

Data Validation Package

July 2010
Groundwater Sampling at the
Sherwood, Washington, Disposal Site

October 2010



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

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Sampling Event Summary

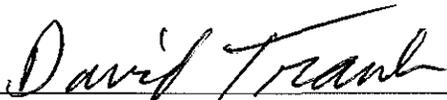
Site: Sherwood, Washington, Disposal site

Sampling Period: July 14, 2010

The 2001 *Long-Term Surveillance Plan (LTSP) for the U.S. Department of Energy Sherwood Project (UMTRCA Title II) Reclamation Cell, Wellpinit, Washington*, does not require groundwater compliance monitoring at the Sherwood site. However, the LTSP stipulates limited groundwater monitoring for chloride and sulfate (designated indicator parameters) and total dissolved solids (TDS) as a best management practice.

Samples were collected from the background well, MW-2B, and the two downgradient wells, MW-4 and MW-10, in accordance with the LTSP. Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites (LMS/PLN/S04351, continually updated)*. The water levels were measured in the wells and in four piezometers completed in the tailings dam.

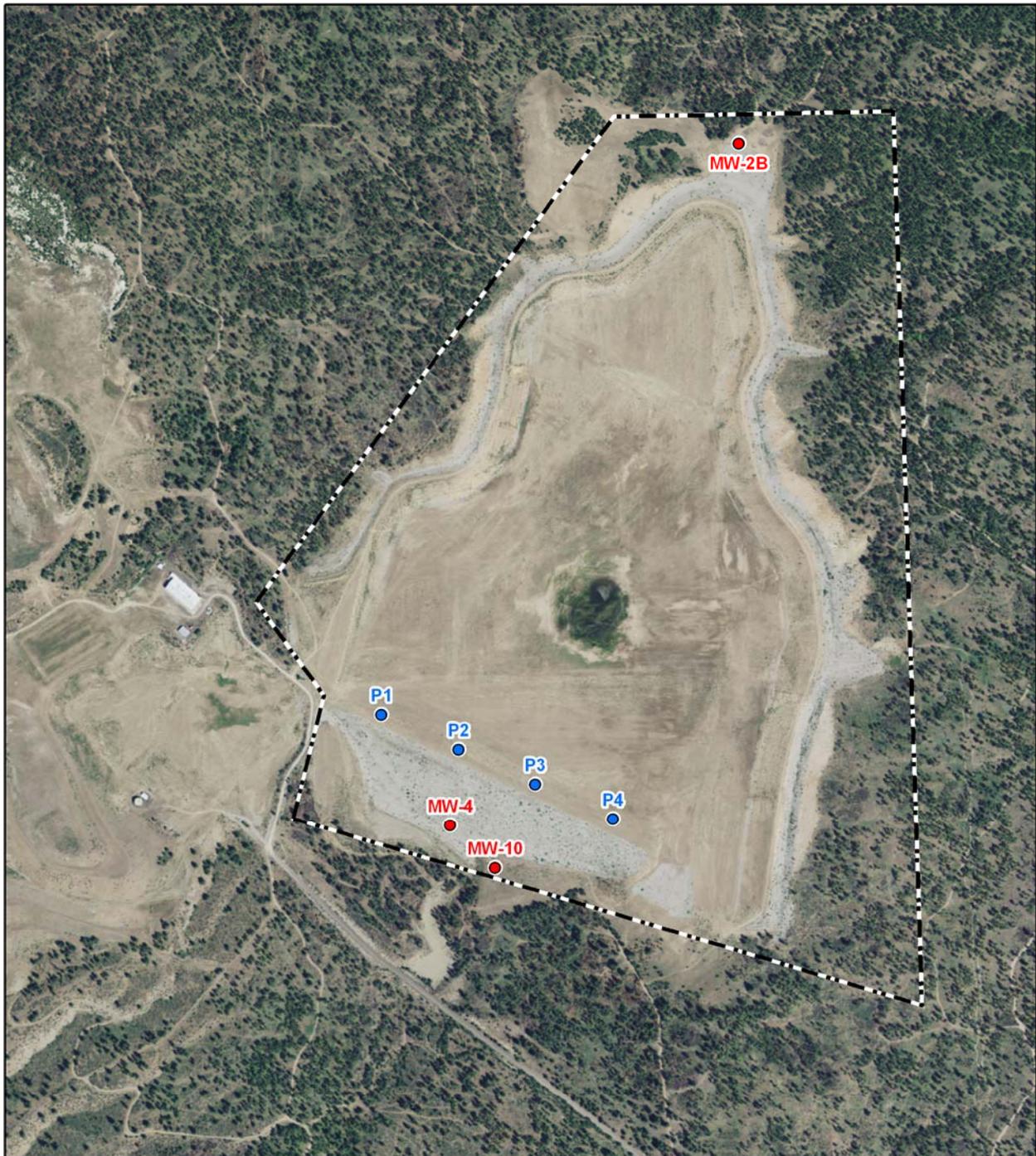
Review of time-concentration graphs included in this report indicate that there were no significant changes in the chloride or sulfate concentrations. The concentrations of chloride and sulfate are well below the State of Washington water quality criteria value of 250 milligrams per liter for both parameters. TDS concentrations continue to be consistent with historical measurements.



David Traub
Site Lead, S.M. Stoller Corporation

10-28-10

Date



LEGEND ● WELL TO BE SAMPLED ● WELL TO BE SAMPLED - WATER LEVEL ONLY - - - SITE BOUNDARY		U.S. DEPARTMENT OF ENERGY <small>GRAND JUNCTION, COLORADO</small>	<small>Work Performed by</small> S.M. Stoller Corporation <small>Under DICE Contract No. DE-AM01-07LM00060</small>
		Planned Sampling Map Sherwood, WA, Disposal Site July 2010	
		<small>DATE PREPARED:</small> October 22, 2010	<small>FILENAME:</small> S0673800

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Sherwood, Washington, Disposal Site Sample Location Map

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	<u>Sherwood, Washington</u>	Date(s) of Water Sampling	<u>July 14, 2010</u>
Date(s) of Verification	<u>September 16, 2010</u>	Name of Verifier	<u>Steve Donovan</u>

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order Letter dated June 28, 2010.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibration was performed on July 12, 2010.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u> <u>Yes</u>	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>Yes</u>	
6. Was the category of the well documented?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling? Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements stabilize prior to sampling? Was the flow rate less than 500 mL/min? If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>Yes</u> <u>Yes</u> <u>Yes</u> <u>Yes</u> <u>NA</u>	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well: Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from location MW-2B.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	Dedicate equipment was used for all wells.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number? Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	Yes	Location ID 2100 was used for the duplicate sample.
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	Samples were chilled within five hours of collection.
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Requisition No. (RIN): 10073200
Sample Event: July 14, 2010
Site(s): Sherwood, Washington
Laboratory: ALS Laboratory Group
Work Order No.: 1007150
Analysis: Inorganics
Validator: Steve Donovan
Review Date: September 16, 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. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Chloride, Cl	MIS-A-039	SW-846 9056	SW-846 9056
Sulfate, SO ₄	MIS-A-044	SW-846 9056	SW-846 9056
Total Dissolved Solids, TDS	WCH-A-033	MCAWW 160.1	MCAWW 160.1

Data Qualifier Summary

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

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1007150-1	MW-2B	Sulfate	J	Poor field duplicate precision
1007150-4	MW-2B Duplicate	Sulfate	J	Poor field duplicate precision

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 4 samples on July 15, 2010, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed on the forms with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents, including the COC form and the sample tickets, had no errors or omissions. A copy of the air bill was included in the receiving documentation.

Preservation and Holding Times

The sample shipment was received cool and 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 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 SW-846 9056

The initial calibrations for chloride and sulfate were performed using five calibration standards each on July 13, 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. Initial and continuing calibration checks were made at the required frequency resulting in seven continuing calibration verification checks. The calibration checks met the acceptance criteria.

Method MCAWW 160.1

There is no initial or continuing calibration requirement associated with the determination of TDS.

Method and Calibration Blanks

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

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) pairs are analyzed for chloride and sulfate as a measure of method performance in the sample matrix. The MS/MSD sample results were within the acceptance criteria demonstrating acceptable method performance.

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. The results were acceptable for all analytes.

Detection Limits/Dilutions

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

Completeness

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

Chromatography Peak Integration

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

Electronic Data Deliverable File

The electronic data deliverable (EDD) file arrived on July 31, 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: 10073200 Lab Code: PAR Validator: Steve Donovan Validation Date: 9/16/2010
Project: Sherwood Analysis Type: Metals General Chem Rad Organics
of Samples: 4 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
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

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

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Wet Chemistry Data Validation Worksheet

RIN: 10073200 **Lab Code:** PAR **Date Due:** 8/12/2010
Matrix: Water **Site Code:** SHE **Date Completed:** 8/6/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
CHLORIDE	07/15/2010	0.000	1.0000	OK	OK	OK	OK	OK	98.00	101.0	101.0	0	
SULFATE	07/15/2010	0.000	1.0000	OK	OK	OK	OK	OK	98.00	87.0	88.0	1.00	
TOTAL DISSOLVED SOLIDS	07/19/2010							OK	106.00			1.00	

Sampling Quality Control Assessment

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

Sampling Protocol

Sample results for all Category I or II monitoring wells were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Wells MW-2B and MW-4 were classified as Category II wells. The sample results for these wells were qualified with a “Q” flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank Assessment

An equipment blank was not required because all wells were sampled with dedicated equipment.

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 non-radiochemical duplicate results that are greater than 5 times the practical quantitation limit (PQL) should be less than 20 percent. For results less than 5 times the PQL, the range should be no greater than the PQL. The radiochemical duplicate results should have a relative error ratio (calculated using the one-sigma total propagated uncertainty) of less than three. One duplicate sample was collected from location MW-2B. With the following exception, the duplicate results met the acceptance criteria. The difference in sulfate results is outside acceptance limits. The sample and duplicate results for sulfate are qualified with a “J” flag as estimated values.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 10073200 Lab Code: PAR Project: Sherwood Validation Date: 9/16/2010

Duplicate: 2100

Sample: MW-2B

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
CHLORIDE	0.56			1	1.7			1			MG/L
SULFATE	7.8			1	5.1			1	41.86		MG/L
TOTAL DISSOLVED SOLIDS	200			1	200			1	0		MG/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 10-28-2010
Steve Donivan Date

Data Validation Lead: Steve Donivan 10-28-2010
Steve Donivan Date

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers 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 sulfate result for well MW-2B was identified as a potential outlier. This result has been previously qualified based on the field duplicate precision and the data for this event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All Historical Data

Laboratory: ALS Laboratory Group

RIN: 10073200

Report Date: 10/1/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab Data		Result	Qualifiers Lab Data		Result	Qualifiers Lab Data		N	N Below Detect	
SHE01	MW-10	N001	07/14/2010	Chloride	1.2	F		2.7	FQ		1.3	FQJ		12	0	No
SHE01	MW-10	N001	07/14/2010	Sulfate	32	F		30	FQ		25.5	L		12	0	No
SHE01	MW-2B	N001	07/14/2010	Chloride	0.56	FQ		2.1	FQ		1.26	FQ		15	0	No
SHE01	MW-2B	N001	07/14/2010	Sulfate	7.8	FQJ		3.5	FQ		2.5	FQ		15	0	Yes
SHE01	MW-4	0001	07/14/2010	Chloride	0.51	FQ		32	FQJ		1.5	FQ		9	0	No
SHE01	MW-4	0001	07/14/2010	Sulfate	7.4	FQ		97	FQJ		19	FQ		9	0	No
SHE01	MW-4	0001	07/14/2010	Total Dissolved Solids	330	FQ		670	FQ		360	FQ		9	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 SHE01, Sherwood Disposal Site

REPORT DATE: 10/1/2010

Location: MW-10 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data		
Chloride	mg/L	07/14/2010	N001	224	-	234	1.2		F #	0.2	
Oxidation Reduction Potential	mV	07/14/2010	N001	224	-	234	111		F #		
pH	s.u.	07/14/2010	N001	224	-	234	7.19		F #		
Specific Conductance	umhos /cm	07/14/2010	N001	224	-	234	1075		F #		
Sulfate	mg/L	07/14/2010	N001	224	-	234	32		F #	0.5	
Temperature	C	07/14/2010	N001	224	-	234	15.5		F #		
Total Dissolved Solids	mg/L	07/14/2010	N001	224	-	234	640		F #	40	
Turbidity	NTU	07/14/2010	N001	224	-	234	4.21		F #		

Groundwater Quality Data by Location (USEE100) FOR SITE SHE01, Sherwood Disposal Site

REPORT DATE: 10/1/2010

Location: MW-2B WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Chloride	mg/L	07/14/2010	N001	47.4	-	57.4	0.56		FQ	#	0.2	
Chloride	mg/L	07/14/2010	N002	47.4	-	57.4	1.7		FQ	#	0.2	
Oxidation Reduction Potential	mV	07/14/2010	N001	47.4	-	57.4	138		FQ	#		
pH	s.u.	07/14/2010	N001	47.4	-	57.4	6.97		FQ	#		
Specific Conductance	umhos /cm	07/14/2010	N001	47.4	-	57.4	284		FQ	#		
Sulfate	mg/L	07/14/2010	N001	47.4	-	57.4	7.8		FQJ	#	0.5	
Sulfate	mg/L	07/14/2010	N002	47.4	-	57.4	5.1		FQJ	#	0.5	
Temperature	C	07/14/2010	N001	47.4	-	57.4	13.09		FQ	#		
Total Dissolved Solids	mg/L	07/14/2010	N001	47.4	-	57.4	200		FQ	#	20	
Total Dissolved Solids	mg/L	07/14/2010	N002	47.4	-	57.4	200		FQ	#	20	
Turbidity	NTU	07/14/2010	N001	47.4	-	57.4	3.33		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE SHE01, Sherwood Disposal Site

REPORT DATE: 10/1/2010

Location: MW-4 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
							Lab	Data QA		
Chloride	mg/L	07/14/2010	0001	184	- 197.5	0.51		FQ #	0.2	
Oxidation Reduction Potential	mV	07/14/2010	N001	184	- 197.5	-40		FQ #		
pH	s.u.	07/14/2010	N001	184	- 197.5	6.96		FQ #		
Specific Conductance	umhos /cm	07/14/2010	N001	184	- 197.5	632		FQ #		
Sulfate	mg/L	07/14/2010	0001	184	- 197.5	7.4		FQ #	0.5	
Temperature	C	07/14/2010	N001	184	- 197.5	18.41		FQ #		
Total Dissolved Solids	mg/L	07/14/2010	0001	184	- 197.5	330		FQ #	20	
Turbidity	NTU	07/14/2010	N001	184	- 197.5	25		FQ #		

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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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE SHE01, Sherwood Disposal Site
REPORT DATE: 10/1/2010

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
MW-10		2008.93	07/14/2010	11:20:11	228.66	1780.27	
MW-2B		2116.04	07/14/2010	09:15:18	54.97	2061.07	
MW-4			07/14/2010	12:45:24	239.68		
P1			07/14/2010	12:38:00			D
P2			07/14/2010	12:20:00	60.64		
P3			07/14/2010	12:18:00			D
P4			07/14/2010	12:37:00	22.14		

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

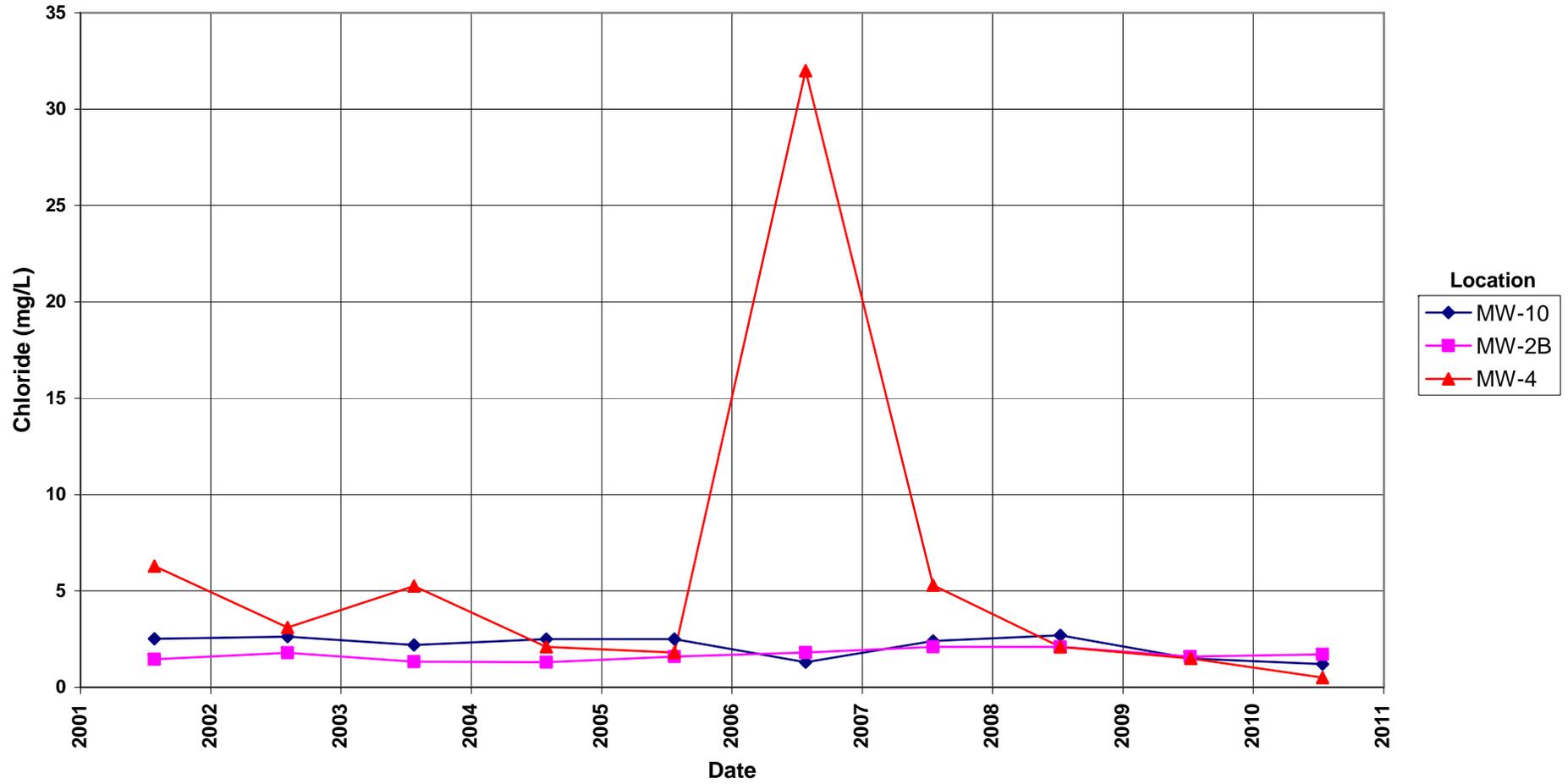
WATER LEVEL FLAGS: D Dry F FLOWING

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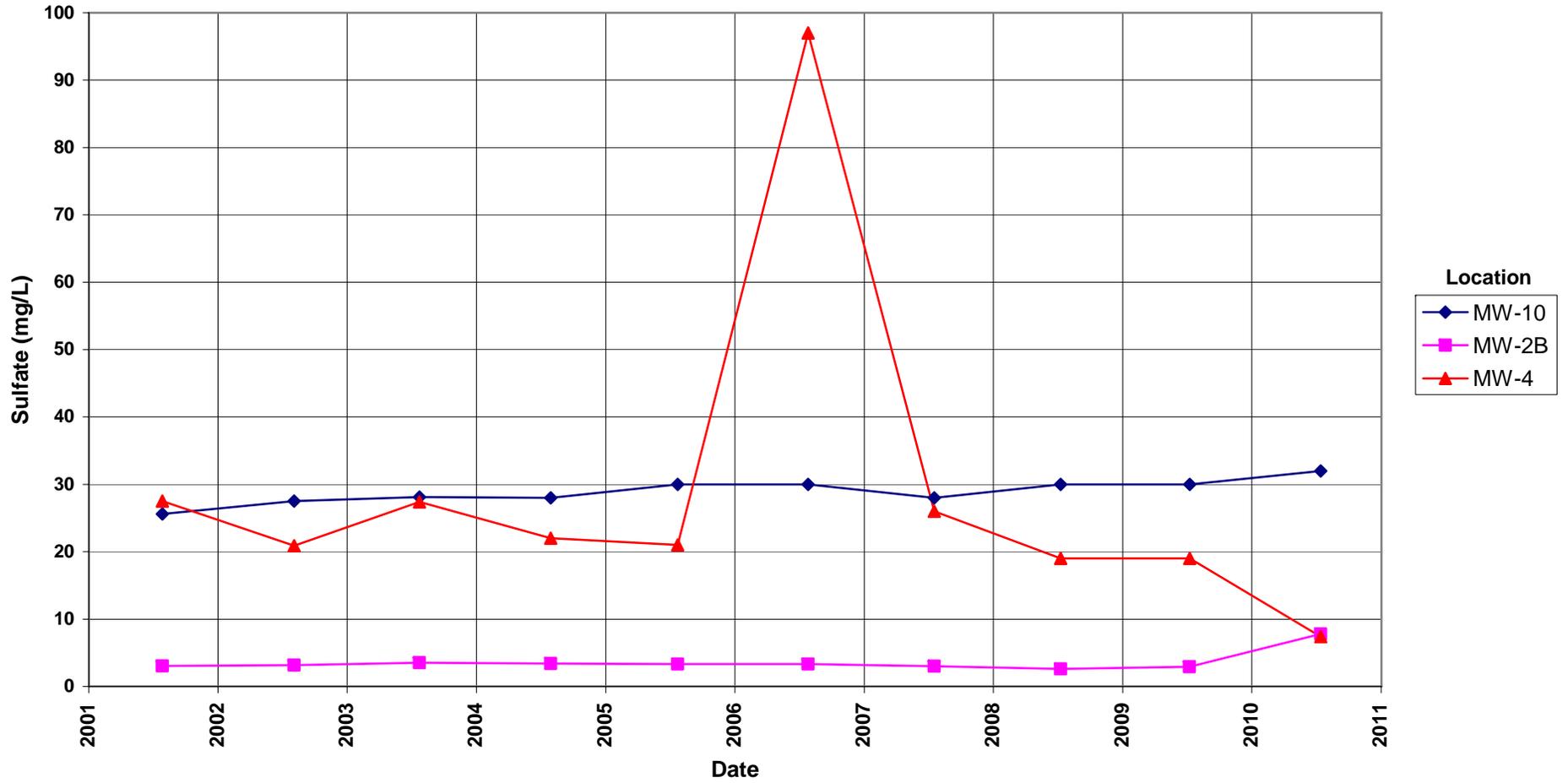
Time-Concentration Graphs

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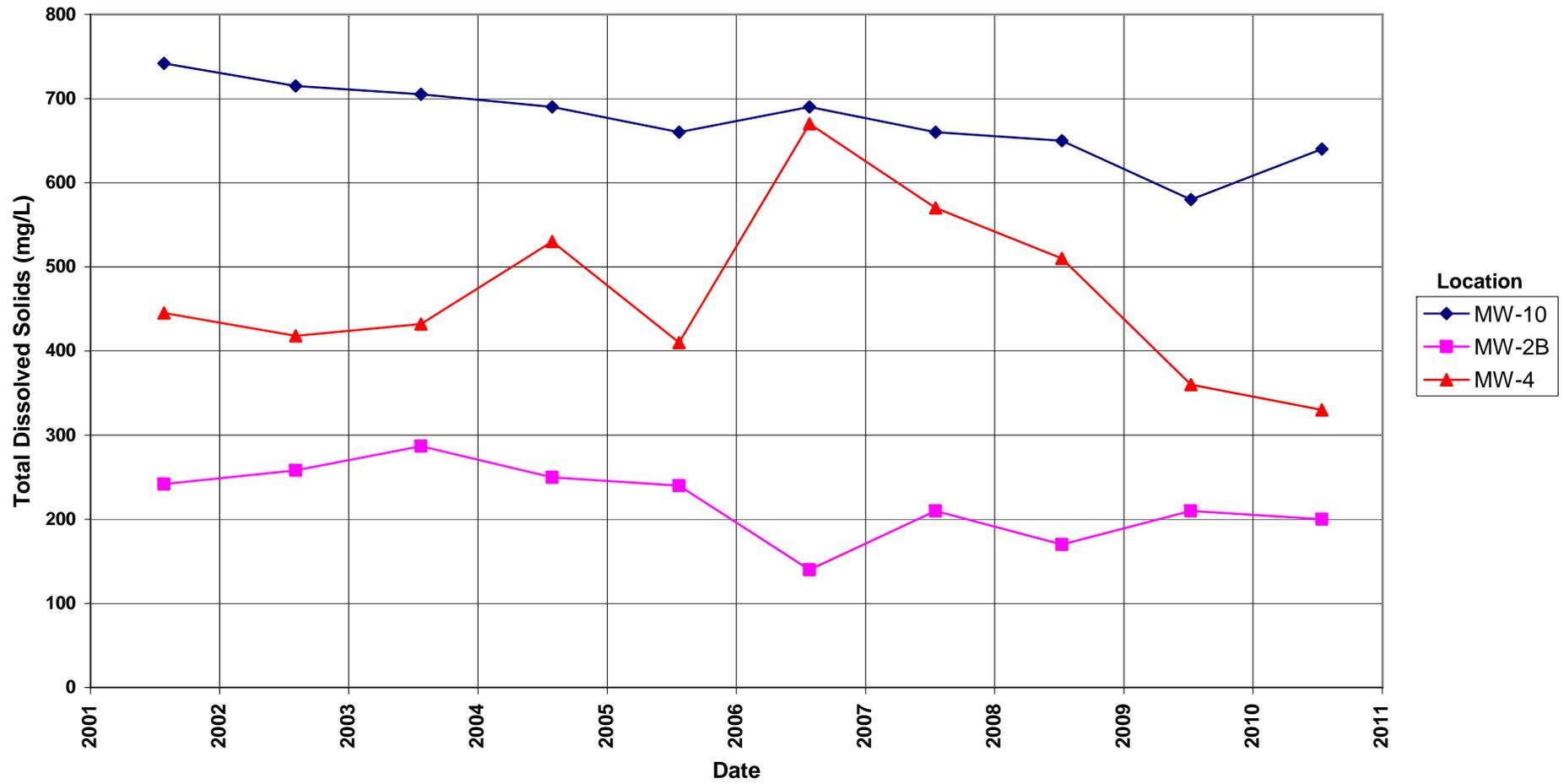
Sherwood Disposal Site Chloride Concentration



Sherwood Disposal Site Sulfate Concentration



Sherwood Disposal Site Total Dissolved Solids Concentration



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Attachment 3
Sampling and Analysis Work Order

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June 28, 2010

U.S. Department of Energy
Office of Legacy Management
ATTN: Richard Bush
Site Manager
2597 B ¼ Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
July 2010 Environmental Sampling Sherwood, Washington

REFERENCE: Task Order LM00-501-03-221-402, Sherwood, WA, Disposal Site

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Sherwood, Washington. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Sherwood disposal site. Water quality data will be collected from monitoring wells at this site as part of the routine environmental sampling currently scheduled to begin the week of July 12, 2010.

The following list shows the locations scheduled to be sampled during this event.

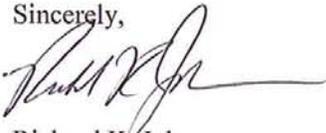
Monitor Wells

MW-2B MW-4 MW-10

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) 248-6022 if you have any questions or concerns.

Sincerely,



Richard K. Johnson
Site lead

RKJ/lcg/lb

Richard Bush
Control Number 10-0729
Page 2

Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Steve Donovan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Richard Johnson, Stoller
EDD Delivery
re-grand.junction

**Sampling Frequencies for Locations
at Sherwood, WA**

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
MW-2B			X			
MW-4			X			
MW-10			X			
P1					X	Water level only
P2					X	Water level only
P3					X	Water level only
P4					X	Water level only

Sampling conducted in July

Constituent Sampling Breakdown

Site	Sherwood		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
Approx. No. Samples/yr	3	0			
<i>Field Measurements</i>					
Alkalinity					
Dissolved Oxygen					
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride	X		0.5	SW-846 9056	MIS-A-039
Chromium					
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium					
Radium-226					
Radium-228					
Selenium					
Silica					
Sodium					
Strontium					
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	X		10	SM2540 C	WCH-A-033
Total Organic Carbon					
Uranium					
Vanadium					
Zinc					
Total No. of Analytes	3	0			

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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Memorandum

DATE: July 22, 2010
 TO: Richard Johnson
 FROM: Gretchen Baer
 SUBJECT: Sampling Trip Report

Site: Sherwood, WA

Date of Sampling Event: July 14, 2010

Team Members: Gretchen Baer and David Atkinson

Number of Locations Sampled: Three monitoring wells were sampled for total dissolved solids, chloride, and sulfate. Water levels at the four piezometers on top of the tailing dam were also collected.

Locations Not Sampled/Reason: None

Location Specific Information:

Location IDs	Comments
MW-4	Cat II based on water level drawdown. Filtered because turbidity > 10 ntu. The new sign provided by site lead was left at this location.
MW-10	Cat I this event but close to Cat II based on water level drawdown.
MW-2B	Cat II based on water level drawdown.

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
2100	MW-2B	Duplicate	Groundwater

RIN Number Assigned: Samples were assigned to RIN 10073200.

Sample Shipment: Samples were shipped overnight by FedEx to ALS Laboratory Group from Copy Junction, 13015 W 14th Ave., Airway Heights, WA, on July 14, 2010.

Well Inspection Summary: Well inspections were conducted at all sampled wells. All wells were in good condition. Piezometer lid hinges are rusted and very hard to open. A hammer or

similar tool is necessary to open the lids.

Some general site photos were taken and are available at “Sites on Gull\Sites_Prod\WA\SHERWOODDISPOSAL\Images\2010\20100714_Baer_Sampling.”

Equipment: The wells were sampled using bladder pumps and the appropriate dedicated equipment. Compressed air (in tanks) was used to actuate the bladder pumps; this method is recommended because the pump depths at MW-4 and MW-10 are at the limit of an air compressor’s capacity.

Water Level Measurements: Water levels were collected in all three sampled wells and in four piezometers on the tailings dam. Water level data in the piezometers were collected with the Water Level Recorder program on a PDA.

Field Variance: Ice was not available at the site. The samples were placed on ice shortly after sampling at 14:00 on 7/14/10.

Institutional Controls:

Fences, Gates, and Locks: The gate on Sherwood Mine Road used to access wells MW-4 and MW-10 was locked. A section of fence off-road to the left of the gate was missing, which allowed vehicle access.

Signs: No issues were observed. The new sign provided by the site lead was left at well MW-4.

Trespassing/Site Disturbances: N/A

Site Issues: Cell phone service (Verizon) was weak but available at the site.

Disposal Cell/Drainage Structure Integrity: Appeared to be acceptable.

Vegetation/Noxious Weed Concerns: There is a significant amount of vegetation growing on the rip rap-covered tailings dam face. Many small pine trees are growing around well MW-4. These trees may prevent truck access to that well in the future.

Maintenance Requirements: None observed.

Safety Issues: None.

Access: The road leading to well MW-2B is becoming eroded by water runoff, but is still in fair condition.

Corrective Action Required/Taken: Sampling personnel need to be able to open the gate on Sherwood Mine Road.

(GB/lcg)

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

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