Data Validation Package

September 2012
Water Sampling at the
Slick Rock, Colorado, Processing Sites

December 2012

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Slick Rock, Colorado, Processing Sites

Sampling Period: September 11-12, 2012

The Slick Rock, Colorado, Processing Sites are referred to as the Slick Rock West Processing Site (SRK05) and the Slick Rock East Processing Site (SRK06). This annual event involved sampling a total of 16 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* (GCAP). Water levels were measured 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 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.

As defined in the GCAP, the constituents of potential concern (COPCs) in the groundwater at 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). Results from this sampling event demonstrated 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 1.

Table 2 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 Wells with Samples that Exceeded Standards in September 2012

Analyte	Standard (mg/L)	Site	Location	Concentration (mg/L)
Manganese [a]	4.2	West	0340	5.4
Molybdenum	0.1	West	0317	0.15
			0318A	1.0
			0339	1.1
			0340	1.5
			0508	1.2
			0510	0.81
Nitrate + Nitrite as Nitrogen	10	West	0318A	34
			0339	44
			0340	320
			0508	200
			0510	210
Selenium [b]	0.18	West	0318A	2.2
			0339	1.8
			0340	2.4
			0508	1.1
			0510	1.1
	0.01	East	0305	0.014
Uranium	0.044	West	0340	0.045
			0508	0.080
			0510	0.083
		East	0303	0.26
			0305	0.69
			0307	0.59
			0311	0.060
			0312	0.11

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 background concentration observed in well SRK06 0300.
[b] Selenium standard for the West Processing Site is the proposed Alternate Concentration Limit.

Table 2. BTEX [a] Maximum Contaminant Levels and Results for Well 0319 in September 2012

Analyte	Maximum Contaminant Level (mg/L)	Concentration in Well 0319 (mg/L)
Benzene	0.005	2.5
Ethyl benzene	0.7	0.18
Toluene	1	0.57
Xylenes, Total	10	4.2

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 benchmark values derived using historical data (from 1997 to present) at background river locations. The background locations are 0693, which is located

upstream of the West Processing Site, but downstream of the East Processing Site and 0696, which is located upstream of the East Processing Site.

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 concentrations at this location and at 0700, which is farther downstream, remain well below the benchmark concentration for background location 0696, as shown in Table 3.

Table 3. Comparison of Slick Rock East Processing Site September 2012 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	0.00070	0.00049

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, only manganese at locations 0349 and 0694 exceeded the benchmark value during this event. Location 0349 is the predicted location where the centroid of the contaminant plumes will intersect the river.

Table 4. Comparison of Slick Rock West Processing Site September 2012 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	0.0111	0.0056	0.024	0.055
Molybdenum	0.0048	0.00099	0.0011	0.0016
Nitrate + Nitrite as N	0.2400	Not detected	Not detected	0.025
Selenium	0.0047	0.00032	0.0003	0.00032
Uranium	0.0022	0.00057	0.00062	0.00083

David Traub
Site Lead, S.M. Stoller Corporation

12-6-12
Date

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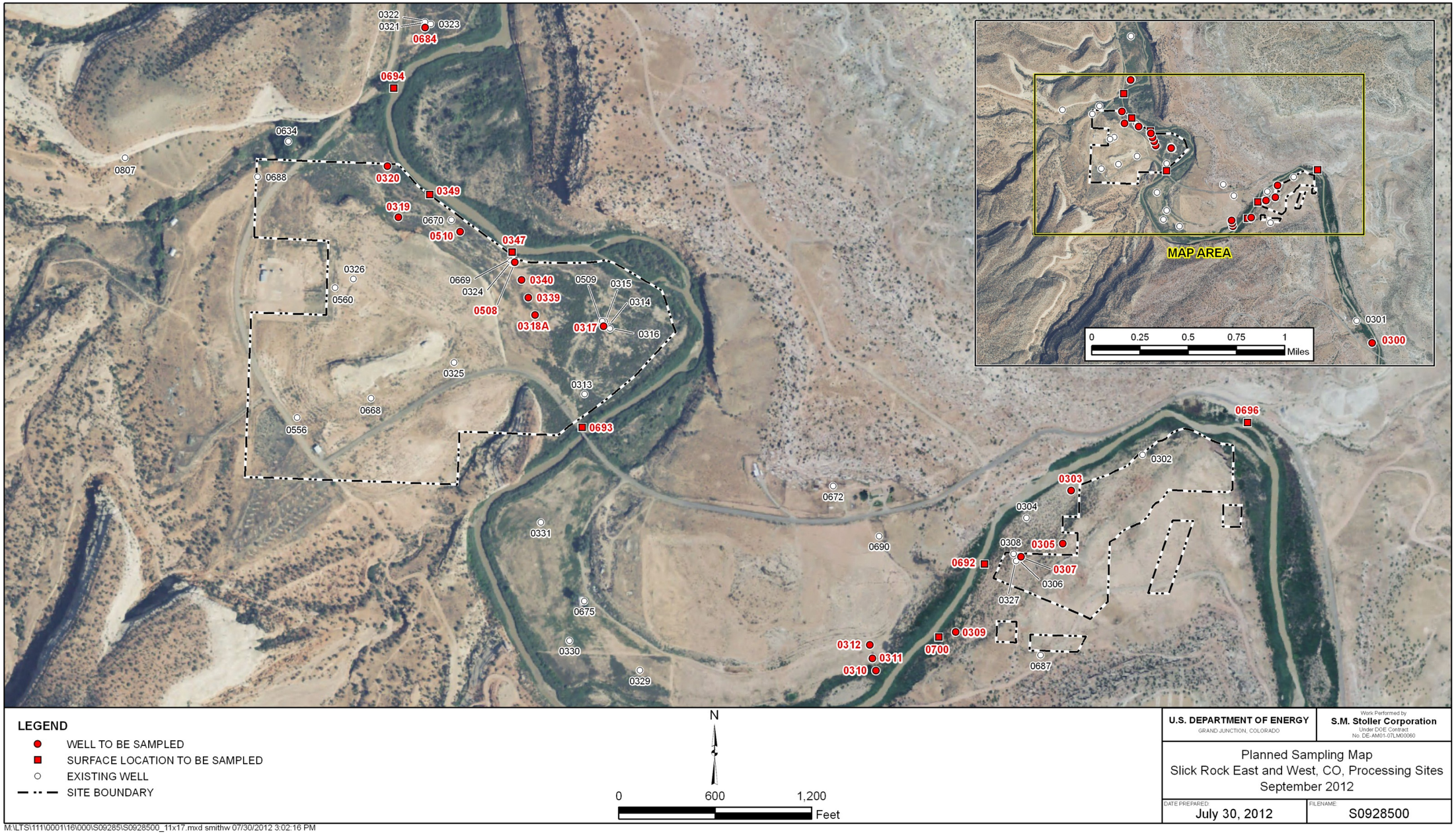

Slick Rock Processing Site Sample Location Map

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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 11-12, 2012
Date(s) of Verification	October 31, 2012	**Name of Verifier**	Gretchen Baer

	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 July 31, 2012.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on September 10, 2012.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	A specific conductance reading was entered into the field sheet incorrectly; all previous and subsequent checks were in range, indicating that the instrument performance was acceptable.
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:		There were no Category II wells.
Was the flow rate less than 500 mL/min?	NA	
Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from locations 0319 and 0339.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	One equipment blank was prepared.
11. Were trip blanks prepared and included with each shipment of VOC samples?	Yes	One trip blank was included with the samples.
12. Were QC samples assigned a fictitious site identification number?	Yes	
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?	No	The VOC samples were received with pH>2. Results have been qualified.
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	Water levels were measured at each sampled monitoring well.

Laboratory Performance Assessment

General Information

Report Number (RIN):	12094825
Sample Event:	September 11-12, 2012
Site(s):	Slick Rock, Colorado; Processing Sites
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1209226
Analysis:	Metals, Organics, Wet Chemistry, and Radiochemistry
Validator:	Gretchen Baer
Review Date:	October 31, 2012

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	SOP 783	SOP 783, EPA 903.1m
Radium-228	GPC-A-020	SOP 749	SOP 724
Volatile Organics	VOA-A-009	SW-846 5030C	SW-846 8260

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
1209226-10	0319	All VOCs	J	Incorrect preservation
1209226-14	0347	Manganese	J	Less than 5 times the equipment blank
1209226-20	0693	Manganese	J	Less than 5 times the equipment blank
1209226-25	0319 Duplicate	All VOCs	J	Incorrect preservation

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 27 water samples on September 14, 2012, 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 0.2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly, with the following exceptions. Two bottles submitted for metals analysis were received with a pH outside of the acceptance range. The laboratory adjusted the pH of the samples upon receipt. The field samples submitted for volatile organics analysis were received with pH values between 3 and 5, which is greater than the pH value of 2 required for preservation. The analysis of these samples exceeded the 7-day holding time for unpreserved samples; the results are qualified with a "J" flag as estimated values. 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 September 19, 2012. 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 nine verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6010B, Manganese
Calibration for manganese was performed on September 27, 2012, using four 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 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.

Method SW-846 6020, Molybdenum, Selenium, Uranium
Calibrations were performed on October 1, 2012, 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 six 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 8260, Volatiles
The initial calibrations for benzene, ethylbenzene, toluene, and xylenes were performed using nine calibration standards on July 13, 2012. 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. 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

Radium-226
Emanation cell plateau voltage determinations and cell efficiency calibrations were performed March 2012. Daily instrument checks performed on September 28, 2012, met the acceptance criteria. All sample chemical recoveries were within the acceptance range of 40 to 110 percent.

Radium-228
Plateau voltage determinations were performed in December 2011 and detector efficiency calibrations were performed in February 2012. Background determinations were performed on October 3, 2012. The daily instrument checks performed on October 5-6, 2012, 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
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. 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.

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 October 11, 2012. 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: 12094825 **Lab Code:** PAR **Validator:** Gretchen Baer **Validation Date:** 10/26/2012

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

# of Samples: 27 **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: 12094825 **Lab Code:** PAR **Date Due:** 10/12/2012

Matrix: Water **Site Code:** SRK **Date Completed:** 10/12/2012

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	ICV	CCV	ICB	CCB								
Manganese	ICP/ES	09/27/2012	-0.8000	1.0000	OK	OK	OK	OK	OK	96.0	95.0	97.0	1.0	96.0	3.0	102.0
Manganese	ICP/ES	09/27/2012							OK	102.0	89.0	92.0	1.0	98.0	3.0	107.0
Molybdenum	ICP/MS	10/01/2012	-0.0370	1.0000	OK	OK	OK	OK	OK	95.0	82.0	86.0	0.0	93.0	2.0	83.0
Molybdenum	ICP/MS	10/01/2012							OK	91.0	92.0	92.0	0.0		0.0	
Selenium	ICP/MS	10/01/2012	-0.0200	1.0000	OK	OK	OK	OK	OK	92.0	94.0	92.0	1.0	99.0	3.0	82.0
Selenium	ICP/MS	10/01/2012							OK	98.0	78.0	84.0	0.0			
Uranium	ICP/MS	10/01/2012	0.0000	1.0000	OK	OK	OK	OK	OK	97.0	98.0	96.0	1.0	100.0	5.0	100.0
Uranium	ICP/MS	10/01/2012							OK	98.0	100.0	86.0	4.0		2.0	

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 12094825 **Lab Code:** PAR **Date Due:** 10/12/2012

Matrix: Water **Site Code:** SRK **Date Completed:** 10/12/2012

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	09/19/2012	0.000	0.9998	OK	OK	OK	OK	OK	108.00				
Nitrate+Nitrite as N	09/19/2012	0.000	0.9999	OK	OK	OK	OK						

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 12094825 **Project:** Slick Rock **Lab Code:** PAR **Validation Date:** 10/31/2012

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:

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

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 12094825 **Lab Code:** PAR **Date Due:** 10/12/2012

Matrix: Water **Site Code:** SRK **Date Completed:** 10/12/2012

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0319	Radium-226	09/28/2012			78.0			
2498	Radium-226	09/28/2012			82.8			
Blank_Spike	Radium-226	09/28/2012			93.2	108.00		
Blank_Spike_Du	Radium-226	09/28/2012			96.9	101.00		0.41
Blank	Radium-226	09/28/2012	0.0167	U	91.5			
0319	Radium-228	10/05/2012			84.4			
2498	Radium-228	10/05/2012			80.0			
Blank_Spike	Radium-228	10/05/2012			94.8	109.00		
Blank_Spike_Du	Radium-228	10/05/2012			91.2	98.70		0.58
Blank	Radium-228	10/05/2012	0.1460	U	90.5			

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. 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 (field ID 2399) was taken from the tubing reel used to collect the surface water samples. This blank was filtered before being containerized and preserved according to analytical requirements. Manganese and uranium were detected in the equipment blank. Associated sample results that are less than 5 times the equipment blank concentration are qualified with a "J" flag (estimated).

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. 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 0319 and 0339 (field duplicate IDs 2498 and 2676). The non-radiochemical duplicate results met the criteria, demonstrating acceptable overall precision. 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: Equipment/Trip Blanks

RIN: 12094825 **Lab Code:** PAR **Project:** Slick Rock **Validation Date:** 10/26/2012

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1209226-24	SW6010	Manganese	1.3	B	0.11	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1209226-14	KKX 712	0347	5.6	1		J
1209226-15	KKX 713	0349	24	1		
1209226-20	KKX 714	0693	3.7	1	B	J
1209226-21	KKX 715	0694	55	1		

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1209226-24	SW6020	Uranium	0.003	B	0.0029	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1209226-14	KKX 712	0347	0.57	1		
1209226-15	KKX 713	0349	0.62	1		
1209226-19	KKX 716	0692	0.7	10		
1209226-20	KKX 714	0693	0.55	1		
1209226-21	KKX 715	0694	0.83	1		
1209226-22	KKX 717	0696	0.57	10		
1209226-23	KKX 721	0700	0.49	10		

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 12094825 Lab Code: PAR Project: Slick Rock Validation Date: 10/26/2012

Duplicate: 2498 **Sample:** 0319

Analyte	Sample Result	Flag	Error	Dilution	Duplicate Result	Flag	Error	Dilution	RPD	RER	Units
Benzene	2500			100	2300	E		10	8.33		UG/L
Benzene	2500			100	2300			100	8.33		UG/L
Ethylbenzene	190			100	200			10	5.13		UG/L
Ethylbenzene	190			100	180			100	5.41		UG/L
m,p-Xylene	3500			100	4100	E		10	15.79		UG/L
m,p-Xylene	3500			100	3200			100	8.96		UG/L
o-Xylene	700			100	710	E		10	1.42		UG/L
o-Xylene	700			100	620			100	12.12		UG/L
Radium-226	1.7		0.626	1	2.16		0.751	1	23.83	0.9	pCi/L
Radium-228	1.95		0.523	1	2.13		0.561	1	8.82	0.5	pCi/L
Toluene	610			100	550			10	10.34		UG/L
Toluene	610			100	540			100	12.17		UG/L

Duplicate: 2676 **Sample:** 0339

Analyte	Sample Result	Flag	Error	Dilution	Duplicate Result	Flag	Error	Dilution	RPD	RER	Units
Manganese	1700			1	1700			1	0		UG/L
Molybdenum	1100			50	1100			100	0		UG/L
Nitrate+Nitrite as N	44			50	37			50	17.28		MG/L
Selenium	1800			50	1800			100	0		UG/L
Uranium	30			50	31			1	3.28		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: Steve Donivan — Date: 12-5-2012

Data Validation Lead: Gretchen Baer — Date: 12/5/12

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

One result was identified as potentially anomalous. The selenium result for location 0307 had a concentration higher than previously observed. The sample was analyzed twice at different dilutions and the results from the two runs were in agreement. Potential anomalies in the field parameters were also examined for patterns of repeated high or low bias, which suggest a systematic error due to instrument malfunction. No such patterns were found and all field data from this event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All Historical Data

Laboratory: ALS Laboratory Group

RIN: 12094825

Report Date: 11/26/2012

					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	09/11/2012	Molybdenum	0.15		F	0.316			0.18		F	17	0	No
SRK05	0320	N001	09/11/2012	Uranium	0.01		F	0.03		F	0.011		F	19	0	No
SRK05	0347	0001	09/11/2012	Molybdenum	0.00099			0.012			0.0013			16	6	No
SRK05	0349	0001	09/12/2012	Molybdenum	0.0011			0.011			0.0015			15	5	No
SRK06	0305	N001	09/12/2012	Selenium	0.014		F	0.0457		F	0.018		F	17	0	No
SRK06	0305	N001	09/12/2012	Uranium	0.69		F	1.7		F	0.78		F	17	0	No
SRK06	0307	N001	09/12/2012	Selenium	0.0029		F	0.00064	U	F	0.0001	U	F	17	10	Yes
SRK06	0312	N001	09/12/2012	Uranium	0.11		F	0.072		F	0.0188		F	12	0	No
SRK06	0700	0001	09/12/2012	Uranium	0.00049			0.0014			0.00059			7	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.

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: 11/27/2012
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	09/11/2012	N001	19.46 - 39.52	300		F	#		
Molybdenum	mg/L	09/11/2012	N001	19.46 - 39.52	0.15		F	#	0.00032	
Oxidation Reduction Potential	mV	09/11/2012	N001	19.46 - 39.52	161.7		F	#		
pH	s.u.	09/11/2012	N001	19.46 - 39.52	7.49		F	#		
Selenium	mg/L	09/11/2012	N001	19.46 - 39.52	0.0058		F	#	0.00032	
Specific Conductance	umhos /cm	09/11/2012	N001	19.46 - 39.52	2472		F	#		
Temperature	C	09/11/2012	N001	19.46 - 39.52	14.02		F	#		
Turbidity	NTU	09/11/2012	N001	19.46 - 39.52	1.32		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/11/2012	N001	9.2 - 14.2	297		F	#		
Manganese	mg/L	09/11/2012	N001	9.2 - 14.2	0.85		F	#	0.00011	
Molybdenum	mg/L	09/11/2012	N001	9.2 - 14.2	1		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N001	9.2 - 14.2	34		F	#	0.2	
Oxidation Reduction Potential	mV	09/11/2012	N001	9.2 - 14.2	85		F	#		
pH	s.u.	09/11/2012	N001	9.2 - 14.2	7.13		F	#		
Selenium	mg/L	09/11/2012	N001	9.2 - 14.2	2.2		F	#	0.00032	
Specific Conductance	umhos /cm	09/11/2012	N001	9.2 - 14.2	1820		F	#		
Temperature	C	09/11/2012	N001	9.2 - 14.2	17.97		F	#		
Turbidity	NTU	09/11/2012	N001	9.2 - 14.2	4.88		F	#		
Uranium	mg/L	09/11/2012	N001	9.2 - 14.2	0.026		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site

REPORT DATE: 11/27/2012

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	09/11/2012	N001	4.55 - 14.58	1007		F	#		
Benzene	ug/L	09/11/2012	N001	4.55 - 14.58	2500		FJ	#	30	
Benzene	ug/L	09/11/2012	N002	4.55 - 14.58	2300		FJ	#	30	
Ethylbenzene	ug/L	09/11/2012	N001	4.55 - 14.58	180		FJ	#	3	
Ethylbenzene	ug/L	09/11/2012	N002	4.55 - 14.58	200		FJ	#	3	
m,p-Xylene	ug/L	09/11/2012	N001	4.55 - 14.58	3500		FJ	#	30	
m,p-Xylene	ug/L	09/11/2012	N002	4.55 - 14.58	3200		FJ	#	30	
o-Xylene	ug/L	09/11/2012	N001	4.55 - 14.58	700		FJ	#	30	
o-Xylene	ug/L	09/11/2012	N002	4.55 - 14.58	620		FJ	#	30	
Oxidation Reduction Potential	mV	09/11/2012	N001	4.55 - 14.58	-132.7		F	#		
pH	s.u.	09/11/2012	N001	4.55 - 14.58	7.12		F	#		
Radium-226	pCi/L	09/11/2012	N001	4.55 - 14.58	1.7		F	#	0.23	0.626
Radium-226	pCi/L	09/11/2012	N002	4.55 - 14.58	2.16		F	#	0.29	0.751
Radium-228	pCi/L	09/11/2012	N001	4.55 - 14.58	1.95		F	#	0.33	0.523
Radium-228	pCi/L	09/11/2012	N002	4.55 - 14.58	2.13		F	#	0.33	0.561
Selenium	mg/L	09/11/2012	N001	4.55 - 14.58	0.0013		F	#	0.00016	
Specific Conductance	umhos /cm	09/11/2012	N001	4.55 - 14.58	4639		F	#		
Temperature	C	09/11/2012	N001	4.55 - 14.58	17.76		F	#		
Toluene	ug/L	09/11/2012	N001	4.55 - 14.58	570		FJ	#	3	
Toluene	ug/L	09/11/2012	N002	4.55 - 14.58	550		FJ	#	3	
Turbidity	NTU	09/11/2012	N001	4.55 - 14.58	7.54		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/11/2012	N001	4.92 - 9.96	340		F	#		
Manganese	mg/L	09/11/2012	N001	4.92 - 9.96	0.47		F	#	0.00011	
Molybdenum	mg/L	09/11/2012	N001	4.92 - 9.96	0.0096		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N001	4.92 - 9.96	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	09/11/2012	N001	4.92 - 9.96	-61.2		F	#		
pH	s.u.	09/11/2012	N001	4.92 - 9.96	7.3		F	#		
Selenium	mg/L	09/11/2012	N001	4.92 - 9.96	0.00033		F	#	0.000032	
Specific Conductance	umhos /cm	09/11/2012	N001	4.92 - 9.96	824		F	#		
Temperature	C	09/11/2012	N001	4.92 - 9.96	16.06		F	#		
Turbidity	NTU	09/11/2012	N001	4.92 - 9.96	3.17		F	#		
Uranium	mg/L	09/11/2012	N001	4.92 - 9.96	0.01		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/11/2012	N001	11	-	14	295		F	#		
Manganese	mg/L	09/11/2012	N001	11	-	14	1.7		F	#	0.00011	
Manganese	mg/L	09/11/2012	N002	11	-	14	1.7		F	#	0.00011	
Molybdenum	mg/L	09/11/2012	N001	11	-	14	1.1		F	#	0.0016	
Molybdenum	mg/L	09/11/2012	N002	11	-	14	1.1		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N001	11	-	14	44		F	#	0.5	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N002	11	-	14	37		F	#	0.5	
Oxidation Reduction Potential	mV	09/11/2012	N001	11	-	14	84.4		F	#		
pH	s.u.	09/11/2012	N001	11	-	14	7.15		F	#		
Selenium	mg/L	09/11/2012	N001	11	-	14	1.8		F	#	0.0016	
Selenium	mg/L	09/11/2012	N002	11	-	14	1.8		F	#	0.0032	
Specific Conductance	umhos /cm	09/11/2012	N001	11	-	14	1920		F	#		
Temperature	C	09/11/2012	N001	11	-	14	16.97		F	#		
Turbidity	NTU	09/11/2012	N001	11	-	14	9.62		F	#		
Uranium	mg/L	09/11/2012	N001	11	-	14	0.03		F	#	0.00015	
Uranium	mg/L	09/11/2012	N002	11	-	14	0.031		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/11/2012	N001	6.51 - 11.51	295		F	#		
Manganese	mg/L	09/11/2012	N001	6.51 - 11.51	5.4		F	#	0.00011	
Molybdenum	mg/L	09/11/2012	N001	6.51 - 11.51	1.5		F	#	0.0032	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N001	6.51 - 11.51	320		F	#	2	
Oxidation Reduction Potential	mV	09/11/2012	N001	6.51 - 11.51	83.2		F	#		
pH	s.u.	09/11/2012	N001	6.51 - 11.51	6.78		F	#		
Selenium	mg/L	09/11/2012	N001	6.51 - 11.51	2.4		F	#	0.0032	
Specific Conductance	umhos /cm	09/11/2012	N001	6.51 - 11.51	4373		F	#		
Temperature	C	09/11/2012	N001	6.51 - 11.51	19.26		F	#		
Turbidity	NTU	09/11/2012	N001	6.51 - 11.51	7.61		F	#		
Uranium	mg/L	09/11/2012	N001	6.51 - 11.51	0.045		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/11/2012	N001	1.01	-	11.01	210		F	#		
Manganese	mg/L	09/11/2012	N001	1.01	-	11.01	2.7		F	#	0.00011	
Molybdenum	mg/L	09/11/2012	N001	1.01	-	11.01	1.2		F	#	0.0016	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N001	1.01	-	11.01	200		F	#	2	
Oxidation Reduction Potential	mV	09/11/2012	N001	1.01	-	11.01	75.9		F	#		
pH	s.u.	09/11/2012	N001	1.01	-	11.01	6.67		F	#		
Selenium	mg/L	09/11/2012	N001	1.01	-	11.01	1.1		F	#	0.0016	
Specific Conductance	umhos /cm	09/11/2012	N001	1.01	-	11.01	3985		F	#		
Temperature	C	09/11/2012	N001	1.01	-	11.01	17.75		F	#		
Turbidity	NTU	09/11/2012	N001	1.01	-	11.01	4		F	#		
Uranium	mg/L	09/11/2012	N001	1.01	-	11.01	0.08		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/11/2012	N001	4.92	-	13.92	286		F	#		
Manganese	mg/L	09/11/2012	N001	4.92	-	13.92	3.7		F	#	0.00011	
Molybdenum	mg/L	09/11/2012	N001	4.92	-	13.92	0.81		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	N001	4.92	-	13.92	210		F	#	2	
Oxidation Reduction Potential	mV	09/11/2012	N001	4.92	-	13.92	63.7		F	#		
pH	s.u.	09/11/2012	N001	4.92	-	13.92	6.75		F	#		
Selenium	mg/L	09/11/2012	N001	4.92	-	13.92	1.1		F	#	0.00032	
Specific Conductance	umhos /cm	09/11/2012	N001	4.92	-	13.92	3651		F	#		
Temperature	C	09/11/2012	N001	4.92	-	13.92	17.64		F	#		
Turbidity	NTU	09/11/2012	N001	4.92	-	13.92	2.41		F	#		
Uranium	mg/L	09/11/2012	N001	4.92	-	13.92	0.083		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	11	-	21	189		F	#		
Manganese	mg/L	09/12/2012	N001	11	-	21	0.44		F	#	0.00011	
Molybdenum	mg/L	09/12/2012	N001	11	-	21	0.0058		F	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	09/12/2012	N001	11	-	21	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	09/12/2012	N001	11	-	21	-11.4		F	#		
pH	s.u.	09/12/2012	N001	11	-	21	7.46		F	#		
Selenium	mg/L	09/12/2012	N001	11	-	21	0.00012		F	#	0.000032	
Specific Conductance	umhos /cm	09/12/2012	N001	11	-	21	693		F	#		
Temperature	C	09/12/2012	N001	11	-	21	14.16		F	#		
Turbidity	NTU	09/12/2012	N001	11	-	21	2.98		F	#		
Uranium	mg/L	09/12/2012	N001	11	-	21	0.0092		F	#	0.0000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	4.3 - 14.3	408		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	4.3 - 14.3	-22.3		F	#		
pH	s.u.	09/12/2012	N001	4.3 - 14.3	7.25		F	#		
Specific Conductance	umhos /cm	09/12/2012	N001	4.3 - 14.3	2643		F	#		
Temperature	C	09/12/2012	N001	4.3 - 14.3	16.82		F	#		
Turbidity	NTU	09/12/2012	N001	4.3 - 14.3	2.84		F	#		
Uranium	mg/L	09/12/2012	N001	4.3 - 14.3	0.26		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	8.7	-	18.7	480		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	8.7	-	18.7	16.2		F	#		
pH	s.u.	09/12/2012	N001	8.7	-	18.7	7.36		F	#		
Selenium	mg/L	09/12/2012	N001	8.7	-	18.7	0.014		F	#	0.0016	
Specific Conductance	umhos /cm	09/12/2012	N001	8.7	-	18.7	2850		F	#		
Temperature	C	09/12/2012	N001	8.7	-	18.7	16		F	#		
Turbidity	NTU	09/12/2012	N001	8.7	-	18.7	3.75		F	#		
Uranium	mg/L	09/12/2012	N001	8.7	-	18.7	0.69		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	4.4	-	14.4	828		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	4.4	-	14.4	-66.5		F	#		
pH	s.u.	09/12/2012	N001	4.4	-	14.4	7.28		F	#		
Selenium	mg/L	09/12/2012	N001	4.4	-	14.4	0.0029		F	#	0.00016	
Specific Conductance	umhos /cm	09/12/2012	N001	4.4	-	14.4	6830		F	#		
Temperature	C	09/12/2012	N001	4.4	-	14.4	15.22		F	#		
Turbidity	NTU	09/12/2012	N001	4.4	-	14.4	5.75		F	#		
Uranium	mg/L	09/12/2012	N001	4.4	-	14.4	0.59		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	10.2	-	20.2	770		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	10.2	-	20.2	-100.4		F	#		
pH	s.u.	09/12/2012	N001	10.2	-	20.2	7.83		F	#		
Specific Conductance	umhos /cm	09/12/2012	N001	10.2	-	20.2	2023		F	#		
Temperature	C	09/12/2012	N001	10.2	-	20.2	14.76		F	#		
Turbidity	NTU	09/12/2012	N001	10.2	-	20.2	8.46		F	#		
Uranium	mg/L	09/12/2012	N001	10.2	-	20.2	0.043		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	14.7	-	19.7	184		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	14.7	-	19.7	-55.6		F	#		
pH	s.u.	09/12/2012	N001	14.7	-	19.7	7.5		F	#		
Specific Conductance	umhos /cm	09/12/2012	N001	14.7	-	19.7	736		F	#		
Temperature	C	09/12/2012	N001	14.7	-	19.7	14.97		F	#		
Turbidity	NTU	09/12/2012	N001	14.7	-	19.7	8.76		F	#		
Uranium	mg/L	09/12/2012	N001	14.7	-	19.7	0.016		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	N001	14.1	-	19.1	239		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	14.1	-	19.1	24.1		F	#		
pH	s.u.	09/12/2012	N001	14.1	-	19.1	7.2		F	#		
Specific Conductance	umhos /cm	09/12/2012	N001	14.1	-	19.1	1099		F	#		
Temperature	C	09/12/2012	N001	14.1	-	19.1	15.97		F	#		
Turbidity	NTU	09/12/2012	N001	14.1	-	19.1	7.12		F	#		
Uranium	mg/L	09/12/2012	N001	14.1	-	19.1	0.06		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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 $CaCO_3$)	mg/L	09/12/2012	N001	14.5 - 19.5	580		F	#		
Oxidation Reduction Potential	mV	09/12/2012	N001	14.5 - 19.5	59.2		F	#		
pH	s.u.	09/12/2012	N001	14.5 - 19.5	7.21		F	#		
Specific Conductance	umhos /cm	09/12/2012	N001	14.5 - 19.5	7009		F	#		
Temperature	C	09/12/2012	N001	14.5 - 19.5	16.7		F	#		
Turbidity	NTU	09/12/2012	N001	14.5 - 19.5	2.09		F	#		
Uranium	mg/L	09/12/2012	N001	14.5 - 19.5	0.11		F	#	0.000029	

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

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

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

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

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: 11/27/2012
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	09/11/2012	0001	134			#		
Manganese	mg/L	09/11/2012	0001	0.0056		J	#	0.00011	
Molybdenum	mg/L	09/11/2012	0001	0.00099			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	09/11/2012	0001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	09/11/2012	N001	31			#		
pH	s.u.	09/11/2012	N001	8.31			#		
Selenium	mg/L	09/11/2012	0001	0.00032			#	0.000032	
Specific Conductance	umhos/cm	09/11/2012	N001	326			#		
Temperature	C	09/11/2012	N001	20.85			#		
Turbidity	NTU	09/11/2012	N001	47			#		
Uranium	mg/L	09/11/2012	0001	0.00057			#	0.0000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
Location: 0349 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	09/12/2012	0001	130			#		
Manganese	mg/L	09/12/2012	0001	0.024			#	0.00011	
Molybdenum	mg/L	09/12/2012	0001	0.0011			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	09/12/2012	0001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	09/12/2012	N001	102.9			#		
pH	s.u.	09/12/2012	N001	8.08			#		
Selenium	mg/L	09/12/2012	0001	0.0003			#	0.000032	
Specific Conductance	umhos/cm	09/12/2012	N001	325			#		
Temperature	C	09/12/2012	N001	19.42			#		
Turbidity	NTU	09/12/2012	N001	1000	>		#		
Uranium	mg/L	09/12/2012	0001	0.00062			#	0.0000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	0001	134			#		
Manganese	mg/L	09/12/2012	0001	0.0037	B	J	#	0.00011	
Molybdenum	mg/L	09/12/2012	0001	0.00097			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	09/12/2012	0001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	09/12/2012	N001	2.6			#		
pH	s.u.	09/12/2012	N001	8.41			#		
Selenium	mg/L	09/12/2012	0001	0.00027			#	0.000032	
Specific Conductance	umhos/cm	09/12/2012	N001	337			#		
Temperature	C	09/12/2012	N001	19.44			#		
Turbidity	NTU	09/12/2012	N001	136			#		
Uranium	mg/L	09/12/2012	0001	0.00055			#	0.0000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK05, Slick Rock West Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	0001	134			#		
Manganese	mg/L	09/12/2012	0001	0.055			#	0.00011	
Molybdenum	mg/L	09/12/2012	0001	0.0016			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	09/12/2012	0001	0.025			#	0.01	
Oxidation Reduction Potential	mV	09/12/2012	N001	173.9			#		
pH	s.u.	09/12/2012	N001	7.46			#		
Selenium	mg/L	09/12/2012	0001	0.00032			#	0.000032	
Specific Conductance	umhos/cm	09/12/2012	N001	374			#		
Temperature	C	09/12/2012	N001	17.99			#		
Turbidity	NTU	09/12/2012	N001	1000	>		#		
Uranium	mg/L	09/12/2012	0001	0.00083			#	0.0000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	0001	152			#		
Oxidation Reduction Potential	mV	09/12/2012	N001	-5.1			#		
pH	s.u.	09/12/2012	N001	8.57			#		
Specific Conductance	umhos/cm	09/12/2012	N001	335			#		
Temperature	C	09/12/2012	N001	21.33			#		
Turbidity	NTU	09/12/2012	N001	181			#		
Uranium	mg/L	09/12/2012	0001	0.0007			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
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	09/12/2012	0001	109			#		
Oxidation Reduction Potential	mV	09/12/2012	N001	47.2			#		
pH	s.u.	09/12/2012	N001	8.38			#		
Specific Conductance	umhos/cm	09/12/2012	N001	373			#		
Temperature	C	09/12/2012	N001	24.41			#		
Turbidity	NTU	09/12/2012	N001	99.7			#		
Uranium	mg/L	09/12/2012	0001	0.00057			#	0.000029	

Surface Water Quality Data by Location (USEE102) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012
Location: 0700 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	09/12/2012	0001	132			#		
Oxidation Reduction Potential	mV	09/12/2012	N001	14.4			#		
pH	s.u.	09/12/2012	N001	8.34			#		
Specific Conductance	umhos/cm	09/12/2012	N001	334			#		
Temperature	C	09/12/2012	N001	21.3			#		
Turbidity	NTU	09/12/2012	N001	168			#		
Uranium	mg/L	09/12/2012	0001	0.00049			#	0.000029	

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

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

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

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

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Equipment Blank and Trip Blank Data

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BLANKS REPORT

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)
RIN: 12094825
Report Date: 11/27/2012

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Benzene	SRK05	0999	09/11/2012	N001	ug/L	0.3	U		0.3		TB
Ethylbenzene	SRK05	0999	09/11/2012	N001	ug/L	0.3	U		0.3		TB
m,p-Xylene	SRK05	0999	09/11/2012	N001	ug/L	0.3	U		0.3		TB
Manganese	SRK05	0999	09/12/2012	0001	mg/L	0.0013	B		0.00011		E
Molybdenum	SRK05	0999	09/12/2012	0001	mg/L	0.000032	U		0.000032		E
Nitrate + Nitrite as Nitrogen	SRK05	0999	09/12/2012	0001	mg/L	0.01	U		0.01		E
o-Xylene	SRK05	0999	09/11/2012	N001	ug/L	0.3	U		0.3		TB
Selenium	SRK05	0999	09/12/2012	0001	mg/L	0.000032	U		0.000032		E
Toluene	SRK05	0999	09/11/2012	N001	ug/L	0.3	U		0.3		TB
Uranium	SRK05	0999	09/12/2012	0001	mg/L	0.000003	B		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

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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: 11/27/2012

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	09/11/2012	13:05:16	11.85	5423.33	
0318A			09/11/2012	13:35:42	12.55	NA	E
0319	O	5430.66	09/11/2012	15:25:50	9.22	5421.44	
0320	O	5427.40	09/11/2012	17:20:31	6.06	5421.34	
0339			09/11/2012	14:05:56	11.39	NA	E
0340			09/11/2012	14:50:12	10.00	NA	E
0508	O	5430.20	09/11/2012	16:35:36	7.17	5423.03	
0510	O	5427.87	09/11/2012	17:00:36	5.92	5421.95	
0684	D	5432.68	09/12/2012	10:35:10	16.63	5416.05	

STATIC WATER LEVELS (USEE700) FOR SITE SRK06, Slick Rock East Processing Site
REPORT DATE: 11/27/2012

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
0303	O	5446.91	09/12/2012	15:10:47	9.6	5437.31	
0305	O	5448.75	09/12/2012	14:05:37	12.52	5436.23	
0307	O	5447.1	09/12/2012	14:45:34	12.15	5434.95	
0309	O	5450.18	09/12/2012	13:25:22	15.52	5434.66	
0310	D	5450.56	09/12/2012	11:35:36	17.87	5432.69	
0311	D	5450.7	09/12/2012	11:55:10	18.51	5432.19	
0312	D	5451.06	09/12/2012	12:10:27	18.04	5433.02	

FLOW CODES: D DOWN GRADIENT
O ON SITE

WATER LEVEL FLAGS: E Top of casing elevation data not available

Hydrographs

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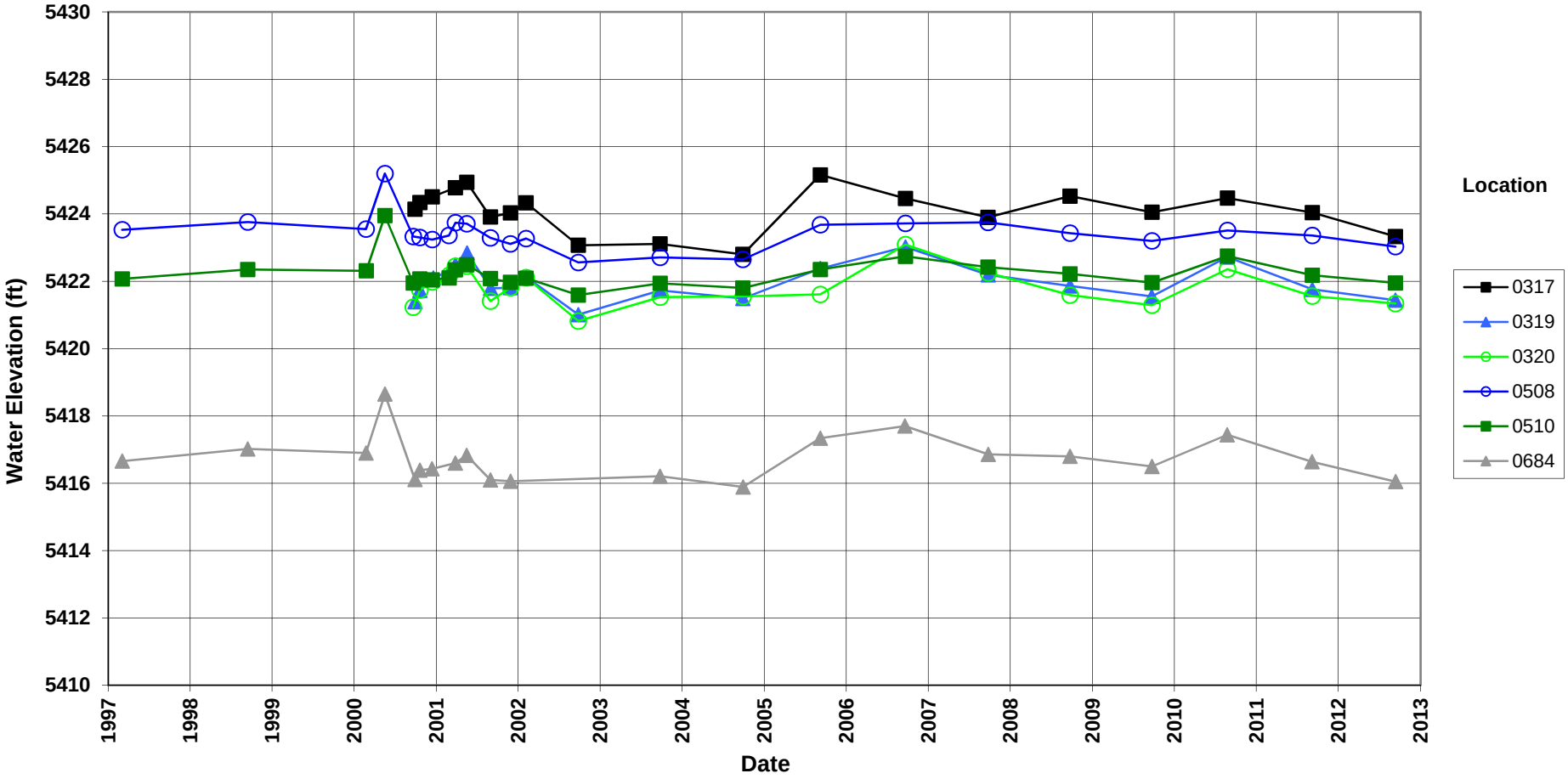
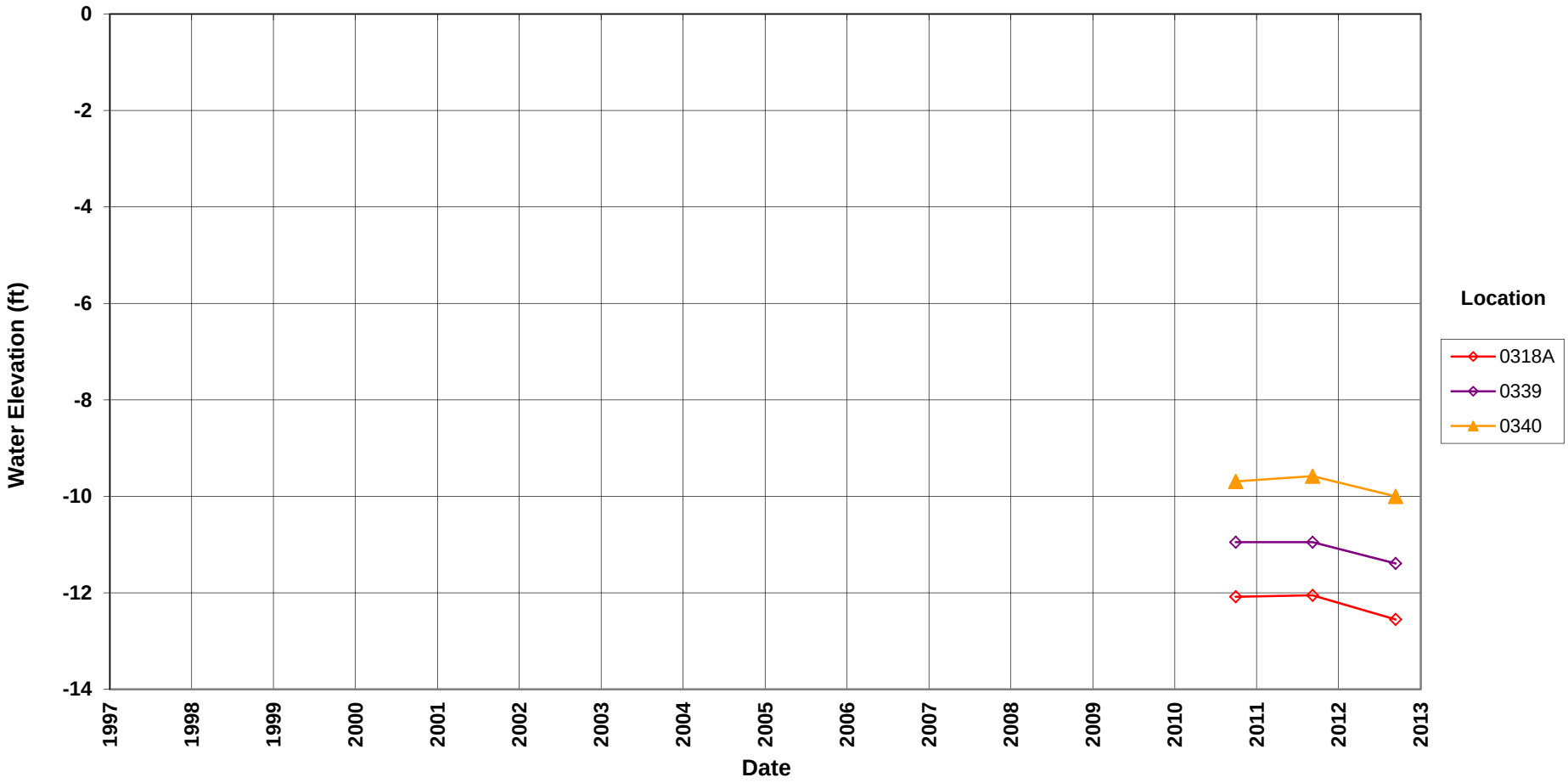
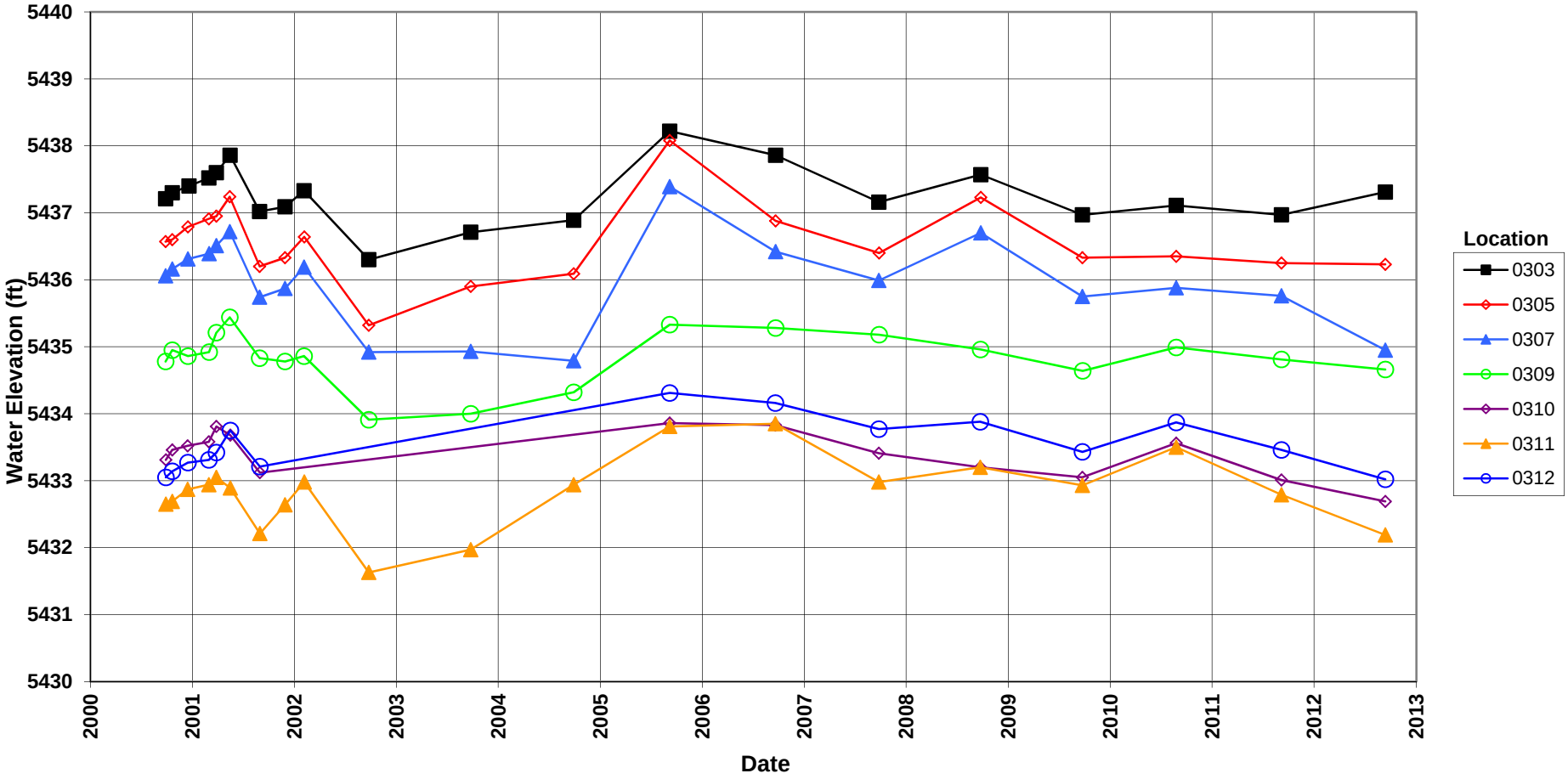
Slick Rock West Processing Site
Hydrograph



Slick Rock West Processing Site
Hydrograph
Locations where elevations are not available



Slick Rock East Processing Site
Hydrograph



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Groundwater
Time-Concentration Graphs

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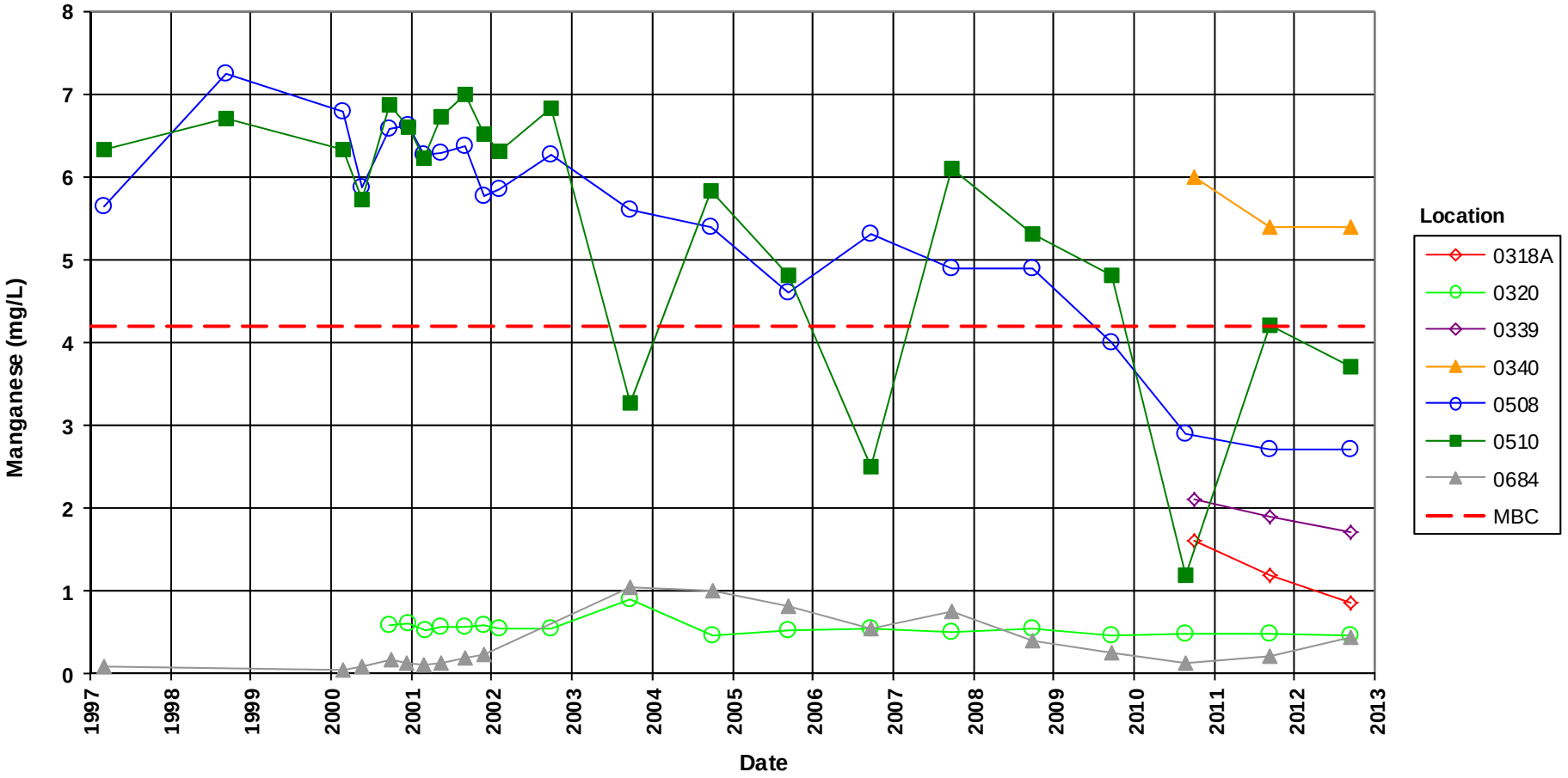
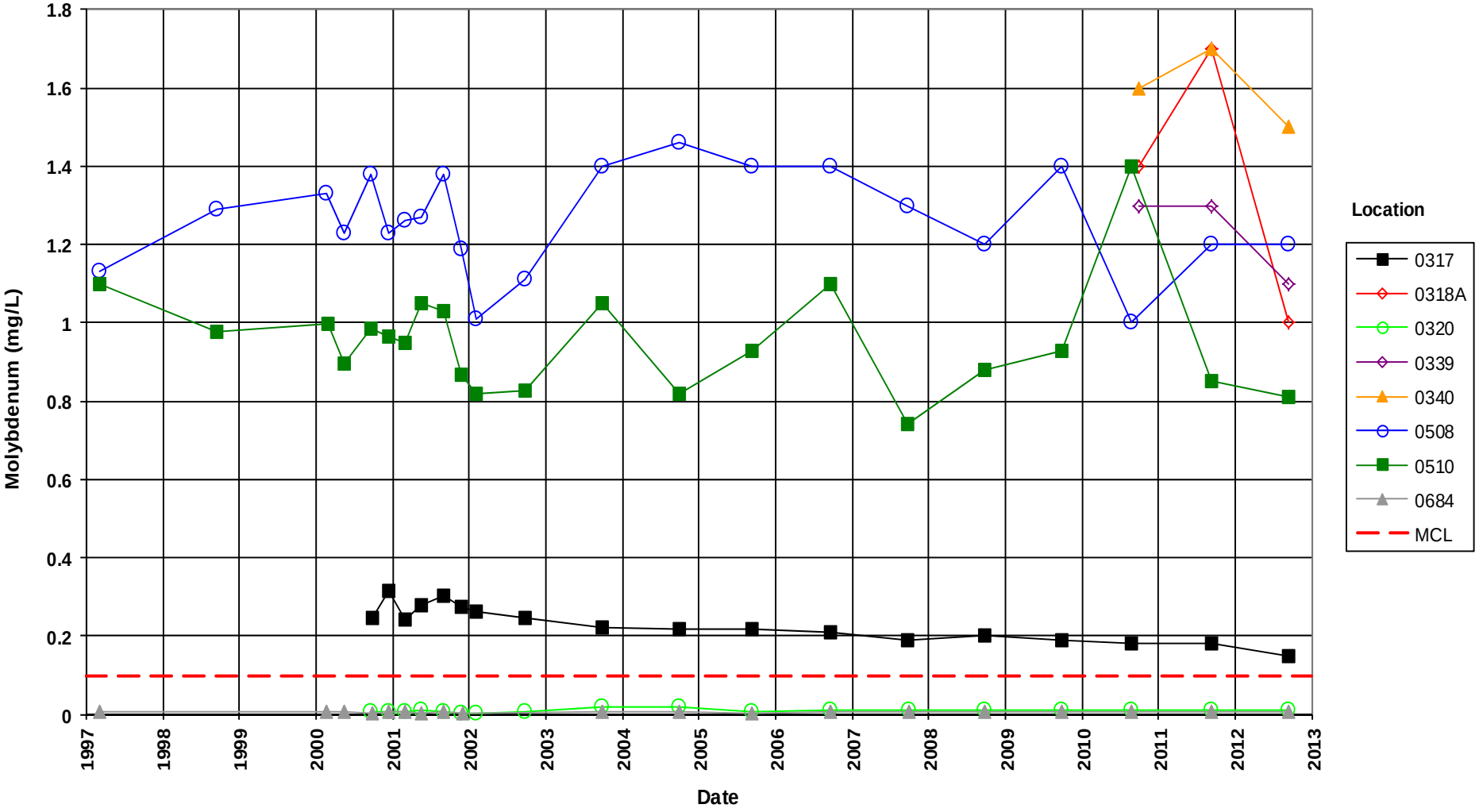
Slick Rock West Processing Site
Manganese Concentration
Maximum Background Concentration (MBC) = 4.2 mg/L

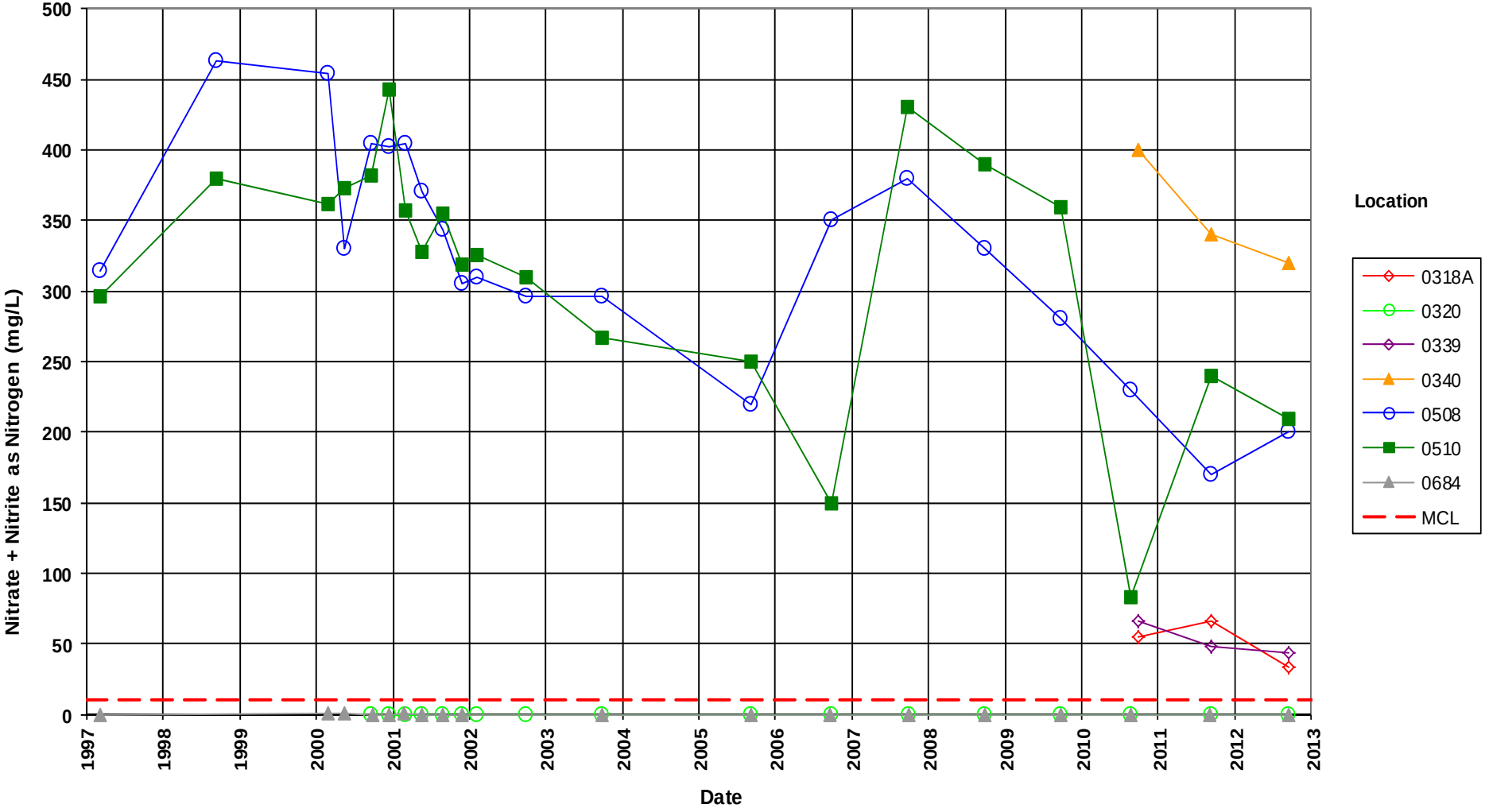


Slick Rock West Processing Site
Molybdenum Concentration

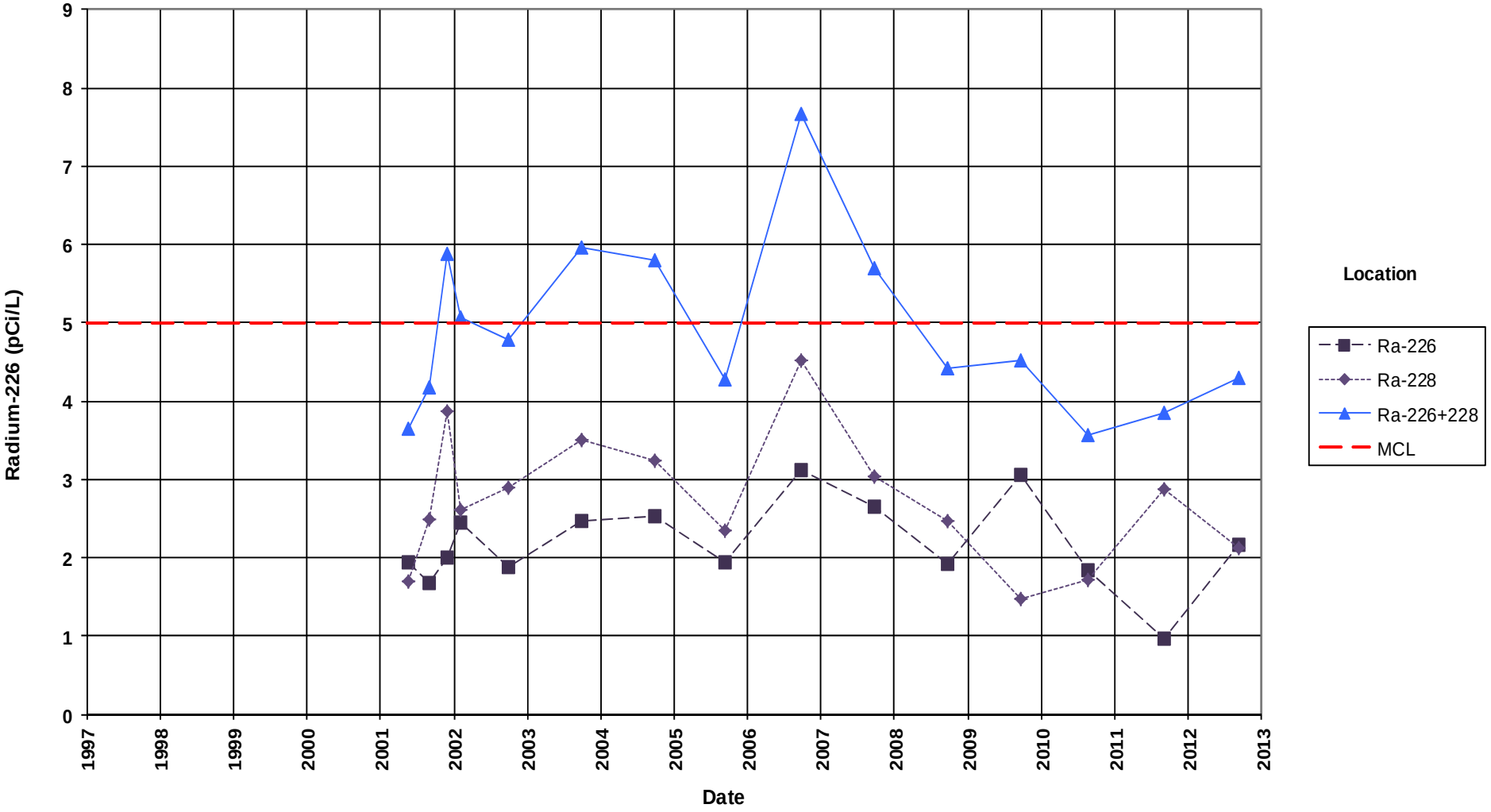
Maximum Concentration Limit (MCL) = 0.10 mg/L



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

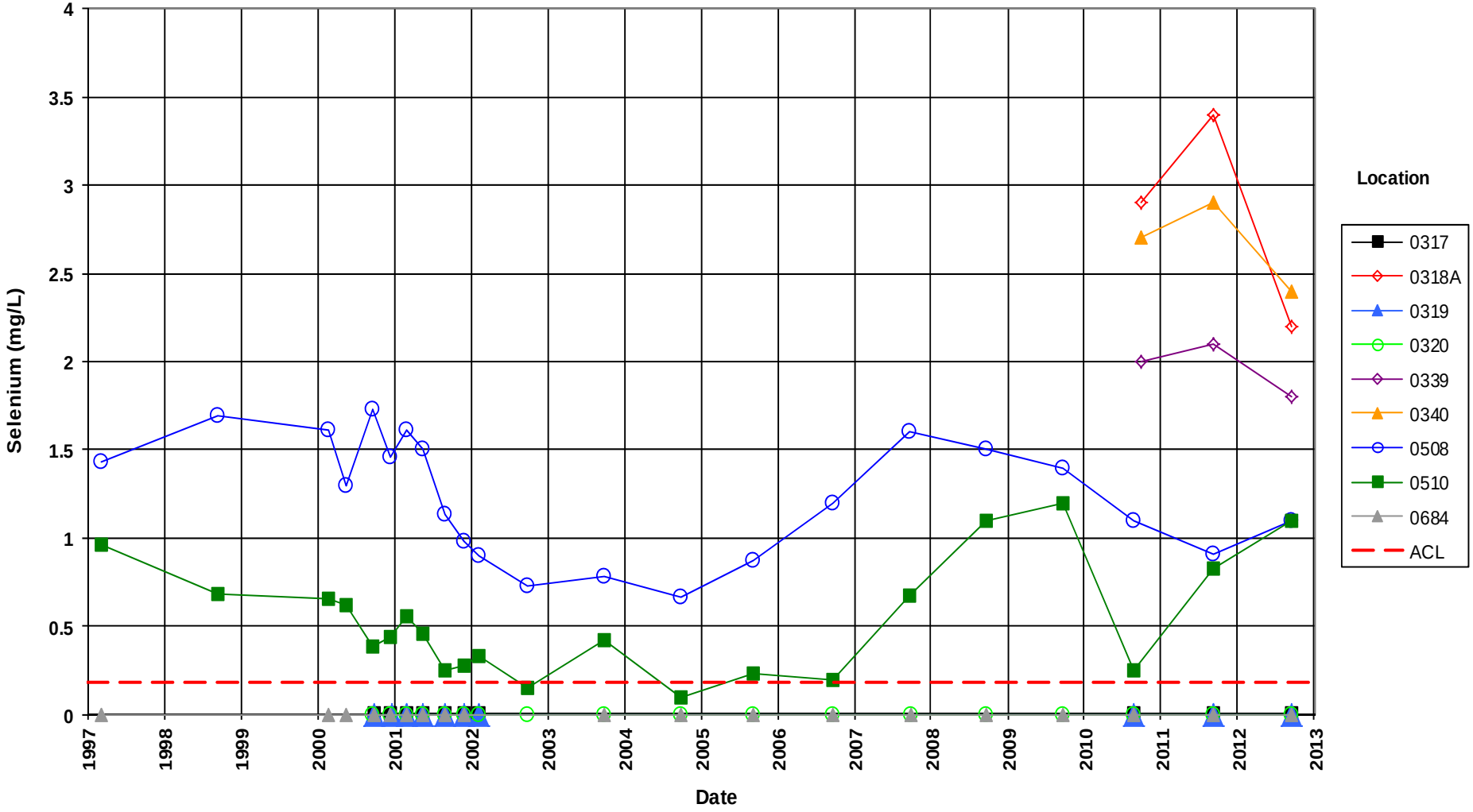


Slick Rock West Processing Site
Radium-226 and Radium-228 Concentrations in Well 0319
Maximum Concentration Limit (MCL) = 5 pCi/L for Ra-226+228



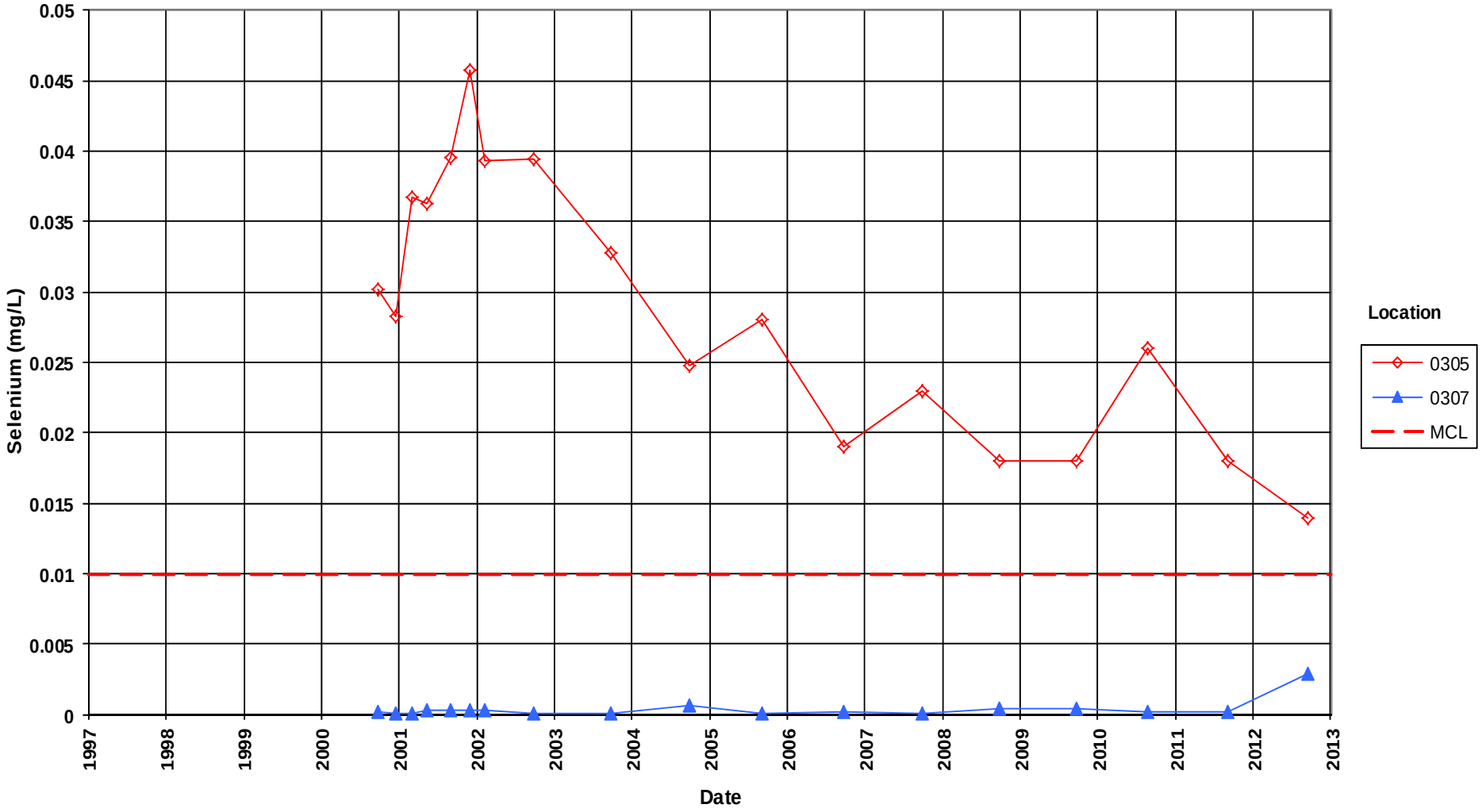
Slick Rock West Processing Site
Selenium Concentration

Alternate Concentration Limit (ACL) = 0.18 mg/L

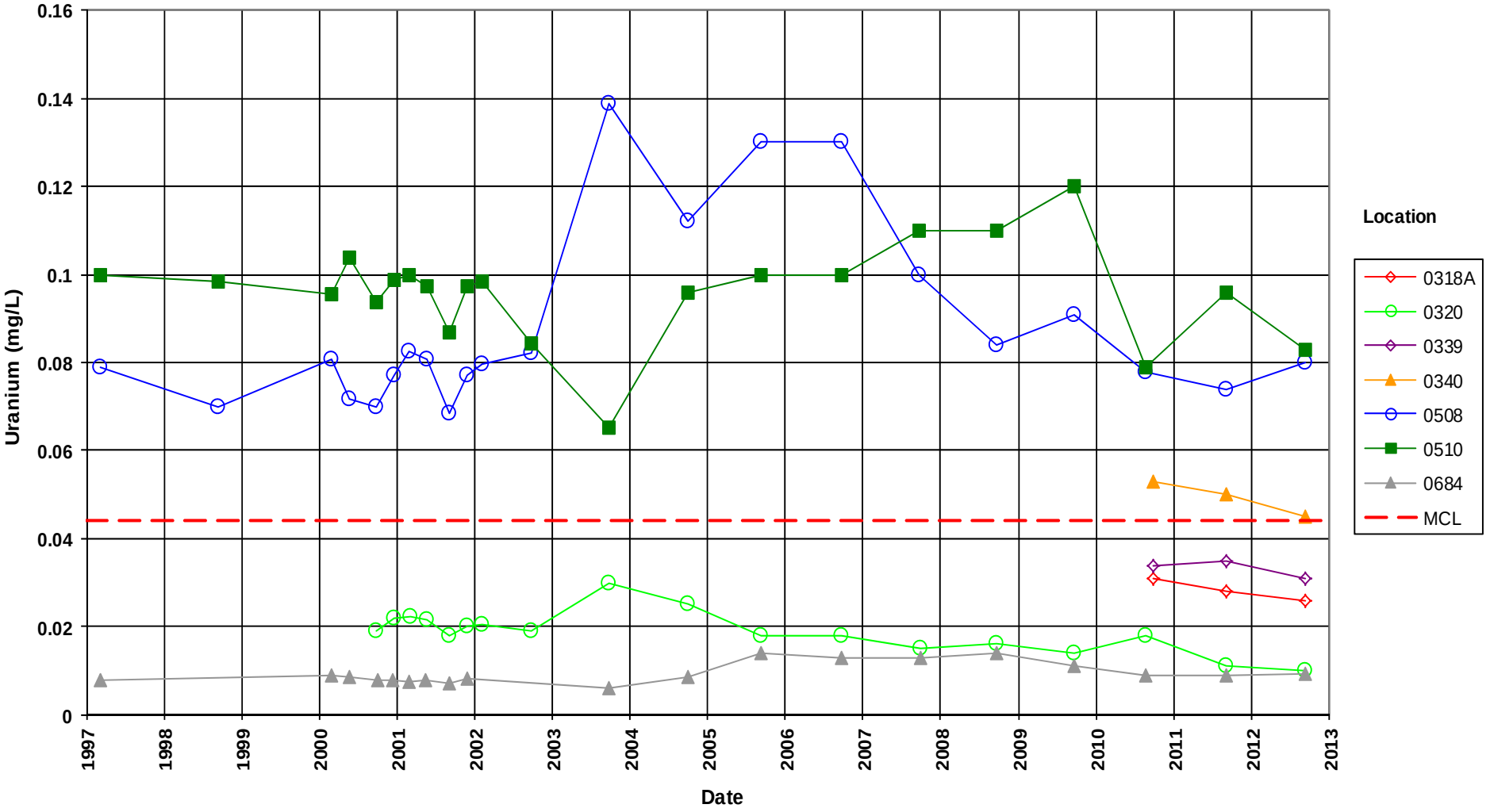


Slick Rock East Processing Site
Selenium Concentration

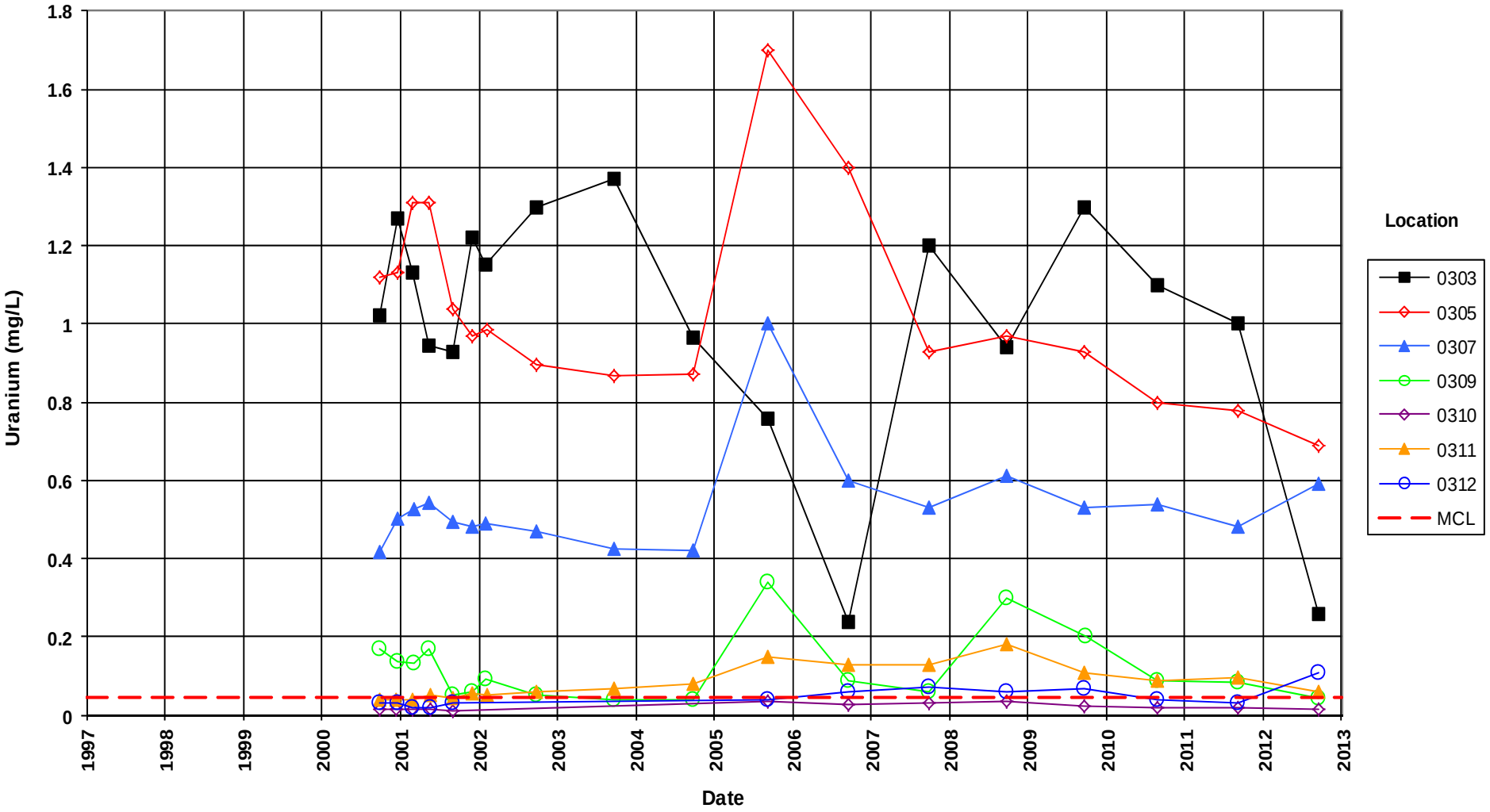
Maximum Concentration Limit (MCL) = 0.01 mg/L



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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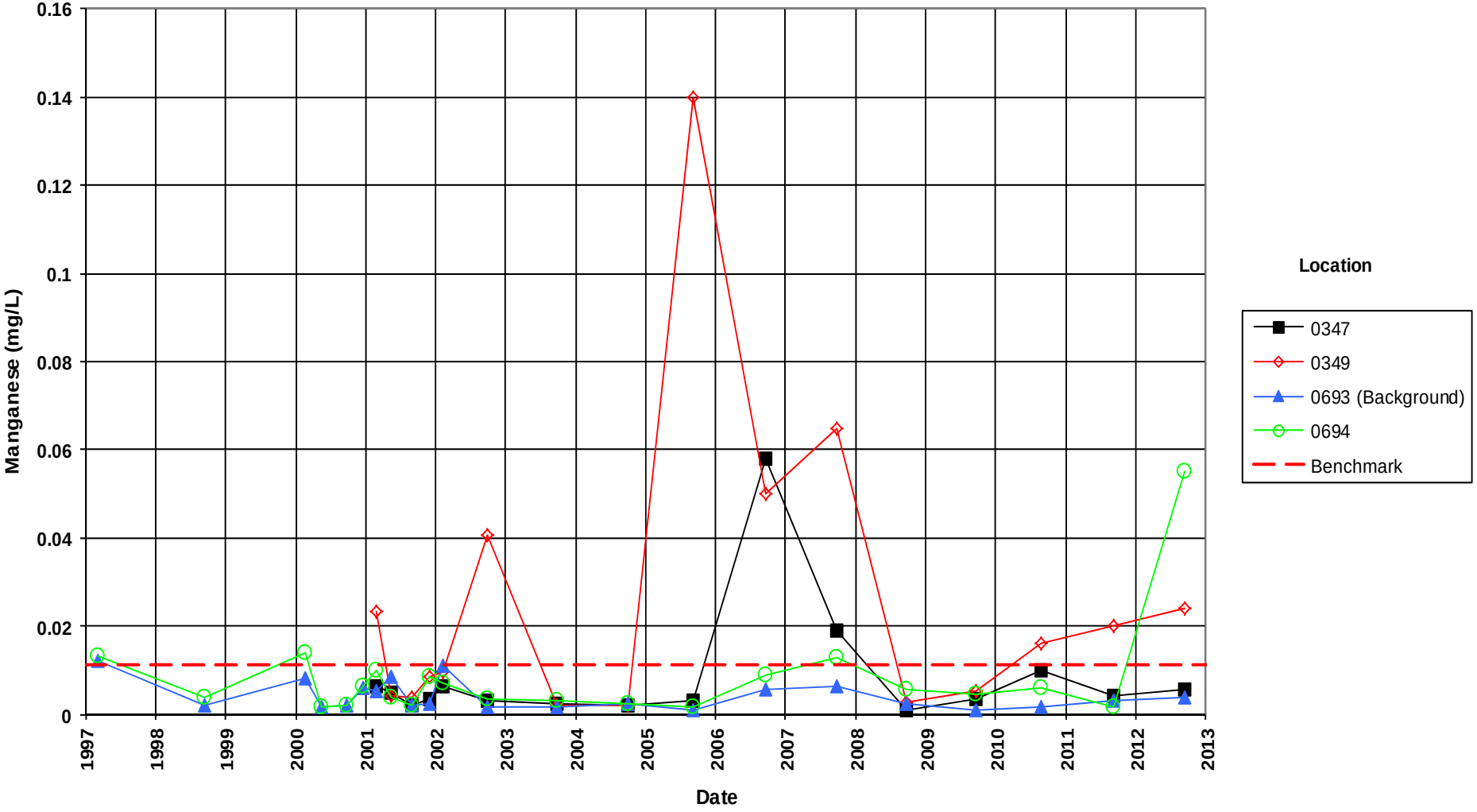
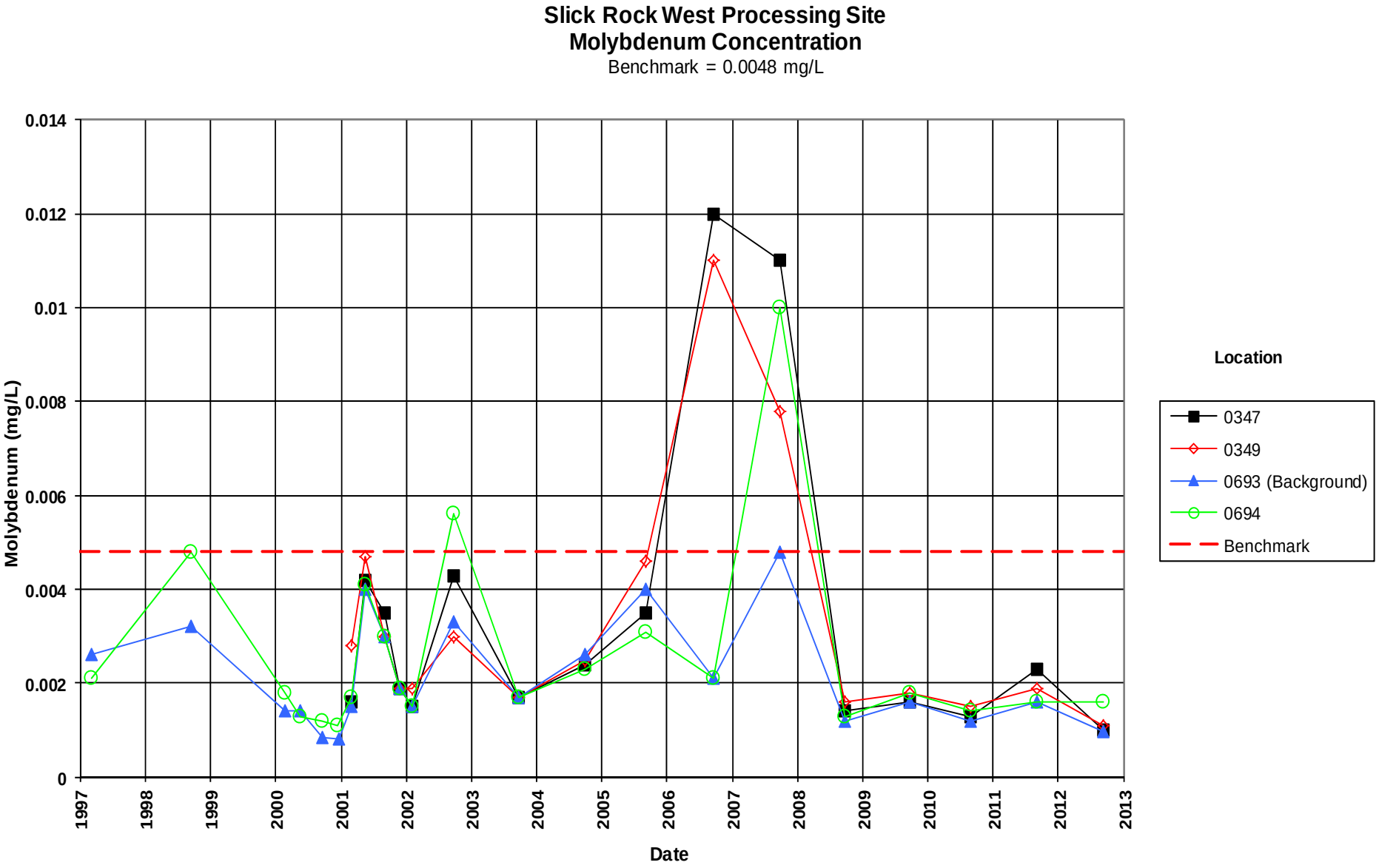
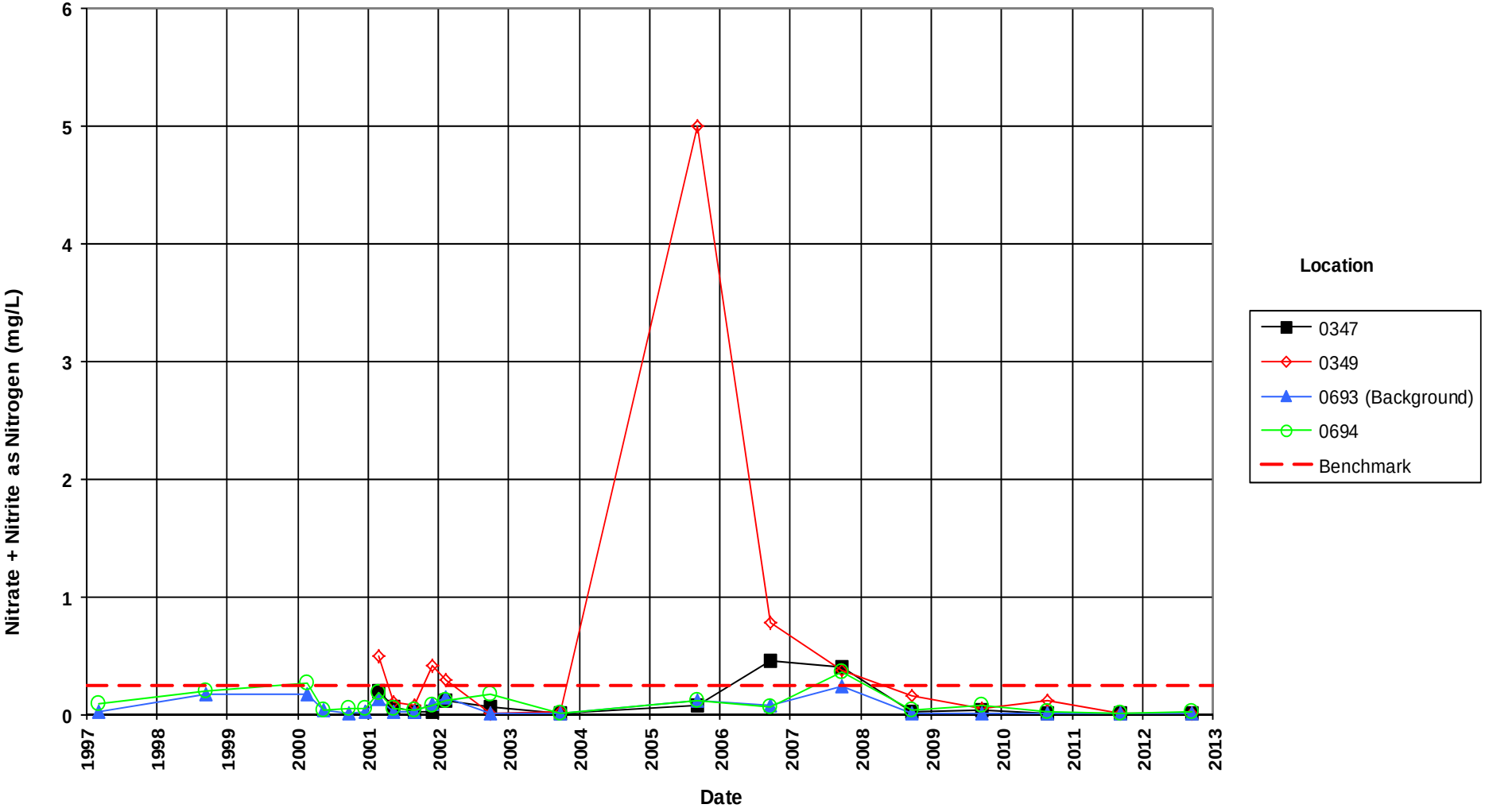
Slick Rock West Processing Site
Manganese Concentration
Benchmark = 0.0111 mg/L

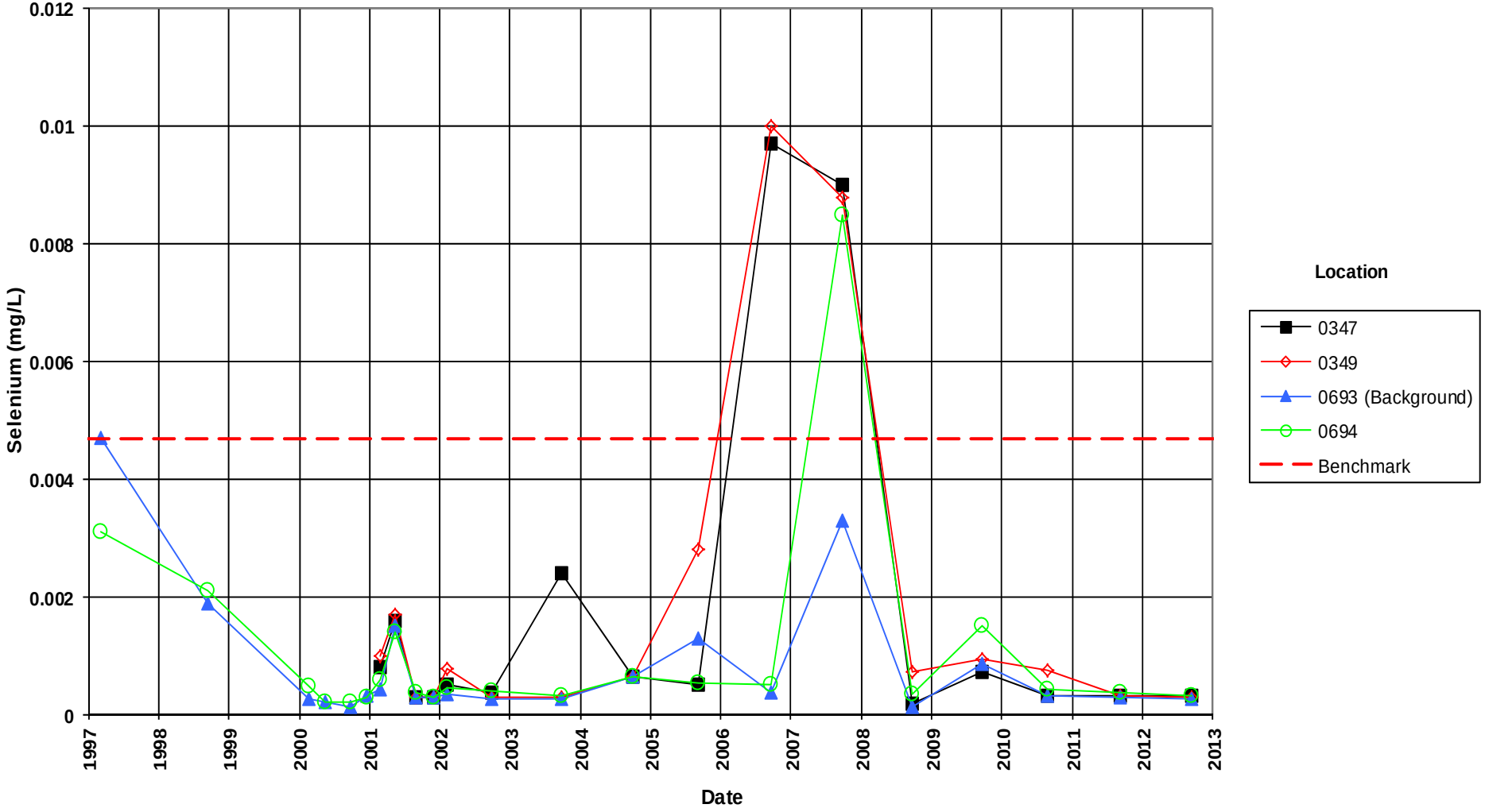



Slick Rock West Processing Site
Molybdenum Concentration
Benchmark = 0.0048 mg/L
Molybdenum (mg/L)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0347
0349
0693 (Background)
0694
Benchmark

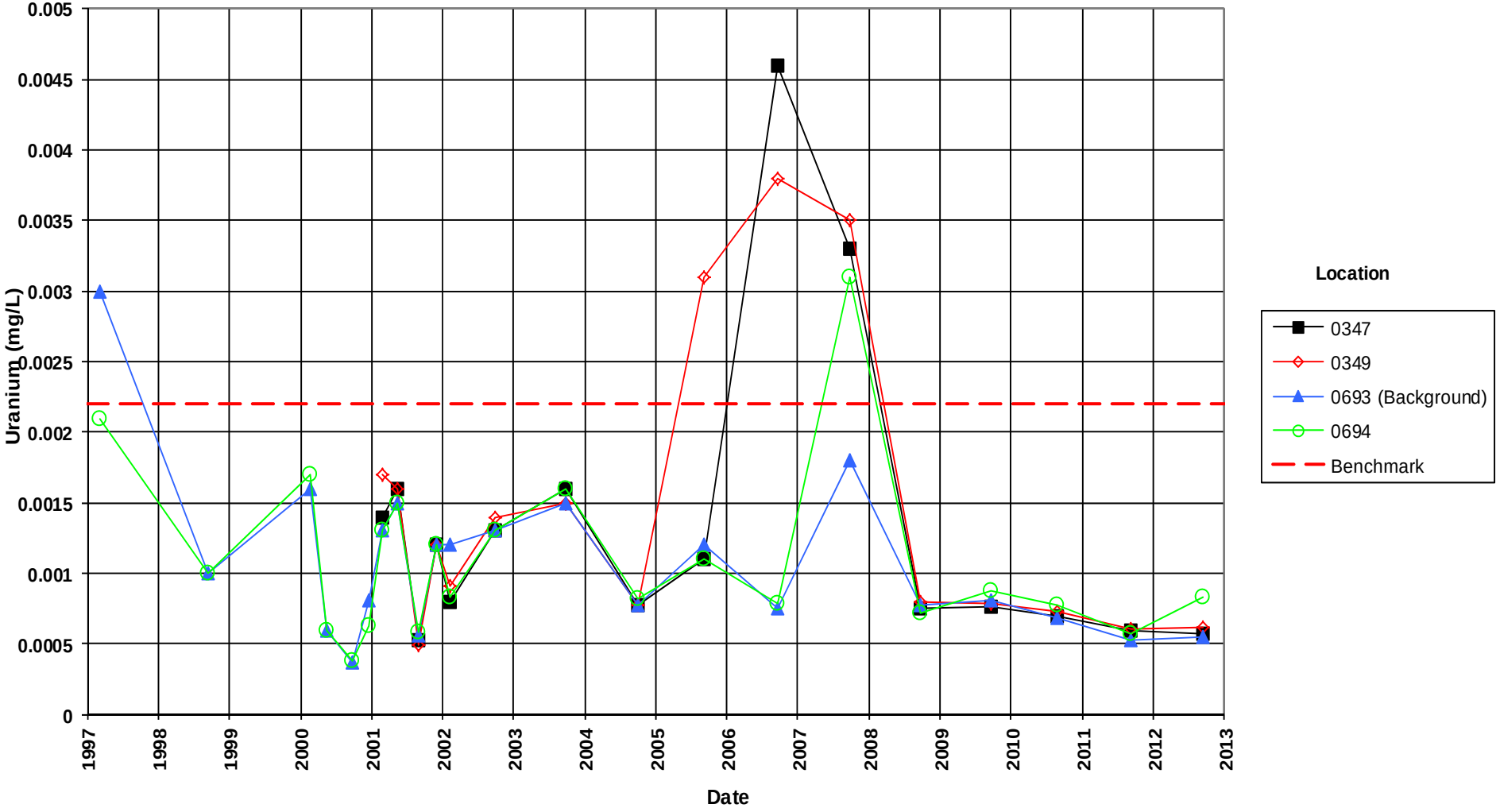
Slick Rock West Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Benchmark = 0.24 mg/L

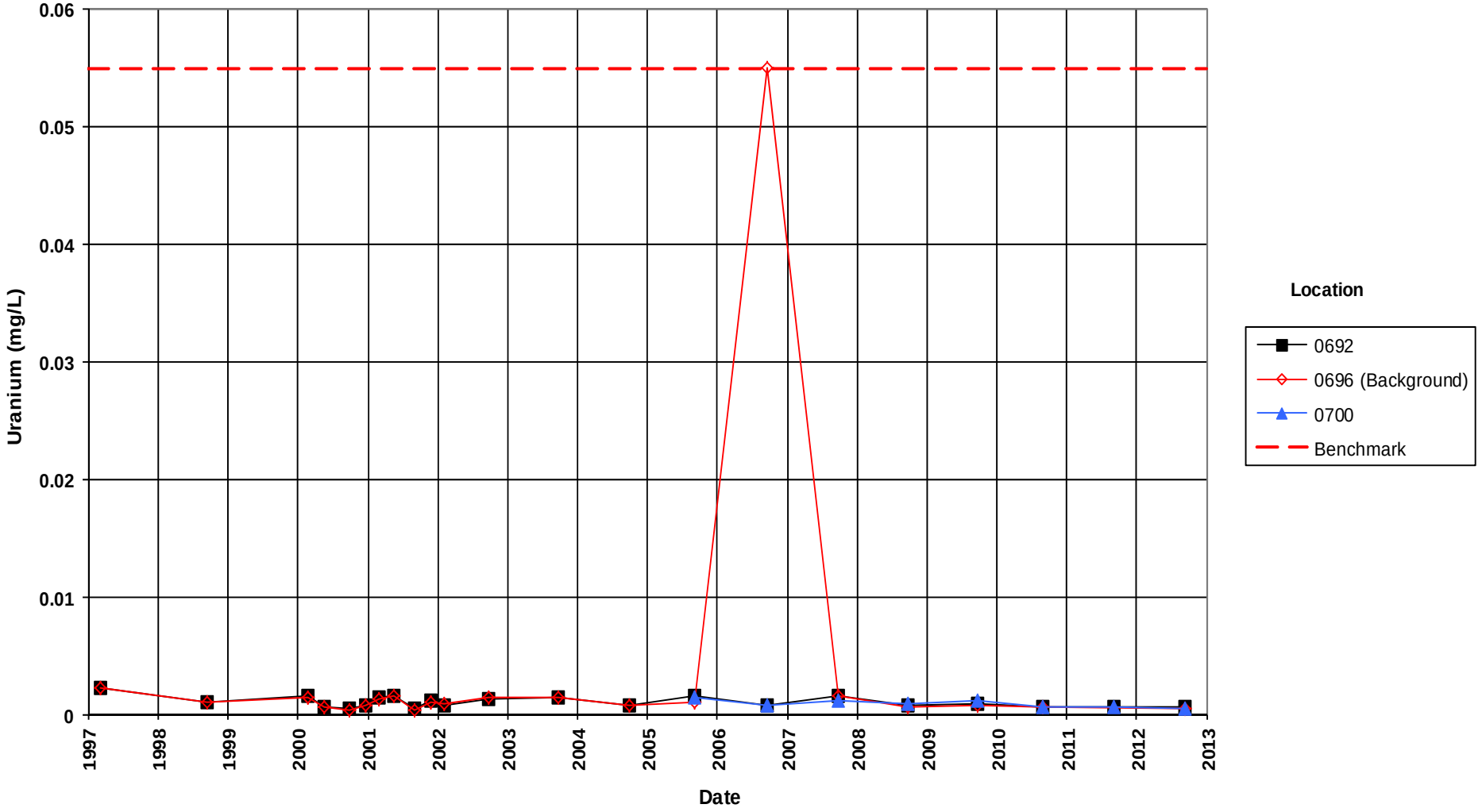


Slick Rock West Processing Site
Selenium Concentration
Benchmark = 0.0047 mg/L



Slick Rock West Processing Site
Uranium Concentration
Benchmark = 0.0022 mg/L




Slick Rock East Processing Site
Uranium Concentration
Benchmark = 0.055 mg/L
Uranium (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0692
0696 (Background)
0700
Benchmark

Attachment 3
Sampling and Analysis Work Order

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Task Order LM00-501
Control Number 12-0805

July 31, 2012

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-AM01-07LM00060, S.M. Stoller Corporation (Stoller) September 2012 Environmental Sampling at the Slick Rock, Colorado, Processing Sites

REFERENCE: Task Order LM00-501-02-120-402, 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 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 September 10, 2012.

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

Monitoring Wells*

West Site

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

East Site

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

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

Surface Water

West Site

347	349	693	694

East Site

692	696	700

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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)
Karl Stoeckle, DOE
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Dave Traub, Stoller
EDD Delivery
rc-grand.junction
File: SRP 410.02(A)

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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					
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					
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 Counter	GPC-A-018
Radium-228	0319		1 pCi/L	Gas Proportional Counter	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
Sodium					
Strontium					
Sulfate					
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.

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

Attachment 4
Trip Report

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Memorandum

DATE: October 16, 2012

TO: David Traub

FROM: Daniel Sellers

SUBJECT: Trip Report

Site: Slick Rock, Colorado, East and West Processing Sites

Dates of Sampling Event: September 11 and 12, 2012

Team Members: Kent Moe and Dan Sellers

Number of Locations Sampled: Samples were collected from the 23 locations identified on the sampling notification letter as follows:

SRK05 (West Site)–9 monitoring wells and 4 surface locations
SRK06 (East Site)–7 monitoring wells and 3 surface locations

Locations Not Sampled/Reason: All scheduled locations were sampled.

Location Specific Information:

Location IDs	Comments
0307, 0309, 0320	Fe bacteria in purge water.
All SRK06 (East) Wells and surface locations	Vegetation has taken over all wells to the point that you no longer can find them easily - they are covered with salt brush and willows and grease wood.
0312	Small black particles in sample water.
0319	• VOCs were collected by reverse flow as follows: *After purging and collecting non-VOC samples, tubing was pulled from the well with volume of water retained in it and vials were filled by reversing the flow on the pump.* Tubing was re-installed to the same depth and re-filled to collect the final vial. • The VOC samples were added to a small volume of HCl in the vials.

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

False ID	True ID	Sample Type	Ticket Number	Associated Matrix
2676	0339	Duplicate (Metals and Nitrate only)	KKX 724	Water
2498	0319	Duplicate (VOCs and Radium only)	KKX 718	Water
2500	----------	Trip Blank (Created 9/8 at 11 a.m. in Bldg 32 using Milli-Q water + HCl)	KKX 722	Water
2399	Associated with all surface water locations	Equipment Blank (Metals and Nitrate only)	KKX 727	Water

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Requisition Identification Number (RIN) Assigned: 12094825. Field data sheets can be found in Crow\sms\12094825 in the Field Data folder.

Sample Shipment: Samples were shipped from Grand Junction to ALS Laboratory Group on September 13, 2012.

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

Well Inspection Summary: No issues were identified.

Field Variance: None

Equipment: All equipment functioned properly. Wells were sampled with a peristaltic pump and dedicated tubing. Surface water samples were collected using a peristaltic pump and tubing with weight. An equipment blank was collected after decontamination of the tubing reel. All other equipment was dedicated.

Stakeholder/Regulatory: Nothing to note.

Institutional Controls:

Fences, Gates, and Locks: All gates were locked and in good condition.
Signs: OK.
Trespassing/Site Disturbances: None noted.

Site Issues: Cell phone service (Verizon) is NOT available at the site, even with the cell phone signal booster.

Disposal Cell/Drainage Structure Integrity: N/A
Vegetation/Noxious Weed Concerns: Heavy brush creates access difficulties.
Maintenance Requirements: Access trails to wells and surface locations need maintenance.
Safety Issues: Over growth of vegetation is a concern.
Access Issues:

- All locations south of the river at the East Site can only be reached on foot or by ATVs. Water runoff is creating deep, steep-sided ditches that may be impossible to cross by truck.
- The road leading to wells 0310, 0311, and 0312 (past non-sampled well 0690) is becoming heavily eroded by water runoff.
- There is heavy brush impeding access to many locations, most notably well 0317 (West Site) and surface water locations 0700 and 0692 (East Site).

Corrective Action Required/Taken: The issues listed above need to be corrected before the next sample event. The East site is a safety concern.

cc: (electronic)
Jason Nguyen, DOE
Steve Donivan, Stoller
Bev Gallagher, Stoller
Dave Traub, Stoller
EDD Delivery

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