

# Data Validation Package

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**May 2012**  
**Groundwater Sampling at the**  
**Lakeview, Oregon, Processing Site**

**August 2012**

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# Sampling Event Summary

**Site:** Lakeview, Oregon, Processing Site

**Sampling Period:** May 16, 2012

This biennial event includes sampling five groundwater locations (four monitoring wells and one domestic well) at the Lakeview, Oregon, Processing Site. For this event, the domestic well (location 0543) could not be sampled because the pump had been turned off. Sampling is conducted to monitor groundwater quality as a best management practice. Sampling and analysis were conducted as specified in *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated) and the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated). One duplicate sample was collected from location 0540. Water levels were measured at each sampled monitoring well.

The constituents monitored at the Lakeview site are manganese and sulfate at all wells, and uranium at wells 0509 and 0540 only. None of the monitoring well uranium concentrations exceeded the Uranium Mill Tailings Remedial Action groundwater standard. Monitoring well manganese and sulfate concentrations that exceed the U.S. Environmental Protection Agency (EPA) Secondary Maximum Contaminant Level are listed in Table 1.

Table 1. Lakeview Locations That Exceed Groundwater Standards

Analyte	EPA SMCL <sup>a</sup> (mg/L)	Location	Concentration (mg/L)
Manganese	0.05	0503	6.8
		0505	2.9
		0509	0.084
		0540	11
Sulfate	250	0503	2400
		0505	1600
		0540	870

mg/L = milligrams per liter

<sup>a</sup> SMCL = Secondary Maximum Contaminant Level (EPA, Safe Drinking Water Act).

Review of time-concentration graphs included in this report indicate that the manganese, specific conductance, sulfate, and uranium concentrations are consistent with historical measurements. The specific conductance and sulfate concentrations in well 0509, which were high in 2010, have returned to historical levels.



Ann Houska  
Site Lead, S.M. Stoller

1/10/13  
Date

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Lakeview, Oregon, Processing Site Sample Location Map

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# **Data Assessment Summary**

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### Water Sampling Field Activities Verification Checklist

<b>Project</b>	<u>Lakeview, Oregon</u>	<b>Date(s) of Water Sampling</b>	<u>May 16, 2012</u>
<b>Date(s) of Verification</b>	<u>July 13, 2012</u>	<b>Name of Verifier</b>	<u>Gretchen Baer</u>

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work order letter dated April 10, 2012.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>No</u>	<u>The domestic well 0543 could not be sampled. The pump had been turned off and no water was flowing to the spigot located at the front exterior of the main house.</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 May 14, 2012.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u> <u>Yes</u>	<u>Daily operation checks were performed on May 16, 2012.</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?	<u>Yes</u>	
Did the water level stabilize prior to sampling?	<u>Yes</u>	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	<u>Yes</u>	
Was the flow rate less than 500 mL/min?	<u>Yes</u>	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<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? Was one pump/tubing volume removed prior to sampling?	NA NA	There were no Category II wells.
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from location 0540.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	Dedicated tubing was used for sample collection from all monitoring 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 Yes	Location ID 2931 was used for the duplicate sample.
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the "Date Signed" fields (FDCS)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	Water levels were measured at each sampled monitoring well.

## Laboratory Performance Assessment

### General Information

Requisition No. (RIN): 12054530  
Sample Event: May 16, 2012  
Site(s): Lakeview, Oregon, Processing Site  
Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
Work Order No.: 1205314  
Analysis: Metals and Wet Chemistry  
Validator: Gretchen Baer  
Review Date: July 13, 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. 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 2.

Table 2 Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Manganese	LMM-01	SW-846 3005A	SW-846 6010B
Sulfate	MIS-A-044	SW-846 9056	SW-846 9056
Uranium	LMM-02	SW-846 3005A	SW-846 6020A

### Data Qualifier Summary

None of the analytical results required qualification.

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received five water samples on May 19, 2012, accompanied by a Chain of Custody form. The Chain of Custody 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 Chain of Custody was complete with 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 intact with the temperature inside the iced cooler at 1.6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

## Detection and Quantitation Limits

The method detection limit (MDL) was reported for all analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The reported MDLs for all analytes demonstrate compliance with contractual requirements.

## Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

### *Method SW-846 6010B, Manganese*

Calibrations were performed on May 26, 2012, using three calibration standards. The calibration curve correlation coefficient value was greater than 0.995. The absolute value of the intercept was greater than 3 times the MDL, but was less than 3 times the reporting limit and all results were above the reporting limit. Initial and continuing calibration verification checks were made at the required frequency resulting in four 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 6020A, Uranium*

Calibrations were performed on May 30, 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 three 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 were stable and within acceptable ranges.

### *Method SW-846 9056, Sulfate*

Initial calibrations were performed using five calibration standards on April 12 and May 30, 2012. The 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 checks were made at the required frequency resulting in 9 calibration checks. The calibration checks met the acceptance criteria.

## Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the MDL for all analytes. For manganese, some calibration blanks were negative and the absolute values were greater than the MDL but less than the PQL. All manganese results were greater than 5 times the MDL, so no results are qualified.

## Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

## Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration (as was the case with the manganese spikes). The spike recoveries met the acceptance 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 replicate 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. The replicate results met these criteria, demonstrating acceptable laboratory precision.

## Laboratory Control Samples

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.

## 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 June 18, 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: 12054530    Lab Code: PAR    Validator: Gretchen Baer    Validation Date: 7/23/2012  
Project: Lakeview Processing Site    Analysis Type:  Metals     General Chem     Rad     Organics  
# of Samples: 5    Matrix: WATER    Requested Analysis Completed: Yes

**Chain of Custody**

Present: OK    Signed: OK    Dated: OK

**Sample**

Integrity: OK    Preservation: OK    Temperature: OK

**Select Quality Parameters**

- Holding Times
- 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

### Metals Data Validation Worksheet

RIN: 12054530Lab Code: PARDate Due: 6/16/2012Matrix: WaterSite Code: LKV01Date Completed: 6/18/2012

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	05/26/2012	-1.6000	1.0000	OK	OK	OK	OK	OK	99.0			0.0	90.0	1.0	99.0
Manganese	ICP/ES	05/26/2012											0.0	99.0		109.0
Manganese	ICP/ES	05/26/2012												99.0		109.0
Uranium	ICP/MS	05/30/2012	0.0000	1.0000	OK	OK	OK	OK	OK	101.0	98.0	98.0	0.0	101.0	2.0	95.0
Uranium	ICP/MS	05/30/2012											0.0			

## SAMPLE MANAGEMENT SYSTEM

### Wet Chemistry Data Validation Worksheet

**RIN:** 12054530      **Lab Code:** PAR      **Date Due:** 6/16/2012  
**Matrix:** Water      **Site Code:** LKV01      **Date Completed:** 6/18/2012

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
SULFATE	04/12/2012	0.316	1.0000	OK		OK							
SULFATE	05/24/2012				OK		OK	97.00	100.0	97.0	1.00		
SULFATE	05/24/2012				OK		OK	94.00	85.0	91.0	2.00		
SULFATE	05/30/2012	0.448	0.9999	OK		OK							

## **Sampling Quality Control Assessment**

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

### Sampling Protocol

Sample results for all monitoring wells met the Category I low-flow sampling criteria and were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

### Equipment Blank Assessment

An equipment blank was not required because all monitoring wells were sampled using the low-flow procedure with a peristaltic pump and dedicated tubing.

### 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. A duplicate sample was collected from location 0540. The duplicate results met the criteria, demonstrating acceptable overall precision.

**SAMPLE MANAGEMENT SYSTEM**  
**Validation Report: Field Duplicates**

Page 1 of 1

RIN: 12054530    Lab Code: PAR    Project: Lakeview Processing Site    Validation Date: 7/23/2012

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Duplicate: 2931

Sample: 0540

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Manganese	11000			5	11000			5	0	UG/L	
SULFATE	870			20	880			20	1.14	MG/L	
Uranium	7.1			10	6.8			10	4.32	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 Donovan 8-3-2012  
Steve Donovan Date

Data Validation Lead: Gretchen Baer 8/3/12  
Gretchen Baer 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.

No values from this sampling event were identified as potential outliers.

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# **Attachment 2**

## **Data Presentation**

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## **Groundwater Quality Data**

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**General Water Quality Data by Location (USEE105) FOR SITE LKV01, Lakeview Processing Site**

**REPORT DATE: 7/24/2012**

**Location: 0503 WELL**

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	05/16/2012	N001	18.16 - 23.16	370		F	#		
Manganese	mg/L	05/16/2012	N001	18.16 - 23.16	6.8		F	#	0.00011	
Oxidation Reduction Potential	mV	05/16/2012	N001	18.16 - 23.16	40.6		F	#		
pH	s.u.	05/16/2012	N001	18.16 - 23.16	6.91		F	#		
Specific Conductance	umhos/cm	05/16/2012	N001	18.16 - 23.16	8131		F	#		
Sulfate	mg/L	05/16/2012	N001	18.16 - 23.16	2400		F	#	50	
Temperature	C	05/16/2012	N001	18.16 - 23.16	11.54		F	#		
Turbidity	NTU	05/16/2012	N001	18.16 - 23.16	5.73		F	#		

**General Water Quality Data by Location (USEE105) FOR SITE LKV01, Lakeview Processing Site**

**REPORT DATE: 7/24/2012**

**Location: 0505 WELL**

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	05/16/2012	N001	21.1 - 26.1	557		F	#		
Manganese	mg/L	05/16/2012	N001	21.1 - 26.1	2.9		F	#	0.00011	
Oxidation Reduction Potential	mV	05/16/2012	N001	21.1 - 26.1	86		F	#		
pH	s.u.	05/16/2012	N001	21.1 - 26.1	7.16		F	#		
Specific Conductance	umhos/cm	05/16/2012	N001	21.1 - 26.1	5813		F	#		
Sulfate	mg/L	05/16/2012	N001	21.1 - 26.1	1600		F	#	50	
Temperature	C	05/16/2012	N001	21.1 - 26.1	10.77		F	#		
Turbidity	NTU	05/16/2012	N001	21.1 - 26.1	1.52		F	#		

**General Water Quality Data by Location (USEE105) FOR SITE LKV01, Lakeview Processing Site**

**REPORT DATE: 7/24/2012**

**Location: 0509 WELL**

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	05/16/2012	N001	26.92 - 31.92	186		F	#		
Manganese	mg/L	05/16/2012	N001	26.92 - 31.92	0.084		F	#	0.00011	
Oxidation Reduction Potential	mV	05/16/2012	N001	26.92 - 31.92	89		F	#		
pH	s.u.	05/16/2012	N001	26.92 - 31.92	7.89		F	#		
Specific Conductance	umhos/cm	05/16/2012	N001	26.92 - 31.92	566		F	#		
Sulfate	mg/L	05/16/2012	N001	26.92 - 31.92	53		F	#	0.5	
Temperature	C	05/16/2012	N001	26.92 - 31.92	12.02		F	#		
Turbidity	NTU	05/16/2012	N001	26.92 - 31.92	8.01		F	#		
Uranium	mg/L	05/16/2012	N001	26.92 - 31.92	0.00008	B	F	#	0.000029	

**General Water Quality Data by Location (USEE105) FOR SITE LKV01, Lakeview Processing Site**

**REPORT DATE: 7/24/2012**

**Location: 0540 WELL**

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	05/16/2012	N001	25.04 - 30.04	45		F	#		
Manganese	mg/L	05/16/2012	N001	25.04 - 30.04	11		F	#	0.00057	
Manganese	mg/L	05/16/2012	N002	25.04 - 30.04	11		F	#	0.00057	
Oxidation Reduction Potential	mV	05/16/2012	N001	25.04 - 30.04	112		F	#		
pH	s.u.	05/16/2012	N001	25.04 - 30.04	6		F	#		
Specific Conductance	umhos/cm	05/16/2012	N001	25.04 - 30.04	1696		F	#		
Sulfate	mg/L	05/16/2012	N001	25.04 - 30.04	870		F	#	10	
Sulfate	mg/L	05/16/2012	N002	25.04 - 30.04	880		F	#	10	
Temperature	C	05/16/2012	N001	25.04 - 30.04	12.63		F	#		
Turbidity	NTU	05/16/2012	N001	25.04 - 30.04	6.21		F	#		
Uranium	mg/L	05/16/2012	N001	25.04 - 30.04	0.0071		F	#	0.000029	
Uranium	mg/L	05/16/2012	N002	25.04 - 30.04	0.0068		F	#	0.000029	

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

**LAB QUALIFIERS:**

- \* Replicate analysis not within control limits.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated

N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).  
P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.  
U Analytical result below detection limit.  
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.  
X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

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

QA QUALIFIER:

# Validated according to quality assurance guidelines.

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## **Static Water Level Data**

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**STATIC WATER LEVELS (USEE700) FOR SITE LKV01, Lakeview Processing Site**  
**REPORT DATE: 7/24/2012**

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
0503	D	4747.73	05/16/2012	12:30:14	8.22	4739.51	
0505	D	4744.64	05/16/2012	13:15:29	6.99	4737.65	
0509	D	4742.14	05/16/2012	14:50:45	4.90	4737.24	
0540	D	4747.89	05/16/2012	14:10:16	5.52	4742.37	

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      B Below top of pump

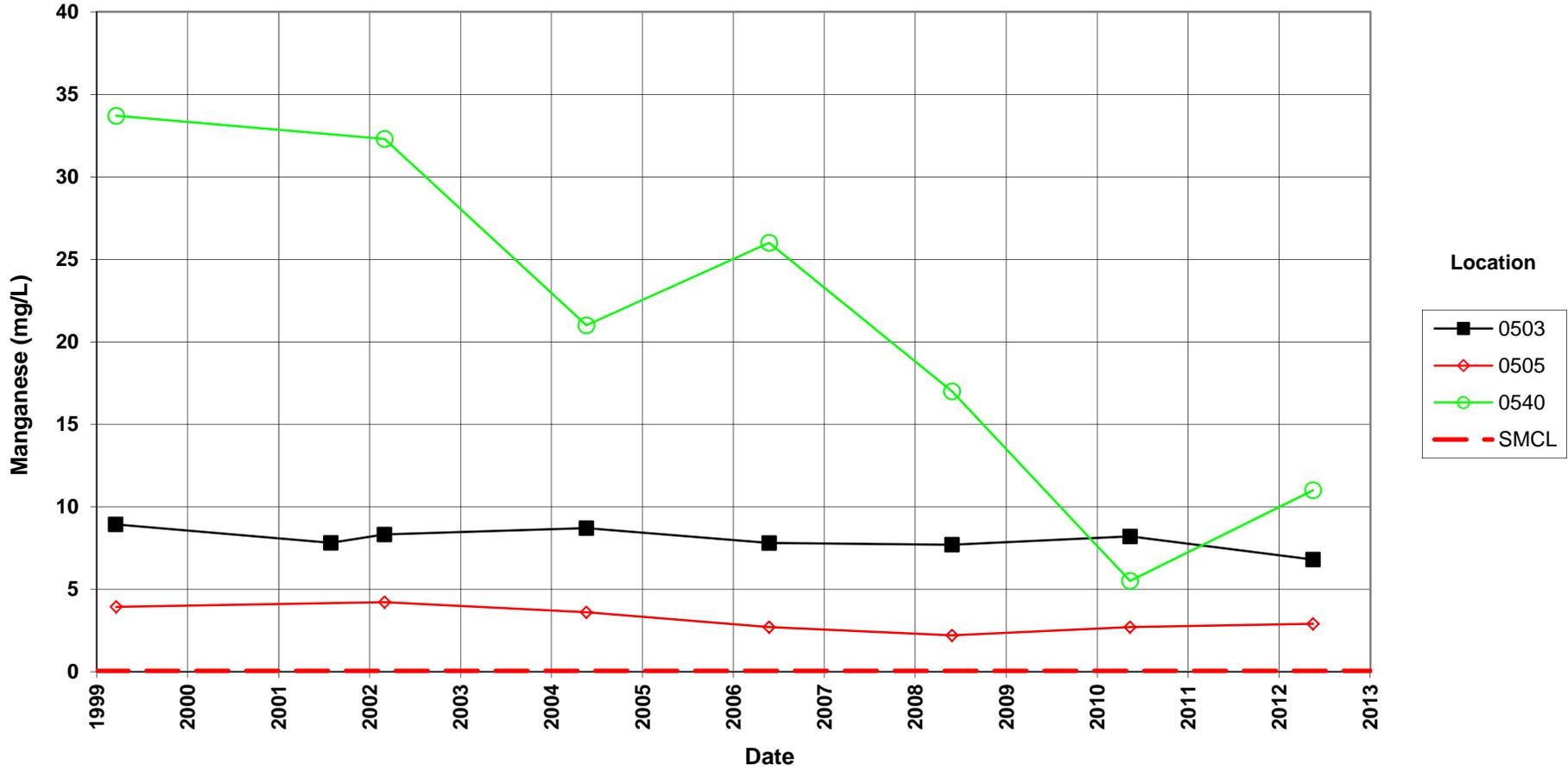
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## **Time-Concentration Graphs**

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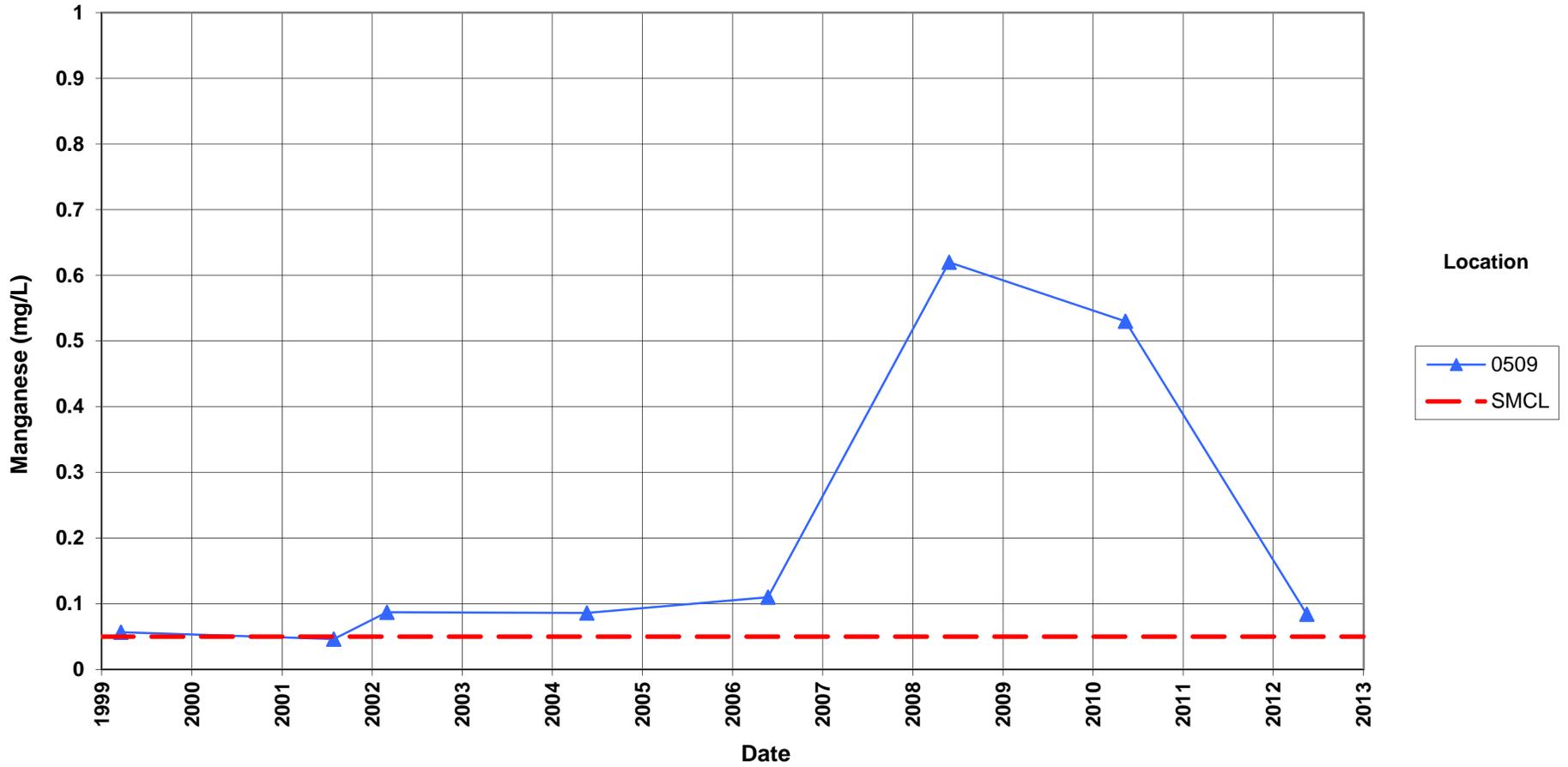
# Lakeview Processing Site Manganese Concentration

Secondary Maximum Contaminant Level (SMCL) = 0.05 mg/L

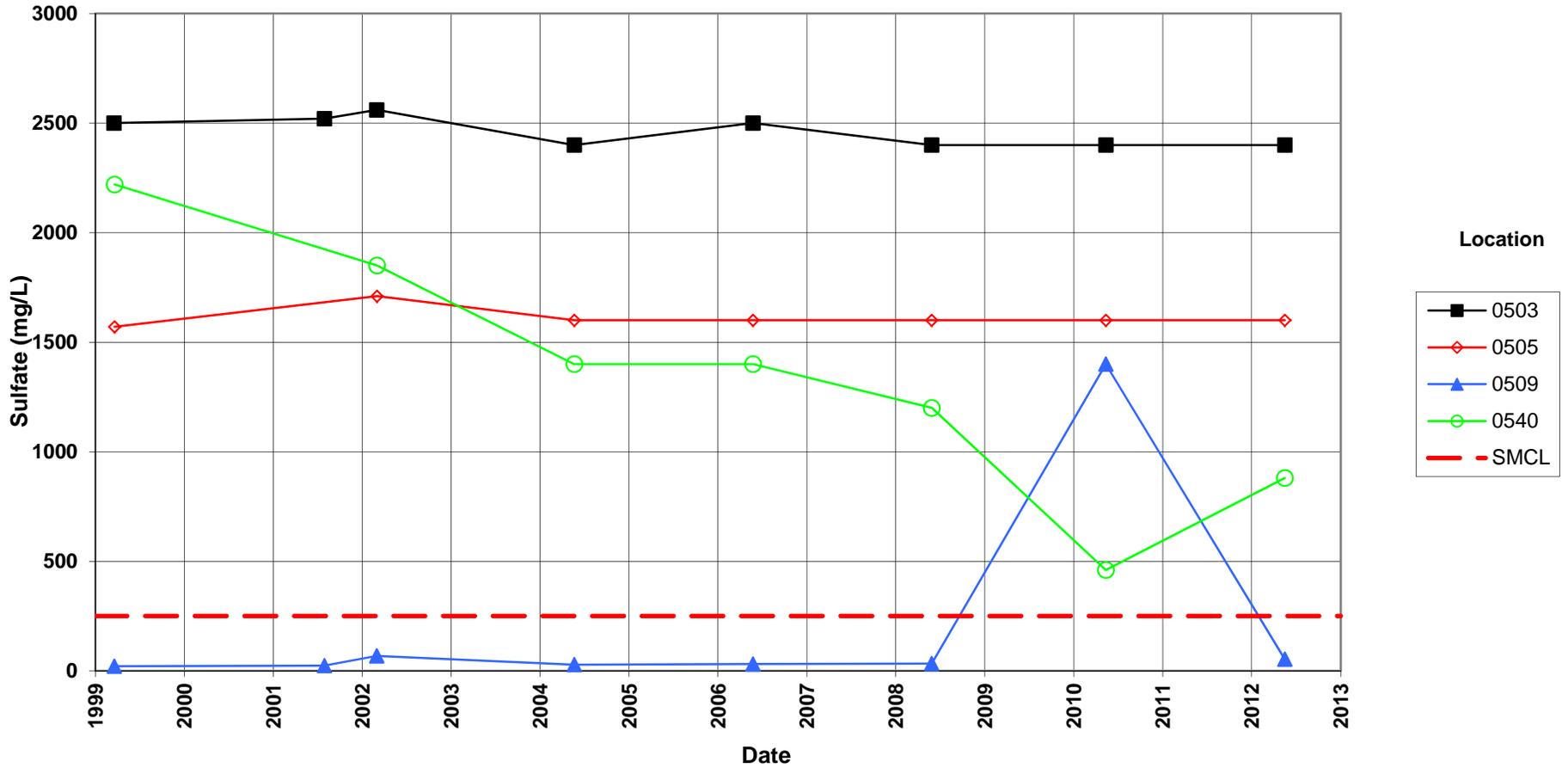


# Lakeview Processing Site Manganese Concentration

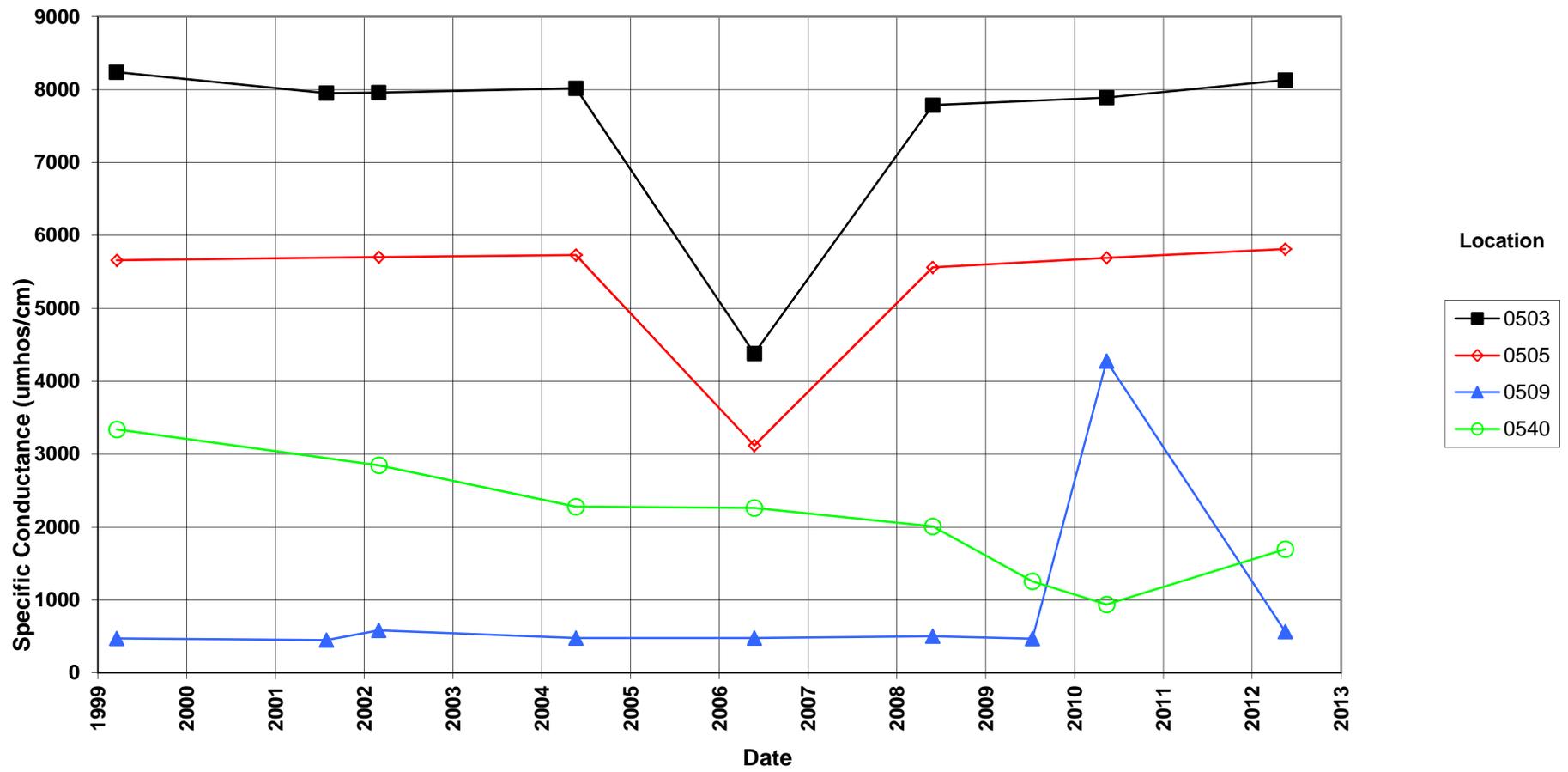
Secondary Maximum Contaminant Level (SMCL) = 0.05 mg/L



**Lakeview Processing Site**  
**Sulfate Concentration**  
Secondary Maximum Contaminant Level = 250 mg/L

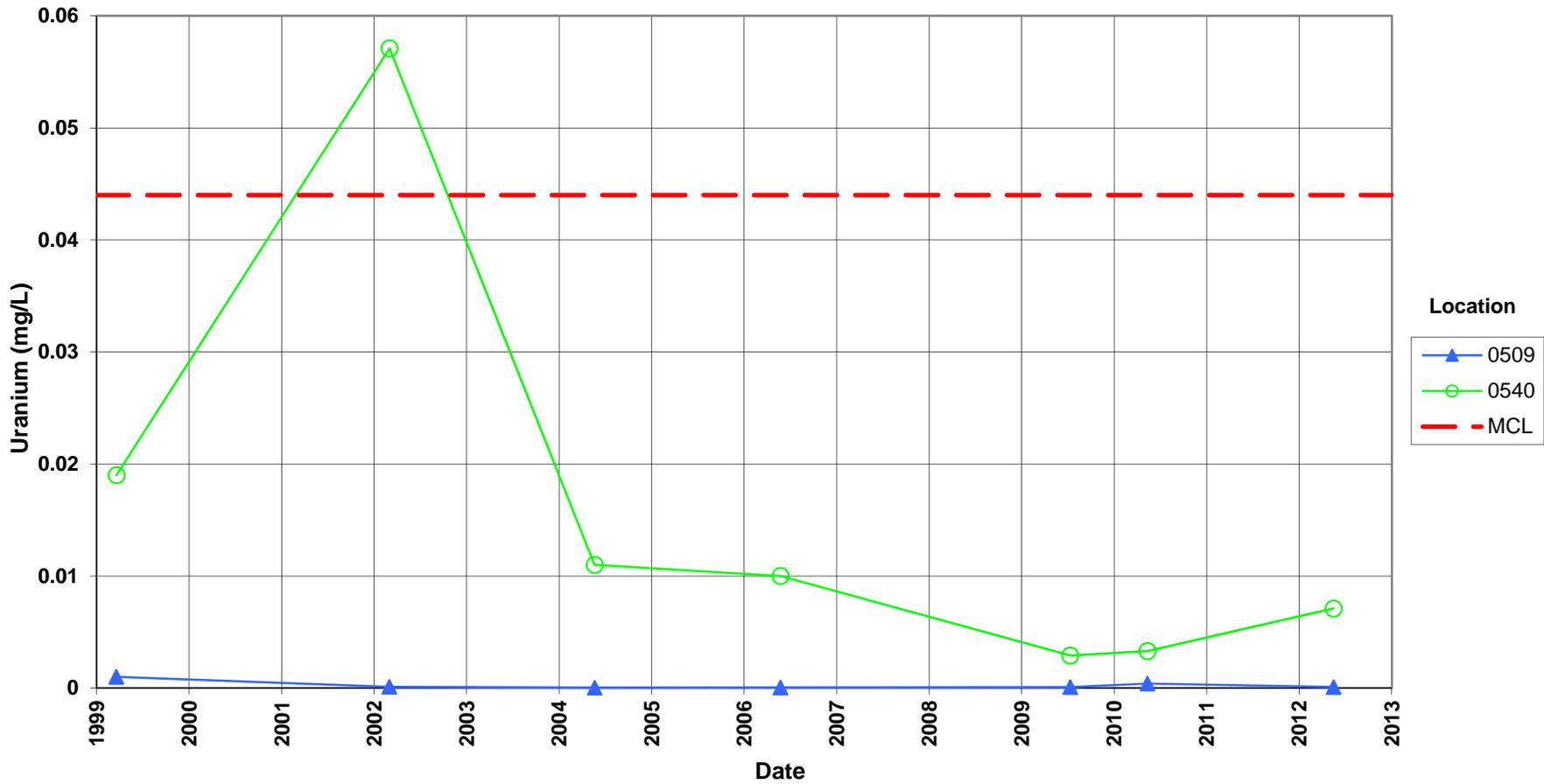


# Lakeview Processing Site Specific Conductance Concentration



# Lakeview Processing Site Uranium Concentration

Maximum Contaminant Level (MCL) = 0.044 mg/L



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**Attachment 3**  
**Sampling and Analysis Work Order**

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established 1959

Task Order LM00-501  
Control Number 12-0536

April 10, 2012

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)  
May 2012 Environmental Sampling at the Lakeview, Oregon, Processing Site

Reference: Task Order LM-501-02-109-402, Lakeview, Oregon, Processing Site

Dear Ms. Dayvault:

The purpose of this letter is to inform you of the upcoming sampling event at Lakeview, Oregon. Enclosed are the map and tables specifying sample locations and analytes for groundwater monitoring at the Lakeview Processing Site which, per your direction, remain consistent with the 2010 sampling event. Water quality data will be collected at the processing site as part of the routine environmental sampling currently scheduled to occur between May 14 and May 18, 2012. A more detailed schedule will be provided to you in the near future.

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

**Monitoring Wells\***

LKV01 Processing Site

503 Sp      505 Sp      509 Sp      540 Al

\*NOTE: Al = alluvium; Sp = Sand or Gravelly Sand, Poorly Graded

**Domestic Well**

543

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Additionally, all monitoring wells will be developed during this sampling event prior to commencing sampling.

Access agreements are being reviewed and are expected to be complete by the beginning of fieldwork.

---

The S.M. Stoller Corporation    2597 Legacy Way    Grand Junction, CO 81503    (970) 248-6000    Fax (970) 248-6040

Jalena Dayvault  
Control Number 12-0536  
Page 2

Please contact me at (970) 248-6579 if you have any questions.

Sincerely,



Ann Houska  
Site Lead

AH/lcg/lb

Enclosures (4)

cc: (electronic)

Karl Stoeckle, DOE  
Steve Donovan, Stoller  
Bev Gallagher, Stoller  
Lauren Goodknight, Stoller  
Ann Houska, Stoller  
EDD Delivery  
rc-grand.junction  
File: LKV 410.02(A)

**Sampling Frequencies for Locations at  
Lakeview, Oregon**

Location ID	Quarterly	Semiannually	Annually	Biennially	Every 5 years	Notes
<b>Monitoring Wells</b>						
<i>LKV01 - Processing Site</i>						
503				Even year		
505				Even year		
509				Even year		
540				Even year		
<b>Private Wells</b>						
<i>LKV01 - Processing Site</i>						
543				Even year		

Biennial sampling conducted in May.

### Constituent Sampling Breakdown

Site	Lakeview			
Analyte	Groundwater	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	5			
<b>Field Measurements</b>				
Alkalinity	X			
Dissolved Oxygen				
Redox Potential	X			
pH	X			
Specific Conductance	X			
Turbidity	X			
Temperature	X			
<b>Laboratory Measurements</b>				
	<b>Processing Site</b>			
Aluminum				
Ammonia as N (NH3-N)				
Arsenic				
Cadmium				
Calcium				
Chloride				
Gross Alpha				
Gross Beta				
Iron				
Lead				
Magnesium				
Manganese	X	0.005	SW-846 6010	LMM-01
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				
Total Organic Carbon				
Uranium	0509 and 0540 only	0.0001	SW-846 6020	LMM-02
Vanadium				
Zinc				
<b>Total No. of Analytes</b>	<b>3</b>			

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

# **Attachment 4**

## **Trip Report**

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## Memorandum

DATE: May 23, 2012  
 TO: Ann Houska  
 FROM: Gretchen Baer  
 SUBJECT: Trip Report

**Site:** Lakeview, Oregon, Processing Site and Disposal Site

**Dates of Sampling and Maintenance Events:** May 15-16, 2012

**Team Members:** Gretchen Baer and Craig Goodknight. Jalena Dayvault was present on May 16 to observe well maintenance and sampling. A copy of the JSA signed by J. Dayvault is available in Crow\sms\12054530.

**Number of Locations Sampled:** Samples were collected from 4 monitoring wells.

**Locations Not Sampled/Reason:** The domestic well 0543 (property address 2250 Missouri Avenue) could not be sampled. The pump has been turned off and no water is flowing to the spigot located at the front exterior of the main house.

**Location Specific Information:**

Location IDs	Comments
All monitoring wells: 0503, 0505, 0509, 0540	Wells were re-developed prior to sampling. See the attached 'Well Development Log.'
0509	Well pad is undermined by several inches and the casing is loose. This does not negatively affect the water quality or the ability to sample. This condition was also observed at nearby well <b>0510</b> , which was not scheduled for sampling. This undermining has <i>not</i> worsened significantly since it was observed in 2009 and 2010.
0540	The property owner, M. Horton, did <i>not</i> meet the sampling team at location 0540 at the scheduled time of 14:00 on 05/16/12. The team was working at this location from 13:50 until 14:20 on 05/16/12.
0543	Checked the spigot at the front of the house. The water has been turned off so we couldn't sample. Called A. Houska. She and J. Dayvault decided we should not attempt to sample the well on the west side of house.

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

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2931	KGT 404	0540	Duplicate	Groundwater

**Report Identification Number (RIN) Assigned:** Samples were assigned to RIN 12054530. Field data sheets can be found in Crow\sms\12054530 in the FieldData folder.

**Sample Shipment:** Samples were shipped overnight by FedEx to ALS Laboratory Group from Copy Junction, 13015 W 14th Ave., Airway Heights, WA, on May 18, 2012.

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

**Well Inspection Summary:** Inspections were conducted at all sampled wells. All wells were in good condition with the exception that wells 0509 and 0510 have well pads that are slightly undermined, as noted above in Location Specific Information.

**Field Variance:** None. Samples were collected according to the *Sampling and Analysis Plan for U. S. Department of Energy Office of Legacy Management Sites*.

**Equipment:** All equipment functioned properly. Wells were sampled with a peristaltic pump and dedicated tubing. The Field Data Collection System was used to collect data. All times collected are in the PDT time zone.

**Stakeholder/Regulatory:** Jalena Dayvault (DOE) conducted a safety assessment while observing sampling at all four wells and redevelopment at one well.

**Institutional Controls:**

**Fences, Gates, and Locks:**

- All gates used to access the wells and the disposal site were kept closed during and after sampling.
- The landowner's gate leading to the disposal site has several locks daisy-chained together. One of the locks can be opened with a 3359 key. Another lock can be opened with a combination. The 4-digit combination can be found in the Field Notebook for this site.
- It appeared that the landowner's gate leading to the disposal site may be replaced soon with another gate that is currently under construction. Future teams should ensure that they will be able to open this new gate.

**Signs:** All OK

**Trespassing/Site Disturbances:** None observed. Per site lead request, the lock at disposal cell location 0516 was examined for tampering. The lock was intact.

**Site Issues:** Cell phone service (Verizon) was available at the processing site.

**Disposal Cell/Drainage Structure Integrity:** Some rocks on the riprap covered west side slope are noticeably degrading. However, did not notice a significant change from 2010.

**Vegetation/Noxious Weed Concerns:** None observed

**Maintenance Requirements:** The following maintenance activities were conducted at the processing site:

- Removed desiccant packs from the 6 SOARS locations. Replaced with new desiccant packs.

- De-winterized the rain gauge station. Propylene glycol was properly containerized, labeled, secured, and brought back to the Grand Junction office. The site lead was notified that the 2 containers are onsite and ready for recycling or disposal. The snow adapter cylinders and an empty 5-gallon 'catch' bucket were secured to the nearby SOARS station for use next fall, when the unit will be winterized. *NOTE: The 5-gallon 'catch' bucket that was in place below the rain gauge was ~2/3 full with propylene glycol or a mix of propylene glycol and water. Several dead bees were observed floating on top.*

This work was performed under the guidance of 2 documents: "Lakeview Met Station Maintenance" and "Waste Management Plan for Used Propylene Glycol." A JSA for SOARS telemetry maintenance was signed by both team members. Copies of these 3 documents are available in Crow\sms\12054530.

**Safety Issues:** None

**Access Issues:**

- See comments under "Fences, Gates, and Locks," above.
- The four wells at the processing site are in cow pastures. In 2010, these pastures were flooded and access to the wells was impeded by standing water. The pastures were mostly dry for this event; however, future sampling teams should prepare for flooded conditions by having rubber boots or hip waders available.
- The spigot location 0543 is at a home that was gated and locked, which prevented vehicle access. Vehicle access was not needed for sampling, so instead of borrowing keys, we obtained permission from Darryl Anderson (of Anderson Engineering) to cross a low wooden fence at the front of the property. A Field Change was added to the sampling JSA to document this decision.

**Corrective Action Required/Taken:** N/A

(GB/lcg)

cc: (electronic)  
Jalena Dayvault, DOE  
Steve Donovan, Stoller  
Jody Waugh, Stoller  
EDD Delivery

Well Development Log

Site Lakeview OR Date 5/15/12

Well ID	Arrival Time	Initial Water Level (ft bvc)	Number of Well Surges	Final Turbidity (NTUs)	Cumulative Volume (gallons)	Flow Rate (gpm)	Comments
0503	12:15	3.29	2	4.2	4 gal	~2	III Completed 14:25
0505	15:00	6.99	1	3.3	45 gal	2.5	III Completed 15:40
0540	17:07	5.35	2	5.6	83 gal	1.7	<del>III</del> 4.2 poles E of well Completed 18:30
0509	09:00	4.87	1	6.54	46 gal	0.7	<del>III</del> -2.2 poles E of well Completed 10:30
	5/16/12						

Conducted by Gretchen Baer  
 Gretchen Baer  
 Craig Goodknight