

Data Validation Package

November 2013
Groundwater and Surface Water
Sampling at the Canonsburg,
Pennsylvania, Disposal Site

February 2014

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Sampling Event Summary

Site: Canonsburg, Pennsylvania, Disposal Site

Sampling Period: November 18, 2013

Five groundwater samples and one surface water sample were collected at the Canonsburg, Pennsylvania, Disposal Site to demonstrate compliance with standards as set forth in the 2000 *Ground Water Compliance Action Plan for the Canonsburg, Pennsylvania, UMTRA Project Site*. Water levels were measured at each sampled well. Sampling and analyses were conducted as specified in *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). One duplicate sample was collected from location 0413.

The U.S. Department of Energy monitors groundwater and surface water at the Canonsburg site to demonstrate that uranium concentrations do not exceed U.S. Nuclear Regulatory Commission-approved alternate concentration limits (ACL) of 1.0 milligram per liter (mg/L) in groundwater and 0.01 mg/L at the point of exposure in Chartiers Creek.

The ACL for uranium was not exceeded in the point-of-compliance wells 0412, 0413, and 0414B, nor was the ACL exceeded at surface location 0602.



Michele L. Miller

2014.02.11 15:16:01 -05'00'

Michele Miller
Site Lead, S.M. Stoller Corporation

Date

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Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

LEGEND ● WELL TO BE SAMPLED ■ SURFACE LOCATION TO BE SAMPLED - - - SITE BOUNDARY		U.S. DEPARTMENT OF ENERGY <small>GRAND JUNCTION, COLORADO</small>	<small>Work Performed by</small> S.M. Stoller Corporation <small>Under DOE Contract No. DE-AM01-07LM00060</small>
		Planned Sampling Map Canonsburg, PA, Disposal Site October 2013	
		<small>DATE PREPARED:</small> September 11, 2013	<small>FILENAME:</small> S1068800

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Canonsburg, Pennsylvania, Disposal Site, Sample Location Map

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	<u>Canonsburg, Pennsylvania</u>	Date(s) of Water Sampling	<u>November 18, 2013</u>
Date(s) of Verification	<u>January 23, 2014</u>	Name of Verifier	<u>Stephen Donovan</u>

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List any Program Directives or other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order letter dated September 25, 2013.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	
3. Were calibrations conducted as specified in the above-named documents?	<u>NA</u>	<u>Calibration data not available.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>NA</u> <u>NA</u>	<u>Operational check data not available.</u>
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>No</u>	<u>The field measurements for wells 0412, 0413, 0414B, and 0424 were recorded after the sample was filtered.</u>
6. Were wells categorized correctly?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	<u>Yes</u>	
Did the water level stabilize prior to sampling?	<u>Yes</u>	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	<u>Yes</u>	<u>Turbidity requirements were not met prior to filtering.</u>
Was the flow rate less than 500 mL/min?	<u>Yes</u>	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well: Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected at location 0413.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	An equipment blank was not required.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	NA	Not required.
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN): 13095639
Sample Event: November 18, 2013
Site(s): Canonsburg, Pennsylvania
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1311457
Analysis: Metals
Validator: Stephen Donovan
Review Date: January 22, 2014

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/POL/S04325, continually updated) “Standard Practice for Validation of Environmental Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Uranium	LMM-02	SW-846 3005A	SW-846 6020

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Sample Shipping/Receiving

ALS Laboratory Group, Fort Collins, Colorado, received seven water samples on November 22, 2013, accompanied by a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed on the form and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal had no errors or omissions. Copies of the air waybill labels were included with the sample receiving documentation.

Preservation and Holding Times

The sample shipments were received cool and intact at ambient temperature which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1311457-1	0406A	Dissolved oxygen	R	Sample filtered prior to measurement
1311457-1	0406A	ORP	R	Sample filtered prior to measurement
1311457-1	0406A	pH	R	Sample filtered prior to measurement
1311457-1	0406A	Specific Conductance	R	Sample filtered prior to measurement
1311457-1	0406A	Temperature	R	Sample filtered prior to measurement
1311457-1	0406A	Turbidity	R	Sample filtered prior to measurement
1311457-2	0412	Dissolved oxygen	R	Sample filtered prior to measurement
1311457-2	0412	ORP	R	Sample filtered prior to measurement
1311457-2	0412	pH	R	Sample filtered prior to measurement
1311457-2	0412	Specific Conductance	R	Sample filtered prior to measurement
1311457-2	0412	Temperature	R	Sample filtered prior to measurement
1311457-2	0412	Turbidity	R	Sample filtered prior to measurement
1311457-3	0413	Dissolved oxygen	R	Sample filtered prior to measurement
1311457-3	0413	ORP	R	Sample filtered prior to measurement
1311457-3	0413	pH	R	Sample filtered prior to measurement
1311457-3	0413	Specific Conductance	R	Sample filtered prior to measurement
1311457-3	0413	Temperature	R	Sample filtered prior to measurement
1311457-3	0413	Turbidity	R	Sample filtered prior to measurement
1311457-4	0414B	Dissolved oxygen	R	Sample filtered prior to measurement
1311457-4	0414B	ORP	R	Sample filtered prior to measurement
1311457-4	0414B	pH	R	Sample filtered prior to measurement
1311457-4	0414B	Specific Conductance	R	Sample filtered prior to measurement
1311457-4	0414B	Temperature	R	Sample filtered prior to measurement
1311457-4	0414B	Turbidity	R	Sample filtered prior to measurement
1311457-5	0424	Dissolved oxygen	R	Sample filtered prior to measurement
1311457-5	0424	ORP	R	Sample filtered prior to measurement
1311457-5	0424	pH	R	Sample filtered prior to measurement
1311457-5	0424	Specific Conductance	R	Sample filtered prior to measurement
1311457-5	0424	Temperature	R	Sample filtered prior to measurement
1311457-5	0424	Turbidity	R	Sample filtered prior to measurement

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all metal analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL.

The reported MDL for uranium demonstrates compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. Calibration and laboratory spike standards were prepared from independent sources.

Method SW-846 6020

Calibration for uranium was performed November 25, 2013. The initial calibration was performed using four calibration standards resulting in a calibration curve with correlation coefficient (r^2) value greater than 0.995. The absolute values of the curve intercept was less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all verification results within the acceptance range. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curves near the PQL with acceptable results. The mass calibration and resolution was checked at the beginning of each analytical run in accordance with the procedure. Internal standard recoveries were stable and within acceptance ranges.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All initial and continuing calibration blank results were below the MDL.

Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) pairs were analyzed for all analytes as a measure of method performance in the sample matrix. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The MS/MSD recoveries met the acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent. For results less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria demonstrating acceptable laboratory precision.

Laboratory Control Samples

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS results were acceptable.

Metals Serial Dilution

Serial dilutions were performed during the metals analysis to monitor physical or chemical interferences that may exist in the sample matrix. A serial dilution was prepared and analyzed for manganese and uranium with acceptable results.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were achieved.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable (EDD) File

The EDD file arrived on December 2, 2013. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 13095639 Lab Code: PAR Validator: Stephen Donovan Validation Date: 01/22/2014
Project: Canonsburg Analysis Type: Metals General Chem Rad Organics
of Samples: 7 Matrix: WATER Requested Analysis Completed: Yes

Chain of Custody

Present: OK Signed: OK Dated: OK

Sample

Integrity: OK Preservation: OK Temperature: OK

Select Quality Parameters

Holding Times

All analyses were completed within the applicable holding times.

Detection Limits

The reported detection limits are equal to or below contract requirements.

Field/Trip Blanks

Field Duplicates

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 13095639 Lab Code: PAR Date Due: 12/20/2013
 Matrix: Water Site Code: CAN01 Date Completed: 12/03/2013

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Uranium	ICP/MS	11/25/2013	0.0000	1.0000	OK	OK	OK	101.0	109.0	112.0	3.0	102.0		120.0

Sampling Quality Control Assessment

The following information summarizes and assesses quality control for this sampling event.

Sampling Protocol

Sample results for all monitoring wells were qualified with an “F” flag in the database, indicating that the wells were purged and sampled using the low-flow sampling method, meeting the Category I criteria. The data from wells 0406A and 0413 were further qualified with a “Q” flag because these are Category II wells.

The field measurements for wells 0412, 0413, 0414B, and 0424 were recorded after the sample was filtered. The field measurements are therefore not valid and are qualified with an “R” flag as rejected.

Equipment Blank Assessment

Dedicated equipment was used for all sample collection and an equipment blank was not required.

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0413. The duplicate results met these criteria demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

Page 1 of 1

RIN: 13095639 Lab Code: PAR Project: Canonsburg Validation Date: 01/22/2014

Duplicate: 2817

Sample: 0413

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Uranium	160			10	140			10	13.33		UG/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Stephen Donovan 2-10-2014
Stephen Donovan Date

Data Validation Lead: Stephen Donovan 2-10-2014
Stephen Donovan Date

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

There were no potential outliers identified, and the data for this event are acceptable as qualified.

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Attachment 2

Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE CAN01, Canonsburg Disposal Site

REPORT DATE: 01/23/2014

Location: 0406A WELL Replacement well for 0406.

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Dissolved Oxygen	mg/L	11/18/2013	N001	5	-	15	0.69		RFQ	#		
Oxidation Reduction Potential	mV	11/18/2013	N001	5	-	15	-149.4		RFQ	#		
pH	s.u.	11/18/2013	N001	5	-	15	7.03		RFQ	#		
Specific Conductance	umhos/cm	11/18/2013	N001	5	-	15	1790		RFQ	#		
Temperature	C	11/18/2013	N001	5	-	15	17.81		RFQ	#		
Turbidity	NTU	11/18/2013	N001	5	-	15	9.39		RFQ	#		
Uranium	mg/L	11/18/2013	N001	5	-	15	0.00042		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE CAN01, Canonsburg Disposal Site

REPORT DATE: 01/23/2014

Location: 0412 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Dissolved Oxygen	mg/L	11/18/2013	N001	13.21 - 18.21	6		RF	#		
Oxidation Reduction Potential	mV	11/18/2013	N001	13.21 - 18.21	-54.1		RF	#		
pH	s.u.	11/18/2013	N001	13.21 - 18.21	6.58		RF	#		
Specific Conductance	umhos/cm	11/18/2013	N001	13.21 - 18.21	3043		RF	#		
Temperature	C	11/18/2013	N001	13.21 - 18.21	12.44		RF	#		
Turbidity	NTU	11/18/2013	N001	13.21 - 18.21	9.97		RF	#		
Uranium	mg/L	11/18/2013	N001	13.21 - 18.21	0.25		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE CAN01, Canonsburg Disposal Site

REPORT DATE: 01/23/2014

Location: 0413 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Dissolved Oxygen	mg/L	11/18/2013	N001	6.05	-	11.05	1.27		RFQ	#		
Oxidation Reduction Potential	mV	11/18/2013	N001	6.05	-	11.05	-54.1		RFQ	#		
pH	s.u.	11/18/2013	N001	6.05	-	11.05	6.9		RFQ	#		
Specific Conductance	umhos/cm	11/18/2013	N001	6.05	-	11.05	785		RFQ	#		
Temperature	C	11/18/2013	N001	6.05	-	11.05	12.9		RFQ	#		
Turbidity	NTU	11/18/2013	N001	6.05	-	11.05	10.9		RFQ	#		
Uranium	mg/L	11/18/2013	N001	6.05	-	11.05	0.16		FQ	#	0.000029	
Uranium	mg/L	11/18/2013	N002	6.05	-	11.05	0.14		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE CAN01, Canonsburg Disposal Site

REPORT DATE: 01/23/2014

Location: 0414B WELL Replacement well for 0414A.

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Dissolved Oxygen	mg/L	11/18/2013	N001	0 -	2.08		RF	#		
Oxidation Reduction Potential	mV	11/18/2013	N001	0 -	-3.2		RF	#		
pH	s.u.	11/18/2013	N001	0 -	6.59		RF	#		
Specific Conductance	umhos /cm	11/18/2013	N001	0 -	875		RF	#		
Temperature	C	11/18/2013	N001	0 -	13.57		RF	#		
Turbidity	NTU	11/18/2013	N001	0 -	5.09		RF	#		
Uranium	mg/L	11/18/2013	N001	0 -	0.0015		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE CAN01, Canonsburg Disposal Site

REPORT DATE: 01/23/2014

Location: 0424 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Dissolved Oxygen	mg/L	11/18/2013	N001	7.58	-	12.58	4.47		RF	#		
Oxidation Reduction Potential	mV	11/18/2013	N001	7.58	-	12.58	-46		RF	#		
pH	s.u.	11/18/2013	N001	7.58	-	12.58	6.65		RF	#		
Specific Conductance	umhos/cm	11/18/2013	N001	7.58	-	12.58	1637		RF	#		
Temperature	C	11/18/2013	N001	7.58	-	12.58	13.64		RF	#		
Turbidity	NTU	11/18/2013	N001	7.58	-	12.58	8.86		RF	#		
Uranium	mg/L	11/18/2013	N001	7.58	-	12.58	0.00005	B	F	#	0.000029	

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE CAN01, Canonsburg Disposal Site

REPORT DATE: 01/23/2014

Location: 0602 SURFACE LOCATION RESERVED MGILBERT, WQD, 4/24/89

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Dissolved Oxygen	mg/L	11/18/2013	N001	9.93		#		
Oxidation Reduction Potential	mV	11/18/2013	N001	-227		#		
pH	s.u.	11/18/2013	N001	7.94		#		
Specific Conductance	umhos/cm	11/18/2013	N001	719		#		
Temperature	C	11/18/2013	N001	11.28		#		
Turbidity	NTU	11/18/2013	N001	91.6		#		
Uranium	mg/L	11/18/2013	N001	0.0007		#	0.000029	

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE CAN01, Canonsburg Disposal Site
REPORT DATE: 01/23/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0406A		941.26	11/18/2013	12:55:04	8.81	932.45
0412	O	949.7	11/18/2013	08:26:19	15.61	934.09
0413	O	940.36	11/18/2013	09:45:28	8.37	931.99
0414B		943.96	11/18/2013	12:15:29	9.94	934.02
0424	C	942.25	11/18/2013	10:51:02	13.47	928.78

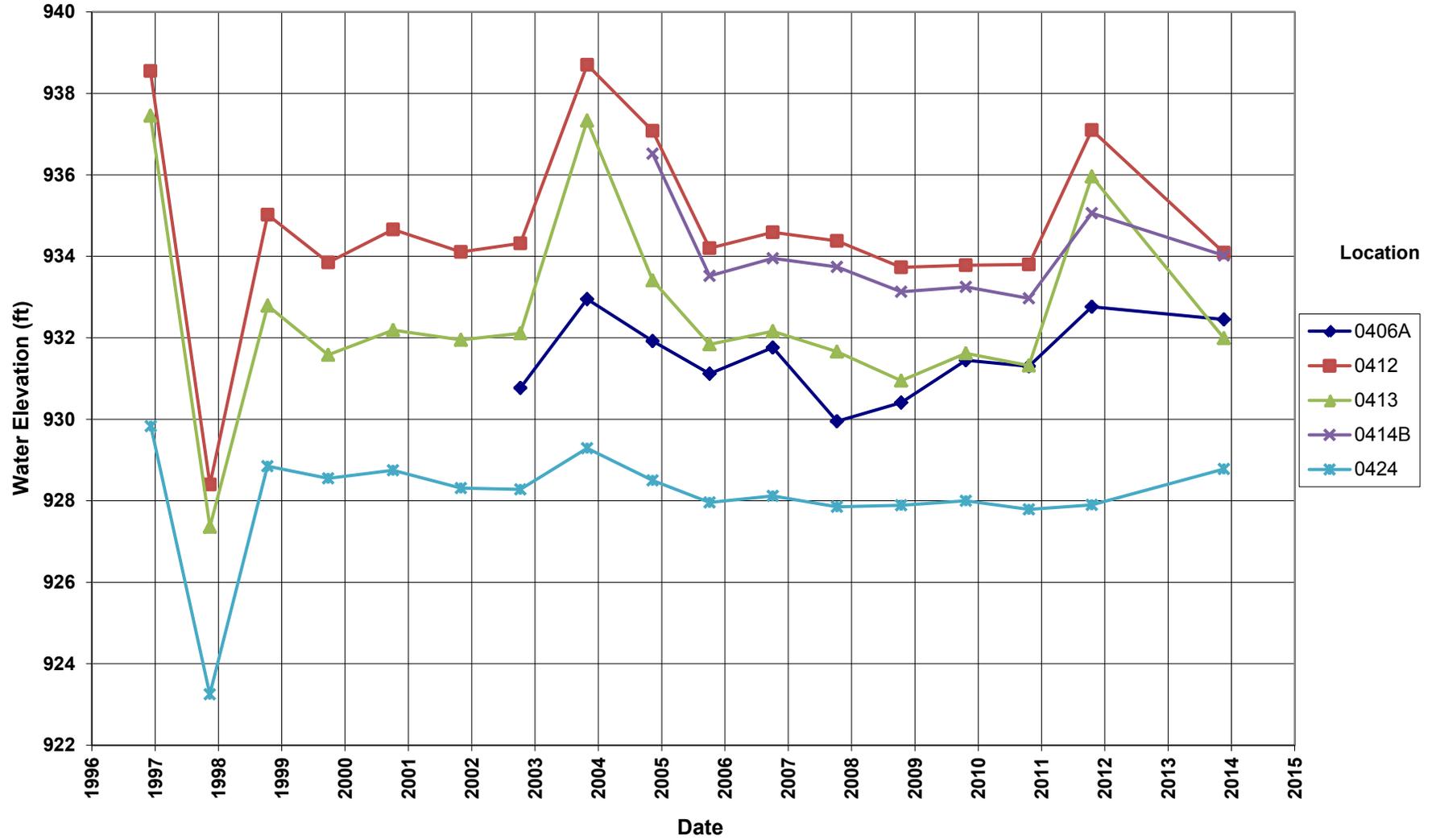
FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT F OFF SITE
 N UNKNOWN O ON SITE U UPGRADIENT

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Hydrograph

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Canonsburg Disposal Site Hydrograph

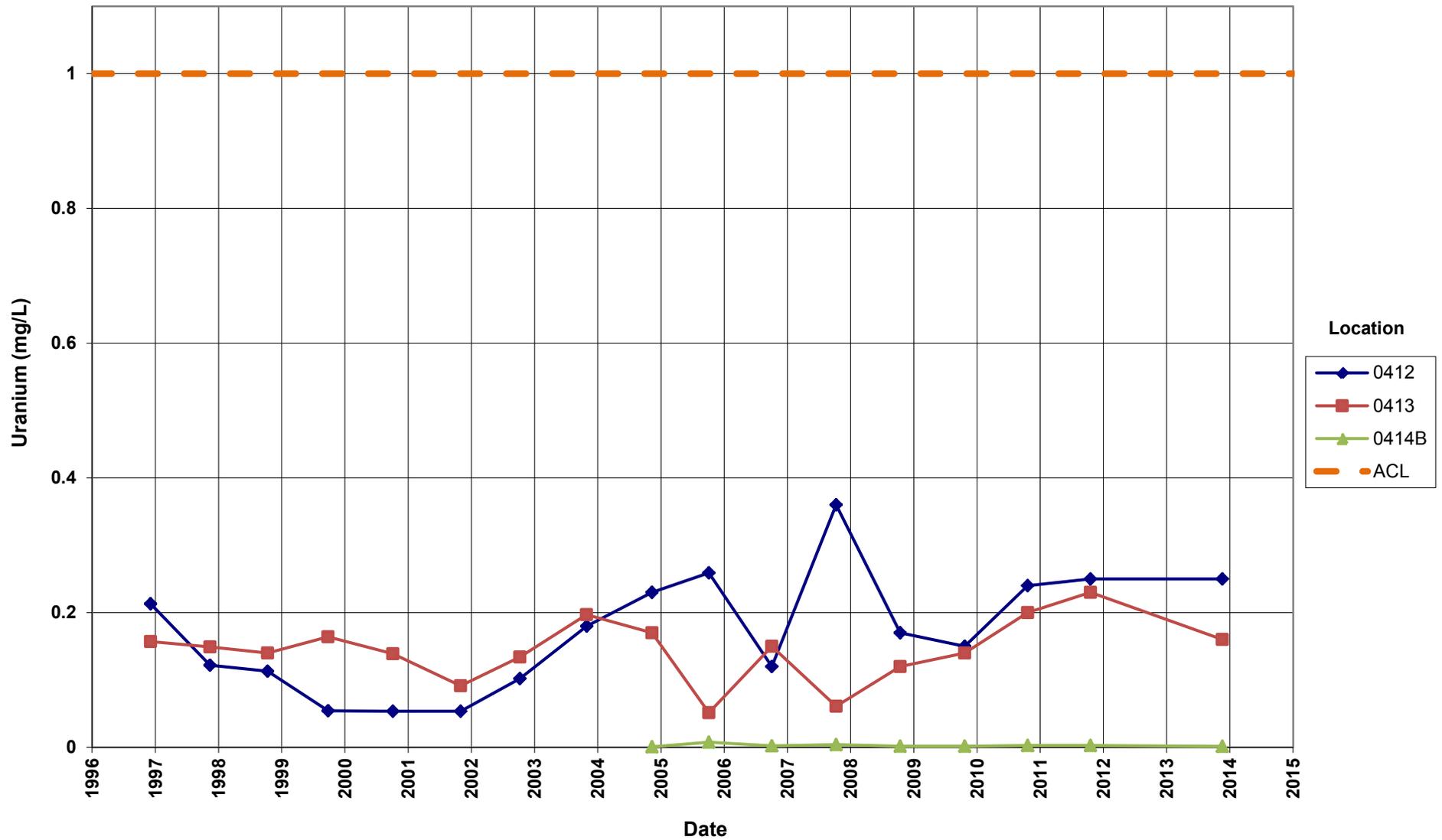


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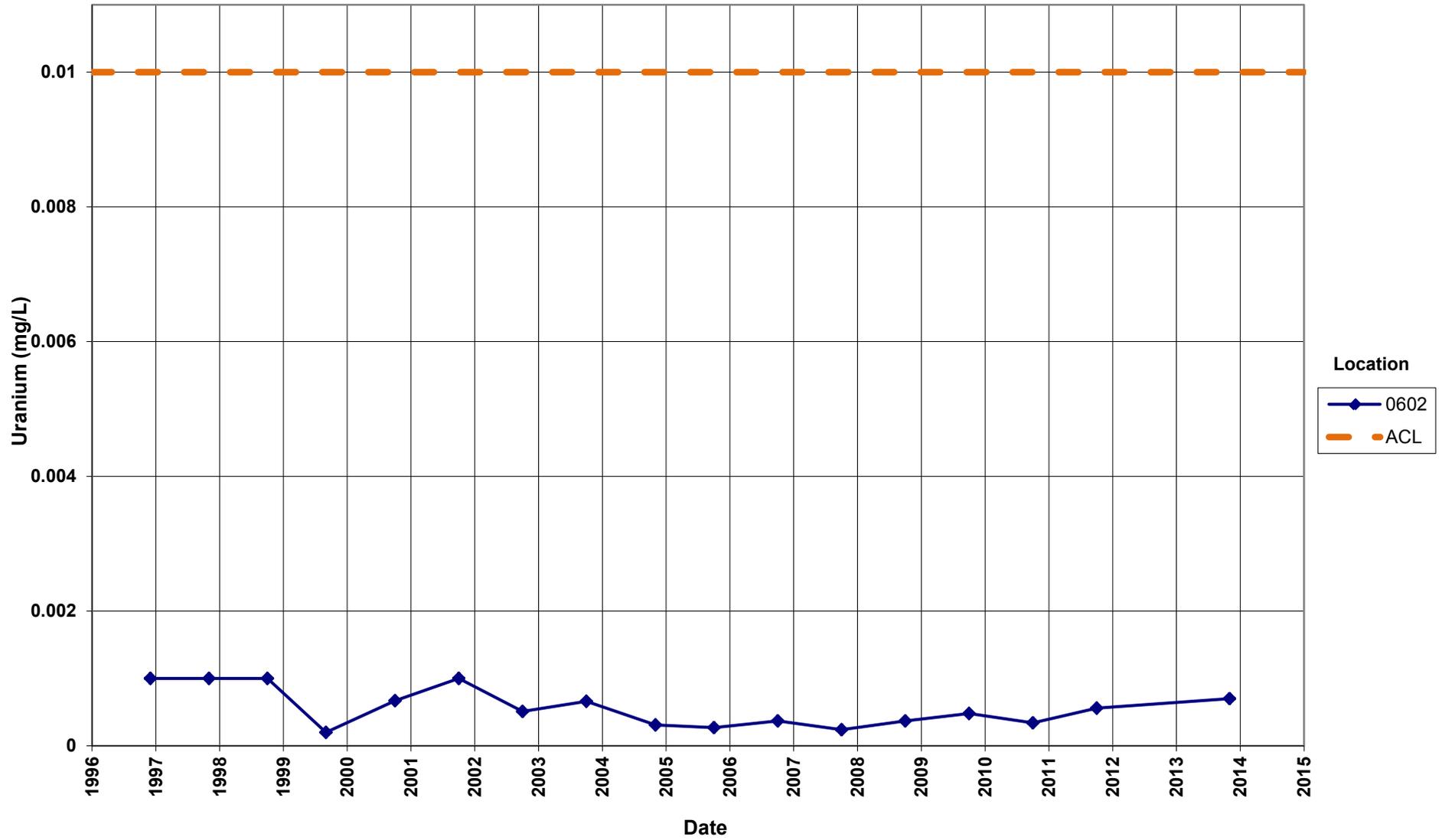
Time-Concentration Graphs

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**Canonsburg Disposal Site
Point of Compliance Wells
Uranium Concentration**
Alternate Concentration Limit = 1.0 mg/L



**Canonsburg Disposal Site
Surface Location
Uranium Concentration**
Alternate Concentration Limit = 0.01 mg/L



Attachment 3
Sampling and Analysis Work Order

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established 1959

Task Order I.M-501
Control Number 13-0839

September 25, 2013

U.S. Department of Energy
Office of Legacy Management
ATTN: Clifford Carpenter
Site Manager
99 Research Park Rd.
Morgantown, WV 26505

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
October 2013 Environmental Sampling at the Canonsburg, Pennsylvania,
Disposal Site

REFERENCE: Task Order LM00-501-02-103-402, Canonsburg, Pennsylvania, Disposal Site

Dear Mr. Carpenter:

The purpose of this letter is to inform you of the upcoming sampling event at Canonsburg, Pennsylvania. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Canonsburg site. Water quality data will be collected from monitoring wells and surface locations at this site as part of the routine environmental sampling currently scheduled to begin the week of October 14, 2013.

The following lists show the monitoring wells (along with associated zone of completion) and surface locations scheduled for sampling during this event.

Monitoring Wells*

0406A Um 0412 Um 0413 Um 0414B Nr 0424 Um

*NOTE: Um = Unconsolidated materials; Nr = No recovery of data for classifying

Surface Locations*

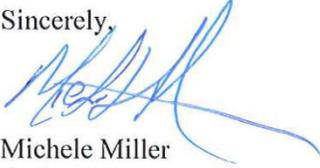
0602

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are being reviewed and are expected to be complete by the beginning of fieldwork.

Clifford Carpenter
Control Number 13-0839
Page 2

Please contact me at (412) 818-7015 if you have any questions.

Sincerely,



Michele Miller
Project Manager

MM/lcg/lb

Enclosures (3)

cc: (electronic)

Christina Pennal, DOE
Steve Donovan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Michele Miller, Stoller
EDD Delivery
rc-grand.junction
File: CAN 410.02(A)

Sampling Frequencies for Locations at Canonsburg, Pennsylvania

Location ID	Quarterly	Semiannually	Annually	Every 5 Years	Not Sampled	Notes
Monitoring Wells						
0406A				X		Next in 10/2013
0412				X		Next in 10/2013
0413				X		Next in 10/2013
0414B				X		Next in 10/2013
0424				X		Next in 10/2013
Surface Locations						
0602				X		Next in 10/2013

Sampling conducted in October
Based on LTSP dated 2008

Constituent Sampling Breakdown

Site	Canonsburg		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
Approx. No. Samples/yr	5	1			
<i>Field Measurements</i>					
Alkalinity					
Dissolved Oxygen	X	X			
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH ₃ -N)					
Calcium					
Chloride					
Chromium					
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO ₃ +NO ₂)-N					
Potassium					
Radium-226					
Radium-228					
Selenium					
Silica					
Sodium					
Strontium					
Sulfate					
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	1	1			

Note: All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

Attachment 4 Trip Report

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Memorandum

DATE: January 6, 2014

TO: Michele Miller
Ken Broberg

FROM: Mike Stott

SUBJECT: Trip Report for Canonsburg, Pennsylvania November 2013 Annual Sampling

Date of Sampling Event: November 18, 2013

Team Members: Mike Stott, Roy Mowen, Bill Gutzwiller

Number of Locations Sampled: A total of six locations were sampled (five monitoring wells and one surface water location). One duplicate sample was collected from monitoring well 0412.

Location Specific Information: The following table includes the established well type identified for each sampled well location.

Ticket Number	Location	Sample Date	Well Type	Comments	Water Levels
LKX 073	0406A	11/18/13	CAT II	N/A	8.81
LKX 077	0424	11/18/13	CAT I	N/A	13.47
LKX 074	0412	11/18/13	CAT II	Duplicate Collected	15.61
LKX 075	0413	11/18/13	CAT II	N/A	8.37
LKX 076	0414B	11/18/13	CAT I	N/A	9.94
LKX 079	0602	11/18/13	Surface water	N/A	N/A

N/A = not applicable

Water Level Measurements: Water levels were measured at all sampled wells. Water level data are provided in the table above and represent depth to water measurements measured from top of well.

Sample Shipment: Samples were shipped overnight by FedEx to ALS Laboratory Group, Fort Collins, CO, on November 21 2013.

Quality Control Sample Cross Reference: Following is the false identification assigned to the quality control sample:

False ID	True ID	Sample Type	Ticket Number
2817	0413	Duplicate	LKX 078

Requisition Numbers Assigned: All samples were assigned to requisition identification number (RIN) 13095639.

Well Maintenance: No maintenance performed during this trip.

Equipment: All monitoring wells are equipped with dedicated downhole and pumphead tubing. All wells were sampled using a peristaltic pump.

Institutional Controls: The Front gate was closed upon arrival, but the lock was only hung on the gate, it was not locked as the shank for the lock was too short to go through the hasp and then lock. The front gate was closed and locked during and after the sampling event with a long shank lock bought locally. The rear gate was closed and locked, but one side of the gate had been knocked from its' hinge and was hanging crooked. All of the well locks were cut off and replaced with non LM keyed locks. Samplers did not have the correct LM keys for the locks. No evidence of vandalism or tampering was noted by sampling personnel.