	0.907		0.221	0.1	1.14		0.231	0.0635	1.16		0.25	0.153	1.11		0.23	0.113	1.15		0.255	0.139
Th230	NAREL TH-EICHROM	0.535		0.164	0.077	0.909		0.201	0.0564	1.07		0.231	0.0755	0.856		0.193	0.0554	0.769		0.197	0.0751
Th232	NAREL TH-EICHROM	0.637		0.181	0.0899	0.883		0.199	0.0692	0.969		0.216	0.0614	1.02		0.214	0.0553	0.778		0.2	0.0929
U234	NAREL U-EICHROM	0.715		0.228	0.175	1.02		0.246	0.084	1.11		0.26	0.07	1.14		0.264	0.0777	1.24		0.28	0.0707
U235	NAREL U-EICHROM	0.122		0.118	0.169	0.0574		0.0673	0.0923	0.0904		0.0792	0.0839	0.0535		0.0611	0.0673	0.0456		0.0636	0.0953
U238	NAREL U-EICHROM	0.626		0.213	0.172	1.06		0.252	0.084	1.15		0.266	0.0789	1.13		0.263	0.069	0.982		0.242	0.0575

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-06				R34243-07				R34243-08				R34243-09				R34243-10			
	Sample #:	SD10				SD11				SD12				SD13				SD14			
	Sampling Location:	9				10				11				12				13			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Sample				Field Sample				Field Sample				Field Sample			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/17/2013				9/17/2013				9/17/2013				9/17/2013				9/17/2013			
	Date Analyzed:	12/12/2013				12/12/2013				12/12/2013				12/12/2013				12/12/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	-0.0271		0.0479	0.139	0.0171		0.0438	0.0834	0.0635		0.0659	0.0912	0.00762		0.0341	0.0707	0.0575		0.0672	0.0925
Be7	NAREL GAM-01-RA									0.186		0.181	0.295								
Bi212	NAREL GAM-01-RA	1.38	J	0.232	0.181	1.4	J	0.306	0.281	1.08	J	0.184	0.166	1.08	J	0.167	0.125	0.976	J	0.202	0.187
Bi214	NAREL GAM-01-RA	1.27	J	0.142	0.0312	0.789	J	0.0993	0.0495	1.04	J	0.117	0.0297	0.985	J	0.109	0.0217	0.871	J	0.1	0.0304
Cs137	NAREL GAM-01-RA	0.0281		0.01	0.0123	0.189		0.0297	0.0215	0.022		0.0097	0.0124	0.0221		0.00635	0.00778	0.0254		0.0091	0.0114
K40	NAREL GAM-01-RA	9.6		1.07	0.14	9.37		1.08	0.238	8.58		0.962	0.143	8.57		0.945	0.0899	7.78		0.88	0.148
Pa234m	NAREL GAM-01-RA													0.911	J	0.671	1.08	1.04	J	0.944	1.55
Pb210	NAREL GAM-01-RA													0.67		0.161	0.206				
Pb212	NAREL GAM-01-RA	1.06	J	0.122	0.0375	1.13	J	0.133	0.051	0.929	J	0.105	0.0271	0.939	J	0.104	0.0208	0.858	J	0.099	0.0333
Pb214	NAREL GAM-01-RA	1.43	J	0.162	0.0379	0.961	J	0.119	0.0568	1.16	J	0.131	0.0331	1.16	J	0.128	0.0214	1.02	J	0.119	0.0383
Ra228	NAREL GAM-01-RA	1.42		0.169	0.0549	1.36		0.177	0.0842	1.21		0.144	0.0507	1.15		0.128	0.0352	1.11		0.129	0.0529
Th234	NAREL GAM-01-RA	0.903	J	0.464	0.669	0.89	J	0.453	0.66	0.817	J	0.602	0.917	0.825	J	0.176	0.22	0.831	J	0.43	0.618
Tl208	NAREL GAM-01-RA	0.369	J	0.0443	0.0173	0.391	J	0.0483	0.0211	0.336	J	0.0399	0.0156	0.315	J	0.036	0.0107	0.279	J	0.0345	0.0157
U235	NAREL GAM-01-RA					0.112	J	0.109	0.177	0.0945	J	0.0615	0.0894	0.066	J	0.0367	0.0537				
Pu238	NAREL PU-EICHROM	0.0177		0.0383	0.0659	-0.011		0.0519	0.125	0.022		0.0388	0.0553	0.00356		0.0592	0.126	0.0153		0.0498	0.0994
Pu239	NAREL PU-EICHROM	0.0177		0.0383	0.0659	0.0407		0.051	0.0688	0.0549		0.0546	0.0553	0.0392		0.0491	0.0661	0.046		0.0523	0.058
Th227	NAREL TH-EICHROM	0.116		0.106	0.127	0.0743		0.0741	0.0748	0.0066		0.0604	0.138	0.0684		0.0778	0.0861	0.0203		0.0753	0.154
Th228	NAREL TH-EICHROM	1.1		0.242	0.152	0.967		0.2	0.0793	0.9		0.217	0.105	1.18		0.238	0.0877	0.971		0.227	0.0892
Th230	NAREL TH-EICHROM	0.847		0.2	0.0749	1.06		0.21	0.061	0.836		0.206	0.0743	0.81		0.19	0.0572	0.697		0.188	0.0678
Th232	NAREL TH-EICHROM	0.922		0.209	0.0609	1.18		0.223	0.0653	0.661		0.183	0.0967	0.966		0.21	0.0571	0.784		0.2	0.0677
U234	NAREL U-EICHROM	1.18		0.284	0.114	1.47		0.308	0.0887	0.956		0.249	0.0642	0.857		0.225	0.072	0.938		0.244	0.0767
U235	NAREL U-EICHROM	0.04		0.062	0.0928	0.0696		0.0716	0.0909	0.0356		0.0638	0.106	0.0743		0.0764	0.0971	0.0792		0.0815	0.103
U238	NAREL U-EICHROM	1.15		0.278	0.102	0.704		0.195	0.0674	0.918		0.243	0.0642	0.95		0.239	0.072	0.905		0.238	0.0624

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-11				R34243-12				R34243-13				R34243-14				R34243-15			
	Sample #:	SD15				SD16				SD17				SD18				SD19			
	Sampling Location:	14				14				15				16				17			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Duplicate of SD15				Field Sample				Field Sample				Field Sample			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/17/2013				9/17/2013				9/17/2013				9/17/2013				9/17/2013			
	Date Analyzed:	12/12/2013				12/12/2013				12/12/2013				12/12/2013				12/12/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0466		0.0593	0.0885	0		0.0421	0.102	0.00875		0.0392	0.0813	0.0283		0.0726	0.138	0.0595		0.0759	0.113
Be7	NAREL GAM-01-RA	0.628		0.246	0.306	0.447		0.205	0.278	1.09		0.457	0.536	0.802		0.301	0.385				
Bi212	NAREL GAM-01-RA	1.03	J	0.224	0.211	1.15	J	0.216	0.187	1.54	J	0.33	0.317	1.61	J	0.292	0.263	1.4	J	0.275	0.252
Bi214	NAREL GAM-01-RA	0.789	J	0.094	0.0364	0.779	J	0.0925	0.0357	1.14	J	0.137	0.0547	1.59	J	0.18	0.0464	1.32	J	0.15	0.0417
Cs137	NAREL GAM-01-RA	0.0257		0.0111	0.0168	0.0301		0.0105	0.013	0.0555		0.0196	0.0233	0.0341		0.0136	0.0173	0.0206		0.0113	0.0154
K40	NAREL GAM-01-RA	8.18		0.927	0.161	8.34		0.945	0.163	14.5		1.64	0.276	7.02		0.816	0.216	10.4		1.17	0.191
Pa234m	NAREL GAM-01-RA	2.01	J	1.11	1.38					2.37		1.64	2.17								
Pb210	NAREL GAM-01-RA																				
Pb212	NAREL GAM-01-RA	0.797	J	0.0952	0.0409	0.819	J	0.0965	0.0388	1.22	J	0.144	0.0568	1.25	J	0.143	0.0468	1.13	J	0.128	0.0404
Pb214	NAREL GAM-01-RA	0.965	J	0.115	0.043	0.961	J	0.113	0.0391	1.44	J	0.168	0.0549	1.79	J	0.201	0.0539	1.52	J	0.171	0.048
Ra228	NAREL GAM-01-RA	1.04		0.124	0.0545	1.06		0.137	0.0634	1.45		0.184	0.0922	1.64		0.193	0.0807	1.33		0.159	0.0681
Th234	NAREL GAM-01-RA	0.922	J	0.493	0.696	0.768	J	0.45	0.666	1.64	J	0.63	0.854	1.37	J	0.853	1.3	0.758	J	0.717	1.13
Tl208	NAREL GAM-01-RA	0.273	J	0.0349	0.0176	0.281	J	0.036	0.0181	0.422	J	0.0552	0.0287	0.429	J	0.0512	0.0218	0.381	J	0.0464	0.0216
U235	NAREL GAM-01-RA	0.1	J	0.087	0.141					0.117		0.124	0.204								
Pu238	NAREL PU-EICHROM	-0.003		0.033	0.0841	0.0125		0.0463	0.0947	0.033		0.0507	0.0854	0.0212		0.0433	0.0784	0.015		0.0438	0.0857
Pu239	NAREL PU-EICHROM	0.0379		0.053	0.0841	0.0415		0.0578	0.0868	0		0.0281	0.0684	0.0454		0.0498	0.069	0.012		0.033	0.0629
Th227	NAREL TH-EICHROM	0.0785		0.0892	0.0987	0.02		0.0582	0.101	0.0513		0.0794	0.119	0.08		0.091	0.101	0.0202		0.0586	0.102
Th228	NAREL TH-EICHROM	0.774		0.202	0.119	0.796		0.204	0.103	1.12		0.24	0.0725	1.35		0.273	0.0821	1.05		0.238	0.0989
Th230	NAREL TH-EICHROM	0.791		0.198	0.0656	0.572		0.169	0.0821	1.02		0.228	0.0725	0.774		0.198	0.0668	0.995		0.229	0.0759
Th232	NAREL TH-EICHROM	0.769		0.197	0.0862	0.633		0.177	0.0667	1.08		0.234	0.0523	0.679		0.183	0.0543	0.841		0.208	0.0758
U234	NAREL U-EICHROM	0.918		0.242	0.0633	0.82		0.203	0.0492	1.03		0.232	0.0485	1.03		0.237	0.0627	1.21		0.266	0.0792
U235	NAREL U-EICHROM	0.0402		0.0622	0.0932	0.0312		0.0554	0.0953	0.0577		0.0578	0.0581	0.109		0.0792	0.0611	0.0499		0.0639	0.0949
U238	NAREL U-EICHROM	0.893		0.238	0.0633	0.622		0.173	0.0604	1.03		0.232	0.0485	0.976		0.231	0.0874	0.893		0.22	0.0645

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-16				R34243-17				R34243-18				R34243-19				R34243-20			
	Sample #:	SD20				SD21				SD22				SD23				SD24			
	Sampling Location:	18				19				20				21				22			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Sample				Field Sample				Field Sample				Field Sample			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/17/2013				9/17/2013				9/17/2013				9/18/2013				9/18/2013			
	Date Analyzed:	12/12/2013				12/12/2013				12/12/2013				12/12/2013				12/12/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0416		0.0649	0.105	0.0515		0.0645	0.0869	0.0102		0.0577	0.125	-0.005		0.0464	0.118	0.0409		0.0512	0.069
Be7	NAREL GAM-01-RA					0.348		0.173	0.242												
Bi212	NAREL GAM-01-RA	1.08	J	0.246	0.223	1.15	J	0.218	0.197	1.11	J	0.18	0.148	1.19	J	0.193	0.154	0.995	J	0.143	0.0978
Bi214	NAREL GAM-01-RA	0.775	J	0.0928	0.0396	0.918	J	0.104	0.0289	0.918	J	0.104	0.0279	1.08	J	0.12	0.0234	0.952	J	0.104	0.0164
Cs137	NAREL GAM-01-RA	0.0226		0.009	0.012	0.02		0.00992	0.0155	-0.0035		0.0109	0.0138	0.019		0.0077	0.00976	0.0204		0.0042	0.0055
K40	NAREL GAM-01-RA	7.11		0.814	0.175	7.51		0.851	0.149	9.53		1.06	0.128	8.99		0.994	0.12	8.04		0.877	0.0719
Pa234m	NAREL GAM-01-RA	2.37	J	1.35	1.63		J							1.11	J	0.764	1.03	1.76	J	0.508	0.549
Pb210	NAREL GAM-01-RA						J							0.695	J	0.193	0.258				
Pb212	NAREL GAM-01-RA	0.756	J	0.089	0.0383	0.913	J	0.103	0.0241	0.905	J	0.101	0.023	0.921	J	0.103	0.0226	0.798	J	0.0885	0.0171
Pb214	NAREL GAM-01-RA	0.916	J	0.107	0.0421	1.01	J	0.115	0.0326	1.02	J	0.114	0.0276	1.25	J	0.138	0.026	1.11	J	0.121	0.0169
Ra228	NAREL GAM-01-RA	0.882		0.112	0.0623	1.01		0.123	0.0582	1.05		0.128	0.0515	1.13		0.13	0.0439	0.988		0.109	0.0297
Th234	NAREL GAM-01-RA						J			0.834	J	0.509	0.791	0.948	J	0.212	0.268	0.474	J	0.261	0.39
Tl208	NAREL GAM-01-RA	0.267	J	0.0325	0.0164	0.301	J	0.036	0.0145	0.318	J	0.0371	0.0131	0.32	J	0.0369	0.0125	0.289	J	0.0322	0.0079
U235	NAREL GAM-01-RA					0.146	J	0.0599	0.0876	0.0539	J	0.0511	0.0838	0.047	J	0.0448	0.0734	0.0662	J	0.0394	0.0635
Pu238	NAREL PU-EICHROM	0.0187		0.0449	0.0847	-0.0116		0.0296	0.0826	-0.0029		0.0276	0.0702	0.0033		0.0373	0.0841	0.0031		0.0357	0.0805
Pu239	NAREL PU-EICHROM	0.0435		0.0515	0.076	0.029		0.0403	0.0607	0.0201		0.036	0.0601	0.0065		0.029	0.0603	0.0031		0.0285	0.0649
Th227	NAREL TH-EICHROM	0.0799		0.0909	0.101	0.0266		0.073	0.139	0.0586		0.0795	0.0983	0.0256		0.0702	0.134	0.0669		0.0931	0.14
Th228	NAREL TH-EICHROM	0.748		0.198	0.107	0.896		0.215	0.082	1.38		0.275	0.104	1.11		0.246	0.137	0.908		0.218	0.0884
Th230	NAREL TH-EICHROM	0.572		0.169	0.082	0.594		0.172	0.082	1.12		0.241	0.0531	0.91		0.213	0.0642	0.593		0.171	0.0671
Th232	NAREL TH-EICHROM	0.697		0.186	0.0667	0.743		0.194	0.0819	1.04		0.231	0.0652	0.815		0.2	0.0642	0.928		0.219	0.067
U234	NAREL U-EICHROM	0.989		0.234	0.053	1.29		0.275	0.0717	1.14		0.253	0.0516	1.22		0.267	0.0787	1.29		0.277	0.0531
U235	NAREL U-EICHROM	0.0672		0.0691	0.0878	0.0863		0.0716	0.062	0.0491		0.0561	0.0618	0.0579		0.0626	0.0768	0.0969		0.0784	0.0782
U238	NAREL U-EICHROM	0.8		0.206	0.053	2.99		0.49	0.0717	0.957		0.228	0.0714	0.863		0.215	0.0722	0.964		0.232	0.0735

Table 7 – Kiskiminetas River Sediments
Radiological Data

CLP Sample Number:		R34243-21				R34243-22				R34243-23				R34243-24				R34243-25			
Sample #:		SD25				SD26				SD27				SD28				SD29			
Sampling Location:		23				24				25				26				26			
Matrix:		SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
Sample Type:		Field Sample				Field Sample				Field Sample				Field Sample				Field Duplicate of SD28			
Units:		PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
Date Sampled:		9/18/2013				9/18/2013				9/18/2013				9/18/2013				9/18/2013			
Date Analyzed:		12/5/2013				12/5/2013				12/5/2013				12/5/2013				12/5/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0221		0.0567	0.108	0.0746		0.101	0.125	0.125		0.128	0.163	0.0354		0.103	0.202	0.0208		0.0671	0.132
Be7	NAREL GAM-01-RA					0.233		0.229	0.375	0.309		0.254	0.412	0.368		0.217	0.293				
Bi212	NAREL GAM-01-RA	1.1	J	0.187	0.159	1.15	J	0.189	0.156	1.2	J	0.247	0.222	1.34	J	0.246	0.209	1.23	J	0.227	0.219
Bi214	NAREL GAM-01-RA	0.954	J	0.11	0.0324	1.01	J	0.115	0.0308	1.13	J	0.13	0.0362	1.06	J	0.122	0.0337	1.15	J	0.131	0.0403
Cs137	NAREL GAM-01-RA	0.0251		0.00904	0.0114	0.0172		0.0105	0.0167	0.0132		0.0115	0.0186	0.0178		0.0106	0.0167	0.0251		0.0125	0.016
K40	NAREL GAM-01-RA	7.47		0.848	0.155	9.33		1.05	0.151	10		1.13	0.156	10.6		1.18	0.15	10.2		1.15	0.202
Pa234m	NAREL GAM-01-RA	1.62	J	1.18	1.39	1.49	J	1.03	1.65	1.48	J	0.876	1.24						J		
Pb210	NAREL GAM-01-RA																				
Pb212	NAREL GAM-01-RA	0.827	J	0.0973	0.0384	0.902	J	0.104	0.0358	0.96	J	0.111	0.0373	1.02	J	0.117	0.0376	1.07	J	0.122	0.04
Pb214	NAREL GAM-01-RA	1.12	J	0.128	0.037	1.15	J	0.132	0.037	1.36	J	0.154	0.0385	1.25	J	0.141	0.0338	1.31	J	0.148	0.0456
Ra228	NAREL GAM-01-RA	1.08		0.126	0.0503	1.25		0.152	0.0565	1.34		0.159	0.0515	1.32		0.157	0.0517	1.24		0.152	0.0759
Th234	NAREL GAM-01-RA	0.538	J	0.479	0.779	0.802	J	0.491	0.784	1.26	J	0.519	0.728	1.27	J	0.519	0.714	0.983	J	0.784	1.2
Tl208	NAREL GAM-01-RA	0.277	J	0.0339	0.0147	0.313	J	0.0387	0.0172	0.326	J	0.0404	0.0183	0.345	J	0.0424	0.0184	0.36	J	0.0442	0.0212
U235	NAREL GAM-01-RA																		J		
Pu238	NAREL PU-EICHROM	0		0.0352	0.0821	0.012		0.0389	0.0776	-0.011		0.0273	0.0862	0.0112		0.0417	0.0852	0.00343		0.0314	0.0716
Pu239	NAREL PU-EICHROM	0.00603		0.027	0.056	0.027		0.0366	0.0453	0.0114		0.033	0.0571	0.0299		0.0462	0.0694	0.0308		0.0418	0.0517
Th227	NAREL TH-EICHROM	0.0568		0.137	0.258	0.0867		0.155	0.259	0.0713		0.151	0.271	0.133		0.132	0.134	0.159		0.174	0.241
Th228	NAREL TH-EICHROM	0.753		0.229	0.151	0.917		0.288	0.192	0.856		0.277	0.207	1.04		0.26	0.127	1.32		0.33	0.214
Th230	NAREL TH-EICHROM	0.561		0.191	0.0994	1.1		0.306	0.094	0.86		0.263	0.0902	0.907		0.237	0.0671	1.15		0.295	0.111
Th232	NAREL TH-EICHROM	0.817		0.232	0.0992	1.17		0.32	0.142	0.919		0.275	0.125	0.905		0.237	0.067	1.12		0.29	0.111
U234	NAREL U-EICHROM	0.852		0.229	0.0756	1.11		0.271	0.0629	1.5		0.332	0.0899	1.09		0.266	0.0617	1.14		0.269	0.0724
U235	NAREL U-EICHROM	0.083		0.0799	0.0906	0.0848		0.0817	0.0926	0.0618		0.0706	0.0778	0.0539		0.0677	0.0909	0.0561		0.064	0.0705
U238	NAREL U-EICHROM	0.738		0.211	0.0852	1.1		0.269	0.0629	1.17		0.284	0.065	0.773		0.217	0.0617	1.2		0.277	0.0815

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-26				R34243-27				R34243-28				R34243-29				R34243-30			
	Sample #:	SD30				SD31				SD32				SD33				SD34			
	Sampling Location:	27				28				29				30				31			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Sample				Field Sample				Field Sample				Field Sample			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/18/2013				9/18/2013				9/18/2013				9/18/2013				9/18/2013			
	Date Analyzed:	12/5/2013				12/5/2013				12/5/2013				1/16/2014				12/5/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0356		0.0767	0.132	0.0372		0.0504	0.0624	0.0097		0.0434	0.09	0.0371		0.0783	0.141	0.0285		0.0582	0.105
Be7	NAREL GAM-01-RA					0.178		0.127	0.206					0.238		0.181	0.293	0.282		0.141	0.195
Bi212	NAREL GAM-01-RA	1.25	J	0.236	0.221	1.14	J	0.175	0.127	0.919	J	0.177	0.174	1.23	J	0.206	0.17	1.11	J	0.18	0.143
Bi214	NAREL GAM-01-RA	1.13	J	0.13	0.041	0.956	J	0.105	0.022	0.913	J	0.103	0.0291	1.05	J	0.117	0.0266	0.985	J	0.11	0.0238
Cs137	NAREL GAM-01-RA	0.0196		0.0103	0.0145	0.0238		0.0053	0.00715	0.0214		0.0086	0.0113	0.0265		0.00924	0.0115	0.022		0.007	0.0091
K40	NAREL GAM-01-RA	10.3		1.16	0.187	9.08		0.995	0.109	7.33		0.829	0.155	8.52		0.952	0.134	7.47		0.833	0.13
Pa234m	NAREL GAM-01-RA					1.27	J	0.654	0.765												
Pb210	NAREL GAM-01-RA																	0.852	J	0.208	0.267
Pb212	NAREL GAM-01-RA	1.06	J	0.121	0.04	0.863	J	0.0961	0.02	0.816	J	0.0929	0.0294	0.894	J	0.1	0.0248	0.844	J	0.0948	0.0248
Pb214	NAREL GAM-01-RA	1.28	J	0.144	0.0396	1.16	J	0.128	0.0217	1.04	J	0.117	0.0318	1.13	J	0.126	0.0292	1.12	J	0.125	0.0271
Ra228	NAREL GAM-01-RA	1.24		0.15	0.0734	1.18		0.131	0.0371	1.03		0.124	0.06	1.16		0.134	0.0521	1.08		0.125	0.0433
Th234	NAREL GAM-01-RA	1.23	J	0.857	1.4	0.752	J	0.29	0.419	0.753	J	0.634	1.04	0.831	J	0.56	0.855	0.79	J	0.211	0.283
Tl208	NAREL GAM-01-RA	0.364	J	0.0445	0.0209	0.295	J	0.0335	0.0104	0.29	J	0.0343	0.0145	0.327	J	0.0378	0.0124	0.284	J	0.0332	0.0126
U235	NAREL GAM-01-RA					0.046	J	0.0427	0.0697						J						
Pu238	NAREL PU-EICHROM	0.0186		0.0477	0.091	0.0036		0.0326	0.0743	0.0477		0.0529	0.0772	0.0213		0.0435	0.0787	0.00594		0.0336	0.0725
Pu239	NAREL PU-EICHROM	0.0261		0.0466	0.0778	0.0178		0.0383	0.066	0.0149		0.0321	0.0553	0.0304		0.0423	0.0635	0.0148		0.032	0.0551
Th227	NAREL TH-EICHROM	0.0908		0.142	0.23	0.416		0.273	0.256	0.121		0.138	0.152	0.064		0.113	0.161	0.102		0.128	0.173
Th228	NAREL TH-EICHROM	1.13		0.292	0.171	1.2		0.331	0.208	0.721		0.232	0.166	1.12		0.293	0.131	1.04		0.264	0.107
Th230	NAREL TH-EICHROM	0.897		0.25	0.0765	0.762		0.253	0.128	1.02		0.268	0.0765	0.933		0.264	0.122	0.735		0.218	0.0978
Th232	NAREL TH-EICHROM	1.02		0.27	0.106	0.976		0.285	0.0927	0.749		0.228	0.106	1.07		0.283	0.112	0.785		0.224	0.0706
U234	NAREL U-EICHROM	1.25		0.286	0.06	1.19		0.254	0.0597	0.985		0.217	0.0546	0.869		0.204	0.046	1.08		0.239	0.0483
U235	NAREL U-EICHROM	0.0333		0.0597	0.0995	0.0385		0.0537	0.0805	0.0388		0.0545	0.0861	0.0146		0.0401	0.0763	0.0766		0.067	0.0711
U238	NAREL U-EICHROM	0.982		0.247	0.0831	0.778		0.197	0.0786	0.738		0.182	0.0546	0.884		0.207	0.0566	0.936		0.218	0.0593

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-31				R34243-32				R34243-33				R34243-34				R34243-35			
	Sample #:	SD35				SD36				SD37				SD38				SD39			
	Sampling Location:	32				32				33				34				35			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Duplicate of SD35				Field Sample				Field Sample				Field Sample			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/18/2013				9/18/2013				9/18/2013				9/18/2013				9/18/2013			
	Date Analyzed:	1/16/2014				1/16/2014				1/16/2014				1/16/2014				1/16/2014			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0245		0.0529	0.091	0.0383		0.0591	0.0888	0.0887		0.0884	0.0893	0.0431		0.0585	0.0723	0.0831		0.0864	0.119
Be7	NAREL GAM-01-RA													0.44		0.212	0.281	0.976		0.342	0.443
Bi212	NAREL GAM-01-RA	1.06	J	0.16	0.124	1.07	J	0.158	0.114	1.18	J	0.198	0.174	1.16	J	0.213	0.191	1.54	J	0.34	0.3
Bi214	NAREL GAM-01-RA	0.931	J	0.103	0.0204	0.91	J	0.101	0.0186	1.18	J	0.133	0.0311	1.02	J	0.115	0.03	1.07	J	0.13	0.056
Cs137	NAREL GAM-01-RA	0.0164		0.0063	0.00829	0.0212		0.0063	0.0077	0.0215		0.00921	0.0122	0.023		0.0103	0.0133	0.115		0.0217	0.0199
K40	NAREL GAM-01-RA	8.16		0.902	0.115	8.4		0.924	0.0784	9.21		1.03	0.143	8.41		0.944	0.136	14		1.58	0.261
Pa234m	NAREL GAM-01-RA																				
Pb210	NAREL GAM-01-RA					0.555	J	0.143	0.189												
Pb212	NAREL GAM-01-RA	0.867	J	0.0964	0.0195	0.98	J	0.107	0.0153	0.962	J	0.109	0.0291	0.91	J	0.103	0.0279	1.2	J	0.142	0.0583
Pb214	NAREL GAM-01-RA	1.11	J	0.122	0.0207	1.09	J	0.12	0.0209	1.3	J	0.146	0.0324	1.12	J	0.127	0.0329	1.29	J	0.155	0.0639
Ra228	NAREL GAM-01-RA	1.06		0.122	0.0375	1.07		0.119	0.0332	1.3		0.156	0.055	1.16		0.14	0.0595	1.47		0.188	0.0921
Th234	NAREL GAM-01-RA	1.11	J	0.398	0.569	0.892	J	0.186	0.222		J			0.62	J	0.563	0.905	1.58	J	0.608	0.824
Tl208	NAREL GAM-01-RA	0.305	J	0.035	0.0112	0.297	J	0.0339	0.0097	0.352	J	0.042	0.017	0.335	J	0.0404	0.0171	0.397	J	0.0506	0.0256
U235	NAREL GAM-01-RA	0.0641	J	0.0435	0.0637	0.0538	J	0.041	0.0665												
Pu238	NAREL PU-EICHROM	0.0114		0.0422	0.0864	0.0037		0.0425	0.0959	0.0158		0.0433	0.0825	-0.0079		0.0273	0.0824	0.0037		0.0419	0.0945
Pu239	NAREL PU-EICHROM	0.0189		0.0409	0.0703	0.0444		0.0505	0.0559	0.0118		0.044	0.0899	0.0118		0.0439	0.0899	0.0219		0.0462	0.0832
Th227	NAREL TH-EICHROM	0.0878		0.11	0.148	0.0474		0.0838	0.119	0.125		0.128	0.163	0.139		0.124	0.116	0.159		0.155	0.201
Th228	NAREL TH-EICHROM	0.954		0.244	0.105	0.926		0.24	0.111	1.4		0.3	0.096	0.919		0.235	0.102	1.28		0.302	0.117
Th230	NAREL TH-EICHROM	0.747		0.211	0.0801	0.807		0.219	0.0644	1.14		0.266	0.088	0.794		0.215	0.0772	1.1		0.274	0.0886
Th232	NAREL TH-EICHROM	0.771		0.215	0.08	0.712		0.205	0.0791	0.601		0.188	0.103	0.656		0.194	0.0771	1.17		0.284	0.0884
U234	NAREL U-EICHROM	0.774		0.215	0.0609	0.962		0.237	0.0777	1.33		0.317	0.105	0.931		0.244	0.0943	1.38		0.312	0.0953
U235	NAREL U-EICHROM	0.0821		0.079	0.0896	0.0801		0.0724	0.0672	0.144		0.109	0.102	0.0396		0.0614	0.092	0.05		0.0698	0.105
U238	NAREL U-EICHROM	0.814		0.223	0.0843	0.747		0.203	0.0561	1.12		0.286	0.105	0.819		0.225	0.0625	1.41		0.316	0.0776

Table 7 – Kiskiminetas River Sediments
Radiological Data

CLP Sample Number:		R34243-36				R34243-37				R34243-38				R34243-39				R34243-40			
Sample #:		SD40				SD41				SD42				SD43				SD44			
Sampling Location:		36				37				38				39				40			
Matrix:		SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
Sample Type:		Field Sample				Field Sample				Field Sample				Field Sample				Field Sample			
Units:		PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
Date Sampled:		9/18/2013				9/18/2013				9/18/2013				9/18/2013				9/18/2013			
Date Analyzed:		1/16/2014				1/16/2014				1/16/2014				1/16/2014				1/16/2014			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0276		0.0805	0.157	0.0478		0.0558	0.0769	0.0573		0.0629	0.0871	0.0353		0.0545	0.0819	0.0393		0.0546	0.0821
Be7	NAREL GAM-01-RA					1.95		0.408	0.405									1.79		0.485	0.526
Bi212	NAREL GAM-01-RA	1.57	J	0.295	0.247	1.23	J	0.267	0.255	1.04	J	0.197	0.184	1.18	J	0.22	0.209	1.62	J	0.378	0.35
Bi214	NAREL GAM-01-RA	0.9	J	0.112	0.0542	0.973	J	0.114	0.0424	0.794	J	0.0948	0.0366	1.01	J	0.117	0.0408	1.13	J	0.135	0.0529
Cs137	NAREL GAM-01-RA	0.0989		0.0222	0.021	0.0829		0.0188	0.0187	0.0553		0.0141	0.0149	0.0294		0.0121	0.0149	0.113		0.0218	0.0207
K40	NAREL GAM-01-RA	12.1		1.38	0.263	10.2		1.15	0.183	9.52		1.07	0.161	8.71		0.983	0.172	14.9		1.68	0.274
Pa234m	NAREL GAM-01-RA									2.51	J	1.17	1.42								
Pb210	NAREL GAM-01-RA																				
Pb212	NAREL GAM-01-RA	1.04	J	0.123	0.0494	0.973	J	0.113	0.0456	0.855	J	0.0999	0.037	0.914	J	0.105	0.0372	1.21	J	0.143	0.0605
Pb214	NAREL GAM-01-RA	1.07	J	0.131	0.0566	1.11	J	0.128	0.0463	0.949	J	0.113	0.0427	1.11	J	0.127	0.0433	1.33	J	0.155	0.0544
Ra228	NAREL GAM-01-RA	1.27		0.165	0.0783	1.04		0.13	0.0727	1		0.126	0.0581	1.1		0.133	0.0636	1.39		0.174	0.0922
Th234	NAREL GAM-01-RA	1.54	J	0.641	0.879	0.957	J	0.766	1.18	1.34	J	0.474	0.613	0.725	J	0.65	1.03	1.48	J	0.621	0.859
Tl208	NAREL GAM-01-RA	0.322	J	0.043	0.0243	0.37	J	0.0449	0.0203	0.291	J	0.0365	0.0175	0.313	J	0.0386	0.019	0.392	J	0.0513	0.0274
U235	NAREL GAM-01-RA																				
Pu238	NAREL PU-EICHROM	-0.0034		0.0324	0.0826	0.00669		0.0501	0.106	0.0142		0.0389	0.0741	0.0412		0.0525	0.0783	-0.0035		0.0231	0.0646
Pu239	NAREL PU-EICHROM	0.0372		0.0466	0.0628	0.0268		0.0474	0.0818	0.0177		0.0383	0.0659	0.024		0.043	0.0718	0.0279		0.043	0.0646
Th227	NAREL TH-EICHROM	0.0411		0.113	0.215	0.0833		0.0897	0.11	0.106		0.102	0.116	0.141		0.127	0.118	0.143		0.12	0.136
Th228	NAREL TH-EICHROM	1.22		0.32	0.187	1.56		0.288	0.0786	0.943		0.217	0.077	0.916		0.245	0.164	1.56		0.297	0.0799
Th230	NAREL TH-EICHROM	1.18		0.305	0.0839	0.82		0.195	0.0486	0.76		0.191	0.051	0.738		0.208	0.064	1.14		0.246	0.0651
Th232	NAREL TH-EICHROM	1.3		0.324	0.126	1.16		0.24	0.0732	0.857		0.204	0.0626	0.843		0.225	0.0885	1.2		0.252	0.0529
U234	NAREL U-EICHROM	1.66		0.352	0.113	1.32		0.28	0.0634	1.18		0.242	0.0649	0.853		0.206	0.119	1.48		0.32	0.0967
U235	NAREL U-EICHROM	0.0646		0.0833	0.129	0.0409		0.0571	0.0855	0.0648		0.06	0.0713	0.12		0.0937	0.125	0.109		0.0882	0.088
U238	NAREL U-EICHROM	1.42		0.318	0.101	1.12		0.253	0.0634	1.33		0.262	0.0649	0.877		0.207	0.0995	1.56		0.33	0.0827

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-41				R34243-42				R34243-43				R34243-44				R34243-45			
	Sample #:	SD45				SD46				SD47				SD48				SD49			
	Sampling Location:	41				42				43				44				44			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Sample				Field Sample				Field Sample				Field Duplicate of SD48			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/19/2013				9/19/2013				9/19/2013				9/19/2013				9/19/2013			
	Date Analyzed:	2/26/2014				2/26/2014				2/26/2014				2/26/2014				2/26/2014			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0198		0.0354	0.0591	0		0.0363	0.0849	-0.007		0.0244	0.0737	-0.0113		0.0392	0.118	-0.0069		0.0339	0.0895
Be7	NAREL GAM-01-RA	3.04		0.631	0.607					0.385		0.174	0.23	2.3		0.545	0.56	1.98		0.352	0.336
Bi212	NAREL GAM-01-RA	1.71	J	0.338	0.31	1.3	J	0.286	0.264	1.25	J	0.204	0.168	1.66	J	0.317	0.282	1.44	J	0.248	0.219
Bi214	NAREL GAM-01-RA	1.14	J	0.141	0.0632	0.967	J	0.114	0.0422	1.07	J	0.119	0.025	1.05	J	0.127	0.0518	1.1	J	0.126	0.0395
Cs137	NAREL GAM-01-RA	0.126		0.0247	0.0232	0.0813		0.0191	0.0196	0.0305		0.0106	0.0123	0.0861		0.0224	0.0233	0.0806		0.0149	0.0148
K40	NAREL GAM-01-RA	15.8		1.79	0.314	11.7		1.32	0.206	12.4		1.36	0.149	12.9		1.46	0.26	12.9		1.44	0.219
Pa234m	NAREL GAM-01-RA		J			1.89	J	1.31	2.1	1.26	J	0.917	1.23								
Pb210	NAREL GAM-01-RA																				
Pb212	NAREL GAM-01-RA	1.29	J	0.154	0.067	1.02	J	0.12	0.0456	1.11	J	0.124	0.026	1.19	J	0.14	0.0545	1.34	J	0.15	0.0269
Pb214	NAREL GAM-01-RA	1.45	J	0.174	0.0686	1.1	J	0.13	0.0491	1.26	J	0.14	0.0286	1.28	J	0.153	0.0613	1.3	J	0.147	0.0374
Ra228	NAREL GAM-01-RA	1.67		0.214	0.0988	1.19		0.147	0.0802	1.28		0.147	0.0488	1.29		0.163	0.0909	1.29		0.154	0.0618
Th234	NAREL GAM-01-RA	1.07	J	0.703	1.13	1.31	J	0.519	0.706	1.51	J	0.508	0.722	1.36	J	0.601	0.831	1.39	J	0.503	0.717
Tl208	NAREL GAM-01-RA	0.463	J	0.0605	0.0317	0.343	J	0.0448	0.0235	0.376	J	0.0434	0.0147	0.399	J	0.0534	0.0294	0.396	J	0.0468	0.019
U235	NAREL GAM-01-RA		J							0.0635	J	0.0504	0.0758					0.0677	J	0.0659	0.0982
Pu238	NAREL PU-EICHROM	-0.0173		0.036	0.103	-0.0101		0.0243	0.0768	0		0.038	0.0924	0.013		0.042	0.0839	-0.0294		0.0287	0.1
Pu239	NAREL PU-EICHROM	0.0242		0.0495	0.0896	0.0371		0.0464	0.0625	0.0446		0.0558	0.0753	0.0194		0.0411	0.0739	0.0556		0.0531	0.0607
Th227	NAREL TH-EICHROM	0		0.075	0.175	0.0369		0.0779	0.14	0.0195		0.0726	0.148	0.11		0.105	0.12	0.095		0.104	0.144
Th228	NAREL TH-EICHROM	1.16		0.249	0.114	1.03		0.228	0.105	1.2		0.261	0.153	1.31		0.267	0.114	1.13		0.248	0.145
Th230	NAREL TH-EICHROM	1.15		0.243	0.0524	1.06		0.227	0.0501	0.721		0.189	0.0735	1.09		0.236	0.0526	1.13		0.24	0.0715
Th232	NAREL TH-EICHROM	1.05		0.232	0.079	1.21		0.246	0.0615	0.98		0.226	0.0956	0.994		0.225	0.0727	0.919		0.213	0.0634
U234	NAREL U-EICHROM	1.2		0.271	0.137	1.44		0.298	0.0734	0.986		0.246	0.0729	1.04		0.253	0.081	1.08		0.25	0.0916
U235	NAREL U-EICHROM	-0.0166		0.0588	0.144	0.021		0.0454	0.078	0.0706		0.0707	0.0711	0.0836		0.0756	0.0701	0.0848		0.0742	0.0787
U238	NAREL U-EICHROM	1.24		0.276	0.134	1.13		0.256	0.0734	0.962		0.243	0.0729	1		0.248	0.081	1.05		0.247	0.0916

Table 7 – Kiskiminetas River Sediments
Radiological Data

	CLP Sample Number:	R34243-46				R34243-47				R34243-48				R34243-49				R34243-50			
	Sample #:	SD50				SD51				SD52				SD53				SD54			
	Sampling Location:	45				46				47				48 (Background)				48 (Background)			
	Matrix:	SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
	Sample Type:	Field Sample				Field Sample				Field Sample				Field Sample				Field Duplicate of SD53			
	Units:	PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
	Date Sampled:	9/19/2013				9/19/2013				9/19/2013				9/19/2013				9/19/2013			
	Date Analyzed:	2/26/2014				2/26/2014				2/26/2014				2/26/2014				2/26/2014			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0259		0.0529	0.0957	0.0164		0.0449	0.0856	0.0042		0.0484	0.109	0.0498		0.0565	0.0626	0.0454		0.0498	0.0689
Be7	NAREL GAM-01-RA	0.244		0.125	0.198					0.372		0.151	0.206	0.526		0.285	0.447	0.374		0.184	0.289
Bi212	NAREL GAM-01-RA	1.21	J	0.198	0.153	1.37	J	0.294	0.282	1.05	J	0.2	0.167	1.29	J	0.239	0.237	1.17	J	0.189	0.159
Bi214	NAREL GAM-01-RA	0.821	J	0.0924	0.0288	1.14	J	0.131	0.044	0.861	J	0.0976	0.0269	1.04	J	0.121	0.0442	1.04	J	0.116	0.0282
Cs137	NAREL GAM-01-RA	0.0826		0.0135	0.011	-0.008		0.022	0.021	0.042		0.0092	0.0102	0.0301		0.0111	0.0148	0.0275		0.0085	0.0107
K40	NAREL GAM-01-RA	9.39		1.03	0.166	12.3		1.38	0.209	8.14		0.907	0.13	10.6		1.2	0.226	10.2		1.14	0.145
Pa234m	NAREL GAM-01-RA	1.55	J	0.712	0.88																
Pb210	NAREL GAM-01-RA									1.22	J	0.249	0.297					1.1	J	0.242	0.305
Pb212	NAREL GAM-01-RA	0.852	J	0.0955	0.0232	1.12	J	0.13	0.0479	0.906	J	0.101	0.02	1.07	J	0.123	0.0422	0.996	J	0.112	0.029
Pb214	NAREL GAM-01-RA	0.959	J	0.107	0.0266	1.3	J	0.149	0.0475	0.995	J	0.112	0.0281	1.18	J	0.137	0.0514	1.18	J	0.132	0.0313
Ra228	NAREL GAM-01-RA	1.05		0.123	0.0495	1.28		0.159	0.0773	0.954		0.113	0.0446	1.21		0.147	0.0726	1.17		0.137	0.0513
Th234	NAREL GAM-01-RA	0.58	J	0.317	0.457	1.37	J	0.706	1.05	0.892	J	0.209	0.28	0.905	J	0.812	1.26	1.23	J	0.262	0.325
Tl208	NAREL GAM-01-RA	0.296	J	0.0343	0.0129	0.404	J	0.0483	0.0207	0.286	J	0.0341	0.0141	0.361	J	0.0445	0.0221	0.344	J	0.0401	0.0146
U235	NAREL GAM-01-RA	0.0896	J	0.0477	0.0656	0.103	J	0.089	0.134	0.0553	J	0.0414	0.062		J			0.0787	J	0.0457	0.0676
Pu238	NAREL PU-EICHROM	0.0294		0.0399	0.0494	0.0282		0.0608	0.112	-0.0252		0.0299	0.103	0.0127		0.0412	0.0824	-0.0128		0.0326	0.091
Pu239	NAREL PU-EICHROM	0.0131		0.0358	0.0683	0.0071		0.0315	0.0655	0.0108		0.0402	0.0822	0.0127		0.0349	0.0665	0.0288		0.039	0.0483
Th227	NAREL TH-EICHROM	0.0618		0.086	0.129	0.132		0.115	0.123	0.0331		0.0713	0.123	0.102		0.104	0.133	0.0661		0.0752	0.0832
Th228	NAREL TH-EICHROM	1		0.227	0.121	1.16		0.252	0.113	0.91		0.22	0.11	1.13		0.24	0.0719	0.857		0.193	0.0678
Th230	NAREL TH-EICHROM	0.794		0.195	0.0698	0.963		0.222	0.0539	0.739		0.193	0.0814	0.677		0.18	0.0638	0.809		0.186	0.0552
Th232	NAREL TH-EICHROM	0.803		0.196	0.0697	1.02		0.23	0.0744	0.745		0.193	0.0662	0.934		0.215	0.0637	0.671		0.168	0.0621
U234	NAREL U-EICHROM	1.46		0.32	0.0759	1.39		0.286	0.11	0.804		0.201	0.068	0.941		0.216	0.115	0.916		0.225	0.0841
U235	NAREL U-EICHROM	0.0392		0.0607	0.0909	0.082		0.0732	0.089	0.0546		0.059	0.0724	0.079		0.0761	0.109	0.115		0.0854	0.0862
U238	NAREL U-EICHROM	1.14		0.274	0.0618	1		0.232	0.0966	0.761		0.195	0.0742	0.72		0.182	0.0911	1.04		0.242	0.0719

Table 7 – Kiskiminetas River Sediments
Radiological Data

CLP Sample Number:		R34243-51				R34243-52				R34243-53				R34243-54			
Sample #:		SD55				SD56				SD57				SD58			
Sampling Location:		49 (Background)				50 (Background)				51 (Background)				52 (Background)			
Matrix:		SEDIMENT				SEDIMENT				SEDIMENT				SEDIMENT			
Sample Type:		Field Sample				Field Sample				Field Sample				Field Sample			
Units:		PCI/GDRY				PCI/GDRY				PCI/GDRY				PCI/GDRY			
Date Sampled:		9/19/2013				9/19/2013				9/19/2013				9/19/2013			
Date Analyzed:		2/26/2014				2/26/2014				2/26/2014				2/26/2014			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0157		0.0339	0.0584	0.0138		0.0379	0.0723	0.00994		0.0369	0.0756	-0.0051		0.0176	0.0531
Be7	NAREL GAM-01-RA	0.217		0.175	0.283	0.358		0.238	0.331	0.495		0.167	0.247				
Bi212	NAREL GAM-01-RA	1.15	J	0.212	0.182	1.19	J	0.23	0.222	1.43		0.216	0.164	1.13	J	0.238	0.229
Bi214	NAREL GAM-01-RA	0.888	J	0.1	0.0257	0.961	J	0.111	0.0385	1.2		0.134	0.0303	1.05	J	0.12	0.0352
Cs137	NAREL GAM-01-RA	0.0268		0.0093	0.0112	0.0403		0.0138	0.0163	0.239		0.0296	0.0142	0.0223		0.0113	0.0177
K40	NAREL GAM-01-RA	9.25		1.03	0.136	8.96		1.02	0.193	13.4		1.47	0.119	8.05		0.915	0.169
Pa234m	NAREL GAM-01-RA									1.64		0.803	1.07	1.25	J	1.04	1.45
Pb210	NAREL GAM-01-RA									1.4		0.223	0.215				
Pb212	NAREL GAM-01-RA	0.841	J	0.0946	0.0243	0.899	J	0.102	0.0334	1.54		0.169	0.0238	0.94	J	0.107	0.0334
Pb214	NAREL GAM-01-RA	0.996	J	0.112	0.0288	1.05	J	0.121	0.0419	1.45		0.16	0.0316	1.19	J	0.135	0.0364
Ra228	NAREL GAM-01-RA	1		0.115	0.043	1.03		0.131	0.0771	1.48		0.166	0.0498	1.23		0.152	0.0647
Th234	NAREL GAM-01-RA	0.864	J	0.538	0.819	1.58	J	0.708	1.07	1.37		0.257	0.285	1.08	J	0.626	0.986
Tl208	NAREL GAM-01-RA	0.289	J	0.0342	0.0133	0.316	J	0.0383	0.0185	0.458		0.0522	0.0149	0.335	J	0.0406	0.0177
U235	NAREL GAM-01-RA	0.0574	J	0.0537	0.088					0.0682		0.0596	0.0971				
Pu238	NAREL PU-EICHROM	0.0109		0.0406	0.0831	0.0072		0.048	0.103	0.0265		0.0411	0.0685	0.00426		0.0241	0.0521
Pu239	NAREL PU-EICHROM	0.0037		0.0334	0.0762	0.0398		0.0498	0.0671	0.037		0.0438	0.0646	0.00213		0.0195	0.0446
Th227	NAREL TH-EICHROM	0.0627		0.0851	0.105	0.0208		0.0605	0.105	0.0124		0.0555	0.115	0.161		0.109	0.081
Th228	NAREL TH-EICHROM	0.975		0.232	0.0974	1.03		0.24	0.115	1.34		0.265	0.0868	1.09		0.222	0.0948
Th230	NAREL TH-EICHROM	0.824		0.208	0.0568	0.771		0.201	0.0695	1.12		0.237	0.0622	0.935		0.201	0.0538
Th232	NAREL TH-EICHROM	0.823		0.208	0.0567	0.71		0.192	0.0781	1.13		0.239	0.0763	0.83		0.187	0.0537
U234	NAREL U-EICHROM	0.846		0.205	0.066	1.02		0.257	0.0856	1.01		0.247	0.0711	0.969		0.216	0.0436
U235	NAREL U-EICHROM	0.0227		0.0479	0.0861	0.103		0.0855	0.0741	0.0963		0.08	0.0692	0.0518		0.0519	0.0522
U238	NAREL U-EICHROM	0.814		0.202	0.0859	0.778		0.219	0.0856	0.938		0.237	0.0711	0.848		0.198	0.0436

Table 8 - Investigation-Derived Waste Samples (IDW)
TCLP Analysis of Drummed Soil Cuttings and Purge/Decon Water

			CLP Sample No(s).	C0AK7/MC0AK7		C0AK5/MC0AK5		C0AK6/MC0AK6	
			Sample #:	IDW01		IDW02		IDW03	
			Sampling Location:	W		W		W	
			IDW Type	IDW Water		IDW Drill Cuttings		IDW Drill Cuttings	
			Matrix:	Water		Water		Water	
			Units:	ug/L		ug/L		ug/L	
			Date Sampled:	9/25/2013		9/25/2013		9/25/2013	
			Date Analyzed:	10/16/2013		10/16/2013		10/16/2013	
Parameter	CAS No.	Analysis	TCLP	Result	Q	Result	Q	Result	Q
2,4,5-TP (Silvex)	93-72-1	CPEST	1000	0.1	U	0.1	U	0.1	U
2,4-D	94-75-7	CPEST	10000	0.5	U	0.5	U	0.5	U
alpha-Chlordane	5103-71-9	CPEST	30	0.05	U	0.05	U	0.05	U
Endrin	72-20-8	CPEST	20	0.1	U	0.1	U	0.1	U
gamma-BHC (Lindane)	58-89-9	CPEST	400	0.05	U	0.05	U	0.05	U
gamma-Chlordane	5103-74-2	CPEST	30	0.05	U	0.05	U	0.05	U
Heptachlor	76-44-8	CPEST	8	0.05	U	0.05	U	0.05	U
Heptachlor epoxide	1024-57-3	CPEST	8	0.05	U	0.05	U	0.05	U
Methoxychlor	72-43-5	CPEST	10000	0.5	U	0.5	U	0.5	U
Toxaphene	8001-35-2	CPEST	500	5	U	5	U	5	U
Arsenic	7440-38-2	E200.7	5000	10	UJ	10	U	10	U
Barium	7440-39-3	E200.7	100000	818		1360		2270	
Cadmium	7440-43-9	E200.7	1000	5	U	5	UJ	5	UJ
Chromium	7440-47-3	E200.7	5000	10	U	10	U	10	U
Lead	7439-92-1	E200.7	5000	10	U	10	U	39.7	
Selenium	7782-49-2	E200.7	1000	35	U	35	U	35	U
Silver	7440-22-4	E200.7	5000	10	U	10	U	10	U
Mercury	7439-97-6	E245.2	200	0.2	UJ	0.025	J-	0.2	UJ
1,1-Dichloroethene	75-35-4	E624	700	5	U	5	U	5	U
1,2-Dichloroethane	107-06-2	E624	500	5	U	5	U	5	U
1,4-Dichlorobenzene	106-46-7	E624	7500	5	U	5	U	5	U
2-Butanone	78-93-3	E624	200000	10	U	10	U	10	U
Benzene	71-43-2	E624	500	5	U	5	U	5	U
Carbon tetrachloride	56-23-5	E624	500	5	U	5	U	5	U
Chlorobenzene	108-90-7	E624	100000	5	U	5	U	5	U
Chloroform	67-66-3	E624	6000	5	U	5	U	5	U
Tetrachloroethene	127-18-4	E624	700	5	U	5	U	5	U
Trichloroethene	79-01-6	E624	500	5	U	5	U	5	U
Vinyl chloride	75-01-4	E624	200	5	U	5	U	5	U
2,4,5-Trichlorophenol	95-95-4	E625	400000	5	U	5	U	5	U
2,4,6-Trichlorophenol	88-06-2	E625	2000	5	U	5	U	5	U
2,4-Dinitrotoluene	121-14-2	E625	130	5	U	5	U	5	U
2-Methylphenol	95-48-7	E625	200000	5	U	5	U	5	U
3-Methylphenol + 4-Methylphenol	111-11-1	E625		4.7	J	5	U	5	U
Hexachlorobenzene	118-74-1	E625	130	5	U	5	U	5	U
Hexachlorobutadiene	87-68-3	E625	500	5	U	5	U	5	U
Hexachloroethane	67-72-1	E625	3000	5	U	5	U	5	U
Nitrobenzene	98-95-3	E625	2000	5	U	5	U	5	U
Pentachlorophenol	87-86-5	E625	100000	10	U	10	U	10	U
Pyridine	110-86-1	E625	5000	5	U	5	U	5	U
Total Cresol	1319-77-3	E625	200000	5	U	5	U	5	U

Table 9 – Blank Samples
Organic and Inorganic Compounds and Analytes

		CLP Sample No.	C0AK2/MC0AK2		C0AK4/MC0AK4		MC0AH8		MC0AH9		MC0AJ0		MC0AJ1		C0AK1/MC0AK1	
		Sample #:	FB02		FB03		RB02		RB03		RB04		RB05		RB06	
		Sampling Location:	Z		Z		Z		Z		Z		Z		Z	
		Matrix:	Water		Water		Water		Water		Water		Water		Water	
		Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
		Date Sampled:	9/23/2013		9/24/2013		9/16/2013		9/17/2013		9/18/2013		9/19/2013		9/23/2013	
		Date Analyzed:	10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013	
Parameter	CAS No.	Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	7429-90-5	E200.8	20	U	20	U	71.3		20	U	59.7		34.8		20	U
Antimony	7440-36-0	E200.8	3.8		0.51	J	2	U	2	U	2	U	0.49	J	2	U
Arsenic	7440-38-2	E200.8	0.077	J	1	U	1	U	1	U	1	U	1	U	1	U
Barium	7440-39-3	E200.8	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Beryllium	7440-41-7	E200.8	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cadmium	7440-43-9	E200.8	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Calcium	7440-70-2	E200.8	500	U	500	U	500	U	500	U	500	U	500	U	500	U
Chromium	7440-47-3	E200.8	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Cobalt	7440-48-4	E200.8	0.26	J	0.043	J	0.25	J	1	U	0.041	J	0.054	J	1	U
Copper	7440-50-8	E200.8	2	U	2	U	0.35	J	2	U	0.36	J	2	U	2	U
Iron	7439-89-6	E200.8	200	U	200	U	200	U	200	U	200	U	200	U	200	U
Lead	7439-92-1	E200.8	0.052	J	1	U	1.2		1	U	0.12	J	0.17	J	0.18	J
Magnesium	7439-95-4	E200.8	27.3	J	5.1	J	25	J	0.72	J	62.3	J	13.1	J	18.1	J
Manganese	7439-96-5	E200.8	0.12	J	1	U	14.2		0.13	J	2.2		4		1.7	
Nickel	7440-02-0	E200.8	0.28	J	1	U	0.89	J	1	U	0.71	J	0.27	J	0.49	J
Potassium	9440-09-7	E200.8	500	U	500	U	500	U	500	U	500	U	500	U	500	U
Selenium	7782-49-2	E200.8	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Silver	7440-22-4	E200.8	0.1	J	1	U	1	U	0.023	J	1	U	1	U	1	U
Sodium	7440-23-5	E200.8	500	U	500	U	500	U	500	U	500	U	500	U	500	U
Thallium	7440-28-0	E200.8	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Uranium	7440-61-1	E200.8	0.19	J	0.034	J	1	U	1	U	1	U	1	U	1	U
Vanadium	7440-62-2	E200.8	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Zinc	7440-66-6	E200.8	8		2	U	5.7		2	U	15.6		3.7		7.3	
Mercury	7439-97-6	E245.2	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ
1,1,1-Trichloroethane	71-55-6	E524.2	0.5	U	0.5	U									0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	E524.2	0.5	U	0.5	U									0.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	E524.2	0.5	U	0.5	U									0.5	U
1,1,2-Trichloroethane	79-00-5	E524.2	0.5	U	0.5	U									0.5	U
1,1-Dichloroethane	75-34-3	E524.2	0.5	U	0.5	U									0.5	U
1,1-Dichloroethene	75-35-4	E524.2	0.5	U	0.5	U									0.5	U
1,2,3-Trichlorobenzene	87-61-6	E524.2	0.5	U	0.5	U									0.5	U
1,2,4-Trichlorobenzene	120-82-1	E524.2	0.5	U	0.5	U									0.5	U
1,2-Dibromo-3-chloropropane	96-12-8	E524.2	0.5	U	0.5	U									0.5	U
1,2-Dibromoethane	106-93-4	E524.2	0.5	U	0.5	U									0.5	U
1,2-Dichlorobenzene	95-50-1	E524.2	0.5	U	0.5	U									0.5	U
1,2-Dichloroethane	107-06-2	E524.2	0.5	U	0.5	U									0.5	U
1,2-Dichloropropane	78-87-5	E524.2	0.5	U	0.5	U									0.5	U
1,3-Dichlorobenzene	541-73-1	E524.2	0.5	U	0.5	U									0.5	U
1,4-Dichlorobenzene	106-46-7	E524.2	0.5	U	0.5	U									0.5	U
2-Butanone	78-93-3	E524.2	5	U	5	U									5	U
2-Hexanone	591-78-6	E524.2	5	U	5	U									5	U
4-Methyl-2-pentanone	108-10-1	E524.2	5	U	5	U									5	U
Acetone	67-64-1	E524.2	5	U	5	U									5	U
Benzene	71-43-2	E524.2	0.5	U	0.5	U									0.5	U
Bromochloromethane	74-97-5	E524.2	0.5	U	0.5	U									0.5	U
Bromodichloromethane	75-27-4	E524.2	0.5	U	0.5	U									0.5	U
Bromoform	75-25-2	E524.2	0.5	U	0.5	U									0.5	U
Bromomethane	74-83-9	E524.2	0.5	U	0.5	U									0.5	U
Carbon disulfide	75-15-0	E524.2	0.5	U	0.5	U									0.5	U
Carbon tetrachloride	56-23-5	E524.2	0.5	U	0.5	U									0.5	U
Chlorobenzene	108-90-7	E524.2	0.5	U	0.5	U									0.5	U
Chloroethane	75-00-3	E524.2	0.5	U	0.5	U									0.5	U
Chloroform	67-66-3	E524.2	0.5	U	3.1										2.3	
Chloromethane	74-87-3	E524.2	0.5	U	0.5	U									0.5	U
cis-1,2-Dichloroethene	156-59-2	E524.2	0.5	U	0.5	U									0.5	U
cis-1,3-Dichloropropene	10061-01-5	E524.2	0.5	U	0.5	U									0.5	U
Cyclohexane	110-82-7	E524.2	0.5	U	0.5	U									0.5	U
Dibromochloromethane	124-48-1	E524.2	0.5	U	0.5	U									0.5	U
Dichlorodifluoromethane	75-71-8	E524.2	0.5	U	0.5	U									0.5	U
Ethylbenzene	100-41-4	E524.2	0.5	U	0.5	U									0.5	U
Isopropylbenzene	98-82-8	E524.2	0.5	U	0.5	U									0.5	U
m,p-Xylene	179601-23-1	E524.2	0.28	J	0.25	J									0.5	U
Methyl acetate	79-20-9	E524.2	0.5	U	0.5	U									0.5	U
Methyl tert-butyl ether	1634-04-4	E524.2	0.5	U	0.5	U									0.5	U
Methylcyclohexane	108-87-2	E524.2	0.5	U	0.5	U									0.5	U
Methylene chloride	75-09-2	E524.2	0.5	U	1.6										1.4	
o-Xylene	95-47-6	E524.2	0.5	U	0.5	U									0.5	U
Styrene	100-42-5	E524.2	0.5	U	0.5	U									0.5	U
Tetrachloroethene	127-18-4	E524.2	0.5	U	0.5	U									0.5	U
Toluene	108-88-3	E524.2	0.59		0.52										0.28	J
trans-1,2-Dichloroethene	156-60-5	E524.2	0.5	U	0.5	U									0.5	U
trans-1,3-Dichloropropene	10061-02-6	E524.2	0.5	U	0.5	U									0.5	U
Trichloroethene	79-01-6	E524.2	0.5	U	0.5	U									0.5	U
Trichlorofluoromethane	75-69-4	E524.2	0.5	U	0.5	U									0.5	U
Vinyl chloride	75-01-4	E524.2	0.5	U	0.5	U									0.5	U
1,1'-Biphenyl	92-52-4	E625	5	UJ	5	U									5	UJ

Table 9 – Blank Samples
Organic and Inorganic Compounds and Analytes

			CLP Sample No.		C0AK2/MC0AK2		C0AK4/MC0AK4		MC0AH8		MC0AH9		MC0AJ0		MC0AJ1		C0AK1/MC0AK1	
			Sample #:		FB02		FB03		RB02		RB03		RB04		RB05		RB06	
			Sampling Location:		Z		Z		Z		Z		Z		Z		Z	
			Matrix:		Water		Water		Water		Water		Water		Water		Water	
			Units:		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
			Date Sampled:		9/23/2013		9/24/2013		9/16/2013		9/17/2013		9/18/2013		9/19/2013		9/23/2013	
			Date Analyzed:		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013	
Parameter	CAS No.	Analysis		Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
1,2,4,5-Tetrachlorobenzene	95-94-3	E625	5	UJ	5	U											5	UJ
1,4-Dioxane	123-91-1	E625	2.5	UJ	2.5	U											2.5	UJ
2,2'-Oxybis(1-chloropropane)	108-60-1	E625	5	UJ	5	U											5	UJ
2,3,4,6-Tetrachlorophenol	58-90-2	E625	5	UJ	5	U											5	UJ
2,4,5-Trichlorophenol	95-95-4	E625	5	UJ	5	U											5	UJ
2,4,6-Trichlorophenol	88-06-2	E625	5	UJ	5	U											5	UJ
2,4-Dichlorophenol	120-83-2	E625	5	UJ	5	U											5	UJ
2,4-Dimethylphenol	105-67-9	E625	5	UJ	5	U											5	UJ
2,4-Dinitrophenol	51-28-5	E625	10	UJ	10	U											10	UJ
2,4-Dinitrotoluene	121-14-2	E625	5	UJ	5	U											5	UJ
2,6-Dinitrotoluene	606-20-2	E625	5	UJ	5	U											5	UJ
2-Chloronaphthalene	91-58-7	E625	5	UJ	5	U											5	UJ
2-Chlorophenol	95-57-8	E625	5	UJ	5	U											5	UJ
2-Methylnaphthalene	91-57-6	E625	5	UJ	5	U											5	UJ
2-Methylphenol	95-48-7	E625	5	UJ	5	U											5	UJ
2-Nitroaniline	88-74-4	E625	10	UJ	10	U											10	UJ
2-Nitrophenol	88-75-5	E625	5	UJ	5	U											5	UJ
3,3'-Dichlorobenzidine	91-94-1	E625	5	UJ	5	U											5	UJ
3-Nitroaniline	99-09-2	E625	10	UJ	10	U											10	UJ
4,6-Dinitro-2-methylphenol	534-52-1	E625	10	UJ	10	U											10	UJ
4-Bromophenyl-phenylether	101-55-3	E625	5	UJ	5	U											5	UJ
4-Chloro-3-methylphenol	59-50-7	E625	5	UJ	5	U											5	UJ
4-Chloroaniline	106-47-8	E625	5	UJ	5	U											5	UJ
4-Chlorophenyl-phenylether	7005-72-3	E625	5	UJ	5	U											5	UJ
4-Methylphenol	106-44-5	E625	5	UJ	5	U											5	UJ
4-Nitroaniline	100-01-6	E625	10	UJ	10	U											10	UJ
4-Nitrophenol	100-02-7	E625	10	UJ	10	U											10	UJ
Acenaphthene	83-32-9	E625	5	UJ	5	U											5	UJ
Acenaphthylene	208-96-8	E625	5	UJ	5	U											5	UJ
Acetophenone	98-86-2	E625	1.9	J	5	U											5	UJ
Anthracene	120-12-7	E625	5	UJ	5	U											5	UJ
Atrazine	1912-24-9	E625	5	UJ	5	U											5	UJ
Benzaldehyde	100-52-7	E625	5	UJ	5	U											5	UJ
Benzo(a)anthracene	56-55-3	E625	5	UJ	5	U											5	UJ
Benzo(a)pyrene	50-32-8	E625	5	UJ	5	U											5	UJ
Benzo(b)fluoranthene	205-99-2	E625	5	UJ	5	U											5	UJ
Benzo(g,h,i)perylene	191-24-2	E625	5	UJ	5	U											5	UJ
Benzo(k)fluoranthene	207-08-9	E625	5	UJ	5	U											5	UJ
Bis(2-chloroethoxy)methane	111-91-1	E625	5	UJ	5	U											5	UJ
Bis(2-chloroethyl)ether	111-44-4	E625	5	UJ	5	U											5	UJ
Bis(2-ethylhexyl)phthalate	117-81-7	E625	5	UJ	5	U											5	UJ
Butylbenzylphthalate	85-68-7	E625	5	UJ	5	U											5	UJ
Caprolactam	105-60-2	E625	5	UJ	5	U											5	UJ
Carbazole	86-74-8	E625	5	UJ	5	U											5	UJ
Chrysene	218-01-9	E625	5	UJ	5	U											5	UJ
Dibenzo(a,h)anthracene	53-70-3	E625	5	UJ	5	U											5	UJ
Dibenzofuran	132-64-9	E625	5	UJ	5	U											5	UJ
Diethylphthalate	84-66-2	E625	5	UJ	5	U											5	UJ
Dimethylphthalate	131-11-3	E625	5	UJ	5	U											5	UJ
Di-n-butylphthalate	84-74-2	E625	4	J	3.3	J											3	J
Di-n-octylphthalate	117-84-0	E625	5	UJ	5	U											5	UJ
Fluoranthene	206-44-0	E625	5	UJ	5	U											5	UJ
Fluorene	86-73-7	E625	5	UJ	5	U											5	UJ
Hexachlorobenzene	118-74-1	E625	5	UJ	5	U											5	UJ
Hexachlorobutadiene	87-68-3	E625	5	UJ	5	U											5	UJ
Hexachlorocyclopentadiene	77-47-4	E625	5	UJ	5	U											5	UJ
Hexachloroethane	67-72-1	E625	5	UJ	5	U											5	UJ
Indeno(1,2,3-cd)pyrene	193-39-5	E625	5	UJ	5	U											5	UJ
Isophorone	78-59-1	E625	5	UJ	5	U											5	UJ
Naphthalene	91-20-3	E625	5	UJ	5	U											5	UJ
Nitrobenzene	98-95-3	E625	5	UJ	5	U											5	UJ
N-Nitroso-di-n-propylamine	621-64-7	E625	5	UJ	5	U											5	UJ
N-Nitrosodiphenylamine	86-30-6	E625	5	UJ	5	U											5	UJ
Pentachlorophenol	87-86-5	E625	10	UJ	10	U											10	UJ
Phenanthrene	85-01-8	E625	5	UJ	5	U											5	UJ
Phenol	108-95-2	E625	5	UJ	5	U											5	UJ
Pyrene	129-00-0	E625	5	UJ	5	U											5	UJ

Table 9 – Blank Samples
Organic and Inorganic Compounds and Analytes

			CLP Sample No.		C0AJ9	
			Sample #:	C0AK3/MC0AK3 RB07	TB04	
			Sampling Location:	Z	Z	
			Matrix:	Water	Water	
			Units:	ug/L	ug/L	
			Date Sampled:	9/24/2013	9/23/2013	
			Date Analyzed:	10/9/2013	10/7/2013	
Parameter	CAS No.	Analysis	Result	Q	Result	Q
Aluminum	7429-90-5	E200.8	32.7			
Antimony	7440-36-0	E200.8	2.3			
Arsenic	7440-38-2	E200.8	0.16	J		
Barium	7440-39-3	E200.8	10	U		
Beryllium	7440-41-7	E200.8	1	U		
Cadmium	7440-43-9	E200.8	0.087	J		
Calcium	7440-70-2	E200.8	589			
Chromium	7440-47-3	E200.8	2	U		
Cobalt	7440-48-4	E200.8	0.82	J		
Copper	7440-50-8	E200.8	0.59	J		
Iron	7439-89-6	E200.8	200	U		
Lead	7439-92-1	E200.8	0.36	J		
Magnesium	7439-95-4	E200.8	105	J		
Manganese	7439-96-5	E200.8	1.4			
Nickel	7440-02-0	E200.8	1.1			
Potassium	9440-09-7	E200.8	500	U		
Selenium	7782-49-2	E200.8	0.29	J		
Silver	7440-22-4	E200.8	0.29	J		
Sodium	7440-23-5	E200.8	630			
Thallium	7440-28-0	E200.8	1	U		
Uranium	7440-61-1	E200.8	0.55	J		
Vanadium	7440-62-2	E200.8	0.63	J		
Zinc	7440-66-6	E200.8	44.6			
Mercury	7439-97-6	E245.2	0.2	UJ		
1,1,1-Trichloroethane	71-55-6	E524.2	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	79-34-5	E524.2	0.5	U	0.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	E524.2	0.5	U	0.5	U
1,1,2-Trichloroethane	79-00-5	E524.2	0.5	U	0.5	U
1,1-Dichloroethane	75-34-3	E524.2	0.5	U	0.5	U
1,1-Dichloroethene	75-35-4	E524.2	0.5	U	0.5	U
1,2,3-Trichlorobenzene	87-61-6	E524.2	0.5	U	0.5	U
1,2,4-Trichlorobenzene	120-82-1	E524.2	0.5	U	0.5	U
1,2-Dibromo-3-chloropropane	96-12-8	E524.2	0.5	U	0.5	U
1,2-Dibromoethane	106-93-4	E524.2	0.5	U	0.5	U
1,2-Dichlorobenzene	95-50-1	E524.2	0.5	U	0.5	U
1,2-Dichloroethane	107-06-2	E524.2	0.5	U	0.5	U
1,2-Dichloropropane	78-87-5	E524.2	0.5	U	0.5	U
1,3-Dichlorobenzene	541-73-1	E524.2	0.5	U	0.5	U
1,4-Dichlorobenzene	106-46-7	E524.2	0.5	U	0.5	U
2-Butanone	78-93-3	E524.2	5	U	5	U
2-Hexanone	591-78-6	E524.2	5	U	5	U
4-Methyl-2-pentanone	108-10-1	E524.2	5	U	5	U
Acetone	67-64-1	E524.2	5	U	5.7	
Benzene	71-43-2	E524.2	0.5	U	0.5	U
Bromochloromethane	74-97-5	E524.2	0.5	U	0.5	U
Bromodichloromethane	75-27-4	E524.2	0.5	U	0.5	U
Bromoform	75-25-2	E524.2	0.5	U	0.5	U
Bromomethane	74-83-9	E524.2	0.5	U	0.5	U
Carbon disulfide	75-15-0	E524.2	0.5	U	0.5	U
Carbon tetrachloride	56-23-5	E524.2	0.5	U	0.5	U
Chlorobenzene	108-90-7	E524.2	0.5	U	0.5	U
Chloroethane	75-00-3	E524.2	0.5	U	0.5	U
Chloroform	67-66-3	E524.2	3.2		0.5	U
Chloromethane	74-87-3	E524.2	0.5	U	0.5	U
cis-1,2-Dichloroethene	156-59-2	E524.2	0.5	U	0.5	U
cis-1,3-Dichloropropene	10061-01-5	E524.2	0.5	U	0.5	U
Cyclohexane	110-82-7	E524.2	0.5	U	0.5	U
Dibromochloromethane	124-48-1	E524.2	0.5	U	0.5	U
Dichlorodifluoromethane	75-71-8	E524.2	0.5	U	0.5	U
Ethylbenzene	100-41-4	E524.2	0.5	U	0.5	U
Isopropylbenzene	98-82-8	E524.2	0.5	U	0.5	U
m,p-Xylene	179601-23-1	E524.2	0.25	J	0.33	J
Methyl acetate	79-20-9	E524.2	0.5	U	0.5	U
Methyl tert-butyl ether	1634-04-4	E524.2	0.5	U	0.5	U
Methylcyclohexane	108-87-2	E524.2	0.5	U	0.5	U
Methylene chloride	75-09-2	E524.2	1.5		0.5	U
o-Xylene	95-47-6	E524.2	0.5	U	0.5	U
Styrene	100-42-5	E524.2	0.5	U	0.5	U
Tetrachloroethene	127-18-4	E524.2	0.5	U	0.5	U
Toluene	108-88-3	E524.2	0.51		0.7	
trans-1,2-Dichloroethene	156-60-5	E524.2	0.5	U	0.5	U
trans-1,3-Dichloropropene	10061-02-6	E524.2	0.5	U	0.5	U
Trichloroethene	79-01-6	E524.2	0.5	U	0.5	U
Trichlorofluoromethane	75-69-4	E524.2	0.5	U	0.5	U
Vinyl chloride	75-01-4	E524.2	0.5	U	0.5	U
1,1'-Biphenyl	92-52-4	E625	5	U		

Table 9 – Blank Samples
Organic and Inorganic Compounds and Analytes

			CLP Sample No.		C0AJ9	
			Sample #:	C0AK3/MC0AK3 RB07	TB04	
			Sampling Location:	Z	Z	
			Matrix:	Water	Water	
			Units:	ug/L	ug/L	
			Date Sampled:	9/24/2013	9/23/2013	
			Date Analyzed:	10/9/2013	10/7/2013	
Parameter	CAS No.	Analysis	Result	Q	Result	Q
1,2,4,5-Tetrachlorobenzene	95-94-3	E625	5	U		
1,4-Dioxane	123-91-1	E625	2.5	U		
2,2'-Oxybis(1-chloropropane)	108-60-1	E625	5	U		
2,3,4,6-Tetrachlorophenol	58-90-2	E625	5	U		
2,4,5-Trichlorophenol	95-95-4	E625	5	U		
2,4,6-Trichlorophenol	88-06-2	E625	5	U		
2,4-Dichlorophenol	120-83-2	E625	5	U		
2,4-Dimethylphenol	105-67-9	E625	5	U		
2,4-Dinitrophenol	51-28-5	E625	10	U		
2,4-Dinitrotoluene	121-14-2	E625	5	U		
2,6-Dinitrotoluene	606-20-2	E625	5	U		
2-Chloronaphthalene	91-58-7	E625	5	U		
2-Chlorophenol	95-57-8	E625	5	U		
2-Methylnaphthalene	91-57-6	E625	5	U		
2-Methylphenol	95-48-7	E625	5	U		
2-Nitroaniline	88-74-4	E625	10	U		
2-Nitrophenol	88-75-5	E625	5	U		
3,3'-Dichlorobenzidine	91-94-1	E625	5	U		
3-Nitroaniline	99-09-2	E625	10	U		
4,6-Dinitro-2-methylphenol	534-52-1	E625	10	U		
4-Bromophenyl-phenylether	101-55-3	E625	5	U		
4-Chloro-3-methylphenol	59-50-7	E625	5	U		
4-Chloroaniline	106-47-8	E625	5	U		
4-Chlorophenyl-phenylether	7005-72-3	E625	5	U		
4-Methylphenol	106-44-5	E625	5	U		
4-Nitroaniline	100-01-6	E625	10	U		
4-Nitrophenol	100-02-7	E625	10	U		
Acenaphthene	83-32-9	E625	5	U		
Acenaphthylene	208-96-8	E625	5	U		
Acetophenone	98-86-2	E625	5	U		
Anthracene	120-12-7	E625	5	U		
Atrazine	1912-24-9	E625	5	U		
Benzaldehyde	100-52-7	E625	5	U		
Benzo(a)anthracene	56-55-3	E625	5	U		
Benzo(a)pyrene	50-32-8	E625	5	U		
Benzo(b)fluoranthene	205-99-2	E625	5	U		
Benzo(g,h,i)perylene	191-24-2	E625	5	U		
Benzo(k)fluoranthene	207-08-9	E625	5	U		
Bis(2-chloroethoxy)methane	111-91-1	E625	5	U		
Bis(2-chloroethyl)ether	111-44-4	E625	5	U		
Bis(2-ethylhexyl)phthalate	117-81-7	E625	5	U		
Butylbenzylphthalate	85-68-7	E625	5	U		
Caprolactam	105-60-2	E625	5	U		
Carbazole	86-74-8	E625	5	U		
Chrysene	218-01-9	E625	5	U		
Dibenzo(a,h)anthracene	53-70-3	E625	5	U		
Dibenzofuran	132-64-9	E625	5	U		
Diethylphthalate	84-66-2	E625	5	U		
Dimethylphthalate	131-11-3	E625	5	U		
Di-n-butylphthalate	84-74-2	E625	1.2	J		
Di-n-octylphthalate	117-84-0	E625	5	U		
Fluoranthene	206-44-0	E625	5	U		
Fluorene	86-73-7	E625	5	U		
Hexachlorobenzene	118-74-1	E625	5	U		
Hexachlorobutadiene	87-68-3	E625	5	U		
Hexachlorocyclopentadiene	77-47-4	E625	5	U		
Hexachloroethane	67-72-1	E625	5	U		
Indeno(1,2,3-cd)pyrene	193-39-5	E625	5	U		
Isophorone	78-59-1	E625	5	U		
Naphthalene	91-20-3	E625	5	U		
Nitrobenzene	98-95-3	E625	5	U		
N-Nitroso-di-n-propylamine	621-64-7	E625	5	U		
N-Nitrosodiphenylamine	86-30-6	E625	5	U		
Pentachlorophenol	87-86-5	E625	10	U		
Phenanthrene	85-01-8	E625	5	U		
Phenol	108-95-2	E625	5	U		
Pyrene	129-00-0	E625	5	U		

Table 10 – Blank Samples
Radionuclides

	CLP Sample Number:	R34243-66				R34243-68				R34243-55				R34243-56			
	Sample #:	FB02				FB03				RB02				RB03			
	Sampling Location:	Z				Z				Z				Z			
	Matrix:	WATER-GROUND				WATER-GROUND				WATER-GROUND				WATER-GROUND			
	Sample Type:	Field Blank				Field Blank				Rinsate Blank				Rinsate Blank			
	Units:	PCI/L				PCI/L				PCI/L				PCI/L			
	Date Sampled:	9/23/2013				9/24/2013				9/16/2013				9/17/2013			
	Date Analyzed:	12/4/2013				12/4/2013				12/4/2013				12/4/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	-0.004		0.0265	0.0738	0.0591		0.0563	0.064	0		0.0217	0.0516	0.0442		0.05	0.055
Ba140	NAREL GAM-01	-407		3530	1610	-353		4880	973	-432		11400	2380	-730		3530	2290
Bi214	NAREL GAM-01																
Co60	NAREL GAM-01	0.0179		0.649	1.16	0.0786		0.419	0.717	-0.144		16.5	1.23	-0.309		1.79	1.27
Cs137	NAREL GAM-01	-0.0681		0.928	1.58	-0.215		0.594	0.993	-0.315		0.898	1.51	-0.257		0.926	1.56
K40	NAREL GAM-01	-9.27		13.6	18	-18		79.5	12.6	-15		19.7	18.6	-9.7		15.6	19.3
Ra226	NAREL GAM-01	-11	J	54.8	49.7	-5.91	J	217	22.2	-9.52	J	50.8	50.4	-19.1	J	99	50.6
Ra228	NAREL GAM-01	-2.17		5.7	5.92	0.301		2.03	3.5	3.18		4.91	6.25	-0.285		4.15	5.77
Pu238	NAREL PU-EICHROM	0.0188		0.0659	0.129	0.0181		0.0464	0.088	0		0.0302	0.073	0.0039		0.035	0.08
Pu239	NAREL PU-EICHROM	0.015		0.0411	0.0781	0.0145		0.0396	0.075	0.006		0.0288	0.0595	0.0347		0.047	0.058
Th227	NAREL TH-EICHROM	0.0328	J	0.0898	0.17	0.0746	J	0.101	0.125	0.026		0.0756	0.13	0		0.075	0.182
Th228	NAREL TH-EICHROM	0.0183	J	0.107	0.21	-0.0139	J	0.0462	0.125	0.029		0.0697	0.131	0.0179		0.085	0.169
Th230	NAREL TH-EICHROM	-0.0137	J	0.033	0.104	0.0139	J	0.0403	0.07	-0.01		0.0335	0.101	0.009		0.04	0.083
Th232	NAREL TH-EICHROM	0.0228	J	0.0491	0.0843	0	J	0.0292	0.07	-0.019		0.0362	0.118	0.0089		0.04	0.083
U234	NAREL U-EICHROM	0.0588		0.0666	0.0736	0.0638		0.0743	0.102	0.089		0.0847	0.0967	0.0316		0.056	0.079
U235	NAREL U-EICHROM	0		0.0371	0.0882	0.0235		0.0644	0.122	0.006		0.0574	0.13	0.0189		0.055	0.095
U238	NAREL U-EICHROM	0.0343		0.0612	0.102	0.049		0.0681	0.102	0.073		0.0785	0.0967	0.0316		0.067	0.119

Table 10 – Blank Samples
Radionuclides

CLP Sample Number:		R34243-57				R34243-58				R34243-65				R34243-67			
Sample #:		RB04				RB05				RB06				RB07			
Sampling Location:		Z				Z				Z				Z			
Matrix:		WATER-GROUND				WATER-GROUND				WATER-GROUND				WATER-GROUND			
Sample Type:		Rinsate Blank				Rinsate Blank				Rinsate Blank				Rinsate Blank			
Units:		PCI/L				PCI/L				PCI/L				PCI/L			
Date Sampled:		9/18/2013				9/19/2013				9/23/2013				9/24/2013			
Date Analyzed:		12/4/2013				12/4/2013				12/4/2013				12/9/2013			
Parameter	Analysis	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC	Result	Q	Uncert. +/- 2σ	MDC
Am241	NAREL AM-EICHROM	0.0237		0.0418	0.0594	0.0298		0.0404	0.05	0.007		0.0404	0.0868	0.006		0.034	0.073
Ba140	NAREL GAM-01	-8.1		3140	1790	334		1160	1980	-285		580	945	-237		81500	1640
Bi214	NAREL GAM-01					3.68	J	2.5	3.44								
Co60	NAREL GAM-01	-0.115		6.56	1.33	0.0226		0.641	1.15	0.057		0.55	0.929	-0.26		2.12	1.23
Cs137	NAREL GAM-01	0.0672		0.848	1.46	0.437		0.896	1.5	0.102		0.626	1.05	-0.041		0.894	1.53
K40	NAREL GAM-01	7.5		12	19	0.858		12.2	18.7	-3.61		9.65	11.5	-7.09		13.9	17.5
Ra226	NAREL GAM-01	10.6	J	22.1	35.4	-5.3	J	39.1	49.9	-17.1	J	95.3	26.9	-5.62	J	40.9	51.1
Ra228	NAREL GAM-01	-0.969		4.3	5.43	-0.0758		2.95	5.07	3.74		3.91	4.81	1.05		3.83	5.6
Pu238	NAREL PU-EICHROM	0.0158		0.0434	0.0823	0.00258		0.0296	0.066	-0.014		0.021	0.0699	0.0099		0.054	0.111
Pu239	NAREL PU-EICHROM	0.00791		0.0354	0.0731	0.0258		0.0357	0.054	0.03		0.0372	0.0501	0.0066		0.03	0.061
Th227	NAREL TH-EICHROM	0.0172		0.077	0.159	0.021		0.061	0.105	0.008		0.0732	0.166	0.0085		0.078	0.178
Th228	NAREL TH-EICHROM	-0.0288		0.0768	0.185	0.0273		0.0619	0.115	-0.076		0.0772	0.205	-0.024		0.05	0.14
Th230	NAREL TH-EICHROM	0.0048		0.044	0.1	0.0703		0.0681	0.089	-0.013		0.0321	0.101	0.0191		0.052	0.099
Th232	NAREL TH-EICHROM	0.0048		0.0551	0.124	0.0429		0.0599	0.095	-0.004		0.0295	0.0822	0.0285		0.069	0.129
U234	NAREL U-EICHROM	0.00996		0.0445	0.092	0.0958		0.0856	0.08	0.025		0.0634	0.12	0.0196		0.054	0.102
U235	NAREL U-EICHROM	0.0298		0.0644	0.11	0.0319		0.0688	0.118	0.083		0.0895	0.11	0.0118		0.053	0.109
U238	NAREL U-EICHROM	0.0398		0.0615	0.092	0.112		0.0915	0.08	0.025		0.0634	0.12	0.0393		0.061	0.091

ATTACHMENT 3
DATA VALIDATION REPORTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 19, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the organic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# C0AJ2 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10027

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

DATE: November 18, 2013

TO: Colleen Walling
ESAT Region 3 Project Officer

FROM: Kurt Roby
Organic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

SUBJECT: Organic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: C0AJ2

OVERVIEW

Case 43811, Sample Delivery Group (SDG) C0AJ2, consisted of eleven (11) aqueous samples including one (1) field duplicate pair, two (2) rinsate blanks and two (2) field blanks analyzed for trace volatile and semivolatile compounds in addition to one (1) trip blank analyzed for trace volatile compounds. All analyses were performed by Spectrum Analytical, Inc. (MITKEM) in accordance with Contract Laboratory Program (CLP) Statement of Work (SOW) SOM01.2 (modified) through the Routine Analytical Services (RAS) program. Modification reference number 1564.8 details the specifications and reporting requirements for the analysis of 1,4-dioxane as a semivolatile compound.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Organic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are listed below.

Trip, field and rinsate blanks were used in evaluating blank contamination for the associated samples in this case based on sampling date.

MINOR PROBLEMS

In the semivolatile fraction, recovery for Deuterated Monitoring Compound (DMC) benzo(a)pyrene-d_{12} was outside the lower control limit for sample C0AJ5. No positive results were reported for compounds associated with this DMC in this sample; quantitation limits for these compounds are estimated and qualified "UJ".

The holding time of seven (7) days from the time of sample collection to sample extraction for semivolatile compounds in an aqueous matrix has been exceeded by one (1) day for samples C0AJ2, C0AJ3, C0AJ4, C0AK1 and C0AK2. Positive results and quantitation limits are impacted and qualified "J" and "UJ", respectively, for these samples.

NOTES

Compounds detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of di-n-butyl phthalate less than CRQL have been reported at CRQL and qualified "U" in samples for which the associated field and rinsate blanks had the same compound present.

The detected concentration of acetone which was greater than CRQL but less than trip blank concentration has been reported at blank concentration and qualified "U" in sample C0AJ5.

Tentatively Identified Compounds (TICs) were analyzed and reported but not validated. They are validated only at a specific request of the data users. TIC data are included with the sample data. Alkane TICs were reported in the laboratory narrative but not included in the sample data. The non-target compound qualifier "NJ" is applied to these data in addition to any other qualifier reported by the laboratory.

No data were impacted for samples which reported recoveries for DMCs outside upper control limits when no positive results were reported for associated compounds.

The sample cooler containing several semivolatile samples had an interior temperature of 8.5°C, which exceeded the criteria of 4.0°C$\pm$2.0°C. Due to the persistence of these compounds in an aqueous matrix, no action was taken by the reviewer based on this finding.

No positive results other than those attributed to blank contamination were detected in field duplicate pair C0AJ3/C0AJ4.

Chain of Custody records list several sample aliquots for laboratory QC. However, Region 3 does not schedule matrix spike/matrix spike duplicate (MS/MSD) analyses on trace volatile, volatile or semivolatile fractions. Therefore, no MS/MSD analyses were performed in this SDG.

GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
B	The result is presumed a blank contaminant as the assessment of blank analysis results has determined the existence and magnitude of contamination resulting from laboratory (or field) activities. This qualifier applies only to drinking water samples.
NJ	The analysis indicates the presence of an analyte that has been "tentatively indentified" and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

DCN: R3ESAT-2013-V058

Sample Summary Report

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ2	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA01	pH:	2.0	Sample Date:	09/23/2013	Sample Time:	12:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoro methane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluorom ethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromet hane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexa ne	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ2	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	EPA01	pH:	7.0	Sample Date:	09/23/2013	Sample Time:	12:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-butylphthalate	5.0	ug/L	1.0	J	UJ	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	UJ	Yes	S4VEM
Tetradecanamide	9.7	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ3	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA02	pH:	2.0	Sample Date:	09/23/2013	Sample Time:	16:50:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ3	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	EPA02	pH:	7.0	Sample Date:	09/23/2013	Sample Time:	16:50:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-butylphthalate	5.0	ug/L	1.0	J	UJ	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	UJ	Yes	S4VEM
13-Docosenamide, (Z)-	9.2	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ4	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA02	pH:	2.0	Sample Date:	09/23/2013	Sample Time:	17:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ4	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	EPA02	pH:	7.0	Sample Date:	09/23/2013	Sample Time:	17:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-butylphthalate	5.0	ug/L	1.0	J	UJ	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	UJ	Yes	S4VEM
Acetic acid, chloro-, hexadecyl ester	5.1	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ5	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	EPA03D	pH:	7.0	Sample Date:	09/24/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	1.8	ug/L	1.0	J	J	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	2.4	ug/L	1.0	J	J	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	5.2	ug/L	1.0			Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	1.7	ug/L	1.0	J	J	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	1.7	ug/L	1.0	J	J	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM
1-Tetracosanol	3.2	ug/L	1.0	NJ	NJ	Yes	S4VEM
Naphthalene, 1-methyl-	2.5	ug/L	1.0	NJ	NJ	Yes	S4VEM
Octanoic Acid	29	ug/L	1.0	NJ	NJ	Yes	S4VEM
n-Decanoic acid	5.4	ug/L	1.0	NJ	NJ	Yes	S4VEM
9-Octadecenamide, (Z)-	13	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ5	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA03D	pH:	2.0	Sample Date:	09/24/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.7	ug/L	1.0		U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ6	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	EPA03S	pH:	7.0	Sample Date:	09/24/2013	Sample Time:	10:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	5.0	ug/L	1.0	J	U	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM
2,6,10-Dodecatrien-1-ol, 3,7,11-trimethy	3.3	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ6	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA03S	pH:	2.0	Sample Date:	09/24/2013	Sample Time:	10:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ7	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA04	pH:	2.0	Sample Date:	09/24/2013	Sample Time:	14:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ7	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	EPA04	pH:	7.0	Sample Date:	09/24/2013	Sample Time:	14:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	6.0	ug/L	1.0			Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	1.3	ug/L	1.0	J	J	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	1.3	ug/L	1.0	J	J	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM
Trichloroacetic acid, tetradecyl ester	6.6	ug/L	1.0	NJ	NJ	Yes	S4VEM
1-Octadecene	9.0	ug/L	1.0	NJ	NJ	Yes	S4VEM
n-Hexadecanoic acid	4.7	ug/L	1.0	NJ	NJ	Yes	S4VEM
1-Hexadecanol	9.3	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ8	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	HW15	pH:	2.0	Sample Date:	09/24/2013	Sample Time:	18:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ8	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	HW15	pH:	7.0	Sample Date:	09/24/2013	Sample Time:	18:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	5.0	ug/L	1.0	J	U	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM
13-Docosenamide, (Z)-	9.4	ug/L	1.0	NJ	NJ	Yes	S4VEM
n-Hexadecanoic acid	3.0	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AJ9	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	2.0	Sample Date:	09/23/2013	Sample Time:	11:12:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.7	ug/L	1.0			Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.70	ug/L	1.0			Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.33	ug/L	1.0	J	J	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK1	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	Z	pH:	7.0	Sample Date:	09/23/2013	Sample Time:	13:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-butylphthalate	3.0	ug/L	1.0	J	J	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	UJ	Yes	S4VEM
Mequinol	6.2	ug/L	1.0	NJ	NJ	Yes	S4VEM
Dodecanoic acid	18	ug/L	1.0	NJ	NJ	Yes	S4VEM
1,2,3-Propanetriol, diacetate	27	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK1	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	2.0	Sample Date:	09/23/2013	Sample Time:	13:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	1.4	ug/L	1.0			Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	2.3	ug/L	1.0			Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.28	ug/L	1.0	J	J	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethyl ether	1.9	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK2	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	2.0	Sample Date:	09/23/2013	Sample Time:	17:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.59	ug/L	1.0			Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.28	ug/L	1.0	J	J	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK2	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	Z	pH:	7.0	Sample Date:	09/23/2013	Sample Time:	17:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acetophenone	1.9	ug/L	1.0	J	J	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	UJ	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	UJ	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-butylphthalate	4.0	ug/L	1.0	J	J	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	UJ	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	UJ	Yes	S4VEM
Propanoic acid, 2-methyl-, 2-ethyl-3-hyd	23	ug/L	1.0	NJ	NJ	Yes	S4VEM
2,2,4-Trimethyl-1,3-pentanediol diisobut	17	ug/L	1.0	NJ	NJ	Yes	S4VEM
7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	5.1	ug/L	1.0	NJ	NJ	Yes	S4VEM
Phenol, 2-methoxy-	15	ug/L	1.0	NJ	NJ	Yes	S4VEM
Benzaldehyde, 3-hydroxy-4-methoxy-	2.0	ug/L	1.0	NJ	NJ	Yes	S4VEM
9-Octadecenamide, (Z)-	10	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK3	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	2.0	Sample Date:	09/24/2013	Sample Time:	11:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	1.5	ug/L	1.0			Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	3.2	ug/L	1.0			Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.51	ug/L	1.0			Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.25	ug/L	1.0	J	J	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethyl ether	3.4	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK3	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	Z	pH:	7.0	Sample Date:	09/24/2013	Sample Time:	11:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	1.2	ug/L	1.0	J	J	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM
Phenol, 2-methoxy-	2.5	ug/L	1.0	NJ	NJ	Yes	S4VEM
13-Docosenamide, (Z)-	23	ug/L	1.0	NJ	NJ	Yes	S4VEM
Dodecanoic acid	5.0	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK4	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	2.0	Sample Date:	09/24/2013	Sample Time:	13:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	1.6	ug/L	1.0			Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	3.1	ug/L	1.0			Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.52	ug/L	1.0			Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.25	ug/L	1.0	J	J	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethyl ether	2.3	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	C0AK4	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	Z	pH:	7.0	Sample Date:	09/24/2013	Sample Time:	13:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	3.3	ug/L	1.0	J	J	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM
Phenol, 2-methoxy-	3.6	ug/L	1.0	NJ	NJ	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	SBLK4Z	Method:	BNA	Matrix:	Water	MA Number:	1564.8
Sample Location:	MB-74063	pH:	7.0	Sample Date:	10/09/2013	Sample Time:	17:01:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Benzaldehyde	5.0	ug/L	1.0	U	U	Yes	S4VEM
Phenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethyl)ether	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,2'-Oxybis(1-chloropropane)	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acetophenone	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
N-Nitroso-di-n-propylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Isophorone	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Nitrophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dimethylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-chloroethoxy)methane	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Naphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloroaniline	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Caprolactam	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chloro-3-methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Methylnaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorocyclopentadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1'-Biphenyl	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Chloronaphthalene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Dimethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,6-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
3-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
Acenaphthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
4-Nitrophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Dibenzofuran	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Diethylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluorene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Chlorophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Nitroaniline	10	ug/L	1.0	U	U	Yes	S4VEM
4,6-Dinitro-2-methylphenol	10	ug/L	1.0	U	U	Yes	S4VEM
N-Nitrosodiphenylamine	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2,4,5-Tetrachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4-Bromophenyl-phenylether	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Atrazine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
Phenanthrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbazole	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-butylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Butylbenzylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
3,3'-Dichlorobenzidine	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chrysene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bis(2-ethylhexyl)	5.0	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
phthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Di-n-octylphthalate	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(b)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(k)fluoranthene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(a)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Indeno(1,2,3-cd)pyrene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibenzo(a,h)anthracene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzo(g,h,i)perylene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,3,4,6-Tetrachlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dioxane	2.5	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	VBLK5Y	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MB-74017	pH:	7.0	Sample Date:	10/06/2013	Sample Time:	22:08:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AJ2	Lab Code:	MITKEM
Sample Number:	VHBLK5Y	Method:	VOA_Trace	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	VHBLK5Y	pH:	7.0	Sample Date:	10/07/2013	Sample Time:	05:41:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Dichlorodifluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Vinyl chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromomethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichlorofluoromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Acetone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon disulfide	0.27	ug/L	1.0	J	J	Yes	S4VEM
Methyl acetate	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylene chloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methyl tert-butyl ether	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
cis-1,2-Dichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Bromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,1-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Cyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	0.50	ug/L	1.0	U	U	Yes	S4VEM
Benzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Methylcyclohexane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromodichloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
cis-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
4-Methyl-2-pentanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Toluene	0.50	ug/L	1.0	U	U	Yes	S4VEM
trans-1,3-Dichloropropene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2-Trichloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	0.50	ug/L	1.0	U	U	Yes	S4VEM
2-Hexanone	5.0	ug/L	1.0	U	U	Yes	S4VEM
Dibromochloromethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromoethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Ethylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
o-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
m,p-Xylene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Styrene	0.50	ug/L	1.0	U	U	Yes	S4VEM
Bromoform	0.50	ug/L	1.0	U	U	Yes	S4VEM
Isopropylbenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,1,2,2-Tetrachloroethane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,3-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dibromo-3-chloropropane	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,4-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM
1,2,3-Trichlorobenzene	0.50	ug/L	1.0	U	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 19, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the organic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# C0AK5 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10026

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 14, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kenneth W. Curry
Senior Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Organic Data Validation (S4VEM)
Case: 43811
SDG: C0AK5
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) C0AK5, from the Kiskimere Groundwater Well Investigation site consisted of two (2) drill cutting solid and one (1) aqueous samples submitted to Spectrum Analytical Incorporated (MITKEM) for Toxicity Characteristic Leaching Procedure (TCLP) performed according to EPA Test Methods for Evaluating Solid Waste, SW-846 Method 1311 (Zero Headspace Extraction for volatile compounds). The leachates were analyzed for selected volatile, semivolatile and pesticide compounds according to Contract Laboratory Program (CLP) Statement of Work (SOW) SOM01.2 with modifications 1722.3, 1723.2 and 1689.7, respectively.

SUMMARY

Validation of data was performed according to the National Functional Guidelines for Validation of Organic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). No problems were detected during validation of these data.

NOTES

3-Methylphenol + 4-methylphenol in sample C0AK7 was detected below the Contract Required Quantitation Limit (CRQL) and was qualified “J”.

Tentatively Identified Compounds (TICs) were not required for this data set.

Recoveries of several Deuterated Monitoring Compounds (DMCs) were outside control limits in the volatile and semivolatile samples. No results were reported for compounds associated with these DMCs in these samples. Therefore, no data were qualified based on this finding.

Manual integrations noted in the laboratory case narrative are accurate. The manual integrations were performed forpyridine-d5 in the semivolatile initial calibration. All manual integrations were initialed by the analyst and a reviewer as required by the SOW and were consistently performed by the analyst.

The method, storage and TCLP extraction blanks associated with these samples were free of contamination.

The aqueous technical holding time of seven (7) days for semivolatile samples was applied to the solid samples by EXES. The sample extractions were performed within the fourteen (14) day solid extraction time. No data were qualified based on this finding.

The Relative Response Factor (RRF) for 1,4-dioxane-d8 in the volatile initial calibration was outside the control limit. No data were qualified based on this DMC calibration outlier.

The sample cooler chest containing the semivolatile samples had an interior temperature of 7.0 ^{o}C when received by the laboratory. Due to the relative stability of these compounds, no data were qualified based on this finding.

All pesticide Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries and Relative Percent Differences (RPDs) were within control limits.

In the semivolatile MS/MSD analyses of samples C0AK5 and C0AK7, recoveries of pyridine were outside the upper control limits in both analyses of these samples. RPDs for this compound were within control limits. No data were qualified based on this finding.

Pyridine-d5 failed precision criteria [Relative Percent Standard Deviation (%RSD)] in the semivolatile initial calibration. No data were qualified based on this finding.

Pesticide Laboratory Control Sample (LCS) recoveries for 4,4'-DDT, heptachlor, gamma-chlordane and aldrin were outside the upper control limits. No positive results were reported for these compounds. Therefore, no data were qualified based on this finding.

All semivolatile LCS recoveries were within control limits.

GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

U The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.

J The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).

B Analyte is presumed to be a blank contamination artifact.

NJ The analysis indicates the presence of an analyte that has been "tentatively indentified" and the associated numerical value represents its approximate concentration.

UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.

R The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

C This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

X This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

Sample Summary Report

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	1722.3
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	11:40:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	11:40:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Total Cresol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyridine	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	11:40:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Methoxychlor	0.50	ug/L	1.0	U	U	Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
alpha-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
gamma-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5MS	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	M1849-01AMS	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	14:20:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	43	ug/L	1.0		J	Yes	S4VEM
Hexachloroethane	34	ug/L	1.0		J	Yes	S4VEM
Nitrobenzene	53	ug/L	1.0		J	Yes	S4VEM
Hexachlorobutadiene	33	ug/L	1.0		J	Yes	S4VEM
2,4,6-Trichlorophenol	51	ug/L	1.0		J	Yes	S4VEM
2,4,5-Trichlorophenol	58	ug/L	1.0		J	Yes	S4VEM
2,4-Dinitrotoluene	53	ug/L	1.0		J	Yes	S4VEM
Hexachlorobenzene	33	ug/L	1.0		J	Yes	S4VEM
Pentachlorophenol	48	ug/L	1.0		J	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	45	ug/L	1.0		J	Yes	S4VEM
Pyridine	62	ug/L	1.0		J	Yes	S4VEM
Total Cresol			1.0		J	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5MS	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	M1849-01AMS	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	15:21:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.45	ug/L	1.0			Yes	S4VEM
Heptachlor	0.42	ug/L	1.0		J	Yes	S4VEM
Endrin	1.0	ug/L	1.0			Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.45	ug/L	1.0		J	Yes	S4VEM
gamma-Chlordane	0.46	ug/L	1.0		J	Yes	S4VEM
alpha-Chlordane	0.45	ug/L	1.0			Yes	S4VEM
Methoxychlor	4.7	ug/L	1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5MSD	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	M1849-01AMSD	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	15:39:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.46	ug/L	1.0			Yes	S4VEM
Heptachlor	0.41	ug/L	1.0		J	Yes	S4VEM
Endrin	1.0	ug/L	1.0			Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.46	ug/L	1.0		J	Yes	S4VEM
gamma-Chlordane	0.47	ug/L	1.0		J	Yes	S4VEM
alpha-Chlordane	0.38	ug/L	1.0			Yes	S4VEM
Methoxychlor	4.6	ug/L	1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK5MSD	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	M1849-01AMSD	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	14:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	46	ug/L	1.0		J	Yes	S4VEM
Hexachloroethane	36	ug/L	1.0		J	Yes	S4VEM
Nitrobenzene	47	ug/L	1.0		J	Yes	S4VEM
Hexachlorobutadiene	39	ug/L	1.0		J	Yes	S4VEM
2,4,6-Trichlorophenol	52	ug/L	1.0		J	Yes	S4VEM
2,4,5-Trichlorophenol	56	ug/L	1.0		J	Yes	S4VEM
2,4-Dinitrotoluene	61	ug/L	1.0		J	Yes	S4VEM
Hexachlorobenzene	50	ug/L	1.0		J	Yes	S4VEM
Pentachlorophenol	65	ug/L	1.0		J	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	48	ug/L	1.0		J	Yes	S4VEM
Pyridine	76	ug/L	1.0		J	Yes	S4VEM
Total Cresol			1.0		J	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK6	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	12:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	UU	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Total Cresol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyridine	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK6	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	1722.3
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	12:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK6	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	12:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Methoxychlor	0.50	ug/L	1.0	U	U	Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
alpha-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
gamma-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	08:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Methoxychlor	0.50	ug/L	1.0	U	U	Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
alpha-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
gamma-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	1722.3
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	08:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	08:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	4.7	ug/L	1.0	J	J	Yes	S4VEM
Total Cresol			1.0	J		Yes	S4VEM
Pyridine	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7MS	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	M1849-03AMS	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	16:26:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	50	ug/L	1.0		J	Yes	S4VEM
Hexachloroethane	35	ug/L	1.0		J	Yes	S4VEM
Nitrobenzene	48	ug/L	1.0		J	Yes	S4VEM
Hexachlorobutadiene	28	ug/L	1.0		J	Yes	S4VEM
2,4,6-Trichlorophenol	52	ug/L	1.0			Yes	S4VEM
2,4,5-Trichlorophenol	52	ug/L	1.0		J	Yes	S4VEM
2,4-Dinitrotoluene	58	ug/L	1.0			Yes	S4VEM
Hexachlorobenzene	34	ug/L	1.0		J	Yes	S4VEM
Pentachlorophenol	49	ug/L	1.0			Yes	S4VEM
3-Methylphenol + 4-Methylphenol	53	ug/L	1.0		J	Yes	S4VEM
Pyridine	69	ug/L	1.0		J	Yes	S4VEM
Total Cresol			1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7MS	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	M1849-03AMS	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	13:36:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.44	ug/L	1.0			Yes	S4VEM
Heptachlor	0.40	ug/L	1.0		J	Yes	S4VEM
Endrin	0.98	ug/L	1.0			Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.44	ug/L	1.0		J	Yes	S4VEM
gamma-Chlordane	0.44	ug/L	1.0		J	Yes	S4VEM
Methoxychlor	4.7	ug/L	1.0			Yes	S4VEM
alpha-Chlordane	0.43	ug/L	1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7MSD	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	M1849-03AMSD	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	16:51:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	49	ug/L	1.0		J	Yes	S4VEM
Hexachloroethane	40	ug/L	1.0		J	Yes	S4VEM
Nitrobenzene	51	ug/L	1.0		J	Yes	S4VEM
Hexachlorobutadiene	41	ug/L	1.0		J	Yes	S4VEM
2,4,6-Trichlorophenol	52	ug/L	1.0		J	Yes	S4VEM
2,4,5-Trichlorophenol	57	ug/L	1.0		J	Yes	S4VEM
2,4-Dinitrotoluene	53	ug/L	1.0			Yes	S4VEM
Hexachlorobenzene	50	ug/L	1.0		J	Yes	S4VEM
Pentachlorophenol	64	ug/L	1.0		J	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	48	ug/L	1.0		J	Yes	S4VEM
Pyridine	80	ug/L	1.0	E	J	Yes	S4VEM
Total Cresol			1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	C0AK7MSD	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	M1849-03AMSD	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	13:54:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.45	ug/L	1.0			Yes	S4VEM
Heptachlor	0.40	ug/L	1.0		J	Yes	S4VEM
Endrin	0.99	ug/L	1.0			Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.45	ug/L	1.0		J	Yes	S4VEM
gamma-Chlordane	0.45	ug/L	1.0		J	Yes	S4VEM
Methoxychlor	4.5	ug/L	1.0			Yes	S4VEM
alpha-Chlordane	0.37	ug/L	1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	PBLK5S	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	MB-74019	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	12:44:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Methoxychlor	0.50	ug/L	1.0	U	U	Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
alpha-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
gamma-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan sulfate	0.10	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDE	0.10	ug/L	1.0	U	U	Yes	S4VEM
delta-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
alpha-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
Aldrin	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan I	0.050	ug/L	1.0	U	U	Yes	S4VEM
Dieldrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDT	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endrin ketone	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan II	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endrin aldehyde	0.10	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDD	0.10	ug/L	1.0	U	U	Yes	S4VEM
beta-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	PBLK5T	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	MB-74113	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	14:11:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Methoxychlor	0.50	ug/L	1.0	U	U	Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
alpha-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
gamma-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDD	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endrin aldehyde	0.10	ug/L	1.0	U	U	Yes	S4VEM
beta-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
delta-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDE	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan II	0.10	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDT	0.10	ug/L	1.0	U	U	Yes	S4VEM
Dieldrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Aldrin	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan I	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin ketone	0.10	ug/L	1.0	U	U	Yes	S4VEM
alpha-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan sulfate	0.10	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	PLCS5S	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	LCS-74069	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	13:01:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.15	ug/L	1.0			Yes	S4VEM
Heptachlor	0.16	ug/L	1.0			Yes	S4VEM
Aldrin	0.16	ug/L	1.0			Yes	S4VEM
Dieldrin	0.32	ug/L	1.0			Yes	S4VEM
Endrin	0.34	ug/L	1.0			Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDT	0.35	ug/L	1.0			Yes	S4VEM
Heptachlor epoxide	0.16	ug/L	1.0			Yes	S4VEM
4,4'-DDE	0.34	ug/L	1.0			Yes	S4VEM
Endosulfan sulfate	0.29	ug/L	1.0			Yes	S4VEM
gamma-Chlordane	0.16	ug/L	1.0			Yes	S4VEM
4,4'-DDD	0.32	ug/L	1.0			Yes	S4VEM
Endrin aldehyde	0.31	ug/L	1.0			Yes	S4VEM
Endosulfan II	0.31	ug/L	1.0			Yes	S4VEM
alpha-Chlordane	0.16	ug/L	1.0			Yes	S4VEM
Methoxychlor	1.7	ug/L	1.0			Yes	S4VEM
beta-BHC	0.16	ug/L	1.0	P		Yes	S4VEM
delta-BHC	0.13	ug/L	1.0			Yes	S4VEM
Endosulfan I	0.15	ug/L	1.0			Yes	S4VEM
alpha-BHC	0.15	ug/L	1.0			Yes	S4VEM
Endrin ketone	0.30	ug/L	1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	PLCS5T	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	LCS-74113	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	14:46:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.16	ug/L	1.0			Yes	S4VEM
Heptachlor	0.16	ug/L	1.0			Yes	S4VEM
Aldrin	0.16	ug/L	1.0			Yes	S4VEM
Dieldrin	0.33	ug/L	1.0			Yes	S4VEM
Endrin	0.33	ug/L	1.0			Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDT	0.35	ug/L	1.0			Yes	S4VEM
Heptachlor epoxide	0.16	ug/L	1.0			Yes	S4VEM
4,4'-DDE	0.34	ug/L	1.0			Yes	S4VEM
Endosulfan sulfate	0.30	ug/L	1.0			Yes	S4VEM
gamma-Chlordane	0.16	ug/L	1.0			Yes	S4VEM
4,4'-DDD	0.33	ug/L	1.0			Yes	S4VEM
Endrin aldehyde	0.31	ug/L	1.0			Yes	S4VEM
beta-BHC	0.18	ug/L	1.0			Yes	S4VEM
Endosulfan II	0.32	ug/L	1.0			Yes	S4VEM
Endrin ketone	0.30	ug/L	1.0			Yes	S4VEM
delta-BHC	0.15	ug/L	1.0			Yes	S4VEM
Methoxychlor	1.7	ug/L	1.0			Yes	S4VEM
Endosulfan I	0.15	ug/L	1.0			Yes	S4VEM
alpha-Chlordane	0.16	ug/L	1.0			Yes	S4VEM
alpha-BHC	0.16	ug/L	1.0			Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	PLEB5U	Method:	Pest	Matrix:	Water	MA Number:	1689.7
Sample Location:	MB-74109	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	14:29:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
gamma-BHC (Lindane)	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor	0.050	ug/L	1.0	U	U	Yes	S4VEM
Heptachlor epoxide	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Methoxychlor	0.50	ug/L	1.0	U	U	Yes	S4VEM
Toxaphene	5.0	ug/L	1.0	U	U	Yes	S4VEM
alpha-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
gamma-Chlordane	0.050	ug/L	1.0	U	U	Yes	S4VEM
alpha-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
Aldrin	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endrin aldehyde	0.10	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDE	0.10	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDD	0.10	ug/L	1.0	U	U	Yes	S4VEM
delta-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
beta-BHC	0.050	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan I	0.050	ug/L	1.0	U	U	Yes	S4VEM
4,4'-DDT	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endrin ketone	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan II	0.10	ug/L	1.0	U	U	Yes	S4VEM
Dieldrin	0.10	ug/L	1.0	U	U	Yes	S4VEM
Endosulfan sulfate	0.10	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	SBLK4B	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	MB-74019	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	13:28:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Total Cresol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyridine	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	SBLK4C	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	MB-74118	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	16:01:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Total Cresol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyridine	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	SLEB4D	Method:	BNA	Matrix:	Water	MA Number:	1723.2
Sample Location:	MB-74109	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	17:17:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Nitrobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobutadiene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,6-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4,5-Trichlorophenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
2,4-Dinitrotoluene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Hexachlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pentachlorophenol	10	ug/L	1.0	U	U	Yes	S4VEM
3-Methylphenol + 4-Methylphenol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Total Cresol	5.0	ug/L	1.0	U	U	Yes	S4VEM
Pyridine	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	VBLK5M	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	1722.3
Sample Location:	MB-74015	pH:	7.0	Sample Date:	09/30/2013	Sample Time:	00:17:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	VHBLK5M	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	1722.3
Sample Location:	VHBLK5M	pH:	7.0	Sample Date:	09/30/2013	Sample Time:	10:51:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK5	Lab Code:	MITKEM
Sample Number:	VLEB5L	Method:	VOA_Low_Med	Matrix:	Water	MA Number:	1722.3
Sample Location:	MB-74093	pH:	7.0	Sample Date:	09/30/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vinyl chloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,1-Dichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
2-Butanone	10	ug/L	1.0	U	U	Yes	S4VEM
Chloroform	5.0	ug/L	1.0	U	U	Yes	S4VEM
Carbon tetrachloride	5.0	ug/L	1.0	U	U	Yes	S4VEM
Benzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,2-Dichloroethane	5.0	ug/L	1.0	U	U	Yes	S4VEM
Trichloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Tetrachloroethene	5.0	ug/L	1.0	U	U	Yes	S4VEM
Chlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM
1,4-Dichlorobenzene	5.0	ug/L	1.0	U	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 25, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the organic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# C0AK6 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10070

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 21, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kenneth W. Curry
Senior Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Organic Data Validation (S4VEM)
Case: 43811
SDG: C0AK6
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) C0AK6, from the Kiskimere Groundwater Well Investigation site consisted of two (2) drill cutting solid and one (1) aqueous samples submitted to Spectrum Analytical Incorporated (MITKEM) for Toxicity Characteristic Leaching Procedure (TCLP) performed according to EPA Test Methods for Evaluating Solid Waste, SW-846 Method 1311. The leachates were analyzed for herbicide compounds 2,4,5-TP (Silvex) and 2,4-D according to Contract Laboratory Program (CLP) Statement of Work (SOW) SOM01.2 with modification 1690.6.

SUMMARY

Validation of data was performed according to the National Functional Guidelines for Validation of Organic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). No problems were detected during validation of these data.

NOTES

No positive results were reported in this data set.

The method and TCLP extraction blanks associated with these samples were free of contamination.

The sample cooler chest containing samples C0AK5 and C0AK6 had an interior temperature of 7.0 ^{o}C when received by the laboratory. Due to the relative stability of these compounds, no data were qualified based on this finding.

All Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries and Relative Percent Differences (RPDs) were within control limits.

All Laboratory Control Sample (LCS) recoveries were outside the upper control limits.

GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted Contract Required Quantitation Limit (CRQL) for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
B	Analyte is presumed to be a blank contamination artifact.
NJ	The analysis indicates the presence of an analyte that has been “tentatively indentified” and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

DCN: ESATR3-2013-V088

Sample Summary Report

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK5	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	11:40:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4,5-TP (Silvex)	0.10	ug/L	1.0	U	U	Yes	S3VE
2,4-D	0.50	ug/L	1.0	U	U	Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK6	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	12:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4,5-TP (Silvex)	0.10	ug/L	1.0	U	U	Yes	S3VE
2,4-D	0.50	ug/L	1.0	U	U	Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK6MS	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	M1850-02AMS	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	00:51:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4-D	7.3	ug/L	1.0			Yes	S3VE
2,4,5-TP (Silvex)	0.80	ug/L	1.0			Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK6MSD	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	M1850-02AMSD	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	01:11:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4-D	5.9	ug/L	1.0			Yes	S3VE
2,4,5-TP (Silvex)	0.69	ug/L	1.0			Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK7	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	W	pH:	7.0	Sample Date:	09/25/2013	Sample Time:	08:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4,5-TP (Silvex)	0.10	ug/L	1.0	U	U	Yes	S3VE
2,4-D	0.50	ug/L	1.0	U	U	Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK7MS	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	M1850-03AMS	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	01:51:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4-D	7.3	ug/L	1.0			Yes	S3VE
2,4,5-TP (Silvex)	0.72	ug/L	1.0			Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	C0AK7MSD	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	M1850-03AMSD	pH:	7.0	Sample Date:	10/16/2013	Sample Time:	02:11:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4,5-TP (Silvex)	0.67	ug/L	1.0			Yes	S3VE
2,4-D	5.7	ug/L	1.0			Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	PBLK5A	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	MB-74117	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	22:33:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4,5-TP (Silvex)	0.10	ug/L	1.0	U	U	Yes	S3VE
2,4-D	0.50	ug/L	1.0	U	U	Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	PBLK5B	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	MB-74106	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	23:13:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4,5-TP (Silvex)	0.10	ug/L	1.0	U	U	Yes	S3VE
2,4-D	0.50	ug/L	1.0	U	U	Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	PLCS5A	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	LCS-74117	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	22:53:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4-D	4.2	ug/L	1.0			Yes	S3VE
2,4,5-TP (Silvex)	0.49	ug/L	1.0			Yes	S3VE

Case No:	43811	Contract:	EPW11033	SDG No:	C0AK6	Lab Code:	MITKEM
Sample Number:	PLCS5B	Method:	PEST	Matrix:	Water	MA Number:	1690.6
Sample Location:	LCS-74106	pH:	7.0	Sample Date:	10/15/2013	Sample Time:	23:32:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
2,4-D	4.1	ug/L	1.0			Yes	S3VE
2,4,5-TP (Silvex)	0.49	ug/L	1.0			Yes	S3VE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 18, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC0AD4 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10025

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 15, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Lisa D. Penix
Inorganic Data Reviewer

Dean Gouveia
ESAT R3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Case: 43811
SDG: MC0AD4
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AD4, consisted of fifteen (15) sediment samples, including two (2) field duplicate pairs analyzed for metals by ICP-MS. All samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 (modified) through the Routine Analytical Services (RAS) program. Modification Reference Number 2183.1 details the specifications and reporting requirements for the addition of uranium (U) to the Target Analyte List.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are listed below. Rinsate blanks MC0AH8 and MC0AH9, were used in evaluating blank contamination for the associated samples in this case based on sampling date. These blanks were analyzed in SDGs MC0AH8.

MINOR PROBLEMS

Matrix spike recovery was extremely low (<30%) for antimony (Sb). Post-digestion matrix spike was within control limits. Low recovery may be attributed to matrix interferences or analyte lost during the digestion process. No positive results were reported. Quantitation limits are estimated and have been qualified “UJ”.

Matrix spike recoveries were high (>125%) for arsenic (As), barium (Ba), chromium (Cr), cobalt (Co), copper (Cu), nickel (Ni), vanadium (V) and zinc (Zn). Post-digestion matrix spike recoveries were high (>125%) for As, Cr, V and Zn. Post-digestion matrix spikes were not performed on Ba, Co, Cu, and Ni. Positive results for these analytes may be estimated high and have been qualified "J+".

Percent difference (%D) in the ICP-MS serial dilution analysis was outside the control limit (>10%) for V. The "J" qualifier for this outlier has been superseded by "J+".

NOTES

All samples were analyzed at a five-fold (5X) dilution in order to bring concentrations of the analytes within the calibration range of the instrument. All results are reported from the diluted analyses and CRQLs are elevated due to the dilutions.

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of Sb, selenium (Se), silver (Ag) and thallium (Tl) less than the CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory and rinsate blanks had the same analyte present.

Reported results for the field duplicate pair MC0AC6/MC0AC7 were within 20% Relative Percent Difference (RPD), ±CRQL for all analytes except lead (Pb) and Zn. No data were qualified due to field duplicate exceedence.

Reported results for the field duplicate pair MC0AD4/MC0AD5 were within 20% Relative Percent Difference (RPD), ±CRQL for all analytes except Ba. No data were qualified due to field duplicate exceedence.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only in drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V056

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100107-BS2	pH:		Sample Date:	10/15/2013	Sample Time:	17:24:23
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	0.98	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.97	mg/kg	5	JD	J	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	2.0	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.0	mg/kg	5	JD	J	Yes	S4VEM
Selenium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	2.0	mg/kg	5	JD	J	Yes	S4VEM
Uranium	2.2	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100107-BS1	pH:		Sample Date:	10/12/2013	Sample Time:	18:21:14
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	0.98	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.97	mg/kg	5	JD	J	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	2.0	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.0	mg/kg	5	JD	J	Yes	S4VEM
Selenium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	2.0	mg/kg	5	JD	J	Yes	S4VEM
Uranium	2.2	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC4	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	005	pH:		Sample Date:	09/16/2013	Sample Time:	16:15:00
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.5	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	12.5	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	129	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	1.5	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.30	mg/kg	5	JD	J	Yes	S4VEM
Chromium	25.8	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	30.3	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	20.5	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	24.4	mg/kg	5	D		Yes	S4VEM
Nickel	52.1	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	18.7	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.7	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.7	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	25.9	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	148	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	0.85	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC4A	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AC4-PS	pH:		Sample Date:	10/13/2013	Sample Time:	15:42:15
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	37.5	mg/kg	5	D		Yes	S4VEM
Chromium	74.3	mg/kg	5	D		Yes	S4VEM
Vanadium	77.8	mg/kg	5	D		Yes	S4VEM
Zinc	406	mg/kg	5	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC4D	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AC4-DUP	pH:		Sample Date:	10/12/2013	Sample Time:	18:37:33
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.5	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	12.9	mg/kg	5	D		Yes	S4VEM
Barium	162	mg/kg	5	D		Yes	S4VEM
Beryllium	1.6	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.33	mg/kg	5	JD	J	Yes	S4VEM
Chromium	29.6	mg/kg	5	D		Yes	S4VEM
Cobalt	30.7	mg/kg	5	D		Yes	S4VEM
Copper	22.1	mg/kg	5	D		Yes	S4VEM
Lead	26.4	mg/kg	5	D		Yes	S4VEM
Nickel	51.8	mg/kg	5	D		Yes	S4VEM
Selenium	18.7	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.7	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.7	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	31.7	mg/kg	5	D		Yes	S4VEM
Zinc	149	mg/kg	5	D		Yes	S4VEM
Uranium	0.94	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC4S	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AC4-MS	pH:		Sample Date:	10/12/2013	Sample Time:	18:29:23
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.5	mg/kg	5	JD,N	U	Yes	S4VEM
Arsenic	23.5	mg/kg	5	D,N		Yes	S4VEM
Barium	508	mg/kg	5	D,N		Yes	S4VEM
Beryllium	10.4	mg/kg	5	D		Yes	S4VEM
Cadmium	8.3	mg/kg	5	D		Yes	S4VEM
Chromium	72.3	mg/kg	5	D,N		Yes	S4VEM
Cobalt	126	mg/kg	5	D,N		Yes	S4VEM
Copper	69.2	mg/kg	5	D,N		Yes	S4VEM
Lead	36.4	mg/kg	5	D		Yes	S4VEM
Nickel	149	mg/kg	5	D,N		Yes	S4VEM
Selenium	18.7	mg/kg	5	JD	U	Yes	S4VEM
Silver	8.2	mg/kg	5	D		Yes	S4VEM
Thallium	7.8	mg/kg	5	D		Yes	S4VEM
Vanadium	137	mg/kg	5	D,N		Yes	S4VEM
Zinc	277	mg/kg	5	D,N		Yes	S4VEM
Uranium	27.3	mg/kg	5	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC5	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	006	pH:		Sample Date:	09/16/2013	Sample Time:	16:10:00
% Moisture :				% Solids :	49.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	10.1	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	19.8	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	165	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.1	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.82	mg/kg	5	JD	J	Yes	S4VEM
Chromium	31.0	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	54.5	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	37.8	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	36.7	mg/kg	5	D		Yes	S4VEM
Nickel	83.2	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	25.2	mg/kg	5	JD	U	Yes	S4VEM
Silver	5.0	mg/kg	5	JD	U	Yes	S4VEM
Thallium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	29.0	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	235	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC6	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	007	pH:		Sample Date:	09/16/2013	Sample Time:	17:10:00
% Moisture :				% Solids :	47.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	10.4	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	16.6	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	149	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.4	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	1.5	mg/kg	5	JD	J	Yes	S4VEM
Chromium	29.1	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	48.4	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	35.1	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	179	mg/kg	5	D		Yes	S4VEM
Nickel	81.1	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	26.1	mg/kg	5	JD	U	Yes	S4VEM
Silver	5.2	mg/kg	5	JD	U	Yes	S4VEM
Thallium	5.2	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	29.8	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	408	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC7	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	007	pH:		Sample Date:	09/16/2013	Sample Time:	17:15:00
% Moisture :				% Solids :	50.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	10.0	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	16.8	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	146	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.7	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Chromium	35.0	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	51.5	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	32.5	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	45.2	mg/kg	5	D		Yes	S4VEM
Nickel	87.0	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Silver	5.0	mg/kg	5	JD	U	Yes	S4VEM
Thallium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	32.3	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	272	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.3	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC8	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	008	pH:		Sample Date:	09/16/2013	Sample Time:	17:20:00
% Moisture :				% Solids :	74.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.7	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	31.5	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	295	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.7	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.46	mg/kg	5	JD	J	Yes	S4VEM
Chromium	35.4	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	86.0	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	49.1	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	58.3	mg/kg	5	D		Yes	S4VEM
Nickel	110	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	16.7	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.3	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	36.8	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	312	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.5	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AC9	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	009	pH:		Sample Date:	09/17/2013	Sample Time:	12:30:00
% Moisture :				% Solids :	77		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	27.8	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	203	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.3	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.58	mg/kg	5	JD	J	Yes	S4VEM
Chromium	53.3	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	96.3	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	37.5	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	35.6	mg/kg	5	D		Yes	S4VEM
Nickel	111	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	16.2	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.2	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	32.7	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	283	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD0	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	010	pH:		Sample Date:	09/17/2013	Sample Time:	13:15:00
% Moisture :				% Solids :	58.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	8.5	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	59.5	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	145	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.61	mg/kg	5	JD	J	Yes	S4VEM
Chromium	85.7	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	13.3	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	48.3	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	88.4	mg/kg	5	D		Yes	S4VEM
Nickel	42.5	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	21.2	mg/kg	5	JD	U	Yes	S4VEM
Silver	4.2	mg/kg	5	JD	U	Yes	S4VEM
Thallium	4.2	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	33.9	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	148	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	0.95	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD1	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	011	pH:		Sample Date:	09/17/2013	Sample Time:	13:45:00
% Moisture :				% Solids :	75.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.6	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	28.4	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	149	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	1.9	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.44	mg/kg	5	JD	J	Yes	S4VEM
Chromium	57.5	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	62.7	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	39.3	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	36.9	mg/kg	5	D		Yes	S4VEM
Nickel	86.1	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	16.5	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.3	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	28.1	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	244	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	0.95	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD2	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	012	pH:		Sample Date:	09/17/2013	Sample Time:	14:00:00
% Moisture :				% Solids :	75.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.6	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	25.2	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	161	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.0	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.48	mg/kg	5	JD	J	Yes	S4VEM
Chromium	28.3	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	63.4	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	32.0	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	34.7	mg/kg	5	D		Yes	S4VEM
Nickel	79.3	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	16.5	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.3	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	26.4	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	231	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	0.92	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD3	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	013	pH:		Sample Date:	09/17/2013	Sample Time:	14:15:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	35.7	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	202	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.6	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.66	mg/kg	5	JD	J	Yes	S4VEM
Chromium	47.6	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	75.1	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	53.2	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	52.9	mg/kg	5	D		Yes	S4VEM
Nickel	101	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	16.3	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.3	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	40.8	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	350	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.3	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD4	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	014	pH:		Sample Date:	09/17/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	73.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.8	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	22.7	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	164	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.1	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.38	mg/kg	5	JD	J	Yes	S4VEM
Chromium	46.8	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	55.3	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	28.4	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	33.2	mg/kg	5	D		Yes	S4VEM
Nickel	78.4	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	16.9	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.4	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	27.9	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	221	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	0.95	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD5	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	014	pH:		Sample Date:	09/17/2013	Sample Time:	14:35:00
% Moisture :				% Solids :	72.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.9	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	21.0	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	231	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	2.2	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.41	mg/kg	5	JD	J	Yes	S4VEM
Chromium	30.8	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	54.6	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	29.6	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	35.4	mg/kg	5	D		Yes	S4VEM
Nickel	71.7	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	17.2	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.4	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	32.6	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	235	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD6	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	015	pH:		Sample Date:	09/17/2013	Sample Time:	15:00:00
% Moisture :				% Solids :	53.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	9.4	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	13.0	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	209	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	1.7	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.56	mg/kg	5	JD	J	Yes	S4VEM
Chromium	31.9	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	22.7	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	28.6	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	32.3	mg/kg	5	D		Yes	S4VEM
Nickel	45.2	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	23.4	mg/kg	5	JD	U	Yes	S4VEM
Silver	4.7	mg/kg	5	JD	U	Yes	S4VEM
Thallium	4.7	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	41.4	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	145	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.4	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD7	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	016	pH:		Sample Date:	09/17/2013	Sample Time:	14:55:00
% Moisture :				% Solids :	63.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.9	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	22.3	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	798	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.90	mg/kg	5	JD	J	Yes	S4VEM
Chromium	105	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	140	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	41.3	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	56.1	mg/kg	5	D		Yes	S4VEM
Nickel	183	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	19.7	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.9	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.9	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	42.1	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	413	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	1.6	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	MC0AD8	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	017	pH:		Sample Date:	09/17/2013	Sample Time:	15:05:00
% Moisture :				% Solids :	78.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.4	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	20.5	mg/kg	5	D,N	J+	Yes	S4VEM
Barium	284	mg/kg	5	D,N	J+	Yes	S4VEM
Beryllium	1.6	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	0.29	mg/kg	5	JD	J	Yes	S4VEM
Chromium	45.3	mg/kg	5	D,N	J+	Yes	S4VEM
Cobalt	31.6	mg/kg	5	D,N	J+	Yes	S4VEM
Copper	35.3	mg/kg	5	D,N	J+	Yes	S4VEM
Lead	32.1	mg/kg	5	D		Yes	S4VEM
Nickel	48.3	mg/kg	5	D,N	J+	Yes	S4VEM
Selenium	15.9	mg/kg	5	JD	U	Yes	S4VEM
Silver	3.2	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	24.6	mg/kg	5	D,N,E	J+	Yes	S4VEM
Zinc	195	mg/kg	5	D,N	J+	Yes	S4VEM
Uranium	0.73	mg/kg	5	JD	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100107-BLK1	pH:		Sample Date:	10/12/2013	Sample Time:	18:17:09
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	1.0	mg/kg	1	U	U	Yes	S4VEM
Arsenic	0.50	mg/kg	1	U	U	Yes	S4VEM
Barium	5.0	mg/kg	1	U	U	Yes	S4VEM
Beryllium	0.50	mg/kg	1	U	U	Yes	S4VEM
Cadmium	0.50	mg/kg	1	U	U	Yes	S4VEM
Chromium	1.0	mg/kg	1	U	U	Yes	S4VEM
Cobalt	0.50	mg/kg	1	U	U	Yes	S4VEM
Copper	1.0	mg/kg	1	U	U	Yes	S4VEM
Lead	0.50	mg/kg	1	U	U	Yes	S4VEM
Nickel	0.50	mg/kg	1	U	U	Yes	S4VEM
Selenium	2.5	mg/kg	1	U	U	Yes	S4VEM
Silver	0.50	mg/kg	1	U	U	Yes	S4VEM
Thallium	0.50	mg/kg	1	J	U	Yes	S4VEM
Vanadium	2.5	mg/kg	1	J	U	Yes	S4VEM
Zinc	1.0	mg/kg	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD4	Lab Code:	BONNER
Sample Number:	PBW01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100107-BLK2	pH:		Sample Date:	10/15/2013	Sample Time:	17:21:11
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 8, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling Alternate COR
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well site for Case No. 43811, SDG# MC0AD5 completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID. Due to the Government Shutdown, this data validation report was delayed.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10024

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 6, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Lisa D. Penix
Inorganic Data Reviewer

Dean Gouveia
ESAT R3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Case: 43811
SDG: MC0AD5
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AD5, consisted of fifteen (15) soil samples, including two (2) field duplicate pairs analyzed for aluminum (Al), calcium (Ca), iron (Fe), magnesium (Mg), manganese (Mn), potassium (K), and sodium (Na) by ICP-AES and mercury (Hg) by cold vapor technique. All samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are listed below. Rinsate blanks MC0AH8 and MC0AH9, were used in evaluating blank contamination for the associated samples in this case based on sampling date. These blanks were analyzed in SDGs MC0AH8 and MC0AH9.

MINOR PROBLEMS

The technical holding time of twenty-eight days from the time of sample collection to sample analysis for Hg has been exceeded by 1 to 2 days for all samples. Positive results may be biased low and have been qualified “J-”.

All samples reported concentrations of Hg less than the Contract Required Quantitation Limit (CRQL). The associated laboratory blanks reported negative concentrations of this analyte greater than the absolute value of the Method Detection Limits (MDLs). Positive results in samples MC0AD1, MC0AD2, MC0AD3 and MC0AD8, which were less than two times the absolute value of the blank concentration, may be biased low and have been qualified “J-”.

Percent difference (%Ds) in the ICP serial dilution analysis was outside the control limit (>10%) for K. Positive results are estimated due to possible matrix interferences and have been qualified "J".

NOTES

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of Na less than the CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory and rinsate blanks had the same analyte present.

Concentrations of Fe and Mn exceeded the calibration range in the initial analysis for the samples listed below. These samples were re-analyzed at dilution to bring the concentration of the compound within the calibration range and to prevent continuing calibration failure due to analyte build-up in the introduction system. Results were reported from the diluted analyses.

Analyte	Dilution Factor	Sample ID
Fe	2X	MC0AC8, MC0AD4, MC0AD5
	3X	MC0AC9, MC0AD0, MC0AD1, MC0AD3, MC0AD7
	4X	MC0AD2, MC0AD8
Mn	2X	MC0AC8,
	3X	MC0AC9, MC0AD1, MC0AD7
	4X	MC0AD2

Matrix spike recoveries for Al, Fe, and Mn were not within recovery limits. However, spike recovery limits do not apply when the sample concentration is greater than four times (≥ 4X) the spike amount added, therefore, no data were qualified due to these outliers. Matrix spike recovery for Hg was within control limits.

Laboratory duplicate analyses of sample MC0AC4 were within control limits for Hg and ICP-AES.

Reported results for the field duplicate pair MC0AC6/MC0AC7 were within 20% Relative Percent Difference (RPD), ±CRQL for all analytes, including Hg and ICP-AES, except Ca.

Reported results for the field duplicate pair MC0AD4/MC0AD5 were within 20% Relative Percent Difference (RPD), ±CRQL for all analytes, including Hg and ICP-AES, except Mg and K.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only in drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V055

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100108-BS1	pH:		Sample Date:	10/07/2013	Sample Time:	14:04:19
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum			1			Yes	S4VEM
Iron			1			Yes	S4VEM
Manganese			1			Yes	S4VEM
Magnesium			1			Yes	S4VEM
Calcium			1			Yes	S4VEM
Sodium			1			Yes	S4VEM
Potassium			1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC4	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	005	pH:		Sample Date:	09/16/2013	Sample Time:	16:15:00
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	14200	mg/kg	1			Yes	S4VEM
Calcium	1840	mg/kg	1			Yes	S4VEM
Iron	41000	mg/kg	1			Yes	S4VEM
Magnesium	1910	mg/kg	1			Yes	S4VEM
Manganese	1410	mg/kg	1			Yes	S4VEM
Potassium	1620	mg/kg	1	E	J	Yes	S4VEM
Sodium	747	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC4	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	005	pH:		Sample Date:	09/16/2013	Sample Time:	16:15:00
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.039	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC4D	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AC4-DUP	pH:		Sample Date:	10/07/2013	Sample Time:	14:17:22
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	13000	mg/kg	1			Yes	S4VEM
Calcium	1670	mg/kg	1			Yes	S4VEM
Iron	41000	mg/kg	1			Yes	S4VEM
Magnesium	1780	mg/kg	1			Yes	S4VEM
Manganese	1350	mg/kg	1			Yes	S4VEM
Potassium	1460	mg/kg	1			Yes	S4VEM
Sodium	747	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC4D	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AC4-DUP	pH:		Sample Date:	10/16/2013	Sample Time:	09:51:19
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.044	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC4S	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AC4-MS	pH:		Sample Date:	10/07/2013	Sample Time:	14:13:03
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	14700	mg/kg	1			Yes	S4VEM
Calcium	1870	mg/kg	1			Yes	S4VEM
Iron	42700	mg/kg	1			Yes	S4VEM
Manganese	1690	mg/kg	1			Yes	S4VEM
Magnesium	1890	mg/kg	1			Yes	S4VEM
Potassium	1580	mg/kg	1			Yes	S4VEM
Sodium	747	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC4S	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AC4-MS	pH:		Sample Date:	10/16/2013	Sample Time:	09:53:44
% Moisture :				% Solids :	66.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.97	mg/kg	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC5	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	006	pH:		Sample Date:	09/16/2013	Sample Time:	16:10:00
% Moisture :				% Solids :	49.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	15300	mg/kg	1			Yes	S4VEM
Calcium	3710	mg/kg	1			Yes	S4VEM
Iron	50200	mg/kg	1			Yes	S4VEM
Magnesium	2640	mg/kg	1			Yes	S4VEM
Manganese	3660	mg/kg	1			Yes	S4VEM
Potassium	2050	mg/kg	1	E	J	Yes	S4VEM
Sodium	1010	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC5	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	006	pH:		Sample Date:	09/16/2013	Sample Time:	16:10:00
% Moisture :				% Solids :	49.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.15	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC6	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	007	pH:		Sample Date:	09/16/2013	Sample Time:	17:10:00
% Moisture :				% Solids :	47.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.094	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC6	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	007	pH:		Sample Date:	09/16/2013	Sample Time:	17:10:00
% Moisture :				% Solids :	47.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	17300	mg/kg	1			Yes	S4VEM
Calcium	4690	mg/kg	1			Yes	S4VEM
Iron	47700	mg/kg	1			Yes	S4VEM
Magnesium	2240	mg/kg	1			Yes	S4VEM
Manganese	1730	mg/kg	1			Yes	S4VEM
Potassium	1980	mg/kg	1	E	J	Yes	S4VEM
Sodium	1040	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC7	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	007	pH:		Sample Date:	09/16/2013	Sample Time:	17:15:00
% Moisture :				% Solids :	50.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.095	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC7	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	007	pH:		Sample Date:	09/16/2013	Sample Time:	17:15:00
% Moisture :				% Solids :	50.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	17300	mg/kg	1			Yes	S4VEM
Calcium	3640	mg/kg	1			Yes	S4VEM
Iron	47600	mg/kg	1			Yes	S4VEM
Magnesium	2390	mg/kg	1			Yes	S4VEM
Manganese	2020	mg/kg	1			Yes	S4VEM
Potassium	1900	mg/kg	1	E	J	Yes	S4VEM
Sodium	998	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC8	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	008	pH:		Sample Date:	09/16/2013	Sample Time:	17:20:00
% Moisture :				% Solids :	74.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10700	mg/kg	1			Yes	S4VEM
Calcium	1300	mg/kg	1			Yes	S4VEM
Iron	81900	mg/kg	2	D		Yes	S4VEM
Magnesium	1830	mg/kg	1			Yes	S4VEM
Manganese	6430	mg/kg	2	D		Yes	S4VEM
Potassium	1220	mg/kg	1	E	J	Yes	S4VEM
Sodium	669	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC8	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	008	pH:		Sample Date:	09/16/2013	Sample Time:	17:20:00
% Moisture :				% Solids :	74.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.045	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC9	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	009	pH:		Sample Date:	09/17/2013	Sample Time:	12:30:00
% Moisture :				% Solids :	77		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11200	mg/kg	1			Yes	S4VEM
Calcium	1170	mg/kg	1			Yes	S4VEM
Iron	103000	mg/kg	3	D		Yes	S4VEM
Magnesium	1720	mg/kg	1			Yes	S4VEM
Manganese	5980	mg/kg	3	D		Yes	S4VEM
Potassium	1060	mg/kg	1	E	J	Yes	S4VEM
Sodium	649	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AC9	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	009	pH:		Sample Date:	09/17/2013	Sample Time:	12:30:00
% Moisture :				% Solids :	77		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.034	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD0	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	010	pH:		Sample Date:	09/17/2013	Sample Time:	13:15:00
% Moisture :				% Solids :	58.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.50	mg/kg	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD0	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	010	pH:		Sample Date:	09/17/2013	Sample Time:	13:15:00
% Moisture :				% Solids :	58.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	12200	mg/kg	1			Yes	S4VEM
Calcium	1860	mg/kg	1			Yes	S4VEM
Iron	128000	mg/kg	3	D		Yes	S4VEM
Magnesium	1470	mg/kg	1			Yes	S4VEM
Manganese	647	mg/kg	1			Yes	S4VEM
Potassium	1100	mg/kg	1	E	J	Yes	S4VEM
Sodium	849	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD1	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	011	pH:		Sample Date:	09/17/2013	Sample Time:	13:45:00
% Moisture :				% Solids :	75.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.0073	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD1	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	011	pH:		Sample Date:	09/17/2013	Sample Time:	13:45:00
% Moisture :				% Solids :	75.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10500	mg/kg	1			Yes	S4VEM
Calcium	2320	mg/kg	1			Yes	S4VEM
Iron	95700	mg/kg	3	D		Yes	S4VEM
Magnesium	1600	mg/kg	1			Yes	S4VEM
Manganese	3890	mg/kg	3	D		Yes	S4VEM
Potassium	1270	mg/kg	1	E	J	Yes	S4VEM
Sodium	659	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD2	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	012	pH:		Sample Date:	09/17/2013	Sample Time:	14:00:00
% Moisture :				% Solids :	75.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.013	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD2	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	012	pH:		Sample Date:	09/17/2013	Sample Time:	14:00:00
% Moisture :				% Solids :	75.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	8770	mg/kg	1			Yes	S4VEM
Calcium	1670	mg/kg	1			Yes	S4VEM
Iron	84700	mg/kg	4	D		Yes	S4VEM
Magnesium	1260	mg/kg	1			Yes	S4VEM
Manganese	4230	mg/kg	4	D		Yes	S4VEM
Potassium	860	mg/kg	1	E	J	Yes	S4VEM
Sodium	661	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD3	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	013	pH:		Sample Date:	09/17/2013	Sample Time:	14:15:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	8570	mg/kg	1			Yes	S4VEM
Calcium	822	mg/kg	1			Yes	S4VEM
Iron	91400	mg/kg	3	D		Yes	S4VEM
Magnesium	1090	mg/kg	1			Yes	S4VEM
Manganese	2660	mg/kg	1			Yes	S4VEM
Potassium	971	mg/kg	1	E	J	Yes	S4VEM
Sodium	654	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD3	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	013	pH:		Sample Date:	09/17/2013	Sample Time:	14:15:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.022	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD4	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	014	pH:		Sample Date:	09/17/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	73.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	9660	mg/kg	1			Yes	S4VEM
Calcium	1350	mg/kg	1			Yes	S4VEM
Iron	60200	mg/kg	2	D		Yes	S4VEM
Magnesium	1220	mg/kg	1			Yes	S4VEM
Manganese	2400	mg/kg	1			Yes	S4VEM
Potassium	1060	mg/kg	1	E	J	Yes	S4VEM
Sodium	678	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD4	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	014	pH:		Sample Date:	09/17/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	73.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.047	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD5	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	014	pH:		Sample Date:	09/17/2013	Sample Time:	14:35:00
% Moisture :				% Solids :	72.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11200	mg/kg	1			Yes	S4VEM
Calcium	1510	mg/kg	1			Yes	S4VEM
Iron	56000	mg/kg	2	D		Yes	S4VEM
Magnesium	1750	mg/kg	1			Yes	S4VEM
Manganese	2130	mg/kg	1			Yes	S4VEM
Potassium	1430	mg/kg	1	E	J	Yes	S4VEM
Sodium	689	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD5	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	014	pH:		Sample Date:	09/17/2013	Sample Time:	14:35:00
% Moisture :				% Solids :	72.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.032	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD6	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	015	pH:		Sample Date:	09/17/2013	Sample Time:	15:00:00
% Moisture :				% Solids :	53.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	16600	mg/kg	1			Yes	S4VEM
Calcium	1970	mg/kg	1			Yes	S4VEM
Iron	30400	mg/kg	1			Yes	S4VEM
Magnesium	2270	mg/kg	1			Yes	S4VEM
Manganese	894	mg/kg	1			Yes	S4VEM
Potassium	1830	mg/kg	1	E	J	Yes	S4VEM
Sodium	936	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD6	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	015	pH:		Sample Date:	09/17/2013	Sample Time:	15:00:00
% Moisture :				% Solids :	53.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.056	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD7	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	016	pH:		Sample Date:	09/17/2013	Sample Time:	14:55:00
% Moisture :				% Solids :	63.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	14500	mg/kg	1			Yes	S4VEM
Calcium	3390	mg/kg	1			Yes	S4VEM
Iron	107000	mg/kg	3	D		Yes	S4VEM
Magnesium	1820	mg/kg	1			Yes	S4VEM
Manganese	7230	mg/kg	3	D		Yes	S4VEM
Potassium	1300	mg/kg	1	E	J	Yes	S4VEM
Sodium	786	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD7	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	016	pH:		Sample Date:	09/17/2013	Sample Time:	14:55:00
% Moisture :				% Solids :	63.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.068	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD8	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	017	pH:		Sample Date:	09/17/2013	Sample Time:	15:05:00
% Moisture :				% Solids :	78.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10200	mg/kg	1			Yes	S4VEM
Calcium	5570	mg/kg	1			Yes	S4VEM
Iron	133000	mg/kg	4	D		Yes	S4VEM
Magnesium	2060	mg/kg	1			Yes	S4VEM
Manganese	2200	mg/kg	1			Yes	S4VEM
Potassium	1010	mg/kg	1	E	J	Yes	S4VEM
Sodium	635	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	MC0AD8	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	017	pH:		Sample Date:	09/17/2013	Sample Time:	15:05:00
% Moisture :				% Solids :	78.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.0081	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100108-BLK1	pH:		Sample Date:	10/07/2013	Sample Time:	13:59:46
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	20.0	mg/kg	1	J	U	Yes	S4VEM
Calcium	500	mg/kg	1	U	U	Yes	S4VEM
Iron	10.0	mg/kg	1	J	U	Yes	S4VEM
Magnesium	500	mg/kg	1	J	U	Yes	S4VEM
Manganese	1.5	mg/kg	1	J	U	Yes	S4VEM
Potassium	75.2	mg/kg	1	J	J	Yes	S4VEM
Sodium	17.5	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD5	Lab Code:	BONNER
Sample Number:	PBS01	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3101512-BLK1	pH:		Sample Date:	10/16/2013	Sample Time:	09:46:58
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	-0.011	mg/kg	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 18, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well site for Case No. 43811, SDG# MC0AD9 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10036

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 13, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Lisa D. Penix
Inorganic Data Reviewer

Dean Gouveia
ESAT R3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Case: 43811
SDG: MC0AD9
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AD9, consisted of eighteen (18) sediment samples, including one (1) field duplicate pair analyzed for aluminum (Al), calcium (Ca), iron (Fe), magnesium (Mg), manganese (Mn), potassium (K), and sodium (Na) by ICP-AES and mercury (Hg) by cold vapor atomic absorption technique. All samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are listed below. Rinsate blanks MC0AH9, MC0AJ0 and MC0AJ1 were used in evaluating blank contamination for the associated samples in this case based on sampling date. These blanks were analyzed in SDGs MC0AH8 and MC0AH9. There were no contaminants found in the analysis of the associated blanks that would impact the data. Sample MC0AF4 was listed on the Chain-of-Custody but laboratory documentation states this sample was not received by the laboratory.

MINOR PROBLEMS

All samples reported concentrations of Hg less than the Contract Required Quantitation Limit (CRQL). The associated laboratory blanks reported negative concentrations of this analyte greater than the absolute value of the Method Detection Limits (MDLs). Positive results in samples MC0AD9, MC0AE0, MC0AE5, MC0AE6, MC0AE7, MC0AF1, MC0AF2 and MC0AF5, which were less than two times the absolute value of the blank concentration, may be biased low and have been qualified “J-”.

The Relative Percent Differences (RPDs) in the laboratory duplicate analysis were outside control limits (20% RPD) for Fe and Mn Positive results for these analytes are estimated and have been qualified "J".

Percent difference (%Ds) in the ICP serial dilution analysis was outside the control limit (>10%) for Mg and Mn. Positive results are estimated due to possible matrix interferences and have been qualified "J".

NOTES

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of Na less than the CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory blanks had the same analyte present.

Concentrations of Fe and Mn exceeded the calibration range in the initial analysis for the samples listed below. These samples were re-analyzed at dilution to bring the concentration of the compound within the calibration range and to prevent continuing calibration failure due to analyte build-up in the introduction system. Results were reported from the diluted analyses.

Analyte	Dilution Factor	Sample ID
Fe	2X	MC0AE0
	3X	MC0AE6, MC0AE7, MC0AE8, MC0AE9, MC0AF0, MC0AF1, MC0AF3, MC0AF5
	4X	MC0AD9, MC0AE2, MC0AE4, MC0AE5, MC0AF2, MC0AF6
	5X	MC0AE3
Mn	3X	MC0AE6, MC0AE7, MC0AE8, MC0AF0 MC0AF1, MC0AH7
	4X	MC0AE2, MC0AE4, MC0AF2, MC0AF6

Laboratory matrix spike analyses of sample MC0AH8 were within control limits for Hg and ICP-AES.

Reported results for the field duplicate pair MC0AE7/MC0AE8 were within 20% Relative Percent Difference (RPD), ±CRQL for all analytes, including Hg and ICP-AES.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only in drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V067

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100105-BS1	pH:		Sample Date:	10/08/2013	Sample Time:	15:01:16
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum			1			Yes	S4VEM
Iron			1			Yes	S4VEM
Manganese			1			Yes	S4VEM
Magnesium			1			Yes	S4VEM
Potassium			1			Yes	S4VEM
Calcium			1			Yes	S4VEM
Sodium			1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AD9	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	018	pH:		Sample Date:	09/17/2013	Sample Time:	15:15:00
% Moisture :				% Solids :	77.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.018	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AD9	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	018	pH:		Sample Date:	09/17/2013	Sample Time:	15:15:00
% Moisture :				% Solids :	77.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	8460	mg/kg	1			Yes	S4VEM
Calcium	688	mg/kg	1			Yes	S4VEM
Iron	115000	mg/kg	4	D,*	J	Yes	S4VEM
Magnesium	887	mg/kg	1	E	J	Yes	S4VEM
Manganese	1020	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	915	mg/kg	1			Yes	S4VEM
Sodium	41.1	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE0	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	019	pH:		Sample Date:	09/17/2013	Sample Time:	15:25:00
% Moisture :				% Solids :	74.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	9680	mg/kg	1			Yes	S4VEM
Calcium	1680	mg/kg	1			Yes	S4VEM
Iron	62500	mg/kg	2	D,*	J	Yes	S4VEM
Magnesium	1090	mg/kg	1	E	J	Yes	S4VEM
Manganese	2550	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	1330	mg/kg	1			Yes	S4VEM
Sodium	76.4	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE0	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	019	pH:		Sample Date:	09/17/2013	Sample Time:	15:25:00
% Moisture :				% Solids :	74.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.020	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE1	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	020	pH:		Sample Date:	09/17/2013	Sample Time:	16:00:00
% Moisture :				% Solids :	69		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	17300	mg/kg	1			Yes	S4VEM
Calcium	1480	mg/kg	1			Yes	S4VEM
Iron	29300	mg/kg	1	*	J	Yes	S4VEM
Magnesium	2200	mg/kg	1	E	J	Yes	S4VEM
Manganese	818	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	2080	mg/kg	1			Yes	S4VEM
Sodium	133	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE1	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	020	pH:		Sample Date:	09/17/2013	Sample Time:	16:00:00
% Moisture :				% Solids :	69		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.044	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE2	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	021	pH:		Sample Date:	09/18/2013	Sample Time:	10:05:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.088	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE2	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	021	pH:		Sample Date:	09/18/2013	Sample Time:	10:05:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	14700	mg/kg	1			Yes	S4VEM
Calcium	1310	mg/kg	1			Yes	S4VEM
Iron	126000	mg/kg	4	D,*	J	Yes	S4VEM
Magnesium	1710	mg/kg	1	E	J	Yes	S4VEM
Manganese	4370	mg/kg	4	D,*,E	J	Yes	S4VEM
Potassium	1560	mg/kg	1			Yes	S4VEM
Sodium	149	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE3	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	022	pH:		Sample Date:	09/18/2013	Sample Time:	10:15:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.024	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE3	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	022	pH:		Sample Date:	09/18/2013	Sample Time:	10:15:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10200	mg/kg	1			Yes	S4VEM
Calcium	775	mg/kg	1			Yes	S4VEM
Iron	139000	mg/kg	5	D,*	J	Yes	S4VEM
Magnesium	1120	mg/kg	1	E	J	Yes	S4VEM
Manganese	2650	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	1310	mg/kg	1			Yes	S4VEM
Sodium	58.0	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE3D	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AE3-DUP	pH:		Sample Date:	10/09/2013	Sample Time:	15:17:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.0082	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE3D	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AE3-DUP	pH:		Sample Date:	10/08/2013	Sample Time:	15:38:03
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10600	mg/kg	1			Yes	S4VEM
Calcium	1270	mg/kg	1			Yes	S4VEM
Iron	105000	mg/kg	5	D,*		Yes	S4VEM
Magnesium	1280	mg/kg	1			Yes	S4VEM
Manganese	3520	mg/kg	1	*		Yes	S4VEM
Potassium	1140	mg/kg	1			Yes	S4VEM
Sodium	77.8	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE3S	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AE3-MS	pH:		Sample Date:	10/09/2013	Sample Time:	15:19:17
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.71	mg/kg	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE3S	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AE3-MS	pH:		Sample Date:	10/08/2013	Sample Time:	15:33:23
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11600	mg/kg	1			Yes	S4VEM
Calcium	965	mg/kg	1			Yes	S4VEM
Iron	119000	mg/kg	5	D		Yes	S4VEM
Manganese	3020	mg/kg	1			Yes	S4VEM
Magnesium	1340	mg/kg	1			Yes	S4VEM
Potassium	1390	mg/kg	1			Yes	S4VEM
Sodium	62.4	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE4	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	023	pH:		Sample Date:	09/18/2013	Sample Time:	10:25:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11000	mg/kg	1			Yes	S4VEM
Calcium	1280	mg/kg	1			Yes	S4VEM
Iron	97000	mg/kg	4	D,*	J	Yes	S4VEM
Magnesium	1320	mg/kg	1	E	J	Yes	S4VEM
Manganese	4060	mg/kg	4	D,*,E	J	Yes	S4VEM
Potassium	1390	mg/kg	1			Yes	S4VEM
Sodium	77.1	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE4	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	023	pH:		Sample Date:	09/18/2013	Sample Time:	10:25:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.027	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE5	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	024	pH:		Sample Date:	09/18/2013	Sample Time:	10:35:00
% Moisture :				% Solids :	78.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	12000	mg/kg	1			Yes	S4VEM
Calcium	1020	mg/kg	1			Yes	S4VEM
Iron	112000	mg/kg	4	D,*	J	Yes	S4VEM
Magnesium	1740	mg/kg	1	E	J	Yes	S4VEM
Manganese	2980	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	1530	mg/kg	1			Yes	S4VEM
Sodium	71.0	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE5	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	024	pH:		Sample Date:	09/18/2013	Sample Time:	10:35:00
% Moisture :				% Solids :	78.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.0094	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE6	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	025	pH:		Sample Date:	09/18/2013	Sample Time:	10:50:00
% Moisture :				% Solids :	79.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.019	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE6	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	025	pH:		Sample Date:	09/18/2013	Sample Time:	10:50:00
% Moisture :				% Solids :	79.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11100	mg/kg	1			Yes	S4VEM
Calcium	1890	mg/kg	1			Yes	S4VEM
Iron	78000	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1680	mg/kg	1	E	J	Yes	S4VEM
Manganese	3430	mg/kg	3	D,*,E	J	Yes	S4VEM
Potassium	1490	mg/kg	1			Yes	S4VEM
Sodium	138	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE7	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	026	pH:		Sample Date:	09/18/2013	Sample Time:	11:00:00
% Moisture :				% Solids :	77.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	13000	mg/kg	1			Yes	S4VEM
Calcium	1170	mg/kg	1			Yes	S4VEM
Iron	86000	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1600	mg/kg	1	E	J	Yes	S4VEM
Manganese	4030	mg/kg	3	D,*,E	J	Yes	S4VEM
Potassium	1550	mg/kg	1			Yes	S4VEM
Sodium	82.2	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE7	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	026	pH:		Sample Date:	09/18/2013	Sample Time:	11:00:00
% Moisture :				% Solids :	77.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.020	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE8	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	026	pH:		Sample Date:	09/18/2013	Sample Time:	11:05:00
% Moisture :				% Solids :	77.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11900	mg/kg	1			Yes	S4VEM
Calcium	1130	mg/kg	1			Yes	S4VEM
Iron	88200	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1790	mg/kg	1	E	J	Yes	S4VEM
Manganese	3760	mg/kg	3	D,*,E	J	Yes	S4VEM
Potassium	1480	mg/kg	1			Yes	S4VEM
Sodium	73.8	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE8	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	026	pH:		Sample Date:	09/18/2013	Sample Time:	11:05:00
% Moisture :				% Solids :	77.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.023	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE9	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	027	pH:		Sample Date:	09/18/2013	Sample Time:	11:10:00
% Moisture :				% Solids :	78.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.093	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AE9	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	027	pH:		Sample Date:	09/18/2013	Sample Time:	11:10:00
% Moisture :				% Solids :	78.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	9210	mg/kg	1			Yes	S4VEM
Calcium	708	mg/kg	1			Yes	S4VEM
Iron	73200	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1150	mg/kg	1	E	J	Yes	S4VEM
Manganese	2420	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	1390	mg/kg	1			Yes	S4VEM
Sodium	60.8	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF0	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	028	pH:		Sample Date:	09/18/2013	Sample Time:	11:30:00
% Moisture :				% Solids :	77.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.098	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF0	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	028	pH:		Sample Date:	09/18/2013	Sample Time:	11:30:00
% Moisture :				% Solids :	77.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11400	mg/kg	1			Yes	S4VEM
Calcium	1310	mg/kg	1			Yes	S4VEM
Iron	100000	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1570	mg/kg	1	E	J	Yes	S4VEM
Manganese	3900	mg/kg	3	D,*,E	J	Yes	S4VEM
Potassium	1460	mg/kg	1			Yes	S4VEM
Sodium	63.5	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF1	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	029	pH:		Sample Date:	09/18/2013	Sample Time:	11:35:00
% Moisture :				% Solids :	74.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.019	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF1	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	029	pH:		Sample Date:	09/18/2013	Sample Time:	11:35:00
% Moisture :				% Solids :	74.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10200	mg/kg	1			Yes	S4VEM
Calcium	1360	mg/kg	1			Yes	S4VEM
Iron	94000	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1220	mg/kg	1	E	J	Yes	S4VEM
Manganese	3820	mg/kg	3	D,*,E	J	Yes	S4VEM
Potassium	1250	mg/kg	1			Yes	S4VEM
Sodium	62.3	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF2	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	030	pH:		Sample Date:	09/18/2013	Sample Time:	11:45:00
% Moisture :				% Solids :	78.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.015	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF2	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	030	pH:		Sample Date:	09/18/2013	Sample Time:	11:45:00
% Moisture :				% Solids :	78.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10400	mg/kg	1			Yes	S4VEM
Calcium	5740	mg/kg	1			Yes	S4VEM
Iron	81600	mg/kg	4	D,*	J	Yes	S4VEM
Magnesium	1410	mg/kg	1	E	J	Yes	S4VEM
Manganese	4150	mg/kg	4	D,*,E	J	Yes	S4VEM
Potassium	1320	mg/kg	1			Yes	S4VEM
Sodium	103	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF3	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	031	pH:		Sample Date:	09/18/2013	Sample Time:	12:00:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10400	mg/kg	1			Yes	S4VEM
Calcium	1200	mg/kg	1			Yes	S4VEM
Iron	82700	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1210	mg/kg	1	E	J	Yes	S4VEM
Manganese	3110	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	1330	mg/kg	1			Yes	S4VEM
Sodium	82.8	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF3	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	031	pH:		Sample Date:	09/18/2013	Sample Time:	12:00:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.024	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF5	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	032	pH:		Sample Date:	09/18/2013	Sample Time:	14:15:00
% Moisture :				% Solids :	77.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.019	mg/kg	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF5	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	032	pH:		Sample Date:	09/18/2013	Sample Time:	14:15:00
% Moisture :				% Solids :	77.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	9970	mg/kg	1			Yes	S4VEM
Calcium	926	mg/kg	1			Yes	S4VEM
Iron	86900	mg/kg	3	D,*	J	Yes	S4VEM
Magnesium	1300	mg/kg	1	E	J	Yes	S4VEM
Manganese	3000	mg/kg	1	*,E	J	Yes	S4VEM
Potassium	1360	mg/kg	1			Yes	S4VEM
Sodium	63.1	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF6	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	033	pH:		Sample Date:	09/18/2013	Sample Time:	14:25:00
% Moisture :				% Solids :	80.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11500	mg/kg	1			Yes	S4VEM
Calcium	1770	mg/kg	1			Yes	S4VEM
Iron	96000	mg/kg	4	D,*	J	Yes	S4VEM
Magnesium	1600	mg/kg	1	E	J	Yes	S4VEM
Manganese	3640	mg/kg	4	D,*,E	J	Yes	S4VEM
Potassium	1430	mg/kg	1			Yes	S4VEM
Sodium	98.5	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AF6	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	033	pH:		Sample Date:	09/18/2013	Sample Time:	14:25:00
% Moisture :				% Solids :	80.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.020	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AH7	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	052	pH:		Sample Date:	09/19/2013	Sample Time:	18:40:00
% Moisture :				% Solids :	72.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	7020	mg/kg	1			Yes	S4VEM
Calcium	1410	mg/kg	1			Yes	S4VEM
Iron	49400	mg/kg	1	*	J	Yes	S4VEM
Magnesium	960	mg/kg	1	E	J	Yes	S4VEM
Manganese	4220	mg/kg	3	D,*,E	J	Yes	S4VEM
Potassium	955	mg/kg	1			Yes	S4VEM
Sodium	76.3	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	MC0AH7	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	052	pH:		Sample Date:	09/19/2013	Sample Time:	18:40:00
% Moisture :				% Solids :	72.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.055	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100105-BLK1	pH:		Sample Date:	10/08/2013	Sample Time:	14:56:32
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	20.0	mg/kg	1	J	U	Yes	S4VEM
Calcium	500	mg/kg	1	U	U	Yes	S4VEM
Iron	10.0	mg/kg	1	U	U	Yes	S4VEM
Magnesium	-2.6	mg/kg	1	J	J	Yes	S4VEM
Manganese	-0.043	mg/kg	1	J	J	Yes	S4VEM
Potassium	500	mg/kg	1	U	U	Yes	S4VEM
Sodium	500	mg/kg	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AD9	Lab Code:	BONNER
Sample Number:	PBS01	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100904-BLK1	pH:		Sample Date:	10/09/2013	Sample Time:	15:03:11
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	-0.0078	mg/kg	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 8, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling Alternate COR
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well site for Case No. 43811, SDG# MC0AF7 completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID. Due to the Government Shutdown, this data validation report was delayed.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10022

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

DATE: October 30, 2013

TO: Colleen Walling
ESAT Region 3 Project Officer

FROM: Kenneth W. Curry
Senior Data Reviewer

Dean Gouveia
ESAT Region 3 Program Manager

SUBJECT: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC0AF7

OVERVIEW

Case, 43811, Sample Delivery Group (SDG) MC0AF7, from the Kiskimere Groundwater Well Investigation site consisted of twenty (20) soil samples including two (2) field duplicate pairs analyzed for metals by ICP-MS. In addition, uranium (U) was analyzed for in accordance with modification 2183.1. All samples were analyzed by Bonner Analytical Testing Company (BONNER). Samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

Associated rinsate blanks, samples MC0AJ0 and MC0AJ1, were analyzed for in SDG MC0AH8. Results reported in these blanks did not impact sample data in this data set.

MINOR PROBLEMS

The laboratory preparation blanks reported negative concentrations of antimony (Sb) greater than the absolute value of Method Detection Limits (MDLs) but less than the Contract Required Quantitation Limit (<CRQL). No positive results were reported for this analyte in affected samples. Quantitation limits for this analyte in all samples are estimated and have been qualified "UJ".

Matrix spike recovery was low (<75%) for Sb. The post digestion spike for this analyte was within control limits. Low recovery may be attributed to matrix interference or analyte lost during the digestion process. No positive results were reported for this analyte. Quantitation limits for this analyte are estimated low and have been qualified "UJ".

Percent differences (%Ds) in the ICP serial dilution analysis were outside the control limit (>10%) for copper (Cu), nickel (Ni) and zinc (Zn). Positive results for these analytes are estimated due to possible matrix interference and qualified "J" unless superseded by "J+".

The initial calibration standard associated with samples MC0AH1 and MC0AH2 had a y-intercept from the linear regression greater than the CRQL for vanadium (V). Quantitation limits for this analyte in these samples were qualified "UJ".

Percent recovery (%R) for internal standard scandium (Sc) was outside the upper control limit (>125%) in sample MC0AG0. This sample was reanalyzed at a two-fold (2X) dilution per ISM01.3 with a similar result. Positive results for analytes associated with this internal standard in this sample were reported from the two-fold (2X) dilution and qualified "J+".

NOTES

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of Sb, beryllium (Be), cadmium (Cd), thallium (Tl) and V less than CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory blanks had the same analyte present.

Reported results for field duplicate pair, MC0AG7/MC0AG8, were within 20% Relative Percent Difference (RPD), $\pm$ CRQL for all analytes.

Reported results for field duplicate pair, MC0AH2/MC0AH3, were within 20% Relative Percent Difference (RPD), $\pm$ CRQL for all analytes with the exception of arsenic (As), chromium (Cr), cobalt (Co), copper (Cu), nickel (Ni), V, and zinc (Zn). No results were reported for manganese (Mn) in sample MC0AH3.

Based on sample screening, all samples were initially analyzed at five-fold (5X) dilutions. The CRQLs are elevated in these samples due to these dilutions.

Sample screening indicated that all samples contained high concentrations of Mn. To protect the integrity of the ICP-MS instrumentation, all samples except MC0AH1 and MC0AH2, were analyzed by ICP-AES. These Mn analyses were not included in this SDG.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant as the assessment of blank analysis results has determined the existence and magnitude of contamination resulting from laboratory (or field) activities.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V053

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100102-BS2	pH:		Sample Date:	10/15/2013	Sample Time:	16:21:36
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	2.2	mg/kg	5	JD	J	Yes	S4VEM
Copper	1.9	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	0.99	mg/kg	5	JD	J	Yes	S4VEM
Nickel	1.1	mg/kg	5	JD	J	Yes	S4VEM
Selenium	3.7	mg/kg	5	JD	J	Yes	S4VEM
Selenium	4.6	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.92	mg/kg	5	JD	J	Yes	S4VEM
Silver	1.0	mg/kg	5	JD	J	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	JD	J	Yes	S4VEM
Uranium	1.9	mg/kg	5	JD		Yes	S4VEM
Uranium	2.1	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100102-BS1	pH:		Sample Date:	10/14/2013	Sample Time:	16:14:32
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	1.9	mg/kg	5	JD	J	Yes	S4VEM
Copper	2.2	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.1	mg/kg	5	JD	J	Yes	S4VEM
Nickel	0.99	mg/kg	5	JD	J	Yes	S4VEM
Selenium	3.7	mg/kg	5	JD	J	Yes	S4VEM
Selenium	4.6	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.92	mg/kg	5	JD	J	Yes	S4VEM
Silver	1.0	mg/kg	5	JD	J	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	JD	J	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Uranium	2.1	mg/kg	5	JD		Yes	S4VEM
Uranium	1.9	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3101609-BS1	pH:		Sample Date:	10/17/2013	Sample Time:	11:54:42
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	J	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	1.9	mg/kg	5	JD	J	Yes	S4VEM
Copper	2.2	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.1	mg/kg	5	JD	J	Yes	S4VEM
Nickel	0.99	mg/kg	5	JD	J	Yes	S4VEM
Selenium	4.6	mg/kg	5	JD	J	Yes	S4VEM
Selenium	3.7	mg/kg	5	JD	J	Yes	S4VEM
Silver	1.0	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.92	mg/kg	5	JD	J	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	5.0	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	JD	J	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Uranium	2.1	mg/kg	5	JD		Yes	S4VEM
Uranium	1.9	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AF7	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	034	pH:		Sample Date:	09/18/2013	Sample Time:	14:35:00
% Moisture :				% Solids :	69		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.2	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	23.0	mg/kg	5	D		Yes	S4VEM
Barium	197	mg/kg	5	D		Yes	S4VEM
Beryllium	3.6	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.6	mg/kg	5	JD	U	Yes	S4VEM
Chromium	25.9	mg/kg	5	D		Yes	S4VEM
Cobalt	56.5	mg/kg	5	D		Yes	S4VEM
Copper	28.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	28.6	mg/kg	5	D		Yes	S4VEM
Nickel	69.1	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.5	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.027	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.6	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	26.6	mg/kg	5	D		Yes	S4VEM
Zinc	223	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	0.95	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AF8	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	035	pH:		Sample Date:	09/18/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	52.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	9.5	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	17.0	mg/kg	5	D		Yes	S4VEM
Barium	167	mg/kg	5	D		Yes	S4VEM
Beryllium	4.8	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	4.8	mg/kg	5	JD	U	Yes	S4VEM
Chromium	33.1	mg/kg	5	D		Yes	S4VEM
Cobalt	33.8	mg/kg	5	D		Yes	S4VEM
Copper	34.9	mg/kg	5	D,E	J	Yes	S4VEM
Lead	38.2	mg/kg	5	D		Yes	S4VEM
Nickel	60.6	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	2.0	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.30	mg/kg	5	JD	J	Yes	S4VEM
Thallium	4.8	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	33.9	mg/kg	5	D		Yes	S4VEM
Zinc	215	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.5	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AF9	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	036	pH:		Sample Date:	09/18/2013	Sample Time:	15:00:00
% Moisture :				% Solids :	43.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	11.6	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	16.7	mg/kg	5	D		Yes	S4VEM
Barium	158	mg/kg	5	D		Yes	S4VEM
Beryllium	5.8	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	5.8	mg/kg	5	JD	U	Yes	S4VEM
Chromium	42.4	mg/kg	5	D		Yes	S4VEM
Cobalt	29.3	mg/kg	5	D		Yes	S4VEM
Copper	41.7	mg/kg	5	D,E	J	Yes	S4VEM
Lead	42.6	mg/kg	5	D		Yes	S4VEM
Nickel	51.3	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	2.8	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.28	mg/kg	5	JD	J	Yes	S4VEM
Thallium	5.8	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	38.9	mg/kg	5	D		Yes	S4VEM
Zinc	239	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	2.3	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG0	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	037	pH:		Sample Date:	09/18/2013	Sample Time:	15:30:00
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	12.2	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	13.1	mg/kg	5	D		Yes	S4VEM
Barium	189	mg/kg	5	D		Yes	S4VEM
Beryllium	6.1	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	6.1	mg/kg	5	JD	U	Yes	S4VEM
Chromium	28.0	mg/kg	5	D		Yes	S4VEM
Cobalt	45.7	mg/kg	5	D		Yes	S4VEM
Copper	32.4	mg/kg	5	D,E	J	Yes	S4VEM
Lead	40.8	mg/kg	5	D		Yes	S4VEM
Nickel	71.8	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.6	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.14	mg/kg	5	JD	J	Yes	S4VEM
Thallium	6.1	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	30.6	mg/kg	5	JD	U	Yes	S4VEM
Zinc	203	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.4	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG0A	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AG0-PS	pH:		Sample Date:	10/14/2013	Sample Time:	18:04:07
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG0D	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AG0-DUP	pH:		Sample Date:	10/14/2013	Sample Time:	16:44:00
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	12.2	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	14.5	mg/kg	5	D		Yes	S4VEM
Barium	197	mg/kg	5	D		Yes	S4VEM
Beryllium	6.1	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	6.1	mg/kg	5	JD	U	Yes	S4VEM
Chromium	32.4	mg/kg	5	D		Yes	S4VEM
Cobalt	48.9	mg/kg	5	D		Yes	S4VEM
Copper	36.4	mg/kg	5	D		Yes	S4VEM
Lead	43.5	mg/kg	5	D		Yes	S4VEM
Nickel	78.3	mg/kg	5	D		Yes	S4VEM
Selenium	1.9	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.13	mg/kg	5	JD	J	Yes	S4VEM
Thallium	6.1	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	33.3	mg/kg	5	D		Yes	S4VEM
Zinc	219	mg/kg	5	D		Yes	S4VEM
Uranium	1.5	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG0S	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AG0-MS	pH:		Sample Date:	10/14/2013	Sample Time:	16:35:32
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	12.2	mg/kg	5	JD,N	U	Yes	S4VEM
Arsenic	25.2	mg/kg	5	D		Yes	S4VEM
Barium	673	mg/kg	5	D		Yes	S4VEM
Beryllium	14.3	mg/kg	5	D		Yes	S4VEM
Cadmium	11.0	mg/kg	5	D		Yes	S4VEM
Chromium	87.7	mg/kg	5	D		Yes	S4VEM
Cobalt	155	mg/kg	5	D		Yes	S4VEM
Copper	84.5	mg/kg	5	D		Yes	S4VEM
Lead	57.0	mg/kg	5	D		Yes	S4VEM
Nickel	181	mg/kg	5	D		Yes	S4VEM
Selenium	25.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	10.1	mg/kg	5	D		Yes	S4VEM
Thallium	10.4	mg/kg	5	D		Yes	S4VEM
Vanadium	169	mg/kg	5	D		Yes	S4VEM
Zinc	330	mg/kg	5	D		Yes	S4VEM
Uranium	44.6	mg/kg	5	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG1	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	038	pH:		Sample Date:	09/18/2013	Sample Time:	15:55:00
% Moisture :				% Solids :	56.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	8.8	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	16.7	mg/kg	5	D		Yes	S4VEM
Barium	170	mg/kg	5	D		Yes	S4VEM
Beryllium	4.4	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	4.4	mg/kg	5	JD	U	Yes	S4VEM
Chromium	34.4	mg/kg	5	D		Yes	S4VEM
Cobalt	30.3	mg/kg	5	D		Yes	S4VEM
Copper	30.6	mg/kg	5	D,E	J	Yes	S4VEM
Lead	35.0	mg/kg	5	D		Yes	S4VEM
Nickel	56.3	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.5	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.077	mg/kg	5	JD	J	Yes	S4VEM
Thallium	4.4	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	26.3	mg/kg	5	D		Yes	S4VEM
Zinc	213	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	2.0	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG2	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	039	pH:		Sample Date:	09/18/2013	Sample Time:	16:10:00
% Moisture :				% Solids :	74.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.7	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	30.8	mg/kg	5	D		Yes	S4VEM
Barium	197	mg/kg	5	D		Yes	S4VEM
Beryllium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Chromium	33.9	mg/kg	5	D		Yes	S4VEM
Cobalt	50.8	mg/kg	5	D		Yes	S4VEM
Copper	41.5	mg/kg	5	D,E	J	Yes	S4VEM
Lead	50.7	mg/kg	5	D		Yes	S4VEM
Nickel	65.6	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.7	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.041	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	46.4	mg/kg	5	D		Yes	S4VEM
Zinc	231	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.3	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG3	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	040	pH:		Sample Date:	09/18/2013	Sample Time:	16:30:00
% Moisture :				% Solids :	39.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	12.6	mg/kg	5	UD,N	UJ	Yes	S4VEM
Arsenic	16.4	mg/kg	5	D		Yes	S4VEM
Barium	223	mg/kg	5	D		Yes	S4VEM
Beryllium	6.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	6.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	34.4	mg/kg	5	D		Yes	S4VEM
Cobalt	33.5	mg/kg	5	D		Yes	S4VEM
Copper	33.0	mg/kg	5	D,E	J	Yes	S4VEM
Lead	44.2	mg/kg	5	D		Yes	S4VEM
Nickel	56.5	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.8	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.099	mg/kg	5	JD	J	Yes	S4VEM
Thallium	6.3	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	37.4	mg/kg	5	D		Yes	S4VEM
Zinc	178	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.5	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG4	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	041	pH:		Sample Date:	09/19/2013	Sample Time:	11:30:00
% Moisture :				% Solids :	30.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	16.6	mg/kg	5	UD,N	UJ	Yes	S4VEM
Arsenic	16.3	mg/kg	5	D		Yes	S4VEM
Barium	239	mg/kg	5	D		Yes	S4VEM
Beryllium	8.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	8.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	42.5	mg/kg	5	D		Yes	S4VEM
Cobalt	40.9	mg/kg	5	D		Yes	S4VEM
Copper	41.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	64.3	mg/kg	5	D		Yes	S4VEM
Nickel	72.1	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.9	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.15	mg/kg	5	JD	J	Yes	S4VEM
Thallium	8.3	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	42.7	mg/kg	5	D		Yes	S4VEM
Zinc	244	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.7	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG5	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	042	pH:		Sample Date:	09/19/2013	Sample Time:	12:00:00
% Moisture :				% Solids :	61.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	16.3	mg/kg	10	UD,N	UJ	Yes	S4VEM
Arsenic	20.6	mg/kg	5	D		Yes	S4VEM
Barium	206	mg/kg	10	D	J+	Yes	S4VEM
Beryllium	8.1	mg/kg	10	JD	U	Yes	S4VEM
Cadmium	8.1	mg/kg	10	JD	U	Yes	S4VEM
Chromium	35.5	mg/kg	5	D		Yes	S4VEM
Cobalt	28.3	mg/kg	10	D	J+	Yes	S4VEM
Copper	44.0	mg/kg	10	D,E	J+	Yes	S4VEM
Lead	70.8	mg/kg	5	D		Yes	S4VEM
Nickel	45.2	mg/kg	10	D,E	J+	Yes	S4VEM
Selenium	2.2	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.15	mg/kg	10	JD	J+	Yes	S4VEM
Thallium	4.1	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	33.2	mg/kg	5	D		Yes	S4VEM
Zinc	246	mg/kg	10	D,E	J+	Yes	S4VEM
Uranium	0.33	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG6	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	043	pH:		Sample Date:	09/19/2013	Sample Time:	13:05:00
% Moisture :				% Solids :	70.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.1	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	21.4	mg/kg	5	D		Yes	S4VEM
Barium	129	mg/kg	5	D		Yes	S4VEM
Beryllium	3.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	31.3	mg/kg	5	D		Yes	S4VEM
Cobalt	70.9	mg/kg	5	D		Yes	S4VEM
Copper	30.0	mg/kg	5	D,E	J	Yes	S4VEM
Lead	35.2	mg/kg	5	D		Yes	S4VEM
Nickel	85.3	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.5	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.038	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	26.6	mg/kg	5	D		Yes	S4VEM
Zinc	238	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG7	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	044	pH:		Sample Date:	09/19/2013	Sample Time:	13:30:00
% Moisture :				% Solids :	41.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	12.0	mg/kg	5	UD,N	UJ	Yes	S4VEM
Arsenic	14.5	mg/kg	5	D		Yes	S4VEM
Barium	173	mg/kg	5	D		Yes	S4VEM
Beryllium	6.0	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	6.0	mg/kg	5	JD	U	Yes	S4VEM
Chromium	46.1	mg/kg	5	D		Yes	S4VEM
Cobalt	38.6	mg/kg	5	D		Yes	S4VEM
Copper	30.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	40.7	mg/kg	5	D		Yes	S4VEM
Nickel	67.3	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.7	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.098	mg/kg	5	JD	J	Yes	S4VEM
Thallium	6.0	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	36.8	mg/kg	5	D		Yes	S4VEM
Zinc	221	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.4	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG8	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	044	pH:		Sample Date:	09/19/2013	Sample Time:	13:35:00
% Moisture :				% Solids :	38.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	13.1	mg/kg	5	UD,N	UJ	Yes	S4VEM
Arsenic	14.8	mg/kg	5	D		Yes	S4VEM
Barium	164	mg/kg	5	D		Yes	S4VEM
Beryllium	6.6	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	6.6	mg/kg	5	JD	U	Yes	S4VEM
Chromium	47.2	mg/kg	5	D		Yes	S4VEM
Cobalt	43.3	mg/kg	5	D		Yes	S4VEM
Copper	32.7	mg/kg	5	D,E	J	Yes	S4VEM
Lead	42.9	mg/kg	5	D		Yes	S4VEM
Nickel	73.6	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.7	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.11	mg/kg	5	JD	J	Yes	S4VEM
Thallium	6.6	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	41.5	mg/kg	5	D		Yes	S4VEM
Zinc	239	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.6	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AG9	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	045	pH:		Sample Date:	09/19/2013	Sample Time:	13:25:00
% Moisture :				% Solids :	55.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	9.0	mg/kg	5	UD,N	UJ	Yes	S4VEM
Arsenic	16.6	mg/kg	5	D		Yes	S4VEM
Barium	138	mg/kg	5	D		Yes	S4VEM
Beryllium	4.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	4.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	39.9	mg/kg	5	D		Yes	S4VEM
Cobalt	20.3	mg/kg	5	D		Yes	S4VEM
Copper	31.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	52.9	mg/kg	5	D		Yes	S4VEM
Nickel	39.1	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.7	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.18	mg/kg	5	JD	J	Yes	S4VEM
Thallium	4.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	30.0	mg/kg	5	D		Yes	S4VEM
Zinc	141	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.3	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH0	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	046	pH:		Sample Date:	09/19/2013	Sample Time:	14:20:00
% Moisture :				% Solids :	49.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	10.1	mg/kg	5	UD,N	UJ	Yes	S4VEM
Arsenic	8.3	mg/kg	5	D		Yes	S4VEM
Barium	169	mg/kg	5	D		Yes	S4VEM
Beryllium	5.1	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	5.1	mg/kg	5	JD	U	Yes	S4VEM
Chromium	25.7	mg/kg	5	D		Yes	S4VEM
Cobalt	18.4	mg/kg	5	D		Yes	S4VEM
Copper	16.2	mg/kg	5	D,E	J	Yes	S4VEM
Lead	17.7	mg/kg	5	D		Yes	S4VEM
Nickel	28.6	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.066	mg/kg	5	JD	J	Yes	S4VEM
Thallium	5.1	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	35.5	mg/kg	5	D		Yes	S4VEM
Zinc	72.2	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.3	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH1	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	047	pH:		Sample Date:	09/19/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	53.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	9.3	mg/kg	5	UD	UJ	Yes	S4VEM
Arsenic	10.6	mg/kg	5	D		Yes	S4VEM
Barium	109	mg/kg	5	D		Yes	S4VEM
Beryllium	1.4	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	4.7	mg/kg	5	JD	U	Yes	S4VEM
Chromium	15.2	mg/kg	5	D		Yes	S4VEM
Cobalt	33.2	mg/kg	5	D		Yes	S4VEM
Copper	19.8	mg/kg	5	D	J	Yes	S4VEM
Lead	26.6	mg/kg	5	D		Yes	S4VEM
Manganese	1940	mg/kg	5	D		Yes	S4VEM
Nickel	46.9	mg/kg	5	D	J	Yes	S4VEM
Selenium	0.43	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.047	mg/kg	5	JD	J	Yes	S4VEM
Thallium	4.7	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	23.4	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	147	mg/kg	5	D	J	Yes	S4VEM
Uranium	0.75	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH2	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	048	pH:		Sample Date:	09/19/2013	Sample Time:	17:00:00
% Moisture :				% Solids :	68		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.4	mg/kg	5	UD	UJ	Yes	S4VEM
Arsenic	18.5	mg/kg	5	D		Yes	S4VEM
Barium	220	mg/kg	5	D		Yes	S4VEM
Beryllium	1.4	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	3.7	mg/kg	5	JD	U	Yes	S4VEM
Chromium	17.5	mg/kg	5	D		Yes	S4VEM
Cobalt	27.3	mg/kg	5	D		Yes	S4VEM
Copper	21.3	mg/kg	5	D	J	Yes	S4VEM
Lead	25.3	mg/kg	5	D		Yes	S4VEM
Manganese	1660	mg/kg	5	D		Yes	S4VEM
Nickel	44.5	mg/kg	5	D	J	Yes	S4VEM
Selenium	2.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.041	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.7	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	18.4	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	123	mg/kg	5	D	J	Yes	S4VEM
Uranium	1.5	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH3	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	048	pH:		Sample Date:	09/19/2013	Sample Time:	17:05:00
% Moisture :				% Solids :	65.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.7	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	32.3	mg/kg	5	D		Yes	S4VEM
Barium	281	mg/kg	5	D		Yes	S4VEM
Beryllium	3.8	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.8	mg/kg	5	JD	U	Yes	S4VEM
Chromium	31.8	mg/kg	5	D		Yes	S4VEM
Cobalt	65.4	mg/kg	5	D		Yes	S4VEM
Copper	38.5	mg/kg	5	D,E	J	Yes	S4VEM
Lead	33.3	mg/kg	5	D		Yes	S4VEM
Nickel	87.4	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.8	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.036	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.8	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	32.1	mg/kg	5	D		Yes	S4VEM
Zinc	246	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH4	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	049	pH:		Sample Date:	09/19/2013	Sample Time:	17:15:00
% Moisture :				% Solids :	73.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.8	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	44.8	mg/kg	5	D		Yes	S4VEM
Barium	129	mg/kg	5	D		Yes	S4VEM
Beryllium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Chromium	29.6	mg/kg	5	D		Yes	S4VEM
Cobalt	39.7	mg/kg	5	D		Yes	S4VEM
Copper	30.5	mg/kg	5	D,E	J	Yes	S4VEM
Lead	46.3	mg/kg	5	D		Yes	S4VEM
Nickel	61.4	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.4	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.037	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	35.8	mg/kg	5	D		Yes	S4VEM
Zinc	191	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH5	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	050	pH:		Sample Date:	09/19/2013	Sample Time:	17:30:00
% Moisture :				% Solids :	54.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	9.2	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	26.1	mg/kg	5	D		Yes	S4VEM
Barium	173	mg/kg	5	D		Yes	S4VEM
Beryllium	4.6	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	4.6	mg/kg	5	JD	U	Yes	S4VEM
Chromium	30.5	mg/kg	5	D		Yes	S4VEM
Cobalt	48.4	mg/kg	5	D		Yes	S4VEM
Copper	28.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	36.8	mg/kg	5	D		Yes	S4VEM
Nickel	70.2	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	1.8	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.061	mg/kg	5	JD	J	Yes	S4VEM
Thallium	4.6	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	27.7	mg/kg	5	D		Yes	S4VEM
Zinc	221	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	MC0AH6	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	051	pH:		Sample Date:	09/19/2013	Sample Time:	17:35:00
% Moisture :				% Solids :	59		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	8.5	mg/kg	5	JD,N	UJ	Yes	S4VEM
Arsenic	36.6	mg/kg	5	D		Yes	S4VEM
Barium	300	mg/kg	5	D		Yes	S4VEM
Beryllium	4.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	4.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	31.5	mg/kg	5	D		Yes	S4VEM
Cobalt	25.6	mg/kg	5	D		Yes	S4VEM
Copper	32.2	mg/kg	5	D,E	J	Yes	S4VEM
Lead	92.7	mg/kg	5	D		Yes	S4VEM
Nickel	39.7	mg/kg	5	D,E	J	Yes	S4VEM
Selenium	3.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.21	mg/kg	5	JD	J	Yes	S4VEM
Thallium	4.2	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	33.5	mg/kg	5	D		Yes	S4VEM
Zinc	148	mg/kg	5	D,E	J	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100102-BLK1	pH:		Sample Date:	10/14/2013	Sample Time:	15:59:02
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	-0.18	mg/kg	5	JD		Yes	S4VEM
Antimony	-0.067	mg/kg	5	JD		Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100102-BLK2	pH:		Sample Date:	10/15/2013	Sample Time:	16:19:09
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	-0.067	mg/kg	5	JD		Yes	S4VEM
Antimony	-0.18	mg/kg	5	JD		Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF7	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3101609-BLK1	pH:		Sample Date:	10/17/2013	Sample Time:	11:50:45
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	-0.067	mg/kg	5	JD		Yes	S4VEM
Antimony	-0.18	mg/kg	5	JD		Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 8, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling Alternate COR
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well site for Case No. 43811, SDG# MC0AF8 completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID. Due to the Government Shutdown, this data validation report was delayed.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10023

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 4, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Lisa D. Penix
Inorganic Data Reviewer

Dean Gouveia
ESAT R3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Case: 43811
SDG: MC0AF8
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AF8, consisted of twenty (20) soil samples, including two (2) field duplicate pairs analyzed for aluminum (Al), calcium (Ca), iron (Fe), magnesium (Mg), manganese (Mn), potassium (K), and sodium (Na) by ICP-AES and mercury (Hg) by cold vapor AA technique. All samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are listed below. Rinsate blanks MC0AH8, MC0AH9, MC0AJ0, MC0AJ1, MC0AK1 and MC0AK3 and field blanks MC0AK2 and MC0AK4 were used in evaluating blank contamination for the associated samples in this case based on sampling date. These blanks were analyzed in SDGs MC0AH8 and MC0AH9. There were no contaminants found in the analysis of the associated blanks that would impact the data.

MINOR PROBLEM

Percent differences (%Ds) in the ICP serial dilution analyses were outside control limits (>10%) for Al, Ca, Fe, Mg, Mn, and K. Positive results for these analytes in all samples are estimated due to possible matrix interferences and have been qualified “J”. Quantitation limits have been qualified “UJ”.

NOTES

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of Ca, Mg, and K less than the CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory blanks had the same analyte present.

Samples MC0AF7, MC0AF8, MC0AG2, MC0AG4, MC0AG5, MC0AG6, MC0AH2, MC0AH3, MC0AH4, MC0AH5 and MC0AH6 were analyzed at three-fold dilutions (3X) on ICP-AES to prevent continuing calibration failure due to analyte build-up in the introduction system. Results were reported from the diluted analyses.

Matrix spike recoveries for Al, Fe, and Mn were not within recovery limits. However, spike recovery limits do not apply when the sample concentration is greater than four times ($\geq$ 4X) the spike amount added, therefore, no data were qualified due to these outliers. Matrix spike recovery for Hg was within control limits.

Laboratory duplicate analyses of sample MC0AG0 were within control limits for Hg and ICP-AES.

Reported results for the field duplicate pairs MC0AG7/MC0AG8 and MC0AH2/MC0AH3 were within 20% Relative Percent Difference (RPD), ±CRQL for all analytes, including Hg and ICP-AES.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only in drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100103-BS1	pH:		Sample Date:	10/13/2013	Sample Time:	13:36:17
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum			1			Yes	S4VEM
Iron			1			Yes	S4VEM
Manganese			1			Yes	S4VEM
Magnesium			1			Yes	S4VEM
Potassium			1			Yes	S4VEM
Sodium			1			Yes	S4VEM
Calcium			1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AF7	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	034	pH:		Sample Date:	09/18/2013	Sample Time:	14:35:00
% Moisture :				% Solids :	69		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11500	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2170	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	86800	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2170	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	3310	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2170	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2170	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AF7	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	034	pH:		Sample Date:	09/18/2013	Sample Time:	14:35:00
% Moisture :				% Solids :	69		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.049	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AF8	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	035	pH:		Sample Date:	09/18/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	52.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	30600	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	3150	mg/kg	3	D,E	J	Yes	S4VEM
Iron	86700	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	3260	mg/kg	3	D,E	J	Yes	S4VEM
Manganese	1520	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2990	mg/kg	3	D,E	J	Yes	S4VEM
Sodium	2860	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AF8	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	035	pH:		Sample Date:	09/18/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	52.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.26	mg/kg	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AF9	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	036	pH:		Sample Date:	09/18/2013	Sample Time:	15:00:00
% Moisture :				% Solids :	43.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	29500	mg/kg	1	E	J	Yes	S4VEM
Calcium	1530	mg/kg	1	E	J	Yes	S4VEM
Iron	64600	mg/kg	1	E	J	Yes	S4VEM
Magnesium	1920	mg/kg	1	E	J	Yes	S4VEM
Manganese	227	mg/kg	1	E	J	Yes	S4VEM
Potassium	2100	mg/kg	1	E	J	Yes	S4VEM
Sodium	1160	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AF9	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	036	pH:		Sample Date:	09/18/2013	Sample Time:	15:00:00
% Moisture :				% Solids :	43.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.19	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG0	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	037	pH:		Sample Date:	09/18/2013	Sample Time:	15:30:00
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.13	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG0	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	037	pH:		Sample Date:	09/18/2013	Sample Time:	15:30:00
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	16100	mg/kg	1	E	J	Yes	S4VEM
Calcium	4990	mg/kg	1	E	J	Yes	S4VEM
Iron	33900	mg/kg	1	E	J	Yes	S4VEM
Magnesium	2290	mg/kg	1	E	J	Yes	S4VEM
Manganese	3290	mg/kg	1	E	J	Yes	S4VEM
Potassium	2150	mg/kg	1	E	J	Yes	S4VEM
Sodium	1220	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG0D	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AG0-DUP	pH:		Sample Date:	10/11/2013	Sample Time:	14:23:21
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG0D	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AG0-DUP	pH:		Sample Date:	10/15/2013	Sample Time:	14:08:16
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	16600	mg/kg	1			Yes	S4VEM
Calcium	5170	mg/kg	1			Yes	S4VEM
Iron	34900	mg/kg	1			Yes	S4VEM
Magnesium	2380	mg/kg	1			Yes	S4VEM
Manganese	3400	mg/kg	1			Yes	S4VEM
Potassium	2220	mg/kg	1			Yes	S4VEM
Sodium	1220	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG0S	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AG0-MS	pH:		Sample Date:	10/15/2013	Sample Time:	14:03:58
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	19900	mg/kg	1			Yes	S4VEM
Calcium	5390	mg/kg	1			Yes	S4VEM
Iron	39500	mg/kg	1			Yes	S4VEM
Manganese	3930	mg/kg	1			Yes	S4VEM
Magnesium	2670	mg/kg	1			Yes	S4VEM
Potassium	2520	mg/kg	1			Yes	S4VEM
Sodium	1220	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG0S	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	MC0AG0-MS	pH:		Sample Date:	10/11/2013	Sample Time:	14:25:42
% Moisture :				% Solids :	40.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	1.4	mg/kg	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG1	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	038	pH:		Sample Date:	09/18/2013	Sample Time:	15:55:00
% Moisture :				% Solids :	56.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	15900	mg/kg	1	E	J	Yes	S4VEM
Calcium	1880	mg/kg	1	E	J	Yes	S4VEM
Iron	49900	mg/kg	1	E	J	Yes	S4VEM
Magnesium	1560	mg/kg	1	E	J	Yes	S4VEM
Manganese	1120	mg/kg	1	E	J	Yes	S4VEM
Potassium	1460	mg/kg	1	E	J	Yes	S4VEM
Sodium	882	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG1	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	038	pH:		Sample Date:	09/18/2013	Sample Time:	15:55:00
% Moisture :				% Solids :	56.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.093	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG2	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	039	pH:		Sample Date:	09/18/2013	Sample Time:	16:10:00
% Moisture :				% Solids :	74.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11400	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2020	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	88600	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2020	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	3800	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2020	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2020	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG2	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	039	pH:		Sample Date:	09/18/2013	Sample Time:	16:10:00
% Moisture :				% Solids :	74.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.048	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG3	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	040	pH:		Sample Date:	09/18/2013	Sample Time:	16:30:00
% Moisture :				% Solids :	39.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.16	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG3	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	040	pH:		Sample Date:	09/18/2013	Sample Time:	16:30:00
% Moisture :				% Solids :	39.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	23000	mg/kg	1	E	J	Yes	S4VEM
Calcium	5290	mg/kg	1	E	J	Yes	S4VEM
Iron	42200	mg/kg	1	E	J	Yes	S4VEM
Magnesium	3440	mg/kg	1	E	J	Yes	S4VEM
Manganese	3310	mg/kg	1	E	J	Yes	S4VEM
Potassium	3130	mg/kg	1	E	J	Yes	S4VEM
Sodium	1260	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG4	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	041	pH:		Sample Date:	09/19/2013	Sample Time:	11:30:00
% Moisture :				% Solids :	30.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.16	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG4	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	041	pH:		Sample Date:	09/19/2013	Sample Time:	11:30:00
% Moisture :				% Solids :	30.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	20300	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	6350	mg/kg	3	D,E	J	Yes	S4VEM
Iron	39900	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	4970	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	3130	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	4970	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	4970	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG5	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	042	pH:		Sample Date:	09/19/2013	Sample Time:	12:00:00
% Moisture :				% Solids :	61.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG5	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	042	pH:		Sample Date:	09/19/2013	Sample Time:	12:00:00
% Moisture :				% Solids :	61.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	25200	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2440	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	59200	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2440	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	289	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2440	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2440	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG6	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	043	pH:		Sample Date:	09/19/2013	Sample Time:	13:05:00
% Moisture :				% Solids :	70.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.039	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG6	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	043	pH:		Sample Date:	09/19/2013	Sample Time:	13:05:00
% Moisture :				% Solids :	70.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10800	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2120	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	57100	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2400	mg/kg	3	D,E	J	Yes	S4VEM
Manganese	2340	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2120	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2120	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG7	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	044	pH:		Sample Date:	09/19/2013	Sample Time:	13:30:00
% Moisture :				% Solids :	41.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.10	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG7	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	044	pH:		Sample Date:	09/19/2013	Sample Time:	13:30:00
% Moisture :				% Solids :	41.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	15400	mg/kg	1	E	J	Yes	S4VEM
Calcium	3160	mg/kg	1	E	J	Yes	S4VEM
Iron	35000	mg/kg	1	E	J	Yes	S4VEM
Magnesium	2280	mg/kg	1	E	J	Yes	S4VEM
Manganese	1420	mg/kg	1	E	J	Yes	S4VEM
Potassium	1940	mg/kg	1	E	J	Yes	S4VEM
Sodium	1200	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG8	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	044	pH:		Sample Date:	09/19/2013	Sample Time:	13:35:00
% Moisture :				% Solids :	38.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG8	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	044	pH:		Sample Date:	09/19/2013	Sample Time:	13:35:00
% Moisture :				% Solids :	38.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	17400	mg/kg	1	E	J	Yes	S4VEM
Calcium	3480	mg/kg	1	E	J	Yes	S4VEM
Iron	39100	mg/kg	1	E	J	Yes	S4VEM
Magnesium	2610	mg/kg	1	E	J	Yes	S4VEM
Manganese	1540	mg/kg	1	E	J	Yes	S4VEM
Potassium	2270	mg/kg	1	E	J	Yes	S4VEM
Sodium	1310	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG9	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	045	pH:		Sample Date:	09/19/2013	Sample Time:	13:25:00
% Moisture :				% Solids :	55.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	15100	mg/kg	1	E	J	Yes	S4VEM
Calcium	1760	mg/kg	1	E	J	Yes	S4VEM
Iron	40300	mg/kg	1	E	J	Yes	S4VEM
Magnesium	1780	mg/kg	1	E	J	Yes	S4VEM
Manganese	1110	mg/kg	1	E	J	Yes	S4VEM
Potassium	1680	mg/kg	1	E	J	Yes	S4VEM
Sodium	896	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AG9	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	045	pH:		Sample Date:	09/19/2013	Sample Time:	13:25:00
% Moisture :				% Solids :	55.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH0	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	046	pH:		Sample Date:	09/19/2013	Sample Time:	14:20:00
% Moisture :				% Solids :	49.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	19600	mg/kg	1	E	J	Yes	S4VEM
Calcium	2290	mg/kg	1	E	J	Yes	S4VEM
Iron	24300	mg/kg	1	E	J	Yes	S4VEM
Magnesium	2540	mg/kg	1	E	J	Yes	S4VEM
Manganese	525	mg/kg	1	E	J	Yes	S4VEM
Potassium	2420	mg/kg	1	E	J	Yes	S4VEM
Sodium	1010	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH0	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	046	pH:		Sample Date:	09/19/2013	Sample Time:	14:20:00
% Moisture :				% Solids :	49.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.068	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH1	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	047	pH:		Sample Date:	09/19/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	53.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10300	mg/kg	1	E	J	Yes	S4VEM
Calcium	1920	mg/kg	1	E	J	Yes	S4VEM
Iron	40600	mg/kg	1	E	J	Yes	S4VEM
Magnesium	1300	mg/kg	1	E	J	Yes	S4VEM
Manganese	2080	mg/kg	1	E	J	Yes	S4VEM
Potassium	1270	mg/kg	1	E	J	Yes	S4VEM
Sodium	935	mg/kg	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH1	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	047	pH:		Sample Date:	09/19/2013	Sample Time:	14:30:00
% Moisture :				% Solids :	53.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.093	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH2	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	048	pH:		Sample Date:	09/19/2013	Sample Time:	17:00:00
% Moisture :				% Solids :	68		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.028	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH2	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	048	pH:		Sample Date:	09/19/2013	Sample Time:	17:00:00
% Moisture :				% Solids :	68		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	9580	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2210	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	64000	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2210	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	2420	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2210	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2210	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH3	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	048	pH:		Sample Date:	09/19/2013	Sample Time:	17:05:00
% Moisture :				% Solids :	65.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	10200	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2300	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	70000	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2300	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	2210	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2300	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2300	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH3	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	048	pH:		Sample Date:	09/19/2013	Sample Time:	17:05:00
% Moisture :				% Solids :	65.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.052	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH4	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	049	pH:		Sample Date:	09/19/2013	Sample Time:	17:15:00
% Moisture :				% Solids :	73.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.018	mg/kg	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH4	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	049	pH:		Sample Date:	09/19/2013	Sample Time:	17:15:00
% Moisture :				% Solids :	73.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	11200	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2040	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	88500	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2040	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	1560	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2040	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2040	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH5	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	050	pH:		Sample Date:	09/19/2013	Sample Time:	17:30:00
% Moisture :				% Solids :	54.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	13200	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2760	mg/kg	3	JD,E	UJ	Yes	S4VEM
Iron	65900	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2760	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	1900	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2760	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2760	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH5	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	050	pH:		Sample Date:	09/19/2013	Sample Time:	17:30:00
% Moisture :				% Solids :	54.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.19	mg/kg	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH6	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	051	pH:		Sample Date:	09/19/2013	Sample Time:	17:35:00
% Moisture :				% Solids :	59		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	14800	mg/kg	3	D,E	J	Yes	S4VEM
Calcium	2640	mg/kg	3	D,E	J	Yes	S4VEM
Iron	82100	mg/kg	3	D,E	J	Yes	S4VEM
Magnesium	2540	mg/kg	3	JD,E	UJ	Yes	S4VEM
Manganese	2790	mg/kg	3	D,E	J	Yes	S4VEM
Potassium	2540	mg/kg	3	JD,E	UJ	Yes	S4VEM
Sodium	2540	mg/kg	3	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	MC0AH6	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	051	pH:		Sample Date:	09/19/2013	Sample Time:	17:35:00
% Moisture :				% Solids :	59		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.23	mg/kg	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	PBS01	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3101105-BLK1	pH:		Sample Date:	10/11/2013	Sample Time:	14:11:49
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.10	mg/kg	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AF8	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	3100103-BLK1	pH:		Sample Date:	10/13/2013	Sample Time:	13:31:43
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	20.0	mg/kg	1	J	U	Yes	S4VEM
Calcium	500	mg/kg	1	U	U	Yes	S4VEM
Iron	10.0	mg/kg	1	U	U	Yes	S4VEM
Magnesium	500	mg/kg	1	U	U	Yes	S4VEM
Manganese	1.5	mg/kg	1	J	U	Yes	S4VEM
Potassium	500	mg/kg	1	J	U	Yes	S4VEM
Sodium	6.9	mg/kg	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 8, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling Alternate COR
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well site for Case No. 43811, SDG# MC0AH7 completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID. Due to the Government Shutdown, this data validation report was delayed.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10021

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

DATE: November 05, 2013

TO: Colleen Walling
ESAT Region 3 Project Officer

FROM: Kenneth W. Curry
Senior Data Reviewer

Kurt Roby
Oversight Chemist

SUBJECT: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well
Case: 43811 SDG: MC0AH7

OVERVIEW

Case, 43811, Sample Delivery Group (SDG) MC0AH7, from the Kiskimere Groundwater Well site consisted of eighteen (18) soil samples including two (2) field duplicate pairs analyzed for metals by ICP-MS. In addition, uranium (U) was analyzed for in accordance with modification 2183.1. All samples were analyzed by Bonner Analytical Testing Company (BONNER). Samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

Associated rinsate blanks, samples MC0H9, MC0AJ0 and MC0AJ1, were analyzed for in SDG MC0AH8. The positive result for silver (Ag) in rinsate blank MC0H9 impacted samples collected 09/17/2013.

MAJOR PROBLEM

Matrix spike recovery was extremely low (<30%) for antimony (Sb). The post digestion spike for this analyte was also extremely low. Low recovery may be attributed to matrix interference or analyte lost during the digestion process. Positive results reported for this analyte may be biased extremely low and have been qualified “J-“. Quantitation limits for this analyte were rejected and qualified “R”.

MINOR PROBLEMS

The laboratory preparation blanks reported negative concentrations of Sb greater than the absolute value of Method Detection Limits (MDLs). No positive results were reported for this analyte less than two times (<2X) the absolute value of the blank in affected samples. Quantitation limits for this analyte in associated samples are estimated. The "UJ" qualifier for this outlier has been superseded by "R".

Matrix spike recoveries were low (<75%) for nickel (Ni) and zinc (Zn). The post digestion spikes for these analytes were within control limits. Low recovery may be attributed to matrix interference or analyte lost during the digestion process. Positive results reported for these analytes were qualified "J".

Percent differences (%Ds) in the ICP serial dilution analysis were outside the control limit (>10%) for copper (Cu), chromium (Cr), lead (Pb), nickel (Ni) and zinc (Zn). Positive results for these analytes are estimated due to possible matrix interference and qualified "J".

Recovery of uranium (U) in the Laboratory Control Sample (LCS) analyzed 10/17/2013. The positive result for this analyte in sample MC0H7, which was analyzed with this LCS, is estimated low and has been qualified J-.

NOTES

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of beryllium (Be), cadmium (Cd), silver (Ag), thallium (Tl) and V less than CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory and rinsate blanks had the same analyte present.

Sample MC0AF4 listed on the Chain of Custody (COC) records was not received by the laboratory. Per Region 3, the laboratory cancelled analysis of this sample. This sample was the field duplicate of sample MC0AF5. Therefore, no comparison can be made for this field duplicate pair.

Reported results for field duplicate pair, MC0AE7/MC0AE8, were within 20% Relative Percent Difference (RPD), $\pm$ CRQL for all analytes with the exception of Cu and Pb.

Based on sample screening, all samples were initially analyzed at five-fold (5X) dilutions. The CRQLs are elevated in these samples due to these dilutions.

Sample screening indicated that all samples contained high concentrations of Mn. To protect the integrity of the ICP-MS instrumentation, all samples except MC0AH7, were analyzed by ICP-AES, for Mn, which were not included in this SDG.

%R for internal standard Sc-45 were outside the control limit for samples MC0AE2, MC0AF5 and MC0AF6. However, only U was analyzed for in this analytical run, which is not associated with Sc-45. Therefore, no data were impacted due to these outliers.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant as the assessment of blank analysis results has determined the existence and magnitude of contamination resulting from laboratory (or field) activities.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V053

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3101602-BS1	pH:		Sample Date:	10/17/2013	Sample Time:	11:37:34
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Antimony	5.0	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	J	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	J	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	2.1	mg/kg	5	JD	J	Yes	S4VEM
Copper	2.0	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.1	mg/kg	5	JD	J	Yes	S4VEM
Nickel	1.0	mg/kg	5	JD	J	Yes	S4VEM
Selenium	4.5	mg/kg	5	JD	J	Yes	S4VEM
Selenium	3.7	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.94	mg/kg	5	JD	J	Yes	S4VEM
Silver	1.1	mg/kg	5	JD	J	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.43	mg/kg	1	J	J	Yes	S4VEM
Uranium	1.9	mg/kg	5	JD		Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	2.0	mg/kg	5	JD	J	Yes	S4VEM
Zinc	1.9	mg/kg	5	JD	J	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100106-BS2	pH:		Sample Date:	10/15/2013	Sample Time:	15:23:04
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Antimony	5.0	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	J	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	J	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	J	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	2.0	mg/kg	5	JD	J	Yes	S4VEM
Copper	2.1	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.0	mg/kg	5	JD	J	Yes	S4VEM
Nickel	1.1	mg/kg	5	JD	J	Yes	S4VEM
Selenium	3.7	mg/kg	5	JD	J	Yes	S4VEM
Selenium	4.5	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.94	mg/kg	5	JD	J	Yes	S4VEM
Silver	1.1	mg/kg	5	JD	J	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.43	mg/kg	1	J	J	Yes	S4VEM
Uranium	1.9	mg/kg	5	JD		Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	1.9	mg/kg	5	JD	J	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Zinc	2.0	mg/kg	5	JD	J	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100106-BS1	pH:		Sample Date:	10/14/2013	Sample Time:	13:53:04
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	JD	J	Yes	S4VEM
Antimony	5.0	mg/kg	5	JD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	J	Yes	S4VEM
Arsenic	2.5	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	JD	J	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	2.0	mg/kg	5	JD	J	Yes	S4VEM
Copper	2.1	mg/kg	5	JD	J	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	JD	U	Yes	S4VEM
Nickel	1.0	mg/kg	5	JD	J	Yes	S4VEM
Nickel	1.1	mg/kg	5	JD	J	Yes	S4VEM
Selenium	3.7	mg/kg	5	JD	J	Yes	S4VEM
Selenium	4.5	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.94	mg/kg	5	JD	J	Yes	S4VEM
Silver	1.1	mg/kg	5	JD	J	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.43	mg/kg	1	J	J	Yes	S4VEM
Uranium	1.9	mg/kg	5	JD		Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	1.9	mg/kg	5	JD	J	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Zinc	2.0	mg/kg	5	JD	J	Yes	S4VEM
Manganese	2.5	mg/kg	5	JD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AD9	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	018	pH:		Sample Date:	09/17/2013	Sample Time:	15:15:00
% Moisture :				% Solids :	77.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	16.6	mg/kg	5	D		Yes	S4VEM
Barium	177	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	19.1	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	22.8	mg/kg	5	D		Yes	S4VEM
Copper	25.5	mg/kg	5	D,E	J	Yes	S4VEM
Lead	27.9	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	41.7	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	0.94	mg/kg	5	JD	J	Yes	S4VEM
Silver	3.2	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.92	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	24.3	mg/kg	5	D	J-	Yes	S4VEM
Zinc	155	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE0	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	019	pH:		Sample Date:	09/17/2013	Sample Time:	15:25:00
% Moisture :				% Solids :	74.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.7	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	19.7	mg/kg	5	D		Yes	S4VEM
Barium	143	mg/kg	5	D		Yes	S4VEM
Beryllium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Chromium	26.7	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	51.7	mg/kg	5	D		Yes	S4VEM
Copper	26.9	mg/kg	5	D,E	J	Yes	S4VEM
Lead	31.8	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	65.1	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	3.4	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.4	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.96	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	21.9	mg/kg	5	D		Yes	S4VEM
Zinc	203	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE1	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	020	pH:		Sample Date:	09/17/2013	Sample Time:	16:00:00
% Moisture :				% Solids :	69		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	7.2	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	6.0	mg/kg	5	D		Yes	S4VEM
Barium	148	mg/kg	5	D		Yes	S4VEM
Beryllium	3.6	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.6	mg/kg	5	JD	U	Yes	S4VEM
Chromium	19.5	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	11.1	mg/kg	5	D		Yes	S4VEM
Copper	12.2	mg/kg	5	D,E	J	Yes	S4VEM
Lead	14.2	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	19.7	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	0.63	mg/kg	5	JD	J	Yes	S4VEM
Silver	3.6	mg/kg	5	JD	U	Yes	S4VEM
Thallium	3.6	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.98	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	27.4	mg/kg	5	D		Yes	S4VEM
Zinc	55.9	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE2	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	021	pH:		Sample Date:	09/18/2013	Sample Time:	10:05:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	27.6	mg/kg	5	D		Yes	S4VEM
Barium	168	mg/kg	5	D		Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	34.1	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	89.7	mg/kg	5	D		Yes	S4VEM
Copper	35.8	mg/kg	5	D,E	J	Yes	S4VEM
Lead	40.2	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	105	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.033	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.7	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	30.9	mg/kg	5	D		Yes	S4VEM
Zinc	333	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE3	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	022	pH:		Sample Date:	09/18/2013	Sample Time:	10:15:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.6	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	38.6	mg/kg	5	D		Yes	S4VEM
Barium	154	mg/kg	5	D		Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	23.5	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	52.4	mg/kg	5	D		Yes	S4VEM
Copper	31.4	mg/kg	5	D,E	J	Yes	S4VEM
Lead	38.2	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	67.6	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.043	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	27.7	mg/kg	5	D		Yes	S4VEM
Zinc	232	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE3A	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AE3-PS	pH:		Sample Date:	10/14/2013	Sample Time:	15:46:20
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	5.0	mg/kg	5	UD	U	Yes	S4VEM
Nickel	166	mg/kg	5	D		Yes	S4VEM
Zinc	581	mg/kg	5	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE3D	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AE3-DUP	pH:		Sample Date:	10/14/2013	Sample Time:	14:30:39
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.6	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	33.8	mg/kg	5	D		Yes	S4VEM
Barium	144	mg/kg	5	D		Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	21.7	mg/kg	5	D		Yes	S4VEM
Cobalt	43.5	mg/kg	5	D		Yes	S4VEM
Copper	28.7	mg/kg	5	D		Yes	S4VEM
Lead	35.1	mg/kg	5	D		Yes	S4VEM
Nickel	56.5	mg/kg	5	D		Yes	S4VEM
Selenium	1.6	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.035	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.0	mg/kg	5	JD	R	Yes	S4VEM
Vanadium	27.0	mg/kg	5	D		Yes	S4VEM
Zinc	191	mg/kg	5	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE3S	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	MC0AE3-MS	pH:		Sample Date:	10/14/2013	Sample Time:	14:22:18
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.96	mg/kg	5	JD,N	J	Yes	S4VEM
Arsenic	37.1	mg/kg	5	D		Yes	S4VEM
Barium	393	mg/kg	5	D		Yes	S4VEM
Beryllium	8.6	mg/kg	5	D		Yes	S4VEM
Cadmium	5.8	mg/kg	5	D		Yes	S4VEM
Chromium	53.9	mg/kg	5	D		Yes	S4VEM
Cobalt	105	mg/kg	5	D		Yes	S4VEM
Copper	71.5	mg/kg	5	D		Yes	S4VEM
Lead	38.5	mg/kg	5	D		Yes	S4VEM
Nickel	116	mg/kg	5	D,N		Yes	S4VEM
Selenium	11.8	mg/kg	5	JD	J	Yes	S4VEM
Silver	5.6	mg/kg	5	D		Yes	S4VEM
Thallium	6.5	mg/kg	5	D		Yes	S4VEM
Uranium	26.7	mg/kg	5	D	R	Yes	S4VEM
Vanadium	98.3	mg/kg	5	D		Yes	S4VEM
Zinc	266	mg/kg	5	D,N		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE4	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	023	pH:		Sample Date:	09/18/2013	Sample Time:	10:25:00
% Moisture :				% Solids :	76.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	24.2	mg/kg	5	D		Yes	S4VEM
Barium	142	mg/kg	5	D		Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	29.9	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	66.9	mg/kg	5	D		Yes	S4VEM
Copper	31.5	mg/kg	5	D,E	J	Yes	S4VEM
Lead	33.1	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	79.3	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.041	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	26.1	mg/kg	5	D		Yes	S4VEM
Zinc	236	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE5	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	024	pH:		Sample Date:	09/18/2013	Sample Time:	10:35:00
% Moisture :				% Solids :	78.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.4	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	20.4	mg/kg	5	D		Yes	S4VEM
Barium	164	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	25.2	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	60.0	mg/kg	5	D		Yes	S4VEM
Copper	29.8	mg/kg	5	D,E	J	Yes	S4VEM
Lead	34.6	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	74.5	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.031	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	26.3	mg/kg	5	D		Yes	S4VEM
Zinc	244	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE6	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	025	pH:		Sample Date:	09/18/2013	Sample Time:	10:50:00
% Moisture :				% Solids :	79.2		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.3	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	20.8	mg/kg	5	D		Yes	S4VEM
Barium	262	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	122	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	64.6	mg/kg	5	D		Yes	S4VEM
Copper	47.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	94.1	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	77.7	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.046	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	39.0	mg/kg	5	D		Yes	S4VEM
Zinc	280	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE7	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	026	pH:		Sample Date:	09/18/2013	Sample Time:	11:00:00
% Moisture :				% Solids :	77.5		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	17.2	mg/kg	5	D		Yes	S4VEM
Barium	184	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	22.0	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	57.6	mg/kg	5	D		Yes	S4VEM
Copper	26.8	mg/kg	5	D,E	J	Yes	S4VEM
Lead	28.6	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	71.9	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	0.99	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.025	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.94	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	23.9	mg/kg	5	D		Yes	S4VEM
Zinc	203	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE8	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	026	pH:		Sample Date:	09/18/2013	Sample Time:	11:05:00
% Moisture :				% Solids :	77.6		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.4	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	21.3	mg/kg	5	D		Yes	S4VEM
Barium	175	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	20.7	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	58.6	mg/kg	5	D		Yes	S4VEM
Copper	36.2	mg/kg	5	D,E	J	Yes	S4VEM
Lead	35.3	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	76.5	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.4	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.038	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	29.3	mg/kg	5	D		Yes	S4VEM
Zinc	220	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AE9	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	027	pH:		Sample Date:	09/18/2013	Sample Time:	11:10:00
% Moisture :				% Solids :	78.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.4	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	26.1	mg/kg	5	D		Yes	S4VEM
Barium	144	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	42.0	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	57.0	mg/kg	5	D		Yes	S4VEM
Copper	38.9	mg/kg	5	D,E	J	Yes	S4VEM
Lead	38.7	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	71.4	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.030	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.3	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	31.3	mg/kg	5	D		Yes	S4VEM
Zinc	230	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AF0	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	028	pH:		Sample Date:	09/18/2013	Sample Time:	11:30:00
% Moisture :				% Solids :	77.4		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.5	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	20.3	mg/kg	5	D		Yes	S4VEM
Barium	258	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	39.9	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	54.0	mg/kg	5	D		Yes	S4VEM
Copper	38.1	mg/kg	5	D,E	J	Yes	S4VEM
Lead	41.5	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	67.6	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	0.98	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.032	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	34.5	mg/kg	5	D		Yes	S4VEM
Zinc	234	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AF1	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	029	pH:		Sample Date:	09/18/2013	Sample Time:	11:35:00
% Moisture :				% Solids :	74.9		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.7	mg/kg	5	UD,N	R	Yes	S4VEM
Arsenic	28.0	mg/kg	5	D		Yes	S4VEM
Barium	207	mg/kg	5	D		Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	25.5	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	75.9	mg/kg	5	D		Yes	S4VEM
Copper	30.2	mg/kg	5	D,E	J	Yes	S4VEM
Lead	36.2	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	85.8	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.3	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.034	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	26.2	mg/kg	5	D		Yes	S4VEM
Zinc	246	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AF2	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	030	pH:		Sample Date:	09/18/2013	Sample Time:	11:45:00
% Moisture :				% Solids :	78.7		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	1.2	mg/kg	5	JD,N	J-	Yes	S4VEM
Arsenic	23.1	mg/kg	5	D		Yes	S4VEM
Barium	160	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	53.3	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	56.3	mg/kg	5	D		Yes	S4VEM
Copper	28.2	mg/kg	5	D,E	J	Yes	S4VEM
Lead	39.9	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	75.8	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.3	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.041	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.0	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	26.8	mg/kg	5	D		Yes	S4VEM
Zinc	237	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AF3	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	031	pH:		Sample Date:	09/18/2013	Sample Time:	12:00:00
% Moisture :				% Solids :	76.3		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.46	mg/kg	5	JD,N	J-	Yes	S4VEM
Arsenic	22.0	mg/kg	5	D		Yes	S4VEM
Barium	143	mg/kg	5	D		Yes	S4VEM
Beryllium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Chromium	27.0	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	56.6	mg/kg	5	D		Yes	S4VEM
Copper	26.9	mg/kg	5	D,E	J	Yes	S4VEM
Lead	30.2	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	70.2	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.3	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.036	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.3	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.98	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	26.6	mg/kg	5	D		Yes	S4VEM
Zinc	213	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AF5	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	032	pH:		Sample Date:	09/18/2013	Sample Time:	14:15:00
% Moisture :				% Solids :	77.8		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.79	mg/kg	5	JD,N	J-	Yes	S4VEM
Arsenic	35.1	mg/kg	5	D		Yes	S4VEM
Barium	148	mg/kg	5	D		Yes	S4VEM
Beryllium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Chromium	36.6	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	61.0	mg/kg	5	D		Yes	S4VEM
Copper	33.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	42.7	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	72.9	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.5	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.035	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.2	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	37.3	mg/kg	5	D		Yes	S4VEM
Zinc	239	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AF6	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	033	pH:		Sample Date:	09/18/2013	Sample Time:	14:25:00
% Moisture :				% Solids :	80.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.50	mg/kg	5	JD,N	J-	Yes	S4VEM
Arsenic	39.9	mg/kg	5	D		Yes	S4VEM
Barium	167	mg/kg	5	D		Yes	S4VEM
Beryllium	3.1	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	3.1	mg/kg	5	JD	U	Yes	S4VEM
Chromium	24.1	mg/kg	5	D,E	J	Yes	S4VEM
Cobalt	49.3	mg/kg	5	D		Yes	S4VEM
Copper	28.3	mg/kg	5	D,E	J	Yes	S4VEM
Lead	43.0	mg/kg	5	D,E	J	Yes	S4VEM
Nickel	63.2	mg/kg	5	D,N,E	J	Yes	S4VEM
Selenium	1.2	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.036	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.1	mg/kg	5	JD	U	Yes	S4VEM
Uranium	1.0	mg/kg	5	JD	J	Yes	S4VEM
Vanadium	32.5	mg/kg	5	D		Yes	S4VEM
Zinc	206	mg/kg	5	D,N,E	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	MC0AH7	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	052	pH:		Sample Date:	09/19/2013	Sample Time:	18:40:00
% Moisture :				% Solids :	72.1		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	6.9	mg/kg	5	UD	R	Yes	S4VEM
Arsenic	14.1	mg/kg	5	D		Yes	S4VEM
Barium	103	mg/kg	5	D		Yes	S4VEM
Beryllium	1.1	mg/kg	5	JD	J	Yes	S4VEM
Cadmium	3.5	mg/kg	5	JD	U	Yes	S4VEM
Chromium	9.3	mg/kg	5	D		Yes	S4VEM
Cobalt	33.8	mg/kg	5	D		Yes	S4VEM
Copper	17.2	mg/kg	5	D		Yes	S4VEM
Lead	15.9	mg/kg	5	D		Yes	S4VEM
Nickel	44.8	mg/kg	5	D		Yes	S4VEM
Selenium	1.0	mg/kg	5	JD	J	Yes	S4VEM
Silver	0.023	mg/kg	5	JD	J	Yes	S4VEM
Thallium	3.5	mg/kg	5	JD	U	Yes	S4VEM
Uranium	0.50	mg/kg	5	JD	J-	Yes	S4VEM
Vanadium	17.3	mg/kg	5	JD	U	Yes	S4VEM
Zinc	130	mg/kg	5	D		Yes	S4VEM
Manganese	1870	mg/kg	5	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100106-BLK1	pH:		Sample Date:	10/14/2013	Sample Time:	13:48:54
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	-0.052	mg/kg	5	JD		Yes	S4VEM
Antimony	-0.12	mg/kg	5	JD		Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	UD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3100106-BLK2	pH:		Sample Date:	10/15/2013	Sample Time:	15:20:38
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	-0.052	mg/kg	5	JD		Yes	S4VEM
Antimony	-0.12	mg/kg	5	JD		Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	UD	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH7	Lab Code:	BONNER
Sample Number:	PBS01	Method:	ICP_MS	Matrix:	Soil	MA Number:	2183.1
Sample Location:	3101602-BLK1	pH:		Sample Date:	10/17/2013	Sample Time:	11:42:26
% Moisture :				% Solids :	100		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	-0.12	mg/kg	5	JD		Yes	S4VEM
Antimony	-0.052	mg/kg	5	JD		Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Arsenic	2.5	mg/kg	5	UD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	JD	U	Yes	S4VEM
Barium	25.0	mg/kg	5	UD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Beryllium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cadmium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Chromium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	UD	U	Yes	S4VEM
Cobalt	2.5	mg/kg	5	JD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Copper	5.0	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Lead	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Nickel	2.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Selenium	12.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Silver	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	UD	U	Yes	S4VEM
Thallium	2.5	mg/kg	5	JD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Uranium	5.0	mg/kg	5	UD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	U	Yes	S4VEM
Vanadium	12.5	mg/kg	5	JD	UJ	Yes	S4VEM
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Zinc	5.0	mg/kg	5	UD	U	Yes	S4VEM
Manganese	2.5	mg/kg	5	UD	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 21, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC0AH8 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10041

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 18, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kurt Roby
Inorganic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC0AH8

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AH8, consisted of ten (10) aqueous samples including six (6) rinsate blanks and two (2) field blanks analyzed for total metals as well as two (2) filtrate samples analyzed for dissolved metals, all by ICP-MS. Samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 (modified) through the Routine Analytical Services (RAS) program. Modification reference number 2183.1 details the specifications and reporting requirements for the addition of uranium (U) to the target analyte list.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

The results for the unfiltered field and rinsate blanks were utilized to qualify data for both the filtrate and unfiltered samples based on sample date.

MINOR PROBLEM

Rinsate blank sample MC0AK3 reported a positive result for nickel (Ni) above the Contract Required Quantitation Limit (CRQL). Field samples MC0AJ7 and MC0AL2 also reported a concentration of this analyte marginally above CRQL. Positive result for this analyte in these field samples may be biased high and have been qualified "J+", as there may be contribution from field contamination.

NOTES

Analytes detected below CRQLs are qualified "J" unless reported at CRQL and qualified "U" in samples due to blank contamination.

Detected concentrations of antimony (Sb), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), thallium (Tl), U, vanadium (V), Zinc (Zn), calcium (Ca), iron (Fe), sodium (Na), aluminum (Al) and potassium (K) less than CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory, rinsate and field blanks had these analytes present.

Field sample MC0AL3 which reported a concentration for Zn greater than CRQL but less than the concentration found in associated rinsate blank sample MC0AK3 has been reported at the blank concentration and qualified "U".

Concentrations of Na exceeded the calibration range in the initial analysis for samples MC0AJ8 and MC0AL3. These samples were re-analyzed at three-fold (3X) dilution to bring the concentration of the analyte within the calibration range. Results for Na are reported from the dilutions noted in these samples.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only for drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: R3ESAT-2013-V072

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	3100109-BS1	pH:		Sample Date:	10/09/2013	Sample Time:	16:42:16
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony			1			Yes	S4VEM
Arsenic			1			Yes	S4VEM
Barium			1			Yes	S4VEM
Beryllium			1			Yes	S4VEM
Cadmium			1			Yes	S4VEM
Chromium			1			Yes	S4VEM
Cobalt			1			Yes	S4VEM
Copper			1			Yes	S4VEM
Lead			1			Yes	S4VEM
Nickel			1			Yes	S4VEM
Selenium			1			Yes	S4VEM
Silver			1			Yes	S4VEM
Thallium			1			Yes	S4VEM
Uranium			1			Yes	S4VEM
Vanadium			1			Yes	S4VEM
Zinc			1			Yes	S4VEM
Aluminum			1			Yes	S4VEM
Iron			1			Yes	S4VEM
Calcium			1			Yes	S4VEM
Manganese			1			Yes	S4VEM
Magnesium			1			Yes	S4VEM
Sodium			1			Yes	S4VEM
Potassium			1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AH8	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/16/2013	Sample Time:	22:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.25	ug/L	1	J	J	Yes	S4VEM
Copper	0.35	ug/L	1	J	J	Yes	S4VEM
Lead	1.2	ug/L	1			Yes	S4VEM
Nickel	0.89	ug/L	1	J	J	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	5.7	ug/L	1			Yes	S4VEM
Magnesium	25.0	ug/L	1	J	J	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Manganese	14.2	ug/L	1			Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	71.3	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AH8D	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	MC0AH8-DUP	pH:	1	Sample Date:	10/09/2013	Sample Time:	16:59:30
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.57	ug/L	1	J	J	Yes	S4VEM
Arsenic	0.080	ug/L	1	J	J	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.25	ug/L	1	J	J	Yes	S4VEM
Copper	0.35	ug/L	1	J	J	Yes	S4VEM
Lead	1.2	ug/L	1			Yes	S4VEM
Nickel	0.92	ug/L	1	J	J	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	0.27	ug/L	1	J	J	Yes	S4VEM
Zinc	5.9	ug/L	1			Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Manganese	14.3	ug/L	1			Yes	S4VEM
Magnesium	25.4	ug/L	1	J	J	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	68.9	ug/L	1			Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AH8S	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	MC0AH8-MS	pH:	1	Sample Date:	10/09/2013	Sample Time:	16:50:54
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	91.7	ug/L	1			Yes	S4VEM
Arsenic	35.8	ug/L	1			Yes	S4VEM
Barium	1850	ug/L	1			Yes	S4VEM
Beryllium	44.0	ug/L	1			Yes	S4VEM
Cadmium	45.3	ug/L	1			Yes	S4VEM
Chromium	179	ug/L	1			Yes	S4VEM
Cobalt	457	ug/L	1			Yes	S4VEM
Copper	224	ug/L	1			Yes	S4VEM
Lead	19.4	ug/L	1			Yes	S4VEM
Nickel	448	ug/L	1			Yes	S4VEM
Selenium	93.3	ug/L	1			Yes	S4VEM
Silver	45.8	ug/L	1			Yes	S4VEM
Thallium	46.1	ug/L	1			Yes	S4VEM
Uranium	99.0	ug/L	1			Yes	S4VEM
Vanadium	459	ug/L	1			Yes	S4VEM
Zinc	450	ug/L	1			Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Iron	237	ug/L	1			Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Manganese	464	ug/L	1			Yes	S4VEM
Magnesium	25.8	ug/L	1	J	J	Yes	S4VEM
Aluminum	1990	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AH9	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/17/2013	Sample Time:	19:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	U	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.0	ug/L	1	U	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	0.023	ug/L	1	J	J	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	2.0	ug/L	1	J	U	Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Manganese	0.13	ug/L	1	J	J	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Magnesium	0.72	ug/L	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AJ0	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/18/2013	Sample Time:	19:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.041	ug/L	1	J	J	Yes	S4VEM
Copper	0.36	ug/L	1	J	J	Yes	S4VEM
Lead	0.12	ug/L	1	J	J	Yes	S4VEM
Nickel	0.71	ug/L	1	J	J	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	15.6	ug/L	1			Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	59.7	ug/L	1			Yes	S4VEM
Manganese	2.2	ug/L	1			Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Magnesium	62.3	ug/L	1	J	J	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AJ1	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/19/2013	Sample Time:	20:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.49	ug/L	1	J	J	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.054	ug/L	1	J	J	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	0.17	ug/L	1	J	J	Yes	S4VEM
Nickel	0.27	ug/L	1	J	J	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	3.7	ug/L	1			Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Magnesium	13.1	ug/L	1	J	J	Yes	S4VEM
Aluminum	34.8	ug/L	1			Yes	S4VEM
Manganese	4.0	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AJ7	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA04	pH:	1	Sample Date:	09/24/2013	Sample Time:	14:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	J	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	308	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	J	U	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	1.9	ug/L	1		J+	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	1.1	ug/L	1			Yes	S4VEM
Vanadium	5.0	ug/L	1	J	U	Yes	S4VEM
Zinc	90.1	ug/L	1			Yes	S4VEM
Iron	334	ug/L	1			Yes	S4VEM
Magnesium	8580	ug/L	1			Yes	S4VEM
Sodium	12700	ug/L	1			Yes	S4VEM
Potassium	9640	ug/L	1			Yes	S4VEM
Aluminum	266	ug/L	1			Yes	S4VEM
Manganese	21.3	ug/L	1			Yes	S4VEM
Calcium	43500	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AJ8	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	HW15	pH:	1	Sample Date:	09/24/2013	Sample Time:	18:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	J	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	119	ug/L	1			Yes	S4VEM
Beryllium	0.17	ug/L	1	J	J	Yes	S4VEM
Cadmium	1.0	ug/L	1	J	U	Yes	S4VEM
Chromium	3.1	ug/L	1			Yes	S4VEM
Cobalt	4.2	ug/L	1			Yes	S4VEM
Copper	6.0	ug/L	1			Yes	S4VEM
Lead	9.9	ug/L	1			Yes	S4VEM
Nickel	15.8	ug/L	1			Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	J	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	J	U	Yes	S4VEM
Zinc	74.4	ug/L	1			Yes	S4VEM
Aluminum	671	ug/L	1			Yes	S4VEM
Magnesium	1460	ug/L	1			Yes	S4VEM
Iron	4000	ug/L	1			Yes	S4VEM
Manganese	331	ug/L	1			Yes	S4VEM
Calcium	2610	ug/L	1			Yes	S4VEM
Potassium	1580	ug/L	1			Yes	S4VEM
Sodium	168000	ug/L	3	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AK1	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/23/2013	Sample Time:	13:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	U	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	0.18	ug/L	1	J	J	Yes	S4VEM
Nickel	0.49	ug/L	1	J	J	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	7.3	ug/L	1			Yes	S4VEM
Manganese	1.7	ug/L	1			Yes	S4VEM
Magnesium	18.1	ug/L	1	J	J	Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AK2	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/23/2013	Sample Time:	17:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	3.8	ug/L	1			Yes	S4VEM
Arsenic	0.077	ug/L	1	J	J	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.26	ug/L	1	J	J	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	0.052	ug/L	1	J	J	Yes	S4VEM
Nickel	0.28	ug/L	1	J	J	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	0.10	ug/L	1	J	J	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	0.19	ug/L	1	J	J	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1			Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Magnesium	27.3	ug/L	1	J	J	Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM
Manganese	0.12	ug/L	1	J	J	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AK3	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/24/2013	Sample Time:	11:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.3	ug/L	1			Yes	S4VEM
Arsenic	0.16	ug/L	1	J	J	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	0.087	ug/L	1	J	J	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.82	ug/L	1	J	J	Yes	S4VEM
Copper	0.59	ug/L	1	J	J	Yes	S4VEM
Lead	0.36	ug/L	1	J	J	Yes	S4VEM
Nickel	1.1	ug/L	1			Yes	S4VEM
Selenium	0.29	ug/L	1	J	J	Yes	S4VEM
Silver	0.29	ug/L	1	J	J	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	0.55	ug/L	1	J	J	Yes	S4VEM
Vanadium	0.63	ug/L	1	J	J	Yes	S4VEM
Zinc	44.6	ug/L	1			Yes	S4VEM
Manganese	1.4	ug/L	1			Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Sodium	630	ug/L	1			Yes	S4VEM
Calcium	589	ug/L	1			Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	32.7	ug/L	1			Yes	S4VEM
Magnesium	105	ug/L	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AK4	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	Z	pH:	1	Sample Date:	09/24/2013	Sample Time:	13:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	0.51	ug/L	1	J	J	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	J	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	0.043	ug/L	1	J	J	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.0	ug/L	1	U	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	0.034	ug/L	1	J	J	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	2.0	ug/L	1	J	U	Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Manganese	1.0	ug/L	1	U	U	Yes	S4VEM
Sodium	500	ug/L	1	U	U	Yes	S4VEM
Calcium	500	ug/L	1	J	U	Yes	S4VEM
Magnesium	5.1	ug/L	1	J	J	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AL2	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA04	pH:	1	Sample Date:	09/24/2013	Sample Time:	14:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	J	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	278	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.4	ug/L	1		J+	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1			Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	96.2	ug/L	1			Yes	S4VEM
Calcium	39000	ug/L	1			Yes	S4VEM
Sodium	14100	ug/L	1			Yes	S4VEM
Potassium	14500	ug/L	1			Yes	S4VEM
Manganese	14.4	ug/L	1			Yes	S4VEM
Magnesium	8340	ug/L	1			Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	MC0AL3	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	HW15	pH:	1	Sample Date:	09/24/2013	Sample Time:	18:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	J	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	78.7	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	J	U	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	2.8	ug/L	1			Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	U	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	44.6	ug/L	1		U	Yes	S4VEM
Sodium	154000	ug/L	3	D		Yes	S4VEM
Potassium	1430	ug/L	1			Yes	S4VEM
Iron	200	ug/L	1	J	U	Yes	S4VEM
Magnesium	1460	ug/L	1			Yes	S4VEM
Calcium	2710	ug/L	1			Yes	S4VEM
Manganese	39.6	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH8	Lab Code:	BONNER
Sample Number:	PBW01	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	3100109-BLK1	pH:		Sample Date:	10/09/2013	Sample Time:	16:37:52
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	U	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	U	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	U	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.0	ug/L	1	U	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	0.20	ug/L	1	J	J	Yes	S4VEM
Magnesium	0.54	ug/L	1	J	J	Yes	S4VEM
Iron	3.1	ug/L	1	J	J	Yes	S4VEM
Manganese	1.0	ug/L	1	U	U	Yes	S4VEM
Calcium	9.4	ug/L	1	J	J	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 21, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC0AH9 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10040

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 18, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kurt Roby
Inorganic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC0AH9

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AH9, consisted of ten (10) aqueous samples including six (6) rinsate blanks and two (2) field blanks analyzed for total mercury (Hg) and two aqueous samples analyzed for dissolved Hg by cold vapor technique. All samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

MINOR PROBLEM

Continuing calibration and preparation blanks reported concentrations for Hg greater than absolute value of the Method Detection Limit (MDL). No positive results were reported for this analyte in field samples; quantitation limits are estimated and have been qualified “UJ”.

NOTES

Quality control limits for Hg in matrix spike and laboratory duplicate analyses were met by the laboratory.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only for drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: R3ESAT-2013-V071

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AH8	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/16/2013	Sample Time:	22:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AH8D	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MC0AH8-DUP	pH:	1	Sample Date:	10/04/2013	Sample Time:	11:31:06
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AH8S	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MC0AH8-MS	pH:	1	Sample Date:	10/04/2013	Sample Time:	11:33:47
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	1.1	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AH9	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/17/2013	Sample Time:	19:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AJ0	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/18/2013	Sample Time:	19:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AJ1	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/19/2013	Sample Time:	20:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AJ7	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA04	pH:	1	Sample Date:	09/24/2013	Sample Time:	14:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AJ8	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	HW15	pH:	1	Sample Date:	09/24/2013	Sample Time:	18:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AK1	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/23/2013	Sample Time:	13:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AK2	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/23/2013	Sample Time:	17:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AK3	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/24/2013	Sample Time:	11:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AK4	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	Z	pH:	1	Sample Date:	09/24/2013	Sample Time:	13:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AL2	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA04	pH:	1	Sample Date:	09/24/2013	Sample Time:	14:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	MC0AL3	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	HW15	pH:	1	Sample Date:	09/24/2013	Sample Time:	18:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AH9	Lab Code:	BONNER
Sample Number:	PBW01	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	3100323-BLK1	pH:		Sample Date:	10/04/2013	Sample Time:	11:26:18
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	-0.031	ug/L	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 19, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC0AJ2 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10037

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

DATE: November 14, 2013

TO: Colleen Walling
ESAT Region 3 Project Officer

FROM: Kenneth W. Curry
Senior Data Reviewer

Dean Gouveia
ESAT Region 3 Program Manager

SUBJECT: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC0AJ2

OVERVIEW

Case, 43811, Sample Delivery Group (SDG) MC0AJ2, from the Kiskimere Groundwater Well Investigation site consisted of five (5) aqueous samples including one (1) field duplicate pair analyzed for metals by ICP-MS and five (5) filtrate samples including one (1) field duplicate pair analyzed for metals by ICP-MS . In addition, uranium (U) was analyzed for in accordance with modification 2183.1. All samples were analyzed by Bonner Analytical Testing Company (BONNER). Samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

Associated rinsate and field blanks, samples MC0AK1, MC0AK2, MC0AK3 and MC0AK4, were analyzed for in SDG MC0AH8. Results reported in these blanks were used to evaluate field samples for blank contamination based on sample collection date. Data were impacted as noted below.

MINOR PROBLEM

The Relative Percent Difference (RPD) for the laboratory duplicate analysis was outside the control limits for zinc (Zn). Positive results and quantitation limits for this analyte are estimated and have been qualified “J” and “UJ”, respectively.

NOTES

Analytes detected below Contract Required Quantitation Limits (CRQLs) are qualified "J" unless reported at CRQL and qualified "U" due to blank contamination.

Detected concentrations of arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), uranium (U), Zn and vanadium (V) less than CRQLs have been reported at CRQLs and qualified "U" in samples for which the associated laboratory, field and/or rinsate blanks had the same analyte present.

Antimony (Sb), Ni and Zn were detected at concentration above the CRQLs in the analyses of the field and rinsate blanks. Results for these compounds reported in the field samples, which were above the CRQL but less than the blank concentration, have been raised to the blank concentration and qualified "U".

Results for field duplicates, MC0AJ3/MC0AJ4 and MC0AK9/MC0AL4 were within 20% Relative Percent Difference (RPD), $\pm$ CRQL for all analytes.

The sample cooler chest containing samples in this data set had an interior temperature of 7.0 ^{o}C when received by the laboratory. Due to the relative stability of these compounds in, no data were qualified based on this finding.

Samples listed below were re-analyzed at the dilution factor given because the detected concentrations of one (1) or more analytes exceeded the linear calibration range in the initial analyses. All analyses are available for review on the report forms. The results for these analytes in these samples should be used from the dilutions noted.

Sample(s)	Dilution Factor	Analyte(s)
MC0AJ2, MC0AK8	4X	manganese (Mn)
MC0AJ5	4X	As, iron (Fe), calcium (Ca)
MC0AL0	4X	Mn, Ca, Fe

All laboratory Quality Control (QC) analyses were within control limits with the exception noted above.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant as the assessment of blank analysis results has determined the existence and magnitude of contamination resulting from laboratory (or field) activities.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V068

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	3093014-BS1	pH:		Sample Date:	10/10/2013	Sample Time:	13:46:49
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony			1			Yes	S4VEM
Arsenic			1			Yes	S4VEM
Barium			1			Yes	S4VEM
Beryllium			1			Yes	S4VEM
Cadmium			1			Yes	S4VEM
Chromium			1			Yes	S4VEM
Cobalt			1			Yes	S4VEM
Copper			1			Yes	S4VEM
Lead			1			Yes	S4VEM
Nickel			1			Yes	S4VEM
Selenium			1			Yes	S4VEM
Silver			1			Yes	S4VEM
Thallium			1			Yes	S4VEM
Uranium			1			Yes	S4VEM
Vanadium			1			Yes	S4VEM
Zinc			1			Yes	S4VEM
Sodium			1			Yes	S4VEM
Calcium			1			Yes	S4VEM
Iron			1			Yes	S4VEM
Magnesium			1			Yes	S4VEM
Aluminum			1			Yes	S4VEM
Potassium			1			Yes	S4VEM
Manganese			1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ2	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA01	pH:	1	Sample Date:	09/23/2013	Sample Time:	12:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	386	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	1.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.7	ug/L	1			Yes	S4VEM
Copper	0.44	ug/L	1	J	J	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	1.9	ug/L	1			Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	J	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1	*	UJ	Yes	S4VEM
Aluminum	31.3	ug/L	1			Yes	S4VEM
Manganese	1750	ug/L	4	D		Yes	S4VEM
Magnesium	9480	ug/L	1			Yes	S4VEM
Iron	137	ug/L	1	J	J	Yes	S4VEM
Calcium	39600	ug/L	1			Yes	S4VEM
Potassium	3670	ug/L	1			Yes	S4VEM
Sodium	4400	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ2D	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	MC0AJ2-DUP	pH:	1	Sample Date:	10/10/2013	Sample Time:	14:04:16
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	R	Yes	S4VEM
Arsenic	0.61	ug/L	1	J	J-	Yes	S4VEM
Barium	380	ug/L	1		J-	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	R	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	R	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.6	ug/L	1		J-	Yes	S4VEM
Copper	1.7	ug/L	1	J	J-	Yes	S4VEM
Lead	0.23	ug/L	1	J	J-	Yes	S4VEM
Nickel	1.9	ug/L	1		J-	Yes	S4VEM
Selenium	5.0	ug/L	1	U	R	Yes	S4VEM
Silver	0.030	ug/L	1	J	J-	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	0.32	ug/L	1	J	J-	Yes	S4VEM
Vanadium	0.25	ug/L	1	J	J-	Yes	S4VEM
Zinc	11.2	ug/L	1	*	J-	Yes	S4VEM
Sodium	4310	ug/L	1		J-	Yes	S4VEM
Manganese	1610	ug/L	4	D	J-	Yes	S4VEM
Iron	134	ug/L	1	J	J-	Yes	S4VEM
Magnesium	9300	ug/L	1		J-	Yes	S4VEM
Aluminum	32.8	ug/L	1		J-	Yes	S4VEM
Calcium	38900	ug/L	1		J-	Yes	S4VEM
Potassium	3620	ug/L	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ2S	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	MC0AJ2-MS	pH:	1	Sample Date:	10/10/2013	Sample Time:	13:55:38
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	98.8	ug/L	1		J-	Yes	S4VEM
Arsenic	40.2	ug/L	1		J-	Yes	S4VEM
Barium	2340	ug/L	1		J-	Yes	S4VEM
Beryllium	49.4	ug/L	1		J-	Yes	S4VEM
Cadmium	46.2	ug/L	1		J-	Yes	S4VEM
Chromium	192	ug/L	1		J-	Yes	S4VEM
Cobalt	470	ug/L	1		J-	Yes	S4VEM
Copper	230	ug/L	1		J-	Yes	S4VEM
Lead	20.4	ug/L	1		J-	Yes	S4VEM
Nickel	466	ug/L	1		J-	Yes	S4VEM
Selenium	98.2	ug/L	1		J-	Yes	S4VEM
Silver	47.5	ug/L	1		J-	Yes	S4VEM
Thallium	48.7	ug/L	1		J-	Yes	S4VEM
Uranium	106	ug/L	1		J-	Yes	S4VEM
Vanadium	497	ug/L	1		J-	Yes	S4VEM
Zinc	464	ug/L	1		J-	Yes	S4VEM
Sodium	4410	ug/L	1		J-	Yes	S4VEM
Magnesium	9520	ug/L	1		J-	Yes	S4VEM
Aluminum	1950	ug/L	1		J-	Yes	S4VEM
Calcium	39700	ug/L	1		J-	Yes	S4VEM
Iron	201	ug/L	1		J-	Yes	S4VEM
Manganese	2160	ug/L	4	D	J-	Yes	S4VEM
Potassium	3690	ug/L	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ3	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	16:50:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	159	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	1.0	ug/L	1	J	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1	J*	UJ	Yes	S4VEM
Iron	612	ug/L	1			Yes	S4VEM
Manganese	275	ug/L	1			Yes	S4VEM
Calcium	70300	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Magnesium	17800	ug/L	1			Yes	S4VEM
Potassium	1280	ug/L	1			Yes	S4VEM
Sodium	11400	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ4	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	17:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	164	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	1.0	ug/L	1	J	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1	J*	UJ	Yes	S4VEM
Sodium	11700	ug/L	1			Yes	S4VEM
Iron	625	ug/L	1			Yes	S4VEM
Potassium	1330	ug/L	1			Yes	S4VEM
Magnesium	18300	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Manganese	282	ug/L	1			Yes	S4VEM
Calcium	72500	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ5	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA03D	pH:	1	Sample Date:	09/24/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1230	ug/L	4	D		Yes	S4VEM
Barium	171	ug/L	1			Yes	S4VEM
Beryllium	18.0	ug/L	1			Yes	S4VEM
Cadmium	1.0	ug/L	1	J	U	Yes	S4VEM
Chromium	30.8	ug/L	1			Yes	S4VEM
Cobalt	96.2	ug/L	1			Yes	S4VEM
Copper	33.3	ug/L	1			Yes	S4VEM
Lead	12.5	ug/L	1			Yes	S4VEM
Nickel	171	ug/L	1			Yes	S4VEM
Selenium	5.0	ug/L	1	J	U	Yes	S4VEM
Silver	1.0	ug/L	1	J	U	Yes	S4VEM
Thallium	1.9	ug/L	1			Yes	S4VEM
Uranium	2.6	ug/L	1			Yes	S4VEM
Vanadium	13.0	ug/L	1			Yes	S4VEM
Zinc	500	ug/L	1	*	J	Yes	S4VEM
Iron	322000	ug/L	4	D		Yes	S4VEM
Sodium	54700	ug/L	1			Yes	S4VEM
Potassium	14000	ug/L	1			Yes	S4VEM
Calcium	172000	ug/L	4	D		Yes	S4VEM
Magnesium	50300	ug/L	1			Yes	S4VEM
Aluminum	53700	ug/L	1			Yes	S4VEM
Manganese	962	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AJ6	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA03S	pH:	1	Sample Date:	09/24/2013	Sample Time:	10:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.3	ug/L	1		U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	359	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	J	U	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	1.1	ug/L	1		U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	J	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	44.6	ug/L	1	*	UJ	Yes	S4VEM
Manganese	91.1	ug/L	1			Yes	S4VEM
Aluminum	56.9	ug/L	1			Yes	S4VEM
Potassium	1820	ug/L	1			Yes	S4VEM
Calcium	52000	ug/L	1			Yes	S4VEM
Iron	1240	ug/L	1			Yes	S4VEM
Magnesium	10300	ug/L	1			Yes	S4VEM
Sodium	9270	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AK8	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA01	pH:	1	Sample Date:	09/23/2013	Sample Time:	12:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	364	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	0.042	ug/L	1	J	J	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.8	ug/L	1			Yes	S4VEM
Copper	0.35	ug/L	1	J	J	Yes	S4VEM
Lead	1.0	ug/L	1	J	U	Yes	S4VEM
Nickel	2.1	ug/L	1			Yes	S4VEM
Selenium	0.24	ug/L	1	J	J	Yes	S4VEM
Silver	1.0	ug/L	1	J	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	0.26	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1	*	UJ	Yes	S4VEM
Magnesium	9230	ug/L	1			Yes	S4VEM
Iron	121	ug/L	1	J	J	Yes	S4VEM
Sodium	3790	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Potassium	2820	ug/L	1			Yes	S4VEM
Calcium	37000	ug/L	1			Yes	S4VEM
Manganese	1840	ug/L	4	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AK8D	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	MC0AK8-DUP	pH:	1	Sample Date:	10/10/2013	Sample Time:	14:43:22
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	R	Yes	S4VEM
Arsenic	0.74	ug/L	1	J	J-	Yes	S4VEM
Barium	367	ug/L	1		J-	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	R	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	R	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.8	ug/L	1		J-	Yes	S4VEM
Copper	0.25	ug/L	1	J	J-	Yes	S4VEM
Lead	0.029	ug/L	1	J	J-	Yes	S4VEM
Nickel	1.8	ug/L	1		J-	Yes	S4VEM
Selenium	5.0	ug/L	1	U	R	Yes	S4VEM
Silver	0.026	ug/L	1	J	J-	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	0.25	ug/L	1	J	J-	Yes	S4VEM
Vanadium	0.29	ug/L	1	J	J-	Yes	S4VEM
Zinc	4.1	ug/L	1		J-	Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Manganese	1850	ug/L	4	D	J-	Yes	S4VEM
Calcium	37200	ug/L	1		J-	Yes	S4VEM
Potassium	2820	ug/L	1		J-	Yes	S4VEM
Magnesium	9290	ug/L	1		J-	Yes	S4VEM
Iron	119	ug/L	1	J	J-	Yes	S4VEM
Sodium	3800	ug/L	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AK8S	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	MC0AK8-MS	pH:	1	Sample Date:	10/10/2013	Sample Time:	14:34:40
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	105	ug/L	1		J-	Yes	S4VEM
Arsenic	42.9	ug/L	1		J-	Yes	S4VEM
Barium	2450	ug/L	1		J-	Yes	S4VEM
Beryllium	52.3	ug/L	1		J-	Yes	S4VEM
Cadmium	49.1	ug/L	1		J-	Yes	S4VEM
Chromium	202	ug/L	1		J-	Yes	S4VEM
Cobalt	496	ug/L	1		J-	Yes	S4VEM
Copper	243	ug/L	1		J-	Yes	S4VEM
Lead	21.2	ug/L	1		J-	Yes	S4VEM
Nickel	494	ug/L	1		J-	Yes	S4VEM
Selenium	99.9	ug/L	1		J-	Yes	S4VEM
Silver	50.5	ug/L	1		J-	Yes	S4VEM
Thallium	51.6	ug/L	1		J-	Yes	S4VEM
Uranium	104	ug/L	1		J-	Yes	S4VEM
Vanadium	523	ug/L	1		J-	Yes	S4VEM
Zinc	485	ug/L	1		J-	Yes	S4VEM
Manganese	2440	ug/L	4	D	J-	Yes	S4VEM
Iron	185	ug/L	1	J	J-	Yes	S4VEM
Potassium	2900	ug/L	1		J-	Yes	S4VEM
Magnesium	9510	ug/L	1		J-	Yes	S4VEM
Sodium	3890	ug/L	1		J-	Yes	S4VEM
Aluminum	2030	ug/L	1		J-	Yes	S4VEM
Calcium	37900	ug/L	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AK9	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	16:50:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	162	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.0	ug/L	1	J	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	0.049	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1	J*	UJ	Yes	S4VEM
Potassium	1320	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM
Magnesium	18200	ug/L	1			Yes	S4VEM
Iron	550	ug/L	1			Yes	S4VEM
Sodium	11500	ug/L	1			Yes	S4VEM
Manganese	272	ug/L	1			Yes	S4VEM
Calcium	71800	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AL0	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA03D	pH:	1	Sample Date:	09/24/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	340	ug/L	1			Yes	S4VEM
Barium	18.2	ug/L	1			Yes	S4VEM
Beryllium	12.1	ug/L	1			Yes	S4VEM
Cadmium	1.0	ug/L	1	J	U	Yes	S4VEM
Chromium	2.4	ug/L	1			Yes	S4VEM
Cobalt	92.4	ug/L	1			Yes	S4VEM
Copper	24.9	ug/L	1			Yes	S4VEM
Lead	5.3	ug/L	1			Yes	S4VEM
Nickel	182	ug/L	1			Yes	S4VEM
Selenium	2.0	ug/L	1	J	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.3	ug/L	1			Yes	S4VEM
Vanadium	5.0	ug/L	1	J	U	Yes	S4VEM
Zinc	437	ug/L	1	*	J	Yes	S4VEM
Potassium	25200	ug/L	1			Yes	S4VEM
Calcium	286000	ug/L	4	D		Yes	S4VEM
Sodium	103000	ug/L	1			Yes	S4VEM
Magnesium	72100	ug/L	1			Yes	S4VEM
Aluminum	19400	ug/L	1			Yes	S4VEM
Iron	255000	ug/L	4	D		Yes	S4VEM
Manganese	1400	ug/L	4	D		Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AL1	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA03S	pH:	1	Sample Date:	09/24/2013	Sample Time:	10:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	340	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.1	ug/L	1	J	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	44.6	ug/L	1	J*	UJ	Yes	S4VEM
Sodium	10200	ug/L	1			Yes	S4VEM
Iron	921	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	J	U	Yes	S4VEM
Magnesium	10200	ug/L	1			Yes	S4VEM
Calcium	53800	ug/L	1			Yes	S4VEM
Manganese	73.3	ug/L	1			Yes	S4VEM
Potassium	1820	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	MC0AL4	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	17:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	J	U	Yes	S4VEM
Barium	162	ug/L	1			Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	J	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.0	ug/L	1	J	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	J	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	8.0	ug/L	1	J*	UJ	Yes	S4VEM
Potassium	1360	ug/L	1			Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM
Calcium	72900	ug/L	1			Yes	S4VEM
Sodium	11500	ug/L	1			Yes	S4VEM
Magnesium	18100	ug/L	1			Yes	S4VEM
Manganese	274	ug/L	1			Yes	S4VEM
Iron	542	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ2	Lab Code:	BONNER
Sample Number:	PBW01	Method:	ICP_MS	Matrix:	Water	MA Number:	2183.1
Sample Location:	3093014-BLK1	pH:		Sample Date:	10/10/2013	Sample Time:	13:42:28
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Antimony	2.0	ug/L	1	U	U	Yes	S4VEM
Arsenic	1.0	ug/L	1	U	U	Yes	S4VEM
Barium	10.0	ug/L	1	U	U	Yes	S4VEM
Beryllium	1.0	ug/L	1	U	U	Yes	S4VEM
Cadmium	1.0	ug/L	1	U	U	Yes	S4VEM
Chromium	2.0	ug/L	1	J	U	Yes	S4VEM
Cobalt	1.0	ug/L	1	U	U	Yes	S4VEM
Copper	2.0	ug/L	1	U	U	Yes	S4VEM
Lead	1.0	ug/L	1	U	U	Yes	S4VEM
Nickel	1.0	ug/L	1	U	U	Yes	S4VEM
Selenium	5.0	ug/L	1	U	U	Yes	S4VEM
Silver	1.0	ug/L	1	U	U	Yes	S4VEM
Thallium	1.0	ug/L	1	J	U	Yes	S4VEM
Uranium	1.0	ug/L	1	U	U	Yes	S4VEM
Vanadium	5.0	ug/L	1	U	U	Yes	S4VEM
Zinc	0.21	ug/L	1	J	J	Yes	S4VEM
Manganese	1.0	ug/L	1	U	U	Yes	S4VEM
Iron	200	ug/L	1	U	U	Yes	S4VEM
Calcium	-65	ug/L	1	J	J	Yes	S4VEM
Magnesium	0.89	ug/L	1	J	J	Yes	S4VEM
Sodium	500	ug/L	1	J	U	Yes	S4VEM
Potassium	500	ug/L	1	J	U	Yes	S4VEM
Aluminum	20.0	ug/L	1	U	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 14, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well site for Case No. 43811, SDG# MC0AJ3 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10034

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 13, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Lisa D. Penix
Inorganic Data Reviewer

Dean Gouveia
ESAT R3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Case: 43811
SDG: MC0AJ3
Site: Kiskimere Groundwater Well Investigation

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AJ3, consisted of five (5) unfiltered groundwater samples including one (1) field duplicate pair and five (5) filtered groundwater samples including one (1) field duplicate pair, analyzed for mercury (Hg) by cold vapor technique. All samples were analyzed by Bonner Analytical Testing Company (BONNER) according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are listed below. Field and rinsate blanks MC0AK1, MC0AK2, MC0AK3 and MC0AK4 were used in evaluating blank contamination for the associated samples in this case based on sampling date. These blanks were analyzed in SDG MC0AH9. There were no positive results reported found in the analysis of the associated blanks.

MINOR PROBLEM

The preparation blank reported a negative concentration of Hg greater than the absolute value of the Method Detection Limit (MDL). Quantitation limits are estimated and have been qualified "UJ".

NOTES

Detected concentrations of Hg less than CRQLs have been reported at CRQLs and qualified "U". However, in samples MC0AJ5 and MC0AJ6, the "U" qualifier is superseded by "UJ" due to negative blank contamination as mentioned above in "Minor Problem".

Matrix spike recoveries and duplicate analyses were within control limits.

The sample cooler containing all samples had an interior temperature of 7.0°C, which exceeded the required cooler temperature of 4.0°C±2.0°C. Due to the relative stability of metals, no data were qualified based on the sample cooler chest temperature.

No positive results were reported in field duplicate pairs MC0AJ3/MC0AJ4 and MC0AK9/MC0AL4.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only in drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: ESATR3-2013-V065

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ2	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA01	pH:	1	Sample Date:	09/23/2013	Sample Time:	12:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ2D	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MC0AJ2-DUP	pH:	1	Sample Date:	10/04/2013	Sample Time:	16:03:25
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	R	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ2S	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MC0AJ2-MS	pH:	1	Sample Date:	10/04/2013	Sample Time:	16:27:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	1.0	ug/L	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ3	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	16:50:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ4	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	17:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ5	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA03D	pH:	1	Sample Date:	09/24/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	J	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AJ6	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA03S	pH:	1	Sample Date:	09/24/2013	Sample Time:	10:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	J	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AK8	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA01	pH:	1	Sample Date:	09/23/2013	Sample Time:	12:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AK8D	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MC0AK8-DUP	pH:	1	Sample Date:	10/04/2013	Sample Time:	16:19:49
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	R	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AK8S	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	MC0AK8-MS	pH:	1	Sample Date:	10/04/2013	Sample Time:	16:22:22
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	1.0	ug/L	1		J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AK9	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	16:50:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AL0	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA03D	pH:	1	Sample Date:	09/24/2013	Sample Time:	08:15:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AL1	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA03S	pH:	1	Sample Date:	09/24/2013	Sample Time:	10:00:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	MC0AL4	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	EPA02	pH:	1	Sample Date:	09/23/2013	Sample Time:	17:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AJ3	Lab Code:	BONNER
Sample Number:	PBW01	Method:	Hg	Matrix:	Water	MA Number:	DEFAULT
Sample Location:	3100326-BLK1	pH:		Sample Date:	10/04/2013	Sample Time:	15:59:02
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	-0.092	ug/L	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 19, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC0AK7 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10035

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 18, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kurt Roby
Inorganic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC0AK7

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC0AK7, consisted of one (1) wastewater sample submitted to Bonner Analytical Testing Company (BONNER) for Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Method 1311 per modification analysis reference number 2024.1. The leachate was then analyzed for arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), selenium (Se) and silver (Ag) by ICP-AES. All analyses were performed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

MINOR PROBLEM

The preparation blank reported a concentration for As greater than absolute value of the Method Detection Limit (MDL). A positive result was not reported for this analyte in the associated sample; the quantitation limit is estimated and has been qualified “UJ”.

NOTES

Detected concentrations of Cr and Se less than CRQLs have been reported at CRQLs and qualified "U" in sample MC0AK7, as the associated laboratory blanks had these analytes present.

Quality control limits in matrix spike, laboratory duplicate and Laboratory Control Sample (LCS) analyses were met by the laboratory.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only for drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: R3ESAT-2013-V066

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AK7	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	3100110-BS1	pH:		Sample Date:	10/15/2013	Sample Time:	11:25:24
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	22.6	ug/L	1			Yes	S4VEM
Barium	462	ug/L	1			Yes	S4VEM
Cadmium	11.5	ug/L	1			Yes	S4VEM
Chromium	22.7	ug/L	1			Yes	S4VEM
Lead	22.8	ug/L	1			Yes	S4VEM
Selenium	80.8	ug/L	1			Yes	S4VEM
Silver	11.5	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AK7	Lab Code:	BONNER
Sample Number:	MC0AK7	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	W	pH:	7	Sample Date:	09/25/2013	Sample Time:	08:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	10.0	ug/L	1	U	UJ	Yes	S4VEM
Barium	818	ug/L	1			Yes	S4VEM
Cadmium	5.0	ug/L	1	U	U	Yes	S4VEM
Chromium	10.0	ug/L	1	J	U	Yes	S4VEM
Lead	10.0	ug/L	1	U	U	Yes	S4VEM
Selenium	35.0	ug/L	1	J	U	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AK7	Lab Code:	BONNER
Sample Number:	MC0AK7D	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	MC0AK7-DUP	pH:	7	Sample Date:	10/15/2013	Sample Time:	11:38:50
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	10.0	ug/L	1	U	UJ	Yes	S4VEM
Barium	811	ug/L	1			Yes	S4VEM
Cadmium	5.0	ug/L	1	U	U	Yes	S4VEM
Chromium	10.0	ug/L	1	J	U	Yes	S4VEM
Lead	10.0	ug/L	1	U	U	Yes	S4VEM
Selenium	35.0	ug/L	1	U	U	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AK7	Lab Code:	BONNER
Sample Number:	MC0AK7S	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	MC0AK7-MS	pH:	7	Sample Date:	10/15/2013	Sample Time:	11:34:22
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	40.7	ug/L	1			Yes	S4VEM
Barium	2870	ug/L	1			Yes	S4VEM
Cadmium	52.4	ug/L	1			Yes	S4VEM
Chromium	200	ug/L	1			Yes	S4VEM
Lead	21.0	ug/L	1			Yes	S4VEM
Selenium	54.0	ug/L	1			Yes	S4VEM
Silver	49.4	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC0AK7	Lab Code:	BONNER
Sample Number:	PBW01	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	3100110-BLK1	pH:		Sample Date:	10/15/2013	Sample Time:	11:20:45
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	-1.6	ug/L	1	J	J	Yes	S4VEM
Barium	200	ug/L	1	J	U	Yes	S4VEM
Cadmium	5.0	ug/L	1	U	U	Yes	S4VEM
Chromium	10.0	ug/L	1	J	U	Yes	S4VEM
Lead	2.6	ug/L	1	J	J	Yes	S4VEM
Selenium	3.2	ug/L	1	J	J	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 19, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC1KR5 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10038

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 18, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kurt Roby
Inorganic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC1KR5

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC1KR5, consisted of two (2) solid samples submitted to Bonner Analytical Testing Company (BONNER) for Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Method 1311 per modification analysis reference number 2024.1. Leachates were then analyzed for arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), selenium (Se) and silver (Ag) by ICP-AES. All samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

MINOR PROBLEM

Percent difference (%D) in the ICP serial dilution analysis was outside the control limit (>10%) for Cd. Quantitation limits for this analyte are estimated due to possible matrix interferences and were qualified “UJ”.

NOTES

Analytes detected below CRQLs are reported at CRQLs and qualified "U" in samples for which the associated laboratory blanks had the same analyte(s) present.

Per ISM01.3, the Laboratory Control Sample (LCS) is to be analyzed using the same sample preparation, analytical method and quality assurance/quality control procedures employed for the EPA samples received. The laboratory failed to prepare the LCS by TCLP. No action was taken by the reviewer based on this finding.

The LCS recovery was within expanded control limits (>50% but <150%) for Ag.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only for drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: R3ESAT-2013-V069

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR5	Lab Code:	BONNER
Sample Number:	LCS01	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	3100301-BS1	pH:		Sample Date:	10/09/2013	Sample Time:	15:22:21
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	20.6	ug/L	1			Yes	S4VEM
Barium	470	ug/L	1			Yes	S4VEM
Cadmium	11.5	ug/L	1			Yes	S4VEM
Chromium	22.5	ug/L	1			Yes	S4VEM
Lead	21.6	ug/L	1			Yes	S4VEM
Selenium	78.5	ug/L	1			Yes	S4VEM
Silver	12.4	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR5	Lab Code:	BONNER
Sample Number:	MC0AK5	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	W	pH:	1	Sample Date:	09/25/2013	Sample Time:	11:40:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	10.0	ug/L	1	J	U	Yes	S4VEM
Barium	1360	ug/L	1			Yes	S4VEM
Cadmium	5.0	ug/L	1	JE	UJ	Yes	S4VEM
Chromium	10.0	ug/L	1	J	U	Yes	S4VEM
Lead	10.0	ug/L	1	J	U	Yes	S4VEM
Selenium	35.0	ug/L	1	J	U	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR5	Lab Code:	BONNER
Sample Number:	MC0AK5D	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	MC0AK5-DUP	pH:	1	Sample Date:	10/09/2013	Sample Time:	15:35:41
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	10.0	ug/L	1	U	U	Yes	S4VEM
Barium	1380	ug/L	1			Yes	S4VEM
Cadmium	5.0	ug/L	1	J	U	Yes	S4VEM
Chromium	10.0	ug/L	1	J	U	Yes	S4VEM
Lead	10.0	ug/L	1	J	U	Yes	S4VEM
Selenium	35.0	ug/L	1	J	U	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR5	Lab Code:	BONNER
Sample Number:	MC0AK5S	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	MC0AK5-MS	pH:	1	Sample Date:	10/09/2013	Sample Time:	15:31:15
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	40.5	ug/L	1			Yes	S4VEM
Barium	3280	ug/L	1			Yes	S4VEM
Cadmium	54.7	ug/L	1			Yes	S4VEM
Chromium	194	ug/L	1			Yes	S4VEM
Lead	26.9	ug/L	1			Yes	S4VEM
Selenium	58.4	ug/L	1			Yes	S4VEM
Silver	53.0	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR5	Lab Code:	BONNER
Sample Number:	MC0AK6	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	W	pH:	1	Sample Date:	09/25/2013	Sample Time:	12:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	10.0	ug/L	1	U	U	Yes	S4VEM
Barium	2270	ug/L	1			Yes	S4VEM
Cadmium	5.0	ug/L	1	JE	UJ	Yes	S4VEM
Chromium	10.0	ug/L	1	J	U	Yes	S4VEM
Lead	39.7	ug/L	1			Yes	S4VEM
Selenium	35.0	ug/L	1	U	U	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR5	Lab Code:	BONNER
Sample Number:	PBW01	Method:	ICP_AES	Matrix:	Water	MA Number:	2024.1
Sample Location:	3100301-BLK1	pH:		Sample Date:	10/09/2013	Sample Time:	15:17:43
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Arsenic	1.0	ug/L	1	J	J	Yes	S4VEM
Barium	200	ug/L	1	J	U	Yes	S4VEM
Cadmium	5.0	ug/L	1	U	U	Yes	S4VEM
Chromium	10.0	ug/L	1	U	U	Yes	S4VEM
Lead	10.0	ug/L	1	U	U	Yes	S4VEM
Selenium	35.0	ug/L	1	J	U	Yes	S4VEM
Silver	10.0	ug/L	1	U	U	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 19, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# MC1KR6 completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10039

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US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 18, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kurt Roby
Inorganic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC1KR6

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC1KR6, consisted of two (2) solid samples submitted to Bonner Analytical Testing Company (BONNER) for Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Method 1311 per modification analysis reference number 2025.1. Leachates were then analyzed for mercury (Hg) by cold vapor technique. All samples were analyzed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

MINOR PROBLEM

Continuing calibration and preparation blanks reported concentrations for Hg greater than absolute values of the Method Detection Limit (MDL). The positive result reported for Hg in sample MC0AK5 which was less than two times (<2X) the absolute value of the blank concentration is estimated low and has been qualified “J-”. The quantitation limit for Hg in sample MC0AK6 is estimated and has been qualified “UJ”.

NOTES

Quality control limits for Hg in matrix spike and laboratory duplicate analyses were met by the laboratory.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only for drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: R3ESAT-2013-V070

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR6	Lab Code:	BONNER
Sample Number:	MC0AK5	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	W	pH:		Sample Date:	09/25/2013	Sample Time:	11:40:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.025	ug/L	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR6	Lab Code:	BONNER
Sample Number:	MC0AK5D	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	MC0AK5-DUP	pH:		Sample Date:	10/04/2013	Sample Time:	15:10:10
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.054	ug/L	1	J	J-	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR6	Lab Code:	BONNER
Sample Number:	MC0AK5S	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	MC0AK5-MS	pH:		Sample Date:	10/04/2013	Sample Time:	15:12:21
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	1.0	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR6	Lab Code:	BONNER
Sample Number:	MC0AK6	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	W	pH:		Sample Date:	09/25/2013	Sample Time:	12:45:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR6	Lab Code:	BONNER
Sample Number:	PBW01	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	3100324-BLK1	pH:		Sample Date:	10/04/2013	Sample Time:	15:05:22
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	-0.068	ug/L	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : November 21, 2013

SUBJECT: Region III Data QA Review

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the inorganic data validation report for the Kiskimere Groundwater Well Investigation site for Case No. 43811, SDG# ~~MC0AK9~~ MC1KR9 for TCLP mercury analysis completed by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 10042

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ICF International
ESAT Region 3
US Environmental Protection Agency Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Phone 410-305-3011

Date: November 20, 2013

To: Colleen Walling
ESAT Region 3 Project Officer

From: Kurt Roby
Inorganic Data Reviewer

Dean Gouveia
ESAT Region 3 Team Manager

Subject: Inorganic Data Validation (S4VEM)
Site: Kiskimere Groundwater Well Investigation
Case: 43811 SDG: MC1KR9

OVERVIEW

Case 43811, Sample Delivery Group (SDG) MC1KR9, consisted of one (1) aqueous waste water sample submitted to Bonner Analytical Testing Company (BONNER) for Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Method 1311 per modification analysis reference number 2025.1. The leachate was then analyzed for mercury (Hg) by cold vapor technique. Analyses were performed according to Contract Laboratory Program (CLP) Statement of Work (SOW) ISM01.3 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to National Functional Guidelines for Validation of Inorganic Data, utilizing Environmental Data Exchange and Evaluation System (EXES) and is assigned the Superfund Data Validation Label S4VEM (Stage_4_Validation_Electronic_Manual). Areas of concern with respect to data usability are discussed below.

MINOR PROBLEM

Laboratory blanks reported concentrations for Hg greater than absolute value of the Method Detection Limit (MDL). No positive result was reported for Hg; the quantitation limit is estimated and has been qualified “UJ”.

NOTES

Quality control limits for Hg in matrix spike and laboratory duplicate analyses were met by the laboratory.

The pH for sample MC0AK7 was incorrectly reported by EXES. Due to the nature of the TCLP extraction, no data were qualified based on sample preservation prior to extraction.

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
B	The result is presumed a blank contaminant. This qualifier is used only for drinking water samples.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DCN: R3ESAT-2013-V073

Sample Summary Report

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR9	Lab Code:	BONNER
Sample Number:	MC0AK7	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	W	pH:	7	Sample Date:	09/25/2013	Sample Time:	08:30:00
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR9	Lab Code:	BONNER
Sample Number:	MC0AK7D	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	MC0AK7-DUP	pH:	7	Sample Date:	10/04/2013	Sample Time:	11:16:52
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.20	ug/L	1	U	UJ	Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR9	Lab Code:	BONNER
Sample Number:	MC0AK7S	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	MC0AK7-MS	pH:	7	Sample Date:	10/04/2013	Sample Time:	11:19:24
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	1.1	ug/L	1			Yes	S4VEM

Case No:	43811	Contract:	EPW09037	SDG No:	MC1KR9	Lab Code:	BONNER
Sample Number:	PBW01	Method:	Hg	Matrix:	Water	MA Number:	2025.1
Sample Location:	3100322-BLK1	pH:		Sample Date:	10/04/2013	Sample Time:	11:11:48
% Moisture :				% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	-0.029	ug/L	1	J	J	Yes	S4VEM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : January 7, 2014

SUBJECT: Radiological Report for Kiskimere Groundwater Well Investigation by NAREL

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the radiological report for the Kiskimere Groundwater Well Investigation site for DAS/Case No. R34243, SDG# 1300084-A forwarded by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

The 15 groundwater samples for Am-241 by alpha spec were analyzed by the National Analytical Radiation Environmental Laboratory (NAREL) managed by the USEPA's Office of Radiation and Indoor Air located in Montgomery, Alabama.

If you have any questions regarding this report, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 01005A

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RADIATION AND INDOOR AIR
National Air and Radiation Environmental Laboratory
540 South Morris Avenue, Montgomery, AL 36115-2601
(334) 270-3400

December 19, 2013

MEMORANDUM

SUBJECT: Radiochemical Results for
Kiskimere Ground Water Samples

FROM: Cindy White, Director
Center for Environmental Radioanalytical Laboratory Science

TO: John Kwedar, RPM
Region 3

Attached are data packages for plutonium and americium analysis of samples collected from Kiskimere, PA. The samples constitute NAREL batch number 1300084. The original sample container tags and chain-of-custody sheets for all samples associated with this project are included and therefore cannot be sent with subsequent shipments of data. NAREL does not attach custody seals to and does not include DC-1, DC-2, or air bills in the data delivery package.

Specific information concerning all aspects of the radiological analysis of the samples is contained in the batch case narratives of the data packages. If you have any questions concerning the analytical results, please contact me at (334)270-7052.

Due to a reorganization within the Office of Radiation and Indoor Air, the National Air and Radiation Environmental Laboratory is now called the National Analytical Radiation Environmental Laboratory (acronym remains the same, NAREL).

Attachments

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
AM ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300084

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Americium-241) by Extraction Chromatography
Report ID:	1300084-AM
Report type:	Original
Date reported:	12/19/2013
Total pages in report:	23

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10849D	R34243-55	PA:KISKIMERE	WATER-GROUND	09/16/2013	09/27/2013
B3.10850W	R34243-66	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10851X	R34243-56	PA:KISKIMERE	WATER-GROUND	09/17/2013	09/27/2013
B3.10852Y	R34243-68	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10853Z	R34243-57	PA:KISKIMERE	WATER-GROUND	09/18/2013	09/27/2013
B3.10854A	R34243-65	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10855B	R34243-58	PA:KISKIMERE	WATER-GROUND	09/19/2013	09/27/2013
B3.10856C	R34243-67	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10857D	R34243-59	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10858E	R34243-60	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10859F	R34243-61	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10860Y	R34243-62	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10861Z	R34243-63	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10862A	R34243-64	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10863B	R34243-69	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

for Mary F. Wisdom — Date 12/19/13
Quality Assurance Manager, NAREL

Cynthia White — Date 12-23-13
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result. uncertainty. and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

ANALYSIS SUMMARY

Analysis method: NAREL AM-EICHROM
Title: Actinides (Americium-241) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10849D	R34243-55		12/05/2013	0010558G	0017598F
B3.10850W	R34243-66		12/05/2013	0010558G	0017598F
B3.10851X	R34243-56		12/05/2013	0010558G	0017598F
B3.10852Y	R34243-68		12/05/2013	0010558G	0017598F
B3.10853Z	R34243-57		12/05/2013	0010558G	0017598F
B3.10854A	R34243-65		12/05/2013	0010558G	0017598F
B3.10855B	R34243-58		12/05/2013	0010558G	0017598F
B3.10856C	R34243-67		12/10/2013	0010558G	0017627T
B3.10857D	R34243-59		12/10/2013	0010558G	0017627T
B3.10858E	R34243-60		12/10/2013	0010558G	0017627T
B3.10859F	R34243-61		12/10/2013	0010558G	0017627T
B3.10860Y	R34243-62		12/10/2013	0010558G	0017627T
B3.10860Y	R34243-62	DUP	12/10/2013	0010558G	0017627T
B3.10861Z	R34243-63		12/10/2013	0010558G	0017627T
B3.10862A	R34243-64		12/10/2013	0010558G	0017627T
B3.10863B	R34243-69		12/10/2013	0010558G	0017627T
LCS-00680047Z *		LCS	12/05/2013	0010558G	0017598F
RBK-00680046Y *		RBK	12/05/2013	0010558G	0017598F

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-55	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS85	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	0.00e+00	2.2e-02	5.2e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10850W	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-66	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-23 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS86	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-3.99e-03	2.6e-02	7.4e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10851X	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-56	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-17 19:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS87	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.42e-02	5.0e-02	5.5e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10852Y	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-68	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-24 13:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS88	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.91e-02	5.6e-02	6.4e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10853Z	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-57	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-18 19:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS97	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.37e-02	4.2e-02	5.9e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10854A	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-65	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-23 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS99	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	7.14e-03	4.0e-02	8.7e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10855B	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-58	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017598F
Collected:	2013-09-19 20:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS100	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.98e-02	4.0e-02	5.0e-02	PCI/L	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10856C	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-67	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-24 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.99e-03	3.4e-02	7.3e-02	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10857D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-59	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-23 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS114	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.69e-02	5.7e-02	1.0e-01	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10858E	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-60	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-23 16:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS115	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.43e-02	5.2e-02	9.0e-02	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10859F	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-61	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-23 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS117	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.06e-02	5.5e-02	9.1e-02	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-62	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS118	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.03e-02	6.4e-02	9.5e-02	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-62	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS119	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.95e-02	6.1e-02	1.0e-01	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10861Z	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-63	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-24 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS129	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	8.81e-03	3.9e-02	8.1e-02	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10862A	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-64	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-24 18:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS130	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.46e-02	4.4e-02	6.2e-02	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10863B	Amount analyzed:	1.000e-01 L
Client sample ID:	R34243-69	Preparation batch #:	0010558G
Matrix:	WATER-GROUND	Assay batch #:	0017627T
Collected:	2013-09-24 08:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:21	1000.0	AS131	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.12e-01	1.4e-01	1.9e-01	PCI/L	12/09/2013 14:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680047Z	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010558G
Matrix:	N/A	Assay batch #:	0017598F
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS101	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.90e+00	2.1e-01	2.2e-02	PCI	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680046Y	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010558G
Matrix:	N/A	Assay batch #:	0017598F
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:16	1000.0	AS135	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-3.36e-03	8.6e-03	2.4e-02	PCI	12/04/2013 17:16 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300084

PREPARATION BATCH SUMMARY

Preparation batch #: 0010558G
Analysis method: NAREL AM-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10849D	R34243-55	00676786A		71.44 %	6.55 %	SPK
B3.10850W	R34243-66	00676792Y		62.01 %	6.06 %	SPK
B3.10851X	R34243-56	00676798E		64.99 %	6.14 %	SPK
B3.10852Y	R34243-68	00676804J		67.59 %	6.23 %	SPK
B3.10853Z	R34243-57	00676810G		59.72 %	5.80 %	SPK
B3.10854A	R34243-65	00676816N		66.21 %	6.17 %	SPK
B3.10855B	R34243-58	00676822L		72.04 %	6.51 %	SPK
B3.10856C	R34243-67	00676828T		60.51 %	5.13 %	SPK
B3.10857D	R34243-59	00676834Q		80.84 %	6.10 %	SPK
B3.10858E	R34243-60	00676840N		73.97 %	5.75 %	SPK
B3.10859F	R34243-61	00676846V		86.25 %	6.43 %	SPK
B3.10860Y	R34243-62	00676852T		85.13 %	6.24 %	SPK
B3.10860Y	R34243-62	00680055Z	DUP	81.87 %	6.11 %	SPK
B3.10861Z	R34243-63	00676858Z		81.42 %	6.09 %	SPK
B3.10862A	R34243-64	00676864X		89.29 %	6.50 %	SPK
B3.10863B	R34243-69	00676870V		72.99 %	5.79 %	SPK
LCS-00680047Z *		00680047Z	LCS	92.05 %	7.55 %	SPK
RBK-00680046Y *		00680046Y	RBK	84.97 %	6.24 %	SPK

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010558G

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10860Y	00680055Z	DUP	AM241		24.1	-0.24	PASS
LCS-00680047Z	00680047Z	LCS	AM241	95.8		-0.77	PASS
RBK-00680046Y	00680046Y	RBK	AM241				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
AM ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300085

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Americium-241) by Extraction Chromatography
Report ID:	1300085-AM
Report type:	Original
Date reported:	01/14/2014
Total pages in report:	28

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10864C	R34243-01	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10865D	R34243-02	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10866E	R34243-03	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10867F	R34243-04	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10868G	R34243-05	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10869H	R34243-06	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10870A	R34243-07	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10871B	R34243-08	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10872C	R34243-09	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10873D	R34243-10	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10874E	R34243-11	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10875F	R34243-12	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10876G	R34243-13	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10877H	R34243-14	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10878J	R34243-15	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10879K	R34243-16	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10880C	R34243-17	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10881D	R34243-18	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10882E	R34243-19	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10883F	R34243-20	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-15-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-16-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

ANALYSIS SUMMARY

Analysis method: NAREL AM-EICHROM
Title: Actinides (Americium-241) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10864C	R34243-01		12/13/2013	0010567H	0017635T
B3.10865D	R34243-02		12/13/2013	0010567H	0017635T
B3.10866E	R34243-03		12/13/2013	0010567H	0017635T
B3.10867F	R34243-04		12/13/2013	0010567H	0017635T
B3.10867F	R34243-04	DUP	12/13/2013	0010567H	0017635T
B3.10868G	R34243-05		12/13/2013	0010567H	0017635T
B3.10869H	R34243-06		12/13/2013	0010567H	0017635T
B3.10870A	R34243-07		12/13/2013	0010567H	0017635T
B3.10871B	R34243-08		12/13/2013	0010567H	0017635T
B3.10872C	R34243-09		12/13/2013	0010567H	0017635T
B3.10873D	R34243-10		12/13/2013	0010567H	0017635T
B3.10874E	R34243-11		12/13/2013	0010567H	0017635T
B3.10875F	R34243-12		12/13/2013	0010567H	0017635T
B3.10876G	R34243-13		12/13/2013	0010567H	0017635T
B3.10877H	R34243-14		12/13/2013	0010567H	0017635T
B3.10878J	R34243-15		12/13/2013	0010567H	0017635T
B3.10879K	R34243-16		12/13/2013	0010567H	0017635T
B3.10880C	R34243-17		12/13/2013	0010567H	0017635T
B3.10881D	R34243-18		12/13/2013	0010567H	0017635T
B3.10882E	R34243-19		12/13/2013	0010567H	0017635T
B3.10883F	R34243-20		12/13/2013	0010567H	0017635T
LCS-00680078G *		LCS	12/13/2013	0010567H	0017635T
RBK-00680077F *		RBK	12/13/2013	0010567H	0017635T

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10864C	Amount analyzed:	2.504e-01 GASH
Client sample ID:	R34243-01	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-16 16:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	66.45 %	Analyst:	AS
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.74e-02	4.8e-02	6.9e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10865D	Amount analyzed:	2.568e-01 GASH
Client sample ID:	R34243-02	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-16 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	51.28 %	Analyst:	AS
Ash/dry weight:	83.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS98	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.49e-02	4.1e-02	7.8e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10866E	Amount analyzed:	2.553e-01 GASH
Client sample ID:	R34243-03	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-16 17:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	47.72 %	Analyst:	AS
Ash/dry weight:	87.84 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.53e-02	4.5e-02	6.4e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.502e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.23e-02	5.6e-02	6.9e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.508e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	0.00e+00	4.7e-02	1.1e-01	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10868G	Amount analyzed:	2.517e-01 GASH
Client sample ID:	R34243-05	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-16 17:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.29 %	Analyst:	AS
Ash/dry weight:	92.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.85e-02	5.0e-02	7.2e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10869H	Amount analyzed:	2.534e-01 GASH
Client sample ID:	R34243-06	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.28 %	Analyst:	AS
Ash/dry weight:	93.58 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-2.71e-02	4.8e-02	1.4e-01	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10870A	Amount analyzed:	2.503e-01 GASH
Client sample ID:	R34243-07	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	58.95 %	Analyst:	AS
Ash/dry weight:	86.99 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.71e-02	4.4e-02	8.3e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10871B	Amount analyzed:	2.573e-01 GASH
Client sample ID:	R34243-08	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 13:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	76.57 %	Analyst:	AS
Ash/dry weight:	92.90 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS114	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	6.35e-02	6.6e-02	9.1e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10872C	Amount analyzed:	2.564e-01 GASH
Client sample ID:	R34243-09	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	76.03 %	Analyst:	AS
Ash/dry weight:	92.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS115	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	7.62e-03	3.4e-02	7.1e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10873D	Amount analyzed:	2.526e-01 GASH
Client sample ID:	R34243-10	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	76.29 %	Analyst:	AS
Ash/dry weight:	94.98 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS117	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.75e-02	6.7e-02	9.3e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10874E	Amount analyzed:	2.533e-01 GASH
Client sample ID:	R34243-11	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	70.88 %	Analyst:	AS
Ash/dry weight:	93.92 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS118	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.66e-02	5.9e-02	8.8e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10875F	Amount analyzed:	2.538e-01 GASH
Client sample ID:	R34243-12	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	71.63 %	Analyst:	AS
Ash/dry weight:	93.88 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS119	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	0.00e+00	4.2e-02	1.0e-01	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10876G	Amount analyzed:	2.519e-01 GASH
Client sample ID:	R34243-13	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	52.74 %	Analyst:	AS
Ash/dry weight:	91.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:43	1000.0	AS121	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	8.75e-03	3.9e-02	8.1e-02	PCI/GDRY	12/12/2013 14:43 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10877H	Amount analyzed:	2.513e-01 GASH
Client sample ID:	R34243-14	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 14:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	63.62 %	Analyst:	AS
Ash/dry weight:	90.85 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:43	1000.0	AS122	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.83e-02	7.3e-02	1.4e-01	PCI/GDRY	12/12/2013 14:43 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10878J	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-15	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 15:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	80.79 %	Analyst:	AS
Ash/dry weight:	93.64 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:43	1000.0	AS123	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.95e-02	7.6e-02	1.1e-01	PCI/GDRY	12/12/2013 14:43 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10879K	Amount analyzed:	2.541e-01 GASH
Client sample ID:	R34243-16	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 15:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	74.29 %	Analyst:	AS
Ash/dry weight:	95.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:43	1000.0	AS124	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.16e-02	6.5e-02	1.1e-01	PCI/GDRY	12/12/2013 14:43 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10880C	Amount analyzed:	2.550e-01 GASH
Client sample ID:	R34243-17	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 15:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	71.01 %	Analyst:	AS
Ash/dry weight:	93.32 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS125	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.15e-02	6.4e-02	8.7e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10881D	Amount analyzed:	2.567e-01 GASH
Client sample ID:	R34243-18	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-17 16:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	68.61 %	Analyst:	AS
Ash/dry weight:	93.10 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS126	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.02e-02	5.8e-02	1.2e-01	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10882E	Amount analyzed:	2.526e-01 GASH
Client sample ID:	R34243-19	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-18 10:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.78 %	Analyst:	AS
Ash/dry weight:	92.52 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS127	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-4.83e-03	4.6e-02	1.2e-01	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10883F	Amount analyzed:	2.523e-01 GASH
Client sample ID:	R34243-20	Preparation batch #:	0010567H
Matrix:	SEDIMENT	Assay batch #:	0017635T
Collected:	2013-09-18 10:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	76.71 %	Analyst:	AS
Ash/dry weight:	92.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS129	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.09e-02	5.1e-02	6.9e-02	PCI/GDRY	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680078G	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010567H
Matrix:	N/A	Assay batch #:	0017635T
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS130	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.06e+00	2.2e-01	1.6e-02	PCI	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680077F	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010567H
Matrix:	N/A	Assay batch #:	0017635T
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 14:44	1000.0	AS131	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.26e-02	1.6e-02	2.1e-02	PCI	12/12/2013 14:44 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300085

PREPARATION BATCH SUMMARY

Preparation batch #: 0010567H
Analysis method: NAREL AM-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10864C	R34243-01	00676892B		78.01 %	6.79 %	AS
B3.10865D	R34243-02	00676898H		81.71 %	6.96 %	AS
B3.10866E	R34243-03	00676904M		77.07 %	6.75 %	AS
B3.10867F	R34243-04	00676910K		85.91 %	7.23 %	AS
B3.10867F	R34243-04	00680084E	DUP	64.67 %	6.12 %	AS
B3.10868G	R34243-05	00676916R		73.22 %	6.56 %	AS
B3.10869H	R34243-06	00676922P		76.87 %	6.72 %	AS
B3.10870A	R34243-07	00676928W		73.78 %	5.76 %	AS
B3.10871B	R34243-08	00676934U		70.59 %	5.63 %	AS
B3.10872C	R34243-09	00676940R		67.94 %	5.47 %	AS
B3.10873D	R34243-10	00676946Y		63.97 %	5.39 %	AS
B3.10874E	R34243-11	00676952W		68.21 %	5.47 %	AS
B3.10875F	R34243-12	00676958C		59.17 %	5.05 %	AS
B3.10876G	R34243-13	00676964A		77.95 %	6.78 %	AS
B3.10877H	R34243-14	00676970Y		58.70 %	5.69 %	AS
B3.10878J	R34243-15	00676976E		68.47 %	6.22 %	AS
B3.10879K	R34243-16	00676982C		77.79 %	6.83 %	AS
B3.10880C	R34243-17	00676988J		73.94 %	6.58 %	AS
B3.10881D	R34243-18	00676994G		67.44 %	6.25 %	AS
B3.10882E	R34243-19	00677000H		71.05 %	6.41 %	AS
B3.10883F	R34243-20	00677006P		70.72 %	5.60 %	AS
LCS-00680078G *		00680078G	LCS	70.07 %	5.62 %	AS
RBK-00680077F *		00680077F	RBK	64.86 %	5.40 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010567H

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10867F	00680084E	DUP	AM241		200.0	-1.43	PASS
LCS-00680078G	00680078G	LCS	AM241	103.9		0.67	PASS
RBK-00680077F	00680077F	RBK	AM241				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
AM ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300086

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Americium-241) by Extraction Chromatography
Report ID:	1300086-AM
Report type:	Original
Date reported:	01/22/2014
Total pages in report:	32

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10884G	R34243-21	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10885H	R34243-22	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10886J	R34243-23	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10887K	R34243-24	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10888L	R34243-25	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10889M	R34243-26	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10890E	R34243-27	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10891F	R34243-28	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10892G	R34243-29	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10893H	R34243-30	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10894J	R34243-31	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10895K	R34243-32	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10896L	R34243-33	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10897M	R34243-34	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10898N	R34243-35	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10899P	R34243-36	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10900N	R34243-37	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10901P	R34243-38	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10902Q	R34243-39	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10903R	R34243-40	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-30-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-30-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

ANALYSIS SUMMARY

Analysis method: NAREL AM-EICHROM
Title: Actinides (Americium-241) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10884G	R34243-21		12/06/2013	0010539D	0014520U
B3.10885H	R34243-22		12/06/2013	0010539D	0014520U
B3.10886J	R34243-23		12/06/2013	0010539D	0014520U
B3.10887K	R34243-24		12/06/2013	0010539D	0014520U
B3.10888L	R34243-25		12/06/2013	0010539D	0014520U
B3.10889M	R34243-26		12/06/2013	0010539D	0014520U
B3.10890E	R34243-27		12/06/2013	0010539D	0014520U
B3.10891F	R34243-28		12/06/2013	0010539D	0014520U
B3.10892G	R34243-29		12/06/2013	0010539D	0014520U
B3.10893H	R34243-30		12/06/2013	0010539D	0014520U
B3.10893H	R34243-30	DUP	12/06/2013	0010539D	0014520U
B3.10894J	R34243-31		01/17/2014	0010638F	0017730Q
B3.10895K	R34243-32		01/17/2014	0010638F	0017730Q
B3.10896L	R34243-33		01/17/2014	0010638F	0017730Q
B3.10897M	R34243-34		01/17/2014	0010638F	0017730Q
B3.10898N	R34243-35		01/17/2014	0010638F	0017730Q
B3.10899P	R34243-36		01/17/2014	0010638F	0017730Q
B3.10900N	R34243-37		01/17/2014	0010638F	0017730Q
B3.10900N	R34243-37	DUP	01/17/2014	0010638F	0017730Q
B3.10901P	R34243-38		01/17/2014	0010638F	0017730Q
B3.10902Q	R34243-39		01/17/2014	0010638F	0017730Q
B3.10903R	R34243-40		01/17/2014	0010638F	0017730Q
LCS-00679606T *		LCS	12/06/2013	0010539D	0014520U
RBK-00679605R *		RBK	12/06/2013	0010539D	0014520U
LCS-00681923Z *		LCS	01/17/2014	0010638F	0017730Q
RBK-00681922Y *		RBK	01/17/2014	0010638F	0017730Q

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10884G	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-21	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 10:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	75.08 %	Analyst:	PMT
Ash/dry weight:	93.89 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS99	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.21e-02	5.7e-02	1.1e-01	PCI/GDRY	12/05/2013 17:17 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10885H	Amount analyzed:	2.650e-01 GASH
Client sample ID:	R34243-22	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 10:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	79.26 %	Analyst:	PMT
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS100	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	7.46e-02	1.0e-01	1.3e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10886J	Amount analyzed:	2.544e-01 GASH
Client sample ID:	R34243-23	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 10:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	79.05 %	Analyst:	PMT
Ash/dry weight:	93.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS101	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.25e-01	1.3e-01	1.6e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10887K	Amount analyzed:	2.540e-01 GASH
Client sample ID:	R34243-24	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 11:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.87 %	Analyst:	PMT
Ash/dry weight:	89.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS104	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.54e-02	1.0e-01	2.0e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10888L	Amount analyzed:	2.563e-01 GASH
Client sample ID:	R34243-25	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 11:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.05 %	Analyst:	PMT
Ash/dry weight:	90.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS106	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.08e-02	6.7e-02	1.3e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10889M	Amount analyzed:	2.616e-01 GASH
Client sample ID:	R34243-26	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 11:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.59 %	Analyst:	PMT
Ash/dry weight:	94.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS107	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.56e-02	7.7e-02	1.3e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10890E	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-27	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	77.72 %	Analyst:	PMT
Ash/dry weight:	94.79 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS109	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.72e-02	5.0e-02	6.2e-02	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10891F	Amount analyzed:	2.646e-01 GASH
Client sample ID:	R34243-28	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 11:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	74.49 %	Analyst:	PMT
Ash/dry weight:	94.14 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS110	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	9.70e-03	4.3e-02	9.0e-02	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10892G	Amount analyzed:	2.606e-01 GASH
Client sample ID:	R34243-29	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	77.64 %	Analyst:	PMT
Ash/dry weight:	93.91 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS112	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.71e-02	7.8e-02	1.4e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.530e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS113	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.85e-02	5.8e-02	1.1e-01	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.667e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010539D
Matrix:	SEDIMENT	Assay batch #:	0014520U
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS114	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	6.78e-02	6.5e-02	7.4e-02	PCI/GDRY	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10894J	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-31	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 14:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	76.59 %	Analyst:	PMT
Ash/dry weight:	93.56 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.45e-02	5.3e-02	9.1e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10895K	Amount analyzed:	2.534e-01 GASH
Client sample ID:	R34243-32	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	77.05 %	Analyst:	PMT
Ash/dry weight:	94.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS98	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.83e-02	5.9e-02	8.9e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10896L	Amount analyzed:	2.583e-01 GASH
Client sample ID:	R34243-33	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 14:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	79.75 %	Analyst:	PMT
Ash/dry weight:	92.72 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	8.87e-02	8.8e-02	8.9e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10897M	Amount analyzed:	2.550e-01 GASH
Client sample ID:	R34243-34	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	72.60 %	Analyst:	PMT
Ash/dry weight:	91.78 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.31e-02	5.8e-02	7.2e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10898N	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-35	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	51.58 %	Analyst:	PMT
Ash/dry weight:	88.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	8.31e-02	8.6e-02	1.2e-01	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10899P	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-36	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	40.94 %	Analyst:	PMT
Ash/dry weight:	83.95 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS102	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.76e-02	8.1e-02	1.6e-01	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.78e-02	5.6e-02	7.7e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.597e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.60e-02	5.9e-02	1.2e-01	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10901P	Amount analyzed:	2.600e-01 GASH
Client sample ID:	R34243-38	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 15:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	60.45 %	Analyst:	PMT
Ash/dry weight:	89.51 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS105	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	5.73e-02	6.3e-02	8.7e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10902Q	Amount analyzed:	2.567e-01 GASH
Client sample ID:	R34243-39	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	76.77 %	Analyst:	PMT
Ash/dry weight:	93.30 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS107	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.53e-02	5.5e-02	8.2e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10903R	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-40	Preparation batch #:	0010638F
Matrix:	SEDIMENT	Assay batch #:	0017730Q
Collected:	2013-09-18 16:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	46.07 %	Analyst:	PMT
Ash/dry weight:	87.73 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS109	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.93e-02	5.5e-02	8.2e-02	PCI/GDRY	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00679606T	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010539D
Matrix:	N/A	Assay batch #:	0014520U
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS115	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.77e+00	1.9e-01	2.3e-02	PCI	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00679605R	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010539D
Matrix:	N/A	Assay batch #:	0014520U
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:17	1000.0	AS117	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	3.37e-03	1.9e-02	4.1e-02	PCI	12/05/2013 17:17 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00681923Z	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010638F
Matrix:	N/A	Assay batch #:	0017730Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS110	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.96e+00	2.6e-01	2.9e-02	PCI	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00681922Y	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010638F
Matrix:	N/A	Assay batch #:	0017730Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/16/2014 16:03	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-1.13e-03	7.5e-03	2.1e-02	PCI	01/16/2014 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010539D
Analysis method: NAREL AM-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10884G	R34243-21	00677012M		79.13 %	6.86 %	PMT
B3.10885H	R34243-22	00677018U		41.06 %	4.72 %	PMT
B3.10886J	R34243-23	00677024R		44.99 %	4.97 %	PMT
B3.10887K	R34243-24	00677030P		47.00 %	5.06 %	PMT
B3.10888L	R34243-25	00677036W		74.83 %	6.31 %	PMT
B3.10889M	R34243-26	00677042U		42.34 %	4.45 %	PMT
B3.10890E	R34243-27	00677048A		78.34 %	6.42 %	PMT
B3.10891F	R34243-28	00677054Y		71.53 %	6.54 %	PMT
B3.10892G	R34243-29	00677060W		55.24 %	5.56 %	PMT
B3.10893H	R34243-30	00677066C		66.72 %	5.43 %	PMT
B3.10893H	R34243-30	00679604Q	DUP	65.04 %	5.37 %	PMT
LCS-00679606T *		00679606T	LCS	76.31 %	5.85 %	PMT
RBK-00679605R *		00679605R	RBK	44.72 %	4.41 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010539D

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10893H	00679604Q	DUP	AM241		81.6	0.90	PASS
LCS-00679606T	00679606T	LCS	AM241	89.2		-2.18	WARN
RBK-00679605R	00679605R	RBK	AM241				PASS

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010638F
Analysis method: NAREL AM-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10894J	R34243-31	00677072A		70.25 %	6.38 %	PMT
B3.10895K	R34243-32	00677078G		73.02 %	6.51 %	PMT
B3.10896L	R34243-33	00677084E		57.36 %	5.68 %	PMT
B3.10897M	R34243-34	00677090C		71.72 %	6.49 %	PMT
B3.10898N	R34243-35	00677096J		68.14 %	6.30 %	PMT
B3.10899P	R34243-36	00677102N		58.67 %	5.83 %	PMT
B3.10900N	R34243-37	00677108V		83.48 %	7.09 %	PMT
B3.10900N	R34243-37	00681921X	DUP	73.50 %	6.55 %	PMT
B3.10901P	R34243-38	00677114T		76.69 %	6.29 %	PMT
B3.10902Q	R34243-39	00677120Q		68.78 %	5.85 %	PMT
B3.10903R	R34243-40	00677126X		77.08 %	6.36 %	PMT
LCS-00681923Z *		00681923Z	LCS	61.39 %	5.98 %	PMT
RBK-00681922Y *		00681922Y	RBK	64.14 %	5.31 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010638F

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10900N	00681921X	DUP	AM241		99.8	-0.79	PASS
LCS-00681923Z	00681923Z	LCS	AM241	99.1		-0.14	PASS
RBK-00681922Y	00681922Y	RBK	AM241				PASS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RADIATION AND INDOOR AIR
National Air and Radiation Environmental Laboratory
540 South Morris Avenue, Montgomery, AL 36115-2601
(334) 270-3400

March 4, 2014

MEMORANDUM

SUBJECT: Radiochemical Results for
Kiskimere Ground Water Samples

FROM: Cindy White, Director
Center for Environmental Radioanalytical Laboratory Science

TO: John Kwedar, RPM
Region 3

Attached is a data package for americium analysis of samples collected from Kiskimere, PA. The samples constitute NAREL batch numbers 1300087.

Specific information concerning all aspects of the radiological analysis of the samples is contained in the batch case narratives of the data packages. If you have any questions concerning the analytical results, please contact me at (334)270-7052.

Due to a reorganization within the Office of Radiation and Indoor Air, the National Air and Radiation Environmental Laboratory is now called the National Analytical Radiation Environmental Laboratory (acronym remains the same, NAREL).

Attachments

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
AM ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300087

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Americium-241) by Extraction Chromatography
Report ID:	1300087-AM
Report type:	Original
Date reported:	02/27/2014
Total pages in report:	22

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10904T	R34243-41	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10905U	R34243-42	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10906V	R34243-43	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10907W	R34243-44	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10908X	R34243-45	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10909Y	R34243-46	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10910Q	R34243-47	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10911R	R34243-48	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10912T	R34243-49	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10913U	R34243-50	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10914V	R34243-51	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10915W	R34243-52	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10916X	R34243-53	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10917Y	R34243-54	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – These samples were analyzed three times. The initial analysis LCS failed NAREL acceptance. The second had an unusual reaction between the samples and the reagents as well as yield failures for several of the samples. The results of the third analysis are reported in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 3-4-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 3-4-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

ANALYSIS SUMMARY

Analysis method: NAREL AM-EICHROM
Title: Actinides (Americium-241) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10904T	R34243-41		02/27/2014	0010771K	0017858G
B3.10905U	R34243-42		02/27/2014	0010771K	0017858G
B3.10906V	R34243-43		02/27/2014	0010771K	0017858G
B3.10906V	R34243-43	DUP	02/27/2014	0010771K	0017858G
B3.10907W	R34243-44		02/27/2014	0010771K	0017858G
B3.10908X	R34243-45		02/27/2014	0010771K	0017858G
B3.10909Y	R34243-46		02/27/2014	0010771K	0017858G
B3.10910Q	R34243-47		02/27/2014	0010771K	0017858G
B3.10911R	R34243-48		02/27/2014	0010771K	0017858G
B3.10912T	R34243-49		02/27/2014	0010771K	0017858G
B3.10913U	R34243-50		02/27/2014	0010771K	0017858G
B3.10914V	R34243-51		02/27/2014	0010771K	0017858G
B3.10915W	R34243-52		02/27/2014	0010771K	0017858G
B3.10916X	R34243-53		02/27/2014	0010771K	0017858G
B3.10917Y	R34243-54		02/27/2014	0010771K	0017858G
LCS-00685245A *		LCS	02/27/2014	0010771K	0017858G
RBK-00685244Z *		RBK	02/27/2014	0010771K	0017858G

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10904T	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-41	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	36.72 %	Analyst:	AS
Ash/dry weight:	84.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS115	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.98e-02	3.5e-02	5.9e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10905U	Amount analyzed:	2.500e-01 GASH
Client sample ID:	R34243-42	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	65.29 %	Analyst:	AS
Ash/dry weight:	89.03 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS116	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	0.00e+00	3.6e-02	8.5e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.518e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS117	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-7.05e-03	2.4e-02	7.4e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.510e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS118	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.81e-02	4.3e-02	6.5e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10907W	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-44	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 13:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	46.70 %	Analyst:	AS
Ash/dry weight:	89.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS119	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-1.13e-02	3.9e-02	1.2e-01	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10908X	Amount analyzed:	2.518e-01 GASH
Client sample ID:	R34243-45	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 13:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	43.30 %	Analyst:	AS
Ash/dry weight:	89.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS120	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-6.92e-03	3.4e-02	9.0e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10909Y	Amount analyzed:	2.525e-01 GASH
Client sample ID:	R34243-46	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 13:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	58.55 %	Analyst:	AS
Ash/dry weight:	88.33 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS121	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	2.59e-02	5.3e-02	9.6e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10910Q	Amount analyzed:	2.564e-01 GASH
Client sample ID:	R34243-47	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 14:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	59.02 %	Analyst:	AS
Ash/dry weight:	91.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS122	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.64e-02	4.5e-02	8.6e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10911R	Amount analyzed:	2.530e-01 GASH
Client sample ID:	R34243-48	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	61.08 %	Analyst:	AS
Ash/dry weight:	91.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS124	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.22e-03	4.8e-02	1.1e-01	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10912T	Amount analyzed:	2.502e-01 GASH
Client sample ID:	R34243-49	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 17:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	68.18 %	Analyst:	AS
Ash/dry weight:	87.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS125	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.98e-02	5.7e-02	6.3e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10913U	Amount analyzed:	2.595e-01 GASH
Client sample ID:	R34243-50	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 17:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	68.63 %	Analyst:	AS
Ash/dry weight:	77.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS127	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	4.54e-02	5.0e-02	6.9e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10914V	Amount analyzed:	2.523e-01 GASH
Client sample ID:	R34243-51	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	78.82 %	Analyst:	AS
Ash/dry weight:	94.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS129	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.57e-02	3.4e-02	5.8e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10915W	Amount analyzed:	2.508e-01 GASH
Client sample ID:	R34243-52	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	59.52 %	Analyst:	AS
Ash/dry weight:	91.11 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS130	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.38e-02	3.8e-02	7.2e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10916X	Amount analyzed:	2.501e-01 GASH
Client sample ID:	R34243-53	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 17:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	60.42 %	Analyst:	AS
Ash/dry weight:	84.47 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS131	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	9.94e-03	3.7e-02	7.6e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10917Y	Amount analyzed:	2.503e-01 GASH
Client sample ID:	R34243-54	Preparation batch #:	0010771K
Matrix:	SEDIMENT	Assay batch #:	0017858G
Collected:	2013-09-19 18:40 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	75.12 %	Analyst:	AS
Ash/dry weight:	70.04 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS132	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-5.08e-03	1.8e-02	5.3e-02	PCI/GDRY	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00685245A	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010771K
Matrix:	N/A	Assay batch #:	0017858G
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS138	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	1.99e+00	2.2e-01	3.0e-02	PCI	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00685244Z	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010771K
Matrix:	N/A	Assay batch #:	0017858G
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL AM-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/26/2014 16:08	1000.0	AS135	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Am241	-3.00e-03	1.0e-02	2.7e-02	PCI	02/26/2014 16:08 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300087

PREPARATION BATCH SUMMARY

Preparation batch #: 0010771K
Analysis method: NAREL AM-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10904T	R34243-41	00685229A		88.28 %	6.52 %	AS
B3.10905U	R34243-42	00685230T		85.42 %	6.34 %	AS
B3.10906V	R34243-43	00685231U		83.57 %	6.44 %	AS
B3.10906V	R34243-43	00685243Y	DUP	79.63 %	6.11 %	AS
B3.10907W	R34243-44	00685232V		47.43 %	4.55 %	AS
B3.10908X	R34243-45	00685233W		76.37 %	5.91 %	AS
B3.10909Y	R34243-46	00685234X		88.97 %	7.34 %	AS
B3.10910Q	R34243-47	00685235Y		79.85 %	6.80 %	AS
B3.10911R	R34243-48	00685236Z		82.35 %	7.06 %	AS
B3.10912T	R34243-49	00685237A		80.18 %	6.92 %	AS
B3.10913U	R34243-50	00685238B		92.11 %	7.48 %	AS
B3.10914V	R34243-51	00685239C		89.99 %	6.60 %	AS
B3.10915W	R34243-52	00685240V		81.19 %	6.26 %	AS
B3.10916X	R34243-53	00685241W		79.94 %	6.24 %	AS
B3.10917Y	R34243-54	00685242X		83.96 %	6.35 %	AS
LCS-00685245A *		00685245A	LCS	75.50 %	5.97 %	AS
RBK-00685244Z *		00685244Z	RBK	75.34 %	5.92 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010771K

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10906V	00685243Y	DUP	AM241		333.7	1.41	PASS
LCS-00685245A	00685245A	LCS	AM241	100.4		0.08	PASS
RBK-00685244Z	00685244Z	RBK	AM241				PASS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Sciences Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE : January 7, 2014

SUBJECT: Radiological Report for Kiskimere Groundwater Well Investigation by NAREL

FROM : Colleen K. Walling
Region III ESAT RPO (3EA22)

TO : Rich Rupert
On-Scene Coordinator (3HS31)

Attached is the radiological report for the Kiskimere Groundwater Well Investigation site for DAS/Case No. R34243, SDG# 1300084-P forwarded by the Region III Environmental Services Assistance Team (ESAT) contractor, ICF International, under the direction of Region III EAID.

The 15 groundwater samples for Pu-238 and Pu-239 by alpha spec were analyzed by the National Analytical Radiation Environmental Laboratory (NAREL) managed by the USEPA's Office of Radiation and Indoor Air located in Montgomery, Alabama.

If you have any questions regarding this report, please call me at (410) 305-2763.

Attachments

cc: Joe Carter (TechLaw, Inc.)
Gene Nance (TechLaw, Inc.)

TO No.: 0002 TDF#: 01005B

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RADIATION AND INDOOR AIR
National Air and Radiation Environmental Laboratory
540 South Morris Avenue, Montgomery, AL 36115-2601
(334) 270-3400

December 19, 2013

MEMORANDUM

SUBJECT: Radiochemical Results for
Kiskimere Ground Water Samples

FROM: Cindy White, Director
Center for Environmental Radioanalytical Laboratory Science

TO: John Kwedar, RPM
Region 3

Attached are data packages for plutonium and americium analysis of samples collected from Kiskimere, PA. The samples constitute NAREL batch number 1300084. The original sample container tags and chain-of-custody sheets for all samples associated with this project are included and therefore cannot be sent with subsequent shipments of data. NAREL does not attach custody seals to and does not include DC-1, DC-2, or air bills in the data delivery package.

Specific information concerning all aspects of the radiological analysis of the samples is contained in the batch case narratives of the data packages. If you have any questions concerning the analytical results, please contact me at (334)270-7052.

Due to a reorganization within the Office of Radiation and Indoor Air, the National Air and Radiation Environmental Laboratory is now called the National Analytical Radiation Environmental Laboratory (acronym remains the same, NAREL).

Attachments

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
PU ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300084

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Plutonium) by Extraction Chromatography
Report ID:	1300084-PU
Report type:	Original
Date reported:	12/12/2013
Total pages in report:	23

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10849D	R34243-55	PA:KISKIMERE	WATER-GROUND	09/16/2013	09/27/2013
B3.10850W	R34243-66	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10851X	R34243-56	PA:KISKIMERE	WATER-GROUND	09/17/2013	09/27/2013
B3.10852Y	R34243-68	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10853Z	R34243-57	PA:KISKIMERE	WATER-GROUND	09/18/2013	09/27/2013
B3.10854A	R34243-65	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10855B	R34243-58	PA:KISKIMERE	WATER-GROUND	09/19/2013	09/27/2013
B3.10856C	R34243-67	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10857D	R34243-59	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10858E	R34243-60	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10859F	R34243-61	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10860Y	R34243-62	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10861Z	R34243-63	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10862A	R34243-64	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10863B	R34243-69	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

for Mary F. Wisdom — Date 12/19/13
Quality Assurance Manager, NAREL

Cynthia White — Date 12-23-13
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

ANALYSIS SUMMARY

Analysis method: NAREL PU-EICHROM
Title: Actinides (Plutonium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10849D	R34243-55		12/05/2013	0010559H	0017599G
B3.10850W	R34243-66		12/05/2013	0010559H	0017599G
B3.10851X	R34243-56		12/05/2013	0010559H	0017599G
B3.10852Y	R34243-68		12/05/2013	0010559H	0017599G
B3.10853Z	R34243-57		12/05/2013	0010559H	0017599G
B3.10854A	R34243-65		12/05/2013	0010559H	0017599G
B3.10855B	R34243-58		12/05/2013	0010559H	0017599G
B3.10856C	R34243-67		12/07/2013	0010559H	0017622M
B3.10857D	R34243-59		12/07/2013	0010559H	0017622M
B3.10858E	R34243-60		12/07/2013	0010559H	0017622M
B3.10859F	R34243-61		12/07/2013	0010559H	0017622M
B3.10860Y	R34243-62		12/07/2013	0010559H	0017622M
B3.10860Y	R34243-62	DUP	12/07/2013	0010559H	0017622M
B3.10861Z	R34243-63		12/07/2013	0010559H	0017622M
B3.10862A	R34243-64		12/07/2013	0010559H	0017622M
B3.10863B	R34243-69		12/07/2013	0010559H	0017622M
LCS-00680049B *		LCS	12/05/2013	0010559H	0017599G
RBK-00680048A *		RBK	12/05/2013	0010559H	0017599G

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-55	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS122	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	0.00e+00	3.0e-02	7.3e-02	PCI/L	12/04/2013 17:24 CST
Pu239	6.44e-03	2.9e-02	5.9e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10850W	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-66	Preparation batch #:	001055911
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-23 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS123	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.88e-02	6.6e-02	1.3e-01	PCI/L	12/04/2013 17:24 CST
Pu239	1.50e-02	4.1e-02	7.8e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10851X	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-56	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-17 19:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS124	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.85e-03	3.5e-02	8.0e-02	PCI/L	12/04/2013 17:24 CST
Pu239	3.47e-02	4.7e-02	5.8e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10852Y	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-68	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-24 13:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS125	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.81e-02	4.6e-02	8.8e-02	PCI/L	12/04/2013 17:24 CST
Pu239	1.45e-02	4.0e-02	7.5e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10853Z	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-57	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-18 19:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS127	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.58e-02	4.3e-02	8.2e-02	PCI/L	12/04/2013 17:24 CST
Pu239	7.91e-03	3.5e-02	7.3e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10854A	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-65	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-23 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS129	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.35e-02	2.1e-02	7.0e-02	PCI/L	12/04/2013 17:24 CST
Pu239	2.98e-02	3.7e-02	5.0e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10855B	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-58	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017599G
Collected:	2013-09-19 20:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS130	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.58e-03	3.0e-02	6.6e-02	PCI/L	12/04/2013 17:24 CST
Pu239	2.58e-02	3.6e-02	5.4e-02	PCI/L	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10856C	Amount analyzed:	4.000e-01 L
Client sample ID:	R34243-67	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-24 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:03	1000.0	AS68	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	9.90e-03	5.4e-02	1.1e-01	PCI/L	12/06/2013 16:03 CST
Pu239	6.60e-03	3.0e-02	6.1e-02	PCI/L	12/06/2013 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10857D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-59	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-23 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:03	1000.0	AS69	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	8.36e-02	8.5e-02	1.1e-01	PCI/L	12/06/2013 16:03 CST
Pu239	-2.61e-02	5.4e-02	1.5e-01	PCI/L	12/06/2013 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10858E	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-60	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-23 16:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:03	1000.0	AS70	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	6.48e-02	8.3e-02	1.3e-01	PCI/L	12/06/2013 16:03 CST
Pu239	2.49e-02	6.4e-02	1.2e-01	PCI/L	12/06/2013 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10859F	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-61	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-23 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:03	1000.0	AS71	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	5.55e-02	7.8e-02	1.2e-01	PCI/L	12/06/2013 16:03 CST
Pu239	-3.03e-02	5.3e-02	1.5e-01	PCI/L	12/06/2013 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-62	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:03	1000.0	AS72	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.44e-02	5.3e-02	9.0e-02	PCI/L	12/06/2013 16:03 CST
Pu239	-4.89e-03	4.7e-02	1.2e-01	PCI/L	12/06/2013 16:03 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-62	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:02	1000.0	AS78	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-3.83e-02	4.5e-02	1.6e-01	PCI/L	12/06/2013 16:02 CST
Pu239	4.38e-02	6.8e-02	1.0e-01	PCI/L	12/06/2013 16:02 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10861Z	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-63	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-24 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:02	1000.0	AS129	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	4.22e-03	4.8e-02	1.1e-01	PCI/L	12/06/2013 16:02 CST
Pu239	-4.22e-03	2.8e-02	7.8e-02	PCI/L	12/06/2013 16:02 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10862A	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-64	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-24 18:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:02	1000.0	AS130	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	4.34e-02	6.7e-02	1.1e-01	PCI/L	12/06/2013 16:02 CST
Pu239	4.34e-02	6.0e-02	9.0e-02	PCI/L	12/06/2013 16:02 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10863B	Amount analyzed:	1.000e-01 L
Client sample ID:	R34243-69	Preparation batch #:	0010559H
Matrix:	WATER-GROUND	Assay batch #:	0017622M
Collected:	2013-09-24 08:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/06/2013 16:02	1000.0	AS131	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-4.07e-02	7.6e-02	2.5e-01	PCI/L	12/06/2013 16:02 CST
Pu239	5.09e-02	1.1e-01	1.9e-01	PCI/L	12/06/2013 16:02 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680049B	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010559H
Matrix:	N/A	Assay batch #:	0017599G
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS131	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	6.74e-03	1.2e-02	2.1e-02	PCI	12/04/2013 17:24 CST
Pu239	2.17e+00	2.2e-01	1.6e-02	PCI	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680048A	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010559H
Matrix:	N/A	Assay batch #:	0017599G
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:24	1000.0	AS133	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.66e-03	1.1e-02	2.3e-02	PCI	12/04/2013 17:24 CST
Pu239	4.14e-03	1.1e-02	2.0e-02	PCI	12/04/2013 17:24 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300084

PREPARATION BATCH SUMMARY

Preparation batch #: 0010559H
Analysis method: NAREL PU-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10849D	R34243-55	00676787B		71.41 %	6.61 %	SPK
B3.10850W	R34243-66	00676793Z		61.40 %	6.07 %	SPK
B3.10851X	R34243-56	00676799F		62.23 %	6.22 %	SPK
B3.10852Y	R34243-68	00676805K		65.36 %	6.36 %	SPK
B3.10853Z	R34243-57	00676811H		59.27 %	5.99 %	SPK
B3.10854A	R34243-65	00676817P		66.19 %	5.59 %	SPK
B3.10855B	R34243-58	00676823M		71.20 %	5.89 %	SPK
B3.10856C	R34243-67	00676829U		64.78 %	5.95 %	SPK
B3.10857D	R34243-59	00676835R		83.16 %	6.91 %	SPK
B3.10858E	R34243-60	00676841P		90.64 %	7.39 %	SPK
B3.10859F	R34243-61	00676847W		85.35 %	7.00 %	SPK
B3.10860Y	R34243-62	00676853U		89.24 %	7.23 %	SPK
B3.10860Y	R34243-62	00680056A	DUP	87.40 %	7.59 %	SPK
B3.10861Z	R34243-63	00676859A		85.03 %	6.48 %	SPK
B3.10862A	R34243-64	00676865Y		84.42 %	6.51 %	SPK
B3.10863B	R34243-69	00676871W		73.19 %	6.02 %	SPK
LCS-00680049B *		00680049B	LCS	88.34 %	6.73 %	SPK
RBK-00680048A *		00680048A	RBK	88.00 %	6.66 %	SPK

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010559H

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10860Y	00680056A	DUP	PU238		-902.5	-1.81	PASS
B3.10860Y	00680056A	DUP	PU239		250.2	1.18	PASS
LCS-00680049B	00680049B	LCS	PU239	102.1		0.37	PASS
RBK-00680048A	00680048A	RBK	PU238				PASS
RBK-00680048A	00680048A	RBK	PU239				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
PU ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300085

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Plutonium) by Extraction Chromatography
Report ID:	1300085-PU
Report type:	Original
Date reported:	01/16/2014
Total pages in report:	30

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10864C	R34243-01	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10865D	R34243-02	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10866E	R34243-03	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10867F	R34243-04	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10868G	R34243-05	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10869H	R34243-06	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10870A	R34243-07	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10871B	R34243-08	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10872C	R34243-09	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10873D	R34243-10	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10874E	R34243-11	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10875F	R34243-12	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10876G	R34243-13	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10877H	R34243-14	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10878J	R34243-15	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10879K	R34243-16	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10880C	R34243-17	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10881D	R34243-18	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10882E	R34243-19	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10883F	R34243-20	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – Samples B3.10865 and B3.10876 were recounted because the original analyses produced a statistically positive Pu-238 result for B3.10865 and a statistically positive Pu-239 result for B3.10876 although in neither case did the spectrum clearly indicate the presence of an alpha peak for the detected isotope and neither result exceeded its "three-sigma" expanded uncertainty. The recounts did not confirm the original positive results. The results of the recounts as well as the original results are included in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-15-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-15-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

ANALYSIS SUMMARY

Analysis method: NAREL PU-EICHROM
Title: Actinides (Plutonium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10864C	R34243-01		12/11/2013	0010568J	0017633Q
B3.10865D	R34243-02		12/11/2013	0010568J	0017633Q
B3.10865D	R34243-02		12/25/2013	0010568J	0017675B
B3.10866E	R34243-03		12/11/2013	0010568J	0017633Q
B3.10867F	R34243-04		12/11/2013	0010568J	0017633Q
B3.10867F	R34243-04	DUP	12/11/2013	0010568J	0017633Q
B3.10868G	R34243-05		12/11/2013	0010568J	0017633Q
B3.10869H	R34243-06		12/11/2013	0010568J	0017633Q
B3.10870A	R34243-07		12/11/2013	0010568J	0017633Q
B3.10871B	R34243-08		12/11/2013	0010568J	0017633Q
B3.10872C	R34243-09		12/11/2013	0010568J	0017633Q
B3.10873D	R34243-10		12/11/2013	0010568J	0017633Q
B3.10874E	R34243-11		12/11/2013	0010568J	0017633Q
B3.10875F	R34243-12		12/11/2013	0010568J	0017633Q
B3.10876G	R34243-13		12/11/2013	0010568J	0017633Q
B3.10876G	R34243-13		12/25/2013	0010568J	0017675B
B3.10877H	R34243-14		12/11/2013	0010568J	0017633Q
B3.10878J	R34243-15		12/11/2013	0010568J	0017633Q
B3.10879K	R34243-16		12/11/2013	0010568J	0017633Q
B3.10880C	R34243-17		12/11/2013	0010568J	0017633Q
B3.10881D	R34243-18		12/11/2013	0010568J	0017633Q
B3.10882E	R34243-19		12/11/2013	0010568J	0017633Q
B3.10883F	R34243-20		12/11/2013	0010568J	0017633Q
LCS-00680080A *		LCS	12/11/2013	0010568J	0017633Q
RBK-00680079H *		RBK	12/11/2013	0010568J	0017633Q

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10864C	Amount analyzed:	2.504e-01 GASH
Client sample ID:	R34243-01	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-16 16:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	66.45 %	Analyst:	AS
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:20	1000.0	AS87	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.35e-02	5.0e-02	8.9e-02	PCI/GDRY	12/10/2013 16:20 CST
Pu239	3.13e-02	4.8e-02	7.3e-02	PCI/GDRY	12/10/2013 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10865D	Amount analyzed:	2.568e-01 GASH
Client sample ID:	R34243-02	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-16 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	51.28 %	Analyst:	AS
Ash/dry weight:	83.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:20	1000.0	AS88	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	8.26e-02	6.3e-02	5.2e-02	PCI/GDRY	12/10/2013 16:20 CST
Pu239	-6.88e-03	2.4e-02	7.2e-02	PCI/GDRY	12/10/2013 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10865D	Amount analyzed:	2.568e-01 GASH
Client sample ID:	R34243-02	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017675B
Collected:	2013-09-16 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	51.28 %	Analyst:	AS
Ash/dry weight:	83.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/24/2013 12:59	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.52e-02	2.4e-02	7.8e-02	PCI/GDRY	12/24/2013 12:59 CST
Pu239	4.55e-02	5.0e-02	6.9e-02	PCI/GDRY	12/24/2013 12:59 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10866E	Amount analyzed:	2.553e-01 GASH
Client sample ID:	R34243-03	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-16 17:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	47.72 %	Analyst:	AS
Ash/dry weight:	87.84 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.73e-02	3.7e-02	6.4e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	1.04e-02	3.9e-02	7.9e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.502e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.30e-02	4.1e-02	6.9e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	2.96e-02	4.0e-02	5.0e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.508e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	0.00e+00	3.2e-02	7.7e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	3.04e-02	4.7e-02	7.7e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10868G	Amount analyzed:	2.517e-01 GASH
Client sample ID:	R34243-05	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-16 17:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.29 %	Analyst:	AS
Ash/dry weight:	92.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.29e-02	5.7e-02	1.0e-01	PCI/GDRY	12/10/2013 16:21 CST
Pu239	2.19e-02	4.6e-02	8.3e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10869H	Amount analyzed:	2.534e-01 GASH
Client sample ID:	R34243-06	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.28 %	Analyst:	AS
Ash/dry weight:	93.58 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.77e-02	3.8e-02	6.6e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	1.77e-02	3.8e-02	6.6e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10870A	Amount analyzed:	2.503e-01 GASH
Client sample ID:	R34243-07	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	58.95 %	Analyst:	AS
Ash/dry weight:	86.99 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.11e-02	5.2e-02	1.2e-01	PCI/GDRY	12/10/2013 16:21 CST
Pu239	4.07e-02	5.1e-02	6.9e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10871B	Amount analyzed:	2.573e-01 GASH
Client sample ID:	R34243-08	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 13:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	76.57 %	Analyst:	AS
Ash/dry weight:	92.90 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS105	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.20e-02	3.9e-02	5.5e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	5.49e-02	5.5e-02	5.5e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10872C	Amount analyzed:	2.564e-01 GASH
Client sample ID:	R34243-09	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	76.03 %	Analyst:	AS
Ash/dry weight:	92.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS106	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.56e-03	5.9e-02	1.3e-01	PCI/GDRY	12/10/2013 16:21 CST
Pu239	3.92e-02	4.9e-02	6.6e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10873D	Amount analyzed:	2.526e-01 GASH
Client sample ID:	R34243-10	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	76.29 %	Analyst:	AS
Ash/dry weight:	94.98 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS107	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.53e-02	5.0e-02	9.9e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	4.60e-02	5.2e-02	5.8e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10874E	Amount analyzed:	2.533e-01 GASH
Client sample ID:	R34243-11	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	70.88 %	Analyst:	AS
Ash/dry weight:	93.92 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS109	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-3.44e-03	3.3e-02	8.4e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	3.79e-02	5.3e-02	8.4e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10875F	Amount analyzed:	2.538e-01 GASH
Client sample ID:	R34243-12	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	71.63 %	Analyst:	AS
Ash/dry weight:	93.88 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS110	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.25e-02	4.6e-02	9.5e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	4.15e-02	5.8e-02	8.7e-02	PCI/GDRY	12/10/2013 16:21 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10876G	Amount analyzed:	2.519e-01 GASH
Client sample ID:	R34243-13	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	52.74 %	Analyst:	AS
Ash/dry weight:	91.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS112	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.83e-02	5.6e-02	1.0e-01	PCI/GDRY	12/10/2013 16:21 CST
Pu239	8.48e-02	6.5e-02	5.3e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10876G	Amount analyzed:	2.519e-01 GASH
Client sample ID:	R34243-13	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017675B
Collected:	2013-09-17 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	52.74 %	Analyst:	AS
Ash/dry weight:	91.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/24/2013 12:59	1000.0	AS114	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.30e-02	5.1e-02	8.5e-02	PCI/GDRY	12/24/2013 12:59 CST
Pu239	0.00e+00	2.8e-02	6.8e-02	PCI/GDRY	12/24/2013 12:59 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10877H	Amount analyzed:	2.513e-01 GASH
Client sample ID:	R34243-14	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 14:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	63.62 %	Analyst:	AS
Ash/dry weight:	90.85 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.12e-02	4.3e-02	7.8e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	4.54e-02	5.0e-02	6.9e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10878J	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-15	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 15:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	80.79 %	Analyst:	AS
Ash/dry weight:	93.64 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS114	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.50e-02	4.4e-02	8.6e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	1.20e-02	3.3e-02	6.3e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10879K	Amount analyzed:	2.541e-01 GASH
Client sample ID:	R34243-16	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 15:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	74.29 %	Analyst:	AS
Ash/dry weight:	95.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS115	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.87e-02	4.5e-02	8.5e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	4.35e-02	5.1e-02	7.6e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10880C	Amount analyzed:	2.550e-01 GASH
Client sample ID:	R34243-17	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 15:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	71.01 %	Analyst:	AS
Ash/dry weight:	93.32 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS117	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.16e-02	3.0e-02	8.3e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	2.90e-02	4.0e-02	6.1e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10881D	Amount analyzed:	2.567e-01 GASH
Client sample ID:	R34243-18	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-17 16:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	68.61 %	Analyst:	AS
Ash/dry weight:	93.10 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS118	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-2.87e-03	2.8e-02	7.0e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	2.01e-02	3.6e-02	6.0e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10882E	Amount analyzed:	2.526e-01 GASH
Client sample ID:	R34243-19	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-18 10:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.78 %	Analyst:	AS
Ash/dry weight:	92.52 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS119	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.25e-03	3.7e-02	8.4e-02	PCI/GDRY	12/10/2013 16:21 CST
Pu239	6.49e-03	2.9e-02	6.0e-02	PCI/GDRY	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10883F	Amount analyzed:	2.523e-01 GASH
Client sample ID:	R34243-20	Preparation batch #:	0010568J
Matrix:	SEDIMENT	Assay batch #:	0017633Q
Collected:	2013-09-18 10:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	76.71 %	Analyst:	AS
Ash/dry weight:	92.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:20	1000.0	AS140	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.11e-03	3.6e-02	8.0e-02	PCI/GDRY	12/10/2013 16:20 CST
Pu239	3.11e-03	2.8e-02	6.5e-02	PCI/GDRY	12/10/2013 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680080A	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010568J
Matrix:	N/A	Assay batch #:	0017633Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS121	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.95e-02	2.1e-02	1.9e-02	PCI	12/10/2013 16:21 CST
Pu239	2.35e+00	2.5e-01	2.3e-02	PCI	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680079H	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010568J
Matrix:	N/A	Assay batch #:	0017633Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	AS122	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.96e-03	1.3e-02	2.8e-02	PCI	12/10/2013 16:21 CST
Pu239	6.85e-03	1.2e-02	2.0e-02	PCI	12/10/2013 16:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300085

PREPARATION BATCH SUMMARY

Preparation batch #: 0010568J
Analysis method: NAREL PU-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10864C	R34243-01	00676893C		92.36 %	7.85 %	AS
B3.10865D	R34243-02	00676899J		88.73 %	7.60 %	AS
B3.10865D	R34243-02	00681299Y		77.76 %	6.17 %	AS
B3.10866E	R34243-03	00676905N		93.64 %	7.86 %	AS
B3.10867F	R34243-04	00676911L		96.66 %	8.02 %	AS
B3.10867F	R34243-04	00680085F	DUP	94.71 %	7.95 %	AS
B3.10868G	R34243-05	00676917T		95.70 %	8.01 %	AS
B3.10869H	R34243-06	00676923Q		98.96 %	8.15 %	AS
B3.10870A	R34243-07	00676929X		88.14 %	7.57 %	AS
B3.10871B	R34243-08	00676935V		83.99 %	6.89 %	AS
B3.10872C	R34243-09	00676941T		89.45 %	7.27 %	AS
B3.10873D	R34243-10	00676947Z		81.79 %	6.73 %	AS
B3.10874E	R34243-11	00676953X		93.52 %	7.40 %	AS
B3.10875F	R34243-12	00676959D		86.80 %	7.61 %	AS
B3.10876G	R34243-13	00676965B		97.26 %	8.05 %	AS
B3.10876G	R34243-13	00681302Z		88.32 %	6.67 %	AS
B3.10877H	R34243-14	00676971Z		86.60 %	6.58 %	AS
B3.10878J	R34243-15	00676977F		89.33 %	6.72 %	AS
B3.10879K	R34243-16	00676983D		86.49 %	6.54 %	AS
B3.10880C	R34243-17	00676989K		94.94 %	7.07 %	AS
B3.10881D	R34243-18	00676995H		90.09 %	6.69 %	AS
B3.10882E	R34243-19	00677001J		81.07 %	6.30 %	AS
B3.10883F	R34243-20	00677007Q		86.80 %	6.63 %	AS
LCS-00680080A *		00680080A	LCS	92.56 %	7.79 %	AS
RBK-00680079H *		00680079H	RBK	93.86 %	7.79 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010568J

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10867F	00680085F	DUP	PU238		200.0	-0.89	PASS
B3.10867F	00680085F	DUP	PU239		2.7	0.03	PASS
LCS-00680080A	00680080A	LCS	PU239	110.3		1.62	PASS
RBK-00680079H	00680079H	RBK	PU238				PASS
RBK-00680079H	00680079H	RBK	PU239				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
PU ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300086

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Plutonium) by Extraction Chromatography
Report ID:	1300086-PU
Report type:	Original
Date reported:	01/16/2014
Total pages in report:	32

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10884G	R34243-21	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10885H	R34243-22	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10886J	R34243-23	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10887K	R34243-24	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10888L	R34243-25	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10889M	R34243-26	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10890E	R34243-27	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10891F	R34243-28	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10892G	R34243-29	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10893H	R34243-30	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10894J	R34243-31	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10895K	R34243-32	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10896L	R34243-33	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10897M	R34243-34	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10898N	R34243-35	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10899P	R34243-36	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10900N	R34243-37	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10901P	R34243-38	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10902Q	R34243-39	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10903R	R34243-40	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-30-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-30-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

ANALYSIS SUMMARY

Analysis method: NAREL PU-EICHROM
Title: Actinides (Plutonium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10884G	R34243-21		12/06/2013	0010540W	0017609Q
B3.10885H	R34243-22		12/06/2013	0010540W	0017609Q
B3.10886J	R34243-23		12/06/2013	0010540W	0017609Q
B3.10887K	R34243-24		12/06/2013	0010540W	0017609Q
B3.10888L	R34243-25		12/06/2013	0010540W	0017609Q
B3.10889M	R34243-26		12/06/2013	0010540W	0017609Q
B3.10890E	R34243-27		12/06/2013	0010540W	0017609Q
B3.10891F	R34243-28		12/06/2013	0010540W	0017609Q
B3.10892G	R34243-29		12/06/2013	0010540W	0017609Q
B3.10893H	R34243-30		12/06/2013	0010540W	0017609Q
B3.10893H	R34243-30	DUP	12/06/2013	0010540W	0017609Q
B3.10894J	R34243-31		01/16/2014	0010639G	0017727W
B3.10895K	R34243-32		01/16/2014	0010639G	0017727W
B3.10896L	R34243-33		01/16/2014	0010639G	0017727W
B3.10897M	R34243-34		01/16/2014	0010639G	0017727W
B3.10898N	R34243-35		01/16/2014	0010639G	0017727W
B3.10899P	R34243-36		01/16/2014	0010639G	0017727W
B3.10900N	R34243-37		01/16/2014	0010639G	0017727W
B3.10900N	R34243-37	DUP	01/16/2014	0010639G	0017727W
B3.10901P	R34243-38		01/16/2014	0010639G	0017727W
B3.10902Q	R34243-39		01/16/2014	0010639G	0017727W
B3.10903R	R34243-40		01/16/2014	0010639G	0017727W
LCS-00679609W *		LCS	12/06/2013	0010540W	0017609Q
RBK-00679608V *		RBK	12/06/2013	0010540W	0017609Q
LCS-00681926C *		LCS	01/16/2014	0010639G	0017727W
RBK-00681925B *		RBK	01/16/2014	0010639G	0017727W

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10884G	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-21	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 10:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	75.08 %	Analyst:	PMT
Ash/dry weight:	93.89 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS118	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	0.00e+00	3.5e-02	8.2e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	6.03e-03	2.7e-02	5.6e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10885H	Amount analyzed:	2.650e-01 GASH
Client sample ID:	R34243-22	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 10:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	79.26 %	Analyst:	PMT
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS119	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.20e-02	3.9e-02	7.8e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	2.70e-02	3.7e-02	4.5e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10886J	Amount analyzed:	2.544e-01 GASH
Client sample ID:	R34243-23	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 10:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	79.05 %	Analyst:	PMT
Ash/dry weight:	93.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS121	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.14e-02	2.7e-02	8.6e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	1.14e-02	3.3e-02	5.7e-02	PCI/GDRY	12/05/2013 17:21 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10887K	Amount analyzed:	2.540e-01 GASH
Client sample ID:	R34243-24	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 11:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.87 %	Analyst:	PMT
Ash/dry weight:	89.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS122	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.12e-02	4.2e-02	8.5e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	2.99e-02	4.6e-02	6.9e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10888L	Amount analyzed:	2.563e-01 GASH
Client sample ID:	R34243-25	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 11:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.05 %	Analyst:	PMT
Ash/dry weight:	90.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS124	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.43e-03	3.1e-02	7.2e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	3.08e-02	4.2e-02	5.2e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10889M	Amount analyzed:	2.616e-01 GASH
Client sample ID:	R34243-26	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 11:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.59 %	Analyst:	PMT
Ash/dry weight:	94.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS125	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.86e-02	4.8e-02	9.1e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	2.61e-02	4.7e-02	7.8e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10890E	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-27	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	77.72 %	Analyst:	PMT
Ash/dry weight:	94.79 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS127	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.55e-03	3.3e-02	7.4e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	1.78e-02	3.8e-02	6.6e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10891F	Amount analyzed:	2.646e-01 GASH
Client sample ID:	R34243-28	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 11:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	74.49 %	Analyst:	PMT
Ash/dry weight:	94.14 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS129	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	4.77e-02	5.3e-02	7.7e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	1.49e-02	3.2e-02	5.5e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10892G	Amount analyzed:	2.606e-01 GASH
Client sample ID:	R34243-29	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	77.64 %	Analyst:	PMT
Ash/dry weight:	93.91 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS130	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.13e-02	4.3e-02	7.9e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	3.04e-02	4.2e-02	6.4e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.530e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS131	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	5.94e-03	3.4e-02	7.3e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	1.48e-02	3.2e-02	5.5e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.667e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010540W
Matrix:	SEDIMENT	Assay batch #:	0017609Q
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS133	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.92e-02	2.3e-02	7.8e-02	PCI/GDRY	12/05/2013 17:21 CST
Pu239	1.37e-02	3.5e-02	6.7e-02	PCI/GDRY	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10894J	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-31	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 14:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	76.59 %	Analyst:	PMT
Ash/dry weight:	93.56 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.14e-02	4.2e-02	8.6e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	1.89e-02	4.1e-02	7.0e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10895K	Amount analyzed:	2.534e-01 GASH
Client sample ID:	R34243-32	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	77.05 %	Analyst:	PMT
Ash/dry weight:	94.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS98	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.70e-03	4.3e-02	9.6e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	4.44e-02	5.0e-02	5.6e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10896L	Amount analyzed:	2.583e-01 GASH
Client sample ID:	R34243-33	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 14:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	79.75 %	Analyst:	PMT
Ash/dry weight:	92.72 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.58e-02	4.3e-02	8.2e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	1.18e-02	4.4e-02	9.0e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10897M	Amount analyzed:	2.550e-01 GASH
Client sample ID:	R34243-34	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	72.60 %	Analyst:	PMT
Ash/dry weight:	91.78 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-7.88e-03	2.7e-02	8.2e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	1.18e-02	4.4e-02	9.0e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10898N	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-35	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	51.58 %	Analyst:	PMT
Ash/dry weight:	88.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.65e-03	4.2e-02	9.5e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	2.19e-02	4.6e-02	8.3e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10899P	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-36	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	40.94 %	Analyst:	PMT
Ash/dry weight:	83.95 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-3.38e-03	3.2e-02	8.3e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	3.72e-02	4.7e-02	6.3e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	6.69e-03	5.0e-02	1.1e-01	PCI/GDRY	01/15/2014 17:18 CST
Pu239	2.68e-02	4.7e-02	8.2e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.597e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS105	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	9.91e-03	3.7e-02	7.5e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	4.63e-02	5.0e-02	6.1e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10901P	Amount analyzed:	2.600e-01 GASH
Client sample ID:	R34243-38	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 15:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	60.45 %	Analyst:	PMT
Ash/dry weight:	89.51 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS107	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.42e-02	3.9e-02	7.4e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	1.77e-02	3.8e-02	6.6e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10902Q	Amount analyzed:	2.567e-01 GASH
Client sample ID:	R34243-39	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	76.77 %	Analyst:	PMT
Ash/dry weight:	93.30 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS109	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	4.12e-02	5.3e-02	7.8e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	2.40e-02	4.3e-02	7.2e-02	PCI/GDRY	01/15/2014 17:18 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10903R	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-40	Preparation batch #:	0010639G
Matrix:	SEDIMENT	Assay batch #:	0017727W
Collected:	2013-09-18 16:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	46.07 %	Analyst:	PMT
Ash/dry weight:	87.73 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS110	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-3.48e-03	2.3e-02	6.5e-02	PCI/GDRY	01/15/2014 17:18 CST
Pu239	2.79e-02	4.3e-02	6.5e-02	PCI/GDRY	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00679609W	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010540W
Matrix:	N/A	Assay batch #:	0017609Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS135	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.09e-02	1.5e-02	2.5e-02	PCI	12/05/2013 17:21 CST
Pu239	2.01e+00	2.0e-01	1.6e-02	PCI	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00679608V	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010540W
Matrix:	N/A	Assay batch #:	0017609Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 17:21	1000.0	AS136	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	8.59e-03	1.5e-02	2.5e-02	PCI	12/05/2013 17:21 CST
Pu239	8.59e-03	1.2e-02	1.8e-02	PCI	12/05/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00681926C	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010639G
Matrix:	N/A	Assay batch #:	0017727W
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS121	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	3.06e-02	2.2e-02	2.3e-02	PCI	01/15/2014 17:18 CST
Pu239	2.34e+00	2.6e-01	2.0e-02	PCI	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00681925B	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010639G
Matrix:	N/A	Assay batch #:	0017727W
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:18	1000.0	AS122	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-5.08e-03	1.1e-02	3.0e-02	PCI	01/15/2014 17:18 CST
Pu239	8.13e-03	1.3e-02	1.9e-02	PCI	01/15/2014 17:18 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010540W
Analysis method: NAREL PU-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10884G	R34243-21	00677013N		87.67 %	6.58 %	PMT
B3.10885H	R34243-22	00677019V		85.51 %	6.51 %	PMT
B3.10886J	R34243-23	00677025T		91.31 %	7.73 %	PMT
B3.10887K	R34243-24	00677031Q		87.08 %	7.44 %	PMT
B3.10888L	R34243-25	00677037X		98.51 %	8.16 %	PMT
B3.10889M	R34243-26	00677043V		91.63 %	7.77 %	PMT
B3.10890E	R34243-27	00677049B		98.34 %	8.07 %	PMT
B3.10891F	R34243-28	00677055Z		85.62 %	6.51 %	PMT
B3.10892G	R34243-29	00677061X		86.94 %	6.63 %	PMT
B3.10893H	R34243-30	00677067D		93.98 %	6.99 %	PMT
B3.10893H	R34243-30	00679607U	DUP	94.52 %	6.95 %	PMT
LCS-00679609W *		00679609W	LCS	91.94 %	6.78 %	PMT
RBK-00679608V *		00679608V	RBK	83.24 %	6.39 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010540W

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10893H	00679607U	DUP	PU238		-379.2	-1.24	PASS
B3.10893H	00679607U	DUP	PU239		8.0	-0.05	PASS
LCS-00679609W	00679609W	LCS	PU239	94.4		-1.06	PASS
RBK-00679608V	00679608V	RBK	PU238				PASS
RBK-00679608V	00679608V	RBK	PU239				PASS

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010639G
Analysis method: NAREL PU-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10894J	R34243-31	00677073B		90.92 %	7.72 %	PMT
B3.10895K	R34243-32	00677079H		94.30 %	7.87 %	PMT
B3.10896L	R34243-33	00677085F		86.00 %	7.48 %	PMT
B3.10897M	R34243-34	00677091D		87.10 %	7.56 %	PMT
B3.10898N	R34243-35	00677097K		91.28 %	7.78 %	PMT
B3.10899P	R34243-36	00677103P		93.86 %	7.89 %	PMT
B3.10900N	R34243-37	00677109W		90.64 %	7.69 %	PMT
B3.10900N	R34243-37	00681924A	DUP	80.52 %	6.72 %	PMT
B3.10901P	R34243-38	00677115U		80.98 %	6.69 %	PMT
B3.10902Q	R34243-39	00677121R		91.85 %	7.32 %	PMT
B3.10903R	R34243-40	00677127Y		97.71 %	8.17 %	PMT
LCS-00681926C *		00681926C	LCS	86.05 %	7.46 %	PMT
RBK-00681925B *		00681925B	RBK	90.49 %	7.61 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010639G

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10900N	00681924A	DUP	PU238		38.8	0.10	PASS
B3.10900N	00681924A	DUP	PU239		53.4	0.57	PASS
LCS-00681926C	00681926C	LCS	PU239	109.9		1.50	PASS
RBK-00681925B	00681925B	RBK	PU238				PASS
RBK-00681925B	00681925B	RBK	PU239				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
PU ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300087

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Plutonium) by Extraction Chromatography
Report ID:	1300087-PU
Report type:	Original
Date reported:	02/11/2014
Total pages in report:	22

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10904T	R34243-41	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10905U	R34243-42	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10906V	R34243-43	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10907W	R34243-44	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10908X	R34243-45	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10909Y	R34243-46	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10910Q	R34243-47	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10911R	R34243-48	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10912T	R34243-49	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10913U	R34243-50	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10914V	R34243-51	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10915W	R34243-52	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10916X	R34243-53	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10917Y	R34243-54	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-12-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-12-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

ANALYSIS SUMMARY

Analysis method: NAREL PU-EICHROM
Title: Actinides (Plutonium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10904T	R34243-41		02/06/2014	0010692M	0017788K
B3.10905U	R34243-42		02/06/2014	0010692M	0017788K
B3.10906V	R34243-43		02/06/2014	0010692M	0017788K
B3.10906V	R34243-43	DUP	02/06/2014	0010692M	0017788K
B3.10907W	R34243-44		02/06/2014	0010692M	0017788K
B3.10908X	R34243-45		02/06/2014	0010692M	0017788K
B3.10909Y	R34243-46		02/06/2014	0010692M	0017788K
B3.10910Q	R34243-47		02/06/2014	0010692M	0017788K
B3.10911R	R34243-48		02/06/2014	0010692M	0017788K
B3.10912T	R34243-49		02/06/2014	0010692M	0017788K
B3.10913U	R34243-50		02/06/2014	0010692M	0017788K
B3.10914V	R34243-51		02/06/2014	0010692M	0017788K
B3.10915W	R34243-52		02/06/2014	0010692M	0017788K
B3.10916X	R34243-53		02/06/2014	0010692M	0017788K
B3.10917Y	R34243-54		02/06/2014	0010692M	0017788K
LCS-00683194Y *		LCS	02/06/2014	0010692M	0017788K
RBK-00683193X *		RBK	02/06/2014	0010692M	0017788K

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10904T	Amount analyzed:	2.522e-01 GASH
Client sample ID:	R34243-41	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	36.72 %	Analyst:	AS
Ash/dry weight:	84.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.73e-02	3.6e-02	1.0e-01	PCI/GDRY	02/05/2014 16:11 CST
Pu239	2.42e-02	5.0e-02	9.0e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10905U	Amount analyzed:	2.590e-01 GASH
Client sample ID:	R34243-42	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	65.29 %	Analyst:	AS
Ash/dry weight:	89.03 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS98	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.01e-02	2.4e-02	7.7e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	3.71e-02	4.6e-02	6.3e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.520e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	0.00e+00	3.8e-02	9.2e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	4.46e-02	5.6e-02	7.5e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.560e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-6.90e-03	3.4e-02	8.9e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	1.73e-02	3.7e-02	6.4e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10907W	Amount analyzed:	2.542e-01 GASH
Client sample ID:	R34243-44	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 13:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	46.70 %	Analyst:	AS
Ash/dry weight:	89.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.30e-02	4.2e-02	8.4e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	1.94e-02	4.1e-02	7.4e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10908X	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-45	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 13:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	43.30 %	Analyst:	AS
Ash/dry weight:	89.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS102	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-2.94e-02	2.9e-02	1.0e-01	PCI/GDRY	02/05/2014 16:11 CST
Pu239	5.56e-02	5.3e-02	6.1e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10909Y	Amount analyzed:	2.510e-01 GASH
Client sample ID:	R34243-46	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 13:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	58.55 %	Analyst:	AS
Ash/dry weight:	88.33 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.94e-02	4.0e-02	4.9e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	1.31e-02	3.6e-02	6.8e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10910Q	Amount analyzed:	2.512e-01 GASH
Client sample ID:	R34243-47	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 14:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	59.02 %	Analyst:	AS
Ash/dry weight:	91.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.82e-02	6.1e-02	1.1e-01	PCI/GDRY	02/05/2014 16:11 CST
Pu239	7.05e-03	3.2e-02	6.5e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10911R	Amount analyzed:	2.521e-01 GASH
Client sample ID:	R34243-48	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	61.08 %	Analyst:	AS
Ash/dry weight:	91.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS105	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-2.52e-02	3.0e-02	1.0e-01	PCI/GDRY	02/05/2014 16:11 CST
Pu239	1.08e-02	4.0e-02	8.2e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10912T	Amount analyzed:	2.570e-01 GASH
Client sample ID:	R34243-49	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 17:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	68.18 %	Analyst:	AS
Ash/dry weight:	87.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS107	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.27e-02	4.1e-02	8.2e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	1.27e-02	3.5e-02	6.6e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10913U	Amount analyzed:	2.552e-01 GASH
Client sample ID:	R34243-50	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 17:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	68.63 %	Analyst:	AS
Ash/dry weight:	77.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS109	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	-1.28e-02	3.3e-02	9.1e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	2.88e-02	3.9e-02	4.8e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10914V	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-51	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	78.82 %	Analyst:	AS
Ash/dry weight:	94.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS110	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	1.09e-02	4.1e-02	8.3e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	3.65e-03	3.3e-02	7.6e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10915W	Amount analyzed:	2.573e-01 GASH
Client sample ID:	R34243-52	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	59.52 %	Analyst:	AS
Ash/dry weight:	91.11 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS111	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	7.23e-03	4.8e-02	1.0e-01	PCI/GDRY	02/05/2014 16:11 CST
Pu239	3.98e-02	5.0e-02	6.7e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10916X	Amount analyzed:	2.516e-01 GASH
Client sample ID:	R34243-53	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 17:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	60.42 %	Analyst:	AS
Ash/dry weight:	84.47 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.65e-02	4.1e-02	6.9e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	3.70e-02	4.4e-02	6.5e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10917Y	Amount analyzed:	2.533e-01 GASH
Client sample ID:	R34243-54	Preparation batch #:	0010692M
Matrix:	SEDIMENT	Assay batch #:	0017788K
Collected:	2013-09-19 18:40 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	75.12 %	Analyst:	AS
Ash/dry weight:	70.04 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS114	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	4.26e-03	2.4e-02	5.2e-02	PCI/GDRY	02/05/2014 16:11 CST
Pu239	2.13e-03	2.0e-02	4.5e-02	PCI/GDRY	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00683194Y	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010692M
Matrix:	N/A	Assay batch #:	0017788K
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS115	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	2.05e-02	1.7e-02	2.2e-02	PCI	02/05/2014 16:11 CST
Pu239	2.28e+00	2.2e-01	1.2e-02	PCI	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00683193X	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010692M
Matrix:	N/A	Assay batch #:	0017788K
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL PU-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/05/2014 16:11	1000.0	AS118	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Pu238	4.05e-03	1.2e-02	2.3e-02	PCI	02/05/2014 16:11 CST
Pu239	9.72e-03	1.2e-02	1.8e-02	PCI	02/05/2014 16:11 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300087

PREPARATION BATCH SUMMARY

Preparation batch #: 0010692M
Analysis method: NAREL PU-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10904T	R34243-41	00677133W		91.44 %	7.74 %	AS
B3.10905U	R34243-42	00677139C		95.59 %	7.93 %	AS
B3.10906V	R34243-43	00677145A		86.52 %	7.50 %	AS
B3.10906V	R34243-43	00683192W	DUP	100.96 %	8.26 %	AS
B3.10907W	R34243-44	00677151Y		103.28 %	8.39 %	AS
B3.10908X	R34243-45	00677157E		103.55 %	8.46 %	AS
B3.10909Y	R34243-46	00677163C		102.36 %	8.32 %	AS
B3.10910Q	R34243-47	00677169J		96.71 %	8.00 %	AS
B3.10911R	R34243-48	00677175G		85.71 %	6.97 %	AS
B3.10912T	R34243-49	00677181E		89.82 %	7.11 %	AS
B3.10913U	R34243-50	00677187L		82.06 %	6.86 %	AS
B3.10914V	R34243-51	00677193J		100.47 %	8.32 %	AS
B3.10915W	R34243-52	00677199Q		93.51 %	7.89 %	AS
B3.10916X	R34243-53	00677205V		92.01 %	6.82 %	AS
B3.10917Y	R34243-54	00677211T		94.65 %	6.96 %	AS
LCS-00683194Y *		00683194Y	LCS	90.97 %	6.75 %	AS
RBK-00683193X *		00683193X	RBK	88.12 %	6.61 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010692M

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10906V	00683192W	DUP	PU238		-200.0	-0.27	PASS
B3.10906V	00683192W	DUP	PU239		88.4	-0.81	PASS
LCS-00683194Y	00683194Y	LCS	PU239	107.0		1.23	PASS
RBK-00683193X	00683193X	RBK	PU238				PASS
RBK-00683193X	00683193X	RBK	PU239				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
TH ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300084

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Thorium) by Extraction Chromatography
Report ID:	1300084-TH
Report type:	Original
Date reported:	01/28/2014
Total pages in report:	23

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10849D	R34243-55	PA:KISKIMERE	WATER-GROUND	09/16/2013	09/27/2013
B3.10850W	R34243-66	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10851X	R34243-56	PA:KISKIMERE	WATER-GROUND	09/17/2013	09/27/2013
B3.10852Y	R34243-68	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10853Z	R34243-57	PA:KISKIMERE	WATER-GROUND	09/18/2013	09/27/2013
B3.10854A	R34243-65	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10855B	R34243-58	PA:KISKIMERE	WATER-GROUND	09/19/2013	09/27/2013
B3.10856C	R34243-67	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10857D	R34243-59	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10858E	R34243-60	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10859F	R34243-61	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10860Y	R34243-62	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10861Z	R34243-63	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10862A	R34243-64	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10863B	R34243-69	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – ~~No problems~~ were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – These samples were analyzed four times. The initial analysis showed Th-229 contamination, and the second and third analyses indicated a problem with the Th-230 standard used in the laboratory control sample. The results of the fourth analysis are reported in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All yields for the samples in this SDG appear to be slight overestimations , but samples B3.10850, B3.10852, and B3.10858 had yields that were above NAREL's upper acceptance level. Since the samples have been analyzed four times and sample volumes are now limited, the high yields were approved by the QA manager. However, these results should be considered estimations of the activities present in the samples.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-12-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-12-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

ANALYSIS SUMMARY

Analysis method: NAREL TH-EICHROM
Title: Actinides (Thorium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10849D	R34243-55		01/23/2014	0010682K	0017748B
B3.10849D	R34243-55	DUP	01/23/2014	0010682K	0017748B
B3.10850W	R34243-66		01/23/2014	0010682K	0017748B
B3.10851X	R34243-56		01/23/2014	0010682K	0017748B
B3.10852Y	R34243-68		01/23/2014	0010682K	0017748B
B3.10853Z	R34243-57		01/23/2014	0010682K	0017748B
B3.10854A	R34243-65		01/23/2014	0010682K	0017748B
B3.10855B	R34243-58		01/23/2014	0010682K	0017748B
B3.10856C	R34243-67		01/23/2014	0010682K	0017748B
B3.10857D	R34243-59		01/23/2014	0010682K	0017748B
B3.10858E	R34243-60		01/23/2014	0010682K	0017748B
B3.10859F	R34243-61		01/23/2014	0010682K	0017748B
B3.10860Y	R34243-62		01/23/2014	0010682K	0017748B
B3.10861Z	R34243-63		01/23/2014	0010682K	0017748B
B3.10862A	R34243-64		01/23/2014	0010682K	0017748B
B3.10863B	R34243-69		01/23/2014	0010682K	0017748B
LCS-00682964N *		LCS	01/23/2014	0010682K	0017748B
RBK-00682963M *		RBK	01/23/2014	0010682K	0017748B

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-55	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS33	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.60e-02	7.6e-02	1.3e-01	PCI/L	01/22/2014 08:30 CST
Th228	2.90e-02	7.0e-02	1.3e-01	PCI/L	01/22/2014 08:30 CST
Th230	-9.68e-03	3.4e-02	1.0e-01	PCI/L	01/22/2014 08:30 CST
Th232	-1.93e-02	3.6e-02	1.2e-01	PCI/L	01/22/2014 08:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-55	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS34	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	0.00e+00	5.1e-02	1.2e-01	PCI/L	01/22/2014 08:30 CST
Th228	4.54e-03	4.2e-02	9.4e-02	PCI/L	01/22/2014 08:30 CST
Th230	9.08e-03	4.1e-02	8.4e-02	PCI/L	01/22/2014 08:30 CST
Th232	-1.36e-02	3.3e-02	1.0e-01	PCI/L	01/22/2014 08:30 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10850W	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-66	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-23 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS35	CEB

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	J	3.28e-02	9.0e-02	1.7e-01	PCI/L	01/22/2014 08:30 CST
Th228	J	1.83e-02	1.1e-01	2.1e-01	PCI/L	01/22/2014 08:30 CST
Th230	J	-1.37e-02	3.3e-02	1.0e-01	PCI/L	01/22/2014 08:30 CST
Th232	J	2.28e-02	4.9e-02	8.4e-02	PCI/L	01/22/2014 08:30 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10851X	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-56	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-17 19:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS36	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	0.00e+00	7.5e-02	1.8e-01	PCI/L	01/22/2014 08:30 CST
Th228	1.79e-02	8.5e-02	1.7e-01	PCI/L	01/22/2014 08:30 CST
Th230	8.95e-03	4.0e-02	8.3e-02	PCI/L	01/22/2014 08:30 CST
Th232	8.93e-03	4.0e-02	8.3e-02	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10852Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-68	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-24 13:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS37	CEB

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	J	7.46e-02	1.0e-01	1.2e-01	PCI/L	01/22/2014 08:30 CST
Th228	J	-1.39e-02	4.6e-02	1.3e-01	PCI/L	01/22/2014 08:30 CST
Th230	J	1.39e-02	4.0e-02	7.0e-02	PCI/L	01/22/2014 08:30 CST
Th232	J	0.00e+00	2.9e-02	6.9e-02	PCI/L	01/22/2014 08:30 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10853Z	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-57	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-18 19:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS38	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.72e-02	7.7e-02	1.6e-01	PCI/L	01/22/2014 08:30 CST
Th228	-2.88e-02	7.7e-02	1.9e-01	PCI/L	01/22/2014 08:30 CST
Th230	4.80e-03	4.4e-02	1.0e-01	PCI/L	01/22/2014 08:30 CST
Th232	4.80e-03	5.5e-02	1.2e-01	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10854A	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-65	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-23 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS40	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	7.99e-03	7.3e-02	1.7e-01	PCI/L	01/22/2014 08:30 CST
Th228	-7.57e-02	7.7e-02	2.0e-01	PCI/L	01/22/2014 08:30 CST
Th230	-1.34e-02	3.2e-02	1.0e-01	PCI/L	01/22/2014 08:30 CST
Th232	-4.45e-03	3.0e-02	8.2e-02	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10855B	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-58	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-19 20:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS73	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.10e-02	6.1e-02	1.1e-01	PCI/L	01/22/2014 08:30 CST
Th228	2.73e-02	6.2e-02	1.2e-01	PCI/L	01/22/2014 08:30 CST
Th230	7.03e-02	6.8e-02	8.9e-02	PCI/L	01/22/2014 08:30 CST
Th232	4.29e-02	6.0e-02	9.5e-02	PCI/L	01/22/2014 08:30 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10856C	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-67	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-24 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS78	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	8.54e-03	7.8e-02	1.8e-01	PCI/L	01/22/2014 08:30 CST
Th228	-2.38e-02	4.9e-02	1.4e-01	PCI/L	01/22/2014 08:30 CST
Th230	1.91e-02	5.2e-02	9.9e-02	PCI/L	01/22/2014 08:30 CST
Th232	2.85e-02	6.9e-02	1.3e-01	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10857D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-59	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-23 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS79	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.47e-02	8.8e-02	1.1e-01	PCI/L	01/22/2014 08:30 CST
Th228	4.41e-02	6.8e-02	1.1e-01	PCI/L	01/22/2014 08:30 CST
Th230	-4.01e-03	2.7e-02	7.4e-02	PCI/L	01/22/2014 08:30 CST
Th232	2.00e-02	4.3e-02	7.4e-02	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10858E	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-60	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-23 16:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS81	CEB

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	J	-2.48e-02	6.0e-02	1.9e-01	PCI/L	01/22/2014 08:30 CST
Th228	J	3.68e-02	6.5e-02	1.1e-01	PCI/L	01/22/2014 08:30 CST
Th230	J	9.21e-03	4.1e-02	8.5e-02	PCI/L	01/22/2014 08:30 CST
Th232	J	-4.60e-03	3.1e-02	8.5e-02	PCI/L	01/22/2014 08:30 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10859F	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-61	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-23 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS82	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.54e-02	7.4e-02	1.3e-01	PCI/L	01/22/2014 08:30 CST
Th228	-1.42e-02	6.6e-02	1.6e-01	PCI/L	01/22/2014 08:30 CST
Th230	-4.72e-03	3.1e-02	8.7e-02	PCI/L	01/22/2014 08:30 CST
Th232	-4.71e-03	4.5e-02	1.1e-01	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-62	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS83	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.60e-02	7.5e-02	1.3e-01	PCI/L	01/22/2014 08:30 CST
Th228	-4.82e-03	5.7e-02	1.4e-01	PCI/L	01/22/2014 08:30 CST
Th230	0.00e+00	4.5e-02	1.1e-01	PCI/L	01/22/2014 08:30 CST
Th232	-4.82e-03	3.2e-02	8.9e-02	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10861Z	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-63	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-24 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS84	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	-9.01e-03	6.0e-02	1.7e-01	PCI/L	01/22/2014 08:30 CST
Th228	1.56e-01	1.1e-01	1.0e-01	PCI/L	01/22/2014 08:30 CST
Th230	5.03e-02	7.0e-02	1.0e-01	PCI/L	01/22/2014 08:30 CST
Th232	3.01e-02	5.3e-02	7.5e-02	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10862A	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-64	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-24 18:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS86	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.75e-02	8.0e-02	1.4e-01	PCI/L	01/22/2014 08:30 CST
Th228	1.53e-01	1.1e-01	1.2e-01	PCI/L	01/22/2014 08:30 CST
Th230	2.55e-02	5.5e-02	9.4e-02	PCI/L	01/22/2014 08:30 CST
Th232	1.53e-02	4.4e-02	7.7e-02	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10863B	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-69	Preparation batch #:	0010682K
Matrix:	WATER-GROUND	Assay batch #:	0017748B
Collected:	2013-09-24 08:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS87	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	3.43e-02	1.0e-01	1.7e-01	PCI/L	01/22/2014 08:30 CST
Th228	8.42e-01	2.7e-01	1.7e-01	PCI/L	01/22/2014 08:30 CST
Th230	2.94e-01	1.6e-01	1.3e-01	PCI/L	01/22/2014 08:30 CST
Th232	3.51e-01	1.7e-01	1.3e-01	PCI/L	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00682964N	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010682K
Matrix:	N/A	Assay batch #:	0017748B
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS88	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.06e-03	1.5e-02	2.5e-02	PCI	01/22/2014 08:30 CST
Th228	1.79e-02	1.9e-02	2.8e-02	PCI	01/22/2014 08:30 CST
Th230	1.83e+00	1.6e-01	2.1e-02	PCI	01/22/2014 08:30 CST
Th232	1.88e-03	8.4e-03	1.7e-02	PCI	01/22/2014 08:30 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00682963M	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010682K
Matrix:	N/A	Assay batch #:	0017748B
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/22/2014 16:52	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.20e-03	1.5e-02	2.6e-02	PCI	01/22/2014 08:30 CST
Th228	6.77e-03	1.2e-02	2.0e-02	PCI	01/22/2014 08:30 CST
Th230	9.68e-04	8.9e-03	2.0e-02	PCI	01/22/2014 08:30 CST
Th232	5.80e-03	1.0e-02	1.5e-02	PCI	01/22/2014 08:30 CST

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PREPARATION BATCH SUMMARY

Preparation batch #: 0010682K
Analysis method: NAREL TH-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10849D	R34243-55	00682947M		98.90 %	2.40 %	SPK
B3.10849D	R34243-55	00682962L	DUP	100.23 %	2.43 %	SPK
B3.10850W	R34243-66	00682948N		103.07 %	2.51 %	SPK
B3.10851X	R34243-56	00682949P		101.50 %	2.47 %	SPK
B3.10852Y	R34243-68	00682950G		102.56 %	2.49 %	SPK
B3.10853Z	R34243-57	00682951H		99.59 %	2.42 %	SPK
B3.10854A	R34243-65	00682952J		101.48 %	2.48 %	SPK
B3.10855B	R34243-58	00682953K		99.97 %	2.44 %	SPK
B3.10856C	R34243-67	00682954L		100.61 %	2.45 %	SPK
B3.10857D	R34243-59	00682955M		96.76 %	2.35 %	SPK
B3.10858E	R34243-60	00682956N		102.84 %	2.51 %	SPK
B3.10859F	R34243-61	00682957P		101.39 %	2.47 %	SPK
B3.10860Y	R34243-62	00682958Q		98.97 %	2.42 %	SPK
B3.10861Z	R34243-63	00682959R		95.46 %	2.33 %	SPK
B3.10862A	R34243-64	00682960J		97.13 %	2.37 %	SPK
B3.10863B	R34243-69	00682961K		75.17 %	1.93 %	SPK
LCS-00682964N *		00682964N	LCS	99.90 %	2.44 %	SPK
RBK-00682963M *		00682963M	RBK	97.58 %	2.37 %	SPK

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010682K

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10849D	00682962L	DUP	TH227		200.0	-0.57	PASS
B3.10849D	00682962L	DUP	TH228		145.9	-0.60	PASS
B3.10849D	00682962L	DUP	TH230		-6266.5	0.71	PASS
B3.10849D	00682962L	DUP	TH232		-34.8	0.23	PASS
LCS-00682964N	00682964N	LCS	TH230	90.5		-2.29	WARN
RBK-00682963M	00682963M	RBK	TH227				PASS
RBK-00682963M	00682963M	RBK	TH228				PASS
RBK-00682963M	00682963M	RBK	TH230				PASS
RBK-00682963M	00682963M	RBK	TH232				PASS

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TH ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300085

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Thorium) by Extraction Chromatography
Report ID:	1300085-TH
Report type:	Original
Date reported:	01/28/2014
Total pages in report:	28

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10864C	R34243-01	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10865D	R34243-02	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10866E	R34243-03	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10867F	R34243-04	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10868G	R34243-05	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10869H	R34243-06	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10870A	R34243-07	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10871B	R34243-08	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10872C	R34243-09	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10873D	R34243-10	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10874E	R34243-11	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10875F	R34243-12	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10876G	R34243-13	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10877H	R34243-14	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10878J	R34243-15	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10879K	R34243-16	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10880C	R34243-17	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10881D	R34243-18	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10882E	R34243-19	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10883F	R34243-20	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – This entire SDG was reanalyzed because of a failure of the LCS during the original analysis. The results of the reanalysis are reported in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-3-14

Mary F. Wisdom Date
Quality Assurance Manager, NAREL

Cynthia White 2-3-14

Cynthia White Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

ANALYSIS SUMMARY

Analysis method: NAREL TH-EICHROM
Title: Actinides (Thorium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10864C	R34243-01		01/24/2014	0010661E	0017746Z
B3.10865D	R34243-02		01/24/2014	0010661E	0017746Z
B3.10866E	R34243-03		01/24/2014	0010661E	0017746Z
B3.10867F	R34243-04		01/24/2014	0010661E	0017746Z
B3.10867F	R34243-04	DUP	01/24/2014	0010661E	0017746Z
B3.10868G	R34243-05		01/24/2014	0010661E	0017746Z
B3.10869H	R34243-06		01/24/2014	0010661E	0017746Z
B3.10870A	R34243-07		01/24/2014	0010661E	0017746Z
B3.10871B	R34243-08		01/24/2014	0010661E	0017746Z
B3.10872C	R34243-09		01/24/2014	0010661E	0017746Z
B3.10873D	R34243-10		01/24/2014	0010661E	0017746Z
B3.10874E	R34243-11		01/24/2014	0010661E	0017746Z
B3.10875F	R34243-12		01/24/2014	0010661E	0017746Z
B3.10876G	R34243-13		01/24/2014	0010661E	0017746Z
B3.10877H	R34243-14		01/24/2014	0010661E	0017746Z
B3.10878J	R34243-15		01/24/2014	0010661E	0017746Z
B3.10879K	R34243-16		01/24/2014	0010661E	0017746Z
B3.10880C	R34243-17		01/24/2014	0010661E	0017746Z
B3.10881D	R34243-18		01/24/2014	0010661E	0017746Z
B3.10882E	R34243-19		01/24/2014	0010661E	0017746Z
B3.10883F	R34243-20		01/24/2014	0010661E	0017746Z
LCS-00682277W *		LCS	01/24/2014	0010661E	0017746Z
RBK-00682276V *		RBK	01/24/2014	0010661E	0017746Z

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10864C	Amount analyzed:	2.531e-01 GASH
Client sample ID:	R34243-01	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-16 16:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	66.45 %	Analyst:	AS
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS33	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	0.00e+00	4.3e-02	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	9.07e-01	2.2e-01	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	5.35e-01	1.6e-01	7.7e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	6.37e-01	1.8e-01	9.0e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10865D	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-02	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-16 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	51.28 %	Analyst:	AS
Ash/dry weight:	83.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS34	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.75e-02	7.7e-02	8.5e-02	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.14e+00	2.3e-01	6.4e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	9.09e-01	2.0e-01	5.6e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	8.83e-01	2.0e-01	6.9e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10866E	Amount analyzed:	2.556e-01 GASH
Client sample ID:	R34243-03	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-16 17:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	47.72 %	Analyst:	AS
Ash/dry weight:	87.84 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS35	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	4.29e-02	7.7e-02	1.3e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.16e+00	2.5e-01	1.5e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	1.07e+00	2.3e-01	7.6e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	9.69e-01	2.2e-01	6.1e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS36	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	4.97e-02	7.8e-02	1.3e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.11e+00	2.3e-01	1.1e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	8.56e-01	1.9e-01	5.5e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	1.02e+00	2.1e-01	5.5e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.559e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS37	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.06e-01	9.5e-02	8.9e-02	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.20e+00	2.4e-01	8.6e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	9.23e-01	2.1e-01	4.8e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	8.36e-01	1.9e-01	4.8e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10868G	Amount analyzed:	2.524e-01 GASH
Client sample ID:	R34243-05	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-16 17:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.29 %	Analyst:	AS
Ash/dry weight:	92.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS38	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	9.31e-02	1.0e-01	1.2e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.15e+00	2.5e-01	1.4e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	7.69e-01	2.0e-01	7.5e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	7.78e-01	2.0e-01	9.3e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10869H	Amount analyzed:	2.590e-01 GASH
Client sample ID:	R34243-06	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.28 %	Analyst:	AS
Ash/dry weight:	93.58 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS40	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.16e-01	1.1e-01	1.3e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.10e+00	2.4e-01	1.5e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	8.47e-01	2.0e-01	7.5e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	9.22e-01	2.1e-01	6.1e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10870A	Amount analyzed:	2.502e-01 GASH
Client sample ID:	R34243-07	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	58.95 %	Analyst:	AS
Ash/dry weight:	86.99 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS73	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	7.43e-02	7.4e-02	7.5e-02	PCI/GDRY	01/22/2014 10:50 CST
Th228	9.67e-01	2.0e-01	7.9e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	1.06e+00	2.1e-01	6.1e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	1.18e+00	2.2e-01	6.5e-02	PCI/GDRY	01/22/2014 10:50 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10871B	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-08	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 13:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	76.57 %	Analyst:	AS
Ash/dry weight:	92.90 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS78	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.58e-03	6.0e-02	1.4e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	9.00e-01	2.2e-01	1.1e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	8.36e-01	2.1e-01	7.4e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	6.61e-01	1.8e-01	9.7e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10872C	Amount analyzed:	2.515e-01 GASH
Client sample ID:	R34243-09	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	76.03 %	Analyst:	AS
Ash/dry weight:	92.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS79	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.84e-02	7.8e-02	8.6e-02	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.18e+00	2.4e-01	8.8e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	8.10e-01	1.9e-01	5.7e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	9.66e-01	2.1e-01	5.7e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10873D	Amount analyzed:	2.517e-01 GASH
Client sample ID:	R34243-10	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	76.29 %	Analyst:	AS
Ash/dry weight:	94.98 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS81	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.03e-02	7.5e-02	1.5e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	9.71e-01	2.3e-01	8.9e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	6.97e-01	1.9e-01	6.8e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	7.84e-01	2.0e-01	6.8e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10874E	Amount analyzed:	2.559e-01 GASH
Client sample ID:	R34243-11	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	70.88 %	Analyst:	AS
Ash/dry weight:	93.92 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS82	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	7.85e-02	8.9e-02	9.9e-02	PCI/GDRY	01/22/2014 10:50 CST
Th228	7.74e-01	2.0e-01	1.2e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	7.91e-01	2.0e-01	6.6e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	7.69e-01	2.0e-01	8.6e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10875F	Amount analyzed:	2.541e-01 GASH
Client sample ID:	R34243-12	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	71.63 %	Analyst:	AS
Ash/dry weight:	93.88 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS83	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.00e-02	5.8e-02	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	7.96e-01	2.0e-01	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	5.72e-01	1.7e-01	8.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	6.33e-01	1.8e-01	6.7e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10876G	Amount analyzed:	2.555e-01 GASH
Client sample ID:	R34243-13	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	52.74 %	Analyst:	AS
Ash/dry weight:	91.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS84	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.13e-02	7.9e-02	1.2e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.12e+00	2.4e-01	7.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	1.02e+00	2.3e-01	7.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	1.08e+00	2.3e-01	5.2e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10877H	Amount analyzed:	2.538e-01 GASH
Client sample ID:	R34243-14	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 14:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	63.62 %	Analyst:	AS
Ash/dry weight:	90.85 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS86	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	8.00e-02	9.1e-02	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.35e+00	2.7e-01	8.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	7.74e-01	2.0e-01	6.7e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	6.79e-01	1.8e-01	5.4e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10878J	Amount analyzed:	2.520e-01 GASH
Client sample ID:	R34243-15	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 15:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	80.79 %	Analyst:	AS
Ash/dry weight:	93.64 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS87	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.02e-02	5.9e-02	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.05e+00	2.4e-01	9.9e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	9.95e-01	2.3e-01	7.6e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	8.41e-01	2.1e-01	7.6e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10879K	Amount analyzed:	2.560e-01 GASH
Client sample ID:	R34243-16	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 15:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	74.29 %	Analyst:	AS
Ash/dry weight:	95.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:10	1000.0	AS88	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	7.99e-02	9.1e-02	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	7.48e-01	2.0e-01	1.1e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	5.72e-01	1.7e-01	8.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	6.97e-01	1.9e-01	6.7e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10880C	Amount analyzed:	2.549e-01 GASH
Client sample ID:	R34243-17	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 15:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	71.01 %	Analyst:	AS
Ash/dry weight:	93.32 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS121	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.66e-02	7.3e-02	1.4e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	8.96e-01	2.2e-01	8.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	5.94e-01	1.7e-01	8.2e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	7.43e-01	1.9e-01	8.2e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10881D	Amount analyzed:	2.574e-01 GASH
Client sample ID:	R34243-18	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-17 16:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	68.61 %	Analyst:	AS
Ash/dry weight:	93.10 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS122	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.86e-02	8.0e-02	9.8e-02	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.38e+00	2.7e-01	1.0e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	1.12e+00	2.4e-01	5.3e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	1.04e+00	2.3e-01	6.5e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10882E	Amount analyzed:	2.510e-01 GASH
Client sample ID:	R34243-19	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-18 10:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.78 %	Analyst:	AS
Ash/dry weight:	92.52 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS123	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.56e-02	7.0e-02	1.3e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	1.11e+00	2.5e-01	1.4e-01	PCI/GDRY	01/22/2014 10:50 CST
Th230	9.10e-01	2.1e-01	6.4e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	8.15e-01	2.0e-01	6.4e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10883F	Amount analyzed:	2.521e-01 GASH
Client sample ID:	R34243-20	Preparation batch #:	0010661E
Matrix:	SEDIMENT	Assay batch #:	0017746Z
Collected:	2013-09-18 10:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	76.71 %	Analyst:	AS
Ash/dry weight:	92.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS124	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.69e-02	9.3e-02	1.4e-01	PCI/GDRY	01/22/2014 10:50 CST
Th228	9.08e-01	2.2e-01	8.8e-02	PCI/GDRY	01/22/2014 10:50 CST
Th230	5.93e-01	1.7e-01	6.7e-02	PCI/GDRY	01/22/2014 10:50 CST
Th232	9.28e-01	2.2e-01	6.7e-02	PCI/GDRY	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00682277W	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010661E
Matrix:	N/A	Assay batch #:	0017746Z
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS125	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	-1.78e-03	1.2e-02	3.3e-02	PCI	01/22/2014 10:50 CST
Th228	2.89e-03	1.4e-02	2.9e-02	PCI	01/22/2014 10:50 CST
Th230	2.17e+00	1.8e-01	1.4e-02	PCI	01/22/2014 10:50 CST
Th232	2.89e-03	8.4e-03	1.4e-02	PCI	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00682276V	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010661E
Matrix:	N/A	Assay batch #:	0017746Z
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:09	1000.0	AS126	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	3.60e-03	1.6e-02	3.3e-02	PCI	01/22/2014 10:50 CST
Th228	1.85e-02	1.8e-02	2.5e-02	PCI	01/22/2014 10:50 CST
Th230	2.63e-02	1.9e-02	1.5e-02	PCI	01/22/2014 10:50 CST
Th232	4.86e-03	1.0e-02	1.8e-02	PCI	01/22/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300085

PREPARATION BATCH SUMMARY

Preparation batch #: 0010661E
Analysis method: NAREL TH-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10864C	R34243-01	00682256Q		96.97 %	2.31 %	AS
B3.10865D	R34243-02	00682257R		98.22 %	2.35 %	AS
B3.10866E	R34243-03	00682258T		97.69 %	2.33 %	AS
B3.10867F	R34243-04	00682259U		100.02 %	2.41 %	AS
B3.10867F	R34243-04	00682278X	DUP	98.46 %	2.35 %	AS
B3.10868G	R34243-05	00682260L		97.30 %	2.34 %	AS
B3.10869H	R34243-06	00682261M		99.48 %	2.36 %	AS
B3.10870A	R34243-07	00682262N		101.37 %	2.44 %	AS
B3.10871B	R34243-08	00682263P		98.76 %	2.36 %	AS
B3.10872C	R34243-09	00682264Q		92.53 %	2.22 %	AS
B3.10873D	R34243-10	00682265R		97.95 %	2.33 %	AS
B3.10874E	R34243-11	00682266T		99.48 %	2.40 %	AS
B3.10875F	R34243-12	00682267U		98.05 %	2.34 %	AS
B3.10876G	R34243-13	00682268V		99.03 %	2.35 %	AS
B3.10877H	R34243-14	00682269W		98.63 %	2.36 %	AS
B3.10878J	R34243-15	00682270N		98.21 %	2.37 %	AS
B3.10879K	R34243-16	00682271P		97.24 %	2.33 %	AS
B3.10880C	R34243-17	00682272Q		95.83 %	2.29 %	AS
B3.10881D	R34243-18	00682273R		94.66 %	2.28 %	AS
B3.10882E	R34243-19	00682274T		98.35 %	2.34 %	AS
B3.10883F	R34243-20	00682275U		97.44 %	2.33 %	AS
LCS-00682277W *		00682277W	LCS	98.22 %	2.34 %	AS
RBK-00682276V *		00682276V	RBK	97.45 %	2.34 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010661E

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10867F	00682278X	DUP	TH227		72.1	0.91	PASS
B3.10867F	00682278X	DUP	TH228		7.5	0.52	PASS
B3.10867F	00682278X	DUP	TH230		7.5	0.47	PASS
B3.10867F	00682278X	DUP	TH232		20.3	-1.30	PASS
LCS-00682277W	00682277W	LCS	TH230	107.7		1.67	PASS
RBK-00682276V	00682276V	RBK	TH227				PASS
RBK-00682276V	00682276V	RBK	TH228				PASS
RBK-00682276V	00682276V	RBK	TH230				PASS
RBK-00682276V	00682276V	RBK	TH232				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
TH ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300086

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Thorium) by Extraction Chromatography
Report ID:	1300086-TH
Report type:	Original
Date reported:	01/16/2014
Total pages in report:	32

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10884G	R34243-21	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10885H	R34243-22	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10886J	R34243-23	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10887K	R34243-24	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10888L	R34243-25	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10889M	R34243-26	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10890E	R34243-27	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10891F	R34243-28	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10892G	R34243-29	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10893H	R34243-30	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10894J	R34243-31	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10895K	R34243-32	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10896L	R34243-33	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10897M	R34243-34	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10898N	R34243-35	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10899P	R34243-36	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10900N	R34243-37	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10901P	R34243-38	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10902Q	R34243-39	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10903R	R34243-40	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – The samples in QC batch 0010586L were reanalyzed because of LCS failure during original analysis. The results of the reanalyses are reported in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-30-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-30-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

ANALYSIS SUMMARY

Analysis method: NAREL TH-EICHROM
Title: Actinides (Thorium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10884G	R34243-21		12/17/2013	0010586L	0014462B
B3.10885H	R34243-22		12/17/2013	0010586L	0014462B
B3.10886J	R34243-23		12/17/2013	0010586L	0014462B
B3.10887K	R34243-24		12/17/2013	0010586L	0014462B
B3.10888L	R34243-25		12/17/2013	0010586L	0014462B
B3.10889M	R34243-26		12/17/2013	0010586L	0014462B
B3.10890E	R34243-27		12/17/2013	0010586L	0014462B
B3.10891F	R34243-28		12/17/2013	0010586L	0014462B
B3.10892G	R34243-29		12/17/2013	0010586L	0014462B
B3.10893H	R34243-30		12/17/2013	0010586L	0014462B
B3.10893H	R34243-30	DUP	12/17/2013	0010586L	0014462B
B3.10894J	R34243-31		01/15/2014	0010637E	0017720N
B3.10895K	R34243-32		01/15/2014	0010637E	0017720N
B3.10896L	R34243-33		01/15/2014	0010637E	0017720N
B3.10897M	R34243-34		01/15/2014	0010637E	0017720N
B3.10898N	R34243-35		01/15/2014	0010637E	0017720N
B3.10899P	R34243-36		01/15/2014	0010637E	0017720N
B3.10900N	R34243-37		01/15/2014	0010637E	0017720N
B3.10900N	R34243-37	DUP	01/15/2014	0010637E	0017720N
B3.10901P	R34243-38		01/15/2014	0010637E	0017720N
B3.10902Q	R34243-39		01/15/2014	0010637E	0017720N
B3.10903R	R34243-40		01/15/2014	0010637E	0017720N
LCS-00680466Q *		LCS	12/17/2013	0010586L	0014462B
RBK-00680465P *		RBK	12/17/2013	0010586L	0014462B
LCS-00681920W *		LCS	01/15/2014	0010637E	0017720N
RBK-00681919D *		RBK	01/15/2014	0010637E	0017720N

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10884G	Amount analyzed:	2.528e-01 GASH
Client sample ID:	R34243-21	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 10:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	75.08 %	Analyst:	PMT
Ash/dry weight:	93.89 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS33	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.68e-02	1.4e-01	2.6e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	7.53e-01	2.3e-01	1.5e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	5.61e-01	1.9e-01	9.9e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	8.17e-01	2.3e-01	9.9e-02	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10885H	Amount analyzed:	2.632e-01 GASH
Client sample ID:	R34243-22	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 10:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	79.26 %	Analyst:	PMT
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS34	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	8.67e-02	1.6e-01	2.6e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	9.17e-01	2.9e-01	1.9e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	1.10e+00	3.1e-01	9.4e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	1.17e+00	3.2e-01	1.4e-01	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10886J	Amount analyzed:	2.540e-01 GASH
Client sample ID:	R34243-23	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 10:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	79.05 %	Analyst:	PMT
Ash/dry weight:	93.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS36	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	7.13e-02	1.5e-01	2.7e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	8.56e-01	2.8e-01	2.1e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	8.60e-01	2.6e-01	9.0e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	9.19e-01	2.7e-01	1.2e-01	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10887K	Amount analyzed:	2.500e-01 GASH
Client sample ID:	R34243-24	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 11:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.87 %	Analyst:	PMT
Ash/dry weight:	89.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS37	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.33e-01	1.3e-01	1.3e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	1.04e+00	2.6e-01	1.3e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	9.07e-01	2.4e-01	6.7e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	9.05e-01	2.4e-01	6.7e-02	PCI/GDRY	12/13/2013 10:45 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10888L	Amount analyzed:	2.504e-01 GASH
Client sample ID:	R34243-25	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 11:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.05 %	Analyst:	PMT
Ash/dry weight:	90.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS38	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.59e-01	1.7e-01	2.4e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	1.32e+00	3.3e-01	2.1e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	1.15e+00	2.9e-01	1.1e-01	PCI/GDRY	12/13/2013 10:45 CST
Th232	1.12e+00	2.9e-01	1.1e-01	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10889M	Amount analyzed:	2.524e-01 GASH
Client sample ID:	R34243-26	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 11:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.59 %	Analyst:	PMT
Ash/dry weight:	94.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS39	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	9.08e-02	1.4e-01	2.3e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	1.13e+00	2.9e-01	1.7e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	8.97e-01	2.5e-01	7.7e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	1.02e+00	2.7e-01	1.1e-01	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10890E	Amount analyzed:	2.526e-01 GASH
Client sample ID:	R34243-27	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	77.72 %	Analyst:	PMT
Ash/dry weight:	94.79 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS40	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	4.16e-01	2.7e-01	2.6e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	1.20e+00	3.3e-01	2.1e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	7.62e-01	2.5e-01	1.3e-01	PCI/GDRY	12/13/2013 10:45 CST
Th232	9.76e-01	2.9e-01	9.3e-02	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10891F	Amount analyzed:	2.533e-01 GASH
Client sample ID:	R34243-28	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 11:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	74.49 %	Analyst:	PMT
Ash/dry weight:	94.14 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS82	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.21e-01	1.4e-01	1.5e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	7.21e-01	2.3e-01	1.7e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	1.02e+00	2.7e-01	7.7e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	7.49e-01	2.3e-01	1.1e-01	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10892G	Amount analyzed:	2.561e-01 GASH
Client sample ID:	R34243-29	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	77.64 %	Analyst:	PMT
Ash/dry weight:	93.91 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS83	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.40e-02	1.1e-01	1.6e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	1.12e+00	2.9e-01	1.3e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	9.33e-01	2.6e-01	1.2e-01	PCI/GDRY	12/13/2013 10:45 CST
Th232	1.07e+00	2.8e-01	1.1e-01	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.558e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS84	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.02e-01	1.3e-01	1.7e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	1.04e+00	2.6e-01	1.1e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	7.35e-01	2.2e-01	9.8e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	7.85e-01	2.2e-01	7.1e-02	PCI/GDRY	12/13/2013 10:45 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.506e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010586L
Matrix:	SEDIMENT	Assay batch #:	0014462B
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS85	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.21e-02	1.1e-01	1.6e-01	PCI/GDRY	12/13/2013 10:45 CST
Th228	9.39e-01	2.7e-01	1.6e-01	PCI/GDRY	12/13/2013 10:45 CST
Th230	9.32e-01	2.6e-01	9.7e-02	PCI/GDRY	12/13/2013 10:45 CST
Th232	6.39e-01	2.1e-01	7.8e-02	PCI/GDRY	12/13/2013 10:45 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10894J	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-31	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 14:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	76.59 %	Analyst:	PMT
Ash/dry weight:	93.56 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:41	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	8.78e-02	1.1e-01	1.5e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	9.54e-01	2.4e-01	1.1e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	7.47e-01	2.1e-01	8.0e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	7.71e-01	2.2e-01	8.0e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10895K	Amount analyzed:	2.534e-01 GASH
Client sample ID:	R34243-32	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	77.05 %	Analyst:	PMT
Ash/dry weight:	94.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:41	1000.0	AS98	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	4.74e-02	8.4e-02	1.2e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	9.26e-01	2.4e-01	1.1e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	8.07e-01	2.2e-01	6.4e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	7.12e-01	2.0e-01	7.9e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10896L	Amount analyzed:	2.583e-01 GASH
Client sample ID:	R34243-33	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 14:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	79.75 %	Analyst:	PMT
Ash/dry weight:	92.72 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:41	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.25e-01	1.3e-01	1.6e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	1.40e+00	3.0e-01	9.6e-02	PCI/GDRY	01/13/2014 11:30 CST
Th230	1.14e+00	2.7e-01	8.8e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	6.01e-01	1.9e-01	1.0e-01	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10897M	Amount analyzed:	2.550e-01 GASH
Client sample ID:	R34243-34	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	72.60 %	Analyst:	PMT
Ash/dry weight:	91.78 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:41	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.39e-01	1.2e-01	1.2e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	9.19e-01	2.4e-01	1.0e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	7.94e-01	2.2e-01	7.7e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	6.56e-01	1.9e-01	7.7e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10898N	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-35	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	51.58 %	Analyst:	PMT
Ash/dry weight:	88.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:41	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.59e-01	1.6e-01	2.0e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	1.28e+00	3.0e-01	1.2e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	1.10e+00	2.7e-01	8.9e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	1.17e+00	2.8e-01	8.8e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10899P	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-36	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	40.94 %	Analyst:	PMT
Ash/dry weight:	83.95 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS102	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	4.11e-02	1.1e-01	2.1e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	1.22e+00	3.2e-01	1.9e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	1.18e+00	3.1e-01	8.4e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	1.30e+00	3.2e-01	1.3e-01	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	8.33e-02	9.0e-02	1.1e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	1.56e+00	2.9e-01	7.9e-02	PCI/GDRY	01/13/2014 11:30 CST
Th230	8.20e-01	2.0e-01	4.9e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	1.16e+00	2.4e-01	7.3e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.597e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.55e-02	7.0e-02	1.3e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	1.36e+00	2.7e-01	1.2e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	1.01e+00	2.3e-01	5.2e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	1.16e+00	2.5e-01	7.2e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10901P	Amount analyzed:	2.600e-01 GASH
Client sample ID:	R34243-38	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 15:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	60.45 %	Analyst:	PMT
Ash/dry weight:	89.51 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS105	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.06e-01	1.0e-01	1.2e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	9.43e-01	2.2e-01	7.7e-02	PCI/GDRY	01/13/2014 11:30 CST
Th230	7.60e-01	1.9e-01	5.1e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	8.57e-01	2.0e-01	6.3e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10902Q	Amount analyzed:	2.567e-01 GASH
Client sample ID:	R34243-39	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	76.77 %	Analyst:	PMT
Ash/dry weight:	93.30 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS106	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.41e-01	1.3e-01	1.2e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	9.16e-01	2.4e-01	1.6e-01	PCI/GDRY	01/13/2014 11:30 CST
Th230	7.38e-01	2.1e-01	6.4e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	8.43e-01	2.2e-01	8.8e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10903R	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-40	Preparation batch #:	0010637E
Matrix:	SEDIMENT	Assay batch #:	0017720N
Collected:	2013-09-18 16:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	46.07 %	Analyst:	PMT
Ash/dry weight:	87.73 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS107	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.43e-01	1.2e-01	1.4e-01	PCI/GDRY	01/13/2014 11:30 CST
Th228	1.56e+00	3.0e-01	8.0e-02	PCI/GDRY	01/13/2014 11:30 CST
Th230	1.14e+00	2.5e-01	6.5e-02	PCI/GDRY	01/13/2014 11:30 CST
Th232	1.20e+00	2.5e-01	5.3e-02	PCI/GDRY	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680466Q	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010586L
Matrix:	N/A	Assay batch #:	0014462B
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS86	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	4.30e-03	1.9e-02	4.0e-02	PCI	12/13/2013 10:45 CST
Th228	1.08e-03	1.5e-02	3.2e-02	PCI	12/13/2013 10:45 CST
Th230	1.91e+00	1.8e-01	1.6e-02	PCI	12/13/2013 10:45 CST
Th232	6.04e-02	2.9e-02	2.0e-02	PCI	12/13/2013 10:45 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680465P	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010586L
Matrix:	N/A	Assay batch #:	0014462B
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/16/2013 14:55	1000.0	AS87	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	0.00e+00	1.3e-02	3.1e-02	PCI	12/13/2013 10:45 CST
Th228	2.07e-03	1.2e-02	2.5e-02	PCI	12/13/2013 10:45 CST
Th230	6.21e-03	1.3e-02	2.3e-02	PCI	12/13/2013 10:45 CST
Th232	1.24e-02	1.4e-02	1.6e-02	PCI	12/13/2013 10:45 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00681920W	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010637E
Matrix:	N/A	Assay batch #:	0017720N
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS109	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.07e-03	1.5e-02	2.5e-02	PCI	01/13/2014 11:30 CST
Th228	3.20e-02	2.1e-02	2.2e-02	PCI	01/13/2014 11:30 CST
Th230	1.93e+00	1.7e-01	1.4e-02	PCI	01/13/2014 11:30 CST
Th232	1.28e-02	1.4e-02	1.7e-02	PCI	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00681919D	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010637E
Matrix:	N/A	Assay batch #:	0017720N
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/14/2014 16:42	1000.0	AS110	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	5.72e-03	1.7e-02	2.9e-02	PCI	01/13/2014 11:30 CST
Th228	1.96e-02	1.8e-02	2.1e-02	PCI	01/13/2014 11:30 CST
Th230	3.09e-02	2.1e-02	1.5e-02	PCI	01/13/2014 11:30 CST
Th232	1.54e-02	1.5e-02	1.5e-02	PCI	01/13/2014 11:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010586L
Analysis method: NAREL TH-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10884G	R34243-21	00680467R		74.75 %	1.99 %	PMT
B3.10885H	R34243-22	00680468T		52.52 %	1.52 %	PMT
B3.10886J	R34243-23	00680469U		55.94 %	1.59 %	PMT
B3.10887K	R34243-24	00680470L		76.84 %	2.03 %	PMT
B3.10888L	R34243-25	00680471M		64.82 %	1.78 %	PMT
B3.10889M	R34243-26	00680472N		65.93 %	1.80 %	PMT
B3.10890E	R34243-27	00680473P		55.22 %	1.57 %	PMT
B3.10891F	R34243-28	00680474Q		70.20 %	1.89 %	PMT
B3.10892G	R34243-29	00680475R		65.31 %	1.79 %	PMT
B3.10893H	R34243-30	00680476T		75.94 %	2.01 %	PMT
B3.10893H	R34243-30	00680464N	DUP	71.31 %	1.91 %	PMT
LCS-00680466Q *		00680466Q	LCS	91.89 %	2.35 %	PMT
RBK-00680465P *		00680465P	RBK	92.73 %	2.36 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010586L

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10893H	00680464N	DUP	TH227		49.0	-0.48	PASS
B3.10893H	00680464N	DUP	TH228		10.4	-0.55	PASS
B3.10893H	00680464N	DUP	TH230		23.6	1.16	PASS
B3.10893H	00680464N	DUP	TH232		20.5	-0.95	PASS
LCS-00680466Q	00680466Q	LCS	TH230	94.3		-1.27	PASS
RBK-00680465P	00680465P	RBK	TH227				PASS
RBK-00680465P	00680465P	RBK	TH228				PASS
RBK-00680465P	00680465P	RBK	TH230				PASS
RBK-00680465P	00680465P	RBK	TH232				PASS

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010637E
Analysis method: NAREL TH-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10894J	R34243-31	00677074C		79.94 %	2.91 %	PMT
B3.10895K	R34243-32	00677080A		81.94 %	3.00 %	PMT
B3.10896L	R34243-33	00677086G		80.70 %	2.95 %	PMT
B3.10897M	R34243-34	00677092E		82.69 %	2.98 %	PMT
B3.10898N	R34243-35	00677098L		69.95 %	2.66 %	PMT
B3.10899P	R34243-36	00677104Q		58.44 %	2.32 %	PMT
B3.10900N	R34243-37	00677110N		95.63 %	3.34 %	PMT
B3.10900N	R34243-37	00681918C	DUP	85.34 %	3.06 %	PMT
B3.10901P	R34243-38	00677116V		93.60 %	3.30 %	PMT
B3.10902Q	R34243-39	00677122T		77.81 %	2.85 %	PMT
B3.10903R	R34243-40	00677128Z		92.69 %	3.26 %	PMT
LCS-00681920W *		00681920W	LCS	101.02 %	3.53 %	PMT
RBK-00681919D *		00681919D	RBK	94.76 %	3.31 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010637E

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10900N	00681918C	DUP	TH227		106.2	-1.02	PASS
B3.10900N	00681918C	DUP	TH228		13.6	-0.99	PASS
B3.10900N	00681918C	DUP	TH230		21.1	1.29	PASS
B3.10900N	00681918C	DUP	TH232		0.3	0.02	PASS
LCS-00681920W	00681920W	LCS	TH230	95.2		-1.09	PASS
RBK-00681919D	00681919D	RBK	TH227				PASS
RBK-00681919D	00681919D	RBK	TH228				PASS
RBK-00681919D	00681919D	RBK	TH230				PASS
RBK-00681919D	00681919D	RBK	TH232				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
TH ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300087

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Thorium) by Extraction Chromatography
Report ID:	1300087-TH
Report type:	Original
Date reported:	02/11/2014
Total pages in report:	22

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10904T	R34243-41	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10905U	R34243-42	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10906V	R34243-43	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10907W	R34243-44	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10908X	R34243-45	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10909Y	R34243-46	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10910Q	R34243-47	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10911R	R34243-48	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10912T	R34243-49	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10913U	R34243-50	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10914V	R34243-51	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10915W	R34243-52	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10916X	R34243-53	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10917Y	R34243-54	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-12-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-12-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

ANALYSIS SUMMARY

Analysis method: NAREL TH-EICHROM
Title: Actinides (Thorium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10904T	R34243-41		02/07/2014	0010695Q	0017789L
B3.10905U	R34243-42		02/07/2014	0010695Q	0017789L
B3.10906V	R34243-43		02/07/2014	0010695Q	0017789L
B3.10906V	R34243-43	DUP	02/07/2014	0010695Q	0017789L
B3.10907W	R34243-44		02/07/2014	0010695Q	0017789L
B3.10908X	R34243-45		02/07/2014	0010695Q	0017789L
B3.10909Y	R34243-46		02/07/2014	0010695Q	0017789L
B3.10910Q	R34243-47		02/07/2014	0010695Q	0017789L
B3.10911R	R34243-48		02/07/2014	0010695Q	0017789L
B3.10912T	R34243-49		02/07/2014	0010695Q	0017789L
B3.10913U	R34243-50		02/07/2014	0010695Q	0017789L
B3.10914V	R34243-51		02/07/2014	0010695Q	0017789L
B3.10915W	R34243-52		02/07/2014	0010695Q	0017789L
B3.10916X	R34243-53		02/07/2014	0010695Q	0017789L
B3.10917Y	R34243-54		02/07/2014	0010695Q	0017789L
LCS-00683200C *		LCS	02/07/2014	0010695Q	0017789L
RBK-00683199D *		RBK	02/07/2014	0010695Q	0017789L

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

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NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10904T	Amount analyzed:	2.522e-01 GASH
Client sample ID:	R34243-41	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	36.72 %	Analyst:	AS
Ash/dry weight:	84.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS33	CEB

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227		0.00e+00	7.5e-02	1.8e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	J	1.16e+00	2.5e-01	1.1e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230		1.15e+00	2.4e-01	5.2e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232		1.05e+00	2.3e-01	7.9e-02	PCI/GDRY	02/05/2014 10:50 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10905U	Amount analyzed:	2.590e-01 GASH
Client sample ID:	R34243-42	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	65.29 %	Analyst:	AS
Ash/dry weight:	89.03 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS34	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	3.69e-02	7.8e-02	1.4e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.03e+00	2.3e-01	1.1e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	1.06e+00	2.3e-01	5.0e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	1.21e+00	2.5e-01	6.2e-02	PCI/GDRY	02/05/2014 10:50 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.520e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS35	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.95e-02	7.3e-02	1.5e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.20e+00	2.6e-01	1.5e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	7.21e-01	1.9e-01	7.3e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	9.80e-01	2.3e-01	9.6e-02	PCI/GDRY	02/05/2014 10:50 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.560e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS36	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.55e-02	7.0e-02	1.3e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.25e+00	2.6e-01	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	7.91e-01	2.0e-01	8.4e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	7.31e-01	1.9e-01	7.8e-02	PCI/GDRY	02/05/2014 10:50 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10907W	Amount analyzed:	2.542e-01 GASH
Client sample ID:	R34243-44	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 13:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	46.70 %	Analyst:	AS
Ash/dry weight:	89.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS37	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.10e-01	1.0e-01	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.31e+00	2.7e-01	1.1e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	1.09e+00	2.4e-01	5.3e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	9.94e-01	2.2e-01	7.3e-02	PCI/GDRY	02/05/2014 10:50 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10908X	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-45	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 13:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	43.30 %	Analyst:	AS
Ash/dry weight:	89.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS38	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	9.50e-02	1.0e-01	1.4e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.13e+00	2.5e-01	1.4e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	1.13e+00	2.4e-01	7.1e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	9.19e-01	2.1e-01	6.3e-02	PCI/GDRY	02/05/2014 10:50 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10909Y	Amount analyzed:	2.510e-01 GASH
Client sample ID:	R34243-46	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 13:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	58.55 %	Analyst:	AS
Ash/dry weight:	88.33 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS39	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.18e-02	8.6e-02	1.3e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.00e+00	2.3e-01	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	7.94e-01	1.9e-01	7.0e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	8.03e-01	2.0e-01	7.0e-02	PCI/GDRY	02/05/2014 10:50 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10910Q	Amount analyzed:	2.512e-01 GASH
Client sample ID:	R34243-47	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 14:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	59.02 %	Analyst:	AS
Ash/dry weight:	91.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS81	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.32e-01	1.1e-01	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.16e+00	2.5e-01	1.1e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	9.63e-01	2.2e-01	5.4e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	1.02e+00	2.3e-01	7.4e-02	PCI/GDRY	02/05/2014 10:50 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10911R	Amount analyzed:	2.521e-01 GASH
Client sample ID:	R34243-48	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	61.08 %	Analyst:	AS
Ash/dry weight:	91.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS82	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	3.31e-02	7.1e-02	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	9.10e-01	2.2e-01	1.1e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	7.39e-01	1.9e-01	8.1e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	7.45e-01	1.9e-01	6.6e-02	PCI/GDRY	02/05/2014 10:50 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10912T	Amount analyzed:	2.570e-01 GASH
Client sample ID:	R34243-49	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 17:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	68.18 %	Analyst:	AS
Ash/dry weight:	87.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS83	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.02e-01	1.0e-01	1.3e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.13e+00	2.4e-01	7.2e-02	PCI/GDRY	02/05/2014 10:50 CST
Th230	6.77e-01	1.8e-01	6.4e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	9.34e-01	2.2e-01	6.4e-02	PCI/GDRY	02/05/2014 10:50 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10913U	Amount analyzed:	2.552e-01 GASH
Client sample ID:	R34243-50	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 17:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	68.63 %	Analyst:	AS
Ash/dry weight:	77.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS84	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.61e-02	7.5e-02	8.3e-02	PCI/GDRY	02/05/2014 10:50 CST
Th228	8.57e-01	1.9e-01	6.8e-02	PCI/GDRY	02/05/2014 10:50 CST
Th230	8.09e-01	1.9e-01	5.5e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	6.71e-01	1.7e-01	6.2e-02	PCI/GDRY	02/05/2014 10:50 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10914V	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-51	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	78.82 %	Analyst:	AS
Ash/dry weight:	94.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS85	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	6.27e-02	8.5e-02	1.1e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	9.75e-01	2.3e-01	9.7e-02	PCI/GDRY	02/05/2014 10:50 CST
Th230	8.24e-01	2.1e-01	5.7e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	8.23e-01	2.1e-01	5.7e-02	PCI/GDRY	02/05/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10915W	Amount analyzed:	2.573e-01 GASH
Client sample ID:	R34243-52	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	59.52 %	Analyst:	AS
Ash/dry weight:	91.11 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS86	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	2.08e-02	6.1e-02	1.0e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.03e+00	2.4e-01	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th230	7.71e-01	2.0e-01	6.9e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	7.10e-01	1.9e-01	7.8e-02	PCI/GDRY	02/05/2014 10:50 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10916X	Amount analyzed:	2.516e-01 GASH
Client sample ID:	R34243-53	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 17:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	60.42 %	Analyst:	AS
Ash/dry weight:	84.47 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS87	CEB

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227		1.24e-02	5.6e-02	1.2e-01	PCI/GDRY	02/05/2014 10:50 CST
Th228	J	1.34e+00	2.6e-01	8.7e-02	PCI/GDRY	02/05/2014 10:50 CST
Th230		1.12e+00	2.4e-01	6.2e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232		1.13e+00	2.4e-01	7.6e-02	PCI/GDRY	02/05/2014 10:50 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10917Y	Amount analyzed:	2.533e-01 GASH
Client sample ID:	R34243-54	Preparation batch #:	0010695Q
Matrix:	SEDIMENT	Assay batch #:	0017789L
Collected:	2013-09-19 18:40 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	75.12 %	Analyst:	AS
Ash/dry weight:	70.04 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS97	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	1.61e-01	1.1e-01	8.1e-02	PCI/GDRY	02/05/2014 10:50 CST
Th228	1.09e+00	2.2e-01	9.5e-02	PCI/GDRY	02/05/2014 10:50 CST
Th230	9.35e-01	2.0e-01	5.4e-02	PCI/GDRY	02/05/2014 10:50 CST
Th232	8.30e-01	1.9e-01	5.4e-02	PCI/GDRY	02/05/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00683200C	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010695Q
Matrix:	N/A	Assay batch #:	0017789L
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS98	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	0.00e+00	1.1e-02	2.6e-02	PCI	02/05/2014 10:50 CST
Th228	5.44e-02	2.6e-02	2.0e-02	PCI	02/05/2014 10:50 CST
Th230	1.98e+00	1.7e-01	1.4e-02	PCI	02/05/2014 10:50 CST
Th232	1.87e-02	1.6e-02	1.7e-02	PCI	02/05/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00683199D	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010695Q
Matrix:	N/A	Assay batch #:	0017789L
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL TH-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:36	1000.0	AS99	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Th227	0.00e+00	1.7e-02	4.1e-02	PCI	02/05/2014 10:50 CST
Th228	8.68e-03	1.4e-02	2.2e-02	PCI	02/05/2014 10:50 CST
Th230	2.02e-02	1.6e-02	1.4e-02	PCI	02/05/2014 10:50 CST
Th232	5.78e-03	1.0e-02	1.4e-02	PCI	02/05/2014 10:50 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300087

PREPARATION BATCH SUMMARY

Preparation batch #: 0010695Q
Analysis method: NAREL TH-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10904T	R34243-41	00677134X		92.46 %	2.17 %	AS
B3.10905U	R34243-42	00677140V		94.27 %	2.23 %	AS
B3.10906V	R34243-43	00677146B		99.38 %	2.32 %	AS
B3.10906V	R34243-43	00683198C	DUP	96.43 %	2.28 %	AS
B3.10907W	R34243-44	00677152Z		95.56 %	2.24 %	AS
B3.10908X	R34243-45	00677158F		97.62 %	2.30 %	AS
B3.10909Y	R34243-46	00677164D		94.23 %	2.22 %	AS
B3.10910Q	R34243-47	00677170B		96.41 %	2.28 %	AS
B3.10911R	R34243-48	00677176H		97.41 %	2.28 %	AS
B3.10912T	R34243-49	00677182F		95.12 %	2.22 %	AS
B3.10913U	R34243-50	00677188M		97.49 %	2.28 %	AS
B3.10914V	R34243-51	00677194K		98.05 %	2.31 %	AS
B3.10915W	R34243-52	00677200P		93.84 %	2.21 %	AS
B3.10916X	R34243-53	00677206W		96.14 %	2.24 %	AS
B3.10917Y	R34243-54	00677212U		90.20 %	2.15 %	AS
LCS-00683200C *		00683200C	LCS	100.12 %	2.35 %	AS
RBK-00683199D *		00683199D	RBK	98.20 %	2.30 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010695Q

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10906V	00683198C	DUP	TH227		26.4	0.12	PASS
B3.10906V	00683198C	DUP	TH228		4.0	0.27	PASS
B3.10906V	00683198C	DUP	TH230		9.3	0.51	PASS
B3.10906V	00683198C	DUP	TH232		29.0	-1.69	PASS
LCS-00683200C	00683200C	LCS	TH230	97.8		-0.50	PASS
RBK-00683199D	00683199D	RBK	TH227				PASS
RBK-00683199D	00683199D	RBK	TH228				PASS
RBK-00683199D	00683199D	RBK	TH230				PASS
RBK-00683199D	00683199D	RBK	TH232				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
U ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300084

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Uranium) by Extraction Chromatography
Report ID:	1300084-U
Report type:	Original
Date reported:	01/28/2014
Total pages in report:	23

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10849D	R34243-55	PA:KISKIMERE	WATER-GROUND	09/16/2013	09/27/2013
B3.10850W	R34243-66	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10851X	R34243-56	PA:KISKIMERE	WATER-GROUND	09/17/2013	09/27/2013
B3.10852Y	R34243-68	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10853Z	R34243-57	PA:KISKIMERE	WATER-GROUND	09/18/2013	09/27/2013
B3.10854A	R34243-65	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10855B	R34243-58	PA:KISKIMERE	WATER-GROUND	09/19/2013	09/27/2013
B3.10856C	R34243-67	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10857D	R34243-59	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10858E	R34243-60	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10859F	R34243-61	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10860Y	R34243-62	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10861Z	R34243-63	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10862A	R34243-64	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10863B	R34243-69	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – All samples in this SDG were reanalyzed as a result of peak tailing that interfered with quantification of the uranium isotopes. The results of the reanalyses are reported in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-3-14

Mary F. Wisdom Date
Quality Assurance Manager, NAREL

Cynthia White 2-3-14

Cynthia White Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

ANALYSIS SUMMARY

Analysis method: NAREL U-EICHROM
Title: Actinides (Uranium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10849D	R34243-55		12/24/2013	0010610T	0017668C
B3.10849D	R34243-55	DUP	12/24/2013	0010610T	0017668C
B3.10850W	R34243-66		12/24/2013	0010610T	0017668C
B3.10851X	R34243-56		12/24/2013	0010610T	0017668C
B3.10852Y	R34243-68		12/24/2013	0010610T	0017668C
B3.10853Z	R34243-57		12/24/2013	0010610T	0017668C
B3.10854A	R34243-65		12/24/2013	0010610T	0017668C
B3.10855B	R34243-58		12/24/2013	0010610T	0017668C
B3.10856C	R34243-67		12/24/2013	0010610T	0017668C
B3.10857D	R34243-59		12/24/2013	0010610T	0017668C
B3.10858E	R34243-60		12/24/2013	0010610T	0017668C
B3.10859F	R34243-61		12/24/2013	0010610T	0017668C
B3.10860Y	R34243-62		12/24/2013	0010610T	0017668C
B3.10861Z	R34243-63		12/24/2013	0010610T	0017668C
B3.10862A	R34243-64		12/24/2013	0010610T	0017668C
B3.10863B	R34243-69		12/24/2013	0010610T	0017668C
LCS-00681067H *		LCS	12/24/2013	0010610T	0017668C
RBK-00681066G *		RBK	12/24/2013	0010610T	0017668C

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-55	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS33	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.89e-02	8.5e-02	9.7e-02	PCI/L	12/23/2013 15:30 CST
U235	6.26e-03	5.7e-02	1.3e-01	PCI/L	12/23/2013 15:30 CST
U238	7.32e-02	7.9e-02	9.7e-02	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-55	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS34	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	4.30e-02	5.8e-02	7.2e-02	PCI/L	12/23/2013 15:30 CST
U235	5.73e-03	5.3e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U238	4.78e-02	6.6e-02	1.0e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10850W	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-66	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-23 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS36	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	5.88e-02	6.7e-02	7.4e-02	PCI/L	12/23/2013 15:30 CST
U235	0.00e+00	3.7e-02	8.8e-02	PCI/L	12/23/2013 15:30 CST
U238	3.43e-02	6.1e-02	1.0e-01	PCI/L	12/23/2013 15:30 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10851X	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-56	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-17 19:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS37	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	3.16e-02	5.6e-02	7.9e-02	PCI/L	12/23/2013 15:30 CST
U235	1.89e-02	5.5e-02	9.5e-02	PCI/L	12/23/2013 15:30 CST
U238	3.16e-02	6.7e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10852Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-68	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-24 13:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS38	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	6.38e-02	7.4e-02	1.0e-01	PCI/L	12/23/2013 15:30 CST
U235	2.35e-02	6.4e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U238	4.90e-02	6.8e-02	1.0e-01	PCI/L	12/23/2013 15:30 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10853Z	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-57	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-18 19:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS39	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.96e-03	4.5e-02	9.2e-02	PCI/L	12/23/2013 15:30 CST
U235	2.98e-02	6.4e-02	1.1e-01	PCI/L	12/23/2013 15:30 CST
U238	3.98e-02	6.1e-02	9.2e-02	PCI/L	12/23/2013 15:30 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10854A	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-65	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-23 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS40	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	2.47e-02	6.3e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U235	8.30e-02	9.0e-02	1.1e-01	PCI/L	12/23/2013 15:30 CST
U238	2.47e-02	6.3e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10855B	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-58	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-19 20:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS67	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.58e-02	8.6e-02	8.0e-02	PCI/L	12/23/2013 15:30 CST
U235	3.19e-02	6.9e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U238	1.12e-01	9.1e-02	8.0e-02	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10856C	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-67	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-24 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS68	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.96e-02	5.4e-02	1.0e-01	PCI/L	12/23/2013 15:30 CST
U235	1.18e-02	5.3e-02	1.1e-01	PCI/L	12/23/2013 15:30 CST
U238	3.93e-02	6.1e-02	9.1e-02	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10857D	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-59	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-23 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS69	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	3.23e-01	1.5e-01	1.1e-01	PCI/L	12/23/2013 15:30 CST
U235	1.27e-02	5.7e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U238	1.91e-01	1.2e-01	8.0e-02	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10858E	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-60	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-23 16:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS70	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	6.47e-02	8.2e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U235	2.58e-02	7.1e-02	1.3e-01	PCI/L	12/23/2013 15:30 CST
U238	3.24e-02	6.8e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10859F	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-61	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-23 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS71	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	4.77e-02	8.3e-02	1.4e-01	PCI/L	12/23/2013 15:30 CST
U235	-6.34e-03	4.2e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U238	6.89e-02	8.0e-02	1.1e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-62	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS72	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.10e-01	9.7e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U235	6.90e-02	8.7e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST
U238	9.42e-02	9.2e-02	1.2e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10861Z	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-63	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-24 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS73	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.28e-01	2.2e-01	1.4e-01	PCI/L	12/23/2013 15:30 CST
U235	1.48e-02	5.5e-02	1.1e-01	PCI/L	12/23/2013 15:30 CST
U238	6.51e-01	1.9e-01	1.0e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10862A	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-64	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-24 18:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS74	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.65e-01	9.9e-02	8.0e-02	PCI/L	12/23/2013 15:30 CST
U235	2.08e-02	5.7e-02	1.1e-01	PCI/L	12/23/2013 15:30 CST
U238	6.52e-02	6.5e-02	6.5e-02	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10863B	Amount analyzed:	2.000e-01 L
Client sample ID:	R34243-69	Preparation batch #:	0010610T
Matrix:	WATER-GROUND	Assay batch #:	0017668C
Collected:	2013-09-24 08:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS75	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	2.26e+00	4.0e-01	1.9e-01	PCI/L	12/23/2013 15:30 CST
U235	8.72e-02	1.0e-01	1.6e-01	PCI/L	12/23/2013 15:30 CST
U238	1.10e+00	2.6e-01	1.3e-01	PCI/L	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00681067H	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010610T
Matrix:	N/A	Assay batch #:	0017668C
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS76	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	2.12e+00	2.3e-01	2.4e-02	PCI	12/23/2013 15:30 CST
U235	1.21e-01	4.6e-02	2.2e-02	PCI	12/23/2013 15:30 CST
U238	2.32e+00	2.5e-01	1.5e-02	PCI	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00681066G	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010610T
Matrix:	N/A	Assay batch #:	0017668C
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	SPK
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/23/2013 15:30	1000.0	AS78	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.35e-02	1.7e-02	2.7e-02	PCI	12/23/2013 15:30 CST
U235	-2.49e-03	8.6e-03	2.6e-02	PCI	12/23/2013 15:30 CST
U238	3.11e-03	1.2e-02	2.4e-02	PCI	12/23/2013 15:30 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300084

PREPARATION BATCH SUMMARY

Preparation batch #: 0010610T
Analysis method: NAREL U-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10849D	R34243-55	00681050Y		91.35 %	8.06 %	SPK
B3.10849D	R34243-55	00681065F	DUP	94.98 %	8.18 %	SPK
B3.10850W	R34243-66	00681051Z		92.56 %	8.02 %	SPK
B3.10851X	R34243-56	00681052A		90.10 %	7.95 %	SPK
B3.10852Y	R34243-68	00681053B		97.40 %	8.45 %	SPK
B3.10853Z	R34243-57	00681054C		89.61 %	7.79 %	SPK
B3.10854A	R34243-65	00681055D		91.23 %	7.94 %	SPK
B3.10855B	R34243-58	00681056E		80.37 %	6.96 %	SPK
B3.10856C	R34243-67	00681057F		87.11 %	7.38 %	SPK
B3.10857D	R34243-59	00681058G		81.98 %	7.09 %	SPK
B3.10858E	R34243-60	00681059H		83.77 %	7.29 %	SPK
B3.10859F	R34243-61	00681060A		81.26 %	7.03 %	SPK
B3.10860Y	R34243-62	00681061B		83.27 %	7.18 %	SPK
B3.10861Z	R34243-63	00681062C		94.65 %	7.83 %	SPK
B3.10862A	R34243-64	00681063D		88.35 %	7.40 %	SPK
B3.10863B	R34243-69	00681064E		82.06 %	6.72 %	SPK
LCS-00681067H *		00681067H	LCS	85.89 %	7.34 %	SPK
RBK-00681066G *		00681066G	RBK	92.23 %	8.11 %	SPK

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010610T

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10849D	00681065F	DUP	U234		69.5	-0.89	PASS
B3.10849D	00681065F	DUP	U235		8.9	-0.01	PASS
B3.10849D	00681065F	DUP	U238		42.0	-0.49	PASS
LCS-00681067H	00681067H	LCS	U234	108.0		1.31	PASS
LCS-00681067H	00681067H	LCS	U235	128.5		1.17	PASS
LCS-00681067H	00681067H	LCS	U238	113.7		2.19	WARN
RBK-00681066G	00681066G	RBK	U234				PASS
RBK-00681066G	00681066G	RBK	U235				PASS
RBK-00681066G	00681066G	RBK	U238				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
U ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300085

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Uranium) by Extraction Chromatography
Report ID:	1300085-U
Report type:	Original
Date reported:	01/28/2014
Total pages in report:	28

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10864C	R34243-01	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10865D	R34243-02	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10866E	R34243-03	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10867F	R34243-04	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10868G	R34243-05	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10869H	R34243-06	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10870A	R34243-07	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10871B	R34243-08	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10872C	R34243-09	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10873D	R34243-10	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10874E	R34243-11	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10875F	R34243-12	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10876G	R34243-13	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10877H	R34243-14	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10878J	R34243-15	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10879K	R34243-16	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10880C	R34243-17	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10881D	R34243-18	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10882E	R34243-19	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10883F	R34243-20	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – This entire SDG was reanalyzed because of a failure of the U-235 LCS result during the original analysis. The results of the reanalysis are reported in this data package.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-3-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-3-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

ANALYSIS SUMMARY

Analysis method: NAREL U-EICHROM
Title: Actinides (Uranium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10864C	R34243-01		01/24/2014	0010662F	0017747A
B3.10865D	R34243-02		01/24/2014	0010662F	0017747A
B3.10866E	R34243-03		01/24/2014	0010662F	0017747A
B3.10867F	R34243-04		01/24/2014	0010662F	0017747A
B3.10867F	R34243-04	DUP	01/24/2014	0010662F	0017747A
B3.10868G	R34243-05		01/24/2014	0010662F	0017747A
B3.10869H	R34243-06		01/24/2014	0010662F	0017747A
B3.10870A	R34243-07		01/24/2014	0010662F	0017747A
B3.10871B	R34243-08		01/24/2014	0010662F	0017747A
B3.10872C	R34243-09		01/24/2014	0010662F	0017747A
B3.10873D	R34243-10		01/24/2014	0010662F	0017747A
B3.10874E	R34243-11		01/24/2014	0010662F	0017747A
B3.10875F	R34243-12		01/24/2014	0010662F	0017747A
B3.10876G	R34243-13		01/24/2014	0010662F	0017747A
B3.10877H	R34243-14		01/24/2014	0010662F	0017747A
B3.10878J	R34243-15		01/24/2014	0010662F	0017747A
B3.10879K	R34243-16		01/24/2014	0010662F	0017747A
B3.10880C	R34243-17		01/24/2014	0010662F	0017747A
B3.10881D	R34243-18		01/24/2014	0010662F	0017747A
B3.10882E	R34243-19		01/24/2014	0010662F	0017747A
B3.10883F	R34243-20		01/24/2014	0010662F	0017747A
LCS-00682300B *		LCS	01/24/2014	0010662F	0017747A
RBK-00682299C *		RBK	01/24/2014	0010662F	0017747A

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10864C	Amount analyzed:	2.531e-01 GASH
Client sample ID:	R34243-01	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-16 16:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	66.45 %	Analyst:	AS
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS65	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	7.15e-01	2.3e-01	1.8e-01	PCI/GDRY	01/23/2014 16:20 CST
U235	1.22e-01	1.2e-01	1.7e-01	PCI/GDRY	01/23/2014 16:20 CST
U238	6.26e-01	2.1e-01	1.7e-01	PCI/GDRY	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10865D	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-02	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-16 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	51.28 %	Analyst:	AS
Ash/dry weight:	83.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS66	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.02e+00	2.5e-01	8.4e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	5.74e-02	6.7e-02	9.2e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	1.06e+00	2.5e-01	8.4e-02	PCI/GDRY	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10866E	Amount analyzed:	2.556e-01 GASH
Client sample ID:	R34243-03	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-16 17:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	47.72 %	Analyst:	AS
Ash/dry weight:	87.84 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS67	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.11e+00	2.6e-01	7.0e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	9.04e-02	7.9e-02	8.4e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	1.15e+00	2.7e-01	7.9e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS68	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.14e+00	2.6e-01	7.8e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	5.35e-02	6.1e-02	6.7e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	1.13e+00	2.6e-01	6.9e-02	PCI/GDRY	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	2.559e-01 GASH
Client sample ID:	R34243-04	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	46.16 %	Analyst:	AS
Ash/dry weight:	84.19 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS69	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.57e-01	2.3e-01	7.2e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	4.96e-02	5.7e-02	6.2e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	9.46e-01	2.3e-01	7.2e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10868G	Amount analyzed:	2.524e-01 GASH
Client sample ID:	R34243-05	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-16 17:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.29 %	Analyst:	AS
Ash/dry weight:	92.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS70	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.24e+00	2.8e-01	7.1e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	4.56e-02	6.4e-02	9.5e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	9.82e-01	2.4e-01	5.7e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10869H	Amount analyzed:	2.590e-01 GASH
Client sample ID:	R34243-06	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.28 %	Analyst:	AS
Ash/dry weight:	93.58 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS71	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.18e+00	2.8e-01	1.1e-01	PCI/GDRY	01/23/2014 16:20 CST
U235	4.00e-02	6.2e-02	9.3e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	1.15e+00	2.8e-01	1.0e-01	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10870A	Amount analyzed:	2.502e-01 GASH
Client sample ID:	R34243-07	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	58.95 %	Analyst:	AS
Ash/dry weight:	86.99 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS72	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.47e+00	3.1e-01	8.9e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	6.96e-02	7.2e-02	9.1e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	7.04e-01	2.0e-01	6.7e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10871B	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-08	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 13:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	76.57 %	Analyst:	AS
Ash/dry weight:	92.90 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS106	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.56e-01	2.5e-01	6.4e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	3.56e-02	6.4e-02	1.1e-01	PCI/GDRY	01/23/2014 16:20 CST
U238	9.18e-01	2.4e-01	6.4e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10872C	Amount analyzed:	2.515e-01 GASH
Client sample ID:	R34243-09	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	76.03 %	Analyst:	AS
Ash/dry weight:	92.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS107	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.57e-01	2.3e-01	7.2e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	7.43e-02	7.6e-02	9.7e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	9.50e-01	2.4e-01	7.2e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10873D	Amount analyzed:	2.517e-01 GASH
Client sample ID:	R34243-10	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	76.29 %	Analyst:	AS
Ash/dry weight:	94.98 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS109	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.38e-01	2.4e-01	7.7e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	7.92e-02	8.1e-02	1.0e-01	PCI/GDRY	01/23/2014 16:20 CST
U238	9.05e-01	2.4e-01	6.2e-02	PCI/GDRY	01/23/2014 16:20 CST

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10874E	Amount analyzed:	2.559e-01 GASH
Client sample ID:	R34243-11	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	70.88 %	Analyst:	AS
Ash/dry weight:	93.92 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS110	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.18e-01	2.4e-01	6.3e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	4.02e-02	6.2e-02	9.3e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	8.93e-01	2.4e-01	6.3e-02	PCI/GDRY	01/23/2014 16:20 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10875F	Amount analyzed:	2.541e-01 GASH
Client sample ID:	R34243-12	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	71.63 %	Analyst:	AS
Ash/dry weight:	93.88 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:19	1000.0	AS113	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.20e-01	2.0e-01	4.9e-02	PCI/GDRY	01/23/2014 16:19 CST
U235	3.12e-02	5.5e-02	9.5e-02	PCI/GDRY	01/23/2014 16:19 CST
U238	6.22e-01	1.7e-01	6.0e-02	PCI/GDRY	01/23/2014 16:19 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10876G	Amount analyzed:	2.555e-01 GASH
Client sample ID:	R34243-13	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	52.74 %	Analyst:	AS
Ash/dry weight:	91.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:19	1000.0	AS114	CEB

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234		1.03e+00	2.3e-01	4.8e-02	PCI/GDRY	01/23/2014 16:19 CST
U235		5.77e-02	5.8e-02	5.8e-02	PCI/GDRY	01/23/2014 16:19 CST
U238	J	1.03e+00	2.3e-01	4.8e-02	PCI/GDRY	01/23/2014 16:19 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10877H	Amount analyzed:	2.538e-01 GASH
Client sample ID:	R34243-14	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 14:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	63.62 %	Analyst:	AS
Ash/dry weight:	90.85 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:19	1000.0	AS115	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.03e+00	2.4e-01	6.3e-02	PCI/GDRY	01/23/2014 16:19 CST
U235	1.09e-01	7.9e-02	6.1e-02	PCI/GDRY	01/23/2014 16:19 CST
U238	9.76e-01	2.3e-01	8.7e-02	PCI/GDRY	01/23/2014 16:19 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10878J	Amount analyzed:	2.520e-01 GASH
Client sample ID:	R34243-15	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 15:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	80.79 %	Analyst:	AS
Ash/dry weight:	93.64 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:19	1000.0	AS117	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.21e+00	2.7e-01	7.9e-02	PCI/GDRY	01/23/2014 16:19 CST
U235	4.99e-02	6.4e-02	9.5e-02	PCI/GDRY	01/23/2014 16:19 CST
U238	8.93e-01	2.2e-01	6.5e-02	PCI/GDRY	01/23/2014 16:19 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10879K	Amount analyzed:	2.560e-01 GASH
Client sample ID:	R34243-16	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 15:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	74.29 %	Analyst:	AS
Ash/dry weight:	95.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:19	1000.0	AS118	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.89e-01	2.3e-01	5.3e-02	PCI/GDRY	01/23/2014 16:19 CST
U235	6.72e-02	6.9e-02	8.8e-02	PCI/GDRY	01/23/2014 16:19 CST
U238	8.00e-01	2.1e-01	5.3e-02	PCI/GDRY	01/23/2014 16:19 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10880C	Amount analyzed:	2.549e-01 GASH
Client sample ID:	R34243-17	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 15:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	71.01 %	Analyst:	AS
Ash/dry weight:	93.32 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:19	1000.0	AS119	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.29e+00	2.7e-01	7.2e-02	PCI/GDRY	01/23/2014 16:19 CST
U235	8.63e-02	7.2e-02	6.2e-02	PCI/GDRY	01/23/2014 16:19 CST
U238	2.99e+00	4.9e-01	7.2e-02	PCI/GDRY	01/23/2014 16:19 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10881D	Amount analyzed:	2.574e-01 GASH
Client sample ID:	R34243-18	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-17 16:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	68.61 %	Analyst:	AS
Ash/dry weight:	93.10 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS138	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.14e+00	2.5e-01	5.2e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	4.91e-02	5.6e-02	6.2e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	9.57e-01	2.3e-01	7.1e-02	PCI/GDRY	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10882E	Amount analyzed:	2.510e-01 GASH
Client sample ID:	R34243-19	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-18 10:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.78 %	Analyst:	AS
Ash/dry weight:	92.52 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS140	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.22e+00	2.7e-01	7.9e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	5.79e-02	6.3e-02	7.7e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	8.63e-01	2.2e-01	7.2e-02	PCI/GDRY	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10883F	Amount analyzed:	2.521e-01 GASH
Client sample ID:	R34243-20	Preparation batch #:	0010662F
Matrix:	SEDIMENT	Assay batch #:	0017747A
Collected:	2013-09-18 10:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	76.71 %	Analyst:	AS
Ash/dry weight:	92.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS142	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.29e+00	2.8e-01	5.3e-02	PCI/GDRY	01/23/2014 16:20 CST
U235	9.69e-02	7.8e-02	7.8e-02	PCI/GDRY	01/23/2014 16:20 CST
U238	9.64e-01	2.3e-01	7.4e-02	PCI/GDRY	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00682300B	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010662F
Matrix:	N/A	Assay batch #:	0017747A
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS143	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	2.00e+00	2.2e-01	1.4e-02	PCI	01/23/2014 16:20 CST
U235	9.14e-02	3.8e-02	1.7e-02	PCI	01/23/2014 16:20 CST
U238	2.13e+00	2.3e-01	1.4e-02	PCI	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00682299C	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010662F
Matrix:	N/A	Assay batch #:	0017747A
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/23/2014 16:20	1000.0	AS144	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.34e-02	1.5e-02	1.7e-02	PCI	01/23/2014 16:20 CST
U235	6.66e-03	1.4e-02	2.5e-02	PCI	01/23/2014 16:20 CST
U238	1.22e-02	1.5e-02	2.1e-02	PCI	01/23/2014 16:20 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300085

PREPARATION BATCH SUMMARY

Preparation batch #: 0010662F
Analysis method: NAREL U-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10864C	R34243-01	00682279Y		71.99 %	6.45 %	AS
B3.10865D	R34243-02	00682280Q		79.67 %	7.02 %	AS
B3.10866E	R34243-03	00682281R		77.93 %	6.82 %	AS
B3.10867F	R34243-04	00682282T		75.54 %	6.66 %	AS
B3.10867F	R34243-04	00682301C	DUP	82.81 %	7.15 %	AS
B3.10868G	R34243-05	00682283U		86.70 %	7.48 %	AS
B3.10869H	R34243-06	00682284V		74.52 %	6.61 %	AS
B3.10870A	R34243-07	00682285W		83.48 %	7.20 %	AS
B3.10871B	R34243-08	00682286X		76.28 %	6.77 %	AS
B3.10872C	R34243-09	00682287Y		79.09 %	6.83 %	AS
B3.10873D	R34243-10	00682288Z		79.28 %	6.93 %	AS
B3.10874E	R34243-11	00682289A		85.35 %	7.71 %	AS
B3.10875F	R34243-12	00682290T		82.28 %	6.79 %	AS
B3.10876G	R34243-13	00682291U		81.36 %	6.74 %	AS
B3.10877H	R34243-14	00682292V		76.14 %	6.39 %	AS
B3.10878J	R34243-15	00682293W		80.53 %	6.75 %	AS
B3.10879K	R34243-16	00682294X		75.68 %	6.35 %	AS
B3.10880C	R34243-17	00682295Y		76.69 %	6.42 %	AS
B3.10881D	R34243-18	00682296Z		76.95 %	6.46 %	AS
B3.10882E	R34243-19	00682297A		78.57 %	6.58 %	AS
B3.10883F	R34243-20	00682298B		76.86 %	6.48 %	AS
LCS-00682300B *		00682300B	LCS	76.49 %	6.42 %	AS
RBK-00682299C *		00682299C	RBK	65.73 %	5.77 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010662F

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10867F	00682301C	DUP	U234		17.6	-1.06	PASS
B3.10867F	00682301C	DUP	U235		7.4	-0.09	PASS
B3.10867F	00682301C	DUP	U238		18.1	-1.08	PASS
LCS-00682300B	00682300B	LCS	U234	102.0		0.35	PASS
LCS-00682300B	00682300B	LCS	U235	97.4		-0.13	PASS
LCS-00682300B	00682300B	LCS	U238	104.5		0.78	PASS
RBK-00682299C	00682299C	RBK	U234				PASS
RBK-00682299C	00682299C	RBK	U235				PASS
RBK-00682299C	00682299C	RBK	U238				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
U ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300086

Project: Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method: Actinides (Uranium) by Extraction Chromatography
Report ID: 1300086-U
Report type: Original
Date reported: 01/16/2014
Total pages in report: 32

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10884G	R34243-21	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10885H	R34243-22	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10886J	R34243-23	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10887K	R34243-24	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10888L	R34243-25	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10889M	R34243-26	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10890E	R34243-27	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10891F	R34243-28	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10892G	R34243-29	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10893H	R34243-30	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10894J	R34243-31	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10895K	R34243-32	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10896L	R34243-33	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10897M	R34243-34	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10898N	R34243-35	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10899P	R34243-36	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10900N	R34243-37	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10901P	R34243-38	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10902Q	R34243-39	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10903R	R34243-40	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-30-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-30-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

ANALYSIS SUMMARY

Analysis method: NAREL U-EICHROM
Title: Actinides (Uranium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10884G	R34243-21		12/05/2013	0010541X	0016925W
B3.10885H	R34243-22		12/05/2013	0010541X	0016925W
B3.10886J	R34243-23		12/05/2013	0010541X	0016925W
B3.10887K	R34243-24		12/05/2013	0010541X	0016925W
B3.10888L	R34243-25		12/05/2013	0010541X	0016925W
B3.10889M	R34243-26		12/05/2013	0010541X	0016925W
B3.10890E	R34243-27		12/05/2013	0010541X	0016925W
B3.10891F	R34243-28		12/05/2013	0010541X	0016925W
B3.10892G	R34243-29		12/05/2013	0010541X	0016925W
B3.10893H	R34243-30		12/05/2013	0010541X	0016925W
B3.10893H	R34243-30	DUP	12/05/2013	0010541X	0016925W
B3.10894J	R34243-31		01/16/2014	0010640Z	0017728X
B3.10895K	R34243-32		01/16/2014	0010640Z	0017728X
B3.10896L	R34243-33		01/16/2014	0010640Z	0017728X
B3.10897M	R34243-34		01/16/2014	0010640Z	0017728X
B3.10898N	R34243-35		01/16/2014	0010640Z	0017728X
B3.10899P	R34243-36		01/16/2014	0010640Z	0017728X
B3.10900N	R34243-37		01/16/2014	0010640Z	0017728X
B3.10900N	R34243-37	DUP	01/16/2014	0010640Z	0017728X
B3.10901P	R34243-38		01/16/2014	0010640Z	0017728X
B3.10902Q	R34243-39		01/16/2014	0010640Z	0017728X
B3.10903R	R34243-40		01/16/2014	0010640Z	0017728X
LCS-00679612Q *		LCS	12/05/2013	0010541X	0016925W
RBK-00679611P *		RBK	12/05/2013	0010541X	0016925W
LCS-00681929F *		LCS	01/16/2014	0010640Z	0017728X
RBK-00681928E *		RBK	01/16/2014	0010640Z	0017728X

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10884G	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-21	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 10:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	75.08 %	Analyst:	PMT
Ash/dry weight:	93.89 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:21	1000.0	AS104	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.52e-01	2.3e-01	7.6e-02	PCI/GDRY	12/04/2013 17:21 CST
U235	8.30e-02	8.0e-02	9.1e-02	PCI/GDRY	12/04/2013 17:21 CST
U238	7.38e-01	2.1e-01	8.5e-02	PCI/GDRY	12/04/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10885H	Amount analyzed:	2.650e-01 GASH
Client sample ID:	R34243-22	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 10:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	79.26 %	Analyst:	PMT
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:21	1000.0	AS106	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.11e+00	2.7e-01	6.3e-02	PCI/GDRY	12/04/2013 17:21 CST
U235	8.48e-02	8.2e-02	9.3e-02	PCI/GDRY	12/04/2013 17:21 CST
U238	1.10e+00	2.7e-01	6.3e-02	PCI/GDRY	12/04/2013 17:21 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10886J	Amount analyzed:	2.544e-01 GASH
Client sample ID:	R34243-23	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 10:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	79.05 %	Analyst:	PMT
Ash/dry weight:	93.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:21	1000.0	AS107	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.50e+00	3.3e-01	9.0e-02	PCI/GDRY	12/04/2013 17:21 CST
U235	6.18e-02	7.1e-02	7.8e-02	PCI/GDRY	12/04/2013 17:21 CST
U238	1.17e+00	2.8e-01	6.5e-02	PCI/GDRY	12/04/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10887K	Amount analyzed:	2.540e-01 GASH
Client sample ID:	R34243-24	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 11:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.87 %	Analyst:	PMT
Ash/dry weight:	89.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:21	1000.0	AS109	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.09e+00	2.7e-01	6.2e-02	PCI/GDRY	12/04/2013 17:21 CST
U235	5.39e-02	6.8e-02	9.1e-02	PCI/GDRY	12/04/2013 17:21 CST
U238	7.73e-01	2.2e-01	6.2e-02	PCI/GDRY	12/04/2013 17:21 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10888L	Amount analyzed:	2.563e-01 GASH
Client sample ID:	R34243-25	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 11:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.05 %	Analyst:	PMT
Ash/dry weight:	90.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:21	1000.0	AS110	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.14e+00	2.7e-01	7.2e-02	PCI/GDRY	12/04/2013 17:21 CST
U235	5.61e-02	6.4e-02	7.1e-02	PCI/GDRY	12/04/2013 17:21 CST
U238	1.20e+00	2.8e-01	8.2e-02	PCI/GDRY	12/04/2013 17:21 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10889M	Amount analyzed:	2.616e-01 GASH
Client sample ID:	R34243-26	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 11:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.59 %	Analyst:	PMT
Ash/dry weight:	94.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS112	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.25e+00	2.9e-01	6.0e-02	PCI/GDRY	12/04/2013 17:22 CST
U235	3.33e-02	6.0e-02	9.9e-02	PCI/GDRY	12/04/2013 17:22 CST
U238	9.82e-01	2.5e-01	8.3e-02	PCI/GDRY	12/04/2013 17:22 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10890E	Amount analyzed:	2.543e-01 GASH
Client sample ID:	R34243-27	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	77.72 %	Analyst:	PMT
Ash/dry weight:	94.79 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS113	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.19e+00	2.5e-01	6.0e-02	PCI/GDRY	12/04/2013 17:22 CST
U235	3.85e-02	5.4e-02	8.0e-02	PCI/GDRY	12/04/2013 17:22 CST
U238	7.78e-01	2.0e-01	7.9e-02	PCI/GDRY	12/04/2013 17:22 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10891F	Amount analyzed:	2.646e-01 GASH
Client sample ID:	R34243-28	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 11:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	74.49 %	Analyst:	PMT
Ash/dry weight:	94.14 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS114	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.85e-01	2.2e-01	5.5e-02	PCI/GDRY	12/04/2013 17:22 CST
U235	3.88e-02	5.4e-02	8.6e-02	PCI/GDRY	12/04/2013 17:22 CST
U238	7.38e-01	1.8e-01	5.5e-02	PCI/GDRY	12/04/2013 17:22 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10892G	Amount analyzed:	2.606e-01 GASH
Client sample ID:	R34243-29	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	77.64 %	Analyst:	PMT
Ash/dry weight:	93.91 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS115	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.69e-01	2.0e-01	4.6e-02	PCI/GDRY	12/04/2013 17:22 CST
U235	1.46e-02	4.0e-02	7.6e-02	PCI/GDRY	12/04/2013 17:22 CST
U238	8.84e-01	2.1e-01	5.7e-02	PCI/GDRY	12/04/2013 17:22 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.530e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS117	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.08e+00	2.4e-01	4.8e-02	PCI/GDRY	12/04/2013 17:22 CST
U235	7.66e-02	6.7e-02	7.1e-02	PCI/GDRY	12/04/2013 17:22 CST
U238	9.36e-01	2.2e-01	5.9e-02	PCI/GDRY	12/04/2013 17:22 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	2.667e-01 GASH
Client sample ID:	R34243-30	Preparation batch #:	0010541X
Matrix:	SEDIMENT	Assay batch #:	0016925W
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	70.68 %	Analyst:	PMT
Ash/dry weight:	94.75 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS118	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.06e+00	2.4e-01	4.8e-02	PCI/GDRY	12/04/2013 17:22 CST
U235	4.21e-02	5.9e-02	9.3e-02	PCI/GDRY	12/04/2013 17:22 CST
U238	8.66e-01	2.1e-01	6.7e-02	PCI/GDRY	12/04/2013 17:22 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10894J	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-31	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 14:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	76.59 %	Analyst:	PMT
Ash/dry weight:	93.56 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS66	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	7.74e-01	2.2e-01	6.1e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	8.21e-02	7.9e-02	9.0e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	8.14e-01	2.2e-01	8.4e-02	PCI/GDRY	01/15/2014 17:15 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10895K	Amount analyzed:	2.534e-01 GASH
Client sample ID:	R34243-32	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	77.05 %	Analyst:	PMT
Ash/dry weight:	94.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS67	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.62e-01	2.4e-01	7.8e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	8.01e-02	7.2e-02	6.7e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	7.47e-01	2.0e-01	5.6e-02	PCI/GDRY	01/15/2014 17:15 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10896L	Amount analyzed:	2.583e-01 GASH
Client sample ID:	R34243-33	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 14:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	79.75 %	Analyst:	PMT
Ash/dry weight:	92.72 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS68	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.33e+00	3.2e-01	1.1e-01	PCI/GDRY	01/15/2014 17:15 CST
U235	1.44e-01	1.1e-01	1.0e-01	PCI/GDRY	01/15/2014 17:15 CST
U238	1.12e+00	2.9e-01	1.1e-01	PCI/GDRY	01/15/2014 17:15 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10897M	Amount analyzed:	2.550e-01 GASH
Client sample ID:	R34243-34	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	72.60 %	Analyst:	PMT
Ash/dry weight:	91.78 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS69	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.31e-01	2.4e-01	9.4e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	3.96e-02	6.1e-02	9.2e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	8.19e-01	2.3e-01	6.2e-02	PCI/GDRY	01/15/2014 17:15 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10898N	Amount analyzed:	2.535e-01 GASH
Client sample ID:	R34243-35	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	51.58 %	Analyst:	PMT
Ash/dry weight:	88.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS70	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.38e+00	3.1e-01	9.5e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	5.00e-02	7.0e-02	1.0e-01	PCI/GDRY	01/15/2014 17:15 CST
U238	1.41e+00	3.2e-01	7.8e-02	PCI/GDRY	01/15/2014 17:15 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10899P	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-36	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	40.94 %	Analyst:	PMT
Ash/dry weight:	83.95 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS71	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.66e+00	3.5e-01	1.1e-01	PCI/GDRY	01/15/2014 17:15 CST
U235	6.46e-02	8.3e-02	1.3e-01	PCI/GDRY	01/15/2014 17:15 CST
U238	1.42e+00	3.2e-01	1.0e-01	PCI/GDRY	01/15/2014 17:15 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS72	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.32e+00	2.8e-01	6.3e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	4.09e-02	5.7e-02	8.5e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	1.12e+00	2.5e-01	6.3e-02	PCI/GDRY	01/15/2014 17:15 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	2.597e-01 GASH
Client sample ID:	R34243-37	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	42.14 %	Analyst:	PMT
Ash/dry weight:	81.17 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS73	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.49e+00	2.9e-01	9.9e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	6.83e-02	6.8e-02	9.7e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	1.30e+00	2.6e-01	6.5e-02	PCI/GDRY	01/15/2014 17:15 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10901P	Amount analyzed:	2.600e-01 GASH
Client sample ID:	R34243-38	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 15:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	60.45 %	Analyst:	PMT
Ash/dry weight:	89.51 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS74	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.18e+00	2.4e-01	6.5e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	6.48e-02	6.0e-02	7.1e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	1.33e+00	2.6e-01	6.5e-02	PCI/GDRY	01/15/2014 17:15 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10902Q	Amount analyzed:	2.567e-01 GASH
Client sample ID:	R34243-39	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	76.77 %	Analyst:	PMT
Ash/dry weight:	93.30 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS75	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.53e-01	2.1e-01	1.2e-01	PCI/GDRY	01/15/2014 17:15 CST
U235	1.20e-01	9.4e-02	1.3e-01	PCI/GDRY	01/15/2014 17:15 CST
U238	8.77e-01	2.1e-01	9.9e-02	PCI/GDRY	01/15/2014 17:15 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10903R	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-40	Preparation batch #:	0010640Z
Matrix:	SEDIMENT	Assay batch #:	0017728X
Collected:	2013-09-18 16:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	46.07 %	Analyst:	PMT
Ash/dry weight:	87.73 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS76	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.48e+00	3.2e-01	9.7e-02	PCI/GDRY	01/15/2014 17:15 CST
U235	1.09e-01	8.8e-02	8.8e-02	PCI/GDRY	01/15/2014 17:15 CST
U238	1.56e+00	3.3e-01	8.3e-02	PCI/GDRY	01/15/2014 17:15 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00679612Q	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010541X
Matrix:	N/A	Assay batch #:	0016925W
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS119	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.90e+00	2.1e-01	1.6e-02	PCI	12/04/2013 17:22 CST
U235	1.06e-01	4.1e-02	2.2e-02	PCI	12/04/2013 17:22 CST
U238	2.10e+00	2.2e-01	2.0e-02	PCI	12/04/2013 17:22 CST

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00679611P	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010541X
Matrix:	N/A	Assay batch #:	0016925W
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 17:22	1000.0	AS121	JEA

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	4.50e-02	2.7e-02	2.6e-02	PCI	12/04/2013 17:22 CST
U235	4.15e-03	1.2e-02	2.1e-02	PCI	12/04/2013 17:22 CST
U238	4.16e-02	2.5e-02	1.7e-02	PCI	12/04/2013 17:22 CST

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SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00681929F	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010640Z
Matrix:	N/A	Assay batch #:	0017728X
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS78	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.98e+00	2.3e-01	2.6e-02	PCI	01/15/2014 17:15 CST
U235	1.01e-01	4.4e-02	3.3e-02	PCI	01/15/2014 17:15 CST
U238	2.06e+00	2.4e-01	2.2e-02	PCI	01/15/2014 17:15 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00681928E	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010640Z
Matrix:	N/A	Assay batch #:	0017728X
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	PMT
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/15/2014 17:15	1000.0	AS79	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	3.68e-02	2.2e-02	2.0e-02	PCI	01/15/2014 17:15 CST
U235	0.00e+00	9.8e-03	2.4e-02	PCI	01/15/2014 17:15 CST
U238	3.85e-02	2.1e-02	1.6e-02	PCI	01/15/2014 17:15 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010541X
Analysis method: NAREL U-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10884G	R34243-21	00677011L		85.39 %	7.63 %	PMT
B3.10885H	R34243-22	00677017T		75.72 %	6.74 %	PMT
B3.10886J	R34243-23	00677023Q		71.30 %	6.34 %	PMT
B3.10887K	R34243-24	00677029X		75.19 %	6.66 %	PMT
B3.10888L	R34243-25	00677035V		87.90 %	7.88 %	PMT
B3.10889M	R34243-26	00677041T		85.94 %	7.68 %	PMT
B3.10890E	R34243-27	00677047Z		84.05 %	6.89 %	PMT
B3.10891F	R34243-28	00677053X		88.28 %	7.16 %	PMT
B3.10892G	R34243-29	00677059D		84.88 %	6.92 %	PMT
B3.10893H	R34243-30	00677065B		88.23 %	7.22 %	PMT
B3.10893H	R34243-30	00679610N	DUP	79.41 %	6.58 %	PMT
LCS-00679612Q *		00679612Q	LCS	81.05 %	6.69 %	PMT
RBK-00679611P *		00679611P	RBK	81.42 %	7.37 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010541X

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10893H	00679610N	DUP	U234		1.8	-0.12	PASS
B3.10893H	00679610N	DUP	U235		58.1	-0.77	PASS
B3.10893H	00679610N	DUP	U238		7.9	-0.47	PASS
LCS-00679612Q	00679612Q	LCS	U234	96.6		-0.63	PASS
LCS-00679612Q	00679612Q	LCS	U235	113.1		0.60	PASS
LCS-00679612Q	00679612Q	LCS	U238	102.9		0.52	PASS
RBK-00679611P	00679611P	RBK	U234				PASS
RBK-00679611P	00679611P	RBK	U235				PASS
RBK-00679611P	00679611P	RBK	U238				PASS

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010640Z
Analysis method: NAREL U-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10894J	R34243-31	00677071Z		81.05 %	7.11 %	PMT
B3.10895K	R34243-32	00677077F		85.82 %	7.31 %	PMT
B3.10896L	R34243-33	00677083D		66.59 %	6.09 %	PMT
B3.10897M	R34243-34	00677089K		75.66 %	6.70 %	PMT
B3.10898N	R34243-35	00677095H		75.41 %	6.76 %	PMT
B3.10899P	R34243-36	00677101M		69.26 %	6.28 %	PMT
B3.10900N	R34243-37	00677107U		82.47 %	7.14 %	PMT
B3.10900N	R34243-37	00681927D	DUP	85.50 %	7.25 %	PMT
B3.10901P	R34243-38	00677113R		92.86 %	7.68 %	PMT
B3.10902Q	R34243-39	00677119Y		86.57 %	7.00 %	PMT
B3.10903R	R34243-40	00677125W		75.54 %	6.69 %	PMT
LCS-00681929F *		00681929F	LCS	89.88 %	7.96 %	PMT
RBK-00681928E *		00681928E	RBK	88.44 %	7.42 %	PMT

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010640Z

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10900N	00681927D	DUP	U234		12.5	0.88	PASS
B3.10900N	00681927D	DUP	U235		50.2	0.61	PASS
B3.10900N	00681927D	DUP	U238		14.6	0.98	PASS
LCS-00681929F	00681929F	LCS	U234	100.7		0.11	PASS
LCS-00681929F	00681929F	LCS	U235	107.4		0.31	PASS
LCS-00681929F	00681929F	LCS	U238	101.1		0.19	PASS
RBK-00681928E	00681928E	RBK	U234				PASS
RBK-00681928E	00681928E	RBK	U235				PASS
RBK-00681928E	00681928E	RBK	U238				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
U ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300087

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Actinides (Uranium) by Extraction Chromatography
Report ID:	1300087-U
Report type:	Original
Date reported:	02/11/2014
Total pages in report:	22

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10904T	R34243-41	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10905U	R34243-42	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10906V	R34243-43	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10907W	R34243-44	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10908X	R34243-45	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10909Y	R34243-46	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10910Q	R34243-47	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10911R	R34243-48	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10912T	R34243-49	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10913U	R34243-50	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10914V	R34243-51	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10915W	R34243-52	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10916X	R34243-53	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10917Y	R34243-54	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-12-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-12-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

ANALYSIS SUMMARY

Analysis method: NAREL U-EICHROM
Title: Actinides (Uranium) by Extraction Chromatography

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10904T	R34243-41		02/07/2014	0010693N	0017791E
B3.10905U	R34243-42		02/07/2014	0010693N	0017791E
B3.10906V	R34243-43		02/07/2014	0010693N	0017791E
B3.10906V	R34243-43	DUP	02/07/2014	0010693N	0017791E
B3.10907W	R34243-44		02/07/2014	0010693N	0017791E
B3.10908X	R34243-45		02/07/2014	0010693N	0017791E
B3.10909Y	R34243-46		02/07/2014	0010693N	0017791E
B3.10910Q	R34243-47		02/07/2014	0010693N	0017791E
B3.10911R	R34243-48		02/07/2014	0010693N	0017791E
B3.10912T	R34243-49		02/07/2014	0010693N	0017791E
B3.10913U	R34243-50		02/07/2014	0010693N	0017791E
B3.10914V	R34243-51		02/07/2014	0010693N	0017791E
B3.10915W	R34243-52		02/07/2014	0010693N	0017791E
B3.10916X	R34243-53		02/07/2014	0010693N	0017791E
B3.10917Y	R34243-54		02/07/2014	0010693N	0017791E
LCS-00683197B *		LCS	02/07/2014	0010693N	0017791E
RBK-00683196A *		RBK	02/07/2014	0010693N	0017791E

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10904T	Amount analyzed:	2.522e-01 GASH
Client sample ID:	R34243-41	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	36.72 %	Analyst:	AS
Ash/dry weight:	84.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS65	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.20e+00	2.7e-01	1.4e-01	PCI/GDRY	02/06/2014 16:39 CST
U235	-1.66e-02	5.9e-02	1.4e-01	PCI/GDRY	02/06/2014 16:39 CST
U238	1.24e+00	2.8e-01	1.3e-01	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10905U	Amount analyzed:	2.590e-01 GASH
Client sample ID:	R34243-42	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	65.29 %	Analyst:	AS
Ash/dry weight:	89.03 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS67	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.44e+00	3.0e-01	7.3e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	2.10e-02	4.5e-02	7.8e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.13e+00	2.6e-01	7.3e-02	PCI/GDRY	02/06/2014 16:39 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.520e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS68	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.86e-01	2.5e-01	7.3e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	7.06e-02	7.1e-02	7.1e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	9.62e-01	2.4e-01	7.3e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.560e-01 GASH
Client sample ID:	R34243-43	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	75.97 %	Analyst:	AS
Ash/dry weight:	93.49 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS69	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.16e+00	2.7e-01	7.3e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	5.20e-02	6.5e-02	8.8e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.00e+00	2.5e-01	7.3e-02	PCI/GDRY	02/06/2014 16:39 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10907W	Amount analyzed:	2.542e-01 GASH
Client sample ID:	R34243-44	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 13:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	46.70 %	Analyst:	AS
Ash/dry weight:	89.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS70	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.04e+00	2.5e-01	8.1e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	8.36e-02	7.6e-02	7.0e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.00e+00	2.5e-01	8.1e-02	PCI/GDRY	02/06/2014 16:39 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10908X	Amount analyzed:	2.562e-01 GASH
Client sample ID:	R34243-45	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 13:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	43.30 %	Analyst:	AS
Ash/dry weight:	89.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS71	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.08e+00	2.5e-01	9.2e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	8.48e-02	7.4e-02	7.9e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.05e+00	2.5e-01	9.2e-02	PCI/GDRY	02/06/2014 16:39 CST

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10909Y	Amount analyzed:	2.510e-01 GASH
Client sample ID:	R34243-46	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 13:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	58.55 %	Analyst:	AS
Ash/dry weight:	88.33 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS72	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.46e+00	3.2e-01	7.6e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	3.92e-02	6.1e-02	9.1e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.14e+00	2.7e-01	6.2e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10910Q	Amount analyzed:	2.512e-01 GASH
Client sample ID:	R34243-47	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 14:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	59.02 %	Analyst:	AS
Ash/dry weight:	91.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS73	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.39e+00	2.9e-01	1.1e-01	PCI/GDRY	02/06/2014 16:39 CST
U235	8.20e-02	7.3e-02	8.9e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.00e+00	2.3e-01	9.7e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10911R	Amount analyzed:	2.521e-01 GASH
Client sample ID:	R34243-48	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	61.08 %	Analyst:	AS
Ash/dry weight:	91.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS74	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.04e-01	2.0e-01	6.8e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	5.46e-02	5.9e-02	7.2e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	7.61e-01	2.0e-01	7.4e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10912T	Amount analyzed:	2.570e-01 GASH
Client sample ID:	R34243-49	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 17:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	68.18 %	Analyst:	AS
Ash/dry weight:	87.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS75	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.41e-01	2.2e-01	1.2e-01	PCI/GDRY	02/06/2014 16:39 CST
U235	7.90e-02	7.6e-02	1.1e-01	PCI/GDRY	02/06/2014 16:39 CST
U238	7.20e-01	1.8e-01	9.1e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10913U	Amount analyzed:	2.552e-01 GASH
Client sample ID:	R34243-50	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 17:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	68.63 %	Analyst:	AS
Ash/dry weight:	77.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS76	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.16e-01	2.3e-01	8.4e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	1.15e-01	8.5e-02	8.6e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	1.04e+00	2.4e-01	7.2e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10914V	Amount analyzed:	2.514e-01 GASH
Client sample ID:	R34243-51	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	78.82 %	Analyst:	AS
Ash/dry weight:	94.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS79	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	8.46e-01	2.0e-01	6.6e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	2.27e-02	4.8e-02	8.6e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	8.14e-01	2.0e-01	8.6e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10915W	Amount analyzed:	2.573e-01 GASH
Client sample ID:	R34243-52	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	59.52 %	Analyst:	AS
Ash/dry weight:	91.11 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS100	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.02e+00	2.6e-01	8.6e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	1.03e-01	8.6e-02	7.4e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	7.78e-01	2.2e-01	8.6e-02	PCI/GDRY	02/06/2014 16:39 CST

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NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10916X	Amount analyzed:	2.516e-01 GASH
Client sample ID:	R34243-53	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 17:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	60.42 %	Analyst:	AS
Ash/dry weight:	84.47 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS101	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.01e+00	2.5e-01	7.1e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	9.63e-02	8.0e-02	6.9e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	9.38e-01	2.4e-01	7.1e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10917Y	Amount analyzed:	2.533e-01 GASH
Client sample ID:	R34243-54	Preparation batch #:	0010693N
Matrix:	SEDIMENT	Assay batch #:	0017791E
Collected:	2013-09-19 18:40 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	75.12 %	Analyst:	AS
Ash/dry weight:	70.04 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS102	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	9.69e-01	2.2e-01	4.4e-02	PCI/GDRY	02/06/2014 16:39 CST
U235	5.18e-02	5.2e-02	5.2e-02	PCI/GDRY	02/06/2014 16:39 CST
U238	8.48e-01	2.0e-01	4.4e-02	PCI/GDRY	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00683197B	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010693N
Matrix:	N/A	Assay batch #:	0017791E
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS103	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	1.89e+00	2.2e-01	1.6e-02	PCI	02/06/2014 16:39 CST
U235	6.43e-02	3.5e-02	2.7e-02	PCI	02/06/2014 16:39 CST
U238	2.15e+00	2.5e-01	2.5e-02	PCI	02/06/2014 16:39 CST

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NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00683196A	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010693N
Matrix:	N/A	Assay batch #:	0017791E
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL U-EICHROM
Dry/wet weight:	N/A	Analyst:	AS
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/06/2014 16:39	1000.0	AS104	CEB

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
U234	2.15e-02	2.1e-02	2.7e-02	PCI	02/06/2014 16:39 CST
U235	1.15e-02	1.8e-02	2.6e-02	PCI	02/06/2014 16:39 CST
U238	7.18e-03	1.3e-02	1.8e-02	PCI	02/06/2014 16:39 CST

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300087

PREPARATION BATCH SUMMARY

Preparation batch #: 0010693N
Analysis method: NAREL U-EICHROM
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10904T	R34243-41	00677131U		82.80 %	7.13 %	AS
B3.10905U	R34243-42	00677137A		83.78 %	7.18 %	AS
B3.10906V	R34243-43	00677143Y		80.75 %	6.99 %	AS
B3.10906V	R34243-43	00683195Z	DUP	80.38 %	7.00 %	AS
B3.10907W	R34243-44	00677149E		81.67 %	7.16 %	AS
B3.10908X	R34243-45	00677155C		84.87 %	7.26 %	AS
B3.10909Y	R34243-46	00677161A		75.02 %	6.67 %	AS
B3.10910Q	R34243-47	00677167G		86.82 %	7.33 %	AS
B3.10911R	R34243-48	00677173E		85.70 %	7.23 %	AS
B3.10912T	R34243-49	00677179L		83.87 %	6.83 %	AS
B3.10913U	R34243-50	00677185J		75.17 %	6.67 %	AS
B3.10914V	R34243-51	00677191G		92.28 %	7.67 %	AS
B3.10915W	R34243-52	00677197N		82.48 %	7.48 %	AS
B3.10916X	R34243-53	00677203T		83.77 %	7.57 %	AS
B3.10917Y	R34243-54	00677209Z		93.08 %	8.21 %	AS
LCS-00683197B *		00683197B	LCS	86.72 %	7.75 %	AS
RBK-00683196A *		00683196A	RBK	78.56 %	7.19 %	AS

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010693N

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10906V	00683195Z	DUP	U234		16.0	0.93	PASS
B3.10906V	00683195Z	DUP	U235		30.2	-0.38	PASS
B3.10906V	00683195Z	DUP	U238		4.2	0.24	PASS
LCS-00683197B	00683197B	LCS	U234	96.5		-0.61	PASS
LCS-00683197B	00683197B	LCS	U235	68.5		-1.69	PASS
LCS-00683197B	00683197B	LCS	U238	105.5		0.89	PASS
RBK-00683196A	00683196A	RBK	U234				PASS
RBK-00683196A	00683196A	RBK	U235				PASS
RBK-00683196A	00683196A	RBK	U238				PASS

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
GAMMA ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300084

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Gamma Spectrometry
Report ID:	1300084-GAMMA
Report type:	Original
Date reported:	01/14/2014
Total pages in report:	25

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10849D	R34243-55	PA:KISKIMERE	WATER-GROUND	09/16/2013	09/27/2013
B3.10850W	R34243-66	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10851X	R34243-56	PA:KISKIMERE	WATER-GROUND	09/17/2013	09/27/2013
B3.10852Y	R34243-68	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10853Z	R34243-57	PA:KISKIMERE	WATER-GROUND	09/18/2013	09/27/2013
B3.10854A	R34243-65	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10855B	R34243-58	PA:KISKIMERE	WATER-GROUND	09/19/2013	09/27/2013
B3.10856C	R34243-67	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10857D	R34243-59	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10858E	R34243-60	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10859F	R34243-61	PA:KISKIMERE	WATER-GROUND	09/23/2013	09/27/2013
B3.10860Y	R34243-62	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10861Z	R34243-63	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10862A	R34243-64	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013
B3.10863B	R34243-69	PA:KISKIMERE	WATER-GROUND	09/24/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-15-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-16-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

GENERAL INFORMATION (CONTINUED)

GAMMA ANALYSIS

The reporting format lists the gamma emitters in alphabetical order. The activity, 2-sigma uncertainty, and a sample-specific estimate of the MDC for radionuclides measured by gamma spectroscopy are reported only if the nuclide is detected above background with the exception of client requested nuclides of interest. The activity for each of the requested nuclides is reported whether negative, positive, or zero along with the associated 2-sigma uncertainty and the sample-specific estimate of the MDC.

Due to potential spectral interferences and other possible problems associated with the determination of the activity of certain radionuclides, the activities for ^{214}Bi, ^{214}Pb, ^{234}Th, ^{234m}Pa, ^{226}Ra, ^{231}Th, and ^{235}U are subject to greater uncertainty than other commonly reported radionuclides. It should be noted that this potential uncertainty is not included in the two-sigma expanded uncertainty that is reported with each result. Although in this report we do provide the calculated activities for these radionuclides, we recommend that the results be used only as a qualitative means of indicating the presence of these radionuclides and not as a quantitative measure of their concentration. The results for these nuclides are not used in the evaluation of quality control samples. Furthermore, because of mutual interference between ^{226}Ra and ^{235}U, NAREL's gamma analysis software tends to overestimate the amounts of these nuclides whenever both are present in a sample. Lower estimates for ^{226}Ra activities can be obtained from the reported activities of its decay products, ^{214}Pb and ^{214}Bi, which are likely to be somewhat less than the ^{226}Ra activity because of the potential escape of radon gas.

NAREL's gamma-ray spectrometry software corrects activities and MDCs for decay between collection and analysis, but only up to a limit of twelve half-lives. If the decay time for a sample exceeds twelve half-lives of a radionuclide, that radionuclide is not reported. This software feature may affect results for short-lived radionuclides, such as ^{131}I and ^{140}Ba, when there is a long delay between collection and analysis.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

ANALYSIS SUMMARY

Analysis method: NAREL GAM-01
Title: Gamma Spectrometry

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10849D	R34243-55		01/06/2014	0010632Z	0017692C
B3.10850W	R34243-66		01/07/2014	0010632Z	0017692C
B3.10851X	R34243-56		01/07/2014	0010632Z	0017692C
B3.10852Y	R34243-68		01/07/2014	0010632Z	0017692C
B3.10853Z	R34243-57		01/07/2014	0010632Z	0017692C
B3.10853Z	R34243-57	DUP	01/07/2014	0010632Z	0017692C
B3.10854A	R34243-65		01/07/2014	0010632Z	0017692C
B3.10855B	R34243-58		01/08/2014	0010632Z	0017692C
B3.10856C	R34243-67		01/08/2014	0010632Z	0017692C
B3.10857D	R34243-59		01/08/2014	0010632Z	0017692C
B3.10858E	R34243-60		01/08/2014	0010632Z	0017692C
B3.10859F	R34243-61		01/08/2014	0010632Z	0017692C
B3.10860Y	R34243-62		01/08/2014	0010632Z	0017692C
B3.10861Z	R34243-63		01/09/2014	0010632Z	0017692C
B3.10862A	R34243-64		01/09/2014	0010632Z	0017692C
B3.10863B	R34243-69		01/09/2014	0010632Z	0017692C
LCS-00681807W *		LCS	01/09/2014	0010632Z	0017692C
RBK-00681808X *		RBK	01/08/2014	0010632Z	0017692C

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

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NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10849D	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-55	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-16 22:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/06/2014 14:49	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-4.32e+02	1.1e+04	2:4e+03	PCI/L	09/16/2013 22:30 EDT
Co60		-1.44e-01	1.6e+01	1.2e+00	PCI/L	09/16/2013 22:30 EDT
Cs137		-3.15e-01	9.0e-01	1.5e+00	PCI/L	09/16/2013 22:30 EDT
K40		-1.50e+01	2.0e+01	1.9e+01	PCI/L	09/16/2013 22:30 EDT
Ra226	J	-9.52e+00	5.1e+01	5.0e+01	PCI/L	09/16/2013 22:30 EDT
Ra228		3.18e+00	4.9e+00	6.3e+00	PCI/L	09/16/2013 22:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10850W	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-66	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-23 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/06/2014 19:51	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-4.07e+02	3.5e+03	1.6e+03	PCI/L	09/23/2013 17:15 EDT
Co60		1.79e-02	6.5e-01	1.2e+00	PCI/L	09/23/2013 17:15 EDT
Cs137		-6.81e-02	9.3e-01	1.6e+00	PCI/L	09/23/2013 17:15 EDT
K40		-9.27e+00	1.4e+01	1.8e+01	PCI/L	09/23/2013 17:15 EDT
Ra226	J	-1.10e+01	5.5e+01	5.0e+01	PCI/L	09/23/2013 17:15 EDT
Ra228		-2.17e+00	5.7e+00	5.9e+00	PCI/L	09/23/2013 17:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10851X	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-56	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-17 19:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/07/2014 00:54	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-7.30e+02	3.5e+03	2.3e+03	PCI/L	09/17/2013 19:15 EDT
Co60		-3.09e-01	1.8e+00	1.3e+00	PCI/L	09/17/2013 19:15 EDT
Cs137		-2.57e-01	9.3e-01	1.6e+00	PCI/L	09/17/2013 19:15 EDT
K40		-9.70e+00	1.6e+01	1.9e+01	PCI/L	09/17/2013 19:15 EDT
Ra226	J	-1.91e+01	9.9e+01	5.1e+01	PCI/L	09/17/2013 19:15 EDT
Ra228		-2.85e-01	4.1e+00	5.8e+00	PCI/L	09/17/2013 19:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10852Y	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-68	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-24 13:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/06/2014 14:50	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-3.53e+02	4.9e+03	9.7e+02	PCI/L	09/24/2013 13:00 EDT
Co60		7.86e-02	4.2e-01	7.2e-01	PCI/L	09/24/2013 13:00 EDT
Cs137		-2.15e-01	5.9e-01	9.9e-01	PCI/L	09/24/2013 13:00 EDT
K40		-1.80e+01	7.9e+01	1.3e+01	PCI/L	09/24/2013 13:00 EDT
Ra226	J	-5.91e+00	2.2e+02	2.2e+01	PCI/L	09/24/2013 13:00 EDT
Ra228		3.01e-01	2.0e+00	3.5e+00	PCI/L	09/24/2013 13:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10853Z	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-57	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-18 19:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/06/2014 14:54	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-8.10e+00	3.1e+03	1.8e+03	PCI/L	09/18/2013 19:00 EDT
Co60		-1.15e-01	6.6e+00	1.3e+00	PCI/L	09/18/2013 19:00 EDT
Cs137		6.72e-02	8.5e-01	1.5e+00	PCI/L	09/18/2013 19:00 EDT
K40		7.50e+00	1.2e+01	1.9e+01	PCI/L	09/18/2013 19:00 EDT
Ra226	J	1.06e+01	2.2e+01	3.5e+01	PCI/L	09/18/2013 19:00 EDT
Ra228		-9.69e-01	4.3e+00	5.4e+00	PCI/L	09/18/2013 19:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10853Z	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-57	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-18 19:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/07/2014 14:23	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		1.00e+02	1.1e+03	1.9e+03	PCI/L	09/18/2013 19:00 EDT
Co60		-2.63e-02	1.1e+00	1.3e+00	PCI/L	09/18/2013 19:00 EDT
Cs137	J	7.73e-01	7.4e-01	1.2e+00	PCI/L	09/18/2013 19:00 EDT
K40		-7.86e-03	1.2e+01	1.9e+01	PCI/L	09/18/2013 19:00 EDT
Ra226	J	-4.10e+00	3.5e+01	4.8e+01	PCI/L	09/18/2013 19:00 EDT
Ra228		1.82e+00	3.9e+00	5.7e+00	PCI/L	09/18/2013 19:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10854A	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-65	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-23 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/06/2014 14:56	1000.0	GE22	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-2.85e+02	5.8e+02	9.4e+02	PCI/L	09/23/2013 13:15 EDT
Co60		5.71e-02	5.5e-01	9.3e-01	PCI/L	09/23/2013 13:15 EDT
Cs137		1.02e-01	6.3e-01	1.0e+00	PCI/L	09/23/2013 13:15 EDT
K40		-3.61e+00	9.6e+00	1.1e+01	PCI/L	09/23/2013 13:15 EDT
Ra226	J	-1.71e+01	9.5e+01	2.7e+01	PCI/L	09/23/2013 13:15 EDT
Ra228		3.74e+00	3.9e+00	4.8e+00	PCI/L	09/23/2013 13:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10855B	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-58	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-19 20:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/07/2014 19:25	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		3.34e+02	1.2e+03	2.0e+03	PCI/L	09/19/2013 20:00 EDT
Bi214	J	3.68e+00	2.5e+00	3.4e+00	PCI/L	09/19/2013 20:00 EDT
Co60		2.26e-02	6.4e-01	1.1e+00	PCI/L	09/19/2013 20:00 EDT
Cs137		4.37e-01	9.0e-01	1.5e+00	PCI/L	09/19/2013 20:00 EDT
K40		8.58e-01	1.2e+01	1.9e+01	PCI/L	09/19/2013 20:00 EDT
Ra226	J	-5.30e+00	3.9e+01	5.0e+01	PCI/L	09/19/2013 20:00 EDT
Ra228		-7.58e-02	2.9e+00	5.1e+00	PCI/L	09/19/2013 20:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10856C	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-67	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-24 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/08/2014 00:27	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-2.37e+02	8.1e+04	1.6e+03	PCI/L	09/24/2013 11:45 EDT
Co60		-2.60e-01	2.1e+00	1.2e+00	PCI/L	09/24/2013 11:45 EDT
Cs137		-4.09e-02	8.9e-01	1.5e+00	PCI/L	09/24/2013 11:45 EDT
K40		-7.09e+00	1.4e+01	1.7e+01	PCI/L	09/24/2013 11:45 EDT
Ra226	J	-5.62e+00	4.1e+01	5.1e+01	PCI/L	09/24/2013 11:45 EDT
Ra228		1.05e+00	3.8e+00	5.6e+00	PCI/L	09/24/2013 11:45 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10857D	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-59	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-23 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/07/2014 14:26	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-2.79e+02	1.1e+04	1.0e+03	PCI/L	09/23/2013 12:30 EDT
Co60		4.88e-01	5.5e-01	9.0e-01	PCI/L	09/23/2013 12:30 EDT
Cs137		-1.08e-01	5.7e-01	9.7e-01	PCI/L	09/23/2013 12:30 EDT
K40		-1.17e+01	2.0e+01	1.2e+01	PCI/L	09/23/2013 12:30 EDT
Ra226	J	3.01e+00	1.3e+01	2.3e+01	PCI/L	09/23/2013 12:30 EDT
Ra228		-4.36e-01	4.8e+00	3.6e+00	PCI/L	09/23/2013 12:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10858E	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-60	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-23 16:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/07/2014 14:58	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		4.79e+02	8.5e+02	1.4e+03	PCI/L	09/23/2013 16:50 EDT
Co60		-1.02e-01	1.1e+01	1.0e+00	PCI/L	09/23/2013 16:50 EDT
Cs137		-4.78e-01	6.7e+00	1.5e+00	PCI/L	09/23/2013 16:50 EDT
K40		-2.89e-01	1.3e+01	1.9e+01	PCI/L	09/23/2013 16:50 EDT
Ra226	J	-5.91e+00	2.2e+01	3.4e+01	PCI/L	09/23/2013 16:50 EDT
Ra228		1.11e-01	3.7e+00	5.6e+00	PCI/L	09/23/2013 16:50 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10859F	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-61	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-23 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/07/2014 15:45	1000.0	GE22	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		1.46e+01	6.2e+02	1.0e+03	PCI/L	09/23/2013 17:30 EDT
Co60		-7.05e-02	3.0e+01	9.4e-01	PCI/L	09/23/2013 17:30 EDT
Cs137		2.32e-01	6.2e-01	1.0e+00	PCI/L	09/23/2013 17:30 EDT
K40		-8.29e+00	1.1e+01	1.2e+01	PCI/L	09/23/2013 17:30 EDT
Ra226	J	-1.09e+01	4.2e+01	2.7e+01	PCI/L	09/23/2013 17:30 EDT
Ra228		2.37e+00	3.1e+00	4.4e+00	PCI/L	09/23/2013 17:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10860Y	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-62	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-24 10:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/08/2014 16:39	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-5.01e+02	3.2e+03	1.8e+03	PCI/L	09/24/2013 10:00 EDT
Co60		-1.32e-01	5.3e+00	1.0e+00	PCI/L	09/24/2013 10:00 EDT
Cs137		4.54e-03	8.9e-01	1.5e+00	PCI/L	09/24/2013 10:00 EDT
K40		-1.79e+00	1.1e+01	1.8e+01	PCI/L	09/24/2013 10:00 EDT
Ra226	J	-8.65e+00	4.8e+01	5.0e+01	PCI/L	09/24/2013 10:00 EDT
Ra228		-1.98e+00	5.2e+00	5.8e+00	PCI/L	09/24/2013 10:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10861Z	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-63	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-24 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/08/2014 21:41	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		1.76e+02	9.9e+02	1.7e+03	PCI/L	09/24/2013 14:00 EDT
Bi214	J	4.71e+00	2.7e+00	3.6e+00	PCI/L	09/24/2013 14:00 EDT
Co60		2.90e-01	6.4e-01	1.1e+00	PCI/L	09/24/2013 14:00 EDT
Cs137		-1.47e-01	9.2e-01	1.6e+00	PCI/L	09/24/2013 14:00 EDT
K40		8.20e+00	1.0e+01	1.7e+01	PCI/L	09/24/2013 14:00 EDT
Ra226	J	-1.54e+01	7.4e+01	5.0e+01	PCI/L	09/24/2013 14:00 EDT
Ra228		-2.71e+00	7.2e+00	6.2e+00	PCI/L	09/24/2013 14:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10862A	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-64	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-24 18:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/09/2014 02:43	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-2.18e+02	1.3e+04	1.7e+03	PCI/L	09/24/2013 18:30 EDT
Bi214	J	4.05e+00	2.6e+00	3.6e+00	PCI/L	09/24/2013 18:30 EDT
Co60		1.10e-01	6.8e-01	1.2e+00	PCI/L	09/24/2013 18:30 EDT
Cs137		2.40e-01	8.9e-01	1.5e+00	PCI/L	09/24/2013 18:30 EDT
K40		-1.47e+01	2.0e+01	1.9e+01	PCI/L	09/24/2013 18:30 EDT
Ra226	J	-1.25e+01	6.0e+01	4.9e+01	PCI/L	09/24/2013 18:30 EDT
Ra228		-1.28e+00	4.5e+00	6.0e+00	PCI/L	09/24/2013 18:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10863B	Amount analyzed:	3.000e+00 L
Client sample ID:	R34243-69	Preparation batch #:	0010632Z
Matrix:	WATER-GROUND	Assay batch #:	0017692C
Collected:	2013-09-24 08:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/08/2014 11:38	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-1.48e+02	9.6e+02	1.5e+03	PCI/L	09/24/2013 08:15 EDT
Bi214	J	3.22e+00	1.8e+00	2.8e+00	PCI/L	09/24/2013 08:15 EDT
Co60		2.09e-01	7.0e-01	1.2e+00	PCI/L	09/24/2013 08:15 EDT
Cs137		-2.20e-01	3.4e+00	1.5e+00	PCI/L	09/24/2013 08:15 EDT
K40		6.10e+01	1.8e+01	2.0e+01	PCI/L	09/24/2013 08:15 EDT
Pb212	J	4.40e+00	1.8e+00	2.6e+00	PCI/L	09/24/2013 08:15 EDT
Pb214	J	2.47e+00	1.8e+00	2.8e+00	PCI/L	09/24/2013 08:15 EDT
Ra226	J	1.79e+01	2.3e+01	3.6e+01	PCI/L	09/24/2013 08:15 EDT
Ra228		2.19e+00	3.1e+00	5.1e+00	PCI/L	09/24/2013 08:15 EDT
Tl208	J	1.10e+00	9.9e-01	1.5e+00	PCI/L	09/24/2013 08:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00681807W	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010632Z
Matrix:	N/A	Assay batch #:	0017692C
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/08/2014 11:39	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi207	3.78e+03	4.2e+02	5.5e+01	PCI	12/15/2010 11:00 CST
Eu155	8.58e+02	1.0e+02	4.1e+01	PCI	12/15/2010 11:00 CST

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SDG #1300084

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00681808X	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010632Z
Matrix:	N/A	Assay batch #:	0017692C
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/08/2014 11:36	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Ba140		-6.05e+00	2.6e+01	1.8e+01	PCI	01/06/2014 07:00 CST
Co60		-1.75e-01	5.4e+00	3.6e+00	PCI	01/06/2014 07:00 CST
Cs137		1.19e+00	2.6e+00	4.4e+00	PCI	01/06/2014 07:00 CST
I131		-1.10e-01	1.1e+01	6.3e+00	PCI	01/06/2014 07:00 CST
K40		9.89e+00	2.9e+01	5.2e+01	PCI	01/06/2014 07:00 CST
Pb212	J	8.94e+00	7.1e+00	1.0e+01	PCI	01/06/2014 07:00 CST
Ra226	J	-3.75e+01	1.7e+02	1.4e+02	PCI	01/06/2014 07:00 CST
Ra228		-5.17e+00	1.5e+01	1.8e+01	PCI	01/06/2014 07:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG 1300084

PREPARATION BATCH SUMMARY

Preparation batch #: 0010632Z
Analysis method: NAREL GAM-01
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10849D	R34243-55	00676784Y		N/A		MO
B3.10850W	R34243-66	00676790W		N/A		MO
B3.10851X	R34243-56	00676796C		N/A		MO
B3.10852Y	R34243-68	00676802G		N/A		MO
B3.10853Z	R34243-57	00676808N		N/A		MO
B3.10853Z	R34243-57	00681806V	DUP	N/A		MO
B3.10854A	R34243-65	00676814L		N/A		MO
B3.10855B	R34243-58	00676820J		N/A		MO
B3.10856C	R34243-67	00676826Q		N/A		MO
B3.10857D	R34243-59	00676832N		N/A		MO
B3.10858E	R34243-60	00676838V		N/A		MO
B3.10859F	R34243-61	00676844T		N/A		MO
B3.10860Y	R34243-62	00676850Q		N/A		MO
B3.10861Z	R34243-63	00676856X		N/A		MO
B3.10862A	R34243-64	00676862V		N/A		MO
B3.10863B	R34243-69	00676868B		N/A		MO
LCS-00681807W *		00681807W	LCS	N/A		MO
RBK-00681808X *		00681808X	RBK	N/A		MO

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010632Z

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10853Z	00681806V	DUP	BA140		235.1	0.07	PASS
B3.10853Z	00681806V	DUP	CO60		-125.7	0.03	PASS
B3.10853Z	00681806V	DUP	CS137		168.0	1.26	PASS
B3.10853Z	00681806V	DUP	K40		200.4	-0.87	PASS
B3.10853Z	00681806V	DUP	RA226		454.4	-0.70	PASS-J
B3.10853Z	00681806V	DUP	RA228		653.6	0.96	PASS
LCS-00681807W	00681807W	LCS	BI207	95.7		-0.75	PASS
LCS-00681807W	00681807W	LCS	EU155	100.1		0.02	PASS
RBK-00681808X	00681808X	RBK	BA140				PASS
RBK-00681808X	00681808X	RBK	CO60				PASS
RBK-00681808X	00681808X	RBK	CS137				PASS
RBK-00681808X	00681808X	RBK	I131				PASS
RBK-00681808X	00681808X	RBK	K40				PASS
RBK-00681808X	00681808X	RBK	PB212				WARN-J
RBK-00681808X	00681808X	RBK	RA226				PASS-J
RBK-00681808X	00681808X	RBK	RA228				PASS

Note: Results qualified with -J may be significantly under or over-estimated and are not evaluated for QC purposes.

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540 S. MORRIS AVE., MONTGOMERY, AL 36115
GAMMA ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300085

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Gamma-ray Spectrometry - Sealed Radium Cans
Report ID:	1300085-GAMMA
Report type:	Original
Date reported:	12/19/2013
Total pages in report:	30

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10864C	R34243-01	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10865D	R34243-02	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10866E	R34243-03	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10867F	R34243-04	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10868G	R34243-05	PA:KISKIMERE	SEDIMENT	09/16/2013	09/27/2013
B3.10869H	R34243-06	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10870A	R34243-07	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10871B	R34243-08	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10872C	R34243-09	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10873D	R34243-10	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10874E	R34243-11	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10875F	R34243-12	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10876G	R34243-13	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10877H	R34243-14	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10878J	R34243-15	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10879K	R34243-16	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10880C	R34243-17	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10881D	R34243-18	PA:KISKIMERE	SEDIMENT	09/17/2013	09/27/2013
B3.10882E	R34243-19	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10883F	R34243-20	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – Samples were sealed and held for 21 days to allow for in-growth before gamma analysis was performed. Pb-210 is not detectable by some NAREL detectors. As a result, not all samples will have a result for Pb-210.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 1-8-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 1-14-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

GENERAL INFORMATION (CONTINUED)

GAMMA ANALYSIS

The reporting format lists the gamma emitters in alphabetical order. The activity, 2-sigma uncertainty, and a sample-specific estimate of the MDC for radionuclides measured by gamma spectroscopy are reported only if the nuclide is detected above background with the exception of client requested nuclides of interest. The activity for each of the requested nuclides is reported whether negative, positive, or zero along with the associated 2-sigma uncertainty and the sample-specific estimate of the MDC.

Due to potential spectral interferences and other possible problems associated with the determination of the activity of certain radionuclides, the activities for ^{214}Bi, ^{214}Pb, ^{234}Th, ^{234m}Pa, ^{226}Ra, ^{231}Th, and ^{235}U are subject to greater uncertainty than other commonly reported radionuclides. It should be noted that this potential uncertainty is not included in the two-sigma expanded uncertainty that is reported with each result. Although in this report we do provide the calculated activities for these radionuclides, we recommend that the results be used only as a qualitative means of indicating the presence of these radionuclides and not as a quantitative measure of their concentration. The results for these nuclides are not used in the evaluation of quality control samples. Furthermore, because of mutual interference between ^{226}Ra and ^{235}U, NAREL's gamma analysis software tends to overestimate the amounts of these nuclides whenever both are present in a sample. Lower estimates for ^{226}Ra activities can be obtained from the reported activities of its decay products, ^{214}Pb and ^{214}Bi, which are likely to be somewhat less than the ^{226}Ra activity because of the potential escape of radon gas.

NAREL's gamma-ray spectrometry software corrects activities and MDCs for decay between collection and analysis, but only up to a limit of twelve half-lives. If the decay time for a sample exceeds twelve half-lives of a radionuclide, that radionuclide is not reported. This software feature may affect results for short-lived radionuclides, such as ^{131}I and ^{140}Ba, when there is a long delay between collection and analysis.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

ANALYSIS SUMMARY

Analysis method: NAREL GAM-01-RA
Title: Gamma-ray Spectrometry - Sealed Radium Cans

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10864C	R34243-01		12/03/2013	0010555D	0017595C
B3.10865D	R34243-02		12/03/2013	0010555D	0017595C
B3.10866E	R34243-03		12/03/2013	0010555D	0017595C
B3.10867F	R34243-04		12/04/2013	0010555D	0017595C
B3.10867F	R34243-04	DUP	12/05/2013	0010555D	0017595C
B3.10868G	R34243-05		12/04/2013	0010555D	0017595C
B3.10869H	R34243-06		12/04/2013	0010555D	0017595C
B3.10870A	R34243-07		12/04/2013	0010555D	0017595C
B3.10871B	R34243-08		12/04/2013	0010555D	0017595C
B3.10872C	R34243-09		12/04/2013	0010555D	0017595C
B3.10873D	R34243-10		12/04/2013	0010555D	0017595C
B3.10874E	R34243-11		12/05/2013	0010555D	0017595C
B3.10875F	R34243-12		12/05/2013	0010555D	0017595C
B3.10876G	R34243-13		12/05/2013	0010555D	0017595C
B3.10877H	R34243-14		12/04/2013	0010555D	0017595C
B3.10878J	R34243-15		12/05/2013	0010555D	0017595C
B3.10879K	R34243-16		12/05/2013	0010555D	0017595C
B3.10880C	R34243-17		12/05/2013	0010555D	0017595C
B3.10881D	R34243-18		12/05/2013	0010555D	0017595C
B3.10882E	R34243-19		12/05/2013	0010555D	0017595C
B3.10883F	R34243-20		12/05/2013	0010555D	0017595C
LCS-00680001J *		LCS	12/05/2013	0010555D	0017595C
RBK-00680002K *		RBK	12/05/2013	0010555D	0017595C

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10864C	Amount analyzed:	5.450e+02 GDRY
Client sample ID:	R34243-01	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-16 16:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	66.45 %	Analyst:	MO
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 12:29	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.94e-01	2.1e-01	2.7e-01	PCI/GDRY	09/16/2013 16:15 EDT
Bi212	J	1.02e+00	1.9e-01	1.8e-01	PCI/GDRY	09/16/2013 16:15 EDT
Bi214	J	7.98e-01	9.3e-02	3.4e-02	PCI/GDRY	09/16/2013 16:15 EDT
Cs137		2.73e-02	9.5e-03	1.2e-02	PCI/GDRY	09/16/2013 16:15 EDT
K40		8.08e+00	9.1e-01	1.5e-01	PCI/GDRY	09/16/2013 16:15 EDT
Pb212	J	8.36e-01	9.6e-02	3.4e-02	PCI/GDRY	09/16/2013 16:15 EDT
Pb214	J	9.33e-01	1.1e-01	3.9e-02	PCI/GDRY	09/16/2013 16:15 EDT
Ra228		9.08e-01	1.1e-01	5.3e-02	PCI/GDRY	09/16/2013 16:15 EDT
Th234	J	9.11e-01	7.7e-01	1.2e+00	PCI/GDRY	09/16/2013 16:15 EDT
Tl208	J	2.88e-01	3.6e-02	1.8e-02	PCI/GDRY	09/16/2013 16:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10865D	Amount analyzed:	2.348e+02 GDRY
Client sample ID:	R34243-02	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-16 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	51.28 %	Analyst:	MO
Ash/dry weight:	83.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 12:26	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.07e+00	2.7e-01	3.1e-01	PCI/GDRY	09/16/2013 16:10 EDT
Bi212	J	1.24e+00	2.3e-01	2.0e-01	PCI/GDRY	09/16/2013 16:10 EDT
Bi214	J	9.02e-01	1.1e-01	3.9e-02	PCI/GDRY	09/16/2013 16:10 EDT
Cs137		6.07e-02	1.5e-02	1.6e-02	PCI/GDRY	09/16/2013 16:10 EDT
K40		1.01e+01	1.1e+00	1.9e-01	PCI/GDRY	09/16/2013 16:10 EDT
Pa234m	J	1.62e+00	1.3e+00	2.0e+00	PCI/GDRY	09/16/2013 16:10 EDT
Pb212	J	9.43e-01	1.1e-01	4.0e-02	PCI/GDRY	09/16/2013 16:10 EDT
Pb214	J	1.06e+00	1.2e-01	4.0e-02	PCI/GDRY	09/16/2013 16:10 EDT
Ra228		1.16e+00	1.4e-01	6.8e-02	PCI/GDRY	09/16/2013 16:10 EDT
Th234	J	8.38e-01	4.2e-01	6.0e-01	PCI/GDRY	09/16/2013 16:10 EDT
Tl208	J	3.19e-01	4.0e-02	1.9e-02	PCI/GDRY	09/16/2013 16:10 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10866E	Amount analyzed:	2.128e+02 GDRY
Client sample ID:	R34243-03	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-16 17:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	47.72 %	Analyst:	MO
Ash/dry weight:	87.84 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 17:29	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.38e+00	3.7e-01	4.0e-01	PCI/GDRY	09/16/2013 17:10 EDT
Bi212	J	1.24e+00	2.5e-01	2.4e-01	PCI/GDRY	09/16/2013 17:10 EDT
Bi214	J	9.33e-01	1.1e-01	4.1e-02	PCI/GDRY	09/16/2013 17:10 EDT
Cs137		7.38e-02	1.7e-02	2.3e-02	PCI/GDRY	09/16/2013 17:10 EDT
K40		1.26e+01	1.4e+00	2.0e-01	PCI/GDRY	09/16/2013 17:10 EDT
Pb212	J	1.08e+00	1.3e-01	4.8e-02	PCI/GDRY	09/16/2013 17:10 EDT
Pb214	J	1.13e+00	1.3e-01	5.2e-02	PCI/GDRY	09/16/2013 17:10 EDT
Ra228		1.23e+00	1.5e-01	7.1e-02	PCI/GDRY	09/16/2013 17:10 EDT
Th234	J	9.80e-01	4.7e-01	6.6e-01	PCI/GDRY	09/16/2013 17:10 EDT
Tl208	J	3.72e-01	4.8e-02	2.3e-02	PCI/GDRY	09/16/2013 17:10 EDT
U235	J	1.06e-01	1.0e-01	1.7e-01	PCI/GDRY	09/16/2013 17:10 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	1.991e+02 GDRY
Client sample ID:	R34243-04	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	46.16 %	Analyst:	MO
Ash/dry weight:	84.19 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 22:31	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.59e+00	4.1e-01	4.3e-01	PCI/GDRY	09/16/2013 17:15 EDT
Bi212	J	1.52e+00	3.1e-01	2.8e-01	PCI/GDRY	09/16/2013 17:15 EDT
Bi214	J	9.26e-01	1.1e-01	4.5e-02	PCI/GDRY	09/16/2013 17:15 EDT
Cs137		8.50e-02	2.2e-02	2.1e-02	PCI/GDRY	09/16/2013 17:15 EDT
K40		1.33e+01	1.5e+00	2.1e-01	PCI/GDRY	09/16/2013 17:15 EDT
Pa234m	J	1.80e+00	1.4e+00	2.2e+00	PCI/GDRY	09/16/2013 17:15 EDT
Pb212	J	1.12e+00	1.3e-01	4.8e-02	PCI/GDRY	09/16/2013 17:15 EDT
Pb214	J	1.16e+00	1.4e-01	5.1e-02	PCI/GDRY	09/16/2013 17:15 EDT
Ra228		1.23e+00	1.6e-01	7.6e-02	PCI/GDRY	09/16/2013 17:15 EDT
Th234	J	9.32e-01	5.2e-01	7.4e-01	PCI/GDRY	09/16/2013 17:15 EDT
Tl208	J	3.64e-01	4.8e-02	2.5e-02	PCI/GDRY	09/16/2013 17:15 EDT
U235	J	9.05e-02	1.1e-01	1.7e-01	PCI/GDRY	09/16/2013 17:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10867F	Amount analyzed:	1.991e+02 GDRY
Client sample ID:	R34243-04	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-16 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	46.16 %	Analyst:	MO
Ash/dry weight:	84.19 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 15:30	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.33e+00	2.5e-01	2.6e-01	PCI/GDRY	09/16/2013 17:15 EDT
Bi212	J	1.31e+00	2.1e-01	1.8e-01	PCI/GDRY	09/16/2013 17:15 EDT
Bi214	J	9.95e-01	1.1e-01	2.9e-02	PCI/GDRY	09/16/2013 17:15 EDT
Cs137		7.33e-02	1.3e-02	1.2e-02	PCI/GDRY	09/16/2013 17:15 EDT
K40		1.26e+01	1.4e+00	1.8e-01	PCI/GDRY	09/16/2013 17:15 EDT
Pa234m	J	2.07e+00	1.0e+00	1.3e+00	PCI/GDRY	09/16/2013 17:15 EDT
Pb212	J	1.20e+00	1.3e-01	2.2e-02	PCI/GDRY	09/16/2013 17:15 EDT
Pb214	J	1.12e+00	1.3e-01	2.7e-02	PCI/GDRY	09/16/2013 17:15 EDT
Ra228		1.15e+00	1.4e-01	5.8e-02	PCI/GDRY	09/16/2013 17:15 EDT
Th234	J	1.19e+00	4.3e-01	6.2e-01	PCI/GDRY	09/16/2013 17:15 EDT
Tl208	J	3.72e-01	4.3e-02	1.6e-02	PCI/GDRY	09/16/2013 17:15 EDT
U235	J	6.32e-02	5.3e-02	8.0e-02	PCI/GDRY	09/16/2013 17:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10868G	Amount analyzed:	3.546e+02 GDRY
Client sample ID:	R34243-05	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-16 17:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.29 %	Analyst:	MO
Ash/dry weight:	92.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 20:52	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.68e-01	2.5e-01	4.0e-01	PCI/GDRY	09/16/2013 17:20 EDT
Bi212	J	1.41e+00	2.8e-01	2.5e-01	PCI/GDRY	09/16/2013 17:20 EDT
Bi214	J	1.32e+00	1.5e-01	4.1e-02	PCI/GDRY	09/16/2013 17:20 EDT
Cs137		2.65e-02	1.3e-02	2.0e-02	PCI/GDRY	09/16/2013 17:20 EDT
K40		1.28e+01	1.4e+00	1.8e-01	PCI/GDRY	09/16/2013 17:20 EDT
Pb212	J	1.22e+00	1.4e-01	4.3e-02	PCI/GDRY	09/16/2013 17:20 EDT
Pb214	J	1.45e+00	1.6e-01	4.4e-02	PCI/GDRY	09/16/2013 17:20 EDT
Ra228		1.52e+00	1.8e-01	7.4e-02	PCI/GDRY	09/16/2013 17:20 EDT
Th234	J	8.68e-01	7.6e-01	1.2e+00	PCI/GDRY	09/16/2013 17:20 EDT
Tl208	J	4.13e-01	4.9e-02	1.9e-02	PCI/GDRY	09/16/2013 17:20 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10869H	Amount analyzed:	3.679e+02 GDRY
Client sample ID:	R34243-06	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 12:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.28 %	Analyst:	MO
Ash/dry weight:	93.58 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 03:33	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.38e+00	2.3e-01	1.8e-01	PCI/GDRY	09/17/2013 12:30 EDT
Bi214	J	1.27e+00	1.4e-01	3.1e-02	PCI/GDRY	09/17/2013 12:30 EDT
Cs137		2.81e-02	1.0e-02	1.2e-02	PCI/GDRY	09/17/2013 12:30 EDT
K40		9.60e+00	1.1e+00	1.4e-01	PCI/GDRY	09/17/2013 12:30 EDT
Pb212	J	1.06e+00	1.2e-01	3.7e-02	PCI/GDRY	09/17/2013 12:30 EDT
Pb214	J	1.43e+00	1.6e-01	3.8e-02	PCI/GDRY	09/17/2013 12:30 EDT
Ra228		1.42e+00	1.7e-01	5.5e-02	PCI/GDRY	09/17/2013 12:30 EDT
Th234	J	9.03e-01	4.6e-01	6.7e-01	PCI/GDRY	09/17/2013 12:30 EDT
Tl208	J	3.69e-01	4.4e-02	1.7e-02	PCI/GDRY	09/17/2013 12:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10870A	Amount analyzed:	1.820e+02 GDRY
Client sample ID:	R34243-07	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 13:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	58.95 %	Analyst:	MO
Ash/dry weight:	86.99 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 10:20	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.40e+00	3.1e-01	2.8e-01	PCI/GDRY	09/17/2013 13:15 EDT
Bi214	J	7.89e-01	9.9e-02	4.9e-02	PCI/GDRY	09/17/2013 13:15 EDT
Cs137		1.89e-01	3.0e-02	2.1e-02	PCI/GDRY	09/17/2013 13:15 EDT
K40		9.37e+00	1.1e+00	2.4e-01	PCI/GDRY	09/17/2013 13:15 EDT
Pb212	J	1.13e+00	1.3e-01	5.1e-02	PCI/GDRY	09/17/2013 13:15 EDT
Pb214	J	9.61e-01	1.2e-01	5.7e-02	PCI/GDRY	09/17/2013 13:15 EDT
Ra228		1.36e+00	1.8e-01	8.4e-02	PCI/GDRY	09/17/2013 13:15 EDT
Th234	J	8.90e-01	4.5e-01	6.6e-01	PCI/GDRY	09/17/2013 13:15 EDT
Tl208	J	3.91e-01	4.8e-02	2.1e-02	PCI/GDRY	09/17/2013 13:15 EDT
U235	J	1.12e-01	1.1e-01	1.8e-01	PCI/GDRY	09/17/2013 13:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10871B	Amount analyzed:	3.351e+02 GDRY
Client sample ID:	R34243-08	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 13:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	76.57 %	Analyst:	MO
Ash/dry weight:	92.90 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 14:34	1000.0	GE09	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.86e-01	1.8e-01	3.0e-01	PCI/GDRY	09/17/2013 13:45 EDT
Bi212	J	1.08e+00	1.8e-01	1.7e-01	PCI/GDRY	09/17/2013 13:45 EDT
Bi214	J	1.04e+00	1.2e-01	3.0e-02	PCI/GDRY	09/17/2013 13:45 EDT
Cs137		2.20e-02	9.7e-03	1.2e-02	PCI/GDRY	09/17/2013 13:45 EDT
K40		8.58e+00	9.6e-01	1.4e-01	PCI/GDRY	09/17/2013 13:45 EDT
Pb212	J	9.29e-01	1.0e-01	2.7e-02	PCI/GDRY	09/17/2013 13:45 EDT
Pb214	J	1.16e+00	1.3e-01	3.3e-02	PCI/GDRY	09/17/2013 13:45 EDT
Ra228		1.21e+00	1.4e-01	5.1e-02	PCI/GDRY	09/17/2013 13:45 EDT
Th234	J	8.17e-01	6.0e-01	9.2e-01	PCI/GDRY	09/17/2013 13:45 EDT
Tl208	J	3.36e-01	4.0e-02	1.6e-02	PCI/GDRY	09/17/2013 13:45 EDT
U235	J	9.45e-02	6.2e-02	8.9e-02	PCI/GDRY	09/17/2013 13:45 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10872C	Amount analyzed:	3.519e+02 GDRY
Client sample ID:	R34243-09	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 14:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	76.03 %	Analyst:	MO
Ash/dry weight:	92.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/03/2013 14:35	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.08e+00	1.7e-01	1.3e-01	PCI/GDRY	09/17/2013 14:00 EDT
Bi214	J	9.85e-01	1.1e-01	2.2e-02	PCI/GDRY	09/17/2013 14:00 EDT
Cs137		2.21e-02	6.4e-03	7.8e-03	PCI/GDRY	09/17/2013 14:00 EDT
K40		8.57e+00	9.4e-01	9.0e-02	PCI/GDRY	09/17/2013 14:00 EDT
Pa234m	J	9.11e-01	6.7e-01	1.1e+00	PCI/GDRY	09/17/2013 14:00 EDT
Pb210	J	6.70e-01	1.6e-01	2.1e-01	PCI/GDRY	09/17/2013 14:00 EDT
Pb212	J	9.39e-01	1.0e-01	2.1e-02	PCI/GDRY	09/17/2013 14:00 EDT
Pb214	J	1.16e+00	1.3e-01	2.1e-02	PCI/GDRY	09/17/2013 14:00 EDT
Ra228		1.15e+00	1.3e-01	3.5e-02	PCI/GDRY	09/17/2013 14:00 EDT
Th234	J	8.25e-01	1.8e-01	2.2e-01	PCI/GDRY	09/17/2013 14:00 EDT
Tl208	J	3.15e-01	3.6e-02	1.1e-02	PCI/GDRY	09/17/2013 14:00 EDT
U235	J	6.60e-02	3.7e-02	5.4e-02	PCI/GDRY	09/17/2013 14:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10873D	Amount analyzed:	3.419e+02 GDRY
Client sample ID:	R34243-10	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	76.29 %	Analyst:	MO
Ash/dry weight:	94.98 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 15:22	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	9.76e-01	2.0e-01	1.9e-01	PCI/GDRY	09/17/2013 14:15 EDT
Bi214	J	8.71e-01	1.0e-01	3.0e-02	PCI/GDRY	09/17/2013 14:15 EDT
Cs137		2.54e-02	9.1e-03	1.1e-02	PCI/GDRY	09/17/2013 14:15 EDT
K40		7.78e+00	8.8e-01	1.5e-01	PCI/GDRY	09/17/2013 14:15 EDT
Pa234m	J	1.04e+00	9.4e-01	1.5e+00	PCI/GDRY	09/17/2013 14:15 EDT
Pb212	J	8.58e-01	9.9e-02	3.3e-02	PCI/GDRY	09/17/2013 14:15 EDT
Pb214	J	1.02e+00	1.2e-01	3.8e-02	PCI/GDRY	09/17/2013 14:15 EDT
Ra228		1.11e+00	1.3e-01	5.3e-02	PCI/GDRY	09/17/2013 14:15 EDT
Th234	J	8.31e-01	4.3e-01	6.2e-01	PCI/GDRY	09/17/2013 14:15 EDT
Tl208	J	2.79e-01	3.5e-02	1.6e-02	PCI/GDRY	09/17/2013 14:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10874E	Amount analyzed:	2.883e+02 GDRY
Client sample ID:	R34243-11	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	70.88 %	Analyst:	MO
Ash/dry weight:	93.92 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 20:25	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		6.28e-01	2.5e-01	3.1e-01	PCI/GDRY	09/17/2013 14:30 EDT
Bi212	J	1.03e+00	2.2e-01	2.1e-01	PCI/GDRY	09/17/2013 14:30 EDT
Bi214	J	7.89e-01	9.4e-02	3.6e-02	PCI/GDRY	09/17/2013 14:30 EDT
Cs137		2.57e-02	1.1e-02	1.7e-02	PCI/GDRY	09/17/2013 14:30 EDT
K40		8.18e+00	9.3e-01	1.6e-01	PCI/GDRY	09/17/2013 14:30 EDT
Pa234m	J	2.01e+00	1.1e+00	1.4e+00	PCI/GDRY	09/17/2013 14:30 EDT
Pb212	J	7.97e-01	9.5e-02	4.1e-02	PCI/GDRY	09/17/2013 14:30 EDT
Pb214	J	9.65e-01	1.1e-01	4.3e-02	PCI/GDRY	09/17/2013 14:30 EDT
Ra228		1.04e+00	1.2e-01	5.5e-02	PCI/GDRY	09/17/2013 14:30 EDT
Th234	J	9.22e-01	4.9e-01	7.0e-01	PCI/GDRY	09/17/2013 14:30 EDT
Tl208	J	2.73e-01	3.5e-02	1.8e-02	PCI/GDRY	09/17/2013 14:30 EDT
U235	J	1.00e-01	8.7e-02	1.4e-01	PCI/GDRY	09/17/2013 14:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10875F	Amount analyzed:	2.853e+02 GDRY
Client sample ID:	R34243-12	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	71.63 %	Analyst:	MO
Ash/dry weight:	93.88 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 01:27	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		4.47e-01	2.0e-01	2.8e-01	PCI/GDRY	09/17/2013 14:35 EDT
Bi212	J	1.15e+00	2.2e-01	1.9e-01	PCI/GDRY	09/17/2013 14:35 EDT
Bi214	J	7.79e-01	9.3e-02	3.6e-02	PCI/GDRY	09/17/2013 14:35 EDT
Cs137		3.01e-02	1.1e-02	1.3e-02	PCI/GDRY	09/17/2013 14:35 EDT
K40		8.34e+00	9.5e-01	1.6e-01	PCI/GDRY	09/17/2013 14:35 EDT
Pb212	J	8.19e-01	9.7e-02	3.9e-02	PCI/GDRY	09/17/2013 14:35 EDT
Pb214	J	9.61e-01	1.1e-01	3.9e-02	PCI/GDRY	09/17/2013 14:35 EDT
Ra228		1.06e+00	1.4e-01	6.3e-02	PCI/GDRY	09/17/2013 14:35 EDT
Th234	J	7.68e-01	4.5e-01	6.7e-01	PCI/GDRY	09/17/2013 14:35 EDT
Tl208	J	2.81e-01	3.6e-02	1.8e-02	PCI/GDRY	09/17/2013 14:35 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10876G	Amount analyzed:	1.611e+02 GDRY
Client sample ID:	R34243-13	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	52.74 %	Analyst:	MO
Ash/dry weight:	91.41 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 06:29	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.09e+00	4.6e-01	5.4e-01	PCI/GDRY	09/17/2013 15:00 EDT
Bi212	J	1.54e+00	3.3e-01	3.2e-01	PCI/GDRY	09/17/2013 15:00 EDT
Bi214	J	1.14e+00	1.4e-01	5.5e-02	PCI/GDRY	09/17/2013 15:00 EDT
Cs137		5.55e-02	2.0e-02	2.3e-02	PCI/GDRY	09/17/2013 15:00 EDT
K40		1.45e+01	1.6e+00	2.8e-01	PCI/GDRY	09/17/2013 15:00 EDT
Pa234m	J	2.37e+00	1.6e+00	2.2e+00	PCI/GDRY	09/17/2013 15:00 EDT
Pb212	J	1.22e+00	1.4e-01	5.7e-02	PCI/GDRY	09/17/2013 15:00 EDT
Pb214	J	1.44e+00	1.7e-01	5.5e-02	PCI/GDRY	09/17/2013 15:00 EDT
Ra228		1.45e+00	1.8e-01	9.2e-02	PCI/GDRY	09/17/2013 15:00 EDT
Th234	J	1.64e+00	6.3e-01	8.5e-01	PCI/GDRY	09/17/2013 15:00 EDT
Tl208	J	4.22e-01	5.5e-02	2.9e-02	PCI/GDRY	09/17/2013 15:00 EDT
U235	J	1.17e-01	1.2e-01	2.0e-01	PCI/GDRY	09/17/2013 15:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10877H	Amount analyzed:	2.904e+02 GDRY
Client sample ID:	R34243-14	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 14:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	63.62 %	Analyst:	MO
Ash/dry weight:	90.85 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 10:26	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		8.02e-01	3.0e-01	3.8e-01	PCI/GDRY	09/17/2013 14:55 EDT
Bi212	J	1.61e+00	2.9e-01	2.6e-01	PCI/GDRY	09/17/2013 14:55 EDT
Bi214	J	1.59e+00	1.8e-01	4.6e-02	PCI/GDRY	09/17/2013 14:55 EDT
Cs137		3.41e-02	1.4e-02	1.7e-02	PCI/GDRY	09/17/2013 14:55 EDT
K40		7.02e+00	8.2e-01	2.2e-01	PCI/GDRY	09/17/2013 14:55 EDT
Pb212	J	1.25e+00	1.4e-01	4.7e-02	PCI/GDRY	09/17/2013 14:55 EDT
Pb214	J	1.79e+00	2.0e-01	5.4e-02	PCI/GDRY	09/17/2013 14:55 EDT
Ra228		1.64e+00	1.9e-01	8.1e-02	PCI/GDRY	09/17/2013 14:55 EDT
Th234	J	1.37e+00	8.5e-01	1.3e+00	PCI/GDRY	09/17/2013 14:55 EDT
Tl208	J	4.29e-01	5.1e-02	2.2e-02	PCI/GDRY	09/17/2013 14:55 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10878J	Amount analyzed:	3.304e+02 GDRY
Client sample ID:	R34243-15	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 15:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	80.79 %	Analyst:	MO
Ash/dry weight:	93.64 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 18:49	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.40e+00	2.8e-01	2.5e-01	PCI/GDRY	09/17/2013 15:05 EDT
Bi214	J	1.32e+00	1.5e-01	4.2e-02	PCI/GDRY	09/17/2013 15:05 EDT
Cs137		2.06e-02	1.1e-02	1.5e-02	PCI/GDRY	09/17/2013 15:05 EDT
K40		1.04e+01	1.2e+00	1.9e-01	PCI/GDRY	09/17/2013 15:05 EDT
Pb212	J	1.13e+00	1.3e-01	4.0e-02	PCI/GDRY	09/17/2013 15:05 EDT
Pb214	J	1.52e+00	1.7e-01	4.8e-02	PCI/GDRY	09/17/2013 15:05 EDT
Ra228		1.33e+00	1.6e-01	6.8e-02	PCI/GDRY	09/17/2013 15:05 EDT
Th234	J	7.58e-01	7.2e-01	1.1e+00	PCI/GDRY	09/17/2013 15:05 EDT
Tl208	J	3.81e-01	4.6e-02	2.2e-02	PCI/GDRY	09/17/2013 15:05 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10879K	Amount analyzed:	3.285e+02 GDRY
Client sample ID:	R34243-16	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 15:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	74.29 %	Analyst:	MO
Ash/dry weight:	95.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/05/2013 03:12	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.08e+00	2.5e-01	2.2e-01	PCI/GDRY	09/17/2013 15:15 EDT
Bi214	J	7.75e-01	9.3e-02	4.0e-02	PCI/GDRY	09/17/2013 15:15 EDT
Cs137		2.26e-02	8.9e-03	1.2e-02	PCI/GDRY	09/17/2013 15:15 EDT
K40		7.11e+00	8.1e-01	1.8e-01	PCI/GDRY	09/17/2013 15:15 EDT
Pa234m	J	2.37e+00	1.4e+00	1.6e+00	PCI/GDRY	09/17/2013 15:15 EDT
Pb212	J	7.56e-01	8.9e-02	3.8e-02	PCI/GDRY	09/17/2013 15:15 EDT
Pb214	J	9.16e-01	1.1e-01	4.2e-02	PCI/GDRY	09/17/2013 15:15 EDT
Ra228		8.82e-01	1.1e-01	6.2e-02	PCI/GDRY	09/17/2013 15:15 EDT
Tl208	J	2.67e-01	3.2e-02	1.6e-02	PCI/GDRY	09/17/2013 15:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10880C	Amount analyzed:	2.951e+02 GDRY
Client sample ID:	R34243-17	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 15:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	71.01 %	Analyst:	MO
Ash/dry weight:	93.32 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 15:31	1000.0	GE09	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.48e-01	1.7e-01	2.4e-01	PCI/GDRY	09/17/2013 15:25 EDT
Bi212	J	1.15e+00	2.2e-01	2.0e-01	PCI/GDRY	09/17/2013 15:25 EDT
Bi214	J	9.18e-01	1.0e-01	2.9e-02	PCI/GDRY	09/17/2013 15:25 EDT
Cs137		2.00e-02	9.9e-03	1.5e-02	PCI/GDRY	09/17/2013 15:25 EDT
K40		7.51e+00	8.5e-01	1.5e-01	PCI/GDRY	09/17/2013 15:25 EDT
Pb212	J	9.13e-01	1.0e-01	2.4e-02	PCI/GDRY	09/17/2013 15:25 EDT
Pb214	J	1.01e+00	1.1e-01	3.3e-02	PCI/GDRY	09/17/2013 15:25 EDT
Ra228		1.01e+00	1.2e-01	5.8e-02	PCI/GDRY	09/17/2013 15:25 EDT
Tl208	J	3.01e-01	3.6e-02	1.5e-02	PCI/GDRY	09/17/2013 15:25 EDT
U235	J	1.46e-01	6.0e-02	8.8e-02	PCI/GDRY	09/17/2013 15:25 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10881D	Amount analyzed:	3.378e+02 GDRY
Client sample ID:	R34243-18	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-17 16:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	68.61 %	Analyst:	MO
Ash/dry weight:	93.10 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 15:33	1000.0	GE06	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.11e+00	1.8e-01	1.5e-01	PCI/GDRY	09/17/2013 16:00 EDT
Bi214	J	9.18e-01	1.0e-01	2.8e-02	PCI/GDRY	09/17/2013 16:00 EDT
Cs137		-3.48e-03	1.1e-02	1.4e-02	PCI/GDRY	09/17/2013 16:00 EDT
K40		9.53e+00	1.1e+00	1.3e-01	PCI/GDRY	09/17/2013 16:00 EDT
Pb212	J	9.05e-01	1.0e-01	2.3e-02	PCI/GDRY	09/17/2013 16:00 EDT
Pb214	J	1.02e+00	1.1e-01	2.8e-02	PCI/GDRY	09/17/2013 16:00 EDT
Ra228		1.05e+00	1.3e-01	5.1e-02	PCI/GDRY	09/17/2013 16:00 EDT
Th234	J	8.34e-01	5.1e-01	7.9e-01	PCI/GDRY	09/17/2013 16:00 EDT
Tl208	J	3.18e-01	3.7e-02	1.3e-02	PCI/GDRY	09/17/2013 16:00 EDT
U235	J	5.39e-02	5.1e-02	8.4e-02	PCI/GDRY	09/17/2013 16:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10882E	Amount analyzed:	3.280e+02 GDRY
Client sample ID:	R34243-19	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-18 10:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.78 %	Analyst:	MO
Ash/dry weight:	92.52 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 16:57	1000.0	GE04	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.19e+00	1.9e-01	1.5e-01	PCI/GDRY	09/18/2013 10:05 EDT
Bi214	J	1.08e+00	1.2e-01	2.3e-02	PCI/GDRY	09/18/2013 10:05 EDT
Cs137		1.90e-02	7.7e-03	9.8e-03	PCI/GDRY	09/18/2013 10:05 EDT
K40		8.99e+00	9.9e-01	1.2e-01	PCI/GDRY	09/18/2013 10:05 EDT
Pa234m	J	1.11e+00	7.6e-01	1.0e+00	PCI/GDRY	09/18/2013 10:05 EDT
Pb210	J	6.95e-01	1.9e-01	2.6e-01	PCI/GDRY	09/18/2013 10:05 EDT
Pb212	J	9.21e-01	1.0e-01	2.3e-02	PCI/GDRY	09/18/2013 10:05 EDT
Pb214	J	1.25e+00	1.4e-01	2.6e-02	PCI/GDRY	09/18/2013 10:05 EDT
Ra228		1.13e+00	1.3e-01	4.4e-02	PCI/GDRY	09/18/2013 10:05 EDT
Th234	J	9.48e-01	2.1e-01	2.7e-01	PCI/GDRY	09/18/2013 10:05 EDT
Tl208	J	3.20e-01	3.7e-02	1.3e-02	PCI/GDRY	09/18/2013 10:05 EDT
U235	J	4.70e-02	4.5e-02	7.3e-02	PCI/GDRY	09/18/2013 10:05 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10883F	Amount analyzed:	6.921e+02 GDRY
Client sample ID:	R34243-20	Preparation batch #:	0010555D
Matrix:	SEDIMENT	Assay batch #:	0017595C
Collected:	2013-09-18 10:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	76.71 %	Analyst:	MO
Ash/dry weight:	92.45 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 15:40	1000.0	GE22	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	9.95e-01	1.4e-01	9.8e-02	PCI/GDRY	09/18/2013 10:15 EDT
Bi214	J	9.52e-01	1.0e-01	1.6e-02	PCI/GDRY	09/18/2013 10:15 EDT
Cs137		2.04e-02	4.2e-03	5.5e-03	PCI/GDRY	09/18/2013 10:15 EDT
K40		8.04e+00	8.8e-01	7.2e-02	PCI/GDRY	09/18/2013 10:15 EDT
Pa234m	J	1.76e+00	5.1e-01	5.5e-01	PCI/GDRY	09/18/2013 10:15 EDT
Pb212	J	7.98e-01	8.8e-02	1.7e-02	PCI/GDRY	09/18/2013 10:15 EDT
Pb214	J	1.11e+00	1.2e-01	1.7e-02	PCI/GDRY	09/18/2013 10:15 EDT
Ra228		9.88e-01	1.1e-01	3.0e-02	PCI/GDRY	09/18/2013 10:15 EDT
Th234	J	4.74e-01	2.6e-01	3.9e-01	PCI/GDRY	09/18/2013 10:15 EDT
Tl208	J	2.89e-01	3.2e-02	7.9e-03	PCI/GDRY	09/18/2013 10:15 EDT
U235	J	6.62e-02	3.9e-02	6.4e-02	PCI/GDRY	09/18/2013 10:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680001J	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010555D
Matrix:	N/A	Assay batch #:	0017595C
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 15:39	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi207		4.71e+03	5.2e+02	3.9e+01	PCI	12/15/2010 11:00 CST
Bi212	J	3.00e+02	9.1e+01	1.1e+02	PCI	12/15/2010 11:00 CST
Bi214	J	1.24e+02	1.7e+01	1.1e+01	PCI	12/15/2010 11:00 CST
Eu155		1.13e+03	1.3e+02	2.8e+01	PCI	12/15/2010 11:00 CST
K40		1.99e+02	4.8e+01	4.4e+01	PCI	12/15/2010 11:00 CST
Pb212	J	2.70e+02	3.1e+01	1.5e+01	PCI	12/15/2010 11:00 CST
Pb214	J	1.40e+02	2.0e+01	1.7e+01	PCI	12/15/2010 11:00 CST
Ra228		2.78e+02	4.0e+01	3.5e+01	PCI	12/15/2010 11:00 CST
Tl208	J	7.89e+01	1.1e+01	7.9e+00	PCI	12/15/2010 11:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300085

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680002K	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010555D
Matrix:	N/A	Assay batch #:	0017595C
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/04/2013 16:58	1000.0	GE07	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	-2.55e+00	2.6e+01	3.9e+01	PCI	12/03/2013 07:00 CST
Bi214	J	2.78e+00	4.6e+00	7.4e+00	PCI	12/03/2013 07:00 CST
Cs137		-9.29e-01	4.1e+00	2.9e+00	PCI	12/03/2013 07:00 CST
K40		2.38e+01	2.5e+01	3.9e+01	PCI	12/03/2013 07:00 CST
Pb212	J	4.60e+00	2.9e+00	5.0e+00	PCI	12/03/2013 07:00 CST
Pb214	J	-8.08e-01	4.9e+00	7.4e+00	PCI	12/03/2013 07:00 CST
Ra228		5.45e+00	8.6e+00	1.3e+01	PCI	12/03/2013 07:00 CST
Th234	J	1.01e+02	9.1e+01	1.5e+02	PCI	12/03/2013 07:00 CST
Tl208	J	1.66e+00	2.3e+00	3.5e+00	PCI	12/03/2013 07:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

QC RESULTS FOR BATCH 0010555D

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10867F	00680003L	DUP	BE7		17.8	-1.08	PASS
B3.10867F	00680003L	DUP	BI212		14.6	-1.10	PASS-J
B3.10867F	00680003L	DUP	BI214		7.2	0.87	PASS-J
B3.10867F	00680003L	DUP	CS137		14.9	-0.94	PASS
B3.10867F	00680003L	DUP	K40		4.8	-0.60	PASS
B3.10867F	00680003L	DUP	PA234M		14.2	0.32	PASS-J
B3.10867F	00680003L	DUP	PB212		7.0	0.87	PASS-J
B3.10867F	00680003L	DUP	PB214		3.6	-0.44	PASS-J
B3.10867F	00680003L	DUP	RA228		7.0	-0.80	PASS
B3.10867F	00680003L	DUP	TH234		24.0	0.75	PASS-J
B3.10867F	00680003L	DUP	TL208		2.0	0.23	PASS-J
B3.10867F	00680003L	DUP	U235		35.5	-0.46	PASS-J
LCS-00680001J	00680001J	LCS	BI207	100.2		0.03	PASS
LCS-00680001J	00680001J	LCS	EU155	110.6		1.56	PASS
RBK-00680002K	00680002K	RBK	BI212				PASS-J
RBK-00680002K	00680002K	RBK	BI214				PASS-J
RBK-00680002K	00680002K	RBK	CS137				PASS
RBK-00680002K	00680002K	RBK	K40				PASS
RBK-00680002K	00680002K	RBK	PB212				HIGH-J
RBK-00680002K	00680002K	RBK	PB214				PASS-J
RBK-00680002K	00680002K	RBK	RA228				PASS
RBK-00680002K	00680002K	RBK	TH234				WARN-J
RBK-00680002K	00680002K	RBK	TL208				PASS-J

Note: Results qualified with -J may be significantly under or over-estimated and are not evaluated for QC purposes.

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
GAMMA ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300086

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Gamma-ray Spectrometry - Sealed Radium Cans
Report ID:	1300086-GAMMA-CORR.
Report type:	Corrected Report for Report ID 1300086-GAMMA
Date reported:	02/13/2014
Total pages in report:	30

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10884G	R34243-21	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10885H	R34243-22	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10886J	R34243-23	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10887K	R34243-24	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10888L	R34243-25	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10889M	R34243-26	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10890E	R34243-27	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10891F	R34243-28	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10892G	R34243-29	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10893H	R34243-30	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10894J	R34243-31	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10895K	R34243-32	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10896L	R34243-33	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10897M	R34243-34	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10898N	R34243-35	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10899P	R34243-36	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10900N	R34243-37	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10901P	R34243-38	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10902Q	R34243-39	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013
B3.10903R	R34243-40	PA:KISKIMERE	SEDIMENT	09/18/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – Samples were sealed and held for 21 days to allow for in-growth before gamma analysis was performed. Pb-210 is not detectable by some NAREL detectors. As a result, not all samples will have a result for Pb-210.

This is a corrected report for Report ID 1300086-GAMMA. The explanation of the correction follows:

The client questioned NAREL about the method ID reported on the original data package which was NAREL GAM-01. The client requested the method NAREL GAM-01-RA which means the samples are sealed

and held for 21 days to allow for in-growth before gamma analysis is performed. There is no difference in the actual gamma analysis for these two methods except the length of time held prior to analysis. Therefore the results in this corrected package remain the same as the original data package results. The only change is the method ID which has been corrected from NAREL GAM-01 to NAREL GAM-01-RA.

5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-13-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-13-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

GENERAL INFORMATION (CONTINUED)

GAMMA ANALYSIS

The reporting format lists the gamma emitters in alphabetical order. The activity, 2-sigma uncertainty, and a sample-specific estimate of the MDC for radionuclides measured by gamma spectroscopy are reported only if the nuclide is detected above background with the exception of client requested nuclides of interest. The activity for each of the requested nuclides is reported whether negative, positive, or zero along with the associated 2-sigma uncertainty and the sample-specific estimate of the MDC.

Due to potential spectral interferences and other possible problems associated with the determination of the activity of certain radionuclides, the activities for ^{214}Bi, ^{214}Pb, ^{234}Th, ^{234m}Pa, ^{226}Ra, ^{231}Th, and ^{235}U are subject to greater uncertainty than other commonly reported radionuclides. It should be noted that this potential uncertainty is not included in the two-sigma expanded uncertainty that is reported with each result. Although in this report we do provide the calculated activities for these radionuclides, we recommend that the results be used only as a qualitative means of indicating the presence of these radionuclides and not as a quantitative measure of their concentration. The results for these nuclides are not used in the evaluation of quality control samples. Furthermore, because of mutual interference between ^{226}Ra and ^{235}U, NAREL's gamma analysis software tends to overestimate the amounts of these nuclides whenever both are present in a sample. Lower estimates for ^{226}Ra activities can be obtained from the reported activities of its decay products, ^{214}Pb and ^{214}Bi, which are likely to be somewhat less than the ^{226}Ra activity because of the potential escape of radon gas.

NAREL's gamma-ray spectrometry software corrects activities and MDCs for decay between collection and analysis, but only up to a limit of twelve half-lives. If the decay time for a sample exceeds twelve half-lives of a radionuclide, that radionuclide is not reported. This software feature may affect results for short-lived radionuclides, such as ^{131}I and ^{140}Ba, when there is a long delay between collection and analysis.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

ANALYSIS SUMMARY

Analysis method: NAREL GAM-01-RA
Title: Gamma-ray Spectrometry - Sealed Radium Cans

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10884G	R34243-21		12/09/2013	0010579M	0017625Q
B3.10884G	R34243-21	DUP	12/11/2013	0010579M	0017625Q
B3.10885H	R34243-22		12/09/2013	0010579M	0017625Q
B3.10886J	R34243-23		12/10/2013	0010579M	0017625Q
B3.10887K	R34243-24		12/10/2013	0010579M	0017625Q
B3.10888L	R34243-25		12/09/2013	0010579M	0017625Q
B3.10889M	R34243-26		12/10/2013	0010579M	0017625Q
B3.10890E	R34243-27		12/10/2013	0010579M	0017625Q
B3.10891F	R34243-28		12/10/2013	0010579M	0017625Q
B3.10892G	R34243-29		12/10/2013	0010579M	0017625Q
B3.10893H	R34243-30		12/10/2013	0010579M	0017625Q
B3.10894J	R34243-31		12/10/2013	0010579M	0017625Q
B3.10895K	R34243-32		12/10/2013	0010579M	0017625Q
B3.10896L	R34243-33		12/10/2013	0010579M	0017625Q
B3.10897M	R34243-34		12/11/2013	0010579M	0017625Q
B3.10898N	R34243-35		12/10/2013	0010579M	0017625Q
B3.10899P	R34243-36		12/10/2013	0010579M	0017625Q
B3.10900N	R34243-37		12/10/2013	0010579M	0017625Q
B3.10901P	R34243-38		12/11/2013	0010579M	0017625Q
B3.10902Q	R34243-39		12/11/2013	0010579M	0017625Q
B3.10903R	R34243-40		12/11/2013	0010579M	0017625Q
LCS-00680270E *		LCS	12/11/2013	0010579M	0017625Q
RBK-00680271F *		RBK	12/11/2013	0010579M	0017625Q

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10884G	Amount analyzed:	3.372e+02 GDRY
Client sample ID:	R34243-21	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 10:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	75.08 %	Analyst:	MO
Ash/dry weight:	93.89 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:45	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.10e+00	1.9e-01	1.6e-01	PCI/GDRY	09/18/2013 10:25 EDT
Bi214	J	9.54e-01	1.1e-01	3.2e-02	PCI/GDRY	09/18/2013 10:25 EDT
Cs137		2.51e-02	9.0e-03	1.1e-02	PCI/GDRY	09/18/2013 10:25 EDT
K40		7.47e+00	8.5e-01	1.5e-01	PCI/GDRY	09/18/2013 10:25 EDT
Pa234m	J	1.62e+00	1.2e+00	1.4e+00	PCI/GDRY	09/18/2013 10:25 EDT
Pb212	J	8.27e-01	9.7e-02	3.8e-02	PCI/GDRY	09/18/2013 10:25 EDT
Pb214	J	1.12e+00	1.3e-01	3.7e-02	PCI/GDRY	09/18/2013 10:25 EDT
Ra228		1.08e+00	1.3e-01	5.0e-02	PCI/GDRY	09/18/2013 10:25 EDT
Th234	J	5.38e-01	4.8e-01	7.8e-01	PCI/GDRY	09/18/2013 10:25 EDT
Tl208	J	2.77e-01	3.4e-02	1.5e-02	PCI/GDRY	09/18/2013 10:25 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10884G	Amount analyzed:	3.372e+02 GDRY
Client sample ID:	R34243-21	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 10:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	75.08 %	Analyst:	MO
Ash/dry weight:	93.89 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 15:19	1000.0	GE06	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		4.20e-01	1.7e-01	2.2e-01	PCI/GDRY	09/18/2013 10:25 EDT
Bi212	J	9.52e-01	1.7e-01	1.5e-01	PCI/GDRY	09/18/2013 10:25 EDT
Bi214	J	8.94e-01	1.0e-01	2.8e-02	PCI/GDRY	09/18/2013 10:25 EDT
Cs137		2.00e-02	8.8e-03	1.1e-02	PCI/GDRY	09/18/2013 10:25 EDT
K40		6.99e+00	7.8e-01	1.2e-01	PCI/GDRY	09/18/2013 10:25 EDT
Pa234m	J	7.46e-01	8.7e-01	1.4e+00	PCI/GDRY	09/18/2013 10:25 EDT
Pb212	J	7.77e-01	8.8e-02	2.5e-02	PCI/GDRY	09/18/2013 10:25 EDT
Pb214	J	9.83e-01	1.1e-01	2.5e-02	PCI/GDRY	09/18/2013 10:25 EDT
Ra228		1.06e+00	1.2e-01	4.4e-02	PCI/GDRY	09/18/2013 10:25 EDT
Th234	J	1.02e+00	5.3e-01	8.0e-01	PCI/GDRY	09/18/2013 10:25 EDT
Tl208	J	2.81e-01	3.4e-02	1.4e-02	PCI/GDRY	09/18/2013 10:25 EDT
U235	J	6.02e-02	4.7e-02	7.2e-02	PCI/GDRY	09/18/2013 10:25 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10885H	Amount analyzed:	3.413e+02 GDRY
Client sample ID:	R34243-22	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 10:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	79.26 %	Analyst:	MO
Ash/dry weight:	94.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 14:47	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.33e-01	2.3e-01	3.7e-01	PCI/GDRY	09/18/2013 10:35 EDT
Bi212	J	1.15e+00	1.9e-01	1.6e-01	PCI/GDRY	09/18/2013 10:35 EDT
Bi214	J	1.01e+00	1.2e-01	3.1e-02	PCI/GDRY	09/18/2013 10:35 EDT
Cs137		1.72e-02	1.1e-02	1.7e-02	PCI/GDRY	09/18/2013 10:35 EDT
K40		9.33e+00	1.0e+00	1.5e-01	PCI/GDRY	09/18/2013 10:35 EDT
Pa234m	J	1.49e+00	1.0e+00	1.6e+00	PCI/GDRY	09/18/2013 10:35 EDT
Pb212	J	9.02e-01	1.0e-01	3.6e-02	PCI/GDRY	09/18/2013 10:35 EDT
Pb214	J	1.15e+00	1.3e-01	3.7e-02	PCI/GDRY	09/18/2013 10:35 EDT
Ra228		1.25e+00	1.5e-01	5.7e-02	PCI/GDRY	09/18/2013 10:35 EDT
Th234	J	8.02e-01	4.9e-01	7.8e-01	PCI/GDRY	09/18/2013 10:35 EDT
Tl208	J	3.13e-01	3.9e-02	1.7e-02	PCI/GDRY	09/18/2013 10:35 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10886J	Amount analyzed:	3.051e+02 GDRY
Client sample ID:	R34243-23	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 10:50 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	79.05 %	Analyst:	MO
Ash/dry weight:	93.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 19:49	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.09e-01	2.5e-01	4.1e-01	PCI/GDRY	09/18/2013 10:50 EDT
Bi212	J	1.20e+00	2.5e-01	2.2e-01	PCI/GDRY	09/18/2013 10:50 EDT
Bi214	J	1.13e+00	1.3e-01	3.6e-02	PCI/GDRY	09/18/2013 10:50 EDT
Cs137		1.32e-02	1.2e-02	1.9e-02	PCI/GDRY	09/18/2013 10:50 EDT
K40		1.00e+01	1.1e+00	1.6e-01	PCI/GDRY	09/18/2013 10:50 EDT
Pa234m	J	1.48e+00	8.8e-01	1.2e+00	PCI/GDRY	09/18/2013 10:50 EDT
Pb212	J	9.60e-01	1.1e-01	3.7e-02	PCI/GDRY	09/18/2013 10:50 EDT
Pb214	J	1.36e+00	1.5e-01	3.9e-02	PCI/GDRY	09/18/2013 10:50 EDT
Ra228		1.34e+00	1.6e-01	5.2e-02	PCI/GDRY	09/18/2013 10:50 EDT
Th234	J	1.26e+00	5.2e-01	7.3e-01	PCI/GDRY	09/18/2013 10:50 EDT
Tl208	J	3.26e-01	4.0e-02	1.8e-02	PCI/GDRY	09/18/2013 10:50 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10887K	Amount analyzed:	3.244e+02 GDRY
Client sample ID:	R34243-24	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 11:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.87 %	Analyst:	MO
Ash/dry weight:	89.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 00:52	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.68e-01	2.2e-01	2.9e-01	PCI/GDRY	09/18/2013 11:00 EDT
Bi212	J	1.34e+00	2.5e-01	2.1e-01	PCI/GDRY	09/18/2013 11:00 EDT
Bi214	J	1.06e+00	1.2e-01	3.4e-02	PCI/GDRY	09/18/2013 11:00 EDT
Cs137		1.78e-02	1.1e-02	1.7e-02	PCI/GDRY	09/18/2013 11:00 EDT
K40		1.06e+01	1.2e+00	1.5e-01	PCI/GDRY	09/18/2013 11:00 EDT
Pb212	J	1.02e+00	1.2e-01	3.8e-02	PCI/GDRY	09/18/2013 11:00 EDT
Pb214	J	1.25e+00	1.4e-01	3.4e-02	PCI/GDRY	09/18/2013 11:00 EDT
Ra228		1.32e+00	1.6e-01	5.2e-02	PCI/GDRY	09/18/2013 11:00 EDT
Th234	J	1.27e+00	5.2e-01	7.1e-01	PCI/GDRY	09/18/2013 11:00 EDT
Tl208	J	3.45e-01	4.2e-02	1.8e-02	PCI/GDRY	09/18/2013 11:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10888L	Amount analyzed:	3.177e+02 GDRY
Client sample ID:	R34243-25	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 11:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.05 %	Analyst:	MO
Ash/dry weight:	90.16 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:52	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.23e+00	2.3e-01	2.2e-01	PCI/GDRY	09/18/2013 11:05 EDT
Bi214	J	1.15e+00	1.3e-01	4.0e-02	PCI/GDRY	09/18/2013 11:05 EDT
Cs137		2.51e-02	1.2e-02	1.6e-02	PCI/GDRY	09/18/2013 11:05 EDT
K40		1.02e+01	1.1e+00	2.0e-01	PCI/GDRY	09/18/2013 11:05 EDT
Pb212	J	1.07e+00	1.2e-01	4.0e-02	PCI/GDRY	09/18/2013 11:05 EDT
Pb214	J	1.31e+00	1.5e-01	4.6e-02	PCI/GDRY	09/18/2013 11:05 EDT
Ra228		1.24e+00	1.5e-01	7.6e-02	PCI/GDRY	09/18/2013 11:05 EDT
Th234	J	9.83e-01	7.8e-01	1.2e+00	PCI/GDRY	09/18/2013 11:05 EDT
Tl208	J	3.60e-01	4.4e-02	2.1e-02	PCI/GDRY	09/18/2013 11:05 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10889M	Amount analyzed:	3.175e+02 GDRY
Client sample ID:	R34243-26	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 11:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.59 %	Analyst:	MO
Ash/dry weight:	94.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 18:15	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.25e+00	2.4e-01	2.2e-01	PCI/GDRY	09/18/2013 11:10 EDT
Bi214	J	1.13e+00	1.3e-01	4.1e-02	PCI/GDRY	09/18/2013 11:10 EDT
Cs137		1.96e-02	1.0e-02	1.4e-02	PCI/GDRY	09/18/2013 11:10 EDT
K40		1.03e+01	1.2e+00	1.9e-01	PCI/GDRY	09/18/2013 11:10 EDT
Pb212	J	1.06e+00	1.2e-01	4.0e-02	PCI/GDRY	09/18/2013 11:10 EDT
Pb214	J	1.28e+00	1.4e-01	4.0e-02	PCI/GDRY	09/18/2013 11:10 EDT
Ra228		1.24e+00	1.5e-01	7.3e-02	PCI/GDRY	09/18/2013 11:10 EDT
Th234	J	1.23e+00	8.6e-01	1.4e+00	PCI/GDRY	09/18/2013 11:10 EDT
Tl208	J	3.64e-01	4.5e-02	2.1e-02	PCI/GDRY	09/18/2013 11:10 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10890E	Amount analyzed:	3.386e+02 GDRY
Client sample ID:	R34243-27	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	77.72 %	Analyst:	MO
Ash/dry weight:	94.79 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:46	1000.0	GE22	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.78e-01	1.3e-01	2.1e-01	PCI/GDRY	09/18/2013 11:30 EDT
Bi212	J	1.14e+00	1.7e-01	1.3e-01	PCI/GDRY	09/18/2013 11:30 EDT
Bi214	J	9.56e-01	1.1e-01	2.2e-02	PCI/GDRY	09/18/2013 11:30 EDT
Cs137		2.38e-02	5.3e-03	7.1e-03	PCI/GDRY	09/18/2013 11:30 EDT
K40		9.08e+00	1.0e+00	1.1e-01	PCI/GDRY	09/18/2013 11:30 EDT
Pa234m	J	1.27e+00	6.5e-01	7.6e-01	PCI/GDRY	09/18/2013 11:30 EDT
Pb212	J	8.63e-01	9.6e-02	2.0e-02	PCI/GDRY	09/18/2013 11:30 EDT
Pb214	J	1.16e+00	1.3e-01	2.2e-02	PCI/GDRY	09/18/2013 11:30 EDT
Ra228		1.18e+00	1.3e-01	3.7e-02	PCI/GDRY	09/18/2013 11:30 EDT
Th234	J	7.52e-01	2.9e-01	4.2e-01	PCI/GDRY	09/18/2013 11:30 EDT
Tl208	J	2.95e-01	3.4e-02	1.0e-02	PCI/GDRY	09/18/2013 11:30 EDT
U235	J	4.60e-02	4.3e-02	7.0e-02	PCI/GDRY	09/18/2013 11:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10891F	Amount analyzed:	3.506e+02 GDRY
Client sample ID:	R34243-28	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 11:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	74.49 %	Analyst:	MO
Ash/dry weight:	94.14 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:48	1000.0	GE07	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	9.19e-01	1.8e-01	1.7e-01	PCI/GDRY	09/18/2013 11:35 EDT
Bi214	J	9.13e-01	1.0e-01	2.9e-02	PCI/GDRY	09/18/2013 11:35 EDT
Cs137		2.14e-02	8.6e-03	1.1e-02	PCI/GDRY	09/18/2013 11:35 EDT
K40		7.33e+00	8.3e-01	1.6e-01	PCI/GDRY	09/18/2013 11:35 EDT
Pb212	J	8.16e-01	9.3e-02	2.9e-02	PCI/GDRY	09/18/2013 11:35 EDT
Pb214	J	1.04e+00	1.2e-01	3.2e-02	PCI/GDRY	09/18/2013 11:35 EDT
Ra228		1.03e+00	1.2e-01	6.0e-02	PCI/GDRY	09/18/2013 11:35 EDT
Th234	J	7.53e-01	6.3e-01	1.0e+00	PCI/GDRY	09/18/2013 11:35 EDT
Tl208	J	2.90e-01	3.4e-02	1.4e-02	PCI/GDRY	09/18/2013 11:35 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10892G	Amount analyzed:	3.295e+02 GDRY
Client sample ID:	R34243-29	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 11:45 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	77.64 %	Analyst:	MO
Ash/dry weight:	93.91 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:49	1000.0	GE06	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.38e-01	1.8e-01	2.9e-01	PCI/GDRY	09/18/2013 11:45 EDT
Bi212	J	1.23e+00	2.1e-01	1.7e-01	PCI/GDRY	09/18/2013 11:45 EDT
Bi214	J	1.05e+00	1.2e-01	2.7e-02	PCI/GDRY	09/18/2013 11:45 EDT
Cs137		2.65e-02	9.2e-03	1.1e-02	PCI/GDRY	09/18/2013 11:45 EDT
K40		8.52e+00	9.5e-01	1.3e-01	PCI/GDRY	09/18/2013 11:45 EDT
Pb212	J	8.94e-01	1.0e-01	2.5e-02	PCI/GDRY	09/18/2013 11:45 EDT
Pb214	J	1.13e+00	1.3e-01	2.9e-02	PCI/GDRY	09/18/2013 11:45 EDT
Ra228		1.16e+00	1.3e-01	5.2e-02	PCI/GDRY	09/18/2013 11:45 EDT
Th234	J	8.31e-01	5.6e-01	8.5e-01	PCI/GDRY	09/18/2013 11:45 EDT
Tl208	J	3.27e-01	3.8e-02	1.2e-02	PCI/GDRY	09/18/2013 11:45 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10893H	Amount analyzed:	3.017e+02 GDRY
Client sample ID:	R34243-30	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	70.68 %	Analyst:	MO
Ash/dry weight:	94.75 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:53	1000.0	GE04	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.82e-01	1.4e-01	2.0e-01	PCI/GDRY	09/18/2013 12:00 EDT
Bi212	J	1.11e+00	1.8e-01	1.4e-01	PCI/GDRY	09/18/2013 12:00 EDT
Bi214	J	9.85e-01	1.1e-01	2.4e-02	PCI/GDRY	09/18/2013 12:00 EDT
Cs137		2.20e-02	7.0e-03	9.1e-03	PCI/GDRY	09/18/2013 12:00 EDT
K40		7.47e+00	8.3e-01	1.3e-01	PCI/GDRY	09/18/2013 12:00 EDT
Pb210	J	8.52e-01	2.1e-01	2.7e-01	PCI/GDRY	09/18/2013 12:00 EDT
Pb212	J	8.44e-01	9.5e-02	2.5e-02	PCI/GDRY	09/18/2013 12:00 EDT
Pb214	J	1.12e+00	1.2e-01	2.7e-02	PCI/GDRY	09/18/2013 12:00 EDT
Ra228		1.08e+00	1.2e-01	4.3e-02	PCI/GDRY	09/18/2013 12:00 EDT
Th234	J	7.90e-01	2.1e-01	2.8e-01	PCI/GDRY	09/18/2013 12:00 EDT
Tl208	J	2.84e-01	3.3e-02	1.3e-02	PCI/GDRY	09/18/2013 12:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10894J	Amount analyzed:	3.636e+02 GDRY
Client sample ID:	R34243-31	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 14:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	76.59 %	Analyst:	MO
Ash/dry weight:	93.56 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:56	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.06e+00	1.6e-01	1.2e-01	PCI/GDRY	09/18/2013 14:10 EDT
Bi214	J	9.31e-01	1.0e-01	2.0e-02	PCI/GDRY	09/18/2013 14:10 EDT
Cs137		1.64e-02	6.3e-03	8.3e-03	PCI/GDRY	09/18/2013 14:10 EDT
K40		8.16e+00	9.0e-01	1.2e-01	PCI/GDRY	09/18/2013 14:10 EDT
Pb212	J	8.67e-01	9.6e-02	2.0e-02	PCI/GDRY	09/18/2013 14:10 EDT
Pb214	J	1.11e+00	1.2e-01	2.1e-02	PCI/GDRY	09/18/2013 14:10 EDT
Ra228		1.06e+00	1.2e-01	3.7e-02	PCI/GDRY	09/18/2013 14:10 EDT
Th234	J	1.11e+00	4.0e-01	5.7e-01	PCI/GDRY	09/18/2013 14:10 EDT
Tl208	J	3.05e-01	3.5e-02	1.1e-02	PCI/GDRY	09/18/2013 14:10 EDT
U235	J	6.41e-02	4.4e-02	6.4e-02	PCI/GDRY	09/18/2013 14:10 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10895K	Amount analyzed:	3.614e+02 GDRY
Client sample ID:	R34243-32	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 14:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	77.05 %	Analyst:	MO
Ash/dry weight:	94.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 09:57	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.07e+00	1.6e-01	1.1e-01	PCI/GDRY	09/18/2013 14:15 EDT
Bi214	J	9.10e-01	1.0e-01	1.9e-02	PCI/GDRY	09/18/2013 14:15 EDT
Cs137		2.12e-02	6.3e-03	7.7e-03	PCI/GDRY	09/18/2013 14:15 EDT
K40		8.40e+00	9.2e-01	7.8e-02	PCI/GDRY	09/18/2013 14:15 EDT
Pb210	J	5.55e-01	1.4e-01	1.9e-01	PCI/GDRY	09/18/2013 14:15 EDT
Pb212	J	9.80e-01	1.1e-01	1.5e-02	PCI/GDRY	09/18/2013 14:15 EDT
Pb214	J	1.09e+00	1.2e-01	2.1e-02	PCI/GDRY	09/18/2013 14:15 EDT
Ra228		1.07e+00	1.2e-01	3.3e-02	PCI/GDRY	09/18/2013 14:15 EDT
Th234	J	8.92e-01	1.9e-01	2.2e-01	PCI/GDRY	09/18/2013 14:15 EDT
Tl208	J	2.97e-01	3.4e-02	9.7e-03	PCI/GDRY	09/18/2013 14:15 EDT
U235	J	5.38e-02	4.1e-02	6.6e-02	PCI/GDRY	09/18/2013 14:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10896L	Amount analyzed:	3.297e+02 GDRY
Client sample ID:	R34243-33	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 14:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	79.75 %	Analyst:	MO
Ash/dry weight:	92.72 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/09/2013 11:04	1000.0	GE09	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.18e+00	2.0e-01	1.7e-01	PCI/GDRY	09/18/2013 14:25 EDT
Bi214	J	1.18e+00	1.3e-01	3.1e-02	PCI/GDRY	09/18/2013 14:25 EDT
Cs137		2.15e-02	9.2e-03	1.2e-02	PCI/GDRY	09/18/2013 14:25 EDT
K40		9.21e+00	1.0e+00	1.4e-01	PCI/GDRY	09/18/2013 14:25 EDT
Pb212	J	9.62e-01	1.1e-01	2.9e-02	PCI/GDRY	09/18/2013 14:25 EDT
Pb214	J	1.30e+00	1.5e-01	3.2e-02	PCI/GDRY	09/18/2013 14:25 EDT
Ra228		1.30e+00	1.6e-01	5.5e-02	PCI/GDRY	09/18/2013 14:25 EDT
Tl208	J	3.52e-01	4.2e-02	1.7e-02	PCI/GDRY	09/18/2013 14:25 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10897M	Amount analyzed:	3.092e+02 GDRY
Client sample ID:	R34243-34	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 14:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	72.60 %	Analyst:	MO
Ash/dry weight:	91.78 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 12:31	1000.0	GE09	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		4.40e-01	2.1e-01	2.8e-01	PCI/GDRY	09/18/2013 14:35 EDT
Bi212	J	1.16e+00	2.1e-01	1.9e-01	PCI/GDRY	09/18/2013 14:35 EDT
Bi214	J	1.02e+00	1.2e-01	3.0e-02	PCI/GDRY	09/18/2013 14:35 EDT
Cs137		2.30e-02	1.0e-02	1.3e-02	PCI/GDRY	09/18/2013 14:35 EDT
K40		8.41e+00	9.4e-01	1.4e-01	PCI/GDRY	09/18/2013 14:35 EDT
Pb212	J	9.10e-01	1.0e-01	2.8e-02	PCI/GDRY	09/18/2013 14:35 EDT
Pb214	J	1.12e+00	1.3e-01	3.3e-02	PCI/GDRY	09/18/2013 14:35 EDT
Ra228		1.16e+00	1.4e-01	6.0e-02	PCI/GDRY	09/18/2013 14:35 EDT
Th234	J	6.20e-01	5.6e-01	9.1e-01	PCI/GDRY	09/18/2013 14:35 EDT
Tl208	J	3.35e-01	4.0e-02	1.7e-02	PCI/GDRY	09/18/2013 14:35 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10898N	Amount analyzed:	1.667e+02 GDRY
Client sample ID:	R34243-35	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	51.58 %	Analyst:	MO
Ash/dry weight:	88.43 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 11:56	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		9.76e-01	3.4e-01	4.4e-01	PCI/GDRY	09/18/2013 14:30 EDT
Bi212	J	1.54e+00	3.4e-01	3.0e-01	PCI/GDRY	09/18/2013 14:30 EDT
Bi214	J	1.07e+00	1.3e-01	5.6e-02	PCI/GDRY	09/18/2013 14:30 EDT
Cs137		1.15e-01	2.2e-02	2.0e-02	PCI/GDRY	09/18/2013 14:30 EDT
K40		1.40e+01	1.6e+00	2.6e-01	PCI/GDRY	09/18/2013 14:30 EDT
Pb212	J	1.20e+00	1.4e-01	5.8e-02	PCI/GDRY	09/18/2013 14:30 EDT
Pb214	J	1.29e+00	1.6e-01	6.4e-02	PCI/GDRY	09/18/2013 14:30 EDT
Ra228		1.47e+00	1.9e-01	9.2e-02	PCI/GDRY	09/18/2013 14:30 EDT
Th234	J	1.58e+00	6.1e-01	8.2e-01	PCI/GDRY	09/18/2013 14:30 EDT
Tl208	J	3.97e-01	5.1e-02	2.6e-02	PCI/GDRY	09/18/2013 14:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10899P	Amount analyzed:	1.453e+02 GDRY
Client sample ID:	R34243-36	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 15:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	40.94 %	Analyst:	MO
Ash/dry weight:	83.95 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:58	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.57e+00	3.0e-01	2.5e-01	PCI/GDRY	09/18/2013 15:00 EDT
Bi214	J	9.00e-01	1.1e-01	5.4e-02	PCI/GDRY	09/18/2013 15:00 EDT
Cs137		9.89e-02	2.2e-02	2.1e-02	PCI/GDRY	09/18/2013 15:00 EDT
K40		1.21e+01	1.4e+00	2.6e-01	PCI/GDRY	09/18/2013 15:00 EDT
Pb212	J	1.04e+00	1.2e-01	4.9e-02	PCI/GDRY	09/18/2013 15:00 EDT
Pb214	J	1.07e+00	1.3e-01	5.7e-02	PCI/GDRY	09/18/2013 15:00 EDT
Ra228		1.27e+00	1.7e-01	7.8e-02	PCI/GDRY	09/18/2013 15:00 EDT
Th234	J	1.54e+00	6.4e-01	8.8e-01	PCI/GDRY	09/18/2013 15:00 EDT
Tl208	J	3.22e-01	4.3e-02	2.4e-02	PCI/GDRY	09/18/2013 15:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10900N	Amount analyzed:	3.050e+02 GDRY
Client sample ID:	R34243-37	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 15:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	42.14 %	Analyst:	MO
Ash/dry weight:	81.17 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 12:15	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.95e+00	4.1e-01	4.0e-01	PCI/GDRY	09/18/2013 15:30 EDT
Bi212	J	1.23e+00	2.7e-01	2.6e-01	PCI/GDRY	09/18/2013 15:30 EDT
Bi214	J	9.73e-01	1.1e-01	4.2e-02	PCI/GDRY	09/18/2013 15:30 EDT
Cs137		8.29e-02	1.9e-02	1.9e-02	PCI/GDRY	09/18/2013 15:30 EDT
K40		1.02e+01	1.2e+00	1.8e-01	PCI/GDRY	09/18/2013 15:30 EDT
Pb212	J	9.73e-01	1.1e-01	4.6e-02	PCI/GDRY	09/18/2013 15:30 EDT
Pb214	J	1.11e+00	1.3e-01	4.6e-02	PCI/GDRY	09/18/2013 15:30 EDT
Ra228		1.04e+00	1.3e-01	7.3e-02	PCI/GDRY	09/18/2013 15:30 EDT
Th234	J	9.57e-01	7.7e-01	1.2e+00	PCI/GDRY	09/18/2013 15:30 EDT
Tl208	J	3.70e-01	4.5e-02	2.0e-02	PCI/GDRY	09/18/2013 15:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10901P	Amount analyzed:	2.502e+02 GDRY
Client sample ID:	R34243-38	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 15:55 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	60.45 %	Analyst:	MO
Ash/dry weight:	89.51 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 22:01	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.04e+00	2.0e-01	1.8e-01	PCI/GDRY	09/18/2013 15:55 EDT
Bi214	J	7.94e-01	9.5e-02	3.7e-02	PCI/GDRY	09/18/2013 15:55 EDT
Cs137		5.53e-02	1.4e-02	1.5e-02	PCI/GDRY	09/18/2013 15:55 EDT
K40		9.52e+00	1.1e+00	1.6e-01	PCI/GDRY	09/18/2013 15:55 EDT
Pa234m	J	2.51e+00	1.2e+00	1.4e+00	PCI/GDRY	09/18/2013 15:55 EDT
Pb212	J	8.55e-01	1.0e-01	3.7e-02	PCI/GDRY	09/18/2013 15:55 EDT
Pb214	J	9.49e-01	1.1e-01	4.3e-02	PCI/GDRY	09/18/2013 15:55 EDT
Ra228		1.00e+00	1.3e-01	5.8e-02	PCI/GDRY	09/18/2013 15:55 EDT
Th234	J	1.34e+00	4.7e-01	6.1e-01	PCI/GDRY	09/18/2013 15:55 EDT
Tl208	J	2.91e-01	3.6e-02	1.8e-02	PCI/GDRY	09/18/2013 15:55 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10902Q	Amount analyzed:	3.477e+02 GDRY
Client sample ID:	R34243-39	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 16:10 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	76.77 %	Analyst:	MO
Ash/dry weight:	93.30 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 20:38	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.18e+00	2.2e-01	2.1e-01	PCI/GDRY	09/18/2013 16:10 EDT
Bi214	J	1.01e+00	1.2e-01	4.1e-02	PCI/GDRY	09/18/2013 16:10 EDT
Cs137		2.94e-02	1.2e-02	1.5e-02	PCI/GDRY	09/18/2013 16:10 EDT
K40		8.71e+00	9.8e-01	1.7e-01	PCI/GDRY	09/18/2013 16:10 EDT
Pb212	J	9.14e-01	1.1e-01	3.7e-02	PCI/GDRY	09/18/2013 16:10 EDT
Pb214	J	1.11e+00	1.3e-01	4.3e-02	PCI/GDRY	09/18/2013 16:10 EDT
Ra228		1.10e+00	1.3e-01	6.4e-02	PCI/GDRY	09/18/2013 16:10 EDT
Th234	J	7.25e-01	6.5e-01	1.0e+00	PCI/GDRY	09/18/2013 16:10 EDT
Tl208	J	3.13e-01	3.9e-02	1.9e-02	PCI/GDRY	09/18/2013 16:10 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10903R	Amount analyzed:	1.308e+02 GDRY
Client sample ID:	R34243-40	Preparation batch #:	0010579M
Matrix:	SEDIMENT	Assay batch #:	0017625Q
Collected:	2013-09-18 16:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	46.07 %	Analyst:	MO
Ash/dry weight:	87.73 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 03:03	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.79e+00	4.8e-01	5.3e-01	PCI/GDRY	09/18/2013 16:30 EDT
Bi212	J	1.62e+00	3.8e-01	3.5e-01	PCI/GDRY	09/18/2013 16:30 EDT
Bi214	J	1.13e+00	1.3e-01	5.3e-02	PCI/GDRY	09/18/2013 16:30 EDT
Cs137		1.13e-01	2.2e-02	2.1e-02	PCI/GDRY	09/18/2013 16:30 EDT
K40		1.49e+01	1.7e+00	2.7e-01	PCI/GDRY	09/18/2013 16:30 EDT
Pb212	J	1.21e+00	1.4e-01	6.0e-02	PCI/GDRY	09/18/2013 16:30 EDT
Pb214	J	1.33e+00	1.5e-01	5.4e-02	PCI/GDRY	09/18/2013 16:30 EDT
Ra228		1.39e+00	1.7e-01	9.2e-02	PCI/GDRY	09/18/2013 16:30 EDT
Th234	J	1.48e+00	6.2e-01	8.6e-01	PCI/GDRY	09/18/2013 16:30 EDT
Tl208	J	3.92e-01	5.1e-02	2.7e-02	PCI/GDRY	09/18/2013 16:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680270E	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010579M
Matrix:	N/A	Assay batch #:	0017625Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 15:21	1000.0	GE07	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi207		4.59e+03	5.1e+02	9.1e+01	PCI	12/15/2010 11:00 CST
Bi212	J	2.35e+02	1.0e+02	1.5e+02	PCI	12/15/2010 11:00 CST
Bi214	J	1.30e+02	1.9e+01	1.6e+01	PCI	12/15/2010 11:00 CST
Eu155		1.10e+03	1.3e+02	5.1e+01	PCI	12/15/2010 11:00 CST
K40		2.05e+02	6.2e+01	6.6e+01	PCI	12/15/2010 11:00 CST
Pb212	J	2.45e+02	3.1e+01	2.2e+01	PCI	12/15/2010 11:00 CST
Pb214	J	1.30e+02	2.2e+01	2.2e+01	PCI	12/15/2010 11:00 CST
Ra228		2.81e+02	4.7e+01	5.2e+01	PCI	12/15/2010 11:00 CST
Tl208	J	8.34e+01	1.3e+01	1.2e+01	PCI	12/15/2010 11:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300086

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680271F	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010579M
Matrix:	N/A	Assay batch #:	0017625Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 15:22	1000.0	GE22	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	-7.28e+00	2.5e+01	2.8e+01	PCI	12/09/2013 07:00 CST
Bi214	J	8.24e+00	4.2e+00	5.9e+00	PCI	12/09/2013 07:00 CST
Cs137		-4.18e-02	4.4e+00	2.0e+00	PCI	12/09/2013 07:00 CST
K40		-8.95e+00	1.6e+01	2.2e+01	PCI	12/09/2013 07:00 CST
Pb212	J	2.00e+00	2.0e+00	3.0e+00	PCI	12/09/2013 07:00 CST
Pb214	J	3.96e+00	3.2e+00	4.8e+00	PCI	12/09/2013 07:00 CST
Ra228		7.78e+00	7.6e+00	9.5e+00	PCI	12/09/2013 07:00 CST
Tl208	J	2.03e+00	1.9e+00	2.4e+00	PCI	12/09/2013 07:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300086

PREPARATION BATCH SUMMARY

Preparation batch #: 0010579M
Analysis method: NAREL GAM-01-RA
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10884G	R34243-21	00677016R		N/A		MO
B3.10884G	R34243-21	00680269M	DUP	N/A		MO
B3.10885H	R34243-22	00677022P		N/A		MO
B3.10886J	R34243-23	00677028W		N/A		MO
B3.10887K	R34243-24	00677034U		N/A		MO
B3.10888L	R34243-25	00677040R		N/A		MO
B3.10889M	R34243-26	00677046Y		N/A		MO
B3.10890E	R34243-27	00677052W		N/A		MO
B3.10891F	R34243-28	00677058C		N/A		MO
B3.10892G	R34243-29	00677064A		N/A		MO
B3.10893H	R34243-30	00677070Y		N/A		MO
B3.10894J	R34243-31	00677076E		N/A		MO
B3.10895K	R34243-32	00677082C		N/A		MO
B3.10896L	R34243-33	00677088J		N/A		MO
B3.10897M	R34243-34	00677094G		N/A		MO
B3.10898N	R34243-35	00677100L		N/A		MO
B3.10899P	R34243-36	00677106T		N/A		MO
B3.10900N	R34243-37	00677112Q		N/A		MO
B3.10901P	R34243-38	00677118X		N/A		MO
B3.10902Q	R34243-39	00677124V		N/A		MO
B3.10903R	R34243-40	00677130T		N/A		MO
LCS-00680270E *		00680270E	LCS	N/A		MO
RBK-00680271F *		00680271F	RBK	N/A		MO

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010579M

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10884G	00680269M	DUP	BE7				Unmatched
B3.10884G	00680269M	DUP	BI212		14.7	-1.21	PASS-J
B3.10884G	00680269M	DUP	BI214		6.4	-0.79	PASS-J
B3.10884G	00680269M	DUP	CS137		22.5	-0.80	PASS
B3.10884G	00680269M	DUP	K40		6.7	-0.84	PASS
B3.10884G	00680269M	DUP	PA234M		73.9	-1.20	PASS-J
B3.10884G	00680269M	DUP	PB212		6.3	-0.77	PASS-J
B3.10884G	00680269M	DUP	PB214		12.6	-1.57	PASS-J
B3.10884G	00680269M	DUP	RA228		1.5	-0.18	PASS
B3.10884G	00680269M	DUP	TH234		62.2	1.36	PASS-J
B3.10884G	00680269M	DUP	TL208		1.4	0.17	PASS-J
B3.10884G	00680269M	DUP	U235				Unmatched
LCS-00680270E	00680270E	LCS	BI207	97.6		-0.42	PASS
LCS-00680270E	00680270E	LCS	EU155	107.3		1.06	PASS
RBK-00680271F	00680271F	RBK	BI212				PASS-J
RBK-00680271F	00680271F	RBK	BI214				HIGH-J
RBK-00680271F	00680271F	RBK	CS137				PASS
RBK-00680271F	00680271F	RBK	K40				PASS
RBK-00680271F	00680271F	RBK	PB212				WARN-J
RBK-00680271F	00680271F	RBK	PB214				WARN-J
RBK-00680271F	00680271F	RBK	RA228				WARN
RBK-00680271F	00680271F	RBK	TL208				WARN-J

Note: Results qualified with -J may be significantly under or over-estimated and are not evaluated for QC purposes.

U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
GAMMA ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1300087

Project:	Kiskimere GW Well Investigation, Kiskimere, PA - 2013B
Analysis method:	Gamma-ray Spectrometry - Sealed Radium Cans
Report ID:	1300087-GAMMA-CORR.
Report type:	Corrected Report for Report ID 1300087-GAMMA
Date reported:	02/13/2014
Total pages in report:	24

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B3.10904T	R34243-41	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10905U	R34243-42	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10906V	R34243-43	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10907W	R34243-44	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10908X	R34243-45	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10909Y	R34243-46	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10910Q	R34243-47	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10911R	R34243-48	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10912T	R34243-49	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10913U	R34243-50	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10914V	R34243-51	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10915W	R34243-52	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10916X	R34243-53	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013
B3.10917Y	R34243-54	PA:KISKIMERE	SEDIMENT	09/19/2013	09/27/2013

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – The dates and times of collection were recorded on the chain of custody and the removable sample tags but were not recorded on the sample containers.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – Samples were sealed and held for 21 days to allow for in-growth before gamma analysis was performed. Pb-210 is not detectable by some NAREL detectors. As a result, not all samples will have a result for Pb-210.

   This is a corrected report for Report ID 1300087-GAMMA. The explanation of the correction follows:

   The client questioned NAREL about the method ID reported on the original data package which was NAREL GAM-01. The client requested the method NAREL GAM-01-RA which means the samples are sealed and held for 21 days to allow for in-growth before gamma analysis is performed. There is no difference in the actual gamma analysis for these two methods except the length of time held prior to analysis. Therefore the results in this corrected package remain the same as the original data package results. The only change is the method ID which has been corrected from NAREL GAM-01 to NAREL GAM-01-RA.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

ACCREDITATION

All analyses included in this data package are accredited by the Oregon Environmental Laboratory Accreditation Program (ORELAP) to the TNI standard.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 2-13-14

Mary F. Wisdom — Date
Quality Assurance Manager, NAREL

Cynthia White 2-13-14

Cynthia White — Date
Director, Center for Environmental Radioanalytical Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample, or blank spike
MS	Matrix spike
MSD	Matrix spike duplicate (not currently analyzed)
RBK	Method blank
STD	External standard (used for ^{228}Ra yield determination)

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

RADIOCHEMICAL DATA

Radiochemical analyses usually require the subtraction of an instrument background measurement result from a gross sample measurement result. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical importance, as for example in the evaluation of trends or the comparison of two groups of samples.

To the extent practical, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the "2-sigma" measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The measurement result, uncertainty, and MDC are always expressed in the same unit of measurement.

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. Generally the score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference. The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation of most analyses. An exception is the use of %R in the evaluation of gross alpha matrix spike results. A gross alpha matrix spike result is considered acceptable if either $|Z| \leq 3$ or $60 \leq \%R \leq 110$.

GENERAL INFORMATION (CONTINUED)

GAMMA ANALYSIS

The reporting format lists the gamma emitters in alphabetical order. The activity, 2-sigma uncertainty, and a sample-specific estimate of the MDC for radionuclides measured by gamma spectroscopy are reported only if the nuclide is detected above background with the exception of client requested nuclides of interest. The activity for each of the requested nuclides is reported whether negative, positive, or zero along with the associated 2-sigma uncertainty and the sample-specific estimate of the MDC.

Due to potential spectral interferences and other possible problems associated with the determination of the activity of certain radionuclides, the activities for ^{214}Bi, ^{214}Pb, ^{234}Th, ^{234m}Pa, ^{226}Ra, ^{231}Th, and ^{235}U are subject to greater uncertainty than other commonly reported radionuclides. It should be noted that this potential uncertainty is not included in the two-sigma expanded uncertainty that is reported with each result. Although in this report we do provide the calculated activities for these radionuclides, we recommend that the results be used only as a qualitative means of indicating the presence of these radionuclides and not as a quantitative measure of their concentration. The results for these nuclides are not used in the evaluation of quality control samples. Furthermore, because of mutual interference between ^{226}Ra and ^{235}U, NAREL's gamma analysis software tends to overestimate the amounts of these nuclides whenever both are present in a sample. Lower estimates for ^{226}Ra activities can be obtained from the reported activities of its decay products, ^{214}Pb and ^{214}Bi, which are likely to be somewhat less than the ^{226}Ra activity because of the potential escape of radon gas.

NAREL's gamma-ray spectrometry software corrects activities and MDCs for decay between collection and analysis, but only up to a limit of twelve half-lives. If the decay time for a sample exceeds twelve half-lives of a radionuclide, that radionuclide is not reported. This software feature may affect results for short-lived radionuclides, such as ^{131}I and ^{140}Ba, when there is a long delay between collection and analysis.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

ANALYSIS SUMMARY

Analysis method: NAREL GAM-01-RA
Title: Gamma-ray Spectrometry - Sealed Radium Cans

NAREL Sample #	Client Sample ID	QC Type	Date Completed	Preparation Batch #	Assay Batch #
B3.10904T	R34243-41		12/11/2013	0010587M	0017641Q
B3.10905U	R34243-42		12/11/2013	0010587M	0017641Q
B3.10906V	R34243-43		12/11/2013	0010587M	0017641Q
B3.10906V	R34243-43	DUP	12/12/2013	0010587M	0017641Q
B3.10907W	R34243-44		12/12/2013	0010587M	0017641Q
B3.10908X	R34243-45		12/12/2013	0010587M	0017641Q
B3.10909Y	R34243-46		12/12/2013	0010587M	0017641Q
B3.10910Q	R34243-47		12/11/2013	0010587M	0017641Q
B3.10911R	R34243-48		12/11/2013	0010587M	0017641Q
B3.10912T	R34243-49		12/12/2013	0010587M	0017641Q
B3.10913U	R34243-50		12/12/2013	0010587M	0017641Q
B3.10914V	R34243-51		12/12/2013	0010587M	0017641Q
B3.10915W	R34243-52		12/12/2013	0010587M	0017641Q
B3.10916X	R34243-53		12/11/2013	0010587M	0017641Q
B3.10917Y	R34243-54		12/12/2013	0010587M	0017641Q
LCS-00680484T *		LCS	12/12/2013	0010587M	0017641Q
RBK-00680485U *		RBK	12/12/2013	0010587M	0017641Q

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10904T	Amount analyzed:	1.430e+02 GDRY
Client sample ID:	R34243-41	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 11:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	36.72 %	Analyst:	MO
Ash/dry weight:	84.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 12:04	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.04e+00	6.3e-01	6.1e-01	PCI/GDRY	09/19/2013 11:30 EDT
Bi212	J	1.71e+00	3.4e-01	3.1e-01	PCI/GDRY	09/19/2013 11:30 EDT
Bi214	J	1.14e+00	1.4e-01	6.3e-02	PCI/GDRY	09/19/2013 11:30 EDT
Cs137		1.26e-01	2.5e-02	2.3e-02	PCI/GDRY	09/19/2013 11:30 EDT
K40		1.58e+01	1.8e+00	3.1e-01	PCI/GDRY	09/19/2013 11:30 EDT
Pb212	J	1.29e+00	1.5e-01	6.7e-02	PCI/GDRY	09/19/2013 11:30 EDT
Pb214	J	1.45e+00	1.7e-01	6.9e-02	PCI/GDRY	09/19/2013 11:30 EDT
Ra228		1.67e+00	2.1e-01	9.9e-02	PCI/GDRY	09/19/2013 11:30 EDT
Th234	J	1.07e+00	7.0e-01	1.1e+00	PCI/GDRY	09/19/2013 11:30 EDT
Tl208	J	4.63e-01	6.1e-02	3.2e-02	PCI/GDRY	09/19/2013 11:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10905U	Amount analyzed:	1.968e+02 GDRY
Client sample ID:	R34243-42	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 12:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	65.29 %	Analyst:	MO
Ash/dry weight:	89.03 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 17:06	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.30e+00	2.9e-01	2.6e-01	PCI/GDRY	09/19/2013 12:00 EDT
Bi214	J	9.67e-01	1.1e-01	4.2e-02	PCI/GDRY	09/19/2013 12:00 EDT
Cs137		8.13e-02	1.9e-02	2.0e-02	PCI/GDRY	09/19/2013 12:00 EDT
K40		1.17e+01	1.3e+00	2.1e-01	PCI/GDRY	09/19/2013 12:00 EDT
Pa234m	J	1.89e+00	1.3e+00	2.1e+00	PCI/GDRY	09/19/2013 12:00 EDT
Pb212	J	1.02e+00	1.2e-01	4.6e-02	PCI/GDRY	09/19/2013 12:00 EDT
Pb214	J	1.10e+00	1.3e-01	4.9e-02	PCI/GDRY	09/19/2013 12:00 EDT
Ra228		1.19e+00	1.5e-01	8.0e-02	PCI/GDRY	09/19/2013 12:00 EDT
Th234	J	1.31e+00^	5.2e-01	7.1e-01	PCI/GDRY	09/19/2013 12:00 EDT
Tl208	J	3.43e-01	4.5e-02	2.4e-02	PCI/GDRY	09/19/2013 12:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.760e+02 GDRY
Client sample ID:	R34243-43	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	75.97 %	Analyst:	MO
Ash/dry weight:	93.49 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:18	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.85e-01	1.7e-01	2.3e-01	PCI/GDRY	09/19/2013 13:05 EDT
Bi212	J	1.25e+00	2.0e-01	1.7e-01	PCI/GDRY	09/19/2013 13:05 EDT
Bi214	J	1.07e+00	1.2e-01	2.5e-02	PCI/GDRY	09/19/2013 13:05 EDT
Cs137		3.05e-02	1.1e-02	1.2e-02	PCI/GDRY	09/19/2013 13:05 EDT
K40		1.24e+01	1.4e+00	1.5e-01	PCI/GDRY	09/19/2013 13:05 EDT
Pa234m	J	1.26e+00	9.2e-01	1.2e+00	PCI/GDRY	09/19/2013 13:05 EDT
Pb212	J	1.11e+00	1.2e-01	2.6e-02	PCI/GDRY	09/19/2013 13:05 EDT
Pb214	J	1.26e+00	1.4e-01	2.9e-02	PCI/GDRY	09/19/2013 13:05 EDT
Ra228		1.28e+00	1.5e-01	4.9e-02	PCI/GDRY	09/19/2013 13:05 EDT
Th234	J	1.51e+00	5.1e-01	7.2e-01	PCI/GDRY	09/19/2013 13:05 EDT
Tl208	J	3.76e-01	4.3e-02	1.5e-02	PCI/GDRY	09/19/2013 13:05 EDT
U235	J	6.35e-02	5.0e-02	7.6e-02	PCI/GDRY	09/19/2013 13:05 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10906V	Amount analyzed:	2.760e+02 GDRY
Client sample ID:	R34243-43	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 13:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	75.97 %	Analyst:	MO
Ash/dry weight:	93.49 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 22:09	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.42e-01	2.8e-01	4.5e-01	PCI/GDRY	09/19/2013 13:05 EDT
Bi212	J	1.43e+00	2.6e-01	2.2e-01	PCI/GDRY	09/19/2013 13:05 EDT
Bi214	J	1.03e+00	1.2e-01	3.8e-02	PCI/GDRY	09/19/2013 13:05 EDT
Cs137		2.38e-02	1.3e-02	1.6e-02	PCI/GDRY	09/19/2013 13:05 EDT
K40		1.27e+01	1.4e+00	1.8e-01	PCI/GDRY	09/19/2013 13:05 EDT
Pa234m	J	1.51e+00	1.2e+00	2.0e+00	PCI/GDRY	09/19/2013 13:05 EDT
Pb212	J	1.11e+00	1.3e-01	4.7e-02	PCI/GDRY	09/19/2013 13:05 EDT
Pb214	J	1.26e+00	1.5e-01	4.4e-02	PCI/GDRY	09/19/2013 13:05 EDT
Ra228		1.38e+00	1.6e-01	6.3e-02	PCI/GDRY	09/19/2013 13:05 EDT
Th234	J	1.34e+00	5.8e-01	8.0e-01	PCI/GDRY	09/19/2013 13:05 EDT
Tl208	J	3.74e-01	4.5e-02	1.9e-02	PCI/GDRY	09/19/2013 13:05 EDT
U235	J	1.16e-01	9.8e-02	1.6e-01	PCI/GDRY	09/19/2013 13:05 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10907W	Amount analyzed:	1.627e+02 GDRY
Client sample ID:	R34243-44	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 13:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	46.70 %	Analyst:	MO
Ash/dry weight:	89.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/12/2013 03:11	300.0	GE14	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.30e+00	5.4e-01	5.6e-01	PCI/GDRY	09/19/2013 13:30 EDT
Bi212	J	1.66e+00	3.2e-01	2.8e-01	PCI/GDRY	09/19/2013 13:30 EDT
Bi214	J	1.05e+00	1.3e-01	5.2e-02	PCI/GDRY	09/19/2013 13:30 EDT
Cs137		8.61e-02	2.2e-02	2.3e-02	PCI/GDRY	09/19/2013 13:30 EDT
K40		1.29e+01	1.5e+00	2.6e-01	PCI/GDRY	09/19/2013 13:30 EDT
Pb212	J	1.19e+00	1.4e-01	5.4e-02	PCI/GDRY	09/19/2013 13:30 EDT
Pb214	J	1.28e+00	1.5e-01	6.1e-02	PCI/GDRY	09/19/2013 13:30 EDT
Ra228		1.29e+00	1.6e-01	9.1e-02	PCI/GDRY	09/19/2013 13:30 EDT
Th234	J	1.36e+00	6.0e-01	8.3e-01	PCI/GDRY	09/19/2013 13:30 EDT
Tl208	J	3.99e-01	5.3e-02	2.9e-02	PCI/GDRY	09/19/2013 13:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10908X	Amount analyzed:	1.599e+02 GDRY
Client sample ID:	R34243-45	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 13:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	43.30 %	Analyst:	MO
Ash/dry weight:	89.37 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 16:54	1000.0	GE03	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		1.98e+00	3.5e-01	3.4e-01	PCI/GDRY	09/19/2013 13:35 EDT
Bi212	J	1.44e+00	2.5e-01	2.2e-01	PCI/GDRY	09/19/2013 13:35 EDT
Bi214	J	1.10e+00	1.3e-01	4.0e-02	PCI/GDRY	09/19/2013 13:35 EDT
Cs137		8.06e-02	1.5e-02	1.5e-02	PCI/GDRY	09/19/2013 13:35 EDT
K40		1.29e+01	1.4e+00	2.2e-01	PCI/GDRY	09/19/2013 13:35 EDT
Pb212	J	1.34e+00	1.5e-01	2.7e-02	PCI/GDRY	09/19/2013 13:35 EDT
Pb214	J	1.30e+00	1.5e-01	3.7e-02	PCI/GDRY	09/19/2013 13:35 EDT
Ra228		1.29e+00	1.5e-01	6.2e-02	PCI/GDRY	09/19/2013 13:35 EDT
Th234	J	1.39e+00	5.0e-01	7.2e-01	PCI/GDRY	09/19/2013 13:35 EDT
Tl208	J	3.96e-01	4.7e-02	1.9e-02	PCI/GDRY	09/19/2013 13:35 EDT
U235	J	6.77e-02	6.6e-02	9.8e-02	PCI/GDRY	09/19/2013 13:35 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10909Y	Amount analyzed:	2.071e+02 GDRY
Client sample ID:	R34243-46	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 13:25 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	58.55 %	Analyst:	MO
Ash/dry weight:	88.33 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 16:56	1000.0	GE22	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.44e-01	1.2e-01	2.0e-01	PCI/GDRY	09/19/2013 13:25 EDT
Bi212	J	1.21e+00	2.0e-01	1.5e-01	PCI/GDRY	09/19/2013 13:25 EDT
Bi214	J	8.21e-01	9.2e-02	2.9e-02	PCI/GDRY	09/19/2013 13:25 EDT
Cs137		8.26e-02	1.4e-02	1.1e-02	PCI/GDRY	09/19/2013 13:25 EDT
K40		9.39e+00	1.0e+00	1.7e-01	PCI/GDRY	09/19/2013 13:25 EDT
Pa234m	J	1.55e+00	7.1e-01	8.8e-01	PCI/GDRY	09/19/2013 13:25 EDT
Pb212	J	8.52e-01	9.5e-02	2.3e-02	PCI/GDRY	09/19/2013 13:25 EDT
Pb214	J	9.59e-01	1.1e-01	2.7e-02	PCI/GDRY	09/19/2013 13:25 EDT
Ra228		1.05e+00	1.2e-01	5.0e-02	PCI/GDRY	09/19/2013 13:25 EDT
Th234	J	5.80e-01	3.2e-01	4.6e-01	PCI/GDRY	09/19/2013 13:25 EDT
Tl208	J	2.96e-01	3.4e-02	1.3e-02	PCI/GDRY	09/19/2013 13:25 EDT
U235	J	8.96e-02	4.8e-02	6.6e-02	PCI/GDRY	09/19/2013 13:25 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10910Q	Amount analyzed:	3.774e+02 GDRY
Client sample ID:	R34243-47	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 14:20 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	59.02 %	Analyst:	MO
Ash/dry weight:	91.18 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 12:07	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.37e+00	2.9e-01	2.8e-01	PCI/GDRY	09/19/2013 14:20 EDT
Bi214	J	1.14e+00	1.3e-01	4.4e-02	PCI/GDRY	09/19/2013 14:20 EDT
Cs137		-7.57e-03	2.2e-02	2.1e-02	PCI/GDRY	09/19/2013 14:20 EDT
K40		1.23e+01	1.4e+00	2.1e-01	PCI/GDRY	09/19/2013 14:20 EDT
Pb212	J	1.12e+00	1.3e-01	4.8e-02	PCI/GDRY	09/19/2013 14:20 EDT
Pb214	J	1.30e+00	1.5e-01	4.7e-02	PCI/GDRY	09/19/2013 14:20 EDT
Ra228		1.28e+00	1.6e-01	7.7e-02	PCI/GDRY	09/19/2013 14:20 EDT
Th234	J	1.37e+00	7.1e-01	1.1e+00	PCI/GDRY	09/19/2013 14:20 EDT
Tl208	J	4.04e-01	4.8e-02	2.1e-02	PCI/GDRY	09/19/2013 14:20 EDT
U235	J	1.03e-01	8.9e-02	1.3e-01	PCI/GDRY	09/19/2013 14:20 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

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SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10911R	Amount analyzed:	2.645e+02 GDRY
Client sample ID:	R34243-48	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 14:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	61.08 %	Analyst:	MO
Ash/dry weight:	91.53 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:37	1000.0	GE04	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.72e-01	1.5e-01	2.1e-01	PCI/GDRY	09/19/2013 14:30 EDT
Bi212	J	1.05e+00	2.0e-01	1.7e-01	PCI/GDRY	09/19/2013 14:30 EDT
Bi214	J	8.61e-01	9.8e-02	2.7e-02	PCI/GDRY	09/19/2013 14:30 EDT
Cs137		4.20e-02	9.2e-03	1.0e-02	PCI/GDRY	09/19/2013 14:30 EDT
K40		8.14e+00	9.1e-01	1.3e-01	PCI/GDRY	09/19/2013 14:30 EDT
Pb210	J	1.22e+00	2.5e-01	3.0e-01	PCI/GDRY	09/19/2013 14:30 EDT
Pb212	J	9.06e-01	1.0e-01	2.0e-02	PCI/GDRY	09/19/2013 14:30 EDT
Pb214	J	9.95e-01	1.1e-01	2.8e-02	PCI/GDRY	09/19/2013 14:30 EDT
Ra228		9.54e-01	1.1e-01	4.5e-02	PCI/GDRY	09/19/2013 14:30 EDT
Th234	J	8.92e-01	2.1e-01	2.8e-01	PCI/GDRY	09/19/2013 14:30 EDT
Tl208	J	2.86e-01	3.4e-02	1.4e-02	PCI/GDRY	09/19/2013 14:30 EDT
U235	J	5.53e-02	4.1e-02	6.2e-02	PCI/GDRY	09/19/2013 14:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10912T	Amount analyzed:	2.743e+02 GDRY
Client sample ID:	R34243-49	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 17:00 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	68.18 %	Analyst:	MO
Ash/dry weight:	87.96 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 20:30	500.0	GE13	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		5.26e-01	2.8e-01	4.5e-01	PCI/GDRY	09/19/2013 17:00 EDT
Bi212	J	1.29e+00	2.4e-01	2.4e-01	PCI/GDRY	09/19/2013 17:00 EDT
Bi214	J	1.04e+00	1.2e-01	4.4e-02	PCI/GDRY	09/19/2013 17:00 EDT
Cs137		3.01e-02	1.1e-02	1.5e-02	PCI/GDRY	09/19/2013 17:00 EDT
K40		1.06e+01	1.2e+00	2.3e-01	PCI/GDRY	09/19/2013 17:00 EDT
Pb212	J	1.07e+00	1.2e-01	4.2e-02	PCI/GDRY	09/19/2013 17:00 EDT
Pb214	J	1.18e+00	1.4e-01	5.1e-02	PCI/GDRY	09/19/2013 17:00 EDT
Ra228		1.21e+00	1.5e-01	7.3e-02	PCI/GDRY	09/19/2013 17:00 EDT
Th234	J	9.05e-01	8.1e-01	1.3e+00	PCI/GDRY	09/19/2013 17:00 EDT
Tl208	J	3.61e-01	4.5e-02	2.2e-02	PCI/GDRY	09/19/2013 17:00 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10913U	Amount analyzed:	2.572e+02 GDRY
Client sample ID:	R34243-50	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 17:05 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	68.63 %	Analyst:	MO
Ash/dry weight:	77.09 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 16:59	1000.0	GE04	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.74e-01	1.8e-01	2.9e-01	PCI/GDRY	09/19/2013 17:05 EDT
Bi212	J	1.17e+00	1.9e-01	1.6e-01	PCI/GDRY	09/19/2013 17:05 EDT
Bi214	J	1.04e+00	1.2e-01	2.8e-02	PCI/GDRY	09/19/2013 17:05 EDT
Cs137		2.75e-02	8.5e-03	1.1e-02	PCI/GDRY	09/19/2013 17:05 EDT
K40		1.02e+01	1.1e+00	1.4e-01	PCI/GDRY	09/19/2013 17:05 EDT
Pb210	J	1.10e+00	2.4e-01	3.1e-01	PCI/GDRY	09/19/2013 17:05 EDT
Pb212	J	9.96e-01	1.1e-01	2.9e-02	PCI/GDRY	09/19/2013 17:05 EDT
Pb214	J	1.18e+00	1.3e-01	3.1e-02	PCI/GDRY	09/19/2013 17:05 EDT
Ra228		1.17e+00	1.4e-01	5.1e-02	PCI/GDRY	09/19/2013 17:05 EDT
Th234	J	1.23e+00	2.6e-01	3.2e-01	PCI/GDRY	09/19/2013 17:05 EDT
Tl208	J	3.44e-01	4.0e-02	1.5e-02	PCI/GDRY	09/19/2013 17:05 EDT
U235	J	7.87e-02	4.6e-02	6.8e-02	PCI/GDRY	09/19/2013 17:05 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10914V	Amount analyzed:	3.347e+02 GDRY
Client sample ID:	R34243-51	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 17:15 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	78.82 %	Analyst:	MO
Ash/dry weight:	94.48 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 17:02	1000.0	GE06	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		2.17e-01	1.7e-01	2.8e-01	PCI/GDRY	09/19/2013 17:15 EDT
Bi212	J	1.15e+00	2.1e-01	1.8e-01	PCI/GDRY	09/19/2013 17:15 EDT
Bi214	J	8.88e-01	1.0e-01	2.6e-02	PCI/GDRY	09/19/2013 17:15 EDT
Cs137		2.68e-02	9.3e-03	1.1e-02	PCI/GDRY	09/19/2013 17:15 EDT
K40		9.25e+00	1.0e+00	1.4e-01	PCI/GDRY	09/19/2013 17:15 EDT
Pb212	J	8.41e-01	9.5e-02	2.4e-02	PCI/GDRY	09/19/2013 17:15 EDT
Pb214	J	9.96e-01	1.1e-01	2.9e-02	PCI/GDRY	09/19/2013 17:15 EDT
Ra228		1.00e+00	1.2e-01	4.3e-02	PCI/GDRY	09/19/2013 17:15 EDT
Th234	J	8.64e-01	5.4e-01	8.2e-01	PCI/GDRY	09/19/2013 17:15 EDT
Tl208	J	2.89e-01	3.4e-02	1.3e-02	PCI/GDRY	09/19/2013 17:15 EDT
U235	J	5.74e-02	5.4e-02	8.8e-02	PCI/GDRY	09/19/2013 17:15 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10915W	Amount analyzed:	2.487e+02 GDRY
Client sample ID:	R34243-52	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 17:30 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	59.52 %	Analyst:	MO
Ash/dry weight:	91.11 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 17:04	1000.0	GE07	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		3.58e-01	2.4e-01	3.3e-01	PCI/GDRY	09/19/2013 17:30 EDT
Bi212	J	1.19e+00	2.3e-01	2.2e-01	PCI/GDRY	09/19/2013 17:30 EDT
Bi214	J	9.61e-01	1.1e-01	3.9e-02	PCI/GDRY	09/19/2013 17:30 EDT
Cs137		4.03e-02	1.4e-02	1.6e-02	PCI/GDRY	09/19/2013 17:30 EDT
K40		8.96e+00	1.0e+00	1.9e-01	PCI/GDRY	09/19/2013 17:30 EDT
Pb212	J	8.99e-01	1.0e-01	3.3e-02	PCI/GDRY	09/19/2013 17:30 EDT
Pb214	J	1.05e+00	1.2e-01	4.2e-02	PCI/GDRY	09/19/2013 17:30 EDT
Ra228		1.03e+00	1.3e-01	7.7e-02	PCI/GDRY	09/19/2013 17:30 EDT
Th234	J	1.58e+00	7.1e-01	1.1e+00	PCI/GDRY	09/19/2013 17:30 EDT
Tl208	J	3.16e-01	3.8e-02	1.8e-02	PCI/GDRY	09/19/2013 17:30 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10916X	Amount analyzed:	2.910e+02 GDRY
Client sample ID:	R34243-53	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 17:35 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	60.42 %	Analyst:	MO
Ash/dry weight:	84.47 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/10/2013 16:21	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Be7		4.95e-01	1.7e-01	2.5e-01	PCI/GDRY	09/19/2013 17:35 EDT
Bi212	J	1.43e+00	2.2e-01	1.6e-01	PCI/GDRY	09/19/2013 17:35 EDT
Bi214	J	1.20e+00	1.3e-01	3.0e-02	PCI/GDRY	09/19/2013 17:35 EDT
Cs137		2.39e-01	3.0e-02	1.4e-02	PCI/GDRY	09/19/2013 17:35 EDT
K40		1.34e+01	1.5e+00	1.2e-01	PCI/GDRY	09/19/2013 17:35 EDT
Pa234m	J	1.64e+00	8.0e-01	1.1e+00	PCI/GDRY	09/19/2013 17:35 EDT
Pb210	J	1.40e+00	2.2e-01	2.2e-01	PCI/GDRY	09/19/2013 17:35 EDT
Pb212	J	1.54e+00	1.7e-01	2.4e-02	PCI/GDRY	09/19/2013 17:35 EDT
Pb214	J	1.45e+00	1.6e-01	3.2e-02	PCI/GDRY	09/19/2013 17:35 EDT
Ra228		1.48e+00	1.7e-01	5.0e-02	PCI/GDRY	09/19/2013 17:35 EDT
Th234	J	1.37e+00	2.6e-01	2.8e-01	PCI/GDRY	09/19/2013 17:35 EDT
Tl208	J	4.58e-01	5.2e-02	1.5e-02	PCI/GDRY	09/19/2013 17:35 EDT
U235	J	6.82e-02	6.0e-02	9.7e-02	PCI/GDRY	09/19/2013 17:35 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	B3.10917Y	Amount analyzed:	2.627e+02 GDRY
Client sample ID:	R34243-54	Preparation batch #:	0010587M
Matrix:	SEDIMENT	Assay batch #:	0017641Q
Collected:	2013-09-19 18:40 EDT	Prep procedure:	N/A
Sample type:	SAM	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	75.12 %	Analyst:	MO
Ash/dry weight:	70.04 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 17:06	1000.0	GE09	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.13e+00	2.4e-01	2.3e-01	PCI/GDRY	09/19/2013 18:40 EDT
Bi214	J	1.05e+00	1.2e-01	3.5e-02	PCI/GDRY	09/19/2013 18:40 EDT
Cs137		2.23e-02	1.1e-02	1.8e-02	PCI/GDRY	09/19/2013 18:40 EDT
K40		8.05e+00	9.2e-01	1.7e-01	PCI/GDRY	09/19/2013 18:40 EDT
Pa234m	J	1.25e+00	1.0e+00	1.5e+00	PCI/GDRY	09/19/2013 18:40 EDT
Pb212	J	9.40e-01	1.1e-01	3.3e-02	PCI/GDRY	09/19/2013 18:40 EDT
Pb214	J	1.19e+00	1.3e-01	3.6e-02	PCI/GDRY	09/19/2013 18:40 EDT
Ra228		1.23e+00	1.5e-01	6.5e-02	PCI/GDRY	09/19/2013 18:40 EDT
Th234	J	1.08e+00	6.3e-01	9.9e-01	PCI/GDRY	09/19/2013 18:40 EDT
Tl208	J	3.35e-01	4.1e-02	1.8e-02	PCI/GDRY	09/19/2013 18:40 EDT

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	LCS-00680484T	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010587M
Matrix:	N/A	Assay batch #:	0017641Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 17:07	1000.0	GE16	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi207		4.67e+03	5.1e+02	4.3e+01	PCI	12/15/2010 11:00 CST
Bi212	J	3.00e+02	9.4e+01	1.1e+02	PCI	12/15/2010 11:00 CST
Bi214	J	1.21e+02	1.6e+01	1.0e+01	PCI	12/15/2010 11:00 CST
Eu155		1.11e+03	1.2e+02	2.6e+01	PCI	12/15/2010 11:00 CST
K40		2.03e+02	4.6e+01	4.2e+01	PCI	12/15/2010 11:00 CST
Pb212	J	2.76e+02	3.2e+01	1.5e+01	PCI	12/15/2010 11:00 CST
Pb214	J	1.48e+02	2.0e+01	1.6e+01	PCI	12/15/2010 11:00 CST
Ra228		2.61e+02	3.4e+01	3.2e+01	PCI	12/15/2010 11:00 CST
Tl208	J	7.85e+01	1.1e+01	7.7e+00	PCI	12/15/2010 11:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG #1300087

SAMPLE ANALYSIS REPORT

Lab sample #:	RBK-00680485U	Amount analyzed:	1.000e+00 SAMP
Client sample ID:	N/A	Preparation batch #:	0010587M
Matrix:	N/A	Assay batch #:	0017641Q
Collected:	N/A	Prep procedure:	N/A
Sample type:	N/A	Analysis method:	NAREL GAM-01-RA
Dry/wet weight:	N/A	Analyst:	MO
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
12/11/2013 17:13	1000.0	GE08	MO

ANALYTICAL RESULTS

Analyte		Activity	± 2 σ Uncertainty	MDC	Unit	Reference Date
Bi212	J	1.59e+01	3.0e+01	5.0e+01	PCI	12/10/2013 12:00 CST
Bi214	J	3.08e-02	6.3e+00	9.2e+00	PCI	12/10/2013 12:00 CST
Cs137		0.00e+00	2.2e+00	3.8e+00	PCI	12/10/2013 12:00 CST
K40		8.27e+00	2.2e+01	4.0e+01	PCI	12/10/2013 12:00 CST
Pb212	J	2.68e+00	3.7e+00	6.4e+00	PCI	12/10/2013 12:00 CST
Pb214	J	-3.34e+00	7.6e+00	9.0e+00	PCI	12/10/2013 12:00 CST
Ra228		-2.18e+00	9.0e+00	1.5e+01	PCI	12/10/2013 12:00 CST
Tl208	J	6.15e+00	2.8e+00	4.0e+00	PCI	12/10/2013 12:00 CST

Note: A "J" qualifier indicates a result that may be significantly under or overestimated.

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ANALYTICAL RADIATION ENVIRONMENTAL LABORATORY

SDG 1300087

PREPARATION BATCH SUMMARY

Preparation batch #: 0010587M
Analysis method: NAREL GAM-01-RA
Preparation procedure: N/A

NAREL Sample #	Client Sample ID	Analysis #	QC Type	Yield	± 2 σ Uncertainty	Analyst
B3.10904T	R34243-41	00677136Z		N/A		MO
B3.10905U	R34243-42	00677142X		N/A		MO
B3.10906V	R34243-43	00677148D		N/A		MO
B3.10906V	R34243-43	00680483R	DUP	N/A		MO
B3.10907W	R34243-44	00677154B		N/A		MO
B3.10908X	R34243-45	00677160Z		N/A		MO
B3.10909Y	R34243-46	00677166F		N/A		MO
B3.10910Q	R34243-47	00677172D		N/A		MO
B3.10911R	R34243-48	00677178K		N/A		MO
B3.10912T	R34243-49	00677184H		N/A		MO
B3.10913U	R34243-50	00677190F		N/A		MO
B3.10914V	R34243-51	00677196M		N/A		MO
B3.10915W	R34243-52	00677202R		N/A		MO
B3.10916X	R34243-53	00677208Y		N/A		MO
B3.10917Y	R34243-54	00677214W		N/A		MO
LCS-00680484T *		00680484T	LCS	N/A		MO
RBK-00680485U *		00680485U	RBK	N/A		MO

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

QC RESULTS FOR BATCH 0010587M

NAREL Sample #	Analysis #	QC Type	Analyte	%R	RPD	Z	Evaluation
B3.10906V	00680483R	DUP	BE7		11.9	-0.26	PASS
B3.10906V	00680483R	DUP	BI212		13.3	1.08	PASS-J
B3.10906V	00680483R	DUP	BI214		3.4	-0.42	PASS-J
B3.10906V	00680483R	DUP	CS137		24.5	-0.79	PASS
B3.10906V	00680483R	DUP	K40		2.7	0.35	PASS
B3.10906V	00680483R	DUP	PA234M		17.9	0.33	PASS-J
B3.10906V	00680483R	DUP	PB212		0.7	-0.09	PASS-J
B3.10906V	00680483R	DUP	PB214		0.3	0.03	PASS-J
B3.10906V	00680483R	DUP	RA228		7.7	0.94	PASS
B3.10906V	00680483R	DUP	TH234		12.0	-0.44	PASS-J
B3.10906V	00680483R	DUP	TL208		0.6	-0.07	PASS-J
B3.10906V	00680483R	DUP	U235		58.3	0.95	PASS-J
LCS-00680484T	00680484T	LCS	BI207	99.3		-0.13	PASS
LCS-00680484T	00680484T	LCS	EU155	109.0		1.33	PASS
RBK-00680485U	00680485U	RBK	BI212				PASS-J
RBK-00680485U	00680485U	RBK	BI214				PASS-J
RBK-00680485U	00680485U	RBK	CS137				PASS
RBK-00680485U	00680485U	RBK	K40				PASS
RBK-00680485U	00680485U	RBK	PB212				PASS-J
RBK-00680485U	00680485U	RBK	PB214				PASS-J
RBK-00680485U	00680485U	RBK	RA228				PASS
RBK-00680485U	00680485U	RBK	TL208				HIGH-J

Note: Results qualified with -J may be significantly under or over-estimated and are not evaluated for QC purposes.

ATTACHMENT 4
TECHNICAL REVIEW COMMENTS

From: Pluta, Bruce
Sent: Tuesday, June 17, 2014 1:25 PM
To: Rupert, Richard
Cc: Leipert, Mark; Tuttle, Jeffrey
Subject: Comments on May 2014 Summary Letter Report: 2013 EPA Monitoring Well Construction, Groundwater Sampling and Kiskiminetas River Sediment Sampling; Kiskimere Groundwater Well Investigation Site, Vandergrift, Armstrong County, Pennsylvania
Importance: High

Rich,

Per your request, I have completed the review of the inorganic chemical data for the sediment provided in the subject report.

As noted in the report, there are exceedances of BTAG sediment screening benchmarks for multiple chemicals at all locations. This is not necessarily surprising given the derivation of the screening benchmarks. Based on the comparison with background concentrations, most of the results appear to be reflective of the composition of the sediment matrix itself, rather than any chemical contamination.

In addition to the comparison provided in the report, I reviewed the exceedances of BTAG screening values against the maximum background concentrations report. In my opinion, this review indicates that there is the potential for low level ecological risk based on the reported chemical concentrations. While there are exceedances of benchmarks, none are sufficiently high enough to indicate an acute or imminent risk given the data that is presented.

The data does suggest samples from locations SD10, SD11, SD14, SD18, and SD23 have a greater number of exceedances of more chemicals, and in some cases at higher concentrations, than the remainder of the data set. Other locations may have had a greater concentration of a chemical, but did not have as great a number of chemicals that exceeded the maximum background and benchmark concentrations. If deemed appropriate upon consideration of other site data, the area of these samples may be appropriate for further evaluation.

The primary uncertainty with this evaluation is associated with the lack of organic carbon and grain size data for each of the samples. This data is necessary to help evaluate the bioavailability of the chemicals and whether or not the samples were collected from appropriately comparable depositional environments. It also aids in background evaluations. It should also be noted that much of the data was "J" qualified.

Thank you for the opportunity to provide support on this project. If you have any questions or need additional assistance, please feel free to contact me.

Bruce

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From: Hudson, Scott
Sent: Friday, June 6, 2014 12:58:24 PM
To: Rupert, Richard
Subject: RE: Kiskimere report.

Hi Rich:

I reviewed all the radioisotope data in the report and didn't see anything of concern.

All results greater than the MDC (lowest level that we can confidently say something is there) are for isotopes of these types:

1) Primordial – uranium and thorium and their decay progeny, and K-40;
2) Cosmogenic – Be-7 from cosmic ray interactions with soil and the atmosphere;
3) Weapons fallout – Cs-137 from nuclear weapon testing.

Also, no amounts were significant; all the results are within the range of expected environmentally-present radioisotopes.

Let me know if you'd like more detail, and thanks for the chance to review.

scott