Data Validation Package

August and September 2010 Groundwater and Surface Water Sampling at the Slick Rock, Colorado, Processing Sites

January 2011

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Slick Rock, Colorado, Processing Sites

Sampling Period: August 24-25 and September 29, 2010

The Slick Rock, Colorado, Processing Sites are referred to as the Slick Rock East Processing Site (SRK06) and the Slick Rock West Processing Site (SRK05). This annual event involved sampling a total of 17 monitoring wells and 7 surface water locations at both sites as required by the 2006 *Draft Final Ground Water Compliance Action Plan for the Slick Rock, Colorado, Processing Sites*. Locations 0300, 0318A, 0339, and 0340 were sampled on September 29, 2010, all other locations were sampled August 24-25, 2010. Water levels were measured at all sampled wells. All sampled wells were inspected and observed to be in good condition with the following exception. Well 0318 had a broken screen at the time of sampling. This well was replaced with well 0318A, which was installed on September 28, 2010 and sampled the following day. Well 0318 was abandoned on September 29, 2010.

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 contaminant level (MCL) to assess compliance with Title 40, *Code of Federal Regulations*, Part 192, with the exception of manganese and selenium. Manganese concentrations are compared to the maximum background concentration of 3.5 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.

Wells with analyte concentrations that exceeded applicable groundwater standards are listed in Table 1. Table 2 lists the drinking water MCLs and results for benzene, toluene, ethyl benzene, and xylenes (total) in well 0319.

Results from this sampling event demonstrated elevated concentrations for most contaminants at West Processing Site locations and elevated selenium and uranium concentrations at most East Processing Site locations, as shown in the time-concentration graphs included in the Data Presentation section.

The radium-226 plus radium-228 concentration has decreased in West Processing Site well 0319 since 2006, and remains below the MCL of 5 picocuries per liter.

Surface water results from Dolores River locations downstream of and adjacent to the processing sites were compared to statistical benchmark values derived using historical data from river locations 0693, which is located upstream of the West Processing Site and 0696, which is located upstream of the East Processing Site. As shown in Tables 3 and 4, no benchmark values were exceeded during this event, which indicates that the sites are having no measurable impact on river water quality.

Table 1. Slick Rock Wells with Samples that Exceeded EPA Standards in August/September 2010

Analyte	Standard (mg/L)	Site	Location	Concentration (mg/L)
Molybdenum	0.1	West	0317	0.18
			0318	3.4
			0318A	1.4
			0339	1.3
			0340	1.6
			0508	1.0
			0510	1.4
Nitrate + Nitrite as Nitrogen	10	West	0318	71
			0318A	55
			0339	66
			0340	400
			0508	230
			0510	83
Selenium[a]	0.18	West	0318	5.9
			0318A	2.9
			0339	2.0
			0340	2.7
			0508	1.1
			0510	0.25
Uranium	0.044	West	0340	0.053
			0508	0.078
			0510	0.079
		East	0303	1.1
			0305	0.80
			0307	0.54
			0309	0.089
			0311	0.090

Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; concentrations are in mg/L.
[a]Selenium standard is the proposed Alternate Concentration Limit.

Table 2. BTEX[a] MCLs and Results for Well 0319 in August 2010

Analyte	MCL (mg/L)	Concentration in Well 0319 (mg/L)
Benzene	0.005	6.1
Ethyl benzene	0.7	0.2
Toluene	1	5.5
Xylenes, Total	10	4.9

MCLs are listed in the 2009 *National Primary Drinking Water Regulations* (EPA 816-F-09-0004, May 2009); concentrations are in mg/L.
[a] BTEX = Benzene, Toluene, Ethyl benzene, and Xylenes (total).

Table 3. Comparison of Slick Rock East Processing Site August 2010 Surface Water Concentrations to Historical Upgradient Benchmarks

Analyte	Benchmark Value for 0696 (mg/L)	0692 Concentration (mg/L)	0700 Concentration (mg/L)
Uranium	0.0550	0.00069	0.00063

Table 4. Comparison of Slick Rock West Processing Site August 2010 Surface Water Concentrations to Historical Upgradient Benchmarks

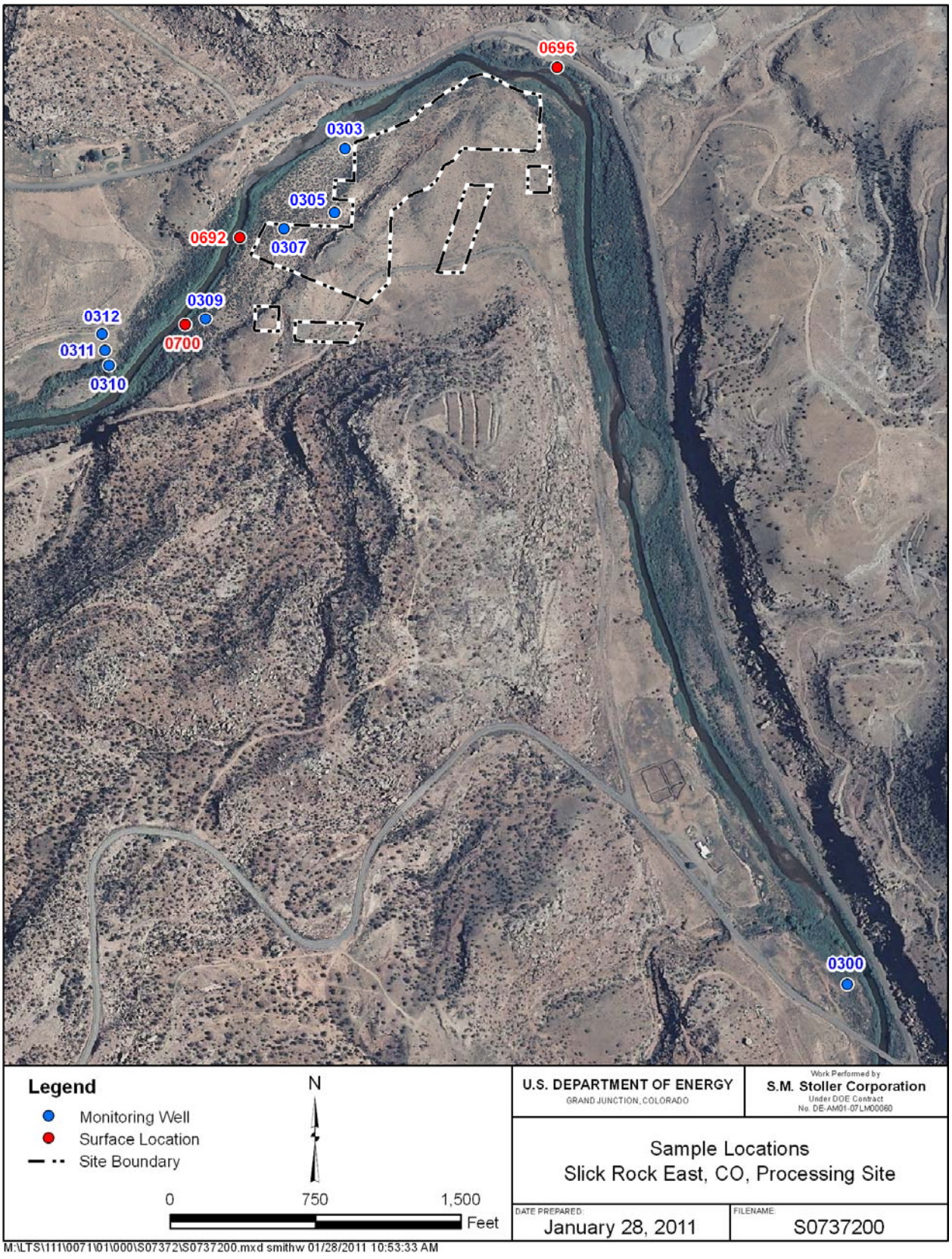
Analyte	Benchmark Value for 0693 (mg/L)	0347 Concentration (mg/L)	0349 Concentration (mg/L)	0694 Concentration (mg/L)
Manganese	0.0122	0.010	0.016	0.0062
Molybdenum	0.0048	0.0013	0.0015	0.0014
Nitrate + Nitrite as N	0.2400	0.011	0.12	0.025
Selenium	0.0047	0.0003	0.0008	0.0004
Uranium	0.0028	0.0007	0.0007	0.0008

David Traub

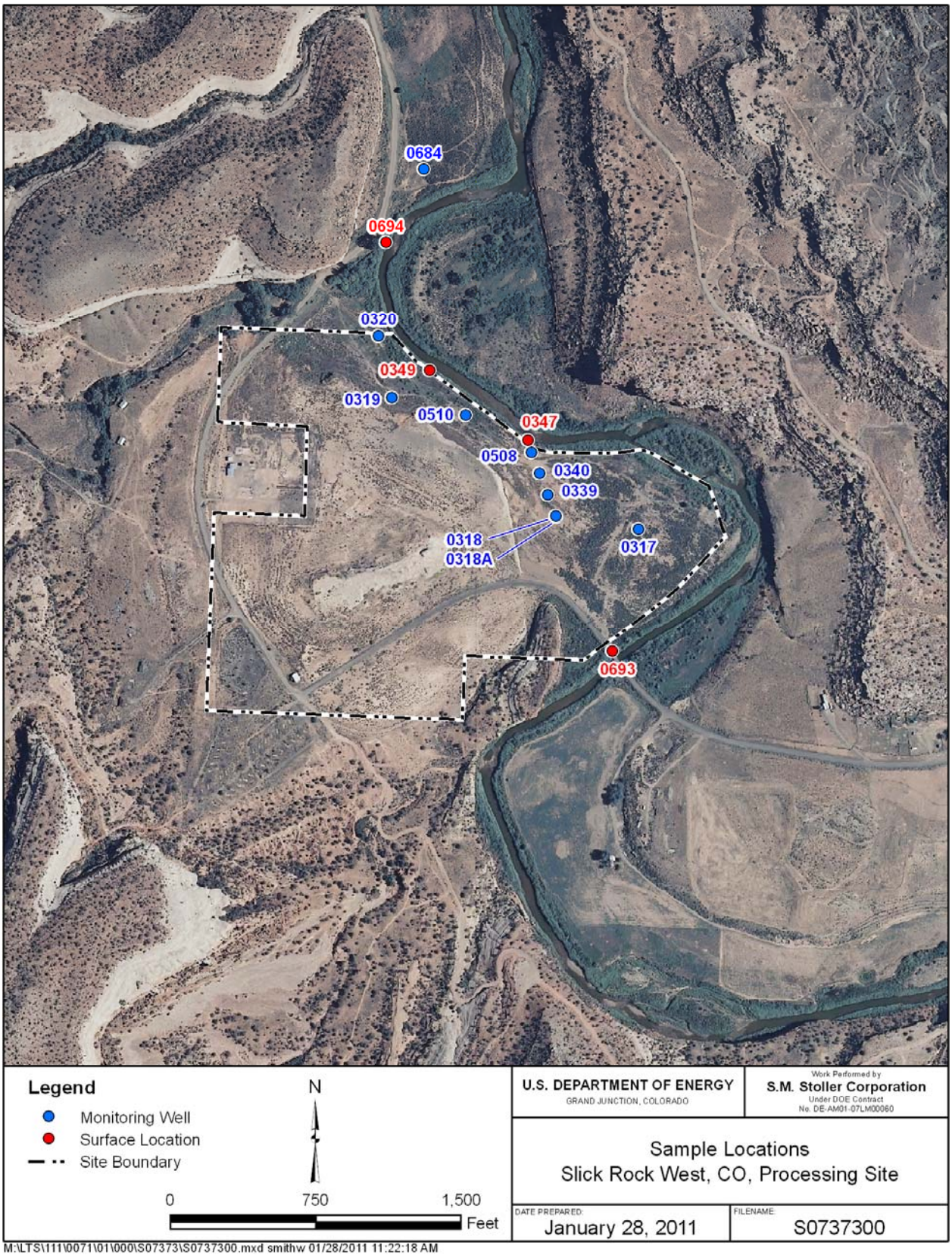
David Traub
Site Lead, S.M. Stoller Corporation

1-31-2011

Date



Slick Rock Processing Site East, Sample Location Map



Slick Rock Processing Site West, 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**	August 24-25, 2010 September 29, 2010
Date(s) of Verification	October 18, 2010	**Name of Verifier**	Steve Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOPs, instructions.		Work Order Letter dated August 11, 2010.
2. Were the sampling locations specified in the planning documents sampled?	Yes	Wells 0300, 0318A, 0339, and 0340 were sampled September 29, 2010.
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on August 24 and September 27, 2010.
4. Was an operational check of the field equipment conducted daily?	Yes	An operational check was performed on August 25 and September 29, 2010.
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?	Yes	
6. Was the category of the well documented?	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 stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

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 wells sampled 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	Duplicate samples were collected from locations 0319, 0339, and 0684.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	One equipment blank was collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	Yes	One trip blank was collected.
12. Were QC samples assigned a fictitious site identification number?	Yes	Location IDs of 2066, 2498, 2500, 2404, and 2676 were used.
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the “Date Signed” fields (FDCS)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	10083304
Sample Event:	August 24-25, 2010
Site(s):	Slick Rock, Colorado; Processing Sites
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1008378
Analysis:	Metals, Organics, Wet Chemistry, and Radiochemistry
Validator:	Steve Donivan
Review Date:	October 18, 2010

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory 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	PA SOP783R8	PA SOP783R8
Radium-228	GPC-A-020	SW-846 9320 (m)	PA SOP724R10
Volatile Organics	VOA-A-009	SW-846 5030C	SW-846 8260B

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
1008378-3	0319	Radium-228	J	Less than the determination limit
1008378-13	0319 Duplicate	Radium-228	J	Less than the determination limit

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 25 water samples on August 27, 2010, accompanied by a Chain of Custody (COC) form. Copies of the two 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

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 0.6 °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.

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 August 30, 2010. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the method detection limit (MDL). Initial and continuing calibration verification checks were made at the required frequency resulting in seven verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6010B, Manganese
Calibration for manganese was performed on September 7, 2010, using a single point calibration. Initial and continuing calibration verification checks were made at the required frequency resulting in 16 verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit (PQL) and all results were within the acceptance range.

Method SW-846 6020, Molybdenum, Selenium, Uranium
Calibrations were performed on September 8, 2010, 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 resulting in 11 verification checks. All calibration checks met 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 8260B, Volatiles
The initial calibrations for benzene, ethylbenzene, toluene, and xylenes were performed using nine calibration standards on August 19, 2010. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. Calibrations using average response factors had relative standard deviations of less than 15 percent. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. 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.

Radiochemical Analysis

Radiochemical results are qualified with a "J" flag (estimated) when the result is greater than the minimum detectable concentration (MDC), but less than Determination Limit (3 times the MDC). Radiochemical results are qualified with a "U" flag (not detected) when the result is greater than the MDC, but less than the Decision Level Concentration, estimated as the two sigma total propagated uncertainty.

Radium-226
Emanation cell plateau voltage determinations and cell efficiency calibrations were performed in March 2010. Daily instrument checks performed on September 21, 2010, met the acceptance criteria. All sample chemical recoveries were within the acceptance range of 40 to 110 percent.

Radium-228
Plateau voltage determinations and detector efficiency calibrations were performed in June 2010. Background determinations were performed on September 2, 2010. The daily instrument checks performed on September 3, 2010, 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, some blank results were negative and the absolute values were greater than the MDL but less 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.

Radiochemistry
All radiochemical method blank results were below the Decision Level Concentration.

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. The spike recoveries met the recovery and precision criteria for all analytes evaluated. For the volatile organics spike analyses, the laboratory used samples from another client.

Laboratory Replicate Analysis

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

The radiochemical relative error ratio (calculated using the one-sigma total propagated uncertainty) for the laboratory control sample replicates 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 100 times the PQL for ICP-MS or greater than 50 times the PQL for ICP. All evaluated serial dilution data were acceptable.

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.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis of molybdenum and uranium to reduce interferences. The required detection limits were met for all non-radiochemical analytes.

All radiochemical MDCs were calculated using the equation specified in *Quality Systems for Analytical Services*. All reported MDCs were less than the required MDCs.

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 September 28, 2010. 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: 10083304 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 10/15/2010

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

# of Samples: 25 **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: 10083304 **Lab Code:** PAR **Date Due:** 9/24/2010

Matrix: Water **Site Code:** SRK **Date Completed:** 9/29/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Manganese	09/07/2010			OK	OK	OK	OK	OK	97.0	91.0	93.0	1.0	90.0	4.0	95.0
Manganese	09/07/2010								99.0	93.0	93.0	0.0	90.0	8.0	98.0
Molybdenum	09/08/2010	0.0000	1.0000	OK	OK	OK	OK	OK	98.0	102.0	101.0	1.0	103.0	0.0	100.0
Molybdenum	09/08/2010							OK	96.0	87.0	101.0	1.0		2.0	99.0
Selenium	09/08/2010	0.0000	1.0000	OK	OK	OK	OK	OK	98.0	100.0	100.0	0.0	105.0	5.0	111.0
Selenium	09/08/2010							OK	96.0	118.0	99.0	2.0			108.0
Uranium	09/08/2010	0.0000	1.0000	OK	OK	OK	OK	OK	95.0	97.0	98.0	0.0	106.0	2.0	110.0
Uranium	09/08/2010							OK	94.0	93.0	108.0	2.0		0.0	110.0

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 10083304 **Project:** Slick Rock **Lab Code:** PAR **Validation Date:** 10/18/2010

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
Radiochemistry Data Validation Worksheet

RIN: 10083304 **Lab Code:** PAR **Date Due:** 9/24/2010

Matrix: Water **Site Code:** SRK **Date Completed:** 9/29/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0319	Radium-226	09/21/2010			86.7			
2498	Radium-226	09/21/2010			87.7			
Blank_Spike	Radium-226	09/21/2010			86.9	108.00		
Blank_Spike_Du	Radium-226	09/21/2010			88.5	103.00		0.30
Blank	Radium-226	09/21/2010	0	U	88.2			
0319	Radium-228	09/03/2010			68.4			
2498	Radium-228	09/03/2010			61.5			
Blank_Spike	Radium-228	09/03/2010			21.0	109.00		
Blank_Spike_Du	Radium-228	09/03/2010			59.4	123.00		0.50
Blank	Radium-228	09/03/2010	0.2250	U	55.0			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 10083304 **Lab Code:** PAR **Date Due:** 9/24/2010

Matrix: Water **Site Code:** SRK **Date Completed:** 9/29/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Nitrate+Nitrite as N	08/30/2010	0.000	0.9996	OK	OK	OK	OK	OK	105.00				

General Information

Report Number (RIN):	10093365
Sample Event:	September 29, 2010
Site(s):	Slick Rock, Colorado; Processing Sites
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1010015
Analysis:	Metals, Organics, Wet Chemistry, and Radiochemistry
Validator:	Steve Donivan
Review Date:	November 23, 2010

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory 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
Nitrate+Nitrite as N	WCH-A-022	MCAWW 353.2	MCAWW 353.2

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
1010015-1	0300	Manganese	J	Serial dilution failure
1010015-1	0300	Selenium	U	Less than 5 times the method blank
1010015-3	0339	Nitrate+Nitrite as N	J	Missed holding time

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 5 water samples on October 1, 2010, accompanied by a COC form. Copies of the air bill 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

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2.2 °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 with the following exception. Sample 0339 was re-analyzed for nitrate+nitrite as N beyond the holding time. The nitrate+nitrite as N result for this sample is qualified with a "J" flag as an estimated value.

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 12, 2010. 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 resulting in eight verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6010B, Manganese
Calibration for manganese was performed on October 21, 2010, using four calibration standards. Initial and continuing calibration verification checks were made at the required frequency resulting in 25 verification checks. All calibration checks met 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, 2010, 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 resulting in seven verification checks. All calibration checks met 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 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.

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 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. The spike recoveries 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 non-radiochemical sample replicates, laboratory control sample replicates, and matrix spike replicates were less than 20 percent for results that are greater than 5 times the PQL, 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 100 times the PQL for ICP-MS or greater than 50 times the PQL for ICP. All evaluated serial dilution data were acceptable.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis of molybdenum and uranium to reduce interferences. 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. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

EDD File

The revised EDD file with corrected nitrate+nitrite as N results arrived on December 2, 2010. 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: 10093365 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 12/3/2010

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	There are 1 holding time failures.
☑ 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

RIN: 10093365 Lab Code: PAR

Non-Compliance Report: Holding Times

Project: Slick Rock

Validation Date: 12/3/2010

				Holding Times			Criteria			Reported Dates		
Ticket	Location	Lab Sample ID	Method Code	Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection Date	Preparation Date	Analysis Date
IKQ 639	0339	1010015-3	WCH-A-022			37			28	09/29/2010	11/05/2010	11/05/2010

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 10093365 **Lab Code:** PAR **Date Due:** 10/29/2010

Matrix: Water **Site Code:** SRK **Date Completed:** 11/1/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Manganese	10/21/2010	0.0000	1.0000	OK	OK	OK	OK	OK	92.0	78.0	81.0	1.0	90.0	15.0	103.0
Molybdenum	10/22/2010	0.0000	1.0000	OK	OK	OK	OK	OK	102.0	109.0	112.0	2.0	95.0		108.0
Selenium	10/22/2010	0.0000	1.0000	OK	OK	OK	OK	OK	105.0	106.0	108.0	2.0	103.0		78.0
Uranium	10/22/2010	0.0000	1.0000	OK	OK	OK	OK	OK	98.0	94.0	101.0	3.0	100.0	4.0	100.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 10093365 **Lab Code:** PAR **Date Due:** 10/29/2010

Matrix: Water **Site Code:** SRK **Date Completed:** 11/1/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Nitrate+Nitrite as N	10/12/2010	0.000	0.9990	OK	OK	OK	OK	OK	94.00	92.0	92.0	0	

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 by 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 Assessment

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. One equipment blank was submitted with these samples. Uranium was detected in this blank. The uranium concentration in the associated samples is greater than 10 times the blank concentration.

Trip Blank Assessment

A trip blank (field ID 2500) 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.

Duplicate samples were collected in August from locations 0319 and 0684 (field duplicate IDs 2498 and 2404). The non-radiochemical duplicate results were acceptable, meeting the Environmental Protection Agency recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the PQL. The radiochemical duplicate results were acceptable with relative error ratios (calculated using the one-sigma total propagated uncertainty) of less than three.

A duplicate sample was collected in September from location 0339 (field duplicate ID 2066). The original duplicate results were not acceptable for nitrate+nitrite as N, with the relative percent difference of 52 percent. The laboratory was requested to repeat the nitrate+nitrite as N analyses. The results of the re-analyses reduced the relative percent difference to less than 5 percent indicating acceptable precision. Only the nitrate+nitrite as N results from the second analysis are reported.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 10083304 **Lab Code:** PAR **Project:** Slick Rock **Validation Date:** 10/15/2010

Duplicate: 2404 **Sample:** 0684

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Manganese	120			1	120			1	0		UG/L
Molybdenum	5.2			1	5.3			1	1.90		UG/L
Nitrate+Nitrite as N	0.082			1	0.078			1	5.00		MG/L
Selenium	0.45			1	0.47			1	4.35		UG/L
Uranium	8.8			1	8.8			1	0		UG/L

Duplicate: 2498 **Sample:** 0319

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Benzene	6100			250	5400			250	12.17		UG/L
Ethylbenzene	200	J		250	180	J		250			UG/L
m,p-Xylene	4000			250	3600			250	10.53		UG/L
o-Xylene	890			250	770			250	14.46		UG/L
Radium-226	0.915		0.435	1	1.84		0.697	1		2.2	pCi/L
Radium-228	1.09		0.471	1	1.73		0.657	1		1.6	pCi/L
Toluene	5500			250	4500			250	20.00		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 10093365 **Lab Code:** PAR **Project:** Slick Rock **Validation Date:** 12/3/2010

Duplicate: 2066 **Sample:** 0339

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Manganese	2100			1	2100			1	0		UG/L
Molybdenum	1300			100	1300			100	0		UG/L
Nitrate+Nitrite as N	66			200	63			200	4.65		MG/L
Selenium	2000			100	1900			100	5.13		UG/L
Uranium	34			100	34			100	0		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 10083304 **Lab Code:** PAR **Project:** Slick Rock **Validation Date:** 10/15/2010

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1008378-15	SW6020	Uranium	0.016		0.0029	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1008378-10	IJY 035	0693	0.69	1		
1008378-11	IJY 036	0694	0.77	1		
1008378-23	IJY 037	0692	0.69	10		
1008378-24	IJY 038	0696	0.68	10		
1008378-25	IJY 042	0700	0.63	10		
1008378-5	IJY 033	0347	0.7	1		
1008378-6	IJY 034	0349	0.73	1		

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: Steve Donivan — 1-27-2011 Date

Data Validation Lead: Steve Donivan — 1-27-2011 Date

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Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

The manganese result from location 0508 was identified as anomalously low and the molybdenum result from location 0510 was identified as anomalously high. Manganese is trending downward in well 0508 and molybdenum is trending upward in well 0510. The data from this sampling event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters
Comparison: All Historical Data
Laboratory: ALS Laboratory Group
RIN: 10083304
Report Date: 10/18/2010

					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	0317	N001	08/25/2010	Molybdenum	0.18		F	0.316			0.19		F	15	0	No
SRK05	0318	N001	08/25/2010	Manganese	0.0069		F	12.8			0.039		F	19	0	No
SRK05	0318	N001	08/25/2010	Nitrate + Nitrite as Nitrogen	71		F	730		F	140		F	6	0	No
SRK05	0319	N001	08/24/2010	Radium-226	0.915		F	3.22			1.26		F	23	0	No
SRK05	0319	N001	08/24/2010	Radium-228	1.09		FJ	4.53		F	1.4		F	23	0	No
SRK05	0347	0001	08/25/2010	Molybdenum	0.0013			0.012			0.0014		U	14	6	No
SRK05	0347	0001	08/25/2010	Nitrate + Nitrite as Nitrogen	0.011			0.46			0.017			5	0	No
SRK05	0349	0001	08/25/2010	Molybdenum	0.0015			0.011			0.0016			13	4	No
SRK05	0508	N001	08/25/2010	Manganese	2.9		F	7.49			3.9		F	31	0	Yes
SRK05	0508	N001	08/25/2010	Molybdenum	1		F	2.43			1.01		F	31	0	No
SRK05	0510	N001	08/25/2010	Manganese	1.2		F	7			2.5		F	42	0	No
SRK05	0510	N001	08/25/2010	Molybdenum	1.4		F	1.38			0.67			42	0	Yes
SRK05	0510	N001	08/25/2010	Nitrate + Nitrite as Nitrogen	83		F	1190			150		F	9	0	No
SRK05	0694	0001	08/24/2010	Nitrate + Nitrite as Nitrogen	0.025			1	U	J	0.036			9	1	No
SRK06	0305	N001	08/25/2010	Uranium	0.8		F	1.7		F	0.867		F	15	0	No
SRK06	0700	0001	08/25/2010	Uranium	0.00063			0.0014			0.00077			5	0	No

Data Validation Outliers Report - Field Parameters Only
Comparison: All Historical Data
Laboratory: Field Measurements
RIN: 10083304
Report Date: 10/18/2010

					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	0318	N001	08/25/2010	Specific Conductance	2335		F	8120		F	2787		F	15	0	No
SRK05	0319	N001	08/24/2010	Specific Conductance	3661		F	12640			5401		F	15	0	No
SRK05	0510	N001	08/25/2010	Alkalinity, Total (As CaCO3)	195		F	420			214		F	41	0	No
SRK05	0510	N001	08/25/2010	pH	6.89		F	6.8		F	6.08			33	0	No
SRK05	0510	N001	08/25/2010	Specific Conductance	2267		F	5292		F	3180			33	0	No
SRK06	0305	N001	08/25/2010	Turbidity	2.22		F	8.59			3.41		F	15	0	No
SRK06	0700	N001	08/25/2010	Oxidation Reduction Potential	-35.7			116			-19.5			5	0	No
SRK06	0700	N001	08/25/2010	Specific Conductance	380			830			394			5	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.

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Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	19.46	-	39.52	270		F	#		
Molybdenum	mg/L	08/25/2010	N001	19.46	-	39.52	0.18		F	#	0.000032	
Oxidation Reduction Potential	mV	08/25/2010	N001	19.46	-	39.52	133.5		F	#		
pH	s.u.	08/25/2010	N001	19.46	-	39.52	7.32		F	#		
Selenium	mg/L	08/25/2010	N001	19.46	-	39.52	0.006		F	#	0.000032	
Specific Conductance	umhos /cm	08/25/2010	N001	19.46	-	39.52	2353		F	#		
Temperature	C	08/25/2010	N001	19.46	-	39.52	15		F	#		
Turbidity	NTU	08/25/2010	N001	19.46	-	39.52	4.61		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
Location: 0318 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/25/2010	N001	4.99	-	15.02	271		F	#		
Manganese	mg/L	08/25/2010	N001	4.99	-	15.02	0.0069		F	#	0.00011	
Molybdenum	mg/L	08/25/2010	N001	4.99	-	15.02	3.4		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	08/25/2010	N001	4.99	-	15.02	71		F	#	1	
Oxidation Reduction Potential	mV	08/25/2010	N001	4.99	-	15.02	62.1		F	#		
pH	s.u.	08/25/2010	N001	4.99	-	15.02	6.89		F	#		
Selenium	mg/L	08/25/2010	N001	4.99	-	15.02	5.9		F	#	0.0032	
Specific Conductance	umhos /cm	08/25/2010	N001	4.99	-	15.02	2335		F	#		
Temperature	C	08/25/2010	N001	4.99	-	15.02	17.8		F	#		
Turbidity	NTU	08/25/2010	N001	4.99	-	15.02	8.87		F	#		
Uranium	mg/L	08/25/2010	N001	4.99	-	15.02	0.025		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 1/18/2011
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
Manganese	mg/L	09/29/2010	N001	9.2	-	14.2	1.6		F	#	0.00011	
Molybdenum	mg/L	09/29/2010	N001	9.2	-	14.2	1.4		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2010	N001	9.2	-	14.2	55		F	#	2	
Oxidation Reduction Potential	mV	09/29/2010	N001	9.2	-	14.2	-177.1		F	#		
pH	s.u.	09/29/2010	N001	9.2	-	14.2	6.73		F	#		
Selenium	mg/L	09/29/2010	N001	9.2	-	14.2	2.9		F	#	0.0032	
Specific Conductance	umhos /cm	09/29/2010	N001	9.2	-	14.2	2178		F	#		
Temperature	C	09/29/2010	N001	9.2	-	14.2	17.62		F	#		
Turbidity	NTU	09/29/2010	N001	9.2	-	14.2	9.62		F	#		
Uranium	mg/L	09/29/2010	N001	9.2	-	14.2	0.031		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/24/2010	N001	4.55 - 14.58	921		F	#		
Benzene	ug/L	08/24/2010	N001	4.55 - 14.58	6100		F	#	42	
Benzene	ug/L	08/24/2010	N002	4.55 - 14.58	5400		F	#	42	
Ethylbenzene	ug/L	08/24/2010	N001	4.55 - 14.58	200	J	F	#	45	
Ethylbenzene	ug/L	08/24/2010	N002	4.55 - 14.58	180	J	F	#	45	
m,p-Xylene	ug/L	08/24/2010	N001	4.55 - 14.58	4000		F	#	42	
m,p-Xylene	ug/L	08/24/2010	N002	4.55 - 14.58	3600		F	#	42	
o-Xylene	ug/L	08/24/2010	N001	4.55 - 14.58	890		F	#	50	
o-Xylene	ug/L	08/24/2010	N002	4.55 - 14.58	770		F	#	50	
Oxidation Reduction Potential	mV	08/24/2010	N001	4.55 - 14.58	-124.7		F	#		
pH	s.u.	08/24/2010	N001	4.55 - 14.58	6.93		F	#		
Radium-226	pCi/L	08/24/2010	N001	4.55 - 14.58	0.915		F	#	0.26	0.435
Radium-226	pCi/L	08/24/2010	N002	4.55 - 14.58	1.84		F	#	0.4	0.697
Radium-228	pCi/L	08/24/2010	N001	4.55 - 14.58	1.09		FJ	#	0.51	0.471
Radium-228	pCi/L	08/24/2010	N002	4.55 - 14.58	1.73		FJ	#	0.58	0.657
Selenium	mg/L	08/24/2010	N001	4.55 - 14.58	0.0014		F	#	0.000032	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
Location: 0319 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	08/24/2010	N001	4.55 - 14.58	3661		F	#		
Temperature	C	08/24/2010	N001	4.55 - 14.58	17.47		F	#		
Toluene	ug/L	08/24/2010	N001	4.55 - 14.58	5500		F	#	48	
Toluene	ug/L	08/24/2010	N002	4.55 - 14.58	4500		F	#	48	
Turbidity	NTU	08/24/2010	N001	4.55 - 14.58	9.52		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	4.92	-	9.96	379		F	#		
Manganese	mg/L	08/25/2010	N001	4.92	-	9.96	0.49		F	#	0.00011	
Molybdenum	mg/L	08/25/2010	N001	4.92	-	9.96	0.013		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	08/25/2010	N001	4.92	-	9.96	0.025		F	#	0.01	
Oxidation Reduction Potential	mV	08/25/2010	N001	4.92	-	9.96	37.2		F	#		
pH	s.u.	08/25/2010	N001	4.92	-	9.96	7.06		F	#		
Selenium	mg/L	08/25/2010	N001	4.92	-	9.96	0.00019		F	#	0.000032	
Specific Conductance	umhos /cm	08/25/2010	N001	4.92	-	9.96	1058		F	#		
Temperature	C	08/25/2010	N001	4.92	-	9.96	17.51		F	#		
Turbidity	NTU	08/25/2010	N001	4.92	-	9.96	6.19		F	#		
Uranium	mg/L	08/25/2010	N001	4.92	-	9.96	0.018		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 1/18/2011
Location: 0339 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	09/29/2010	N001	11	-	14	2.1		F	#	0.00011	
Manganese	mg/L	09/29/2010	N002	11	-	14	2.1		F	#	0.00011	
Molybdenum	mg/L	09/29/2010	N001	11	-	14	1.3		F	#	0.0032	
Molybdenum	mg/L	09/29/2010	N002	11	-	14	1.3		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2010	N001	11	-	14	66		FJ	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2010	N002	11	-	14	63		F	#	2	
Oxidation Reduction Potential	mV	09/29/2010	N001	11	-	14	-185.8		F	#		
pH	s.u.	09/29/2010	N001	11	-	14	6.77		F	#		
Selenium	mg/L	09/29/2010	N001	11	-	14	2		F	#	0.0032	
Selenium	mg/L	09/29/2010	N002	11	-	14	1.9		F	#	0.0032	
Specific Conductance	umhos /cm	09/29/2010	N001	11	-	14	2282		F	#		
Temperature	C	09/29/2010	N001	11	-	14	16.34		F	#		
Turbidity	NTU	09/29/2010	N001	11	-	14	9.31		F	#		
Uranium	mg/L	09/29/2010	N001	11	-	14	0.034		F	#	0.00029	
Uranium	mg/L	09/29/2010	N002	11	-	14	0.034		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 1/18/2011
Location: 0340 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	09/29/2010	N001	6.51	-	11.51	6		F	#	0.00011	
Molybdenum	mg/L	09/29/2010	N001	6.51	-	11.51	1.6		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2010	N001	6.51	-	11.51	400		F	#	5	
Oxidation Reduction Potential	mV	09/29/2010	N001	6.51	-	11.51	-230.9		F	#		
pH	s.u.	09/29/2010	N001	6.51	-	11.51	6.38		F	#		
Selenium	mg/L	09/29/2010	N001	6.51	-	11.51	2.7		F	#	0.0032	
Specific Conductance	umhos /cm	09/29/2010	N001	6.51	-	11.51	5168		F	#		
Temperature	C	09/29/2010	N001	6.51	-	11.51	18.08		F	#		
Turbidity	NTU	09/29/2010	N001	6.51	-	11.51	9.49		F	#		
Uranium	mg/L	09/29/2010	N001	6.51	-	11.51	0.053		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	1.01 - 11.01	326		F	#		
Manganese	mg/L	08/25/2010	N001	1.01 - 11.01	2.9		F	#	0.00011	
Molybdenum	mg/L	08/25/2010	N001	1.01 - 11.01	1		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	08/25/2010	N001	1.01 - 11.01	230		F	#	5	
Oxidation Reduction Potential	mV	08/25/2010	N001	1.01 - 11.01	64.1		F	#		
pH	s.u.	08/25/2010	N001	1.01 - 11.01	6.58		F	#		
Selenium	mg/L	08/25/2010	N001	1.01 - 11.01	1.1		F	#	0.0032	
Specific Conductance	umhos /cm	08/25/2010	N001	1.01 - 11.01	4250		F	#		
Temperature	C	08/25/2010	N001	1.01 - 11.01	18.14		F	#		
Turbidity	NTU	08/25/2010	N001	1.01 - 11.01	2.74		F	#		
Uranium	mg/L	08/25/2010	N001	1.01 - 11.01	0.078		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	4.92	-	13.92	195		F	#		
Manganese	mg/L	08/25/2010	N001	4.92	-	13.92	1.2		F	#	0.00011	
Molybdenum	mg/L	08/25/2010	N001	4.92	-	13.92	1.4		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	08/25/2010	N001	4.92	-	13.92	83		F	#	1	
Oxidation Reduction Potential	mV	08/25/2010	N001	4.92	-	13.92	95		F	#		
pH	s.u.	08/25/2010	N001	4.92	-	13.92	6.89		F	#		
Selenium	mg/L	08/25/2010	N001	4.92	-	13.92	0.25		F	#	0.0032	
Specific Conductance	umhos /cm	08/25/2010	N001	4.92	-	13.92	2267		F	#		
Temperature	C	08/25/2010	N001	4.92	-	13.92	18.98		F	#		
Turbidity	NTU	08/25/2010	N001	4.92	-	13.92	2.72		F	#		
Uranium	mg/L	08/25/2010	N001	4.92	-	13.92	0.079		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/24/2010	N001	11	-	21	184		F	#		
Manganese	mg/L	08/24/2010	N001	11	-	21	0.12		F	#	0.00011	
Manganese	mg/L	08/24/2010	N002	11	-	21	0.12		F	#	0.00011	
Molybdenum	mg/L	08/24/2010	N001	11	-	21	0.0052		F	#	0.000032	
Molybdenum	mg/L	08/24/2010	N002	11	-	21	0.0053		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	08/24/2010	N001	11	-	21	0.082		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	08/24/2010	N002	11	-	21	0.078		F	#	0.01	
Oxidation Reduction Potential	mV	08/24/2010	N001	11	-	21	28.1		F	#		
pH	s.u.	08/24/2010	N001	11	-	21	7.28		F	#		
Selenium	mg/L	08/24/2010	N001	11	-	21	0.00045		F	#	0.000032	
Selenium	mg/L	08/24/2010	N002	11	-	21	0.00047		F	#	0.000032	
Specific Conductance	umhos /cm	08/24/2010	N001	11	-	21	689		F	#		
Temperature	C	08/24/2010	N001	11	-	21	14.94		F	#		
Turbidity	NTU	08/24/2010	N001	11	-	21	2.98		F	#		
Uranium	mg/L	08/24/2010	N001	11	-	21	0.0088		F	#	0.0000029	
Uranium	mg/L	08/24/2010	N002	11	-	21	0.0088		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 1/18/2011
Location: 0300 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Manganese	mg/L	09/29/2010	N001	9.5	-	19.5	2.1	E	FJ	#	0.00011	
Molybdenum	mg/L	09/29/2010	N001	9.5	-	19.5	0.0098		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/29/2010	N001	9.5	-	19.5	0.014		F	#	0.01	
Oxidation Reduction Potential	mV	09/29/2010	N001	9.5	-	19.5	-94.6		F	#		
pH	s.u.	09/29/2010	N001	9.5	-	19.5	6.59		F	#		
Selenium	mg/L	09/29/2010	N001	9.5	-	19.5	0.001		UF	#	0.00032	
Specific Conductance	umhos /cm	09/29/2010	N001	9.5	-	19.5	8585		F	#		
Temperature	C	09/29/2010	N001	9.5	-	19.5	15.23		F	#		
Turbidity	NTU	09/29/2010	N001	9.5	-	19.5	4.06		F	#		
Uranium	mg/L	09/29/2010	N001	9.5	-	19.5	0.016		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	4.3	-	14.3	523		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	4.3	-	14.3	-95		F	#		
pH	s.u.	08/25/2010	N001	4.3	-	14.3	7.14		F	#		
Specific Conductance	umhos /cm	08/25/2010	N001	4.3	-	14.3	3484		F	#		
Temperature	C	08/25/2010	N001	4.3	-	14.3	18.75		F	#		
Turbidity	NTU	08/25/2010	N001	4.3	-	14.3	1.72		F	#		
Uranium	mg/L	08/25/2010	N001	4.3	-	14.3	1.1		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	8.7	-	18.7	415		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	8.7	-	18.7	74.5		F	#		
pH	s.u.	08/25/2010	N001	8.7	-	18.7	7.11		F	#		
Selenium	mg/L	08/25/2010	N001	8.7	-	18.7	0.026		F	#	0.0032	
Specific Conductance	umhos /cm	08/25/2010	N001	8.7	-	18.7	3376		F	#		
Temperature	C	08/25/2010	N001	8.7	-	18.7	16.79		F	#		
Turbidity	NTU	08/25/2010	N001	8.7	-	18.7	2.22		F	#		
Uranium	mg/L	08/25/2010	N001	8.7	-	18.7	0.8		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	4.4	-	14.4	718		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	4.4	-	14.4	-76.7		F	#		
pH	s.u.	08/25/2010	N001	4.4	-	14.4	7.09		F	#		
Selenium	mg/L	08/25/2010	N001	4.4	-	14.4	0.00023		F	#	0.000032	
Specific Conductance	umhos /cm	08/25/2010	N001	4.4	-	14.4	6053		F	#		
Temperature	C	08/25/2010	N001	4.4	-	14.4	16.86		F	#		
Turbidity	NTU	08/25/2010	N001	4.4	-	14.4	8.31		F	#		
Uranium	mg/L	08/25/2010	N001	4.4	-	14.4	0.54		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	10.2	-	20.2	759		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	10.2	-	20.2	-89.9		F	#		
pH	s.u.	08/25/2010	N001	10.2	-	20.2	7.52		F	#		
Specific Conductance	umhos /cm	08/25/2010	N001	10.2	-	20.2	3438		F	#		
Temperature	C	08/25/2010	N001	10.2	-	20.2	14.85		F	#		
Turbidity	NTU	08/25/2010	N001	10.2	-	20.2	7.69		F	#		
Uranium	mg/L	08/25/2010	N001	10.2	-	20.2	0.089		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	14.7	-	19.7	206		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	14.7	-	19.7	-106.7		F	#		
pH	s.u.	08/25/2010	N001	14.7	-	19.7	7.39		F	#		
Specific Conductance	umhos /cm	08/25/2010	N001	14.7	-	19.7	850		F	#		
Temperature	C	08/25/2010	N001	14.7	-	19.7	15.7		F	#		
Turbidity	NTU	08/25/2010	N001	14.7	-	19.7	8.95		F	#		
Uranium	mg/L	08/25/2010	N001	14.7	-	19.7	0.021		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/25/2010	N001	14.1	-	19.1	310		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	14.1	-	19.1	24.4		F	#		
pH	s.u.	08/25/2010	N001	14.1	-	19.1	7.06		F	#		
Specific Conductance	umhos /cm	08/25/2010	N001	14.1	-	19.1	2271		F	#		
Temperature	C	08/25/2010	N001	14.1	-	19.1	19.72		F	#		
Turbidity	NTU	08/25/2010	N001	14.1	-	19.1	5.18		F	#		
Uranium	mg/L	08/25/2010	N001	14.1	-	19.1	0.09		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
Location: 0312 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/25/2010	N001	14.5	-	19.5	297		F	#		
Oxidation Reduction Potential	mV	08/25/2010	N001	14.5	-	19.5	63.5		F	#		
pH	s.u.	08/25/2010	N001	14.5	-	19.5	7.33		F	#		
Specific Conductance	umhos /cm	08/25/2010	N001	14.5	-	19.5	2364		F	#		
Temperature	C	08/25/2010	N001	14.5	-	19.5	18.22		F	#		
Turbidity	NTU	08/25/2010	N001	14.5	-	19.5	2.69		F	#		
Uranium	mg/L	08/25/2010	N001	14.5	-	19.5	0.041		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.
- 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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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: 10/18/2010
Location: 0347 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/25/2010	0001	128			#		
Manganese	mg/L	08/25/2010	0001	0.01			#	0.00011	
Molybdenum	mg/L	08/25/2010	0001	0.0013			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	08/25/2010	0001	0.011			#	0.01	
Selenium	mg/L	08/25/2010	0001	0.00031			#	0.000032	
Uranium	mg/L	08/25/2010	0001	0.0007			#	0.0000029	
Oxidation Reduction Potential	mV	08/25/2010	N001	17.4			#		
pH	s.u.	08/25/2010	N001	8.35			#		
Specific Conductance	umhos/cm	08/25/2010	N001	381			#		
Temperature	C	08/25/2010	N001	20.42			#		
Turbidity	NTU	08/25/2010	N001	543			#		

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
Location: 0349 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/25/2010	0001	131			#		
Manganese	mg/L	08/25/2010	0001	0.016			#	0.00011	
Molybdenum	mg/L	08/25/2010	0001	0.0015			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	08/25/2010	0001	0.12			#	0.01	
Selenium	mg/L	08/25/2010	0001	0.00076			#	0.000032	
Uranium	mg/L	08/25/2010	0001	0.00073			#	0.0000029	
Oxidation Reduction Potential	mV	08/25/2010	N001	64.2			#		
pH	s.u.	08/25/2010	N001	8.4			#		
Specific Conductance	umhos/cm	08/25/2010	N001	380			#		
Temperature	C	08/25/2010	N001	23			#		
Turbidity	NTU	08/25/2010	N001	613			#		

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
Location: 0693 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/24/2010	0001	165			#		
Manganese	mg/L	08/24/2010	0001	0.0018	B		#	0.00011	
Molybdenum	mg/L	08/24/2010	0001	0.0012			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	08/24/2010	0001	0.01	U		#	0.01	
Selenium	mg/L	08/24/2010	0001	0.00032			#	0.000032	
Uranium	mg/L	08/24/2010	0001	0.00069			#	0.0000029	
Oxidation Reduction Potential	mV	08/24/2010	N001	5.2			#		
pH	s.u.	08/24/2010	N001	8.38			#		
Specific Conductance	umhos/cm	08/24/2010	N001	383			#		
Temperature	C	08/24/2010	N001	27.64			#		
Turbidity	NTU	08/24/2010	N001	192			#		

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010
Location: 0694 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/24/2010	0001	125			#		
Manganese	mg/L	08/24/2010	0001	0.0062			#	0.00011	
Molybdenum	mg/L	08/24/2010	0001	0.0014			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	08/24/2010	0001	0.025			#	0.01	
Selenium	mg/L	08/24/2010	0001	0.00042			#	0.000032	
Uranium	mg/L	08/24/2010	0001	0.00077			#	0.0000029	
Oxidation Reduction Potential	mV	08/24/2010	N001	39.4			#		
pH	s.u.	08/24/2010	N001	8.45			#		
Specific Conductance	umhos/cm	08/24/2010	N001	389			#		
Temperature	C	08/24/2010	N001	24.9			#		
Turbidity	NTU	08/24/2010	N001	66.4			#		

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
Location: 0692 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/25/2010	0001	129			#		
Uranium	mg/L	08/25/2010	0001	0.00069			#	0.000029	
Oxidation Reduction Potential	mV	08/25/2010	N001	21			#		
pH	s.u.	08/25/2010	N001	8.44			#		
Specific Conductance	umhos/cm	08/25/2010	N001	367			#		
Temperature	C	08/25/2010	N001	25.59			#		
Turbidity	NTU	08/25/2010	N001	62.2			#		

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
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 CaCO3)	mg/L	08/24/2010	0001	120			#		
Uranium	mg/L	08/24/2010	0001	0.00068			#	0.000029	
Oxidation Reduction Potential	mV	08/24/2010	N001	19.8			#		
pH	s.u.	08/24/2010	N001	8.41			#		
Specific Conductance	umhos/cm	08/24/2010	N001	378			#		
Temperature	C	08/24/2010	N001	24.82			#		
Turbidity	NTU	08/24/2010	N001	66.7			#		

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010
Location: 0700 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/25/2010	0001	151			#		
Uranium	mg/L	08/25/2010	0001	0.00063			#	0.000029	
Oxidation Reduction Potential	mV	08/25/2010	N001	-35.7			#		
pH	s.u.	08/25/2010	N001	8.45			#		
Specific Conductance	umhos/cm	08/25/2010	N001	380			#		
Temperature	C	08/25/2010	N001	26.43			#		
Turbidity	NTU	08/25/2010	N001	161			#		

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: 10083304
Report Date: 10/18/2010

Parameter	Site Code	Location ID	Sample Date	ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Benzene	SRK05	0999	08/24/2010	N001	ug/L	0.17	U		0.17		TB
Ethylbenzene	SRK05	0999	08/24/2010	N001	ug/L	0.18	U		0.18		TB
m,p-Xylene	SRK05	0999	08/24/2010	N001	ug/L	0.17	U		0.17		TB
Manganese	SRK05	0999	08/24/2010	N002	mg/L	0.00011	U		0.00011		E
Molybdenum	SRK05	0999	08/24/2010	N002	mg/L	0.000032	U		0.000032		E
Nitrate + Nitrite as Nitrogen	SRK05	0999	08/24/2010	N002	mg/L	0.01	U		0.01		E
o-Xylene	SRK05	0999	08/24/2010	N001	ug/L	0.2	U		0.2		TB
Selenium	SRK05	0999	08/24/2010	N002	mg/L	0.000032	U		0.000032		E
Toluene	SRK05	0999	08/24/2010	N001	ug/L	0.19	U		0.19		TB
Uranium	SRK05	0999	08/24/2010	N002	mg/L	0.000016			0.0000029		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.
TB	Trip Blank

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 10/18/2010

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0317		5435.18	08/25/2010	09:27:08	10.71	5424.47
0318	O	5435.22	08/25/2010	09:52:15	11.2	5424.02
0319	O	5430.66	08/24/2010	16:54:52	7.94	5422.72
0320	O	5427.4	08/25/2010	11:01:34	5.04	5422.36
0508	O	5430.2	08/25/2010	08:34:24	6.69	5423.51
0510	O	5427.87	08/25/2010	10:15:15	5.12	5422.75
0684	D	5432.68	08/24/2010	15:27:40	15.24	5417.44

STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 10/18/2010

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
0300	U	5467.35	09/29/2010	13:55:48	14.15	5453.2
0303	O	5446.91	08/25/2010	14:20:31	9.8	5437.11
0305	O	5448.75	08/25/2010	13:58:24	12.4	5436.35
0307	O	5447.1	08/25/2010	15:38:22	11.22	5435.88
0309	O	5450.18	08/25/2010	14:53:15	15.19	5434.99
0310	D	5450.56	08/25/2010	11:57:39	17	5433.56
0311	D	5450.7	08/25/2010	12:14:32	17.2	5433.5
0312	D	5451.06	08/25/2010	12:36:02	17.19	5433.87

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

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Hydrographs

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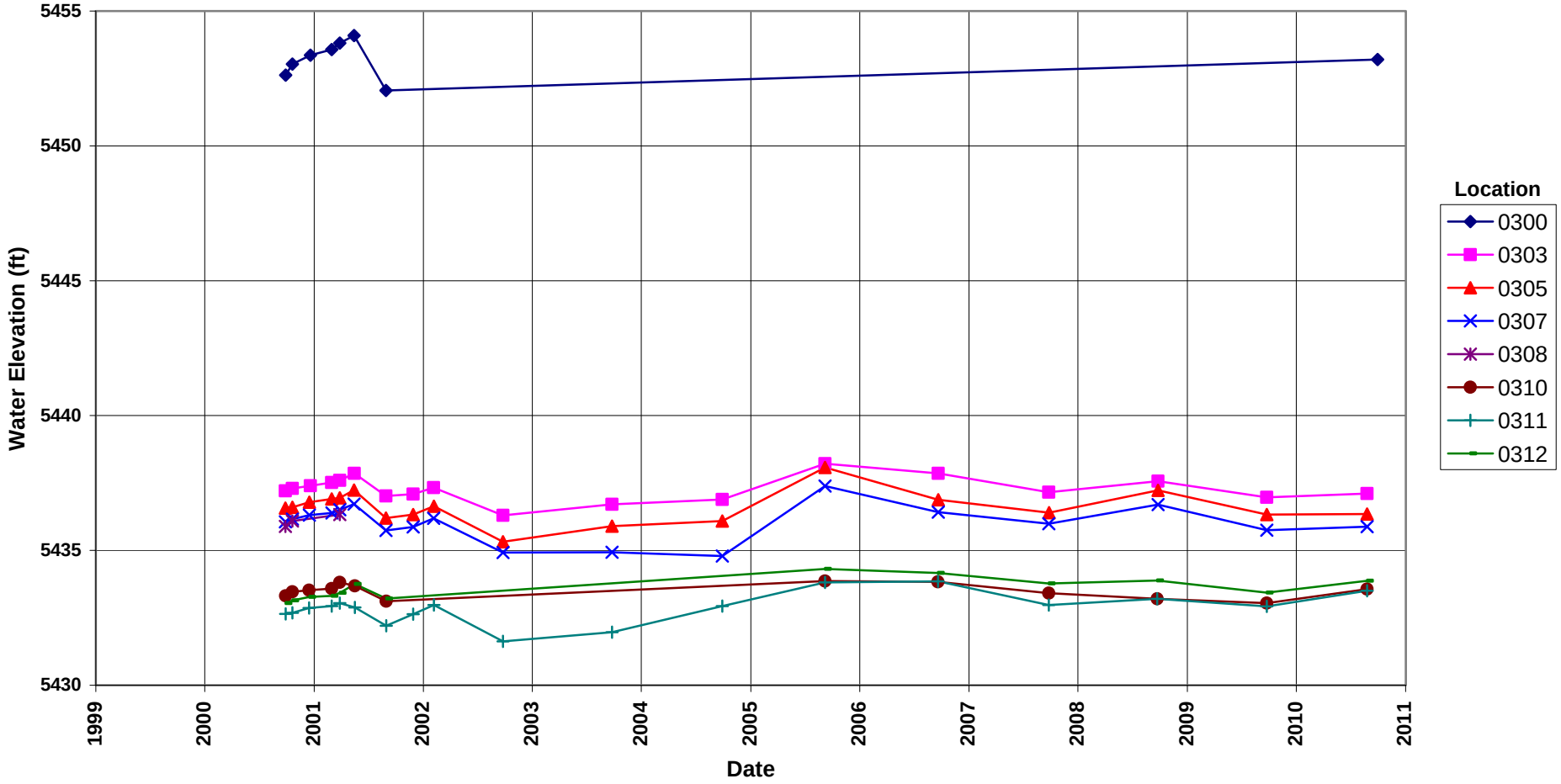
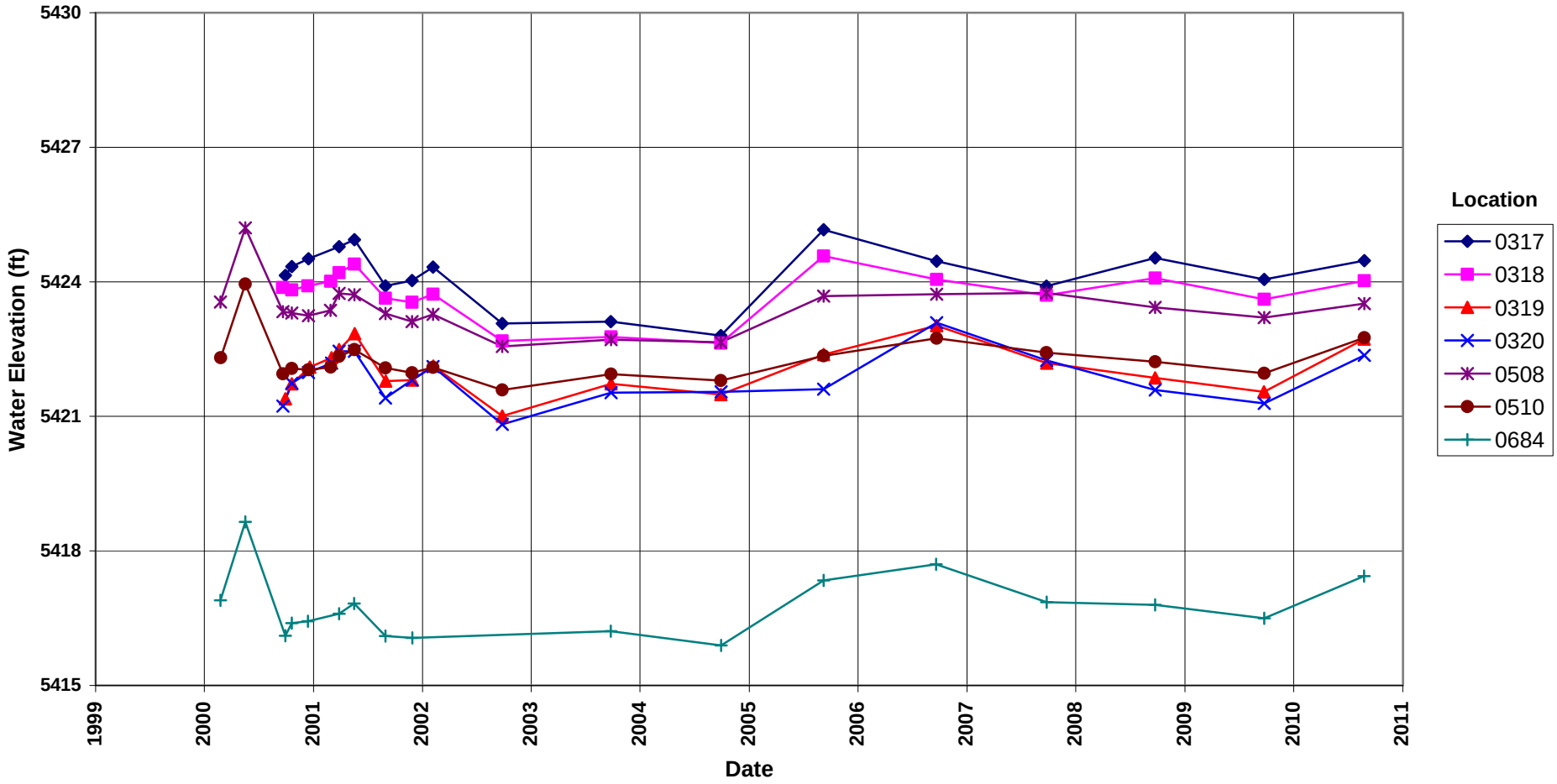
Slick Rock East Processing Site
Hydrograph



Slick Rock West Processing Site
Hydrograph



Time-Concentration Graphs

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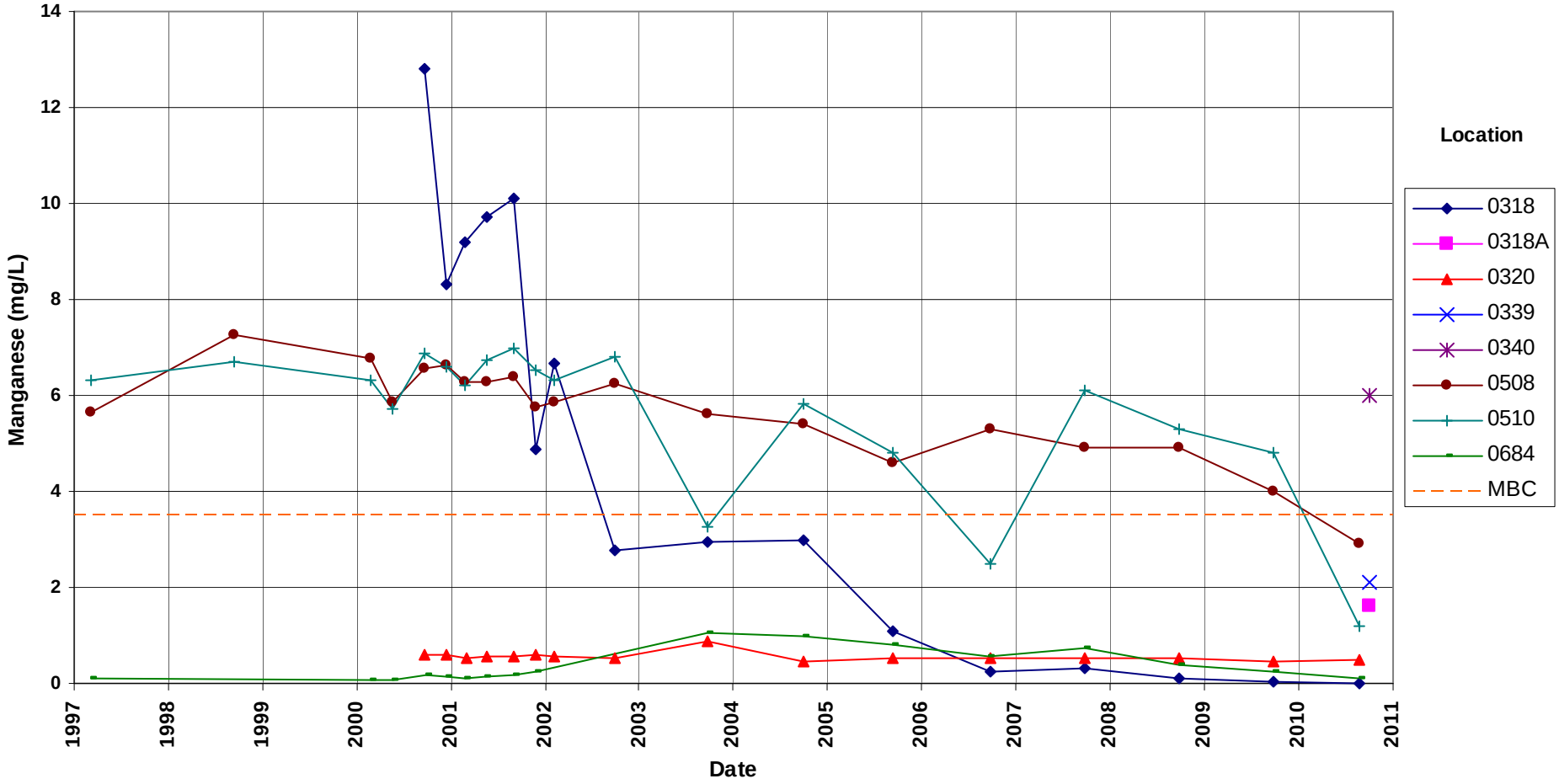
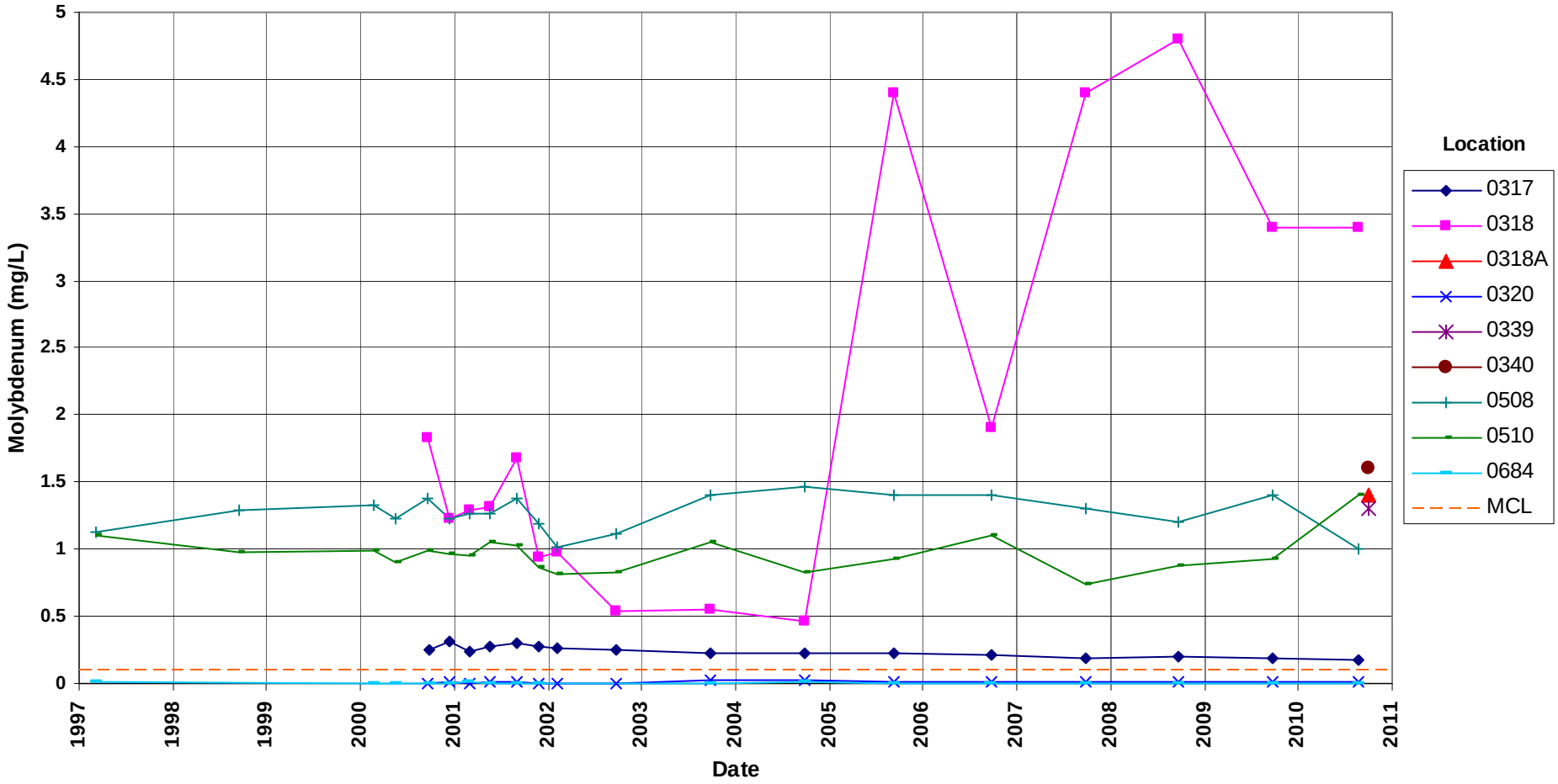
Slick Rock West Processing Site
Manganese Concentration
Maximum Background Concentration (MBD) = 3.5 mg/L

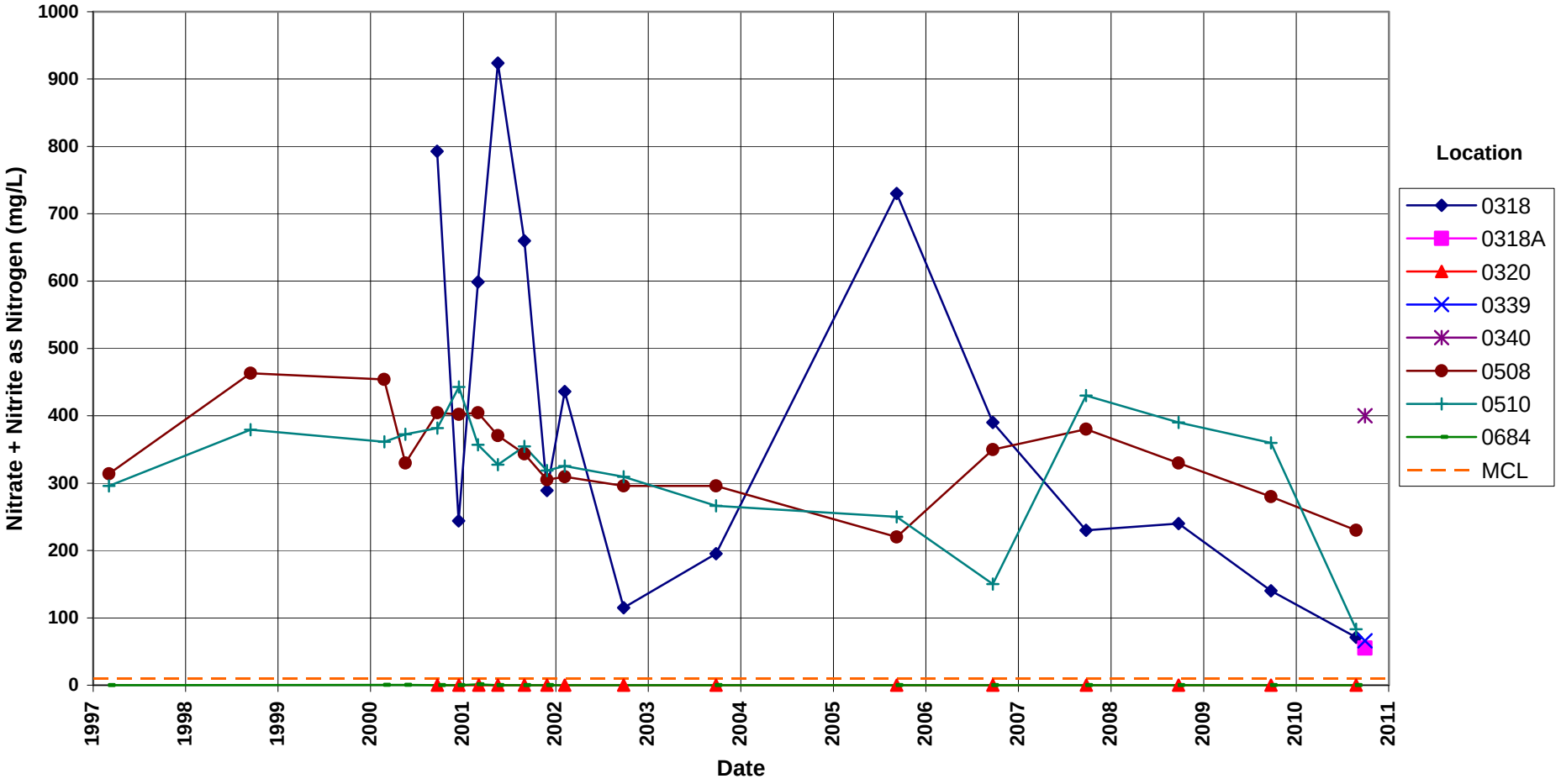


Slick Rock West Processing Site
Molybdenum Concentration
Maximum Contaminant Level (MCL) = 0.1 mg/L

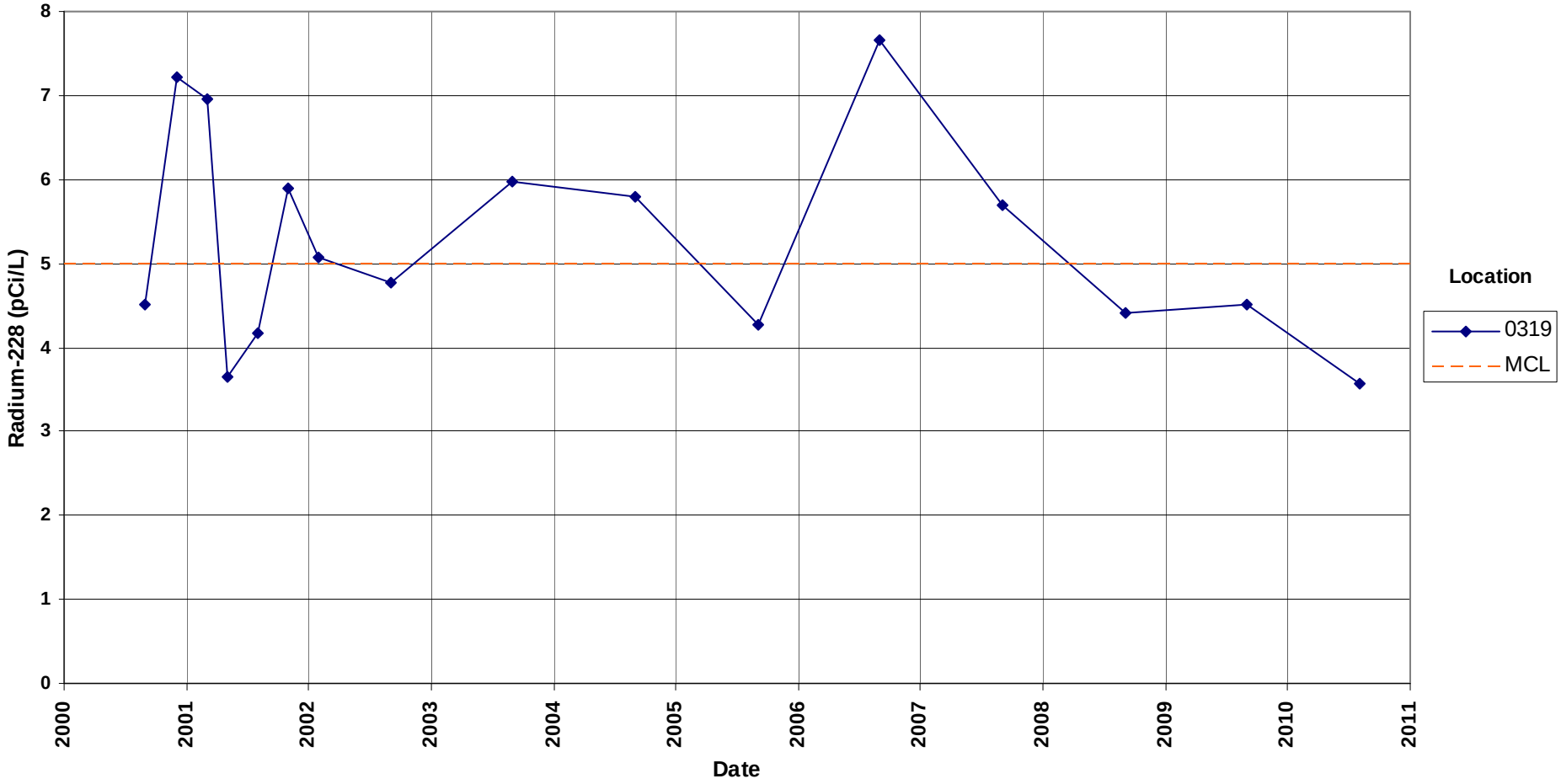


Slick Rock West Processing Site
Nitrate + Nitrite as Nitrogen Concentration

Maximum Contaminant Level (MCL) = 10.0 mg/L

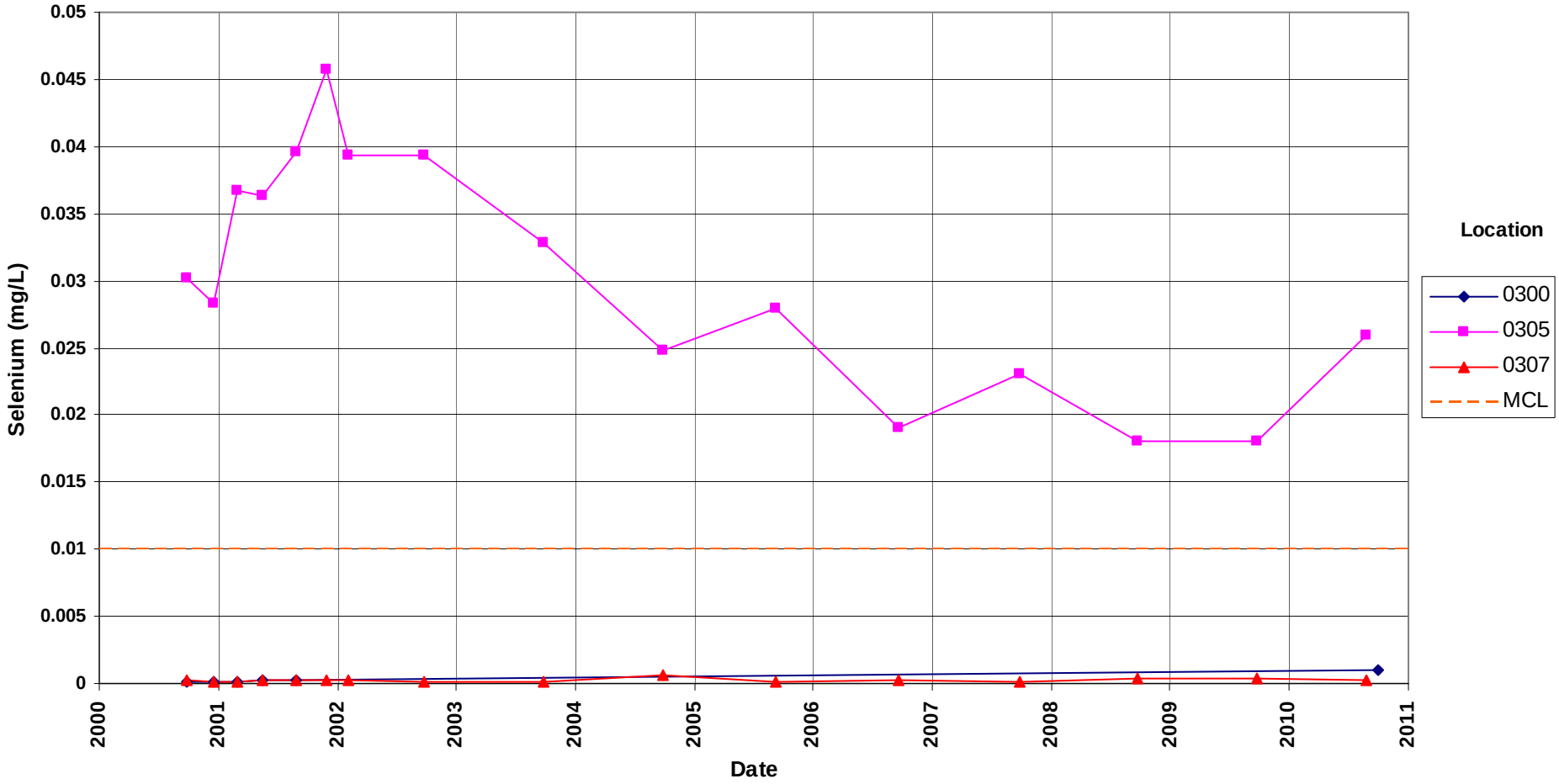


Slick Rock West Processing Site
Radium-226+228 Concentration
Maximum Contaminant Level (MCL) = 5.0 pCi/L

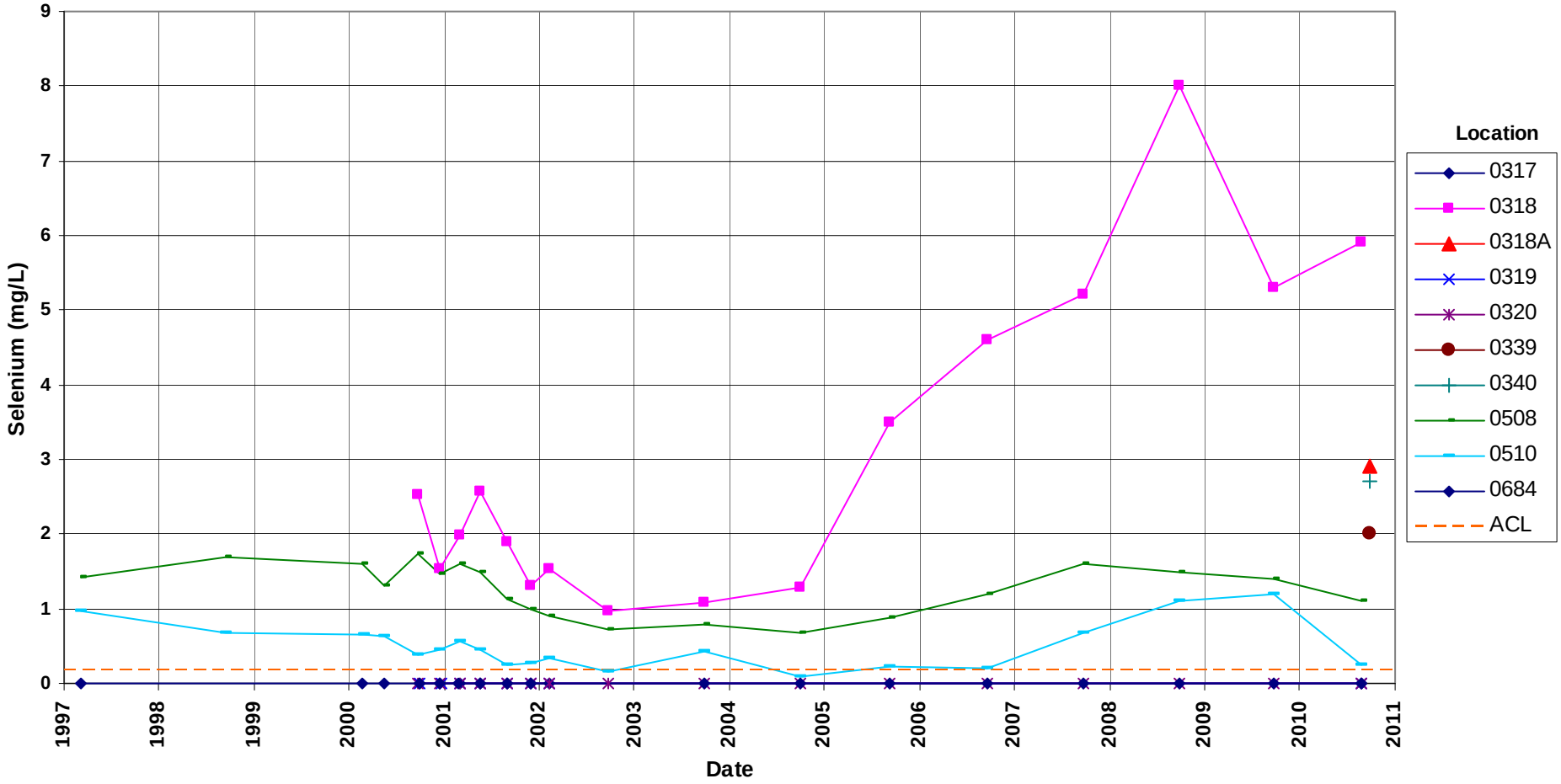


Slick Rock East Processing Site
Selenium Concentration

Maximum Contaminant Level (MCL) = 0.01 mg/L

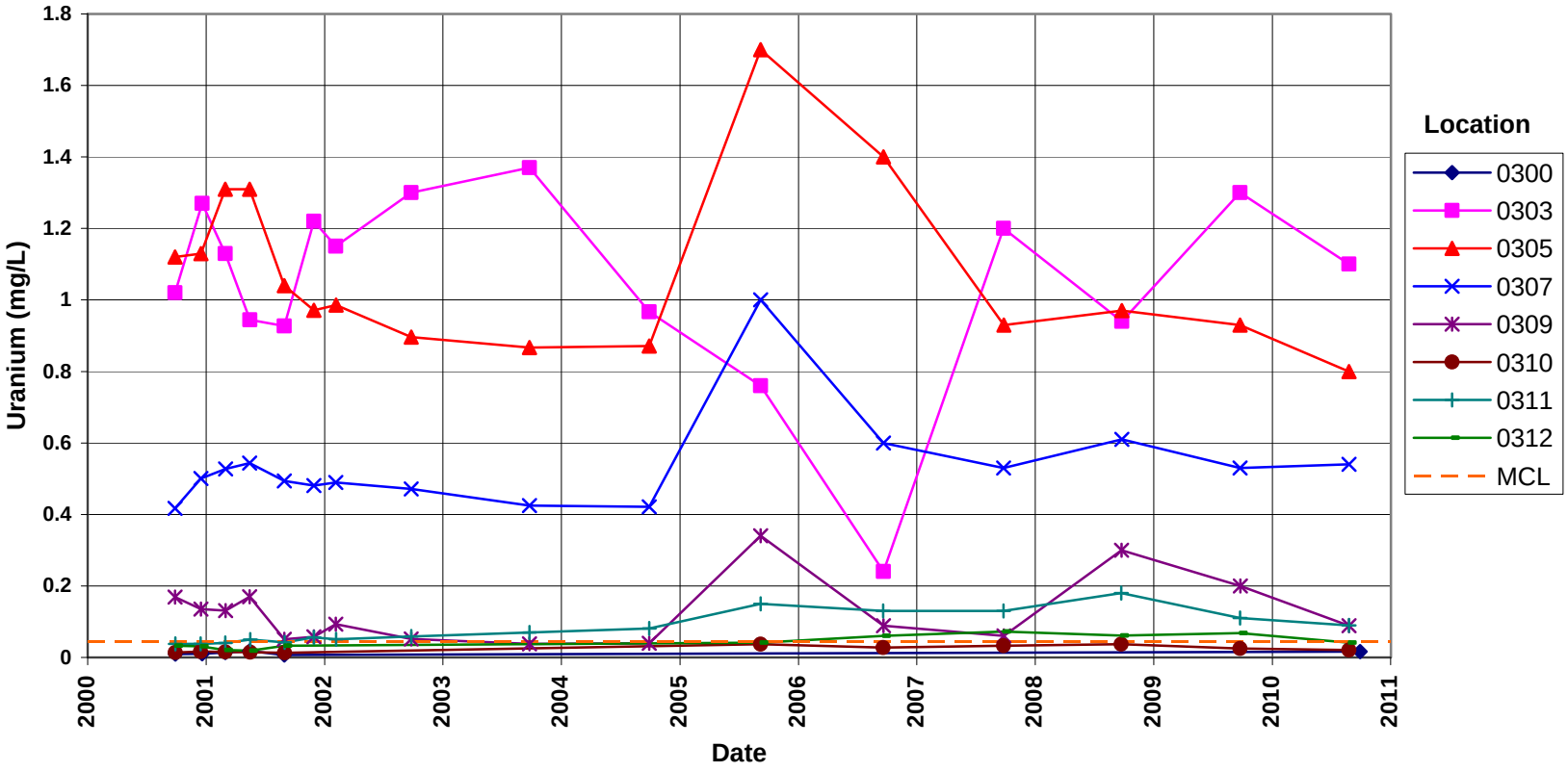


Slick Rock West Processing Site
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.18 mg/L

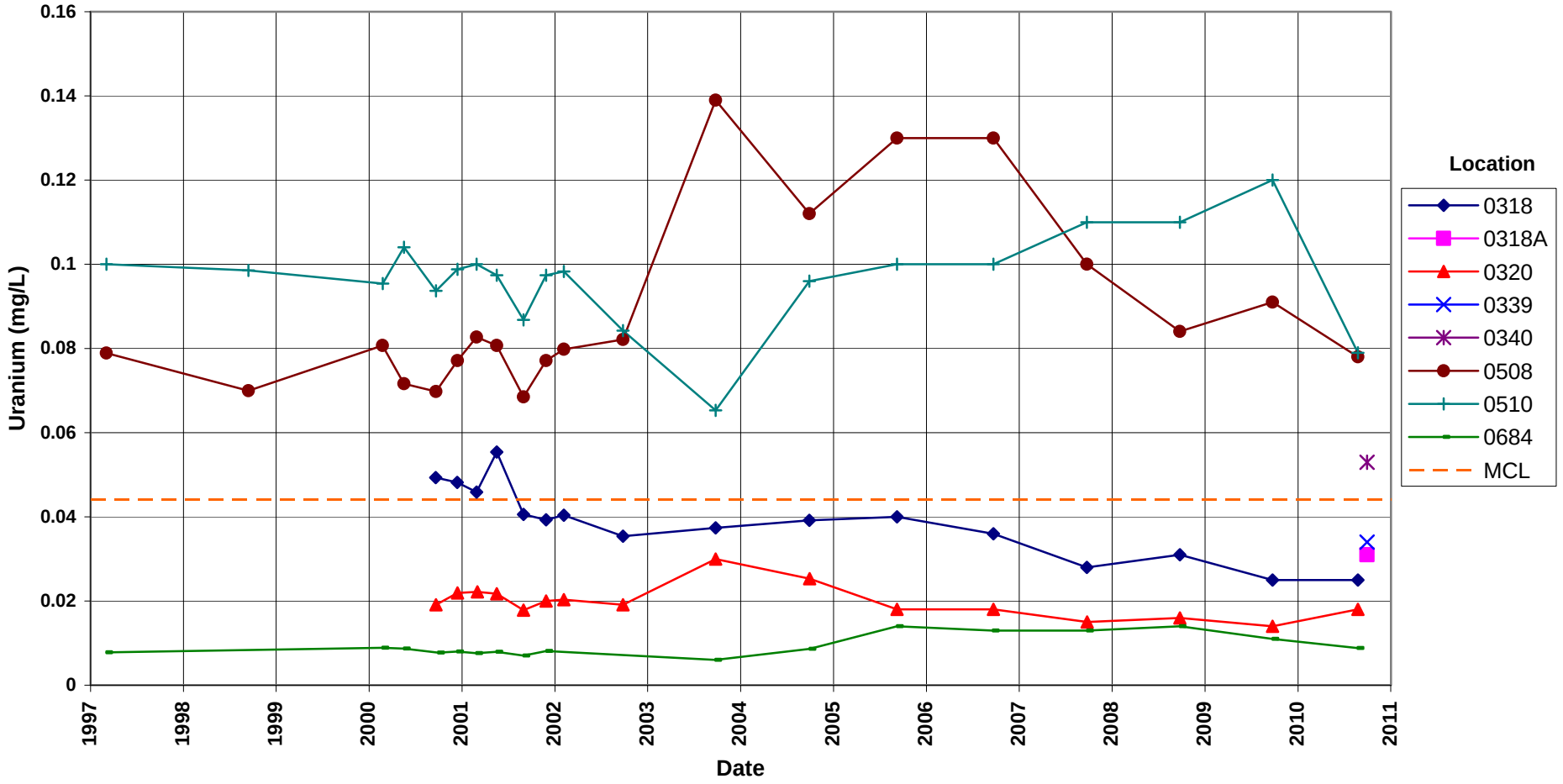


Slick Rock East Processing Site
Uranium Concentration

Maximum Contaminant Level (MCL) = 0.044 mg/L



Slick Rock West Processing Site
Uranium Concentration
Maximum Contaminant Level (MCL) = 0.044 mg/L



Attachment 3
Sampling and Analysis Work Order

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Task Order LM00-501
Control Number 10-0817

August 11, 2010

U.S. Department of Energy
Office of Legacy Management
ATTN: Richard Bush
Site Manager
2597 B ¾ Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
August 2010 Environmental Sampling at Slick Rock, Colorado

REFERENCE: Task Order LM00-501-02-120-402, Slick Rock, CO, Site

Dear Mr. Bush:

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 routine monitoring at the Slick Rock sites. Water quality data will be collected from monitoring wells and surface locations at this site as part of the routine environmental sampling currently scheduled to begin the week of August 30, 2010.

The following lists show the locations scheduled to be sampled during this event.

Monitoring Wells*

West Site

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

East Site

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

*NOTE: Al = Alluvium; Je = Jurassic Entrada Sandstone; *Italicized wells are to be installed the week of August 23, 2010.*

Surface Water

West Site

347	349	693	694

East Site

692	696	700

The S.M. Stoller Corporation 2597 B ¾ Road Grand Junction, CO 81503 (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.

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

Sincerely,

David Traub

David Traub
Site Lead

DT/lcg/lb

Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
David Traub, Stoller
EDD Delivery
rc-grand.junction

Sampling Frequencies for Locations at Slick Rock, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
Union Carbide						
317			X			
318			X			
318A			X			
319			X			
320			X			
339			X			
340			X			
508			X			
510			X			
684			X			
North Continent						
303			X			
305			X			
307			X			
309			X			
310			X			
311			X			
312			X			
Surface Locations						
Union Carbide						
347			X			
349			X			
693			X			
694			X			
North Continent						
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					
Ammonia as N (NH3-N)					
Lead					
Magnesium					
Manganese	0318, 0320, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.005	SW-846 6010	LMM-01
Molybdenum	0317, 0318, 0320, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	0318, 0320, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.05	EPA 353.1	WCH-A-022
Potassium					
Radium-226	0319				GPC-A-018
Radium-228	0319				GPC-A-020
Selenium	0305, 0307, 0317, 0318, 0319, 0320, 0508, 0510, 0684	0347, 0349, 0693, 0694	0.0001	SW-846 6020	LMM-02
Sodium					
Uranium	0303, 0305, 0307, 0309, 0310, 0311, 0312, 0318, 0320, 0508, 0510, 0684	X	0.0001	SW-846 6020	LMM-02
VOCs (BETX)	0319 only		0.005	SW-846 8260	VOA-A-009
Total No. of Analytes	8	5			

Note: All analyte samples are considered unfiltered unless stated otherwise. 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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Stoller
Grand Junction Office
established 1959

Memorandum

DATE: August 30, 2010

TO: David Traub

FROM: Jeff Walters

SUBJECT: Sampling Trip Report

Site: Slick Rock, Colorado- East and West

Dates of Sampling Event: August 24-26, 2010

Team Members: Jeff Walters and Joe Trevino

Number of Locations Sampled: 7 monitoring wells, 4 surface water locations, 3 duplicates, and 1 trip blank were collected on the West side; 7 monitoring wells and 3 surface water locations were collected on the East side.

Locations Not Sampled/Reason: None.

Location Specific Information: None.

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

Date	Sample Time	Ticket Number	False ID	Location	Type
8/24/2010	1200	IJY 044	2404	0684	Duplicate
8/24/2010	1230	IJY 039	2498	0319	Duplicate
8/24/2010	1645	IJY 043	2500	------	Trip Blank
8/24/2010	1600	IJY 045	2676	------	Equipment Blank

RIN Number Assigned: All samples were assigned to RIN 10083304.

Sample Shipment: Samples were shipped overnight via FedEx to ALS Laboratory Group, Fort Collins, CO, from Grand Junction, CO, on August 26, 2010.

Water Level Measurements: None.

Well Inspection Summary: No issues were identified.

Field Variance: All surface water locations were filtered.

Equipment: All equipment functioned properly.

Institutional Controls: No issues were identified.

Fences, Gates, Locks: All appeared to be in nominal working condition.
Trespassing/Site Disturbances: No issues were identified.

Site Issues: No issues were identified.

Disposal Cell/Drainage Structure Integrity: N/A
Vegetation/Noxious Weed Concerns: N/A
Maintenance Requirements: Brush needs to be cleared from around most wells and some cleared to make roadways to those wells.
Access Issues: None

Corrective Action Taken: None.

cc: (electronic)
Rich Bush, DOE
Cheri Bahrke, Stoller
Steve Donivan, Stoller
EDD Delivery

Stoller established 1959
Grand Junction Office

Memorandum

DATE: January 12, 2011

TO: David Traub

FROM: Kent Moe

SUBJECT: Sampling Trip Report

Site: Slick Rock, Colorado

Dates of Sampling Event: September 29, 2010

Team Members: Kent Moe and Joe Treviño

Number of Locations Sampled: 3 new wells installed and sampled. Well 0300 was resampled.

Locations Not Sampled/Reason: None.

Location Specific Information:

Ticket Number	Location	Sample Date	Description	Notes
IKQ 637	0300	9/29/10	Category I	
IKQ 638	0318A	9/29/10	Category I	
IKQ 639	0339	9/29/10	Category I	
IKQ 640	0340	9/29/10	Category I	

Field Variance: None

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

False ID	True ID	Sample Type	Associated Matrix	Ticket Number	Notes
2066	0339	Duplicate	Groundwater	IKQ 661	

RIN Number Assigned: All samples were assigned to RIN 100933365.

Sample Shipment: Samples were shipped overnight by FedEx to ALS Laboratory., Fort Collins, CO, from Grand Junction, CO, on September 30.

Well Inspection Summary: These were all new wells. We also abandoned well 0318 and replaced it with 0318A.

Equipment: The wells were sampled using the low-flow procedure with a peristaltic pump and the appropriate dedicated equipment.

Institutional Controls: All gates were appropriately closed and locked during the sampling event.

Fences, Gates, Locks: All were in good condition.
Signs: No missing or vandalized signs were observed.
Trespassing/Site Disturbances: N/A

Site Issues: None

Disposal Cell/Drainage Structure Integrity: N/A
Vegetation/Noxious Weed Concerns: None
Maintenance Requirements: In future events, brush may need to be pruned back at some locations.

Corrective Action Taken/Required: None.

(KLM/lcg)

cc: (electronic)
Rich Bush, DOE
Cheri Bahrke, Stoller
Steve Donivan, Stoller
EDD Delivery