Data Validation Package

September 2015
Groundwater and Surface Water Sampling at the Slick Rock, Colorado, Processing Sites

January 2016

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Slick Rock, Colorado, Processing Sites

Sampling Period: September 28–30 and October 15, 2015

The Slick Rock West Processing Site (SRK05) and the Slick Rock East Processing Site (SRK06) are collectively known as the Slick Rock, Colorado, Processing Sites. Both sites were sampled during this annual event as required by the 2006 *Draft Final Ground Water Compliance Action Plan for the Slick Rock, Colorado, Processing Sites* (GCAP). All monitoring locations specified in the GCAP were sampled with the following exceptions. Monitoring well location SRK06-0312 could not be sampled because it was dry. Surface water locations SRK05-0349 and SRK06-0700 could not be sampled because they could not be accessed due to overgrown vegetation along the bank of the Dolores River. Difficulties encountered during the September sampling trip prevented sampling of locations SRK05-0320 and SRK05-0693. Sampling of these locations was completed during a follow-up trip on October 15, 2015. An additional sample, SRK06-0672, was collected at that time per landowner request and site lead approval. Water levels were measure at all sampled wells.

The proposed compliance strategy for the Slick Rock sites is natural flushing in conjunction with institutional controls and compliance monitoring. Contaminant concentrations at the Slick Rock sites are compared to their respective maximum concentration limit (MCL) to assess compliance with Title 40, *Code of Federal Regulations*, Part 192 (40 CFR 192), with the exception of manganese and selenium. Manganese concentrations are compared to the maximum historical background concentration of 4.2 milligrams per liter (mg/L) to assess compliance because manganese does not have an MCL. A human-health risk-based alternate concentration limit of 0.18 mg/L has been proposed to assess compliance for selenium because groundwater modeling predicts that selenium concentrations at the Slick Rock West Processing Site will not be reduced to below the MCL within 100 years.

The constituents of potential concern (COPCs) defined in the GCAP for the West Processing Site are manganese, molybdenum, nitrate, selenium, and uranium. Additional COPCs (radium-226, radium-228, benzene, toluene, ethylbenzene, and xylenes) are isolated to one well (0319). As shown in Table 1, results from this sampling event demonstrate elevated concentrations for most contaminants at West Processing Site locations.

Selenium and uranium are the COPCs at the East Processing Site. Uranium concentrations exceed the MCL at most East Processing Site groundwater locations. The selenium contamination is isolated to the onsite well 0305. Wells with analyte concentrations that exceeded applicable groundwater standards are listed in Table 2.

Table 3 lists the drinking water maximum contaminant levels and results for benzene, toluene, ethyl benzene, and xylenes (total) in well 0319. The radium-226 plus radium-228 concentration has decreased in this well since 2006, and remains below the maximum contaminant level of 5 picocuries per liter.

Table 1. Slick Rock West Wells with Samples that Exceeded Standards in September 2015

Analyte	Standard (mg/L)	Location	Concentration (mg/L)
Manganese [a]	4.2	SRK05-0340	4.4
Molybdenum	0.1	SRK05-0317	0.16
		SRK05-0318A	0.71
		SRK05-0339	0.92
		SRK05-0340	1.6
		SRK05-0508	1.1
		SRK05-0510	0.89
Nitrate + Nitrite as Nitrogen	10	SRK05-0318A	50
		SRK05-0339	56
		SRK05-0340	230
		SRK05-0508	140
		SRK05-0510	180
Selenium [b]	0.18	SRK05-0318A	4.3
		SRK05-0339	2.6
		SRK05-0340	2.1
		SRK05-0508	1.8
		SRK05-0510	0.92
Uranium	0.044	SRK05-0340	0.045
		SRK05-0508	0.052
		SRK05-0510	0.099

Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; concentrations are in milligrams per liter (mg/L).
[a] Manganese standard is the maximum historical background concentration observed in well SRK06 0300.
[b] Selenium standard for the West Processing Site is the proposed Alternate Concentration Limit.

Table 2. Slick Rock East Wells with Samples that Exceeded Standards in September 2015

Analyte	Standard (mg/L)	Location	Concentration (mg/L)
Selenium [b]	0.01	SRK06-0305	0.018
Uranium	0.044	SRK06-0303	1.3
		SRK06-0305	0.77
		SRK06-0307	0.40
		SRK06-0311	0.055

Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; concentrations are in milligrams per liter (mg/L).

Table 3. BTEX [a] Maximum Contaminant Levels and Results for Well SRK05-0319 in September 2015

Analyte	Maximum Contaminant Level (mg/L)	Concentration in Well SRK05-0319 (mg/L)
Benzene	0.005	4.8
Ethylbenzene	0.7	0.16
Toluene	1	3.1
Xylenes, Total	10	4.17

Maximum Contaminant Levels are listed in the 2009 *National Primary Drinking Water Regulations* (EPA 816-F-09-0004, May 2009); concentrations are in milligrams per liter (mg/L).
[a] BTEX = Benzene, toluene, ethyl benzene, and xylenes (total).

Surface water results from Dolores River locations downstream of and adjacent to the processing sites were compared to statistical background threshold values (BTVs) derived using historical data (from 1997 to present) at background river locations. The background locations are SRK05-0693, which is located upstream of the West Processing Site, but downstream of the East Processing Site, and SRK06-0696 which is located upstream of the East Processing Site.

West Processing Site surface water locations in the Dolores River are monitored to verify that the compliance strategy is protective of the environment. The potential for environmental exposure to site contaminants exists in the Dolores River because it receives groundwater discharge from the contaminated alluvial aquifer. As shown in Table 4, the manganese BTV was exceeded at location 0347. Based on the turbidity, the sample from location 0347 should have been filtered, but was submitted unfiltered for total (not dissolved) metals analysis.

Table 4. Comparison of Slick Rock West Processing Site September 2015 Surface Water Concentrations to Historical Upgradient BTVs

Analyte	BTV for SRK05-0693 (mg/L)	SRK05-0347 Concentration (mg/L)	SRK05-0694 Concentration (mg/L)
Manganese	0.024	0.028	0.0059
Molybdenum	0.008	0.001	0.002
Nitrate + Nitrite as N	0.47	nd [a]	nd [a]
Selenium	0.0047	0.001	0.001
Uranium	0.0043	0.001	0.001

[a] Not Detected

Surface water location 0692 at the East Processing Site is monitored for uranium because it is the predicted location where the centroid of the uranium plume will intersect the river. The uranium concentration at this location of 0.001 mg/L remains below the BTV concentration for background location 0696 of 0.002 mg/L.

David Traub, Site Lead
Navarro Research and Engineering, Inc.

Jan 25, 2016
Date

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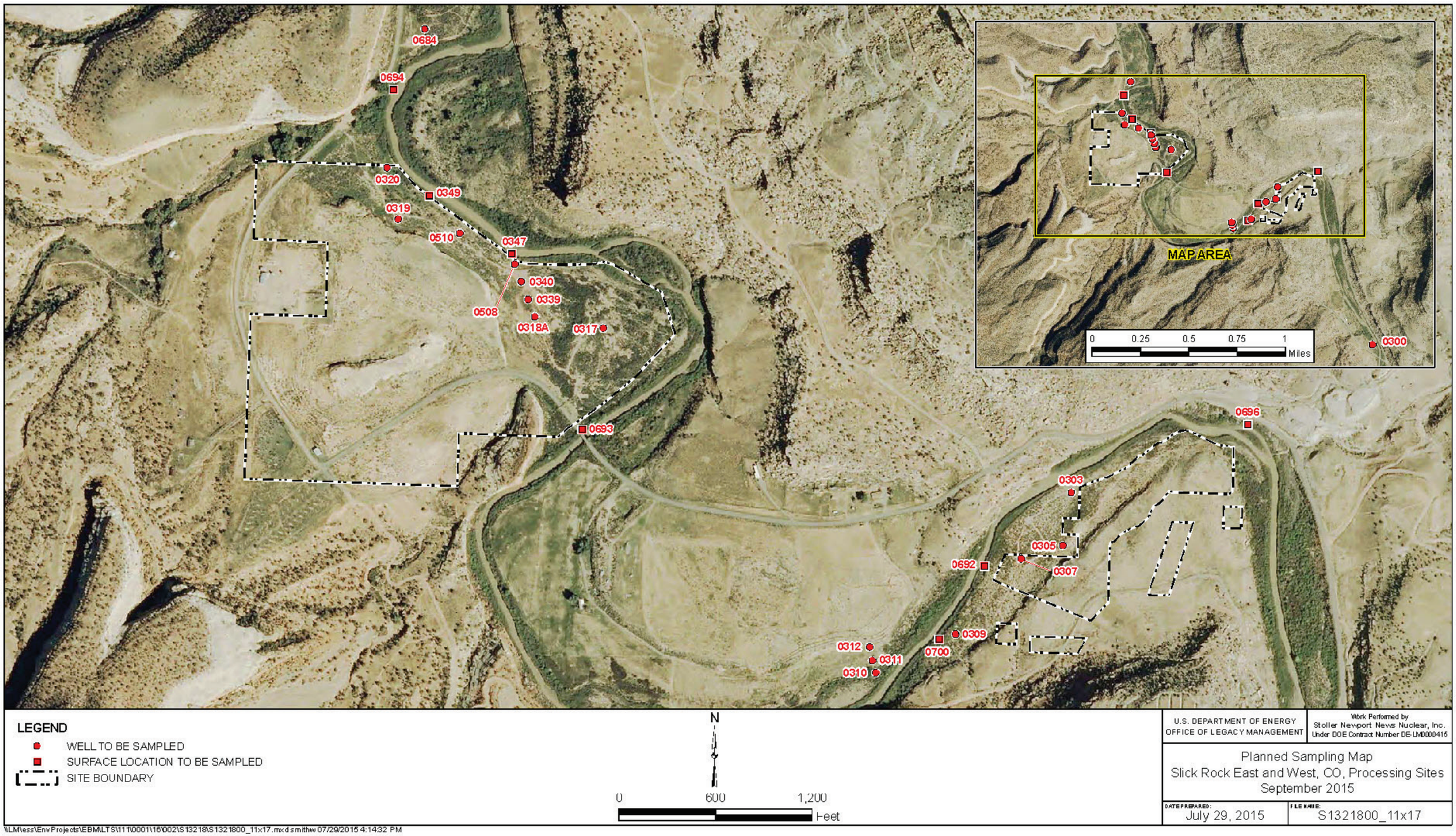

Slick Rock, Colorado, Processing Sites, Sample Location Map

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Slick Rock, Colorado	**Date(s) of Water Sampling**	September 28–30 and October 15, 2015
Date(s) of Verification	December 23, 2015	**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 letter dated July 30, 2015.
2. Were the sampling locations specified in the planning documents sampled?	No	Monitoring well location SRK06-0312 was dry. Surface water locations SRK05-0349 and SRK06-0700 could not be sampled due to lack of access.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed September 28 and October 9, 2015. Dates for turbidity primary calibration are missing.
4. Was an operational check of the field equipment conducted daily?	Yes	An end of trip check was not performed on September 30, 2015.
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	No	The turbidity was not recorded at location 0692.
6. Were wells categorized correctly?	Yes	
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?	No	Specific conductance stability criteria was not met for well 0319.
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?	NA	All monitoring wells were Category I.
Was one pump/tubing volume removed prior to sampling?		
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicates were collected from locations SRK05-0318A and SRK05-0319.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	No	An equipment blank was required, but not collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	Yes	
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?	No	Location 0347 turbidity was > 10 NTUs, but the sample was not 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	At locations 0692, 0694, and 0696, the filters used were listed as 5 µm pore size instead of 0.45 µm.
18. Was the presence or absence of ice in the cooler documented at every sample location?	No	Documentation is missing for location 0317.
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	15087319
Sample Event:	September 28–30, 2015
Site(s):	Slick Rock, Colorado, Processing Sites
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1510125
Analysis:	Metals, Organics, Wet Chemistry, and Radiochemistry
Validator:	Stephen Donivan
Review Date:	December 22, 2015

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. 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 5.

Table 5. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Manganese	LMM-01	SW-846 3005A	SW-846 6010B
Molybdenum, Selenium, Uranium	LMM-02	SW-846 3005A	SW-846 6020A
Nitrite + Nitrate as N	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Radium-226	ASP-A-016	SOP 783	SOP 783, EPA 903.1m
Radium-228	GPC-A-020	SOP 749	SOP 724

Data Qualifier Summary

Analytical results were qualified as listed in Table 6. Refer to the sections below for an explanation of the data qualifiers applied.

Table 6. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1510125-1	0317	Selenium	J	PQL check result
1510125-3	0319	Selenium	J	Field duplicate result
1510125-7	0347	Selenium	J	PQL check result
1510125-10	0684	Selenium	J	PQL check result
1510125-11	0694	Selenium	J	PQL check result
1510125-14	0319 Duplicate	Radium-228	J	Less than the determination limit
1510125-14	0319 Duplicate	Selenium	J	Field duplicate result
1510125-15	0300	Radium-228	U	Less than the decision level
1510125-15	0300	Selenium	J	PQL check result
1510125-18	0307	Selenium	J	PQL check result

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 24 water samples on October 8, 2015, accompanied by a Chain of Custody (COC) form. Copies of the three air bills were included in the receiving documentation. The COC 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 COC form was complete with no errors or omissions with the following exception. Sample vials for volatiles analysis were listed on the COC form for location 2533 (0319 Duplicate) but not received. Sampling for volatiles analysis was performed at a later date. The laboratory noted sediment was visible in the sample bottles from location 0319 where the samples were submitted as filtered.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2.8° C, which complies with requirements. The other two coolers were received at ambient temperature, which complies with requirements. All samples were received in the correct container types and had been preserved correctly. 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.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the minimum detectable concentration (MDC), Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC 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, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a "U" flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as 3 times the MDC. Results not previously "U" qualified that are less than the DL are qualified with a "J" flag as estimated values.

The reported MDLs for all metal, organic, and wet chemical analytes, and MDCs for radiochemical 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 MCAWW 353.2, Nitrate + Nitrite as N
Calibrations for nitrite + nitrate as N were performed using seven calibration standards on October 26, 2015. 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 SW-846 6010B, Manganese
Calibration for manganese was performed on October 15 and 22, 2015, using three calibration standards. The calibration curve correlation coefficient value was greater than 0.995 and the absolute value of the intercept was only slightly greater than 3 times the MDL. 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 6020, Molybdenum, Selenium, Uranium
Calibrations were performed on October 19–21, 2015, 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 MDL. 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 molybdenum and selenium check results exceeded the acceptance range in most cases. Associated sample 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.

Radiochemical Analysis

Radium-226
Emanation cell plateau voltage determinations and cell efficiency calibrations were performed October 2015. Daily instrument checks performed on October 22, 2015, met the acceptance criteria. All sample chemical recoveries were within the acceptance range of 40 to 110 percent. Chemical recoveries for several of the samples were adjusted by the laboratory to minimize possible low biases. The results for these samples are qualified with a "J" flag as estimated values.

Radium-228
Plateau voltage determinations were performed in June 2015 and detector efficiency calibrations were performed in June 2015. Background determinations were performed on October 15, 2015. The daily instrument checks performed on October 15, 2015, met the acceptance criteria. All sample chemical recoveries were within the acceptance range of 40 to 110 percent.

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.

Metals and Wet Chemistry
All method blank and calibration blank results associated with the samples were below the PQLs for all analytes. 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 the method blank was negative and the absolute value was greater than the PQL. All associated manganese results were greater than 5 times the MDL, not requiring qualification.

Radiochemistry
The radiochemical method blank results were below the DLC.

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) pairs were analyzed for metals and nitrate + nitrite as N as a measure of 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. MS/MSD pairs were not analyzed for volatile organics, due to insufficient sample. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for non-radiochemical replicate results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

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. All evaluated serial dilution data were acceptable, with the exception of manganese and selenium. The serial dilution percent difference for manganese and selenium was greater than 10 percent and the associated sample results are qualified with "J" flags as estimated values.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL (MDC for radiochemistry) and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on November 6, 2015. 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: 15087319 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 12/22/2015

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

# of Samples: 21 **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 were 2 duplicates evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 15087319 **Lab Code:** PAR **Date Due:** 11/06/2015

Matrix: Water **Site Code:** SRK01 **Date Completed:** 11/06/2015

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								
Manganese	ICP/ES	10/15/2015	0.0000	1.0000	OK	OK	OK	103.0	93.0	93.0	0.0	105.0	5.0	109.0
Manganese	ICP/ES	10/22/2015	0.0000	1.0000	OK	OK	OK	108.0	107.0	105.0	2.0	101.0	3.0	104.0
Molybdenum	ICP/MS	10/19/2015	0.0000	1.0000	OK	OK	OK	97.0	75.0		0.0	103.0	7.0	154.0
Molybdenum	ICP/MS	10/20/2015	0.0000	1.0000	OK	OK	OK	101.0	99.0	79.0	1.0	102.0		125.0
Molybdenum	ICP/MS	10/20/2015								99.0	0.0			159.0
Selenium	ICP/MS	10/19/2015	0.0000	1.0000	OK	OK	OK	102.0			1.0	114.0	2.0	263.0
Selenium	ICP/MS	10/20/2015	0.0000	1.0000	OK	OK	OK	116.0	106.0	91.0	1.0	100.0		177.0
Selenium	ICP/MS	10/20/2015								92.0	14.0			137.0
Uranium	ICP/MS	10/19/2015	0.0000	1.0000	OK	OK	OK	99.0	90.0		3.0	104.0	6.0	130.0
Uranium	ICP/MS	10/20/2015	0.0000	1.0000	OK	OK	OK	107.0	106.0	92.0	1.0	104.0		130.0
Uranium	ICP/MS	10/20/2015								104.0	1.0	102.0		110.0

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 15087319 **Lab Code:** PAR **Date Due:** 11/06/2015

Matrix: Water **Site Code:** SRK01 **Date Completed:** 11/06/2015

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate RER
0300	Radium-226	10/22/2015			97.9			
0319	Radium-226	10/22/2015			97.8			
2533	Radium-226	10/22/2015			95.0			
Blank_Spike	Radium-226	10/22/2015			93.6	80.30		
Blank_Spike_Du	Radium-226	10/22/2015			95.1	74.80		0.40
Method_Blank	Radium-226	10/22/2015	0.0515	U	95.6			
0300	Radium-228	10/15/2015			97.9			
0319	Radium-228	10/15/2015			97.8			
2533	Radium-228	10/15/2015			95.0			
Blank_Spike	Radium-228	10/15/2015			93.6	105.00		
Blank_Spike_Du	Radium-228	10/15/2015			95.1	101.00		0.20
Method_Blank	Radium-228	10/15/2015	-0.0600	U	95.6			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15087319 **Lab Code:** PAR **Date Due:** 11/06/2015

Matrix: Water **Site Code:** SRK01 **Date Completed:** 11/06/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
NITRATE/NITRITE AS N	10/26/2015	0.000	0.9993	OK	OK	OK	96.00				

General Information

Report Number (RIN):	15107424
Sample Event:	October 15, 2015
Site(s):	Slick Rock, Colorado, Processing Sites
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1510277
Analysis:	Metals, Organics, Wet Chemistry
Validator:	Stephen Donivan
Review Date:	December 23, 2015

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. 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
Manganese	LMM-01	SW-846 3005A	SW-846 6010B
Molybdenum, Selenium, Uranium	LMM-02	SW-846 3005A	SW-846 6020A
Nitrite + Nitrate as N	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Volatile Organics, VOA	VOA-A-009	SW-846 5030C	SW-846 8260

Data Qualifier Summary

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

Table 8. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
All	All	Selenium	J	PQL check result
1510277-3	0693	Molybdenum	J	PQL check result
1510277-5	0672	Molybdenum	J	PQL check result

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 5 water samples on October 16, 2015, accompanied by a Chain of Custody (COC) form. Copies of the three air bills were included in the receiving documentation. The COC 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 COC form was complete with no errors or

omissions. Two of the VOA vials from location 0319 were received with notable headspace. The third vial was used for sample analysis.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 3.2° C, which complies with requirements. The other two coolers were received at ambient temperature, which complies with requirements. All samples were received in the correct container types and had been preserved correctly. 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 metal, organic, and wet chemical 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 MCAWW 353.2, Nitrate + Nitrite as N
Calibrations for nitrate + nitrite as N were performed using seven calibration standards on October 23, 2015. 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 SW-846 6010B, Manganese
Calibration for manganese was performed on October 26, 2015, using three calibration standards. The calibration curve correlation coefficient value was greater than 0.995 and the absolute value of the intercept was only slightly greater than 3 times the MDL. 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 6020, Molybdenum, Selenium, Uranium
Calibrations were performed on October 22, 2015, 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 MDL. 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 check results exceeded the acceptance range in most cases. Associated sample 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 8260, Volatiles
The initial calibrations for benzene, ethyl benzene, toluene, and xylenes were performed using nine calibration standards on September 15, 2015. Calibration curves are established using the average response factor approach. Calibrations using average response factors had relative standard deviations of less than 15 percent. Initial and continuing calibration verification checks were made at the required frequency. The verification checks met all acceptance criteria. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

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.

Metals and Wet Chemistry
All method blank and calibration blank results associated with the samples were below the PQLs for all analytes. 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 the method blank was negative and the absolute value was greater than the PQL. All associated manganese results were greater than 5 times the MDL, not requiring qualification.

Volatile Organics
The method blank results were below the MDLs for all target compounds.

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) pairs were analyzed for metals and nitrate + nitrite as N as a measure of 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. MS/MSD pairs were not analyzed for volatile organics, due to insufficient sample. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for non-radiochemical replicate results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

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. All evaluated serial dilution data were acceptable, with the exception of manganese and selenium. The serial dilution percent difference for manganese and selenium was greater than 10 percent and the associated sample results are qualified with "J" flags as estimated values.

Volatile Organics Internal Standard and Surrogate Recovery

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All samples are spiked with surrogate compounds prior to sample preparation. Surrogate recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries may also be influenced by the success in recoveries of the internal standards. Internal standard recoveries were stable and within acceptance ranges. All surrogate recoveries were within the acceptance ranges.

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all volatile organics data. All peak integrations were satisfactory.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL (MDC for radiochemistry) and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on November 9, 2015. 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: 15107424 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 12/23/2015

Project: Slick Rock **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	There was 1 trip/equipment blank evaluated.
☐ Field Duplicates	

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 15107424 **Lab Code:** PAR **Date Due:** 11/13/2015

Matrix: Water **Site Code:** SRK01 **Date Completed:** 11/06/2015

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								
Manganese	ICP/ES	10/26/2015	0.0000	1.0000	OK	OK	OK	101.0	100.0	100.0	0.0	102.0		100.0
Molybdenum	ICP/MS	10/22/2015	0.0000	1.0000	OK	OK	OK	96.0	107.0	103.0	3.0	101.0		135.0
Selenium	ICP/MS	10/22/2015	0.0000	1.0000	OK	OK	OK	102.0	113.0	104.0	8.0	94.0		258.0
Uranium	ICP/MS	10/22/2015	0.0000	1.0000	OK	OK	OK	109.0	120.0	119.0	1.0	104.0		160.0

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 15107424 **Project:** Slick Rock **Lab Code:** PAR **Validation Date:** 12/23/2015

LCS Recovery: All LCS recoveries were within the laboratory acceptance limits.

Method Blank(s): All method blanks results were below the method detection limit.

MS/MSD Recovery: All MS/MSD recoveries were within the laboratory acceptance limits.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15107424 **Lab Code:** PAR **Date Due:** 11/13/2015

Matrix: Water **Site Code:** SRK01 **Date Completed:** 11/06/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
NITRATE/NITRITE AS N	10/23/2015	0.000	0.9993	OK	OK	OK	96.00	104.0	100.0	3.00	

Sampling Quality Control Assessment

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

Sampling Protocol

Surface water locations were sampled using a peristaltic pump and tubing reel or container immersion. Monitoring wells were sampled using a peristaltic pump and dedicated tubing. All monitoring wells met the Category I low-flow sampling criteria. Sample results for these wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

Equipment Blank

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. An equipment blank was not taken from the tubing reel used to collect the surface water samples.

Trip Blank

A trip blank (field ID 2799) was prepared and analyzed for volatile organics to document contamination attributable to shipping and field handling procedures. There were no target analytes detected in the trip blank.

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 that are less than 5 times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from locations SRK05-0318A and SRK05-0319 (field duplicate IDs 2498 and 2533). The non-radiochemical duplicate results met the criteria, with the exception of selenium at location 0319 (the range exceeded the PQL). The associated samples are qualified with "J" flags as estimated values. The relative error ratio for radiochemical duplicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 15087319 **Lab Code:** PAR **Project:** Slick Rock **Validation Date:** 12/22/2015

Duplicate: 2498 **Sample:** 0318A

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Manganese	1100			1	1100			1	0		UG/L
Molybdenum	710			10	720			10	1.40		UG/L
NITRATE/NITRITE AS N	50			100	50			100	0		MG/L
Selenium	4300			10	4400			10	2.30		UG/L
Uranium	29			10	28			10	3.51		UG/L

Duplicate: 2533 **Sample:** 0319

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Radium-226	1.41		0.449	1	1.41		0.45	1	0	0	pCi/L
Radium-228	1.3		0.444	1	1.28		0.444	1		0.1	pCi/L
Selenium	3			10	7.4			10	r>PQL		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 — 1-22-2016 — Date

Data Validation Lead: Stephen Donivan — Stephen Donivan — 1-22-2016 — Date

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers 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.

The selenium results for locations SRK05-0319 and SRK06-0300 were identified as statistical outliers. Review of these data did not identify any errors and the data from this event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All Historical Data

Laboratory: ALS Laboratory Group

RIN: 15087319

Report Date: 01/13/2016

					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	
SRK05	0319	0001	09/28/2015	Selenium	0.00300		FJ	0.00140	B	F	0.0003	U		13	1	Yes
SRK05	0508	N001	09/30/2015	Selenium	1.80		F	1.73			0.0350			35	0	No
SRK05	0508	N001	09/30/2015	Uranium	0.0520		F	0.139		F	0.0550		F	36	0	NA
SRK06	0300	N001	09/28/2015	Manganese	4.50		F	4.19		F	2.10	E	FJ	9	0	No
SRK06	0300	N001	09/28/2015	Selenium	0.00460		FJ	0.00210		F	0.0001	U		10	5	Yes
SRK06	0307	N001	09/29/2015	Uranium	0.400		F	1.000		F	0.417			20	0	NA

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

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Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0317 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	09/29/2015	N001	19.46 - 39.52	303		F	#		
Molybdenum	mg/L	09/29/2015	N001	19.46 - 39.52	0.16		F	#	0.00032	
Oxidation Reduction Potential	mV	09/29/2015	N001	19.46 - 39.52	155		F	#		
pH	s.u.	09/29/2015	N001	19.46 - 39.52	7.18		F	#		
Selenium	mg/L	09/29/2015	N001	19.46 - 39.52	0.0062		FJ	#	0.00032	
Specific Conductance	umhos /cm	09/29/2015	N001	19.46 - 39.52	2553		F	#		
Temperature	C	09/29/2015	N001	19.46 - 39.52	15.03		F	#		
Turbidity	NTU	09/29/2015	N001	19.46 - 39.52	9.85		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0318A WELL Replacement well for 0318

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	09/29/2015	N001	9.2	-	14.2	289		F	#		
Manganese	mg/L	09/29/2015	N001	9.2	-	14.2	1.1		F	#	0.00011	
Manganese	mg/L	09/29/2015	N002	9.2	-	14.2	1.1		F	#	0.00024	
Molybdenum	mg/L	09/29/2015	N001	9.2	-	14.2	0.71		F	#	0.00032	
Molybdenum	mg/L	09/29/2015	N002	9.2	-	14.2	0.72		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2015	N001	9.2	-	14.2	50		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2015	N002	9.2	-	14.2	50		F	#	1	
Oxidation Reduction Potential	mV	09/29/2015	N001	9.2	-	14.2	135.4		F	#		
pH	s.u.	09/29/2015	N001	9.2	-	14.2	6.98		F	#		
Selenium	mg/L	09/29/2015	N001	9.2	-	14.2	4.3		F	#	0.00032	
Selenium	mg/L	09/29/2015	N002	9.2	-	14.2	4.4		F	#	0.00032	
Specific Conductance	umhos /cm	09/29/2015	N001	9.2	-	14.2	1939		F	#		
Temperature	C	09/29/2015	N001	9.2	-	14.2	18.86		F	#		
Turbidity	NTU	09/29/2015	N001	9.2	-	14.2	8.62		F	#		
Uranium	mg/L	09/29/2015	N001	9.2	-	14.2	0.029		F	#	0.000029	
Uranium	mg/L	09/29/2015	N002	9.2	-	14.2	0.028		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0319 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	10/15/2015	N001	4.55	-	14.58	946		F	#		
Benzene	ug/L	10/15/2015	N001	4.55	-	14.58	4800		F	#	30	
Ethylbenzene	ug/L	10/15/2015	N001	4.55	-	14.58	160		F	#	30	
m,p-Xylene	ug/L	10/15/2015	N001	4.55	-	14.58	3400		F	#	30	
o-Xylene	ug/L	10/15/2015	N001	4.55	-	14.58	770		F	#	30	
Oxidation Reduction Potential	mV	10/15/2015	N001	4.55	-	14.58	-91		F	#		
pH	s.u.	10/15/2015	N001	4.55	-	14.58	7.04		F	#		
Radium-226	pCi/L	09/28/2015	0001	4.55	-	14.58	1.41		F	#	0.13	0.449
Radium-226	pCi/L	09/28/2015	0002	4.55	-	14.58	1.41		F	#	0.17	0.45
Radium-228	pCi/L	09/28/2015	0001	4.55	-	14.58	1.3		F	#	0.43	0.444
Radium-228	pCi/L	09/28/2015	0002	4.55	-	14.58	1.28		FJ	#	0.44	0.444
Selenium	mg/L	09/28/2015	0001	4.55	-	14.58	0.003		FJ	#	0.00032	
Selenium	mg/L	09/28/2015	0002	4.55	-	14.58	0.0074		FJ	#	0.00032	
Specific Conductance	umhos /cm	10/15/2015	N001	4.55	-	14.58	3350		F	#		
Temperature	C	10/15/2015	N001	4.55	-	14.58	15.72		F	#		
Toluene	ug/L	10/15/2015	N001	4.55	-	14.58	3100		F	#	30	
Turbidity	NTU	10/15/2015	N001	4.55	-	14.58	7.71		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0320 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	10/15/2015	N001	4.92	-	9.96	324		F	#		
Manganese	mg/L	10/15/2015	N001	4.92	-	9.96	0.59		F	#	0.00024	
Molybdenum	mg/L	10/15/2015	N001	4.92	-	9.96	0.014		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	10/15/2015	N001	4.92	-	9.96	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	10/15/2015	N001	4.92	-	9.96	-70.8		F	#		
pH	s.u.	10/15/2015	N001	4.92	-	9.96	7.18		F	#		
Selenium	mg/L	10/15/2015	N001	4.92	-	9.96	0.0006	J	FJ	#	0.00032	
Specific Conductance	umhos /cm	10/15/2015	N001	4.92	-	9.96	964		F	#		
Temperature	C	10/15/2015	N001	4.92	-	9.96	16.2		F	#		
Turbidity	NTU	10/15/2015	N001	4.92	-	9.96	9.8		F	#		
Uranium	mg/L	10/15/2015	N001	4.92	-	9.96	0.011		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0339 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	09/29/2015	N001	11	-	14	289		F	#		
Manganese	mg/L	09/29/2015	N001	11	-	14	1.9		F	#	0.00011	
Molybdenum	mg/L	09/29/2015	N001	11	-	14	0.92		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2015	N001	11	-	14	56		F	#	1	
Oxidation Reduction Potential	mV	09/29/2015	N001	11	-	14	157.8		F	#		
pH	s.u.	09/29/2015	N001	11	-	14	6.94		F	#		
Selenium	mg/L	09/29/2015	N001	11	-	14	2.6		F	#	0.00032	
Specific Conductance	umhos /cm	09/29/2015	N001	11	-	14	2028		F	#		
Temperature	C	09/29/2015	N001	11	-	14	17.05		F	#		
Turbidity	NTU	09/29/2015	N001	11	-	14	8.05		F	#		
Uranium	mg/L	09/29/2015	N001	11	-	14	0.033		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0340 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	09/30/2015	N001	6.51 - 11.51	135		F	#		
Manganese	mg/L	09/30/2015	0001	6.51 - 11.51	4.4		F	#	0.00011	
Molybdenum	mg/L	09/30/2015	0001	6.51 - 11.51	1.6		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/30/2015	0001	6.51 - 11.51	230		F	#	5	
Oxidation Reduction Potential	mV	09/30/2015	N001	6.51 - 11.51	123.5		F	#		
pH	s.u.	09/30/2015	N001	6.51 - 11.51	6.69		F	#		
Selenium	mg/L	09/30/2015	0001	6.51 - 11.51	2.1		F	#	0.00032	
Specific Conductance	umhos /cm	09/30/2015	N001	6.51 - 11.51	3536		F	#		
Temperature	C	09/30/2015	N001	6.51 - 11.51	18.64		F	#		
Turbidity	NTU	09/30/2015	N001	6.51 - 11.51	33.8		F	#		
Uranium	mg/L	09/30/2015	0001	6.51 - 11.51	0.045		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0508 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	09/30/2015	N001	1.01 - 11.01	317		F	#		
Manganese	mg/L	09/30/2015	N001	1.01 - 11.01	3.2		F	#	0.00024	
Molybdenum	mg/L	09/30/2015	N001	1.01 - 11.01	1.1		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/30/2015	N001	1.01 - 11.01	140		F	#	2	
Oxidation Reduction Potential	mV	09/30/2015	N001	1.01 - 11.01	88.7		F	#		
pH	s.u.	09/30/2015	N001	1.01 - 11.01	6.76		F	#		
Selenium	mg/L	09/30/2015	N001	1.01 - 11.01	1.8		F	#	0.00032	
Specific Conductance	umhos /cm	09/30/2015	N001	1.01 - 11.01	3004		F	#		
Temperature	C	09/30/2015	N001	1.01 - 11.01	17.47		F	#		
Turbidity	NTU	09/30/2015	N001	1.01 - 11.01	7.21		F	#		
Uranium	mg/L	09/30/2015	N001	1.01 - 11.01	0.052		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0510 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	09/30/2015	N001	4.92	-	13.92	130		F	#		
Manganese	mg/L	09/30/2015	N001	4.92	-	13.92	3.8		F	#	0.00024	
Molybdenum	mg/L	09/30/2015	N001	4.92	-	13.92	0.89		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/30/2015	N001	4.92	-	13.92	180		F	#	5	
Oxidation Reduction Potential	mV	09/30/2015	N001	4.92	-	13.92	123.9		F	#		
pH	s.u.	09/30/2015	N001	4.92	-	13.92	6.6		F	#		
Selenium	mg/L	09/30/2015	N001	4.92	-	13.92	0.92		F	#	0.00032	
Specific Conductance	umhos /cm	09/30/2015	N001	4.92	-	13.92	3510		F	#		
Temperature	C	09/30/2015	N001	4.92	-	13.92	16.2		F	#		
Turbidity	NTU	09/30/2015	N001	4.92	-	13.92	9.56		F	#		
Uranium	mg/L	09/30/2015	N001	4.92	-	13.92	0.099		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0684 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	09/30/2015	N001	11	-	21	230		F	#		
Manganese	mg/L	09/30/2015	N001	11	-	21	0.42		F	#	0.00024	
Molybdenum	mg/L	09/30/2015	N001	11	-	21	0.0091		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/30/2015	N001	11	-	21	0.078		F	#	0.01	
Oxidation Reduction Potential	mV	09/30/2015	N001	11	-	21	84.3		F	#		
pH	s.u.	09/30/2015	N001	11	-	21	7.29		F	#		
Selenium	mg/L	09/30/2015	N001	11	-	21	0.004		FJ	#	0.00032	
Specific Conductance	umhos /cm	09/30/2015	N001	11	-	21	1006		F	#		
Temperature	C	09/30/2015	N001	11	-	21	13.88		F	#		
Turbidity	NTU	09/30/2015	N001	11	-	21	9.63		F	#		
Uranium	mg/L	09/30/2015	N001	11	-	21	0.012		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0300 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	09/28/2015	N001	9.5	-	19.5	618		F	#		
Manganese	mg/L	09/28/2015	N001	9.5	-	19.5	4.5		F	#	0.0012	
Molybdenum	mg/L	09/28/2015	N001	9.5	-	19.5	0.0038		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/28/2015	N001	9.5	-	19.5	0.03		F	#	0.01	
Oxidation Reduction Potential	mV	09/28/2015	N001	9.5	-	19.5	-94.3		F	#		
pH	s.u.	09/28/2015	N001	9.5	-	19.5	6.87		F	#		
Radium-226	pCi/L	09/28/2015	N001	9.5	-	19.5	0.16	U	F	#	0.16	0.115
Radium-228	pCi/L	09/28/2015	N001	9.5	-	19.5	0.453		UF	#	0.45	0.306
Selenium	mg/L	09/28/2015	N001	9.5	-	19.5	0.0046		FJ	#	0.00032	
Specific Conductance	umhos /cm	09/28/2015	N001	9.5	-	19.5	10900		F	#		
Temperature	C	09/28/2015	N001	9.5	-	19.5	16.19		F	#		
Turbidity	NTU	09/28/2015	N001	9.5	-	19.5	3.96		F	#		
Uranium	mg/L	09/28/2015	N001	9.5	-	19.5	0.013		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0303 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	09/29/2015	N001	4.3	-	14.3	572		F	#		
Oxidation Reduction Potential	mV	09/29/2015	N001	4.3	-	14.3	-100.6		F	#		
pH	s.u.	09/29/2015	N001	4.3	-	14.3	7.22		F	#		
Specific Conductance	umhos /cm	09/29/2015	N001	4.3	-	14.3	3826		F	#		
Temperature	C	09/29/2015	N001	4.3	-	14.3	17.97		F	#		
Turbidity	NTU	09/29/2015	N001	4.3	-	14.3	7.88		F	#		
Uranium	mg/L	09/29/2015	N001	4.3	-	14.3	1.3		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0305 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	09/29/2015	N001	8.7	-	18.7	398		F	#		
Oxidation Reduction Potential	mV	09/29/2015	N001	8.7	-	18.7	60.9		F	#		
pH	s.u.	09/29/2015	N001	8.7	-	18.7	7.2		F	#		
Selenium	mg/L	09/29/2015	N001	8.7	-	18.7	0.018		F	#	0.00032	
Specific Conductance	umhos /cm	09/29/2015	N001	8.7	-	18.7	2826		F	#		
Temperature	C	09/29/2015	N001	8.7	-	18.7	15.33		F	#		
Turbidity	NTU	09/29/2015	N001	8.7	-	18.7	9.59		F	#		
Uranium	mg/L	09/29/2015	N001	8.7	-	18.7	0.77		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0307 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	09/29/2015	N001	4.4	-	14.4	309		F	#		
Oxidation Reduction Potential	mV	09/29/2015	N001	4.4	-	14.4	-86.8		F	#		
pH	s.u.	09/29/2015	N001	4.4	-	14.4	7.17		F	#		
Selenium	mg/L	09/29/2015	N001	4.4	-	14.4	0.00063	J	FJ	#	0.00032	
Specific Conductance	umhos /cm	09/29/2015	N001	4.4	-	14.4	5168		F	#		
Temperature	C	09/29/2015	N001	4.4	-	14.4	14.96		F	#		
Turbidity	NTU	09/29/2015	N001	4.4	-	14.4	6.17		F	#		
Uranium	mg/L	09/29/2015	N001	4.4	-	14.4	0.4		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0309 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	09/29/2015	N001	10.2	-	20.2	584		F	#		
Oxidation Reduction Potential	mV	09/29/2015	N001	10.2	-	20.2	-126.7		F	#		
pH	s.u.	09/29/2015	N001	10.2	-	20.2	7.65		F	#		
Specific Conductance	umhos /cm	09/29/2015	N001	10.2	-	20.2	1752		F	#		
Temperature	C	09/29/2015	N001	10.2	-	20.2	14.67		F	#		
Turbidity	NTU	09/29/2015	N001	10.2	-	20.2	9.25		F	#		
Uranium	mg/L	09/29/2015	N001	10.2	-	20.2	0.037		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0310 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	09/28/2015	N001	14.7	-	19.7	170		F	#		
Oxidation Reduction Potential	mV	09/28/2015	N001	14.7	-	19.7	-69.1		F	#		
pH	s.u.	09/28/2015	N001	14.7	-	19.7	7.17		F	#		
Specific Conductance	umhos /cm	09/28/2015	N001	14.7	-	19.7	994		F	#		
Temperature	C	09/28/2015	N001	14.7	-	19.7	15.13		F	#		
Turbidity	NTU	09/28/2015	N001	14.7	-	19.7	3.54		F	#		
Uranium	mg/L	09/28/2015	N001	14.7	-	19.7	0.025		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0311 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	09/28/2015	N001	14.1	-	19.1	229		F	#		
Oxidation Reduction Potential	mV	09/28/2015	N001	14.1	-	19.1	106.9		F	#		
pH	s.u.	09/28/2015	N001	14.1	-	19.1	6.98		F	#		
Specific Conductance	umhos /cm	09/28/2015	N001	14.1	-	19.1	1113		F	#		
Temperature	C	09/28/2015	N001	14.1	-	19.1	17.5		F	#		
Turbidity	NTU	09/28/2015	N001	14.1	-	19.1	4.77		F	#		
Uranium	mg/L	09/28/2015	N001	14.1	-	19.1	0.053		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0672 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	10/15/2015	N001	-	261			#		
Manganese	mg/L	10/15/2015	N001	-	0.00024	U		#	0.00024	
Molybdenum	mg/L	10/15/2015	N001	-	0.00057	J	J	#	0.00032	
Oxidation Reduction Potential	mV	10/15/2015	N001	-	80.1			#		
pH	s.u.	10/15/2015	N001	-	8.07			#		
Selenium	mg/L	10/15/2015	N001	-	0.0016		J	#	0.00032	
Specific Conductance	umhos /cm	10/15/2015	N001	-	518			#		
Temperature	C	10/15/2015	N001	-	26.4			#		
Turbidity	NTU	10/15/2015	N001	-	14.2			#		
Uranium	mg/L	10/15/2015	N001	-	0.0034			#	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.

Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0347 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	09/30/2015	N001	124			#		
Manganese	mg/L	09/30/2015	N001	0.028			#	0.00024	
Molybdenum	mg/L	09/30/2015	N001	0.0014			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/30/2015	N001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	09/30/2015	N001	50.6			#		
pH	s.u.	09/30/2015	N001	8.33			#		
Selenium	mg/L	09/30/2015	N001	0.00068	J	J	#	0.00032	
Specific Conductance	umhos/cm	09/30/2015	N001	405			#		
Temperature	C	09/30/2015	N001	18.41			#		
Turbidity	NTU	09/30/2015	N001	55.6			#		
Uranium	mg/L	09/30/2015	N001	0.00096			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0693 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	10/15/2015	0001	107			#		
Manganese	mg/L	10/15/2015	0001	0.0031	J		#	0.00024	
Molybdenum	mg/L	10/15/2015	0001	0.0011		J	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	10/15/2015	0001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	10/15/2015	N001	73.6			#		
pH	s.u.	10/15/2015	N001	8.37			#		
Selenium	mg/L	10/15/2015	0001	0.00045	J	J	#	0.00032	
Specific Conductance	umhos/cm	10/15/2015	N001	365			#		
Temperature	C	10/15/2015	N001	10.53			#		
Turbidity	NTU	10/15/2015	N001	84			#		
Uranium	mg/L	10/15/2015	0001	0.00088			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016
Location: 0694 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	09/30/2015	N001	155			#		
Manganese	mg/L	09/30/2015	0001	0.0059			#	0.00024	
Molybdenum	mg/L	09/30/2015	0001	0.0016			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/30/2015	0001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	09/30/2015	N001	97.2			#		
pH	s.u.	09/30/2015	N001	7.62			#		
Selenium	mg/L	09/30/2015	0001	0.00067	J	J	#	0.00032	
Specific Conductance	umhos/cm	09/30/2015	N001	373			#		
Temperature	C	09/30/2015	N001	15.31			#		
Turbidity	NTU	09/30/2015	N001	39.2			#		
Uranium	mg/L	09/30/2015	0001	0.00095			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0692 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	09/29/2015	N001	124			#		
Oxidation Reduction Potential	mV	09/29/2015	N001	110.3			#		
pH	s.u.	09/29/2015	N001	8.52			#		
Specific Conductance	umhos/cm	09/29/2015	N001	379			#		
Temperature	C	09/29/2015	N001	27.89			#		
Uranium	mg/L	09/29/2015	0001	0.0011			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016
Location: 0696 SURFACE LOCATION WQD, KNOWNS

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	09/29/2015	N001	114			#		
Oxidation Reduction Potential	mV	09/29/2015	N001	127.7			#		
pH	s.u.	09/29/2015	N001	8.54			#		
Specific Conductance	umhos/cm	09/29/2015	N001	380			#		
Temperature	C	09/29/2015	N001	21.36			#		
Turbidity	NTU	09/29/2015	N001	69.4			#		
Uranium	mg/L	09/29/2015	0001	0.00091			#	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.

Trip Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 15107424
Report Date: 01/13/2016

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Benzene	SRK05	0999	10/15/2015	N001	ug/L	0.3	U		0.3		TB
Ethylbenzene	SRK05	0999	10/15/2015	N001	ug/L	0.3	U		0.3		TB
m,p-Xylene	SRK05	0999	10/15/2015	N001	ug/L	0.3	U		0.3		TB
o-Xylene	SRK05	0999	10/15/2015	N001	ug/L	0.3	U		0.3		TB
Toluene	SRK05	0999	10/15/2015	N001	ug/L	0.3	U		0.3		TB

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.

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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 01/13/2016

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0317		5435.18	09/29/2015	14:45:37	12.2	5422.98	
0318A		5435.77	09/29/2015	15:15:25	12.71	5423.06	
0319	O	5430.66	10/15/2015	09:35:17	8.13	5422.53	
0320	O	5427.4	10/15/2015	10:00:46	4.8	5422.6	
0339		5434.47	09/29/2015	16:15:21	11.51	5422.96	
0340		5433.09	09/30/2015	12:35:17	10.17	5422.92	
0508	O	5430.2	09/30/2015	11:50:47	7.27	5422.93	
0510	O	5427.87	09/30/2015	13:00:01	5.62	5422.25	
0684	D	5432.68	09/30/2015	09:50:10	16.17	5416.51	

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

WATER LEVEL FLAGS: D Dry F Flowing B Below top of pump

STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 01/13/2016

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0300	U	5467.35	09/28/2015	16:45:09	13.77	5453.58	
0303	O	5446.91	09/29/2015	12:55:45	10.4	5436.51	
0305	O	5448.75	09/29/2015	10:20:28	12.98	5435.77	
0307	O	5447.1	09/29/2015	11:50:06	11.7	5435.4	
0309	O	5450.18	09/29/2015	11:10:18	15.3	5434.88	
0310	D	5450.56	09/28/2015	16:05:25	17.8	5432.76	
0311	D	5450.7	09/28/2015	15:35:10	18.43	5432.27	
0312	D	5451.06	09/28/2015	15:38:00			D

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWNGRADIENT F OF SITE
N UNKNOWN O ONSITE U UPGRADIENT

WATER LEVEL FLAGS: D Dry F Flowing B Below top of pump

Hydrographs

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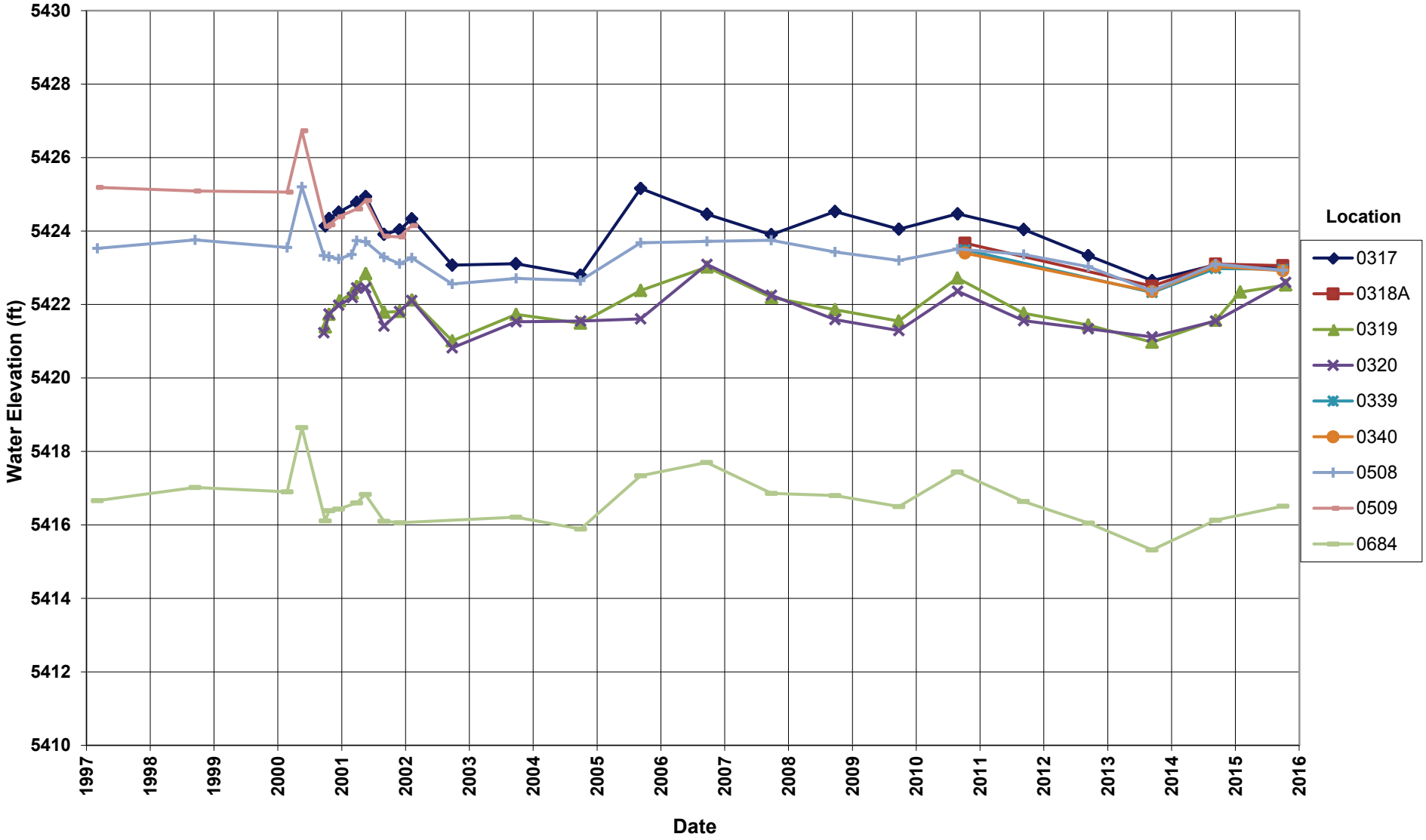
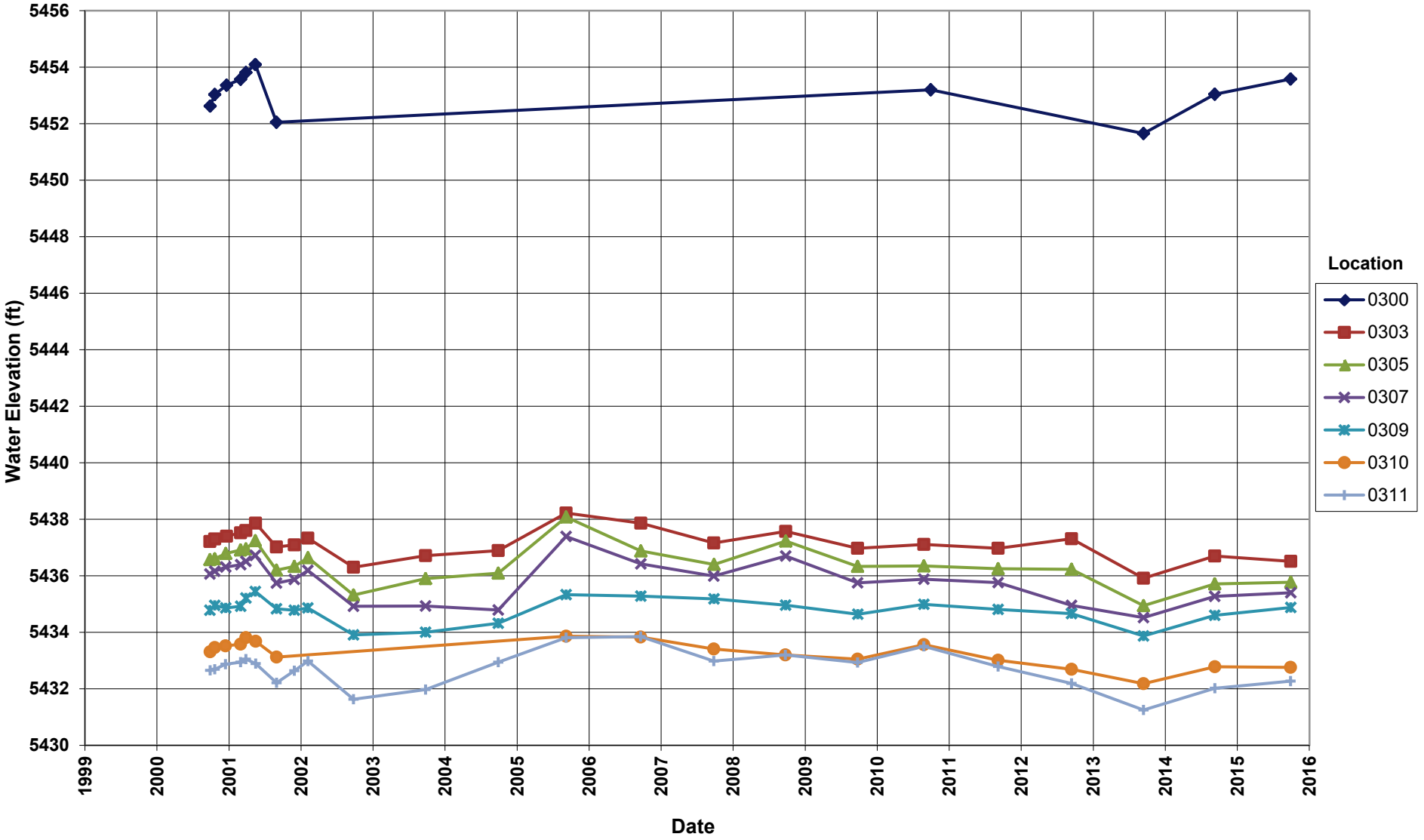
Slick Rock West Processing Site
Hydrograph



Slick Rock East Processing Site
Hydrograph



Groundwater
Time-Concentration Graphs

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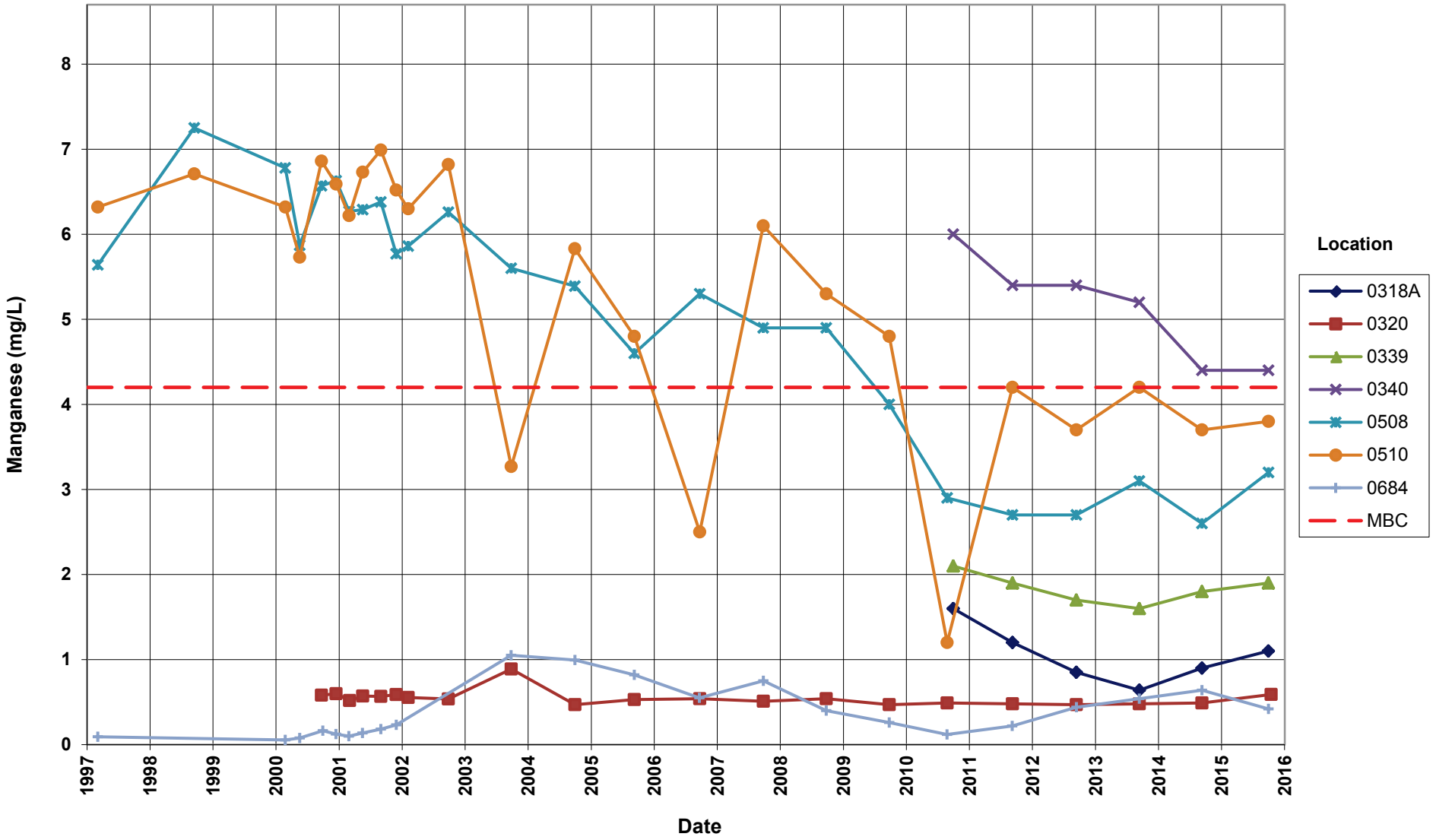
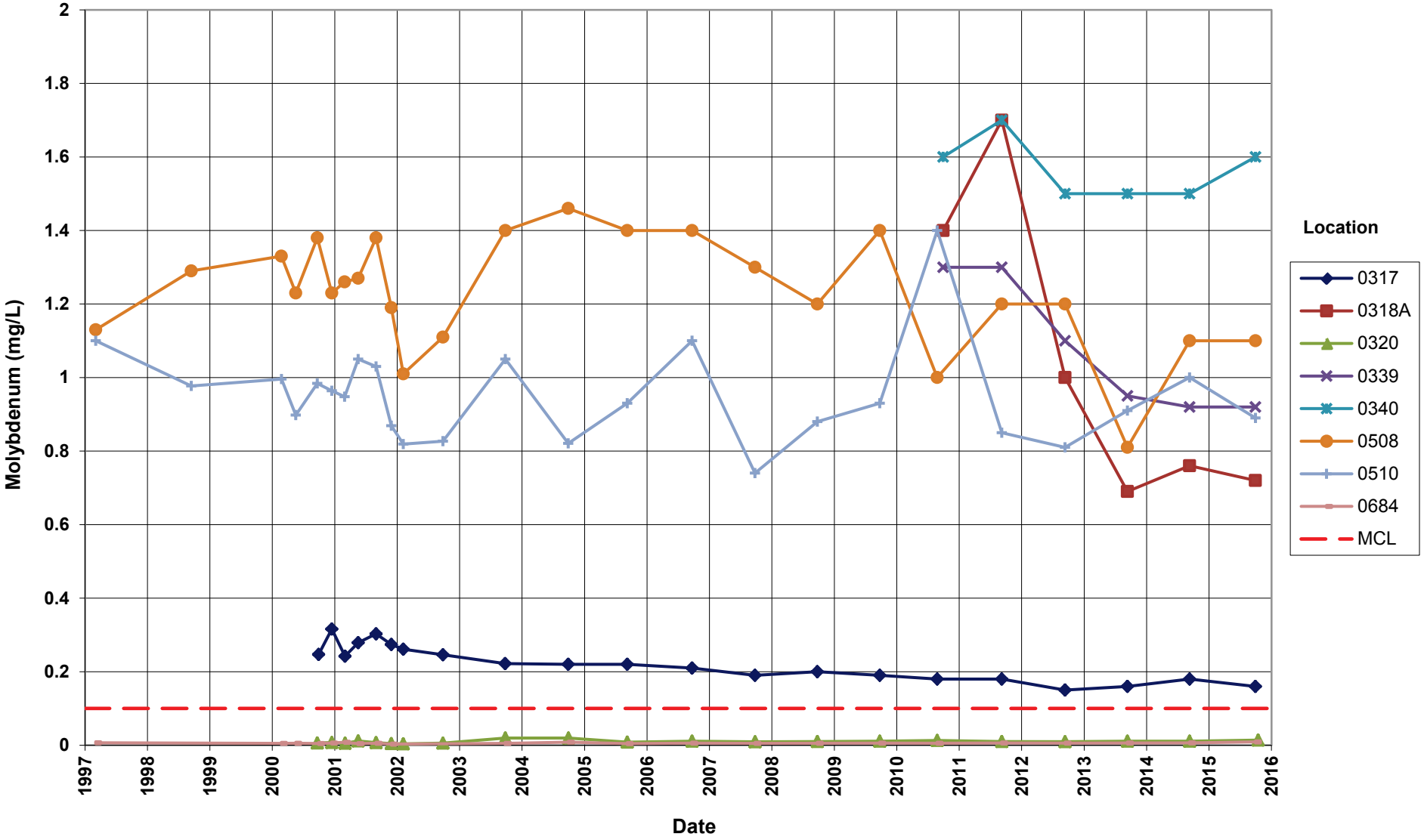
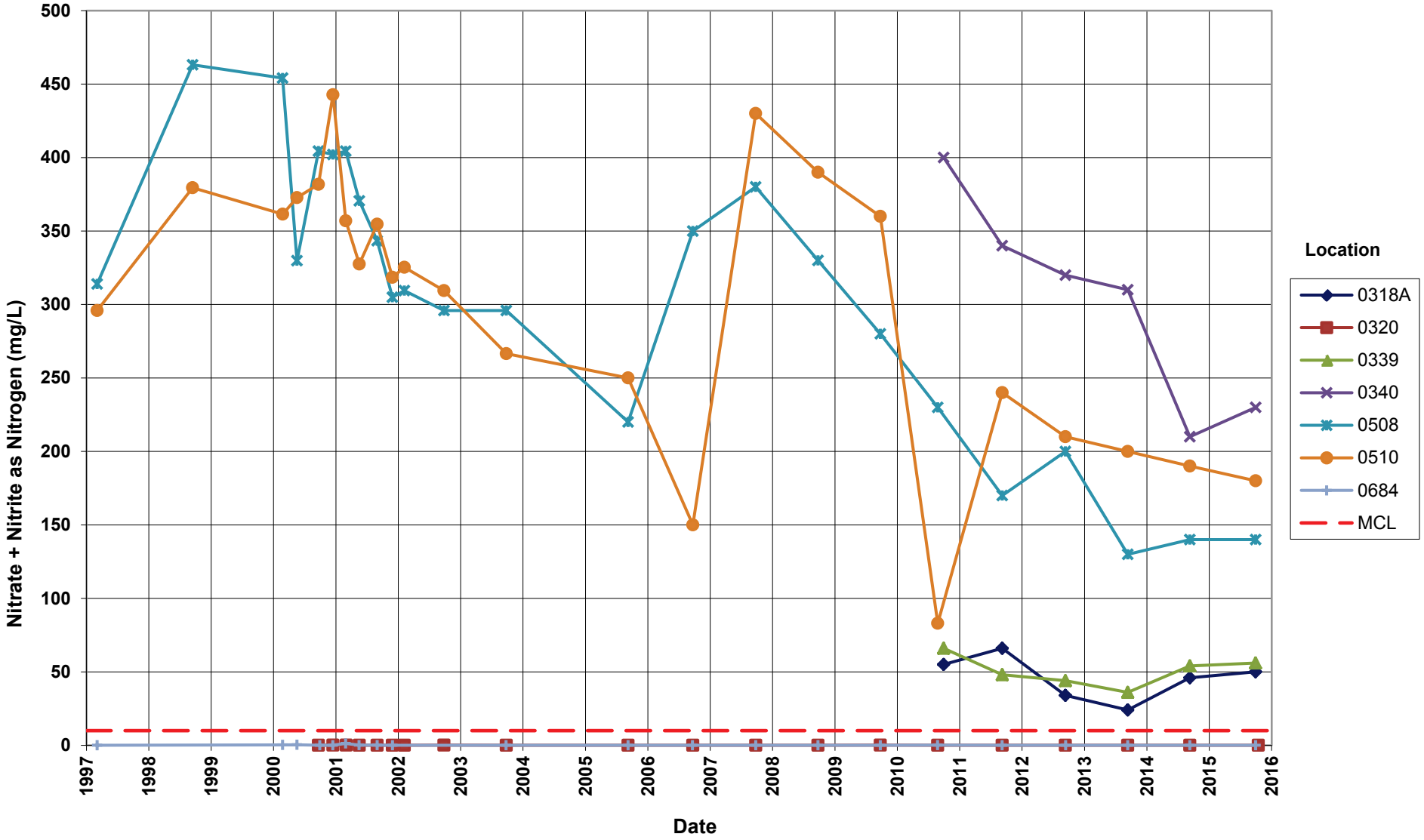
Slick Rock West Processing Site
Manganese Concentration
Maximum Background Concentration (MBC) = 4.2 mg/L



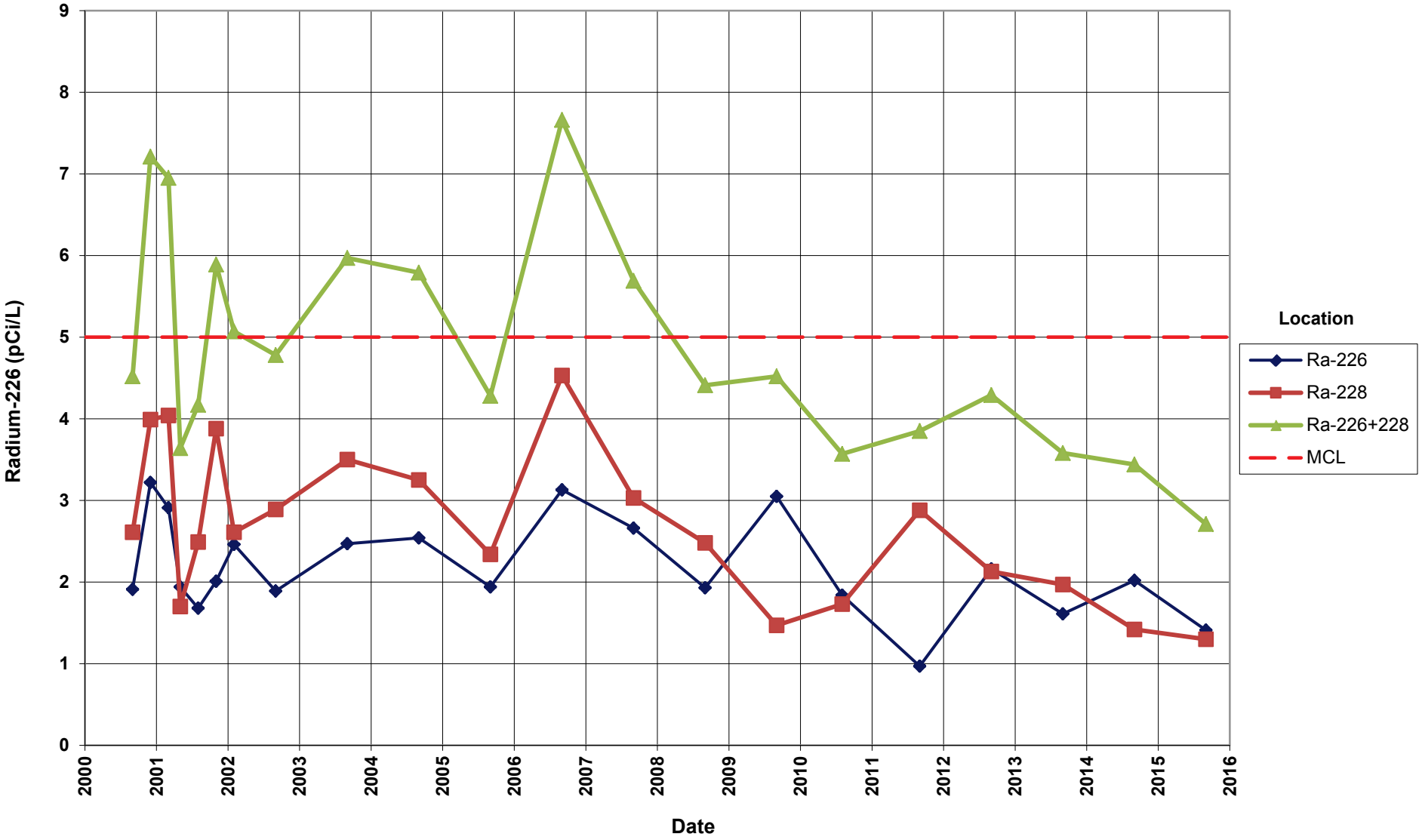
Slick Rock West Processing Site
Molybdenum Concentration
Maximum Concentration Limit (MCL) = 0.10 mg/L



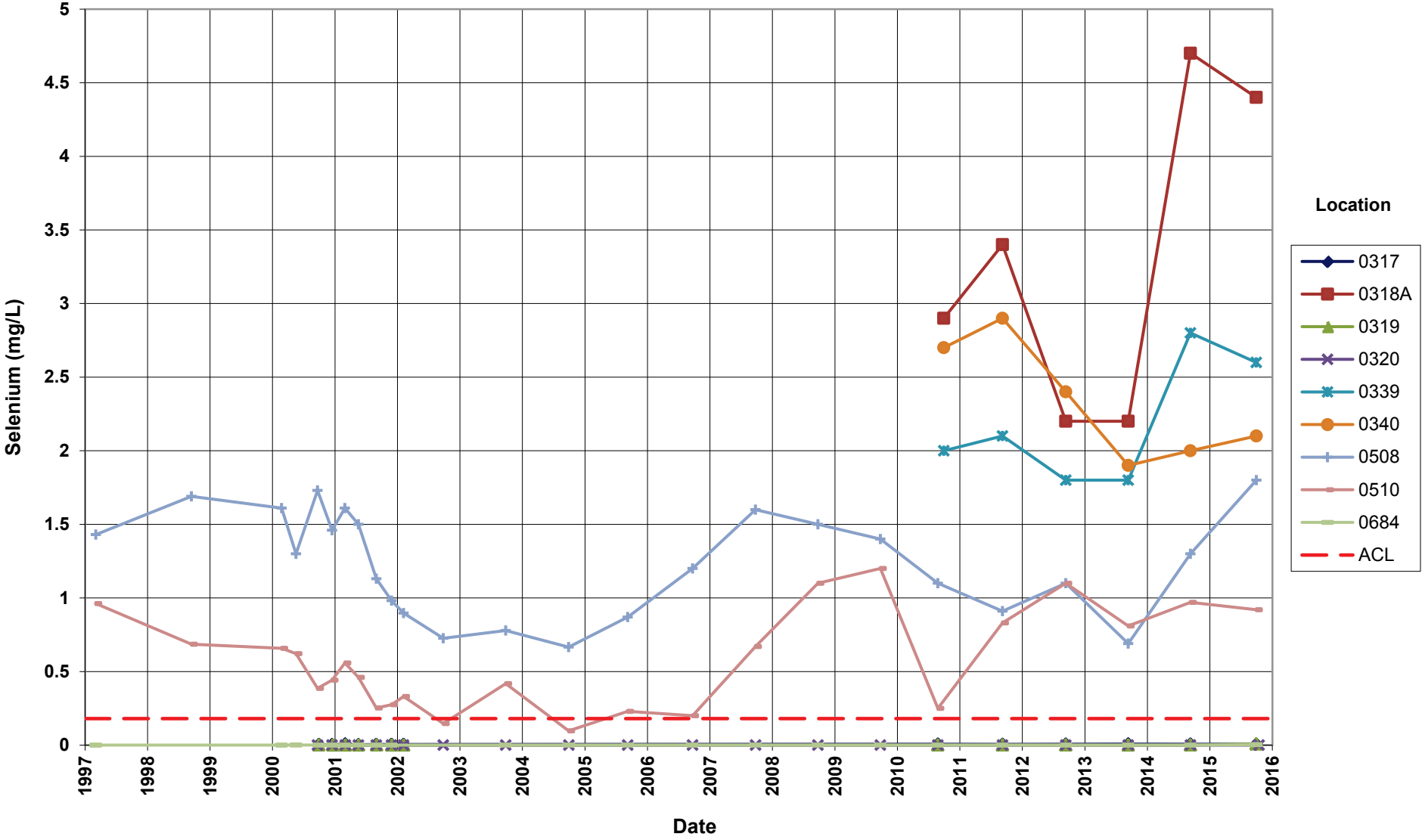
Slick Rock West Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit (MCL) = 10 mg/L



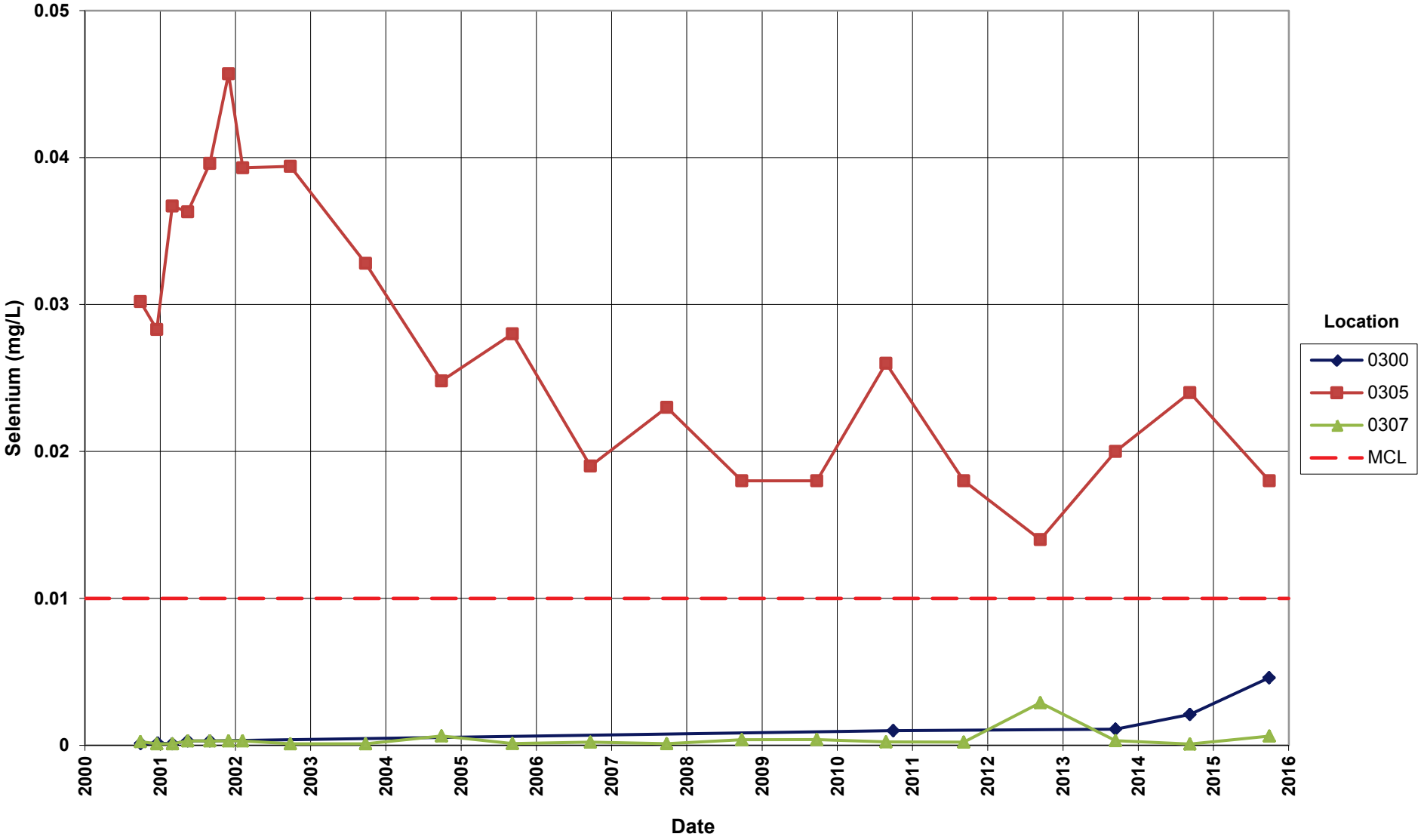
Slick Rock West Processing Site
Radium-226 and Radium-228 Concentrations in Well 0319
Maximum Concentration Limit (MCL) = 5 pCi/L for Ra-226+228



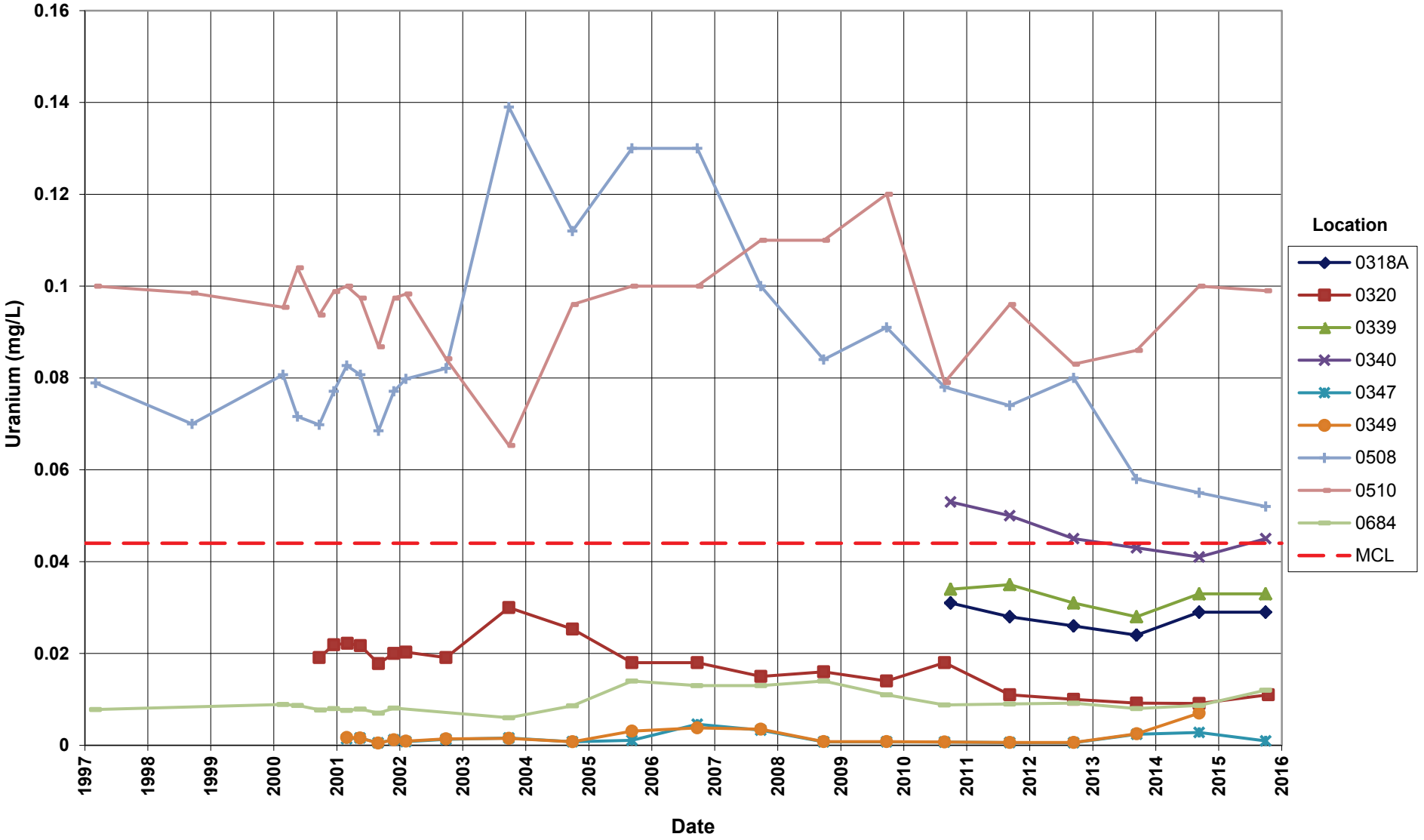
Slick Rock West Processing Site
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.18 mg/L



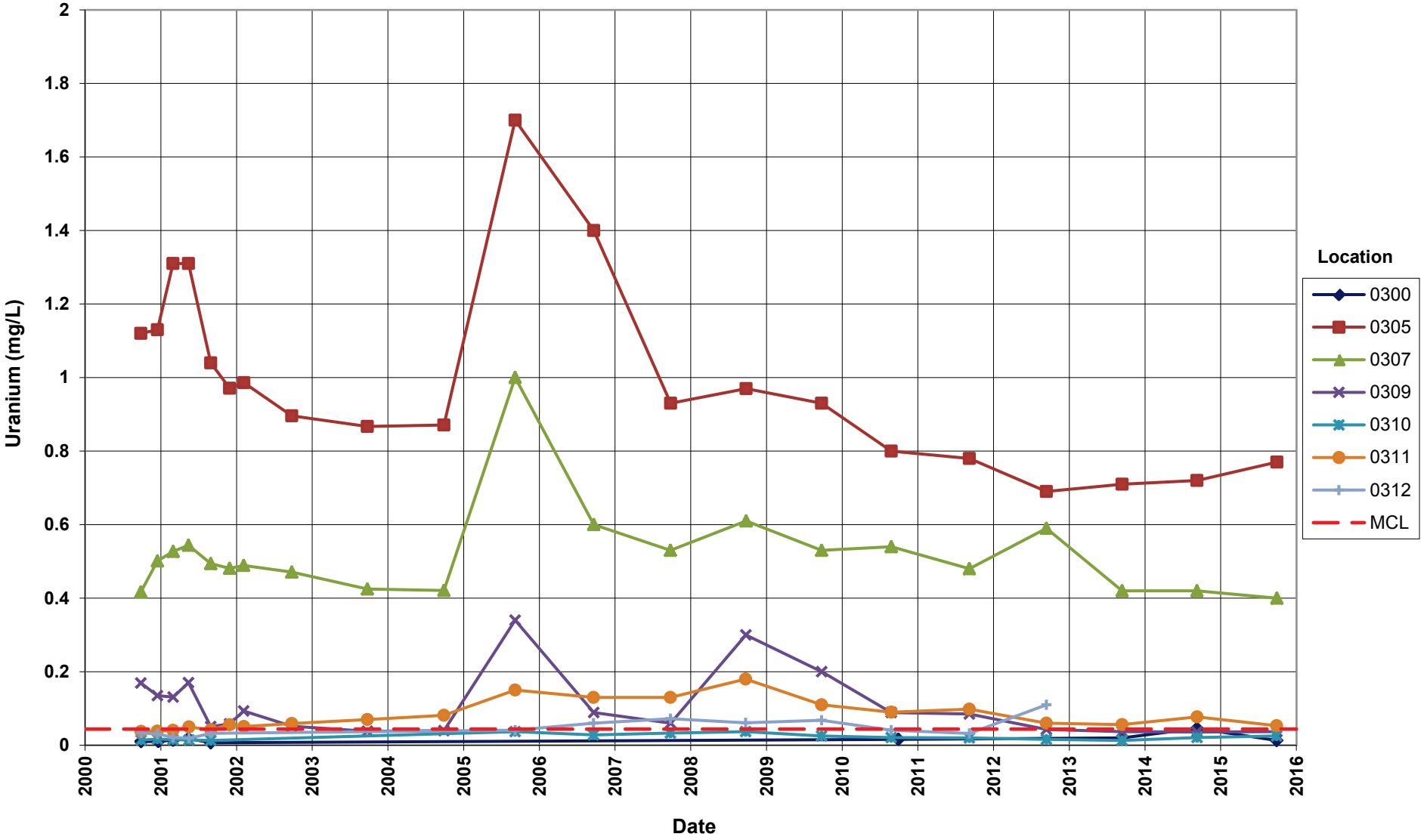
Slick Rock East Processing Site
Selenium Concentration
Maximum Concentration Limit (MCL) = 0.01 mg/L



Slick Rock West Processing Site
Uranium Concentration
Maximimun Concentration Limit (MCL) = 0.044 mg/L



Slick Rock East Processing Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L



Surface Water
Time-Concentration Graphs

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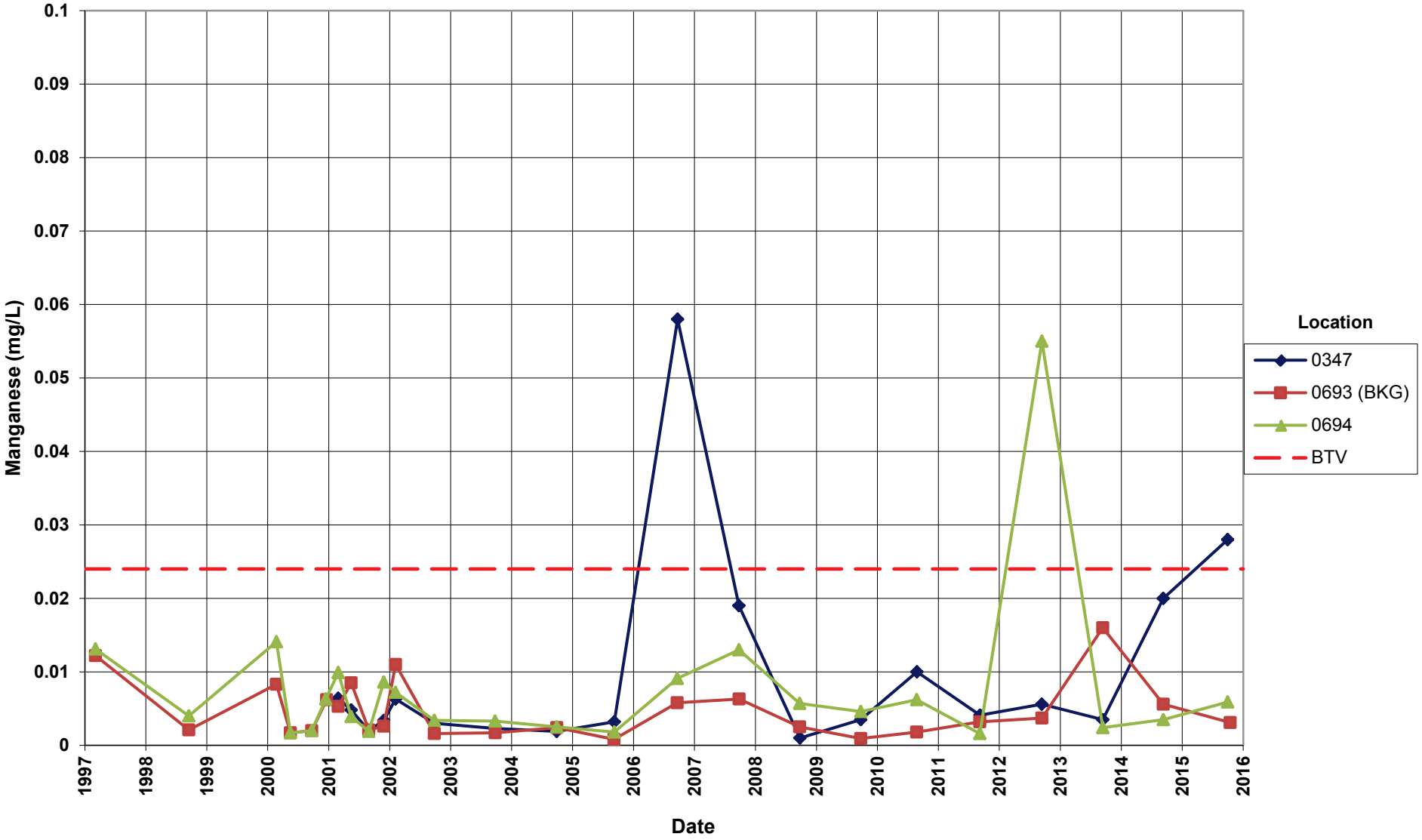
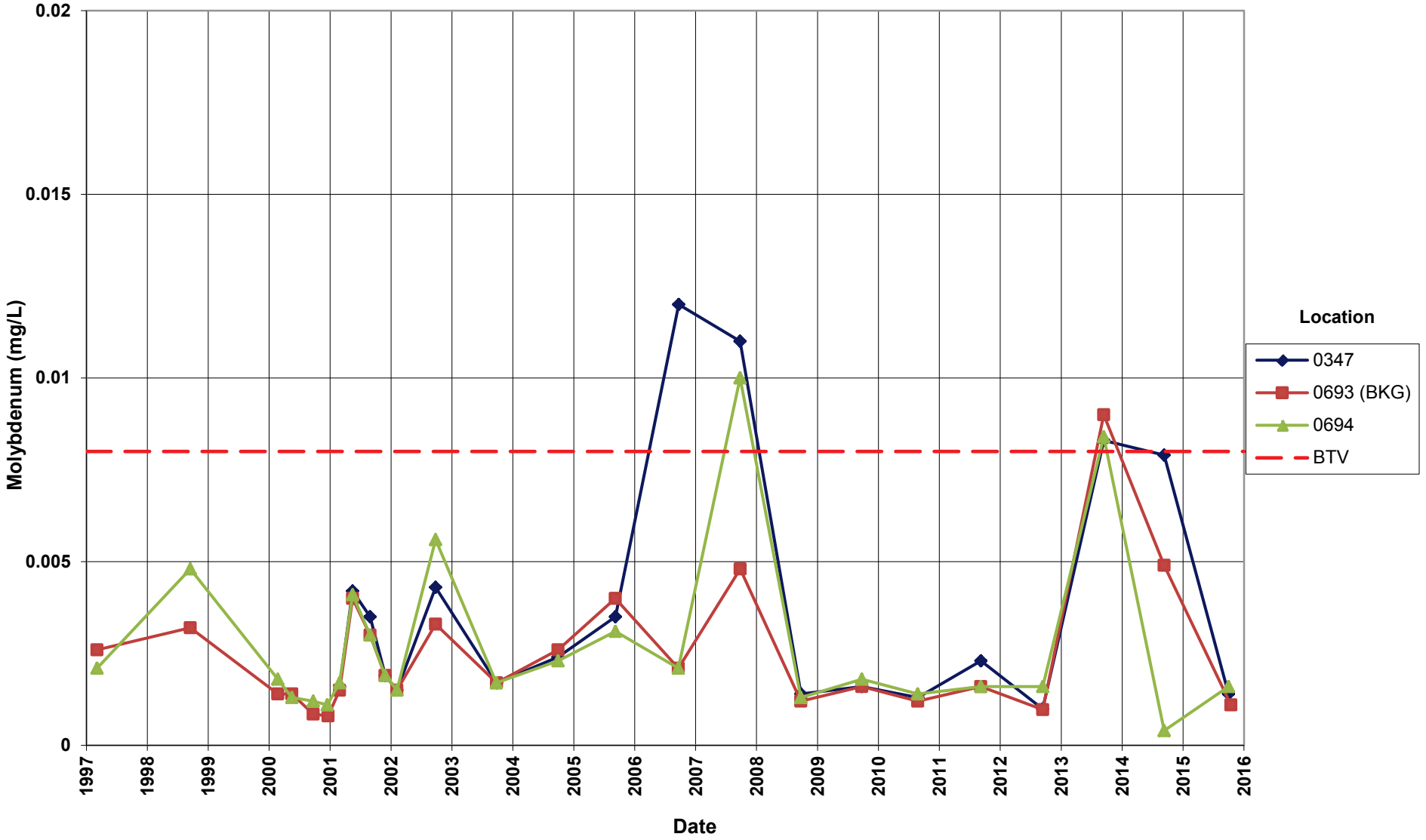
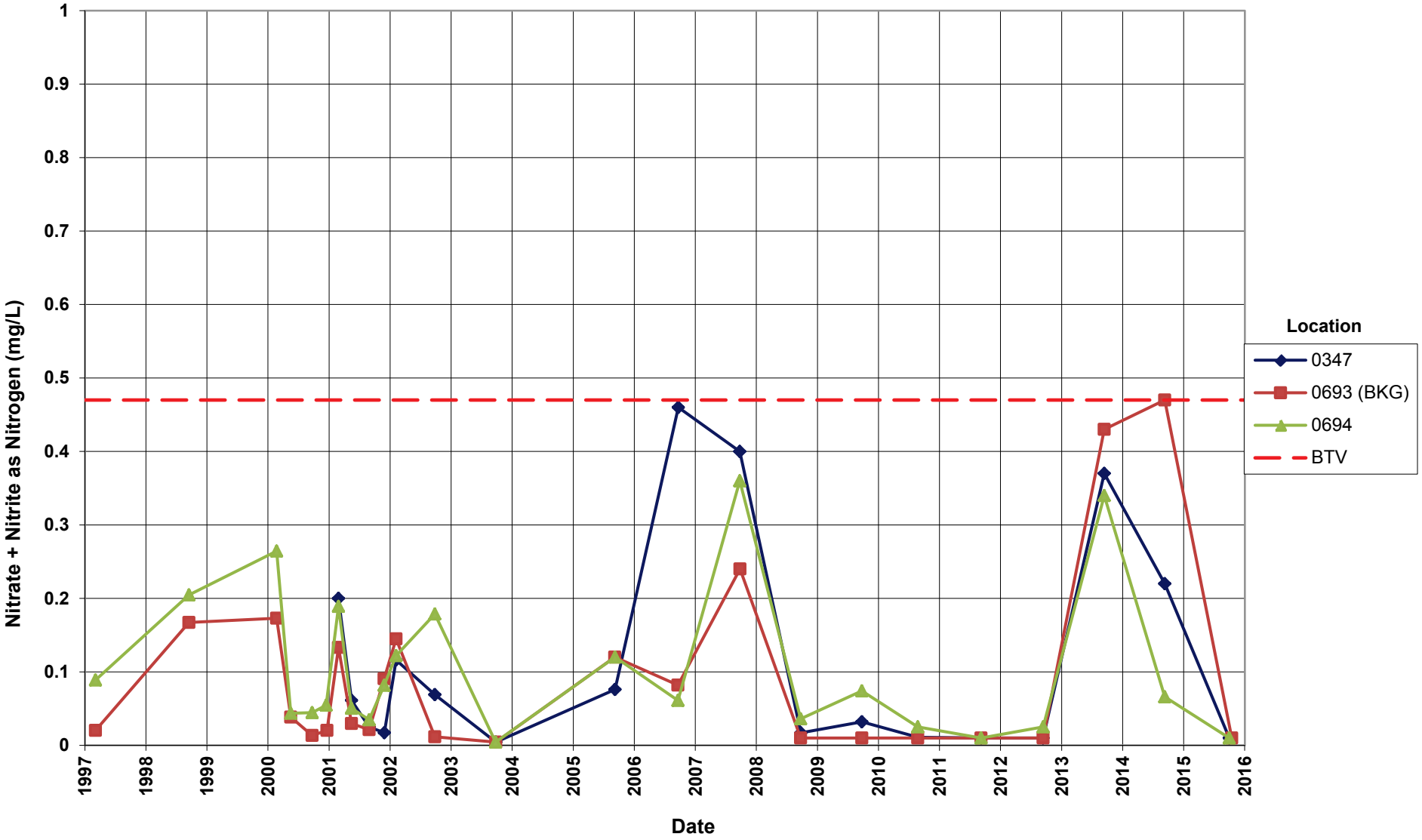
Slick Rock West Processing Site
Manganese Concentration
Background Threshold Value (BTV) = 0.024 mg/L



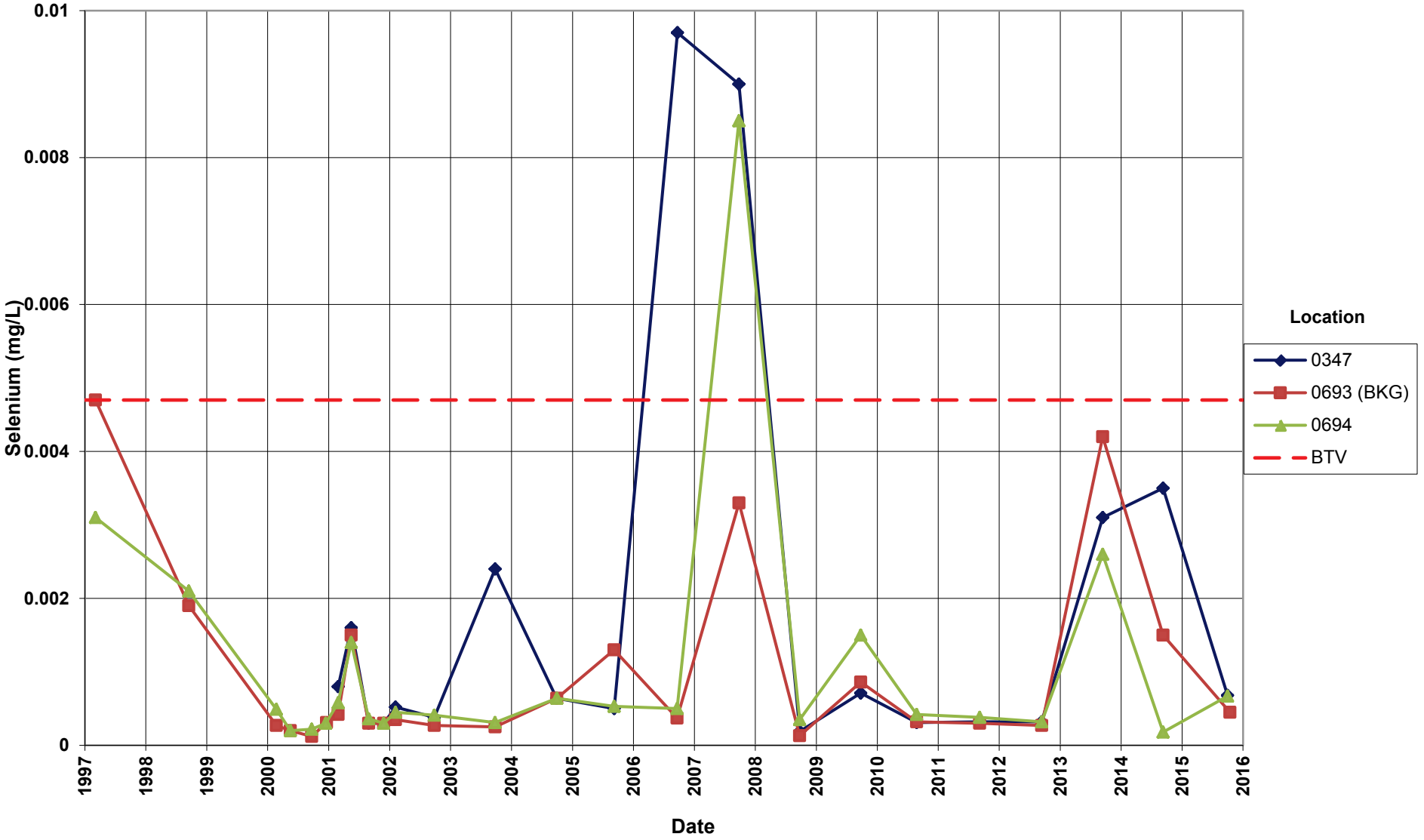
Slick Rock West Processing Site
Molybdenum Concentration
Background Treshold Value (BTV) = 0.008 mg/L



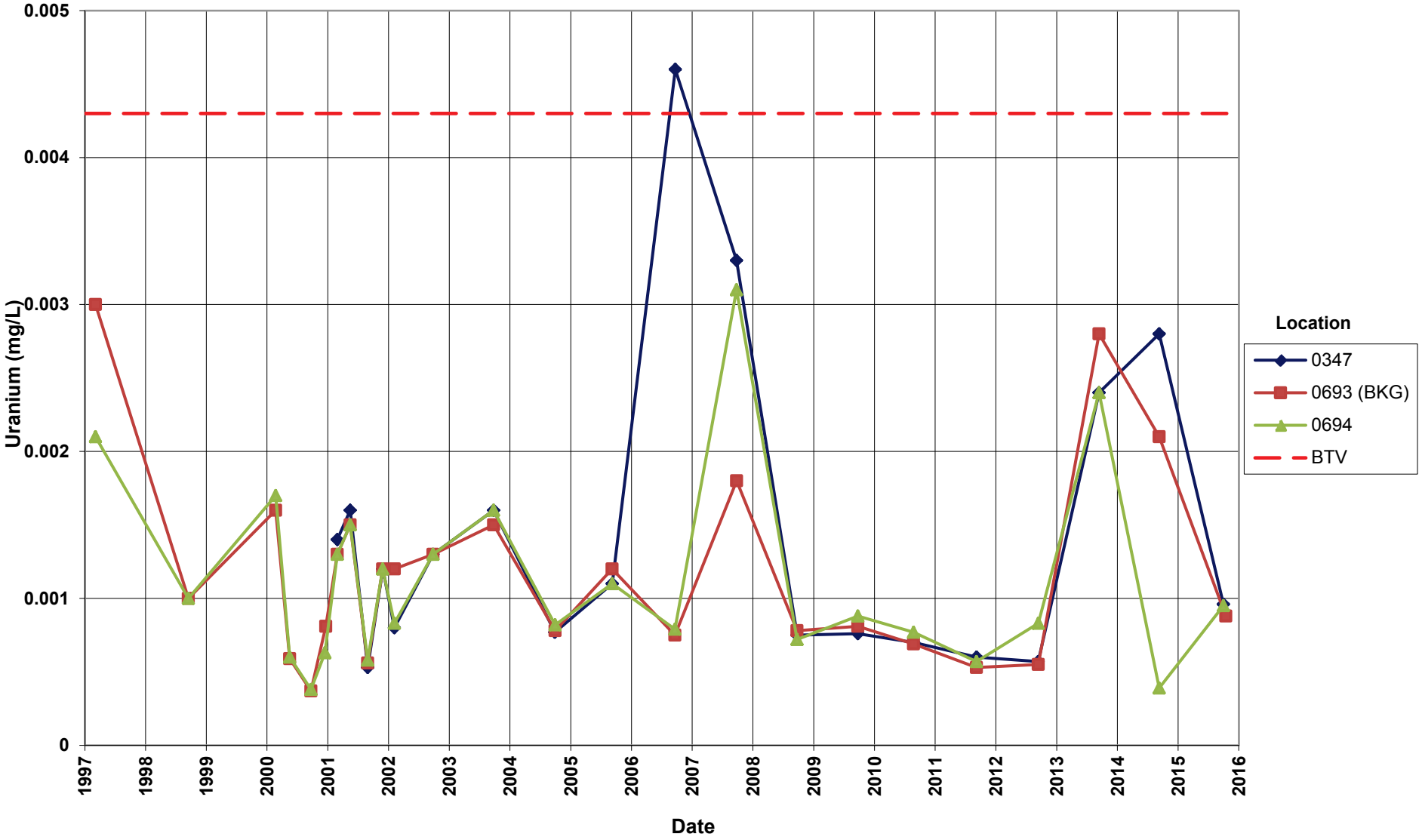
Slick Rock West Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Background Threshold Value = 0.47 mg/L



Slick Rock West Processing Site
Selenium Concentration
Background Threshold Value = 0.0047 mg/L



Slick Rock West Processing Site
Uranium Concentration
Background Threshold Value = 0.0043 mg/L



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Attachment 3
Sampling and Analysis Work Order

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Stoller Newport News Nuclear

July 30, 2015

Task Assignment 103
Control Number 15-0704

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

SUBJECT: Contract No. DE-LM0000415, Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc.
Task Assignment 103 LTS&M - UMTRCA TI & TII, D&D, Others, and AS&T
September 2015 Environmental Sampling at the Slick Rock, Colorado, Processing Sites

REFERENCE: Task Assignment 103, 3-103-1-02-120, Slick Rock, Colorado, Processing Sites

Dear Mr. Nguyen:

The purpose of this letter is to inform you of the upcoming sampling event at Slick Rock, Colorado. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Slick Rock 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 August 31, 2015.

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

MONITORING WELLS

West Site

317 Je	319 Al	320 Al	339 Al	340 Al	508 Al	510 Al	684 Al
318A Al							

East Site

300 Al	303 Al	305 Al	307 Al	309 Al	310 Al	311 Al	312 Al

*NOTE: Al = Alluvium; Je = Jurassic Entrada Sandstone

SURFACE LOCATIONS

West Site

347	349	693	694

East Site

692	696	700

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.

Please contact me at (970) 248-6557 if you have any questions.

Sincerely,

David Traub

David Traub
Site Lead

DT/lcg/bkb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Steve Donivan, SN3
Lauren Goodknight, SN3
Diana Osborne, SN3
David Traub, SN3
EDD Delivery
rc-grand.junction
File: SRE 400.02
File: SRW 400.02

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

Sampling Frequencies for Locations at Slick Rock, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
WEST						
317			X			
318A			X			
319			X			
320			X			
339			X			
340			X			
508			X			
510			X			
684			X			
EAST						
300			X			
303			X			
305			X			
307			X			
309			X			
310			X			
311			X			
312			X			
Surface Locations						
WEST						
347			X			
349			X			
693			X			
694			X			
EAST						
692			X			
696			X			
700			X			

Sampling conducted in September

Constituent Sampling Breakdown

Site	Slick Rock				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	14	7			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen					
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride					
Chromium					
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese	0318A, 0320, 0339, 0340, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.005	SW-846 6010	LMM-01
Molybdenum	0317, 0318A, 0320, 0339, 0340, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	0318A, 0320, 0339, 0340, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.05	EPA 353.1	WCH-A-022
Potassium					
Radium-226	0319		1 pCi/L	Gas Proportional Counte	GPC-A-018
Radium-228	0319		1 pCi/L	Gas Proportional Counte	GPC-A-020
Selenium	0305, 0307, 0317, 0318A, 0319, 0320, 0339, 0340, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.0001	SW-846 6020	LMM-02
Silica					
Sodium					
Strontium					
Sulfate					
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Uranium	0303, 0305, 0307, 0309, 0310, 0311, 0312, 0318A, 0320, 0339, 0340, 0508, 0510, 0684	X	0.0001	SW-846 6020	LMM-02
Vanadium					
VOCs (BETX)	0319 only		0.005	SW-846 8260	VOA-A-009
Zinc					
Total No. of Analytes	8	5			

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

Attachment 4
Trip Report

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Memorandum

DATE: January 11, 2016

TO: David Traub

FROM: David Atkinson

SUBJECT: REVISED Sampling Trip Report

Site: Slick Rock Processing Site

Dates of Event: 9/28/2015 – 9/29/2015, 10/15/2015

Team Members: David Atkinson, Eric Szabelski, Jeff Price, and Samantha Tigar

Number of Locations Sampled: Samples were collected at 21 of the 24 locations identified on the sampling notification letter dated July 30, 2015. In addition one sample (Slick Rock East domestic well location 0672) was collected per landowner request and site lead approval.

	Locations Sampled	Planned Locations
Slick Rock West Monitoring Wells	9	9
Slick Rock West Surface Water Locations	3	4
Slick Rock East Monitoring Wells	8*	8
Slick Rock East Surface Water Locations	2	3

*One of the 8 locations collected (0672) was not on the planned sampling list.

Locations Not Sampled/Reason: Monitoring well location 0312 at the Slick Rock East site could not be sampled because it was dry. Slick Rock West surface water location 0349 and Slick Rock East surface location 0700 could not be sampled because they could not be accessed due to overgrown willows along the bank of the Dolores River.

Location Specific Information: Slick Rock West monitoring well location 0320 and surface water location 0693 were not sampled during the first planned sampling event because the samplers ran out of time due to getting a vehicle stuck. These two locations and Slick Rock West monitoring well location 0319 (sample was re-collected) were sampled during the follow-up event on October 15, 2015. The database screened interval for well 0318A is listed as lower than the total depth.

Quality Control Sample Cross Reference: The following table summarizes the QC samples collected during the sampling event:

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2498	NJS 860	SRK05-0318A	Duplicate	Groundwater
2799	NLV 711	Associated with SRK05-0319	Trip Blank	Groundwater
2533	NJS 868	SRK05-0319	Duplicate	Groundwater

*Duplicate 2498 was mistakenly associated with both samples 0318A and 0317 in the field data sheets, however it is a duplicate only of 0318A.
**Due to difficulties in the field there was not an equipment blank taken.
***Trip Blank 2799 is associated with sample NLV 710 which was collected during the follow-up event (RIN 15107424).

Report Identification Number (RIN) Assigned: Samples were assigned to RIN 15087319 (original sampling event) and 15107424 (follow-up event). Field data sheets can be found in Crow\sms\15087319 and Crow\sms\15107424 in the Field Data folders.

Sample Shipment: Samples were shipped overnight via FedEx from Grand Junction, CO, to ALS Laboratory Group in Fort Collins, CO, on October 6, 2015, and October 15, 2015.

Water Level Measurements: Water levels were measured in all sampled wells.

Well Inspection Summary: All wells were in good condition.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan (SAP) for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). All surface water samples were collected via container immersion or using disposable tubing.

Field Variance: Field measurements were not collected at location SRK05-0320 due to problems with the equipment.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory: Nothing to note.

Institutional Controls:

Fences, Gates, Locks: All gates were locked and in good condition with the significant exception of the main access gate to the Slick Rock West site main area. This entrance needs major repairs to control erosion and prevent unauthorized access.

Signs: No issues observed.

Trespassing/Site Disturbances: None observed.

Disposal Cell/Drainage Structure Integrity: NA

Safety Issues: The access issues caused by excessively thick willows along the banks of the Dolores River and the large gulley cut across Slick Rock East have become serious safety issues. The excessive vegetation near the surface locations makes it impossible safely approach these locations because of a lack of visible footing, and extreme risk of eye injury due to whipping and protruding willow branches. The large gulley on Slick Rock East is too wide and deep to safely cross. Without ladders and two or three people to ferry equipment down into and then back out of the gulley, there is no reliable and safe way to cross the gulley on foot while carrying equipment.

Access Issues: Two surface locations could not be safely accessed due to excessively thick, overgrown willows along the riverbank. In addition, Slick Rock East monitoring well location 0309 was difficult to access due to a large gulley (approximately 6-8 ft. deep and 15-30 ft. wide) that has been cut across the flood plain to the river. This gulley makes it impossible to drive to this well location and also Slick Rock East surface location 0700. Alternate access to these locations should be established prior to sampling again. The samplers also experienced difficulty in getting their sampling truck freed from a muddy area near Slick Rock West location 0320. Access to this location should be made with a Razer or ATVs unless the ground is completely dry across the entire site. Access to the main area of the Slick Rock East site is threatened by erosion occurring along the cliff side of the road. Erosion will eventually (samplers estimate with 2-5 years) wash the entire road away from the cliff and access to the site will be completely blocked. The Slick Rock West site entrance needs extensive repairs including erosion control, a new gate, and other actions. Slick Rock West surface locations 0349 and 0347 are located across a barbed wire fence and need gates or step ladders installed for proper access, in addition to clear paths cut to the river bank.

General Information: Nothing to note.

Immediate Actions Taken: None.

Future Actions Required or Suggested: Alternate access to Slick Rock East locations 0700 and 0309 should be established and paths through the willows cleared from all surface locations. The road accessing the Slick Rock East main area should be shored up in several spots along the cliff face to prevent further erosion and complete wash-out.

cc: (electronic)
Jason Nguyen, DOE
Steve Donivan, Navarro
Dave Traub, Navarro
EDD Delivery

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