Data Validation Package

June and September 2014 Groundwater and Surface Water Sampling at the Durango, Colorado, Disposal and Processing Sites

October 2014

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Durango, Colorado, Disposal and Processing Sites

Sampling Period: June 2–4, 2014, July 1, 2014, and September 4, 2014

Annual groundwater and surface water monitoring events were conducted at the Durango, Colorado, Disposal and Processing sites as specified is the applicable site documents. Sampe collection and analyses were conducted according to procedures in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (SAP) (LMS/PRO/S04351, continually updated). Water levels were measured at each sampled well.

The 2011 *Long-Term Surveillance Plan for the Durango Disposal Site, Durango, Colorado* (LTSP), requires annual monitoring to verify the performance of the disposal cell. Point-of-compliance wells 0607, 0612, and 0621, and monitoring wells 0605, 0608, 0618, and 0623 were sampled as specified in the plan. Concentrations of the indicator parameters molybdenum, selenium, and uranium in the point-of-compliance wells were below their respective 2011 LTSP approved concentration limits of 0.22 milligram per liter (mg/L), 0.42 mg/L, and 0.077 mg/L.

The 2003 *Preliminary Final Ground Water Compliance Action Plan for the Durango, Colorado, UMTRA Project Site* (GCAP) requires annual monitoring of groundwater and surface water from the Mill Tailings area to determine progress of the natural flushing process in meeting compliance standards. Groundwater samples also were collected at the Raffinate Pond area as a best management practice to monitor selenium and uranium concentrations. Groundwater locations identified in the preliminary GCAP were sampled during the June 2–4, 2014, sampling event. Additional groundwater locations not in the preliminary GCAP (0622, 0629, 0857, and 0866) were sampled July 1, 2014 to assess background groundwater quality after the wells were re-developed. Surface water sampling was performed in September to coincide with low-flow conditions in the Animas River.

U.S. Environmental Protection Agency (EPA) groundwater standards for cadmium, selenium, and uranium were exceeded in samples collected from processing site monitoring wells as shown in Table 1.

Table 1. Durango Processing Site Wells Exceeding EPA Standards in June 2014

Analyte	Standard[a]	Cleanup Goal[b]	Site Code[c]	Location	Concentration (mg/L)
Cadmium	0.01	Not applicable	DUR01	0612	0.044
Selenium	0.01	0.05	DUR01	0630	0.018
				0633	0.016
			DUR02	0598	0.068
				0607	0.370
				0884	0.680
Uranium	0.044	Not applicable	DUR01	0612	1.000
				0617	0.180
				0630	0.250
				0631	0.130
				0633	0.600
				0634	0.079
			DUR02	0598	0.071
				0879	0.140
				0884	0.150

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; concentrations are in mg/L.
[b] Cleanup goal for selenium from the 2003 *Preliminary Final Ground Water Compliance Action Plan for the Durango, Colorado, UMTRA Project Site*. Concentrations are in mg/L.
[c] DUR01 = Mill Tailings Area; DUR02 = Raffinate Ponds Area.

Surface water results from Animas River locations adjacent to and downstream of the processing site were compared to statistical background threshold values (BTVs) using historical data from location 0652, which is located upstream of the site on the Animas River. As shown in Table 2, no BTVs were exceeded during this event, which indicates that the site is having no measurable impact on river water quality.

Table 2. Comparison of Animas River Concentrations to BTVs

Analyte	BTV for 0652[a]	0652	0584	0586	0654	0678	0691
Cadmium	0.0008	ND	ND	0.0001	0.0002	0.0001	0.0001
Molybdenum	0.0024	0.0011	0.0011	0.0013	0.0002	0.0012	0.0013
Selenium	0.0005	0.0002	0.0003	0.0002	0.0002	0.0001	0.0002
Uranium	0.0019	0.0010	0.0011	0.0011	0.0011	0.0010	0.0011

[a] BTV = background threshold values based on historical data set from upstream location 0652
Concentrations are in milligrams per liter (mg/L)
ND: Not Detected

David Miller, Site Lead
The S.M. Stoller Corporation,
a wholly owned subsidiary of
Huntington Ingalls Industries

Date 2/24/15

Durango, Colorado, Disposal Site Sample Location Map—June 2014

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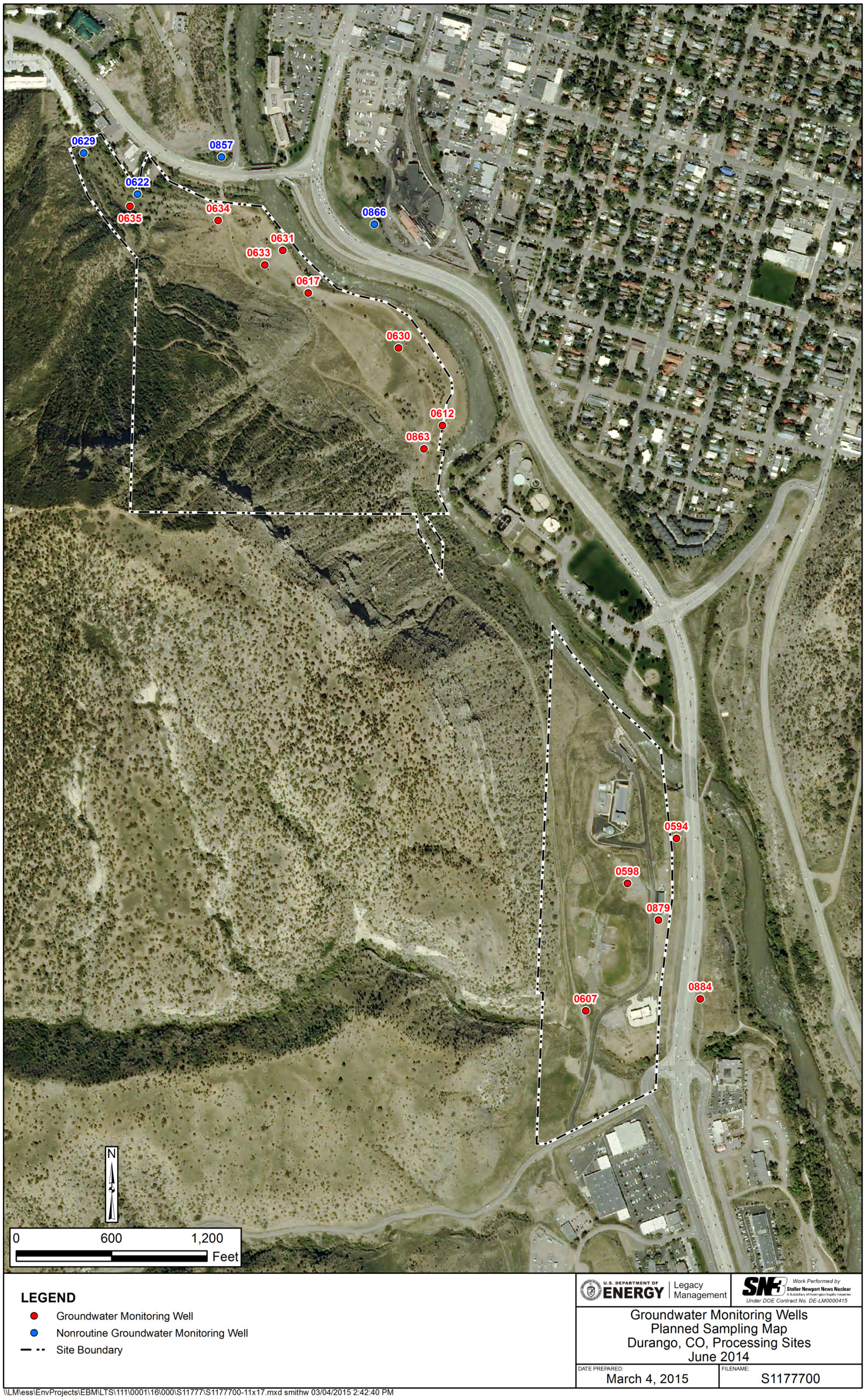

Durango, Colorado, Processing Site Sample Location Map—June 2014

Durango, Colorado, Processing Sites Sample Location Map—September 2014

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Durango, Colorado	**Date(s) of Water Sampling**	June 2–4, 2014, July 1, 2014, and September 4, 2014
Date(s) of Verification	October 1, 2014	**Name of Verifier**	Stephen Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Work Order letters dated May 7 and July 30, 2014. Program Directive DUR-2014-01. The Work Order letter included 4 non-GCAP wells for additional background evaluation.
2. Were the sampling locations specified in the planning documents sampled?	No	Location DUR02-0588 was not sampled because it was dry.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed on May 30, June 30, and September 3, 2014.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	No	The pH operational check reading for on Sonde "K" on June 4, 2014, was slightly high, outside acceptance range. The probe was cleaned with soap and a brush, but readings remained high. This instrument was not used for the rest of the event. On September 4, 2014, at 1200 in the post-trip calibration check, turbidimeter S-16916 was slightly high on the lowest standard, outside acceptance range.
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	See Sampling Protocol section on page 34.
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

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	Duplicate samples were collected from locations DUR01-0622, DUR01-0863, DUR02-654, and DUR03-0816.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	
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 in Table 2 of the SAP?	Yes	Seven samples were filtered.
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?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	14056210
Sample Event:	June 2-4, 2014
Site(s):	Durango, Colorado
Laboratory:	ALS Laboratory Group
Work Order No.:	1406121
Analysis:	Metals and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	July 17, 2014

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

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Chloride	MIS-A-045	SW-846 9056	SW-846 9056
Metals, Ca, Fe, K, Mg, Mn, Na	LMM-01	SW-846 3005A	SW-846 6010B
Metals, Cd, Mo, Se, U	LMM-02	SW-846 3005A	SW-846 6020A
Sulfate	MIS-A-045	SW-846 9056	SW-846 9056
Total Dissolved Solids	WCH-B-033	EPA 160.1	EPA 160.1

Data Qualifier Summary

Analytical results were qualified as listed in Table 4. Refer to the sections below for an explanation of the data qualifiers applied.

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1406121-1	0612	Selenium	J	PQL verification check
1406121-2	0617	Selenium	J	PQL verification check
1406121-4	0631	Selenium	J	PQL verification check
1406121-6	0634	Selenium	J	PQL verification check
1406121-7	0635	Selenium	J	PQL verification check
1406121-8	0863	Cadmium	J	PQL verification check
1406121-8	0863	Selenium	J	PQL verification check
1406121-9	0863 Duplicate	Cadmium	J	PQL verification check
1406121-9	0863 Duplicate	Selenium	J	PQL verification check
1406121-10	0594	pH	J	Calibration drift

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1406121-11	0598	pH	J	Calibration drift
1406121-13	0879	Selenium	J	PQL verification check
1406121-15	0605	pH	J	Calibration drift
1406121-15	0605	Selenium	J	PQL verification check
1406121-16	0607	pH	J	Calibration drift
1406121-16	0607	Selenium	J	PQL verification check
1406121-17	0608	Iron	U	Less than 5 times the calibration blank
1406121-17	0608	pH	J	Calibration drift
1406121-17	0608	Selenium	J	PQL verification check
1406121-18	0612	Iron	U	Less than 5 times the calibration blank
1406121-18	0612	pH	J	Calibration drift
1406121-18	0612	Selenium	J	PQL verification check
1406121-19	0618	Iron	U	Less than 5 times the calibration blank
1406121-19	0618	pH	J	Calibration drift
1406121-20	0621	Molybdenum	J	Less than 5 times the equipment blank
1406121-20	0621	pH	J	Calibration drift
1406121-21	0623	pH	J	Calibration drift
1406121-21	0623	Selenium	J	PQL verification check
1406121-22	0618 Duplicate	Iron	U	Less than 5 times the calibration blank
1406121-23	Equipment Blank	Calcium	U	Less than 5 times the calibration blank
1406121-23	Equipment Blank	Iron	U	Less than 5 times the calibration blank
1406121-23	Equipment Blank	Magnesium	U	Less than 5 times the calibration blank
1406121-23	Equipment Blank	Manganese	U	Less than 5 times the calibration blank
1406121-23	Equipment Blank	Sodium	U	Less than 5 times the calibration blank
1406121-24	Equipment Blank	Selenium	U	Less than 5 times the calibration blank

PQL = practical quantitation limit

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 24 water samples on June 6, 2014, accompanied by a Chain of Custody (COC) form. The receiving documentation included copies of the shipping labels listing the air waybill numbers. The form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The form had no errors or omissions.

Preservation and Holding Times

The sample shipment was received cool and intact with temperatures inside the iced cooler at 1 °C, 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.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all metal, organic, and wet chemical 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 MDLs for all analytes demonstrate 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. All calibration and laboratory spike standards were prepared from independent sources.

Method SW-846 6010B
Calibrations for calcium, iron, magnesium, manganese, potassium, and sodium were performed on June 10, 2014, using four (three for manganese) calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDLs. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 6020A
Calibrations for cadmium, molybdenum, selenium, and uranium were performed on June 10, 2014, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDLs. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range with the exception of cadmium and selenium. The associated sample cadmium and selenium results that are greater than the MDL but less than 5 times the PQL are qualified with a "J" flag as estimated values. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056
Initial calibrations were performed for chloride and sulfate using five calibration standards on April 21, 2014. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration check results within the acceptance range.

Method EPA 160.1
There are no calibration requirements associated with the determination of total dissolved solids.

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 method blank and calibration blank results associated with the samples were below the PQL for all analytes with the exception of one chloride calibration blank. Sample results associated with this blank were reanalyzed with acceptable blanks. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

For manganese, some blank results were negative and the absolute values were greater than the MDL but less than the PQL. All associated results were greater than 5 times the MDL and required no qualification.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB 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) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spikes met the recovery and precision criteria for all analytes evaluated. Matrix spikes are not required for sodium, potassium, magnesium, and calcium; these results were evaluated only for acceptable precision.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the PQL, indicating acceptable precision for all analytes, with the following exception. The duplicate prepared from sample 0863 did not meet the acceptance criteria for uranium. The associated sample uranium result is qualified with a "J" flag as an estimated value.

Laboratory Control Sample

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. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. The serial dilution data met the acceptance criteria for all data evaluated with the following exceptions. The serial dilution prepared from sample 0608 did not meet the acceptance criteria for potassium, selenium, and sodium. The associated sample results for these analytes are qualified with a "J" flag as estimated values.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

Completeness

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

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. There were no manual integrations performed and all peak integrations were satisfactory.

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter. Table 5 shows the total anion and cation results in the samples from this event where there is sufficient data to perform the calculation. The charge balance is expressed as relative percent difference. Typically, a charge balance difference of 10 percent is considered acceptable.

Table 5. Comparison of Major Anions and Cations

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0605	28.40	28.28	0.21
0607	43.43	44.01	0.67
0612	44.56	49.39	5.13
0623	43.01	43.87	0.99

The charge balance difference was below 10 percent indicating that there are no significant errors associated with the measurement of major ion concentrations for the locations listed.

Electronic Data Deliverable (EDD) File

The EDD file received arrived on June 13, 2014. 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: 14056210 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 07/17/2014

Project: Durango **Analysis Type:** ☑ Metals ☑ General Chem ☐ Rad ☐ Organics

# of Samples: 24 **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	There were 2 trip/equipment blanks evaluated.
☑ Field Duplicates	There were 2 duplicates evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 14056210 **Lab Code:** PAR **Date Due:** 07/04/2014

Matrix: Water **Site Code:** DUR01 **Date Completed:** 06/16/2014

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								
Cadmium	ICP/MS	06/10/2014	0.0000	1.0000	OK	OK	OK	109.0	106.0	110.0	2.0	103.0	3.0	137.0
Calcium	ICP/ES	06/10/2014	0.0000	1.0000	OK	OK	OK	104.0	102.0	104.0	0.0	109.0	2.0	109.0
Calcium	ICP/ES	06/10/2014					OK	104.0				107.0		107.0
Iron	ICP/ES	06/10/2014	0.0000	1.0000	OK	OK	OK	98.0	91.0	95.0	3.0	114.0	2.0	108.0
Iron	ICP/ES	06/10/2014					OK	99.0				107.0		103.0
Magnesium	ICP/ES	06/10/2014	0.0000	1.0000	OK	OK	OK	100.0	98.0	99.0	0.0	105.0	2.0	102.0
Magnesium	ICP/ES	06/10/2014					OK	99.0				101.0		100.0
Manganese	ICP/ES	06/10/2014	0.0000	1.0000	OK	OK	OK	102.0	93.0	93.0	1.0	97.0	8.0	110.0
Manganese	ICP/ES	06/10/2014					OK	100.0	102.0	103.0	0.0	91.0	4.0	103.0
Molybdenum	ICP/MS	06/10/2014	0.0000	1.0000	OK	OK	OK	102.0	109.0	107.0	1.0	96.0	4.0	93.0
Molybdenum	ICP/MS	06/10/2014					OK	102.0	104.0	105.0	1.0			
Potassium	ICP/ES	06/10/2014	0.0000	1.0000	OK	OK	OK	100.0	117.0	118.0	1.0		4.0	84.0
Potassium	ICP/ES	06/10/2014					OK	100.0						81.0
Selenium	ICP/MS	06/10/2014	0.0000	1.0000	OK	OK	OK	111.0	105.0	107.0	2.0	98.0		147.0
Selenium	ICP/MS	06/10/2014					OK	108.0	105.0	107.0	2.0			
Sodium	ICP/ES	06/10/2014	0.0000	1.0000	OK	OK	OK	102.0			0.0		4.0	83.0
Sodium	ICP/ES	06/10/2014					OK	101.0						82.0
Uranium	ICP/MS	06/10/2014	0.0000	1.0000	OK	OK	OK	109.0	112.0	111.0	0.0	103.0	3.0	90.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 14056210 **Lab Code:** PAR **Date Due:** 07/04/2014

Matrix: Water **Site Code:** DUR01 **Date Completed:** 06/16/2014

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	06/10/2014					OK	105.0			1.0			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 14056210 **Lab Code:** PAR **Date Due:** 07/04/2014

Matrix: Water **Site Code:** DUR01 **Date Completed:** 06/16/2014

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
CHLORIDE	06/09/2014	0.000	0.9999	OK	OK	OK	98.00				
CHLORIDE	06/10/2014							98.0	98.0	0	
SULFATE	06/09/2014	0.000	0.9998	OK	OK	OK	98.00				
SULFATE	06/10/2014							89.0	90.0	0	
TOTAL DISSOLVED SOLIDS	06/10/2014					OK	108.00			2.00	

General Information

Report Number (RIN):	14066283
Sample Event:	July 1, 2014
Site(s):	Durango, Colorado
Laboratory:	ALS Laboratory Group
Work Order No.:	1407091
Analysis:	Metals and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	July 21, 2014

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325), "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation of 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 6.

Table 6. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Chloride	MIS-A-045	SW-846 9056	SW-846 9056
Metals, Ca, Fe, K, Mg, Mn, Na	LMM-01	SW-846 3005A	SW-846 6010B
Metals, Cd, Mo, Se, U	LMM-02	SW-846 3005A	SW-846 6020A
Sulfate	MIS-A-045	SW-846 9056	SW-846 9056
Total Dissolved Solids	WCH-B-033	EPA 160.1	EPA 160.1

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received five water samples on July 8, 2014, accompanied by a COC form. The receiving documentation included copies of the shipping labels listing the air waybill numbers. The form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The form had no errors or omissions.

Preservation and Holding Times

The sample shipment was received cool and intact with temperatures inside the iced cooler at 1.2 °C, 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.

Detection and Quantitation Limits

The MDL was reported for all metal, organic, and wet chemical 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 PQL for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The reported MDLs for all analytes demonstrate 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. All calibration and laboratory spike standards were prepared from independent sources.

Method SW-846 6010B
Calibrations for calcium, iron, magnesium, manganese, potassium, and sodium were performed on July 11, 2014, using four (three for manganese) calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDLs. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 6020A
Calibrations for cadmium, molybdenum, selenium, and uranium were performed on July 11, 2014, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDLs. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056
Initial calibrations were performed for chloride and sulfate using five calibration standards on June 15, 2014. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration check results within the acceptance range.

Method EPA 160.1
There are no calibration requirements associated with the determination of total dissolved solids.

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 method blank and calibration blank results associated with the samples were below the PQL for all analytes with the exception of manganese. For manganese, some blank results were negative and the absolute values were greater than the MDL but less than the PQL. All associated results were greater than 5 times the MDL and required no qualification.

ICP ICS Analysis

ICP interference check samples ICSA and ICSAB 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

MS/MSD samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spikes met the recovery and precision criteria for all analytes evaluated. Matrix spikes are not required for sodium, potassium, magnesium, and calcium; these results were evaluated only for acceptable precision.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the PQL, indicating acceptable precision for all analytes.

Laboratory Control Sample

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. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. The serial dilution data met the acceptance criteria for all data evaluated.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

Completeness

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

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. There were no manual integrations performed and all peak integrations were satisfactory.

EDD File

The EDD file arrived on July 16, 2014. 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: 14066283 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 07/21/2014

Project: Durango **Analysis Type:** ☑ Metals ☑ General Chem ☐ Rad ☐ Organics

# of Samples: 5 **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: 14066283 **Lab Code:** PAR **Date Due:** 08/05/2014

Matrix: Water **Site Code:** DUR01 **Date Completed:** 07/17/2014

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								
Iron	ICP/ES	07/11/2014	0.0000	0.9984	OK	OK	OK	99.0	91.0	106.0	9.0	115.0	2.0	102.0
Manganese	ICP/ES	07/11/2014	0.0000	1.0000	OK	OK	OK	102.0	92.0	93.0	0.0	101.0	3.0	106.0
Molybdenum	ICP/MS	07/11/2014	0.0000	1.0000	OK	OK	OK	109.0	104.0	104.0	0.0	98.0		92.0
Selenium	ICP/MS	07/11/2014	0.0000	1.0000	OK	OK	OK	116.0	104.0	109.0	5.0	100.0		73.0
Uranium	ICP/MS	07/11/2014	0.0000	1.0000	OK	OK	OK	111.0	107.0	99.0	4.0	105.0	0.0	100.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 14066283 **Lab Code:** PAR **Date Due:** 08/05/2014

Matrix: Water **Site Code:** DUR01 **Date Completed:** 07/17/2014

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
CHLORIDE	07/09/2014	0.000	0.9999	OK	OK	OK	100.00				
CHLORIDE	07/10/2014							97.0	97.0	0	
SULFATE	07/09/2014	0.000	0.9998	OK	OK	OK	98.00				
SULFATE	07/10/2014							101.0	100.0	0	

General Information

Report Number (RIN):	14086441
Sample Event:	September 4, 2014
Site(s):	Durango, Colorado
Laboratory:	ALS Laboratory Group
Work Order No.:	1409111
Analysis:	Metals
Validator:	Stephen Donivan
Review Date:	September 30, 2014

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325), "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation of 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 7.

Table 7. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Metals, Cd, Mo, Se, U	LMM-02	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

Analytical results were qualified as listed in Table 8. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 8. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1409111-1	0584	Selenium	J	PQL verification check
1409111-2	0586	Selenium	J	PQL verification check
1409111-3	0652	Selenium	J	PQL verification check
1409111-4	0654	Selenium	J	PQL verification check
1409111-5	0678	Selenium	J	PQL verification check
1409111-6	0691	Selenium	J	PQL verification check
1409111-7	0654 Duplicate	Selenium	J	PQL verification check

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received eight water samples on September 9, 2014, accompanied by a COC form. The receiving documentation included copies of the shipping labels listing the air waybill numbers. The form was checked to confirm that all

of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The form had no errors or omissions.

Preservation and Holding Times

The sample shipment was received 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.

Detection and Quantitation Limits

The MDL was reported for all metal, organic, and wet chemical 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 PQL for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The reported MDLs for all analytes demonstrate 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. All calibration and laboratory spike standards were prepared from independent sources.

Method SW-846 6020A
Calibrations for cadmium, molybdenum, selenium, and uranium were performed on September 10, 2014, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDLs. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL, the selenium check was not within the acceptance range. Sample selenium results that are greater than the MDL but less than 5 times the PQL are qualified with a "J" flag as estimated values. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable 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 method blank and calibration blank results associated with the

samples were below the PQL for all analytes with the exception of manganese. For manganese, some blank results were negative and the absolute values were greater than the MDL but less than the PQL. All associated results were greater than 5 times the MDL and required no qualification.

ICPICS Analysis

ICP interference check samples ICSA and ICSAB 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

MS/MSD samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spikes met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the PQL, indicating acceptable precision for all analytes.

Laboratory Control Sample

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. All control sample results were acceptable.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. The serial dilution data met the acceptance criteria for all data evaluated.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

Completeness

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

EDD File

The EDD file arrived on September 16, 2014. 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: 14086441 **Lab Code:** PAR **Validator:** _____ **Validation Date:** 09/30/2014

Project: Durango **Analysis Type:** ☐ Metals ☐ General Chem ☐ Rad ☐ Organics

# of Samples: 8 **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	There was 1 trip/equipment blank evaluated.
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 14086441 **Lab Code:** PAR **Date Due:** 10/07/2014

Matrix: Water **Site Code:** DUR01 **Date Completed:** 09/22/2014

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								
Cadmium	ICP/MS	09/10/2014	0.0000	1.0000	OK	OK	OK	97.0	97.0	92.0	6.0	101.0		93.0
Molybdenum	ICP/MS	09/10/2014	0.0000	1.0000	OK	OK	OK	101.0	103.0	99.0	4.0	98.0		106.0
Selenium	ICP/MS	09/11/2014	0.0000	1.0000	OK	OK	OK	108.0	111.0	105.0	5.0	98.0		152.0
Uranium	ICP/MS	09/10/2014	0.0000	1.0000	OK	OK	OK	101.0	101.0	94.0	6.0	104.0		110.0

Sampling Quality Control Assessment

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

Sampling Protocol

All monitoring wells were sampled using a peristaltic pump and dedicated tubing, or a dedicated bladder pump, meeting Category I or II low-flow sampling criteria with the following exception. Well DUR02-0879 was sampled per Program Directive DUR-2014-01 (Well was purged and sampled using high flow purging protocol). Sample results for monitoring wells meeting the Category I or II criteria were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

Wells DUR01-0629, DUR01-0633, DUR01-0634, DUR02-0594, DUR02-0607, DUR03-0605, DUR03-0612, and DUR03-0623 were classified as Category II due to water level drawdown. The sample results for these six wells were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

Equipment Blanks

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. Three equipment blanks were submitted with these samples. Molybdenum, sulfate, and uranium were detected in one or more of the blanks. Associated sample results for these analytes that are greater than the MDL but less than 5 times the blank concentration are qualified with a "J" flag as estimated values.

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. Duplicate samples were collected from wells DUR01-0622, DUR01-0863, DUR02-0654, and DUR03-0618. The duplicate results met the acceptance criteria demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 14056210 **Lab Code:** PAR **Project:** Durango **Validation Date:** 07/17/2014

Duplicate: 2171 **Sample:** 0863

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Cadmium	0.033			1	0.052			1			UG/L
Manganese	98			1	99			1	1.02		UG/L
Molybdenum	0.43			1	0.46			1	6.74		UG/L
Selenium	0.38			1	0.42			1	10.00		UG/L
SULFATE	590			25	610			25	3.33		MG/L
Uranium	0.32			1	0.31			1	3.17		UG/L

Duplicate: 2173 **Sample:** 0618

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Calcium	370000			1	360000			1	2.74		UG/L
CHLORIDE	51			20	50			20	1.98		MG/L
Iron	12	B		1	9.3	B		1			UG/L
Magnesium	190000			1	190000			1	0		UG/L
Manganese	0.11	U		1	0.11	U		1			UG/L
Molybdenum	0.52			1	0.5			1	3.92		UG/L
Potassium	3200			1	3200			1	0		UG/L
Selenium	6.3			1	6.2			1	1.60		UG/L
Sodium	130000			1	150000			1	14.29		UG/L
SULFATE	1400			25	1400			25	0		MG/L
TOTAL DISSOLVED SOLIDS	2500			1	2500			1	0		MG/L
Uranium	150			1	150			1	0		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 14066283 **Lab Code:** PAR **Project:** Durango **Validation Date:** 07/21/2014

Duplicate: 2650 **Sample:** 0622

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
CHLORIDE	21			10	21			10	0		MG/L
Iron	740			1	720			1	2.74		UG/L
Manganese	440			1	440			1	0		UG/L
Molybdenum	3.2			5	3.3			5	3.08		UG/L
Selenium	0.6			5	0.27			1			UG/L
SULFATE	130			10	130			10	0		MG/L
Uranium	11			5	11			5	0		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 14086441 **Lab Code:** PAR **Project:** Durango **Validation Date:** 09/30/2014

Duplicate: 2517 **Sample:** 0654

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Cadmium	0.16	B		10	0.15	B		10			UG/L
Molybdenum	1.1			10	1.2			10			UG/L
Selenium	0.22			1	0.21			1	4.65		UG/L
Uranium	1.1			10	1.1			10	0		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 Donivan — Stephen Donivan — 10-23-2014 — Date

Data Validation Lead: Stephen Donivan — Stephen Donivan — 10-23-2014 — Date

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 can result from transcription errors, data-coding errors, or measurement system problems. However, outliers can also represent true extreme values of a distribution and can 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.** Do this 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 as to whether the data are normally distributed using the Shapiro-Wilk Test.
2. **Apply the appropriate statistical test.** Dixon's Test for extreme values 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.

Three metals were identified as potential outliers. These results were confirmed by comparison of results from multiple analyses prepared at different dilutions.

Three pH values were identified as potential outliers. Review of the calibration data for the pH probe used for these measurements indicates that the probe calibration was acceptable the morning of June 3, 2014, but not acceptable the following morning. The pH values recorded on June 3, 2014, are qualified with a “J” flag as estimated values.

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Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2004

Laboratory: ALS Laboratory Group

RIN: 14056210

Report Date: 10/01/2014

					Current			**Historical Maximum**			**Historical Minimum**			**Number of Data Points**		**Statistical Outlier**
						Qualifiers			*Qualifiers*			*Qualifiers*				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
DUR01	0612	0001	06/04/2014	Molybdenum	0.0820		F	0.120		FJ	0.0870		F	12	0	No
DUR01	0612	0001	06/04/2014	Uranium	1.000		F	1.70		F	1.10		F	12	0	No
DUR01	0617	N001	06/04/2014	Selenium	0.00022		FJ	0.0720		F	0.00083		F	10	0	No
DUR01	0633	N001	06/04/2014	Sulfate	4600		FQ	3900		FQ	2200		F	10	0	No
DUR01	0634	N001	06/04/2014	Molybdenum	0.00390		FQ	0.00240		FQ	0.00089	B	FQ	10	1	No
DUR01	0635	N001	06/04/2014	Molybdenum	0.00097		F	0.00320		FQ	0.00120		F	12	1	NA
DUR01	0863	N001	06/04/2014	Manganese	0.0980		F	0.120		F	0.110		F	12	0	NA
DUR01	0863	N001	06/04/2014	Molybdenum	0.00043		F	0.00098	B	UF	0.00052		F	12	6	No
DUR01	0863	N001	06/04/2014	Selenium	0.00038		FJ	0.00024		F	0.000014	U	F	12	8	Yes
DUR02	0594	0001	06/03/2014	Uranium	0.0240		FQ	0.1000		FQ	0.0280		F	9	0	No
DUR02	0598	0001	06/03/2014	Selenium	0.0680		F	0.990		F	0.230		F	11	0	NA
DUR02	0598	0001	06/03/2014	Uranium	0.0710		F	0.230		F	0.0960		F	11	0	NA
DUR02	0879	N001	06/04/2014	Selenium	0.00480		J	1.20		F	0.0120			7	0	NA
DUR03	0605	N001	06/03/2014	Iron	0.460		FQ	0.120		UF	0.00490	U	FQ	14	8	Yes
DUR03	0607	N001	06/03/2014	Chloride	12.0		F	28.0		F	13.0		F	12	0	NA
DUR03	0623	0001	06/03/2014	Manganese	0.970		FQ	0.530		FQ	0.00023	U	FQ	15	1	Yes

Data Validation Outliers Report - Field Parameters Only
Comparison: All historical Data Beginning 01/01/2004
Laboratory: Field Measurements
RIN: 14056210
Report Date: 10/01/2014

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
DUR03	0605	N001	06/03/2014	Oxidation Reduction Potential	-253.7		FQ	29.6		F	-235.5		F	10	0	No
DUR03	0605	N001	06/03/2014	pH	7.15		FQJ	7.02		F	6.60		FQ	10	0	Yes
DUR03	0607	N001	06/03/2014	Oxidation Reduction Potential	-302.9		F	-78.9		F	-249		F	10	0	No
DUR03	0607	N001	06/03/2014	pH	7.25		FJ	6.98		F	6.56		F	10	0	Yes
DUR03	0608	N002	06/03/2014	Oxidation Reduction Potential	-29.5		F	208			10.00		F	38	0	NA
DUR03	0608	N002	06/03/2014	pH	7.97		FJ	7.91		F	6.72		F	38	0	NA
DUR03	0608	N002	06/03/2014	Temperature	13.5		F	12.6			7.10			38	0	No
DUR03	0612	N001	06/03/2014	Temperature	11.4		FQ	74.8			11.5		FQ	10	0	NA
DUR03	0618	N004	06/03/2014	Oxidation Reduction Potential	-168.3		F	246			-19.7		F	38	0	No
DUR03	0621	N002	06/03/2014	pH	6.02		FJ	5.70		F	3.12		F	38	0	Yes
DUR03	0623	N001	06/03/2014	Oxidation Reduction Potential	-142		FQ	77.3		FQ	-81		FQ	15	0	No
DUR03	0623	N001	06/03/2014	pH	7.40		FQJ	7.24		FQ	6.25		FQ	15	0	NA
DUR03	0623	N001	06/03/2014	Specific Conductance	3626		FQ	3160		FQ	2062		FQ	15	0	No

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

NA: Data are not normally or lognormally distributed.

Attachment 2
Data Presentation

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Groundwater Quality Data
Durango Disposal Site

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Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0605 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	N001	36 - 56	683		FQ	#		
Calcium	mg/L	06/03/2014	N001	36 - 56	130		FQ	#	0.012	
Chloride	mg/L	06/03/2014	N001	36 - 56	31		FQ	#	2	
Iron	mg/L	06/03/2014	N001	36 - 56	0.46		FQ	#	0.0049	
Magnesium	mg/L	06/03/2014	N001	36 - 56	110		FQ	#	0.013	
Manganese	mg/L	06/03/2014	N001	36 - 56	0.029		FQ	#	0.00011	
Molybdenum	mg/L	06/03/2014	N001	36 - 56	0.000055	B	FQ	#	0.000032	
Oxidation Reduction Potential	mV	06/03/2014	N001	36 - 56	-253.7		FQ	#		
pH	s.u.	06/03/2014	N001	36 - 56	7.15		FQJ	#		
Potassium	mg/L	06/03/2014	N001	36 - 56	9.7		FQ	#	0.11	
Selenium	mg/L	06/03/2014	N001	36 - 56	0.000088	B	FQJ	#	0.000032	
Sodium	mg/L	06/03/2014	N001	36 - 56	290		FQ	#	0.033	
Specific Conductance	umhos /cm	06/03/2014	N001	36 - 56	2344		FQ	#		
Sulfate	mg/L	06/03/2014	N001	36 - 56	660		FQ	#	10	
Temperature	C	06/03/2014	N001	36 - 56	12.58		FQ	#		
Total Dissolved Solids	mg/L	06/03/2014	N001	36 - 56	1700		FQ	#	40	
Turbidity	NTU	06/03/2014	N001	36 - 56	7.71		FQ	#		
Uranium	mg/L	06/03/2014	N001	36 - 56	0.000079	*	FQ	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0607 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	N001	36.7 - 56.7	414		F	#		
Calcium	mg/L	06/03/2014	N001	36.7 - 56.7	290		F	#	0.012	
Chloride	mg/L	06/03/2014	N001	36.7 - 56.7	12		F	#	4	
Iron	mg/L	06/03/2014	N001	36.7 - 56.7	0.22		F	#	0.0049	
Magnesium	mg/L	06/03/2014	N001	36.7 - 56.7	180		F	#	0.013	
Manganese	mg/L	06/03/2014	N001	36.7 - 56.7	0.069		F	#	0.00011	
Molybdenum	mg/L	06/03/2014	N001	36.7 - 56.7	0.00008	B	F	#	0.000032	
Oxidation Reduction Potential	mV	06/03/2014	N001	36.7 - 56.7	-302.9		F	#		
pH	s.u.	06/03/2014	N001	36.7 - 56.7	7.25		FJ	#		
Potassium	mg/L	06/03/2014	N001	36.7 - 56.7	9.1		F	#	0.11	
Selenium	mg/L	06/03/2014	N001	36.7 - 56.7	0.000093	B	FJ	#	0.000032	
Sodium	mg/L	06/03/2014	N001	36.7 - 56.7	320		F	#	0.033	
Specific Conductance	umhos /cm	06/03/2014	N001	36.7 - 56.7	3235		F	#		
Sulfate	mg/L	06/03/2014	N001	36.7 - 56.7	1700		F	#	12	
Temperature	C	06/03/2014	N001	36.7 - 56.7	11.29		F	#		
Total Dissolved Solids	mg/L	06/03/2014	N001	36.7 - 56.7	3000		F	#	40	
Turbidity	NTU	06/03/2014	N001	36.7 - 56.7	6.55		F	#		
Uranium	mg/L	06/03/2014	N001	36.7 - 56.7	0.0001		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0608 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	N002	29 - 39	271		F	#		
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	N001	29 - 39	273		F	#		
Calcium	mg/L	06/03/2014	N002	29 - 39	140		F	#	0.012	
Chloride	mg/L	06/03/2014	N002	29 - 39	11		F	#	1	
Iron	mg/L	06/03/2014	N002	29 - 39	0.05	B	UF	#	0.0049	
Magnesium	mg/L	06/03/2014	N002	29 - 39	76		F	#	0.013	
Manganese	mg/L	06/03/2014	N002	29 - 39	0.00011	U	F	#	0.00011	
Molybdenum	mg/L	06/03/2014	N001	29 - 39	0.0012		F	#	0.00032	
Molybdenum	mg/L	06/03/2014	N002	29 - 39	0.0011		F	#	0.00016	
Molybdenum	mg/L	07/01/2014	N001	29 - 39	0.0012		F	#	0.00032	
Oxidation Reduction Potential	mV	06/03/2014	N002	29 - 39	-29.5		F	#		
Oxidation Reduction Potential	mV	07/01/2014	N001	29 - 39	61		F	#		
pH	s.u.	06/03/2014	N002	29 - 39	7.97		FJ	#		
pH	s.u.	07/01/2014	N001	29 - 39	7.07		F	#		
Potassium	mg/L	06/03/2014	N002	29 - 39	2.7		F	#	0.11	
Selenium	mg/L	06/03/2014	N001	29 - 39	0.0025		F	#	0.000032	
Selenium	mg/L	06/03/2014	N002	29 - 39	0.0031		FJ	#	0.00016	
Selenium	mg/L	07/01/2014	N001	29 - 39	0.0024		F	#	0.000032	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0608 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sodium	mg/L	06/03/2014	N002	29 - 39	51		F	#	0.0066	
Specific Conductance	umhos /cm	06/03/2014	N002	29 - 39	1204		F	#		
Specific Conductance	umhos /cm	07/01/2014	N001	29 - 39	1235		F	#		
Sulfate	mg/L	06/03/2014	N002	29 - 39	420		F	#	2.5	
Temperature	C	06/03/2014	N002	29 - 39	13.5		F	#		
Temperature	C	07/01/2014	N001	29 - 39	15.4		F	#		
Total Dissolved Solids	mg/L	06/03/2014	N002	29 - 39	940		F	#	20	
Turbidity	NTU	06/03/2014	N002	29 - 39	3.07		F	#		
Turbidity	NTU	07/01/2014	N001	29 - 39	1.67		F	#		
Uranium	mg/L	06/03/2014	N001	29 - 39	0.021		F	#	0.000029	
Uranium	mg/L	06/03/2014	N002	29 - 39	0.022		F	#	0.000015	
Uranium	mg/L	06/03/2014	N005	29 - 39	0.0207			0	0.0002	
Uranium	mg/L	07/01/2014	N001	29 - 39	0.022		F	#	0.000029	
Uranium	mg/L	07/01/2014	N003	29 - 39	0.0211			0	0.0002	
Vanadium	mg/L	06/03/2014	N001	29 - 39	0.00032		F	#	0.000015	
Vanadium	mg/L	07/01/2014	N001	29 - 39	0.0005		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0612 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	N001	98.09 - 108.09	2280		FQ	#		
Calcium	mg/L	06/03/2014	N001	98.09 - 108.09	9.3		FQ	#	0.012	
Chloride	mg/L	06/03/2014	N001	98.09 - 108.09	53		FQ	#	4	
Iron	mg/L	06/03/2014	N001	98.09 - 108.09	0.09	B	UFQ	#	0.0049	
Magnesium	mg/L	06/03/2014	N001	98.09 - 108.09	4.2		FQ	#	0.013	
Manganese	mg/L	06/03/2014	N001	98.09 - 108.09	0.012		FQ	#	0.00011	
Molybdenum	mg/L	06/03/2014	N001	98.09 - 108.09	0.00019		FQ	#	0.000032	
Oxidation Reduction Potential	mV	06/03/2014	N001	98.09 - 108.09	-307.6		FQ	#		
pH	s.u.	06/03/2014	N001	98.09 - 108.09	7.71		FQJ	#		
Potassium	mg/L	06/03/2014	N001	98.09 - 108.09	10		FQ	#	0.11	
Selenium	mg/L	06/03/2014	N001	98.09 - 108.09	0.000064	B	FQJ	#	0.000032	
Sodium	mg/L	06/03/2014	N001	98.09 - 108.09	1000		FQ	#	0.066	
Specific Conductance	umhos /cm	06/03/2014	N001	98.09 - 108.09	3917		FQ	#		
Sulfate	mg/L	06/03/2014	N001	98.09 - 108.09	110		FQ	#	10	
Temperature	C	06/03/2014	N001	98.09 - 108.09	11.39		FQ	#		
Total Dissolved Solids	mg/L	06/03/2014	N001	98.09 - 108.09	2800		FQ	#	80	
Turbidity	NTU	06/03/2014	N001	98.09 - 108.09	4.05		FQ	#		
Uranium	mg/L	06/03/2014	N001	98.09 - 108.09	0.00026		FQ	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0618 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	N004	29.77 - 49.77	402		F	#		
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	N001	29.77 - 49.77	411		F	#		
Calcium	mg/L	06/03/2014	N003	29.77 - 49.77	360		F	#	0.012	
Calcium	mg/L	06/03/2014	N004	29.77 - 49.77	370		F	#	0.012	
Chloride	mg/L	06/03/2014	N003	29.77 - 49.77	50		F	#	4	
Chloride	mg/L	06/03/2014	N004	29.77 - 49.77	51		F	#	4	
Iron	mg/L	06/03/2014	N003	29.77 - 49.77	0.0093	B	UF	#	0.0049	
Iron	mg/L	06/03/2014	N004	29.77 - 49.77	0.012	B	UF	#	0.0049	
Magnesium	mg/L	06/03/2014	N003	29.77 - 49.77	190		F	#	0.013	
Magnesium	mg/L	06/03/2014	N004	29.77 - 49.77	190		F	#	0.013	
Manganese	mg/L	06/03/2014	N003	29.77 - 49.77	0.00011	U	F	#	0.00011	
Manganese	mg/L	06/03/2014	N004	29.77 - 49.77	0.00011	U	F	#	0.00011	
Molybdenum	mg/L	06/03/2014	N001	29.77 - 49.77	0.0005	B	F	#	0.00032	
Molybdenum	mg/L	06/03/2014	N002	29.77 - 49.77	0.00059	B	F	#	0.00032	
Molybdenum	mg/L	06/03/2014	N003	29.77 - 49.77	0.0005		F	#	0.000032	
Molybdenum	mg/L	06/03/2014	N004	29.77 - 49.77	0.00052		F	#	0.000032	
Molybdenum	mg/L	07/01/2014	N001	29.77 - 49.77	0.0007	B	F	#	0.00032	
Oxidation Reduction Potential	mV	06/03/2014	N004	29.77 - 49.77	-168.3		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0618 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Oxidation Reduction Potential	mV	07/01/2014	N001	29.77	-	49.77	155.6		F	#		
pH	s.u.	06/03/2014	N004	29.77	-	49.77	7.66		FJ	#		
pH	s.u.	07/01/2014	N001	29.77	-	49.77	6.69		F	#		
Potassium	mg/L	06/03/2014	N003	29.77	-	49.77	3.2		F	#	0.11	
Potassium	mg/L	06/03/2014	N004	29.77	-	49.77	3.2		F	#	0.11	
Selenium	mg/L	06/03/2014	N001	29.77	-	49.77	0.0061		F	#	0.000032	
Selenium	mg/L	06/03/2014	N002	29.77	-	49.77	0.0064		F	#	0.000032	
Selenium	mg/L	06/03/2014	N003	29.77	-	49.77	0.0062		F	#	0.000032	
Selenium	mg/L	06/03/2014	N004	29.77	-	49.77	0.0063		F	#	0.000032	
Selenium	mg/L	07/01/2014	N001	29.77	-	49.77	0.0061		F	#	0.000032	
Sodium	mg/L	06/03/2014	N003	29.77	-	49.77	150		F	#	0.0066	
Sodium	mg/L	06/03/2014	N004	29.77	-	49.77	130		F	#	0.0066	
Specific Conductance	umhos /cm	06/03/2014	N004	29.77	-	49.77	2767		F	#		
Specific Conductance	umhos /cm	07/01/2014	N001	29.77	-	49.77	2896		F	#		
Sulfate	mg/L	06/03/2014	N003	29.77	-	49.77	1400		F	#	12	
Sulfate	mg/L	06/03/2014	N004	29.77	-	49.77	1400		F	#	12	
Temperature	C	06/03/2014	N004	29.77	-	49.77	11.32		F	#		
Temperature	C	07/01/2014	N001	29.77	-	49.77	13.04		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0618 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Total Dissolved Solids	mg/L	06/03/2014	N003	29.77 - 49.77	2500		F	#	40	
Total Dissolved Solids	mg/L	06/03/2014	N004	29.77 - 49.77	2500		F	#	40	
Turbidity	NTU	06/03/2014	N004	29.77 - 49.77	0.64		F	#		
Turbidity	NTU	07/01/2014	N001	29.77 - 49.77	0.66		F	#		
Uranium	mg/L	06/03/2014	N001	29.77 - 49.77	0.15		F	#	0.000029	
Uranium	mg/L	06/03/2014	N002	29.77 - 49.77	0.16		F	#	0.000029	
Uranium	mg/L	06/03/2014	N003	29.77 - 49.77	0.15		F	#	0.0000029	
Uranium	mg/L	06/03/2014	N004	29.77 - 49.77	0.15		F	#	0.0000029	
Uranium	mg/L	06/03/2014	N005	29.77 - 49.77	0.1667			0	0.0002	
Uranium	mg/L	06/03/2014	N006	29.77 - 49.77	0.1646			0	0.0002	
Uranium	mg/L	07/01/2014	N001	29.77 - 49.77	0.15		F	#	0.000029	
Uranium	mg/L	07/01/2014	N003	29.77 - 49.77	0.155			0	0.0002	
Vanadium	mg/L	06/03/2014	N001	29.77 - 49.77	0.00035		F	#	0.000015	
Vanadium	mg/L	06/03/2014	N002	29.77 - 49.77	0.00028	B	F	#	0.000015	
Vanadium	mg/L	07/01/2014	N001	29.77 - 49.77	0.00044		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0621 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	N002	78.46 - 88.46	10		F	#		
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	N001	78.46 - 88.46	0		F	#		
Calcium	mg/L	06/03/2014	N002	78.46 - 88.46	470		F	#	0.012	
Chloride	mg/L	06/03/2014	N002	78.46 - 88.46	18		F	#	4	
Iron	mg/L	06/03/2014	N002	78.46 - 88.46	140		F	#	0.0049	
Magnesium	mg/L	06/03/2014	N002	78.46 - 88.46	350		F	#	0.013	
Manganese	mg/L	06/03/2014	N002	78.46 - 88.46	2.8		F	#	0.00011	
Molybdenum	mg/L	06/03/2014	N001	78.46 - 88.46	0.0007	B	JF	#	0.00032	
Molybdenum	mg/L	06/03/2014	N002	78.46 - 88.46	0.00083		FJ	#	0.000032	
Molybdenum	mg/L	07/01/2014	N001	78.46 - 88.46	0.00037	B	F	#	0.00032	
Molybdenum	mg/L	07/01/2014	N002	78.46 - 88.46	0.00036	B	F	#	0.00032	
Oxidation Reduction Potential	mV	06/03/2014	N002	78.46 - 88.46	36.2		F	#		
Oxidation Reduction Potential	mV	07/01/2014	N001	78.46 - 88.46	159.1		F	#		
pH	s.u.	06/03/2014	N002	78.46 - 88.46	6.02		FJ	#		
pH	s.u.	07/01/2014	N001	78.46 - 88.46	4.59		F	#		
Potassium	mg/L	06/03/2014	N002	78.46 - 88.46	15		F	#	0.11	
Selenium	mg/L	06/03/2014	N001	78.46 - 88.46	0.0039		F	#	0.000032	
Selenium	mg/L	06/03/2014	N002	78.46 - 88.46	0.0042		F	#	0.000032	
Selenium	mg/L	07/01/2014	N001	78.46 - 88.46	0.0047		F	#	0.000032	
Selenium	mg/L	07/01/2014	N002	78.46 - 88.46	0.0042		F	#	0.000032	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0621 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sodium	mg/L	06/03/2014	N002	78.46 - 88.46	190		F	#	0.033	
Specific Conductance	umhos /cm	06/03/2014	N002	78.46 - 88.46	4074		F	#		
Specific Conductance	umhos /cm	07/01/2014	N001	78.46 - 88.46	4355		F	#		
Sulfate	mg/L	06/03/2014	N002	78.46 - 88.46	2800		F	#	25	
Temperature	C	06/03/2014	N002	78.46 - 88.46	11.92		F	#		
Temperature	C	07/01/2014	N001	78.46 - 88.46	13.22		F	#		
Total Dissolved Solids	mg/L	06/03/2014	N002	78.46 - 88.46	4100		F	#	80	
Turbidity	NTU	06/03/2014	N002	78.46 - 88.46	9.31		F	#		
Turbidity	NTU	07/01/2014	N001	78.46 - 88.46	6.9		F	#		
Uranium	mg/L	06/03/2014	N001	78.46 - 88.46	0.00044		JF	#	0.000029	
Uranium	mg/L	06/03/2014	N002	78.46 - 88.46	0.00017		F	#	0.0000029	
Uranium	mg/L	06/03/2014	N005	78.46 - 88.46	0.004	U		0	0.0002	
Uranium	mg/L	07/01/2014	N001	78.46 - 88.46	0.00009	B	UF	#	0.000029	
Uranium	mg/L	07/01/2014	N002	78.46 - 88.46	0.0001		F	#	0.000029	
Uranium	mg/L	07/01/2014	N003	78.46 - 88.46	0.004	U		0	0.0002	
Uranium	mg/L	07/01/2014	N004	78.46 - 88.46	0.004	U		0	0.0002	
Vanadium	mg/L	06/03/2014	N001	78.46 - 88.46	0.0005		JF	#	0.000015	
Vanadium	mg/L	07/01/2014	N001	78.46 - 88.46	0.00095		F	#	0.000015	
Vanadium	mg/L	07/01/2014	N002	78.46 - 88.46	0.00091		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014
Location: 0623 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	06/03/2014	0001	19.35 - 39.35	470		FQ	#		
Calcium	mg/L	06/03/2014	0001	19.35 - 39.35	300		FQ	#	0.012	
Chloride	mg/L	06/03/2014	0001	19.35 - 39.35	41		FQ	#	4	
Iron	mg/L	06/03/2014	0001	19.35 - 39.35	6.5		FQ	#	0.0049	
Magnesium	mg/L	06/03/2014	0001	19.35 - 39.35	250		FQ	#	0.013	
Manganese	mg/L	06/03/2014	0001	19.35 - 39.35	0.97		FQ	#	0.00011	
Molybdenum	mg/L	06/03/2014	0001	19.35 - 39.35	0.00071		FQ	#	0.000032	
Oxidation Reduction Potential	mV	06/03/2014	N001	19.35 - 39.35	-142		FQ	#		
pH	s.u.	06/03/2014	N001	19.35 - 39.35	7.4		FQJ	#		
Potassium	mg/L	06/03/2014	0001	19.35 - 39.35	3.4		FQ	#	0.11	
Selenium	mg/L	06/03/2014	0001	19.35 - 39.35	0.000044	B	FQJ	#	0.000032	
Sodium	mg/L	06/03/2014	0001	19.35 - 39.35	170		FQ	#	0.033	
Specific Conductance	umhos /cm	06/03/2014	N001	19.35 - 39.35	3626		FQ	#		
Sulfate	mg/L	06/03/2014	0001	19.35 - 39.35	1600		FQ	#	12	
Temperature	C	06/03/2014	N001	19.35 - 39.35	13.81		FQ	#		
Total Dissolved Solids	mg/L	06/03/2014	0001	19.35 - 39.35	2800		FQ	#	40	
Turbidity	NTU	06/03/2014	N001	19.35 - 39.35	31.2		FQ	#		
Uranium	mg/L	06/03/2014	0001	19.35 - 39.35	0.0011		FQ	#	0.0000029	

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.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
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.	G	Possible grout contamination, pH > 9.	J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.	Q	Qualitative result due to sampling technique.	R	Unusable result.
U	Parameter analyzed for but was not detected.	X	Location is undefined.		

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

Groundwater Quality Data
Durango Processing Site

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Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0612 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cadmium	mg/L	06/04/2014	0001	37.41	-	57.41	0.044		F	#	0.000023	
Manganese	mg/L	06/04/2014	0001	37.41	-	57.41	5.5		F	#	0.00011	
Molybdenum	mg/L	06/04/2014	0001	37.41	-	57.41	0.082		F	#	0.000064	
Selenium	mg/L	06/04/2014	0001	37.41	-	57.41	0.00062		FJ	#	0.000065	
Sulfate	mg/L	06/04/2014	0001	37.41	-	57.41	1600		F	#	12	
Uranium	mg/L	06/04/2014	0001	37.41	-	57.41	1		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0617 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	06/04/2014	N001	14	-	29	0.93		F	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	14	-	29	0.0012		F	#	0.00016	
Selenium	mg/L	06/04/2014	N001	14	-	29	0.00022		FJ	#	0.000032	
Sulfate	mg/L	06/04/2014	N001	14	-	29	1800		F	#	12	
Uranium	mg/L	06/04/2014	N001	14	-	29	0.18		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0622 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	N001	9	-	14	334		F	#		
Chloride	mg/L	07/01/2014	N001	9	-	14	21		F	#	2	
Chloride	mg/L	07/01/2014	N002	9	-	14	21		F	#	2	
Iron	mg/L	07/01/2014	N001	9	-	14	0.74		F	#	0.0049	
Iron	mg/L	07/01/2014	N002	9	-	14	0.72		F	#	0.0049	
Manganese	mg/L	07/01/2014	N001	9	-	14	0.44		F	#	0.00011	
Manganese	mg/L	07/01/2014	N002	9	-	14	0.44		F	#	0.00011	
Molybdenum	mg/L	07/01/2014	N001	9	-	14	0.0032		F	#	0.00016	
Molybdenum	mg/L	07/01/2014	N002	9	-	14	0.0033		F	#	0.00016	
Oxidation Reduction Potential	mV	07/01/2014	N001	9	-	14	13.8		F	#		
pH	s.u.	07/01/2014	N001	9	-	14	6.76		F	#		
Selenium	mg/L	07/01/2014	N001	9	-	14	0.0006		F	#	0.00016	
Selenium	mg/L	07/01/2014	N002	9	-	14	0.00027		F	#	0.000032	
Specific Conductance	umhos /cm	07/01/2014	N001	9	-	14	915		F	#		
Sulfate	mg/L	07/01/2014	N001	9	-	14	130		F	#	5	
Sulfate	mg/L	07/01/2014	N002	9	-	14	130		F	#	5	
Temperature	C	07/01/2014	N001	9	-	14	11.88		F	#		
Turbidity	NTU	07/01/2014	N001	9	-	14	8.56		F	#		
Uranium	mg/L	07/01/2014	N001	9	-	14	0.011		F	#	0.000015	
Uranium	mg/L	07/01/2014	N002	9	-	14	0.011		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0629 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	0001	9	-	19	506		FQ	#		
Chloride	mg/L	07/01/2014	0001	9	-	19	14		FQ	#	4	
Iron	mg/L	07/01/2014	0001	9	-	19	1.4		FQ	#	0.0049	
Manganese	mg/L	07/01/2014	0001	9	-	19	0.086		FQ	#	0.00011	
Molybdenum	mg/L	07/01/2014	0001	9	-	19	0.0039		FQ	#	0.00016	
Oxidation Reduction Potential	mV	07/01/2014	N001	9	-	19	3.6		FQ	#		
pH	s.u.	07/01/2014	N001	9	-	19	6.8		FQ	#		
Selenium	mg/L	07/01/2014	0001	9	-	19	0.00014		FQ	#	0.000032	
Specific Conductance	umhos /cm	07/01/2014	N001	9	-	19	4287		FQ	#		
Sulfate	mg/L	07/01/2014	0001	9	-	19	2100		FQ	#	25	
Temperature	C	07/01/2014	N001	9	-	19	16.15		FQ	#		
Turbidity	NTU	07/01/2014	N001	9	-	19	19.8		FQ	#		
Uranium	mg/L	07/01/2014	0001	9	-	19	0.00098		FQ	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0630 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	06/04/2014	N001	28.3	-	38.3	0.44		F	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	28.3	-	38.3	0.0027		F	#	0.00032	
Selenium	mg/L	06/04/2014	N001	28.3	-	38.3	0.018		F	#	0.00032	
Sulfate	mg/L	06/04/2014	N001	28.3	-	38.3	1600		F	#	12	
Uranium	mg/L	06/04/2014	N001	28.3	-	38.3	0.25		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0631 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	06/04/2014	N001	6	-	16	0.47		F	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	6	-	16	0.0065		F	#	0.00016	
Selenium	mg/L	06/04/2014	N001	6	-	16	0.00033		FJ	#	0.000032	
Sulfate	mg/L	06/04/2014	N001	6	-	16	200		F	#	5	
Uranium	mg/L	06/04/2014	N001	6	-	16	0.13		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0633 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	06/04/2014	N001	4	-	14	0.7		FQ	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	4	-	14	0.0019		FQ	#	0.00032	
Selenium	mg/L	06/04/2014	N001	4	-	14	0.016		FQ	#	0.00032	
Sulfate	mg/L	06/04/2014	N001	4	-	14	4600		FQ	#	50	
Uranium	mg/L	06/04/2014	N001	4	-	14	0.6		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0634 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	06/04/2014	N001	8	-	18	0.031		FQ	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	8	-	18	0.0039		FQ	#	0.000032	
Selenium	mg/L	06/04/2014	N001	8	-	18	0.00078		FQJ	#	0.000032	
Sulfate	mg/L	06/04/2014	N001	8	-	18	2200		FQ	#	25	
Uranium	mg/L	06/04/2014	N001	8	-	18	0.079		FQ	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0635 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	06/04/2014	N001	5.5	-	15.5	0.13		F	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	5.5	-	15.5	0.00097		F	#	0.000032	
Selenium	mg/L	06/04/2014	N001	5.5	-	15.5	0.00016		FJ	#	0.000032	
Sulfate	mg/L	06/04/2014	N001	5.5	-	15.5	1100		F	#	12	
Uranium	mg/L	06/04/2014	N001	5.5	-	15.5	0.016		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0857 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	0001	12	-	17	388		F	#		
Chloride	mg/L	07/01/2014	0001	12	-	17	650		F	#	10	
Iron	mg/L	07/01/2014	0001	12	-	17	6.7		F	#	0.0049	
Manganese	mg/L	07/01/2014	0001	12	-	17	0.65		F	#	0.00011	
Molybdenum	mg/L	07/01/2014	0001	12	-	17	0.0053		F	#	0.00016	
Oxidation Reduction Potential	mV	07/01/2014	N001	12	-	17	-3.7		F	#		
pH	s.u.	07/01/2014	N001	12	-	17	6.64		F	#		
Selenium	mg/L	07/01/2014	0001	12	-	17	0.00099		F	#	0.00016	
Specific Conductance	umhos /cm	07/01/2014	N001	12	-	17	3580		F	#		
Sulfate	mg/L	07/01/2014	0001	12	-	17	690		F	#	25	
Temperature	C	07/01/2014	N001	12	-	17	15.51		F	#		
Turbidity	NTU	07/01/2014	N001	12	-	17	96.2		F	#		
Uranium	mg/L	07/01/2014	0001	12	-	17	0.028		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0863 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cadmium	mg/L	06/04/2014	N001	58	-	67.5	0.000033		FJ	#	0.000012	
Cadmium	mg/L	06/04/2014	N002	58	-	67.5	0.000052		FJ	#	0.000012	
Manganese	mg/L	06/04/2014	N001	58	-	67.5	0.098		F	#	0.00011	
Manganese	mg/L	06/04/2014	N002	58	-	67.5	0.099		F	#	0.00011	
Molybdenum	mg/L	06/04/2014	N001	58	-	67.5	0.00043		F	#	0.000032	
Molybdenum	mg/L	06/04/2014	N002	58	-	67.5	0.00046		F	#	0.000032	
Selenium	mg/L	06/04/2014	N001	58	-	67.5	0.00038		FJ	#	0.000032	
Selenium	mg/L	06/04/2014	N002	58	-	67.5	0.00042		FJ	#	0.000032	
Sulfate	mg/L	06/04/2014	N001	58	-	67.5	590		F	#	12	
Sulfate	mg/L	06/04/2014	N002	58	-	67.5	610		F	#	12	
Uranium	mg/L	06/04/2014	N001	58	-	67.5	0.00032		F	#	0.0000029	
Uranium	mg/L	06/04/2014	N002	58	-	67.5	0.00031		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014
Location: 0866 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	07/01/2014	N001	12 - 21.5	357		F	#		
Chloride	mg/L	07/01/2014	N001	12 - 21.5	240		F	#	4	
Iron	mg/L	07/01/2014	N001	12 - 21.5	0.6		F	#	0.0049	
Manganese	mg/L	07/01/2014	N001	12 - 21.5	1.2		F	#	0.00011	
Molybdenum	mg/L	07/01/2014	N001	12 - 21.5	0.0023		F	#	0.00016	
Oxidation Reduction Potential	mV	07/01/2014	N001	12 - 21.5	66.9		F	#		
pH	s.u.	07/01/2014	N001	12 - 21.5	6.69		F	#		
Selenium	mg/L	07/01/2014	N001	12 - 21.5	0.01		F	#	0.00016	
Specific Conductance	umhos /cm	07/01/2014	N001	12 - 21.5	1501		F	#		
Sulfate	mg/L	07/01/2014	N001	12 - 21.5	87		F	#	10	
Temperature	C	07/01/2014	N001	12 - 21.5	14.4		F	#		
Turbidity	NTU	07/01/2014	N001	12 - 21.5	9.2		F	#		
Uranium	mg/L	07/01/2014	N001	12 - 21.5	0.0059		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/01/2014
Location: 0594 WELL Original location DH-116.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Selenium	mg/L	06/03/2014	0001	8.5	-	38.5	0.008		FQ	#	0.00032	
Uranium	mg/L	06/03/2014	0001	8.5	-	38.5	0.024		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR02, Durango Raffinate Pond Process Site

REPORT DATE: 10/01/2014

Location: 0598 WELL Original location Bureau of Rec well DH-110.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Selenium	mg/L	06/03/2014	0001	66.2	-	96.2	0.068		F	#	0.00032	
Uranium	mg/L	06/03/2014	0001	66.2	-	96.2	0.071		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/01/2014
Location: 0607 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Selenium	mg/L	06/04/2014	0001	35	-	55	0.37		FQ	#	0.00032	
Uranium	mg/L	06/04/2014	0001	35	-	55	0.0039		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/01/2014
Location: 0879 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Selenium	mg/L	06/04/2014	N001	27	-	36.9	0.0048		J	#	0.00032	
Uranium	mg/L	06/04/2014	N001	27	-	36.9	0.14			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/01/2014
Location: 0884 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Selenium	mg/L	06/02/2014	N001	36.5	-	46.5	0.68		F	#	0.00032	
Uranium	mg/L	06/02/2014	N001	36.5	-	46.5	0.15		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.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- 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 DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/03/2014
Location: 0584 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/04/2014	N001	124			#		
Cadmium	mg/L	09/04/2014	N001	0.00012	U		#	0.00012	
Molybdenum	mg/L	09/04/2014	N001	0.0011			#	0.00032	
Oxidation Reduction Potential	mV	09/04/2014	N001	54.3			#		
pH	s.u.	09/04/2014	N001	7.94			#		
Selenium	mg/L	09/04/2014	N001	0.00027		J	#	0.000032	
Specific Conductance	umhos/cm	09/04/2014	N001	588			#		
Temperature	C	09/04/2014	N001	24.18			#		
Turbidity	NTU	09/04/2014	N001	4.25			#		
Uranium	mg/L	09/04/2014	N001	0.0011			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/03/2014
Location: 0586 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/04/2014	N001	128			#		
Cadmium	mg/L	09/04/2014	N001	0.00014	B		#	0.00012	
Molybdenum	mg/L	09/04/2014	N001	0.0013			#	0.00032	
Oxidation Reduction Potential	mV	09/04/2014	N001	48.9			#		
pH	s.u.	09/04/2014	N001	7.87			#		
Selenium	mg/L	09/04/2014	N001	0.00017		J	#	0.000032	
Specific Conductance	umhos/cm	09/04/2014	N001	591			#		
Temperature	C	09/04/2014	N001	16.03			#		
Turbidity	NTU	09/04/2014	N001	5.01			#		
Uranium	mg/L	09/04/2014	N001	0.0011			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/03/2014
Location: 0652 SURFACE LOCATION SURFACE WATER AND SED.

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/04/2014	N001	131			#		
Cadmium	mg/L	09/04/2014	N001	0.00012	U		#	0.00012	
Molybdenum	mg/L	09/04/2014	N001	0.0011			#	0.00032	
Oxidation Reduction Potential	mV	09/04/2014	N001	51.1			#		
pH	s.u.	09/04/2014	N001	7.87			#		
Selenium	mg/L	09/04/2014	N001	0.00018		J	#	0.000032	
Specific Conductance	umhos/cm	09/04/2014	N001	587			#		
Temperature	C	09/04/2014	N001	20.24			#		
Turbidity	NTU	09/04/2014	N001	2.14			#		
Uranium	mg/L	09/04/2014	N001	0.001			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/03/2014
Location: 0691 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/04/2014	N001	118			#		
Cadmium	mg/L	09/04/2014	N001	0.00012	B		#	0.00012	
Molybdenum	mg/L	09/04/2014	N001	0.0013			#	0.00032	
Oxidation Reduction Potential	mV	09/04/2014	N001	59.8			#		
pH	s.u.	09/04/2014	N001	7.92			#		
Selenium	mg/L	09/04/2014	N001	0.00015		J	#	0.000032	
Specific Conductance	umhos/cm	09/04/2014	N001	532			#		
Temperature	C	09/04/2014	N001	27.81			#		
Turbidity	NTU	09/04/2014	N001	4.38			#		
Uranium	mg/L	09/04/2014	N001	0.0011			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/03/2014
Location: 0654 SURFACE LOCATION RESERVED FOR CDAY

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/04/2014	N001	125			#		
Cadmium	mg/L	09/04/2014	N001	0.00016	B		#	0.00012	
Cadmium	mg/L	09/04/2014	N002	0.00015	B		#	0.00012	
Molybdenum	mg/L	09/04/2014	N001	0.0011			#	0.00032	
Molybdenum	mg/L	09/04/2014	N002	0.0012			#	0.00032	
Oxidation Reduction Potential	mV	09/04/2014	N001	53.6			#		
pH	s.u.	09/04/2014	N001	7.73			#		
Selenium	mg/L	09/04/2014	N001	0.00022		J	#	0.000032	
Selenium	mg/L	09/04/2014	N002	0.00021		J	#	0.000032	
Specific Conductance	umhos/cm	09/04/2014	N001	584			#		
Temperature	C	09/04/2014	N001	14.03			#		
Turbidity	NTU	09/04/2014	N001	9.87			#		
Uranium	mg/L	09/04/2014	N001	0.0011			#	0.000029	
Uranium	mg/L	09/04/2014	N002	0.0011			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/03/2014
Location: 0678 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/04/2014	N001	126			#		
Cadmium	mg/L	09/04/2014	N001	0.00014	B		#	0.00012	
Molybdenum	mg/L	09/04/2014	N001	0.0012			#	0.00032	
Oxidation Reduction Potential	mV	09/04/2014	N001	48.6			#		
pH	s.u.	09/04/2014	N001	7.82			#		
Selenium	mg/L	09/04/2014	N001	0.00014		J	#	0.000032	
Specific Conductance	umhos/cm	09/04/2014	N001	586			#		
Temperature	C	09/04/2014	N001	14.51			#		
Turbidity	NTU	09/04/2014	N001	3.81			#		
Uranium	mg/L	09/04/2014	N001	0.001			#	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.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
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.	G	Possible grout contamination, pH > 9.	J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.	Q	Qualitative result due to sampling technique.	R	Unusable result.
U	Parameter analyzed for but was not detected.	X	Location is undefined.		

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

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Equipment Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 14056210
Report Date: 10/01/2014

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Selenium	DUR02	0999	06/04/2014	N003	mg/L	0.000036	B	J	0.000032		E
Uranium	DUR02	0999	06/04/2014	N003	mg/L	0.00003	B		0.000015		E
Calcium	DUR03	0999	06/03/2014	N001	mg/L	0.21	B	U	0.012		E
Chloride	DUR03	0999	06/03/2014	N001	mg/L	0.2	U		0.2		E
Iron	DUR03	0999	06/03/2014	N001	mg/L	0.032	B	U	0.0049		E
Magnesium	DUR03	0999	06/03/2014	N001	mg/L	0.064	B	U	0.013		E
Manganese	DUR03	0999	06/03/2014	N001	mg/L	0.00022	B	U	0.00011		E
Molybdenum	DUR03	0999	06/03/2014	N001	mg/L	0.0034			0.00016		E
Potassium	DUR03	0999	06/03/2014	N001	mg/L	0.11	U		0.11		E
Selenium	DUR03	0999	06/03/2014	N001	mg/L	0.000032	U		0.000032		E
Sodium	DUR03	0999	06/03/2014	N001	mg/L	0.15	B	U	0.0066		E
Sulfate	DUR03	0999	06/03/2014	N001	mg/L	0.65			0.5		E
Total Dissolved Solids	DUR03	0999	06/03/2014	N001	mg/L	20	U		20		E
Uranium	DUR03	0999	06/03/2014	N001	mg/L	0.000015	U		0.000015		E

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.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
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.	G	Possible grout contamination, pH > 9.	J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.	Q	Qualitative result due to sampling technique.	R	Unusable result.
U	Parameter analyzed for but was not detected.	X	Location is undefined.		

SAMPLE TYPES:

E	Equipment Blank.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE DUR03, Durango Disposal Site
REPORT DATE: 10/01/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0605	U	7189.6	06/03/2014	10:10:15	38.36	7151.24
0607	D	7099.1	06/03/2014	08:50:52	43.81	7055.29
0608	D	7035	06/03/2014	12:30:35	39.59	6995.41
0608	D	7035	07/01/2014	14:05:30	40.01	6994.99
0612	D	7109.8	06/03/2014	08:00:31	102.26	7007.54
0618	D	7036.41	06/03/2014	13:10:15	41.63	6994.78
0618	D	7036.41	07/01/2014	15:00:14	42.05	6994.36
0621	U	7035.77	06/03/2014	14:55:43	53.48	6982.29
0621	U	7035.77	07/01/2014	13:35:12	54.02	6981.75
0623	U	7048.67	06/03/2014	11:15:48	35.41	7013.26

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT F OFFSITE
N UNKNOWN O ONSITE U UPGRADIENT

STATIC WATER LEVELS (USEE700) FOR SITE DUR01, Durango Mill Tailings Process Site
REPORT DATE: 10/01/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0612	D	6500.94	06/04/2014	10:45:58	40.15	6460.79
0617	D	6498.11	06/04/2014	11:40:04	28.15	6469.96
0622	U	6494.8	07/01/2014	10:40:03	11.23	6483.57
0629	B	6507.75	07/01/2014	10:05:39	17.68	6490.07
0630	D	6494.44	06/04/2014	11:15:58	32.47	6461.97
0631	D	6477.91	06/04/2014	12:50:11	6.59	6471.32
0633	D	6481.81	06/04/2014	12:15:08	11.77	6470.04
0634	D	6491.75	06/04/2014	08:15:25	16.91	6474.84
0635	D	6497.68	06/04/2014	08:50:06	13.18	6484.5
0857	B	6490.08	07/01/2014	18:00:08	15.52	6474.56
0863		6513.32	06/04/2014	10:00:51	56.49	6456.83
0866	B	6483.32	07/01/2014	17:20:19	12.89	6470.43

STATIC WATER LEVELS (USEE700) FOR SITE DUR02, Durango Raffinate Pond Process Site
REPORT DATE: 10/01/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0594	O	6472.49	06/03/2014	17:20:14	22.03	6450.46
0598	O	6479.09	06/03/2014	16:35:39	21.9	6457.19
0607	U	6527.95	06/04/2014	16:00:11	50.93	6477.02
0879		6473.91	06/04/2014	15:20:24	21.25	6452.66
0884		6476.37	06/02/2014	16:35:17	17.84	6458.53

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT F OFFSITE
N UNKNOWN O ONSITE U UPGRADIENT

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Time-Concentration Graphs
Durango Disposal Site

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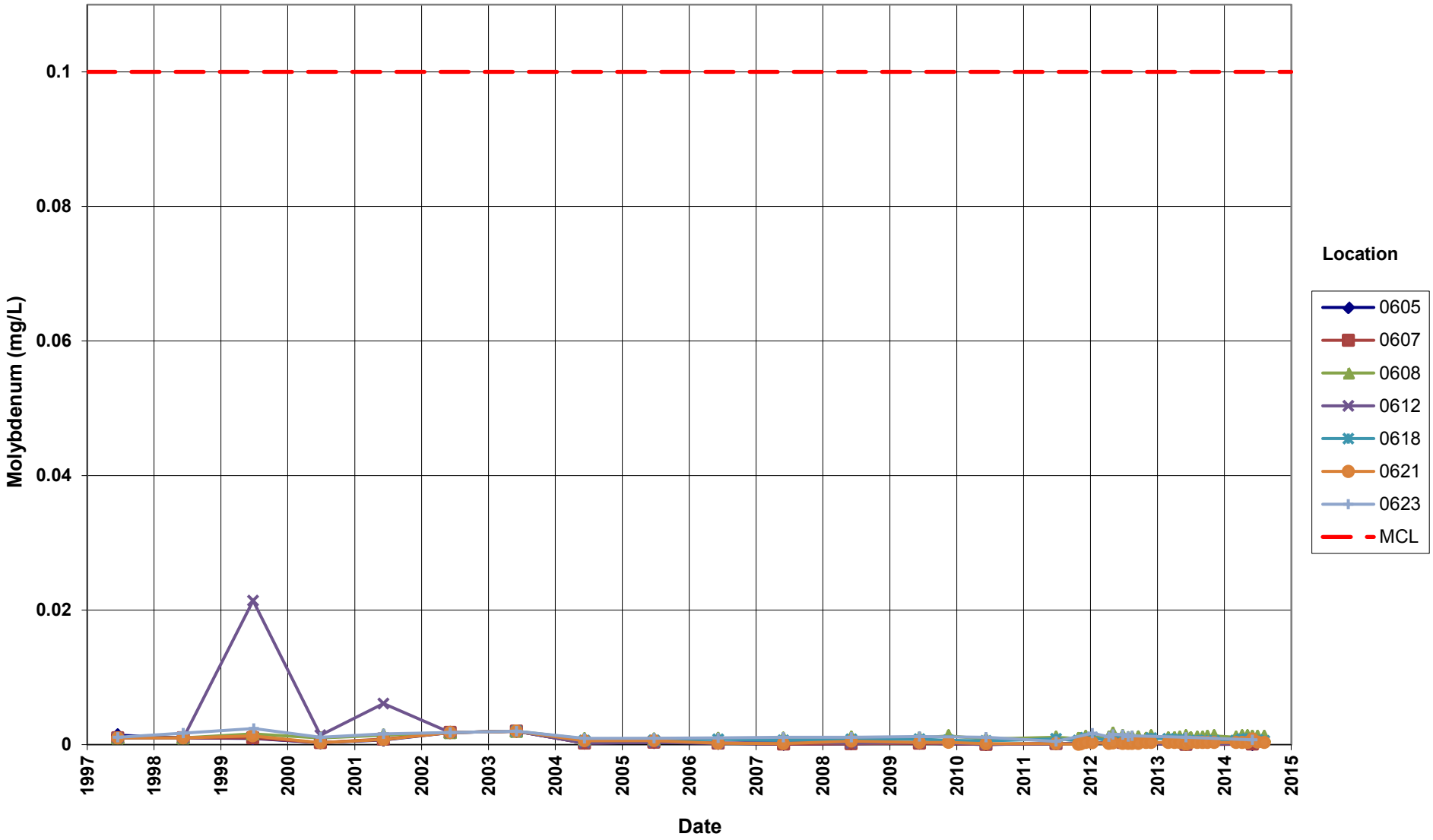
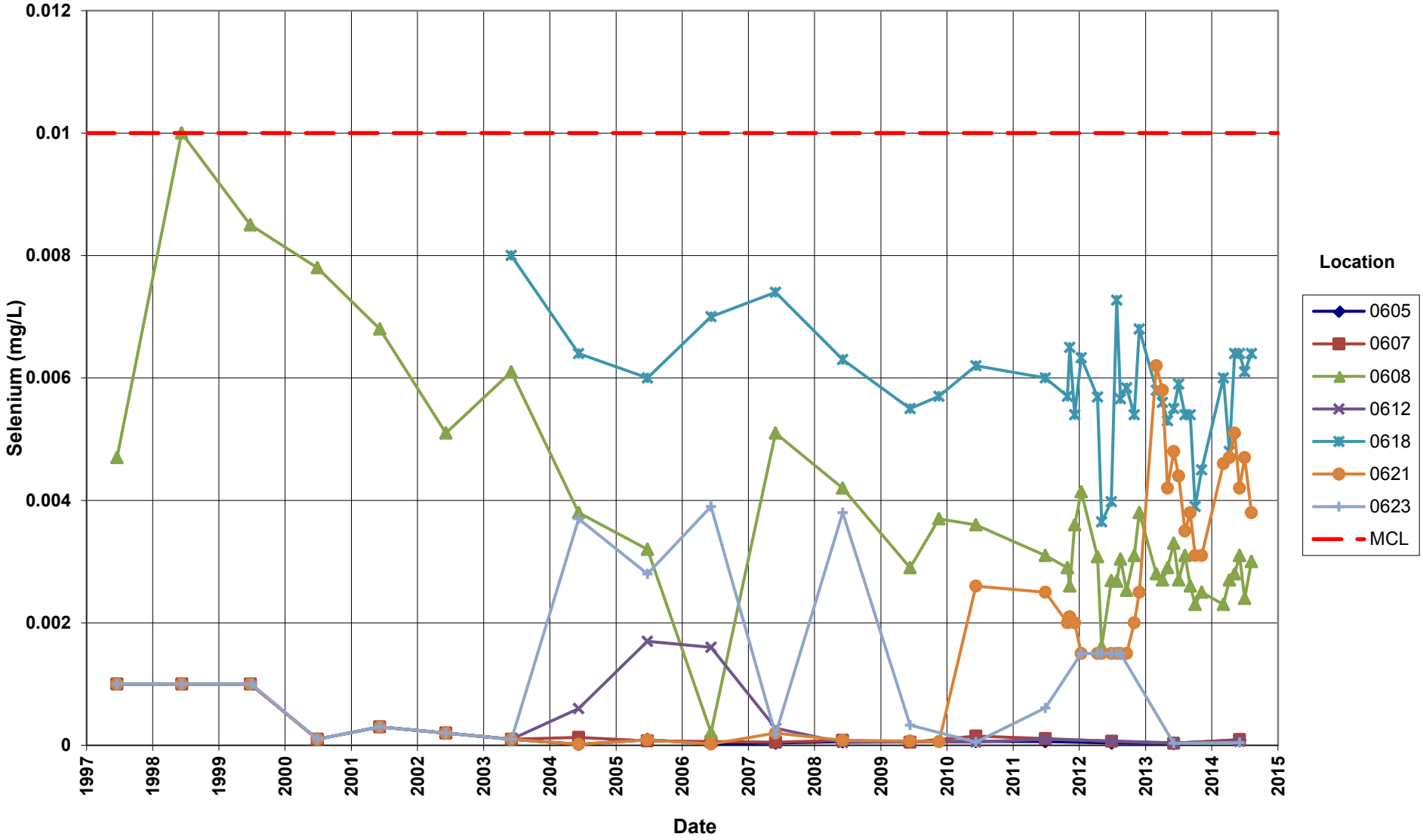
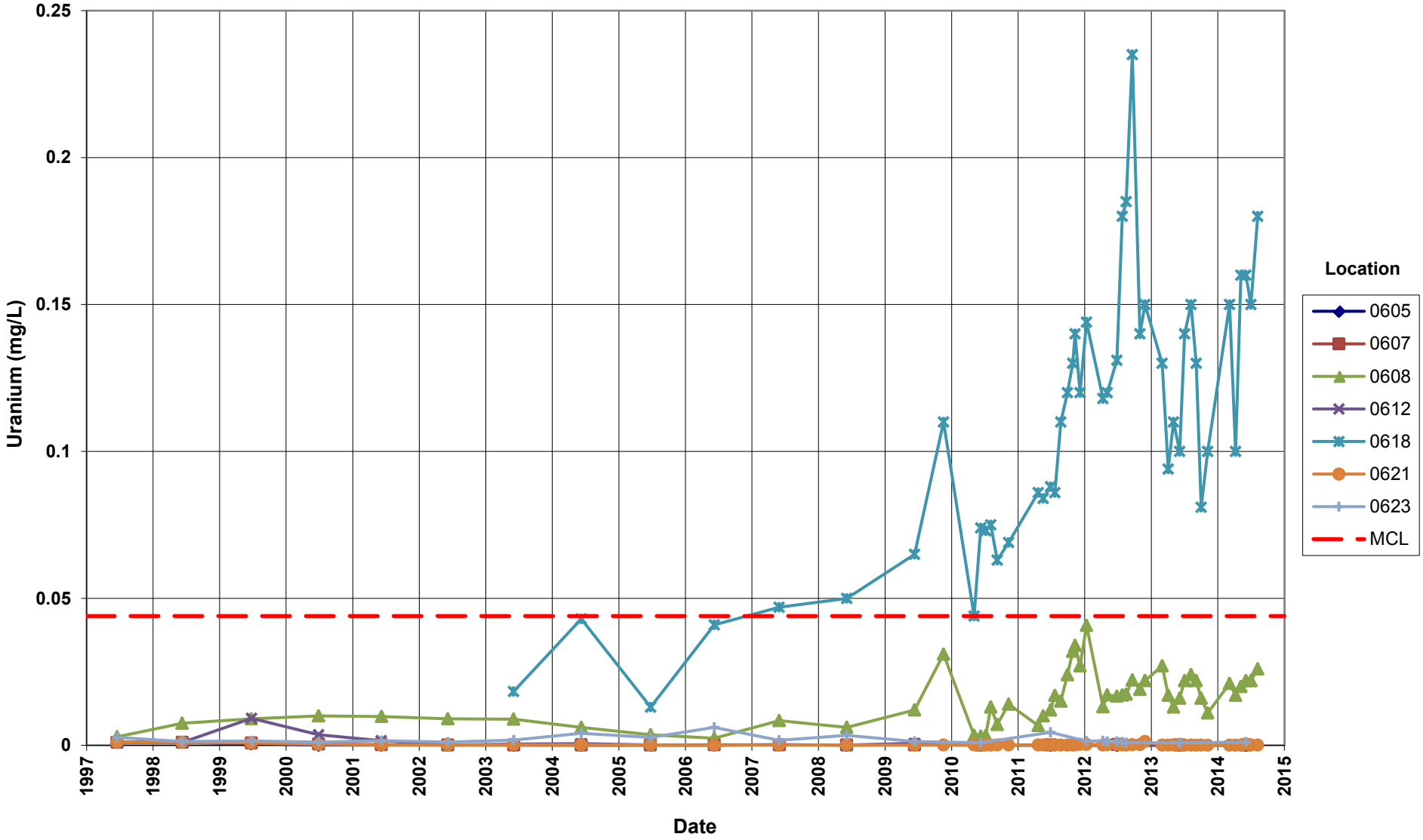
Durango Disposal Site
Molybdenum Concentration
Maximum Contaminant Level (MCL) = 0.1 mg/L
Proposed Concentration Limit = 0.22 mg/L



Durango Disposal Site
Selenium Concentration
Maximum Contaminant Level (MCL) = 0.01 mg/L
Proposed Concentration Limit = 0.042 mg/L



Durango Disposal Site
Uranium Concentration
Maximum Contaminant Level (MCL) = 0.044 mg/L
Proposed Concentration Limit (PCL) = 0.077 mg/L



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Time-Concentration Graphs
Durango Processing Site

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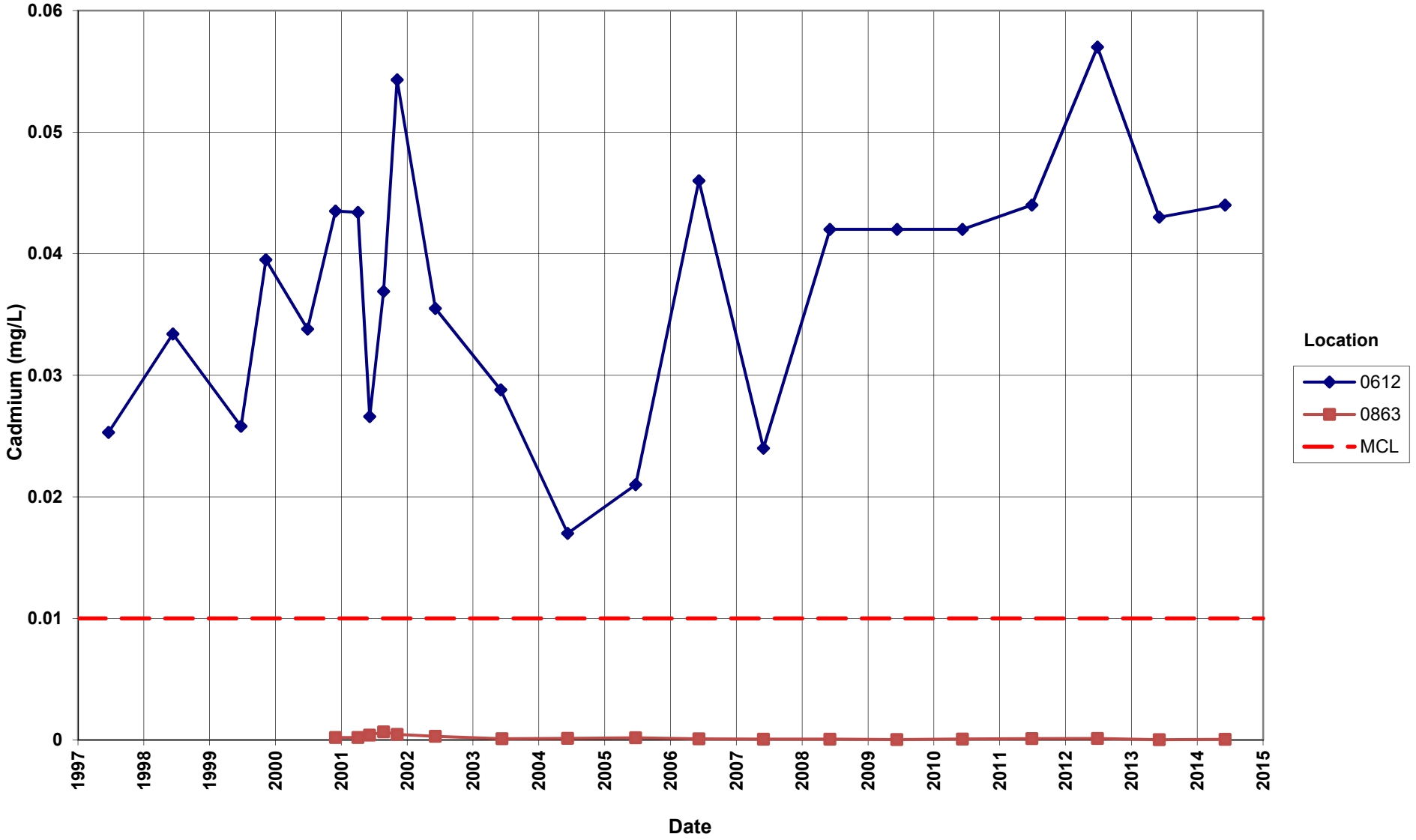
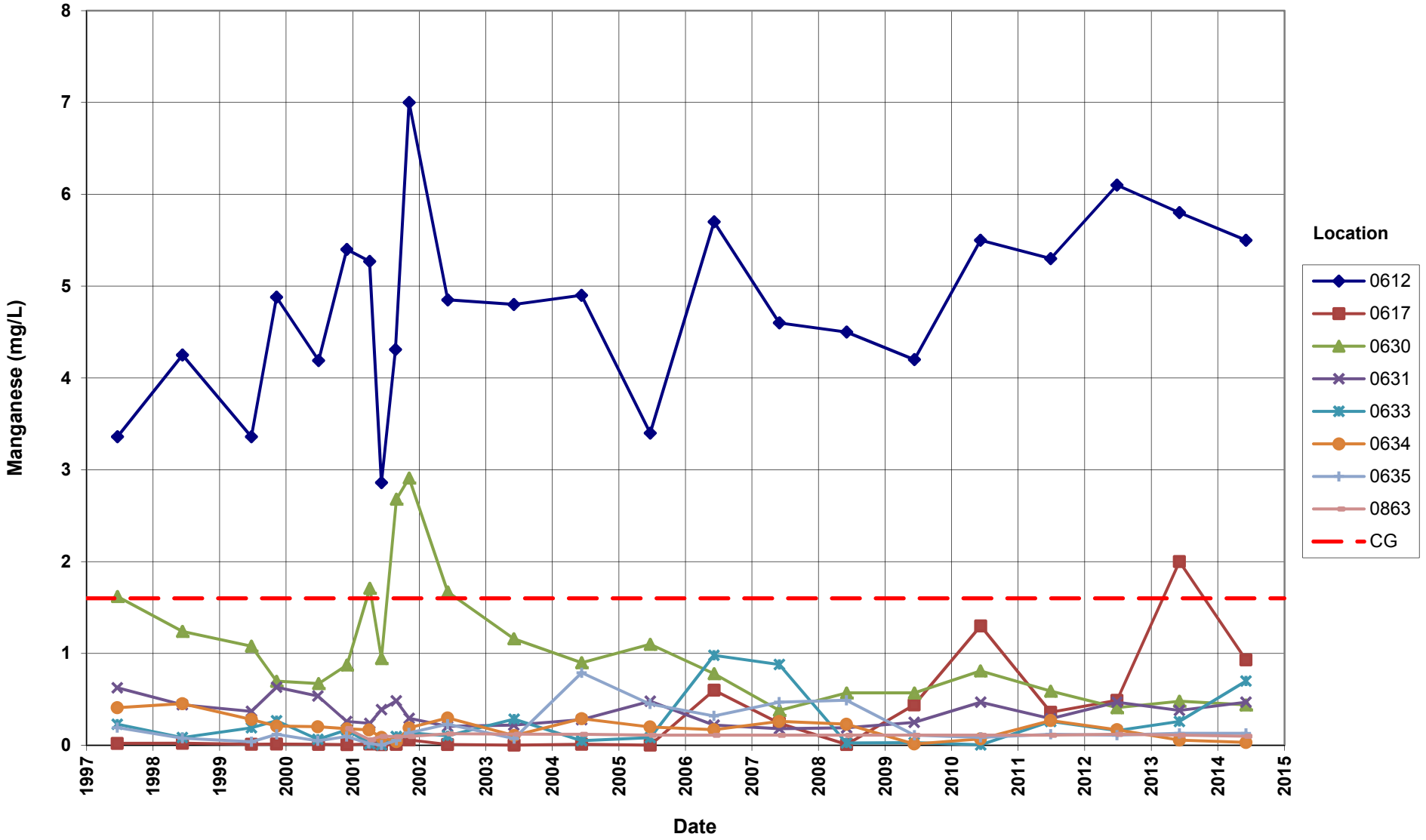
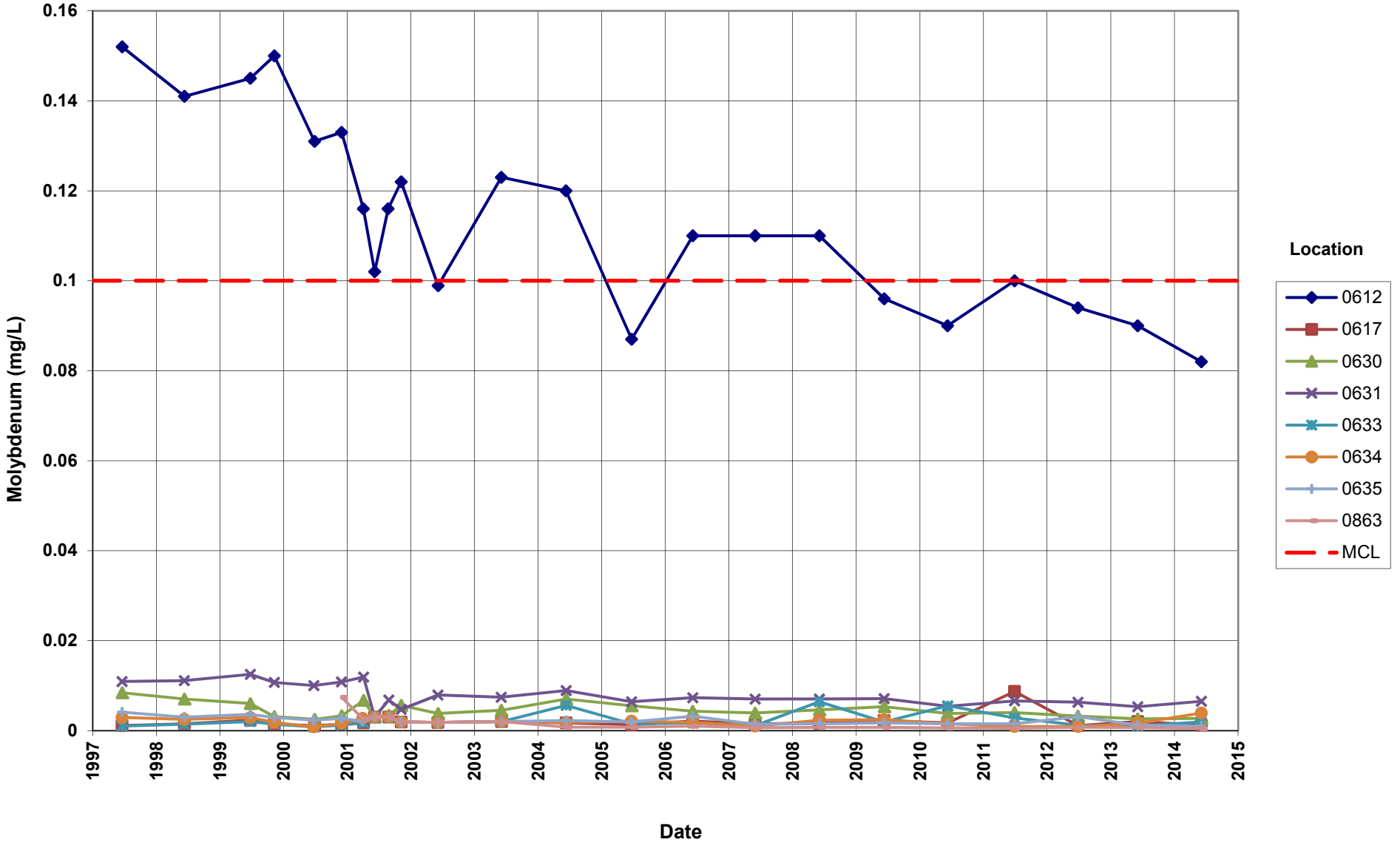
Durango Mill Tailings Process Site
Cadmium Concentration
Maximum Contaminant Level (MCL) = 0.01 mg/L



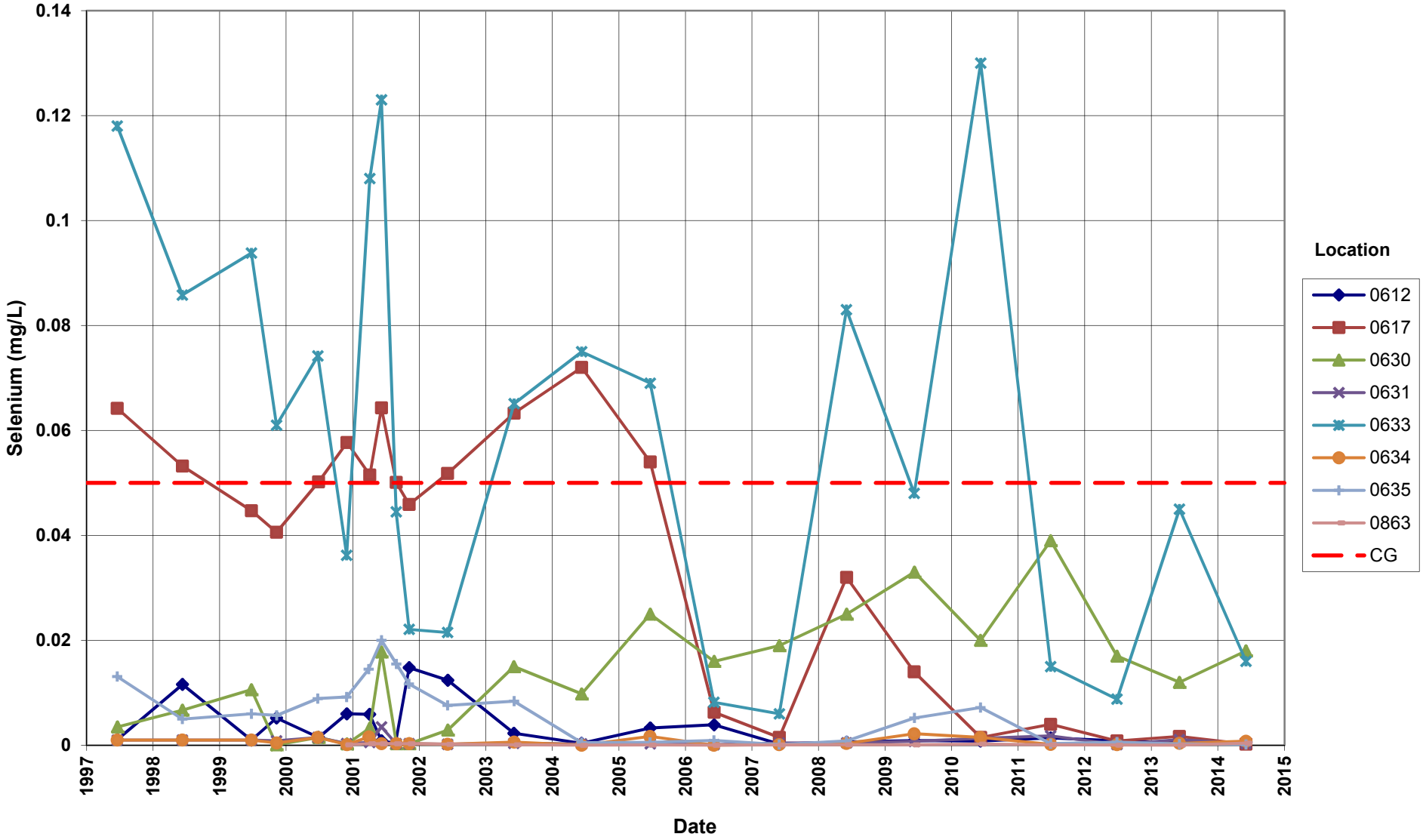
Durango Mill Tailings Process Site
Manganese Concentration
Compliance Goal (CG) = 1.6 mg/L



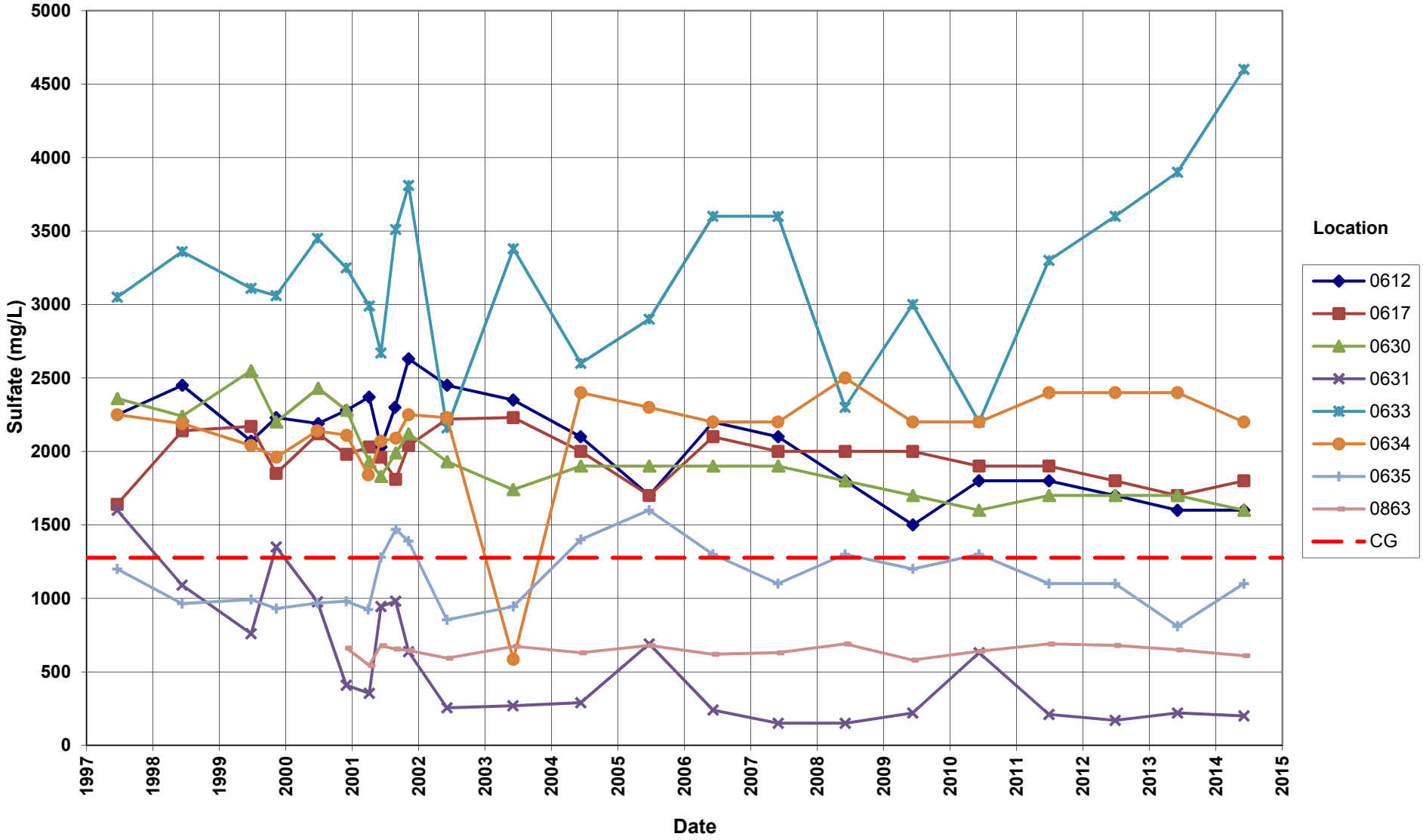
Durango Mill Tailings Process Site
Molybdenum Concentration
Maximum Contaminant Level (MCL) = 0.1 mg/L



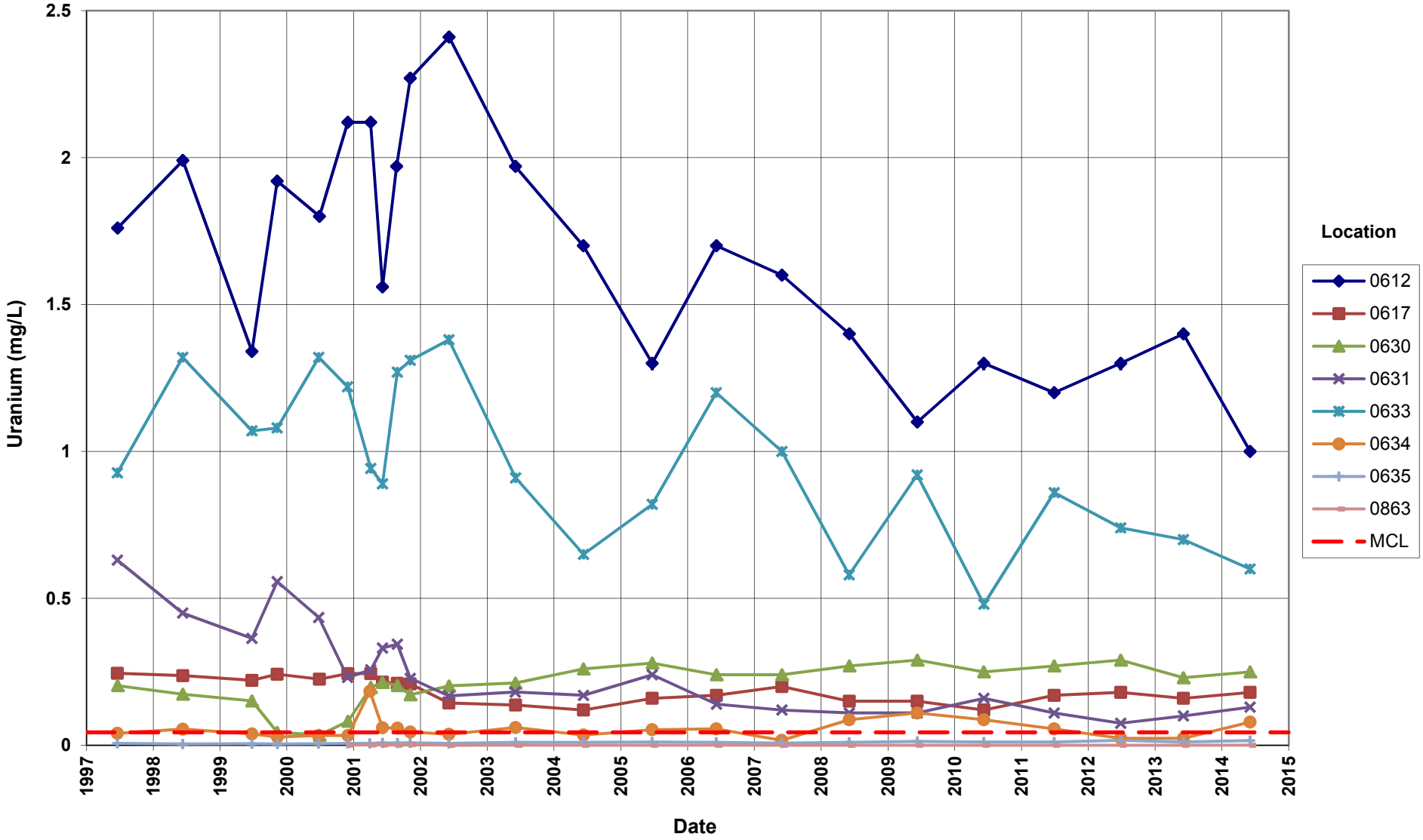
Durango Mill Tailings Process Site
Selenium Concentration
Maximum Contaminant Level (MCL) = 0.01 mg/L
Compliance Goal (CG) = 0.05 mg/L



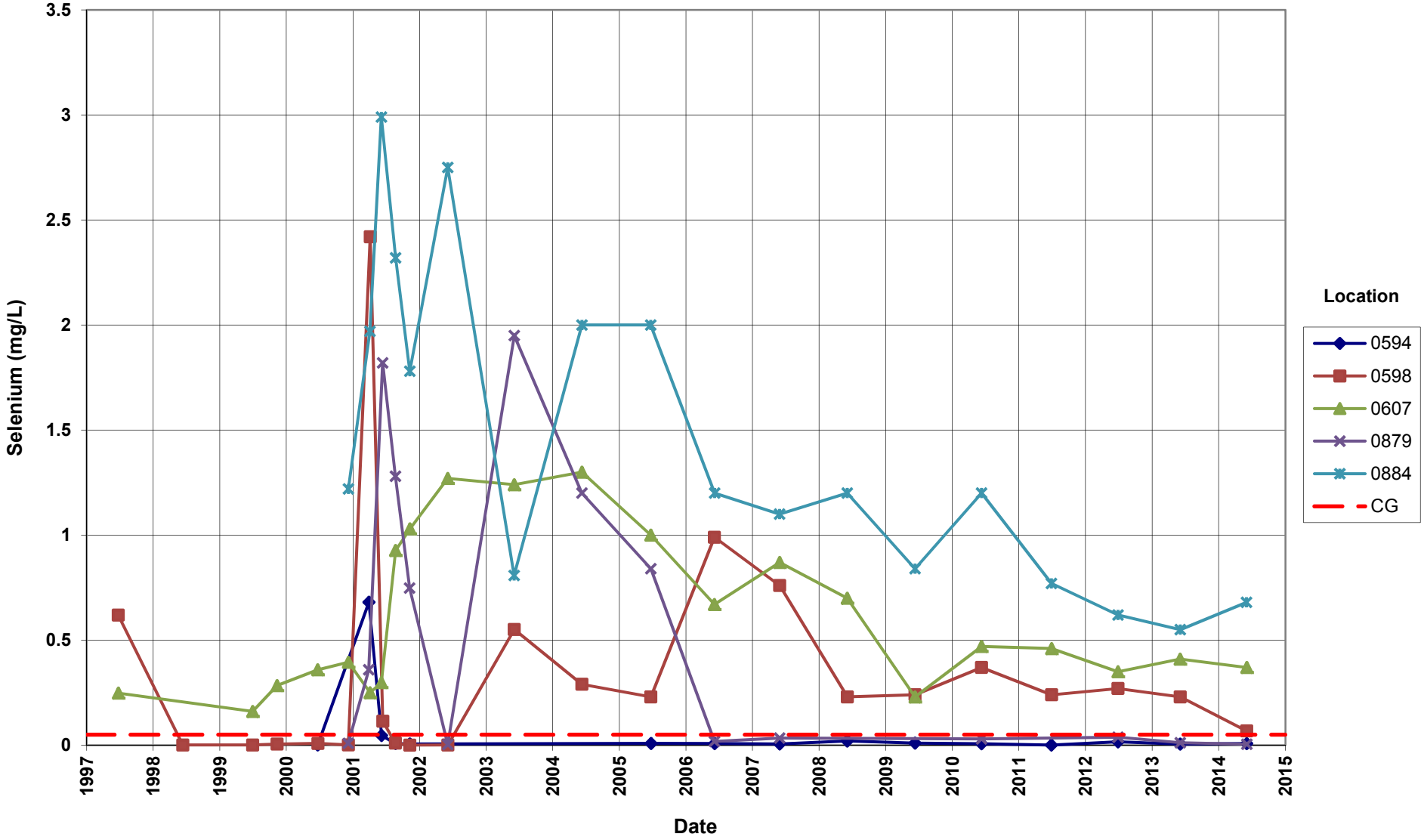
Durango Mill Tailings Process Site
Sulfate Concentration
Compliance Goal (CG) = 1276 mg/L



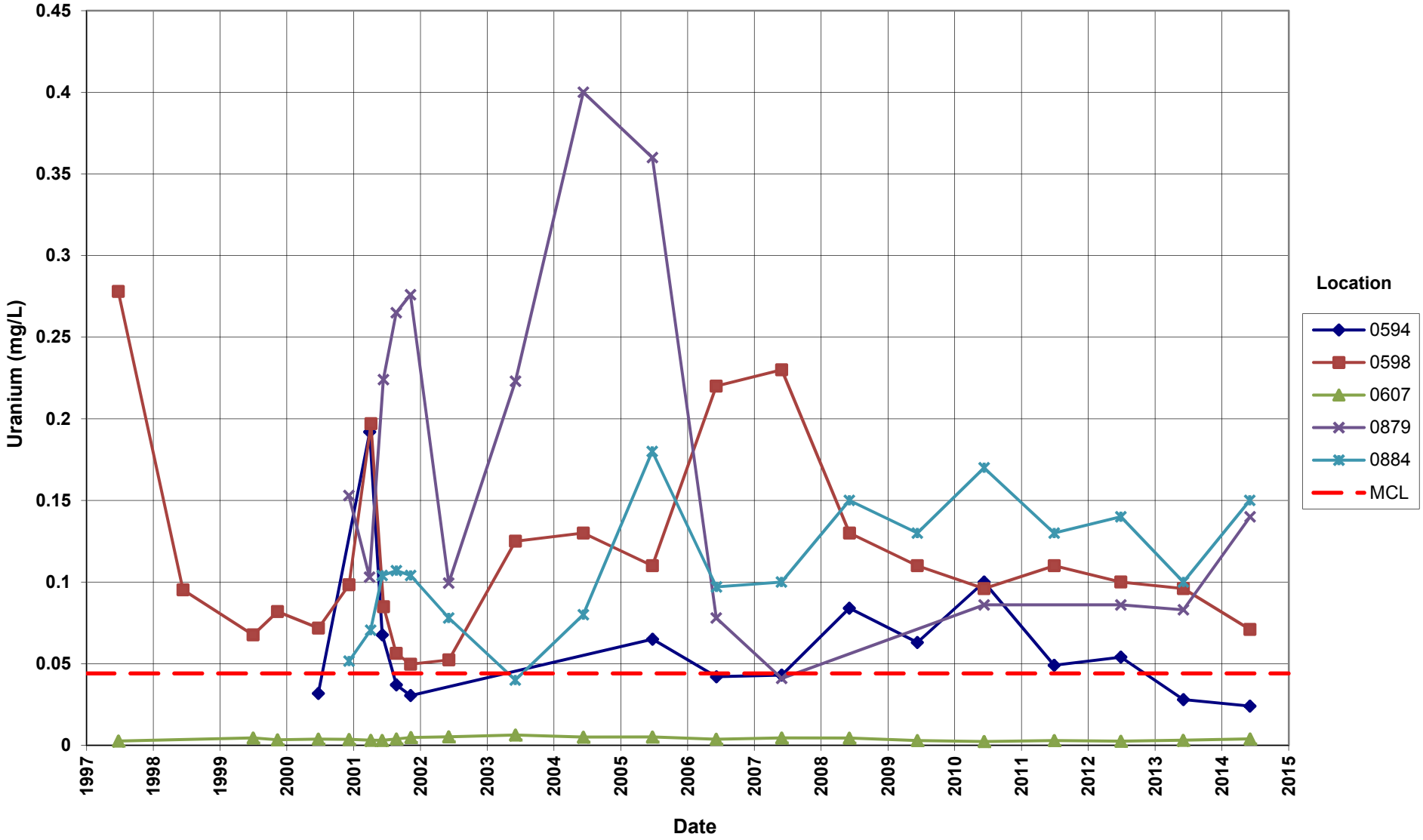
Durango Mill Tailings Process Site
Uranium Concentration
Maximum Contaminant Level (MCL) = 0.044 mg/L



Durango Raffinate Pond Process Site
Selenium Concentration
Maximum Contaminant Level (MCL) = 0.01 mg/L
Compliance Goal (CG) = 0.05 mg/L



Durango Raffinate Pond Process Site
Uranium Concentration
Maximum Contaminant Level = 0.044 mg/L



Time-Concentration Graphs
Surface Water

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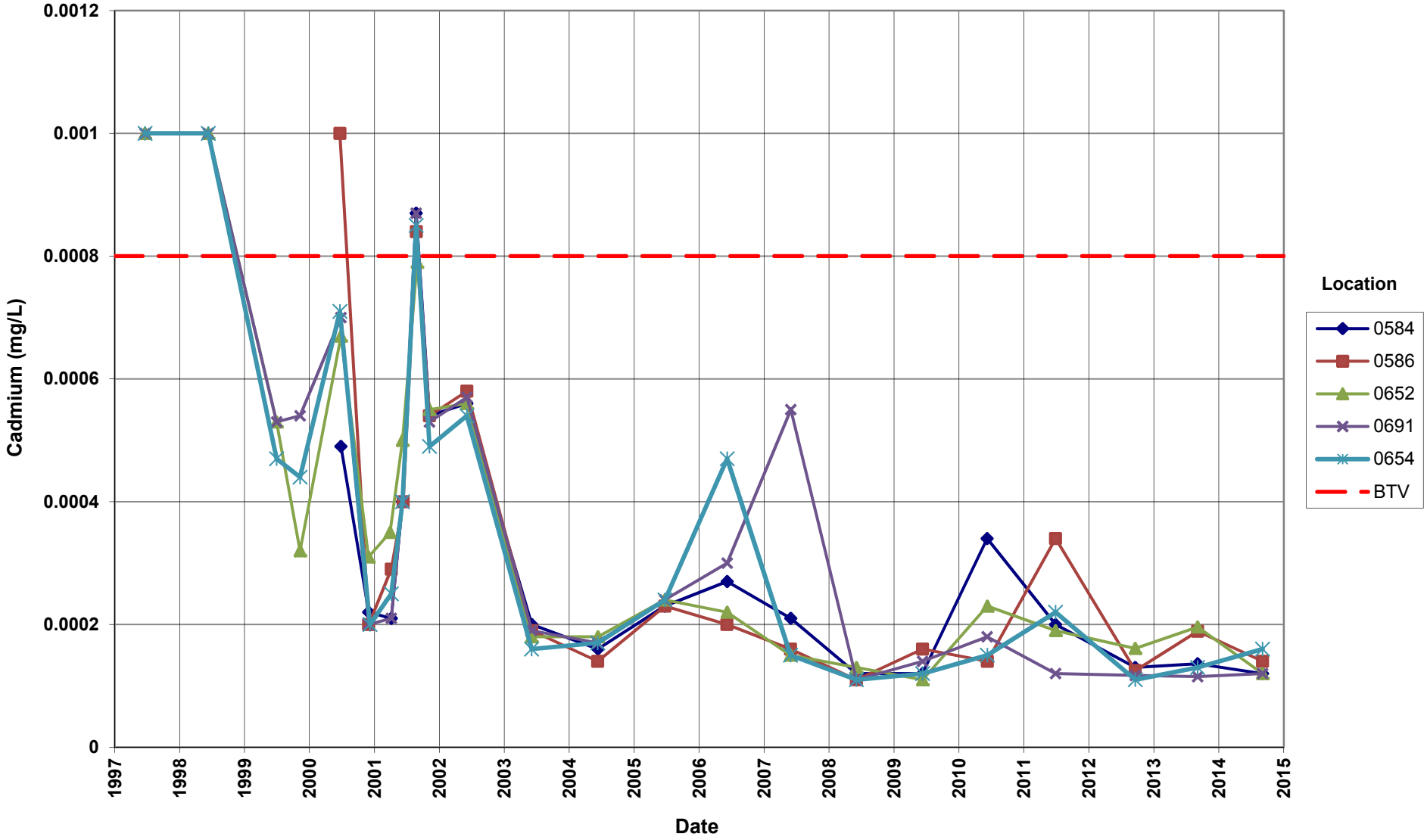
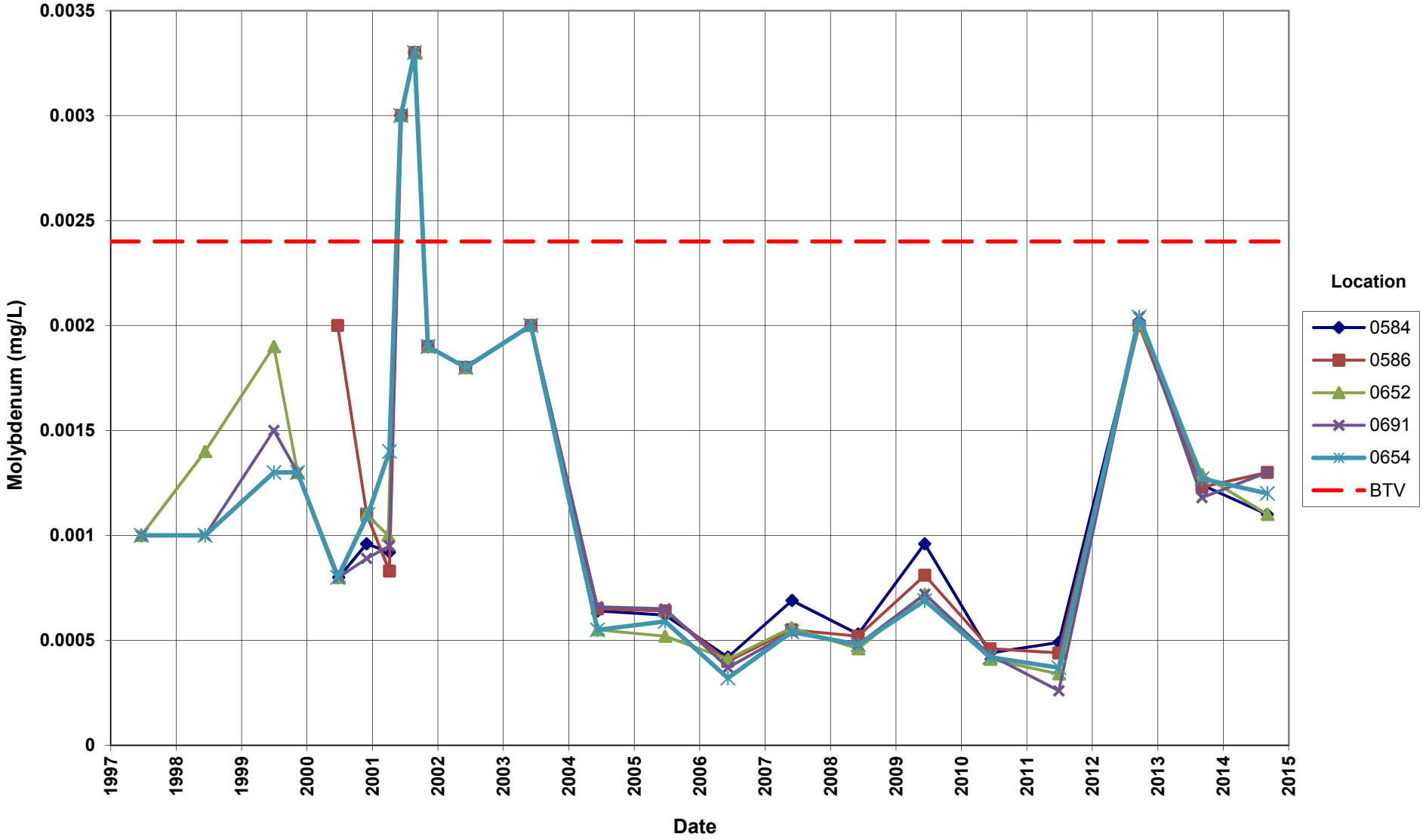
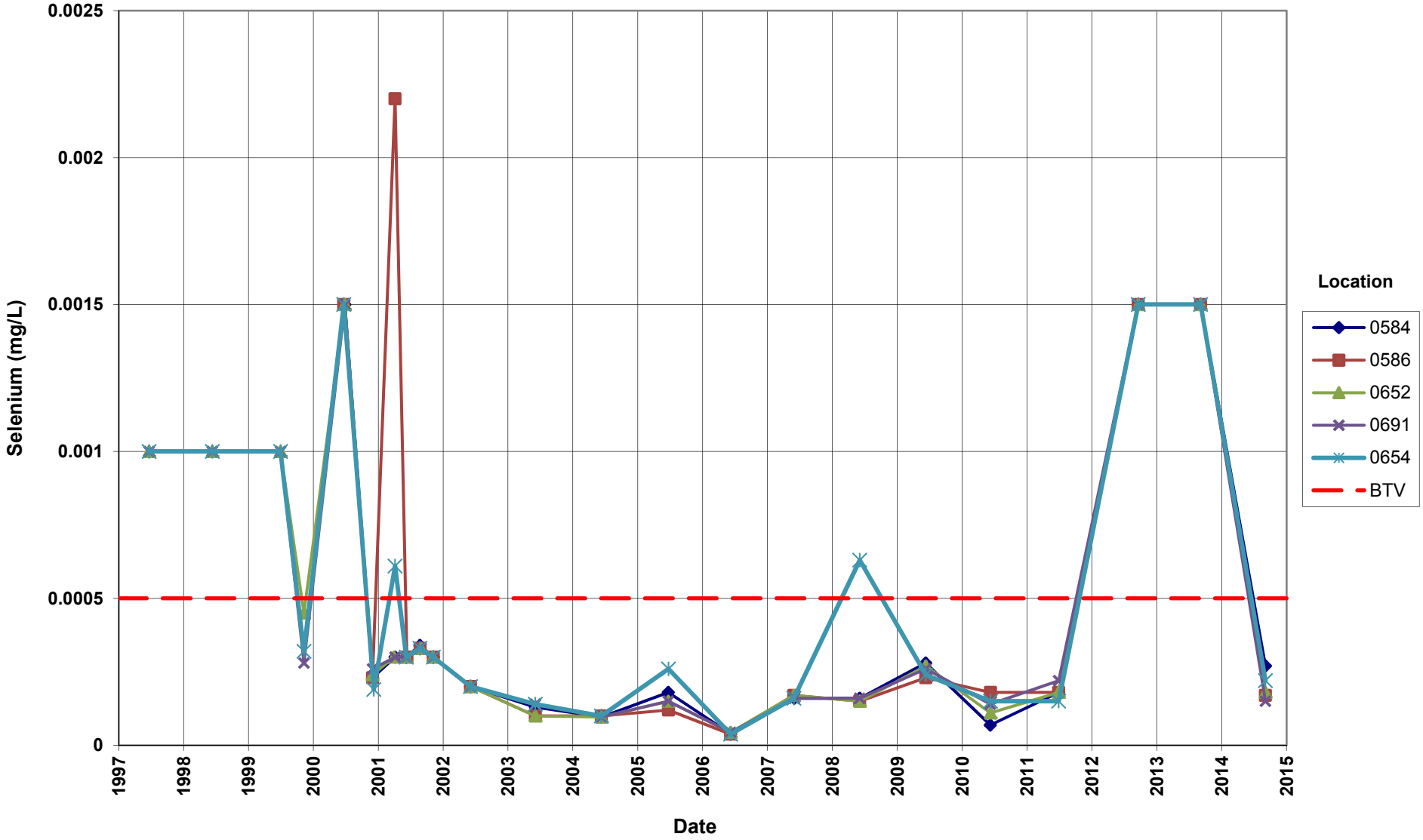
Durango Mill Tailings Process Site
Cadmium Concentration
Background Threshold Value (BTV) = 0.0008

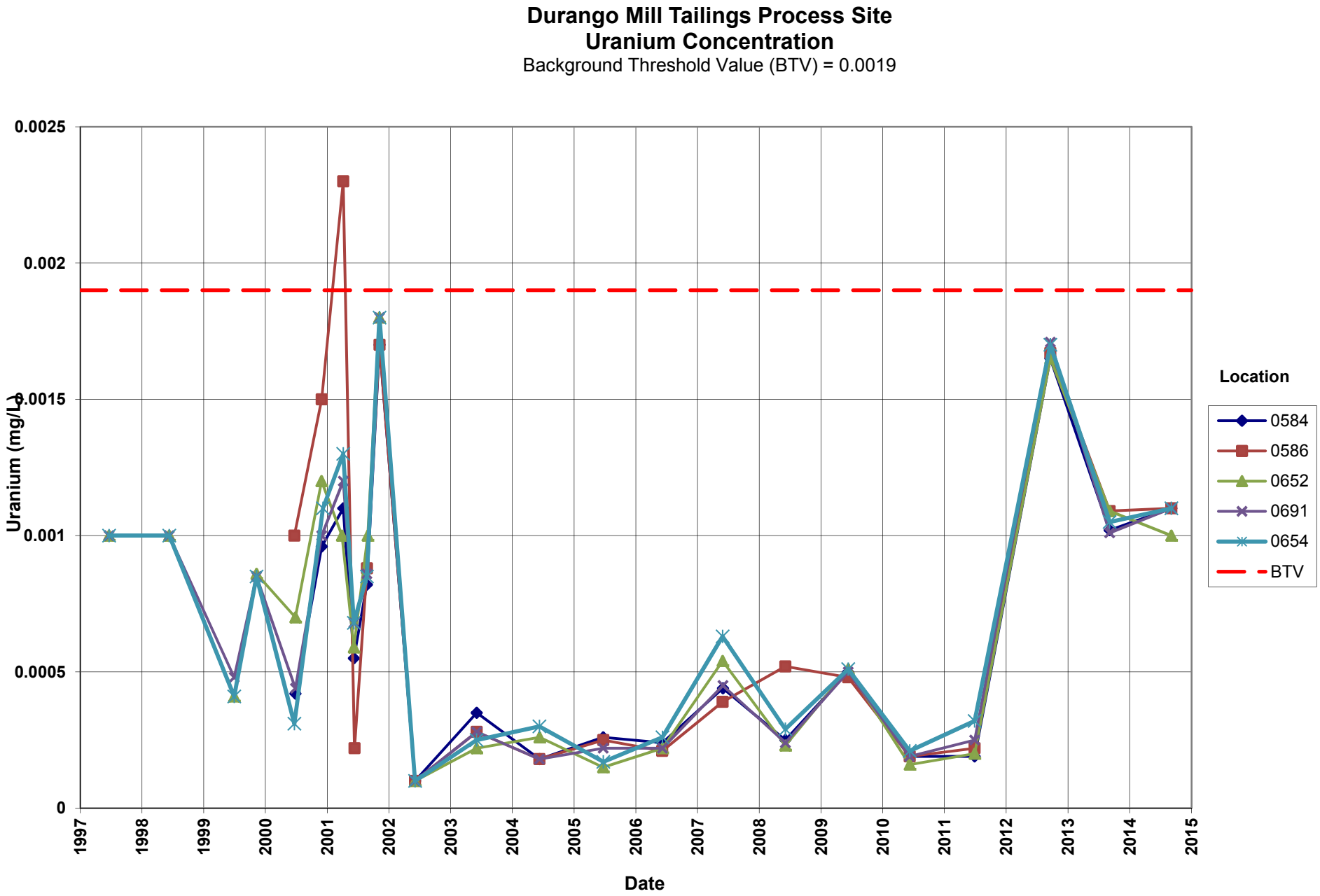


Durango Mill Tailings Process Site
Molybdenum Concentration
Background Threshold Value (BTV) = 0.0024



Durango Mill Tailings Process Site
Selenium Concentration
Background Threshold Value (BTV) = 0.0005




Durango Mill Tailings Process Site
Uranium Concentration
Background Threshold Value (BTV) = 0.0019
Uranium (mg/L)
0.0025
0.002
0.0015
0.001
0.0005
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Date
Location
0584
0586
0652
0691
0654
BTV

Attachment 3
Sampling and Analysis Work Orders

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Stoller Newport News Nuclear

ERRATA SHEET

DATE: February 12, 2015

SUBJECT: Sampling and Analysis Work Order

Four locations as indicated in the Work Order and highlighted below, were not selected based on the draft Groundwater Compliance Action Plan (see page two of the Work Order). They were selected for evaluation as background locations.

Monitoring Wells for Compliance

DUR01 Mill Site

612 Al/Km 630 Al/Km 631 Al/Km 633 Km 634 Km 635 Km 863 Al
617 Al

Monitoring Wells for Additional Background Evaluation

DUR01 Mill Site

622 Al 629 Al/Km 857 Al 866 Al

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Stoller

May 7, 2014

Task Order LM00-501
Control Number 14-0555

U.S. Department of Energy
Office of Legacy Management
ATTN: Jalena Dayvault
Site Manager
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries (Stoller)
June 2014 Environmental Sampling at the Durango, Colorado, Processing and Disposal Sites

REFERENCE: Task Order LM00-501-02-104-402, Durango, Colorado, Processing and Disposal Sites

Dear Ms. Dayvault:

The purpose of this letter is to inform you of the upcoming sampling at Durango, Colorado. Enclosed are the maps and tables specifying sample locations and analytes for monitoring at the Durango sites. Water quality data will be collected from monitoring wells at these sites as part of the routine environmental sampling currently scheduled to begin the week of June 2, 2014. Surface water sampling will be conducted in September. We will notify you of the exact date and time the week before the scheduled sampling.

The following lists show the monitoring wells (with zone of completion) and surface locations scheduled to be sampled during this event.

Monitoring Wells

DUR01 Mill Site

612 Al/Km	622 Al	630 Al/Km	633 Km	635 Km	863 Al	866 Al
617 Al	629 Al/Km	631 Al/Km	634 Km	857 Al		

DUR02 Raffinate Pond

594 Mf	598 Mf/Pl	607 Al	879 Mf	884 Al		

DUR03 Bodo Canyon

605 Cf	607 Cf	608 Al	612 Km	618 Al	621 Cf	623 Al

*NOTE: Al = Alluvium; Cf = Cliff House Formation; Km = Mancos Shale; Mf = Menefee Formation; Pl = Point Lookout Formation

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

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. All analytes and locations were selected based on the site regulatory documents (Processing Site – Draft Groundwater Compliance Action Plan; Disposal Site – Long-Term Surveillance and Maintenance Plan).

Please contact me at (970) 248-6690 if you have any questions.

Sincerely,

Cassandra Gauthier
Site Lead

CG/lcg/lb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Steve Donivan, Stoller
Bev Gallagher, Stoller
Cassandra Gauthier, Stoller
Lauren Goodknight, Stoller
EDD Delivery
rc-grand.junction
File: DUP 410.02 (A)
DUD 410.02 (A)

Sampling Frequencies for Locations at Durango, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
DUR01 Mill Tailings						
612			X			
617			X			
622			6/14 only			One-time only
629			6/14 only			One-time only
630			X			
631			X			Download datalogger
633			X			Download datalogger
634			X			
635			X			
857			6/14 only			One-time only
859					X	Download datalogger
863			X			Download datalogger
866			6/14 only			One-time only
DUR02 Raffinate Pond						
594			X			Se and U ONLY
596					X	Download datalogger
598			X			Se and U ONLY
607			X			Se and U ONLY
879			X			Se and U ONLY
884			X			Se and U ONLY
888					X	Download datalogger
889					X	Download datalogger
890					X	Download datalogger
DUR03 Bodo Canyon						
605			X			
607			X			POC WELL
608			X			"
612			X			"
618			X			"; supplements 608
621			X			"
623			X			BACKGROUND
MW-1					X	Download datalogger
NVP					X	Download datalogger
P7					X	Download datalogger

Groundwater sampling conducted in June; surface water sampling conducted in September.

Constituent Sampling Breakdown

Site	Durango				
Analyte	**Groundwater**	**Surface Water**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	20	7			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen					
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X				
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH_3-N)					
Cadmium	0612 & 0863 only	X	0.001	SW-846 6020	LMM-02
Calcium	DUR03 only		5	SW-846 6010	LMM-01
Chloride	0622, 0629, 0857, 0866, and DUR03 only		0.5	SW-846 9056	MIS-A-039
Chromium					
Iron	0622, 0629, 0857, 0866, and DUR03 only		0.1	SW-846 6020	LMM-01
Lead					
Magnesium	DUR03 only		5	SW-846 6010	LMM-01
Manganese	All Mill Tailings Areas and Bodo Canyon locations		0.005	SW-846 6010	LMM-01
Molybdenum	All Mill Tailings Areas and Bodo Canyon locations	X	0.003	SW-846 6020	LMM-02
Nickel					
Nitrate + Nitrite as N (NO_3+NO_2)-N					
Potassium	DUR03 only		1	SW-846 6010	LMM-01
Selenium	X	X	0.0001	SW-846 6020	LMM-02
Silica					
Sodium	DUR03 only		1	SW-846 6010	LMM-01
Strontium					
Sulfate	All Mill Tailings Areas and Bodo Canyon locations		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	DUR03 only		10	SM2540 C	WCH-A-033
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Zinc					
Total No. of Analytes	13	4			

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

Stoller

July 30, 2014

Task Assignment 501
Control Number 14-0781

U.S. Department of Energy
Office of Legacy Management
ATTN: Jalena Dayvault
Site Manager
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: Contract No. DE-LM0000415, The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries (Stoller)
Task Assignment 501 Long-Term Surveillance and Maintenance 1– LTS&M 1
September 2014 Environmental Sampling at the Durango, Colorado, Processing Sites

REFERENCE: Task Assignment 501-02-104-402, Durango, Colorado, Processing Sites

Dear Ms. Dayvault:

The purpose of this letter is to inform you of the upcoming sampling event at Durango, Colorado. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Durango processing sites. Water quality data will be collected at this site as part of the routine environmental sampling currently scheduled to begin the week of September 1, 2014.

The following list shows the surface locations scheduled for sampling during this event.

SURFACE LOCATIONS

DUR01

584 586 652 691

DUR02

588 654 678

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.

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

Please contact me at (970) 248-6652 if you have any questions.

Sincerely,

David Miller
Site Lead

DM/lcg/lb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
David Miller, Stoller
EDD Delivery
rc-grand.junction
File: DUR 410.02(A)

Sampling Frequencies for Locations at Durango, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Surface Locations						
DUR01 Mill Tailings						
584			X			
586			X			
652			X			RIVER
691			X			RIVER
DUR02 Raffinate Pond						
588			X			
654			X			RIVER
656					X	Unsafe
678			X			RIVER; new location; replaces 0656

Groundwater sampling conducted in June; surface water sampling conducted in September.

Constituent Sampling Breakdown

Site	Durango				
Analyte	**Groundwater**	**Surface Water**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	20	7			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen					
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X				
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH_3-N)					
Cadmium	0612 & 0863 only	X	0.001	SW-846 6020	LMM-02
Calcium	DUR03 only		5	SW-846 6010	LMM-01
Chloride	DUR03 only		0.5	SW-846 9056	MIS-A-039
Chromium					
Gross Alpha					
Gross Beta					
Iron	DUR03 only		0.1	SW-846 6020	LMM-01
Lead					
Magnesium	DUR03 only		5	SW-846 6010	LMM-01
Manganese	All Mill Tailings Areas and Bodo Canyon locations		0.005	SW-846 6010	LMM-01
Molybdenum	All Mill Tailings Areas and Bodo Canyon locations	X	0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO_3+NO_2)-N					
Potassium	DUR03 only		1	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium	X	X	0.0001	SW-846 6020	LMM-02
Silica					
Sodium	DUR03 only		1	SW-846 6010	LMM-01
Strontium					
Sulfate	All Mill Tailings Areas and Bodo Canyon locations		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	DUR03 only		10	SM2540 C	WCH-A-033
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	13	4			

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

Attachment 4
Trip Reports

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Stoller

Memorandum

DATE: June 17, 2014

TO: David Miller

FROM: Gretchen Baer

SUBJECT: Trip Report

Site: Durango, Colorado, Processing (DUR01), Raffinate Pond (DUR02) and Disposal (DUR03) Sites Sampling (including monthly sampling)

Dates of Sampling Event: June 2-4, 2014

Team Members: Gretchen Baer and Alison Kuhlman. David Miller, Linda Sheader, Andria Dutcher, Jalena Dayvault, and Mike Cosby (CDPHE) were also onsite during the event.

Number of Locations Sampled: Samples were collected from 20 of the 24 locations identified on the sampling notification letter as follows:

	Locations Sampled	Planned Locations
Mill Tailings Site, DUR01	8 wells	12 wells
Raffinate Pond Site, DUR02	5 wells	5 wells
Bodo Canyon Site, DUR03	7 wells	7 wells

Field data sheets can be found \\crow\SMS\14056210 in the Field Data folder.

Splits for uranium analysis were collected for the monthly sampling event (DUR03 locations 0608, 0618, and 0621) for the Environmental Sciences Laboratory (ESL). These split samples were created by collecting metals samples in 500 mL bottles, acidifying, then splitting ~50 mL in to 50-mL bottles.

Locations Not Sampled/Reason: DUR01 locations 0622, 0629, 0857, and 0866 were not sampled during this event. These locations were last sampled in 2001 or 2002 and it was determined by the DOE Site Manager that these wells should be re-developed before sampling.

Location Specific Information:

Site	Location IDs	Comments
DUR01	0612	Category I turbidity stability requirement could not be met during the purge. Samples were filtered according to the SAP.
DUR01	0633	Category II
DUR02	0594	Category II. Concrete pad is loose, undermined slightly.
DUR02	0598	Category I turbidity stability requirement could not be met during the purge. Samples were filtered according to the SAP.
DUR02	0607	Category II
DUR02	0879	Sampled per Program Directive DUR-2014-01: well was purged and sampled using high flow purging protocol. This is required due to construction activities that had altered the well; the bladder pump is now wedged in place and does not work and cannot be removed. An equipment blank was taken with the non-dedicated pump head tubing. New ¼" I.D. downhole tubing was installed prior to sampling.
DUR03	0605	Category II. Water-level measurement taken from top of gray casing at the sawed-in notch. Sulfur odor present. The water tubing connection leaks a little during each discharge. It was not leaking back into well and did not adversely affect sampling.
DUR03	0607	Sulfur odor.
DUR03	0612	Category II. Sulfur odor. High alkalinity value (which is typical for this location)
DUR03	0621	The pH stabilized at 6. An equipment blank was collected on the bladder pump that was installed prior to sampling.
DUR03	0623	Borderline CAT I/CAT II. Confirmed water level drop at ~100mL/min. Sampled as CAT II.

Quality Control Sample Cross Reference: The following are the false identifications assigned to the quality control samples.

False ID	True ID	Ticket Number	Sample Type	Associated Matrix
2171	DUR01 0863	MGT 150	Duplicate	Groundwater
2173	DUR03 0618	MGT 152	Duplicate	Groundwater
2242	DUR03 0618	MGT 134	ESL Duplicate	Groundwater
2640	Associated with DUR03 0621	MHT 564	Equipment Blank	Water
2642	Associated with DUR03 0621	MHT 566	ESL Equipment Blank	Water
2643	Associated with DUR02 0879	MHT 616	Equipment Blank	Water

Requisition Index Numbers (RINs) Assigned:

RIN	Associated Lab	Comments
14056208	ALS Fort Collins	Samples collected for the monthly sampling event (DUR03 locations 0608, 0618, and 0621)
14056209	ESL	Splits for uranium analysis collected for the monthly sampling event (DUR03 locations 0608, 0618, and 0621)
14056210	ALS Fort Collins	Samples collected for the annual groundwater sampling event. Field data sheets can be found in this RIN directory in lm\raapps\sms. All field data collected with the Field Data Collection System are associated with this RIN.

Sample Shipment: ALS samples were shipped overnight via FedEx to ALS Fort Collins, CO, from Grand Junction, CO, on June 5, 2014. ESL samples were hand-delivered on June 5, 2014.

Water Level Measurements: Water level measurements were collected at all sampled wells.

Well Inspection Summary: All wells were in good condition with the exceptions of well DUR02 0607 is bent (this has been noted in previous trip reports) and flush mount well DUR02 0598 has a concrete pad that is loose. This well is located on a frontage road and the pad is loose because it has been driven over.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated) and Program Directive DUR-2014-01.

Field Variance:

- Wells DUR01 0612 and DUR02 0598: the category I turbidity stability requirement could not be met during the purge. Samples were filtered according to the SAP.
- During a daily calibration check, a pH reading was slightly high. This instrument was not used further; another instrument was checked and used for the remainder of the event.

Equipment: Except for well DUR02 0879, all wells were sampled using the low-flow procedure. Wells were sampled with a peristaltic pump and dedicated tubing, or a dedicated bladder pump. All equipment functioned properly, with the following exceptions:

- The pH meter on sonde “K”: on 6/4/14 a.m., the pH operational check reading was slightly high, outside acceptance range. The probe was cleaned with soap and a brush, but readings remained high. This instrument was not used for the rest of the event: the "F" sonde (which had been calibrated prior to the event) was used. All pH values collected with "K" on 6/3/14 should be examined for bias.
- At well DUR03 0621: The original bladder pump was not working properly. It was replaced with a used bladder pump. The pump was deconned and an equipment blank was collected before installation. The check valve was not working properly on the new pump. (It was draining backwards slightly during refill; this did not adversely affect turbidity or any other aspect of sample quality.) Extra volume was purged before collecting stability parameters and samples.

Institutional Controls

Fences, Gates, Locks: All gates were appropriately closed and locked during the sampling event. The 3359 key worked in a lock that is “daisy-chained” on the gate for the dog park and key 2396 worked for the lock on the chain at the dog park entrance. Key 0356 is used for the Bureau of Reclamation well DUR02 0598.
Signs: No issues observed.
Trespassing/Site Disturbances: A jogger was seen within site boundaries at the disposal cell on June 3, 2014.

Site Issues:

Disposal Cell/Drainage Structure Integrity: No issues observed.
Vegetation/Noxious Weed Concerns: No issues observed.

Maintenance Requirements:

- Well DUR03 0621 needs a new bladder pump. The one currently installed has a leaking check valve.
- DUR01 0622, 0629, 0857, and 0866: These wells need to be redeveloped prior to sampling, as per discussion during the event between the site lead and the DOE Site Manager.
- DUR02 0594: This flush mount well pad is loose. Consideration should be made on how to protect this well pad from being driven over.
- Some wells need to be re-developed; turbidity requirements were not met for two Cat I wells during this event.

Safety Issues: There were significant road and utility construction activities adjacent to several sampling areas. In particular, DUR01 0866 is in a construction area; a construction project manager on-site was contacted and she escorted us to the well. High-visibility vests and hard-hats may be needed for work at this well if it is to be re-developed in the next few weeks.

Access Issues:

- Samplers called Durango police dispatch prior to arriving at and upon leaving the Durango Processing site (DUR01, aka "the dog park") to let them know about sampling activities.
- Bureau of Reclamation personnel are available in an office trailer just below well DUR02 0607 if help is needed for accessing wells 0598 or 0879. It is required to check in at the Utilities office prior to and after sampling these two wells.
- Stacy Silvas, Project Manager at Concrete Works of Colorado (see the sampling notebook for her cell phone number) was contacted before accessing the dog park and well DUR01 0866. If we plan to enter these areas in the next few months, S. Silvas wants to be called a few days in advance so that she can make sure that construction work will not be in the way.
- On June 2, 2014, Andria Dutcher evaluated the access to the dog park and to some other locations at the millsite and raffinate areas.

Corrective Action Required/Taken: Numerous well maintenance issues were identified that require action and are listed in the "Maintenance Requirements" section above.

(GB/lcg)

cc: (electronic)
Jalena Dayvault, DOE
Steve Donivan, Stoller
David Miller, Stoller
EDD Delivery

Stoller

Memorandum

DATE: July 8, 2014

TO: David Miller

FROM: Alison Kuhlman

SUBJECT: Well Sampling and Re-development Trip Report

Site: Durango, Colorado, Processing (DUR01)

Dates of Sampling Event: June 30 - July 1, 2014

Team Members: Gretchen Baer and Alison Kuhlman. David Miller was also onsite during the sampling event.

Number of Locations Sampled: Monitoring wells 0622, 0629, 0857, and 0866 were sampled for metals and anions (Mo, Se, U, Fe, Mn, Cl, and SO4). Field data sheets can be found \\crow\SMS\14066283 in the Field Data folder.

Locations Not Sampled: All scheduled locations were sampled.

Location Specific Information:

Location IDs	Comments
All monitoring wells: 0622, 0629, 0857, 0866	Wells were re-developed prior to sampling. See the attached 'Well Development Log.'
0622	The water level was taken from the top of the casing. Downhole tubing was measured to be approximately 14 feet long. Sample intake depth was approximately 14 feet.
0629	The recorded water level is from prior to re-development. On 7/1/2014 the water level was 18.50 and the well was sampled as a cat II. Down hole tubing is placed at 21.5 feet below the top of the casing.
0857	Borderline Cat I/Cat II
0866	On 7/01/2014 at approximately 1600, 12 gallons were purged using the high flow method from the fixed depth until the turbidity read 33.6 NTU. The low flow method was then used to continue the purge collecting field parameters and sampling the well as a Cat I well. The downhole tubing was fixed at 19.5 feet.

Quality Control Sample Cross Reference: The following are the false identifications assigned to the quality control samples.

False ID	True ID	Ticket Number	Sample Type	Associated Matrix
2650	0622	MHU 967	Duplicate	Groundwater

Requisition Index Numbers (RINs) Assigned: All samples were assigned to RIN 14066283.

Sample Shipment: Samples were shipped overnight to ALS in Fort Collins, CO via FedEx from Grand Junction, CO, on July 7, 2014.

Water Level Measurements: Water level measurements were collected at all sampled wells. As indicated in the location specific information, the water level from location 0629 recorded in FDCS was prior to well re-development as the water level did not sufficiently recover after re-development.

Well Inspection Summary: No issues were identified.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

Field Variance:

- Well 0857: the category I turbidity stability requirement could not be met during the purge. Samples were filtered according to the SAP.

Equipment: All wells were sampled using the low-flow procedure. Wells were sampled with a peristaltic pump and dedicated tubing. The wells were re-developed using traditional methods of surging and purging of the turbid water using a peristaltic pump. All equipment functioned properly.

Institutional Controls

Fences, Gates, Locks: All gates were appropriately closed and locked during the sampling event. The 3359 key worked in a lock that is "daisy-chained" on the gate for the dog park. The lock on the chain at the dog park entrance had been cut and the 2396 key was no longer needed.
Signs: No issues observed.
Trespassing/Site Disturbances: No issues were observed.

Site Issues

Disposal Cell/Drainage Structure Integrity: No issues observed.
Vegetation/Noxious Weed Concerns: No issues observed.
Maintenance Requirements: None.
Safety Issues: 0866 is in a construction area; a construction project manager was contacted prior to re-development and sampling and contacted once onsite to provide guidance to the well. High-visibility vests were needed for work at this well.

Access Issues

- Samplers called Durango police dispatch prior to arriving at and upon leaving the Durango Processing site (DUR01, aka "the dog park") to let them know about sampling activities.
- Stacy Silvas, Project Manager at Concrete Works of Colorado (see the sampling notebook for her cell phone number) was contacted before accessing the dog park and well DUR01 0866. If we plan to enter these areas in the next month, S. Silvas wants to be called a few days in advance so that she can make sure that construction work will not be in the way. Construction is anticipated to be complete in August.

Corrective Action Required/Taken: N/A

(GB/lcg)

cc: (electronic)
Jalena Dayvault, DOE
Steve Donivan, Stoller
David Miller, Stoller
EDD Delivery

Well Development Log

Site Durango Date 06/30/14 - 07/01/14

Well ID	Time	Initial Water Level (ft btc)	Number of Well Surges	Final Turbidity (NTUs)	Cumulative Volume (gallons)	Flow Rate (gpm)	Comments
0629	6/30 1700	17.68	1	>100	2		Purged dry, recovering at 0.1ft per 7 min
0622	06/30 1800	11.26	1	3.77	25		
0866	06/30 1900	12.89	3	≈900	50+12		Left overnight, 12 gallons purged 7/1
0857	07/01 0800	15.58	2	>100	12		7gal purged till dry, 5 more then dry

Conducted by: Alison Kuhlman + Gretchen Baer

Stoller

Memorandum

DATE: September 25, 2014

TO: David Miller

FROM: Alison Kuhlman

SUBJECT: Trip Report

Site: Durango, Colorado, Processing (DUR01) and Raffinate Pond (DUR02)

Dates of Sampling Event: September 3 – 4, 2014

Team Members: David Attkinson and Alison Kuhlman. Jalena Dayvault and Terry Petrosky were also onsite during the event.

Number of Locations Sampled: Samples were collected from 6 of the 7 locations identified on the sampling notification letter as follows:

	Locations Sampled	Planned Locations
Mill Tailings Site, DUR01	4 surface water locations	4 surface water locations
Raffinate Pond Site, DUR02	2 surface water locations	3 surface water locations

Locations Not Sampled/Reason: DUR02 location 0588 was not sampled because it was dry.

Location Specific Information: None.

Quality Control Sample Cross Reference: The following are the false identifications assigned to the quality control samples.

False ID	Ticket Number	True ID	Sample Type	Sample Date/Time
2521	MJT 039	Associated with 0584, 0586, 0691, 0654, and 0678	Equipment Blank	9-4-14/1130
2517	MJT 038	0654	Duplicate	9-4-14/0800

Duplicates were collected by filling all bottles labeled with the location number first, then filling all bottles labeled with the false ID second.

Requisition Index Numbers (RINs) Assigned: Samples were assigned to RIN 14086441. Field data sheets can be found at \\crow\SMS\14086441\FieldData.

Sample Shipment: ALS samples were shipped overnight via FedEx to ALS Fort Collins, CO, from Grand Junction, CO, on September 5, 2014.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated).

Field Variance: None.

Equipment: Apart from location 0652 all surface water locations were sampled with a peristaltic pump and tubing reel with a weight. At location 0652 the field measurements were taken through the tubing reel, however the sample was collected via container immersion. All equipment functioned properly, with the following exception. Turbidimeter S-16916: on September 4, 2014 at 1200 in the post-trip calibration check, the turbidity reading was slightly high on the lowest standard, outside acceptance range. All turbidity values from September 4, 2014, should be examined for bias.

Institutional Controls

Fences, Gates, Locks: All gates were appropriately closed and locked during the sampling event. The 3359 key worked in a lock that is "daisy-chained" on the gate for the dog park. The chain at the dog park entrance has been removed. The yellow posts remain and it appears one was potentially hit as it is bent (see attached photo).
Signs: No issues observed.
Trespassing/Site Disturbances: No issues observed.

Site Issues:

Disposal Cell/Drainage Structure Integrity: No issues observed.
Vegetation/Noxious Weed Concerns: No issues observed.
Maintenance Requirements: None.
Safety Issues: None.
Access Issues:

- Samplers called Durango police dispatch prior to arriving at the Durango Processing site (DUR01, aka "the dog park") to let them know about sampling activities.
- Stacy Silvas, Project Manager at Concrete Works of Colorado, was contacted before accessing the dog park. She confirmed that construction by their company in the area is complete and she no longer needs to be contacted.

Corrective Action Required/Taken: None.

(AK/lcg)

cc: (electronic)
Jalena Dayvault, DOE
David Miller, Stoller
Steve Donivan, Stoller


H
INFO
STATE LAW

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