Data Validation Package

May 2010
Groundwater Sampling at the Lakeview, Oregon, Processing Site

August 2010

U.S. DEPARTMENT OF ENERGY
Legacy Management

FSME30

Contents

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Sampling Event Summary

Site: Lakeview, Oregon, Processing Site

Sampling Period: May 12, 2010

This biennial event includes sampling five groundwater locations (four monitoring wells and one domestic well, 0543) at the Lakeview, Oregon, Processing Site. Sampling is conducted to monitor groundwater quality as a best management practice, as specified in the 2006 *Ground Water Compliance Action Plan for the Lakeview, Oregon, Processing Site*. Sampling and analysis was 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 (SMCL) are listed in Table 1.

Table 1. Lakeview Locations That Exceed Groundwater Standards

Analyte	EPA SMCL[a] (mg/L)	Location	Concentration (mg/L)
Manganese	0.05	0503	8.2
		0505	2.7
		0509	0.53
		0540	5.5
		0543	1.6
Sulfate	250	0503	2,400
		0505	1,600
		0509	1,400
		0540	460

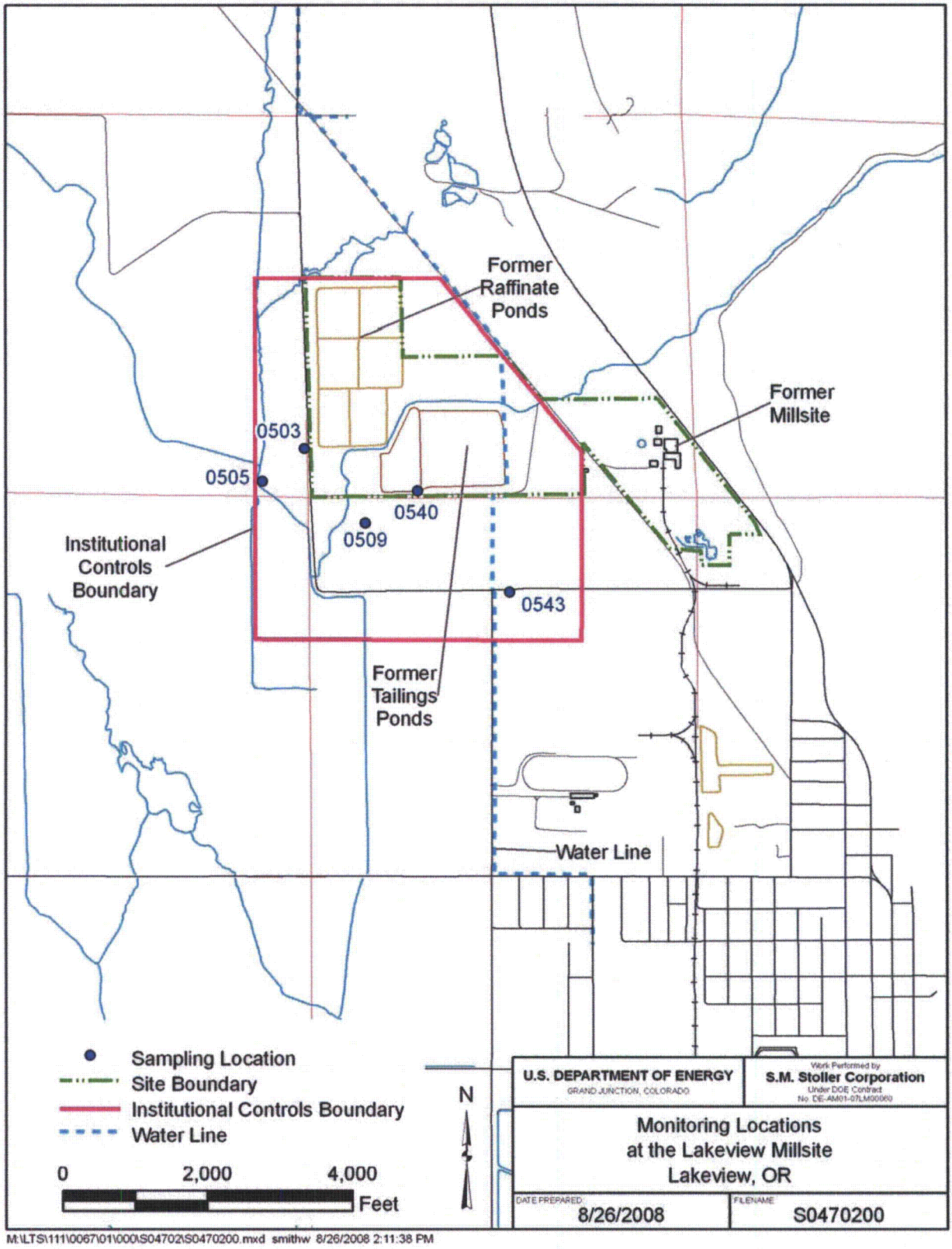
mg/L = milligrams per liter
[a] SMCL = Secondary Maximum Contaminant Level (EPA, Safe Drinking Water Act).

The time-concentration graphs for monitoring wells included with the analytical data indicate a significant increase in sulfate concentration in well 0509 which caused an exceedance of the SMCL in this well for the first time. The increase is confirmed by the specific conductance measurement that was performed at the time of sample collection. Both the manganese and sulfate concentrations in well 0540 dropped significantly, continuing the downward trend.

Ann M. Houska — 8/5/10

Ann Houska
Site Lead, S.M. Stoller

Date



Lakeview, Oregon, Processing Site Sample Location Map

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Lakeview, Oregon	**Date(s) of Water Sampling**	May 12, 2010
Date(s) of Verification	July 13, 2010	**Name of Verifier**	Steve Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOPs, instructions.		Work order letter dated April 19, 2010.
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 May 5, 2010.
4. Was an operational check of the field equipment conducted daily?	Yes	Daily operation checks were performed on May 12, 2010.
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	NA	There were no Category II wells.
Was one pump/tubing volume removed prior to sampling?		
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?	Yes	Location ID 2931 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	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN): 10053038
Sample Event: May 12, 2010
Site(s): Lakeview, Oregon, Processing Site
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1005160
Analysis: Metals and Wet Chemistry
Validator: Steve Donivan
Review Date: July 13, 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 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

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received six water samples on May 18, 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 form 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 waybill label was included with the receiving documentation.

Preservation and Holding Times

The sample shipments were received intact at a temperature of 2.4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

Data Qualifier Summary

None of the analytical results required qualification.

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 6010B, Manganese
Calibration was performed for manganese on June 11, 2010. The initial calibration was performed using a single point calibration. Initial and continuing calibration verification checks were made at the required frequency resulting in seven verification checks. All initial and continuing calibration verification results were within the acceptance range. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curves near the practical quantitation limit (PQL). All check results were within the acceptance range.

Method SW-846 6020A, Uranium
Calibration was performed for uranium on June 10–11, 2010. The initial calibration was performed using four calibration standards resulting in calibration curves with correlation coefficient (r^2) values greater than 0.995. The absolute value of curve intercepts were less than 3 times the method detection limit (MDL). Initial and continuing calibration verification checks were made at the required frequency resulting in 14 verification checks. All initial and continuing calibration verification results were within the acceptance range. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curves near the PQL. All check results were within the acceptance range. The mass calibration and resolution was checked at the beginning of each analytical run in accordance with the procedure. Internal standard recoveries were stable and within acceptance ranges.

Method SW-846 9056, Sulfate
Calibration was performed for sulfate on May 5, 2010. The initial calibration was performed using six calibration standards resulting in a calibration curve with r^2 values greater than 0.995. The absolute value of the curve intercept was less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in six verification checks. All initial and continuing calibration verification results were within the acceptance range. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curves near the PQL. All check results were within the acceptance range.

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 initial and continuing calibration blank results were below the PQLs for all analytes. In cases where blank concentration exceeds the instrument

detection limit, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than 5 times the blank concentration.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

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

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) 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. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

The relative percent difference values for the laboratory replicate sample results for all analytes were less than twenty percent, indicating acceptable laboratory precision.

Laboratory Control Samples (LCS)

LCS 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 LCS results were acceptable for all analyses.

Metals Serial Dilution

Serial dilutions were performed during the metals analysis to monitor physical or chemical interferences that may exist in the sample matrix. Serial dilutions were prepared and analyzed for manganese and uranium. The acceptance criteria were met for both analytes.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis of uranium to reduce interferences. The required detection limits were achieved for both analytes.

Completeness

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

Electronic Data Deliverable (EDD) File

The EDD file arrived on June 17, 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: 10053038 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 7/13/2010

Project: Lakeview Processing Site **Analysis Type:** [x] Metals [x] General Chem [ ] Rad [ ] Organics

# of Samples: 6 **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

[x] Holding Times	All analyses were completed within the applicable holding times
[x] Detection Limits	The reported detection limits are equal to or below contract requirements.
[ ] Field/Trip Blanks	
[x] Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 10053038 **Lab Code:** PAR **Date Due:** 6/15/2010

Matrix: Water **Site Code:** LKV01 **Date Completed:** 6/16/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
MANGANESE	06/11/2010			OK	OK	OK	OK	OK	102.0	75.0	81.0	0.0	96.0	5.0	99.0
MANGANESE	06/11/2010												97.0		98.0
URANIUM	06/10/2010	0.0000	1.0000	OK	OK	OK	OK	OK	103.0	106.0	102.0	3.0	107.0	2.0	100.0
URANIUM	06/11/2010	0.0000	1.0000	OK	OK	OK	OK					3.0	102.0		99.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 10053038 **Lab Code:** PAR **Date Due:** 6/15/2010

Matrix: Water **Site Code:** LKV01 **Date Completed:** 6/18/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
SULFATE	05/19/2010	0 000	1 0000	OK	OK	OK	OK	OK	99 00	99 0	100 0	0	
SULFATE	05/19/2010							OK	98 00	99 0			

Sampling Quality Control Assessment

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

Sampling Protocol

All monitoring wells were purged and sampled using Category I criteria. Sample results for these wells were qualified with an "F" flag in the database indicating the wells were purged and sampled using the low-flow sampling method.

Equipment Blank Assessment

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 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 these criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 10053038 Lab Code: PAR Project: Lakeview Processing Site Validation Date: 7/13/2010

Duplicate: 2931 Sample: 0540

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
MANGANESE	5500			1	5500			1	0		UG/L
SULFATE	460			10	450			10	2.20		MG/L
URANIUM	2.9			10	3.3			10	12.90		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: 8-3-2010

Data Validation Lead: Steve Donivan — Date: 8-3-2010

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 from location 0509 was identified as a potential outlier. The specific conductance measured at this location also was much higher than the historical maximum, confirming the sulfate concentration observed reflects an actual change in concentration and is not due to any type of error. 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: 10053038
Report Date: 7/13/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current Result	Current Qualifiers Lab	Current Qualifiers Data	Historical Maximum Result	Historical Maximum Qualifiers Lab	Historical Maximum Qualifiers Data	Historical Minimum Result	Historical Minimum Qualifiers Lab	Historical Minimum Qualifiers Data	Number of Data Points N	Number of Data Points N Below Detect	Statistical Outlier
LKV01	0509	N001	05/12/2010	Sulfate	1400		F	68		F	11			13	0	Yes
LKV01	0540	N001	05/12/2010	Manganese	5.5		F	39			14.3			15	0	No
LKV01	0540	N001	05/12/2010	Sulfate	460		F	2970			1200		FQ	13	0	No

Data Validation Outliers Report - Field Parameters Only
Comparison: All Historical Data
Laboratory: Field Measurements
RIN: 10053038
Report Date: 7/13/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current Result	Current Qualifiers Lab	Current Qualifiers Data	Historical Maximum Result	Historical Maximum Qualifiers Lab	Historical Maximum Qualifiers Data	Historical Minimum Result	Historical Minimum Qualifiers Lab	Historical Minimum Qualifiers Data	Number of Data Points N	Number of Data Points N Below Detect	Statistical Outlier
LKV01	0509	N001	05/12/2010	Specific Conductance	4278		F	583		F	273			13	0	Yes
LKV01	0540	N001	05/12/2010	Specific Conductance	939		F	3880			1256		F	14	0	No
LKV01	0543	N001	05/12/2010	Oxidation Reduction Potential	155.7			76.7			-122			5	0	No
LKV01	0543	N001	05/12/2010	pH	7.64			7.62			7.33			6	0	No
LKV01	0543	N001	05/12/2010	Temperature	9.95			14.24			10.11			6	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 LKV01, Lakeview Processing Site
REPORT DATE: 7/14/2010
Location: 0503 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	05/12/2010	N001	18.16 - 23.16	349		F	#		
Dissolved Oxygen	mg/L	05/12/2010	N001	18.16 - 23.16	0.42		F	#		
Manganese	mg/L	05/12/2010	N001	18.16 - 23.16	8.2		F	#	0.00027	
Oxidation Reduction Potential	mV	05/12/2010	N001	18.16 - 23.16	13.7		F	#		
pH	s.u.	05/12/2010	N001	18.16 - 23.16	6.94		F	#		
Specific Conductance	umhos /cm	05/12/2010	N001	18.16 - 23.16	7890		F	#		
Sulfate	mg/L	05/12/2010	N001	18.16 - 23.16	2400		F	#	50	
Temperature	C	05/12/2010	N001	18.16 - 23.16	12.31		F	#		
Turbidity	NTU	05/12/2010	N001	18.16 - 23.16	8.78		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE LKV01, Lakeview Processing Site
REPORT DATE: 7/14/2010
Location: 0505 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	05/12/2010	N001	21.1	-	26.1	551		F	#		
Dissolved Oxygen	mg/L	05/12/2010	N001	21.1	-	26.1	0.81		F	#		
Manganese	mg/L	05/12/2010	N001	21.1	-	26.1	2.7		F	#	0.00011	
Oxidation Reduction Potential	mV	05/12/2010	N001	21.1	-	26.1	158.7		F	#		
pH	s.u.	05/12/2010	N001	21.1	-	26.1	7.27		F	#		
Specific Conductance	umhos /cm	05/12/2010	N001	21.1	-	26.1	5692		F	#		
Sulfate	mg/L	05/12/2010	N001	21.1	-	26.1	1600		F	#	50	
Temperature	C	05/12/2010	N001	21.1	-	26.1	10.47		F	#		
Turbidity	NTU	05/12/2010	N001	21.1	-	26.1	1.11		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE LKV01, Lakeview Processing Site
REPORT DATE: 7/14/2010
Location: 0509 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	05/12/2010	N001	26.92 - 31.92	189		F	#		
Dissolved Oxygen	mg/L	05/12/2010	N001	26.92 - 31.92	2.28		F	#		
Manganese	mg/L	05/12/2010	N001	26.92 - 31.92	0.53		F	#	0.00011	
Oxidation Reduction Potential	mV	05/12/2010	N001	26.92 - 31.92	185.7		F	#		
pH	s.u.	05/12/2010	N001	26.92 - 31.92	7.79		F	#		
Specific Conductance	umhos /cm	05/12/2010	N001	26.92 - 31.92	4278		F	#		
Sulfate	mg/L	05/12/2010	N001	26.92 - 31.92	1400		F	#	25	
Temperature	C	05/12/2010	N001	26.92 - 31.92	9.87		F	#		
Turbidity	NTU	05/12/2010	N001	26.92 - 31.92	5.05		F	#		
Uranium	mg/L	05/12/2010	N001	26.92 - 31.92	0.00039		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE LKV01, Lakeview Processing Site
REPORT DATE: 7/14/2010
Location: 0540 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	05/12/2010	N001	25.04 - 30.04	21		F	#		
Dissolved Oxygen	mg/L	05/12/2010	N001	25.04 - 30.04	1.52		F	#		
Manganese	mg/L	05/12/2010	N001	25.04 - 30.04	5.5		F	#	0.000054	
Manganese	mg/L	05/12/2010	N002	25.04 - 30.04	5.5		F	#	0.000054	
Oxidation Reduction Potential	mV	05/12/2010	N001	25.04 - 30.04	159.4		F	#		
pH	s.u.	05/12/2010	N001	25.04 - 30.04	5.99		F	#		
Specific Conductance	umhos /cm	05/12/2010	N001	25.04 - 30.04	939		F	#		
Sulfate	mg/L	05/12/2010	N001	25.04 - 30.04	460		F	#	5	
Sulfate	mg/L	05/12/2010	N002	25.04 - 30.04	450		F	#	5	
Temperature	C	05/12/2010	N001	25.04 - 30.04	10.58		F	#		
Turbidity	NTU	05/12/2010	N001	25.04 - 30.04	8.95		F	#		
Uranium	mg/L	05/12/2010	N001	25.04 - 30.04	0.0029		F	#	0.000029	
Uranium	mg/L	05/12/2010	N002	25.04 - 30.04	0.0033		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE LKV01, Lakeview Processing Site
REPORT DATE: 7/14/2010
Location: 0543 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	05/12/2010	N001	-	188			#		
Dissolved Oxygen	mg/L	05/12/2010	N001	-	1.43			#		
Manganese	mg/L	05/12/2010	N001	-	1.6			#	0.000054	
Oxidation Reduction Potential	mV	05/12/2010	N001	-	155.7			#		
pH	s.u.	05/12/2010	N001	-	7.64			#		
Specific Conductance	umhos /cm	05/12/2010	N001	-	430			#		
Sulfate	mg/L	05/12/2010	N001	-	15			#	1	
Temperature	C	05/12/2010	N001	-	9.95			#		
Turbidity	NTU	05/12/2010	N001	-	5.11			#		

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.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE LKV01, Lakeview Processing Site
REPORT DATE: 7/14/2010

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
0503	D	4747.73	05/12/2010	13:25:38	8.39	4739.34	
0505	D	4744.64	05/12/2010	12:20:03	7.58	4737.06	
0509	D	4742.14	05/12/2010	09:10:44	6.25	4735.89	
0540	D	4747.89	05/12/2010	11:10:23	4.4	4743.49	

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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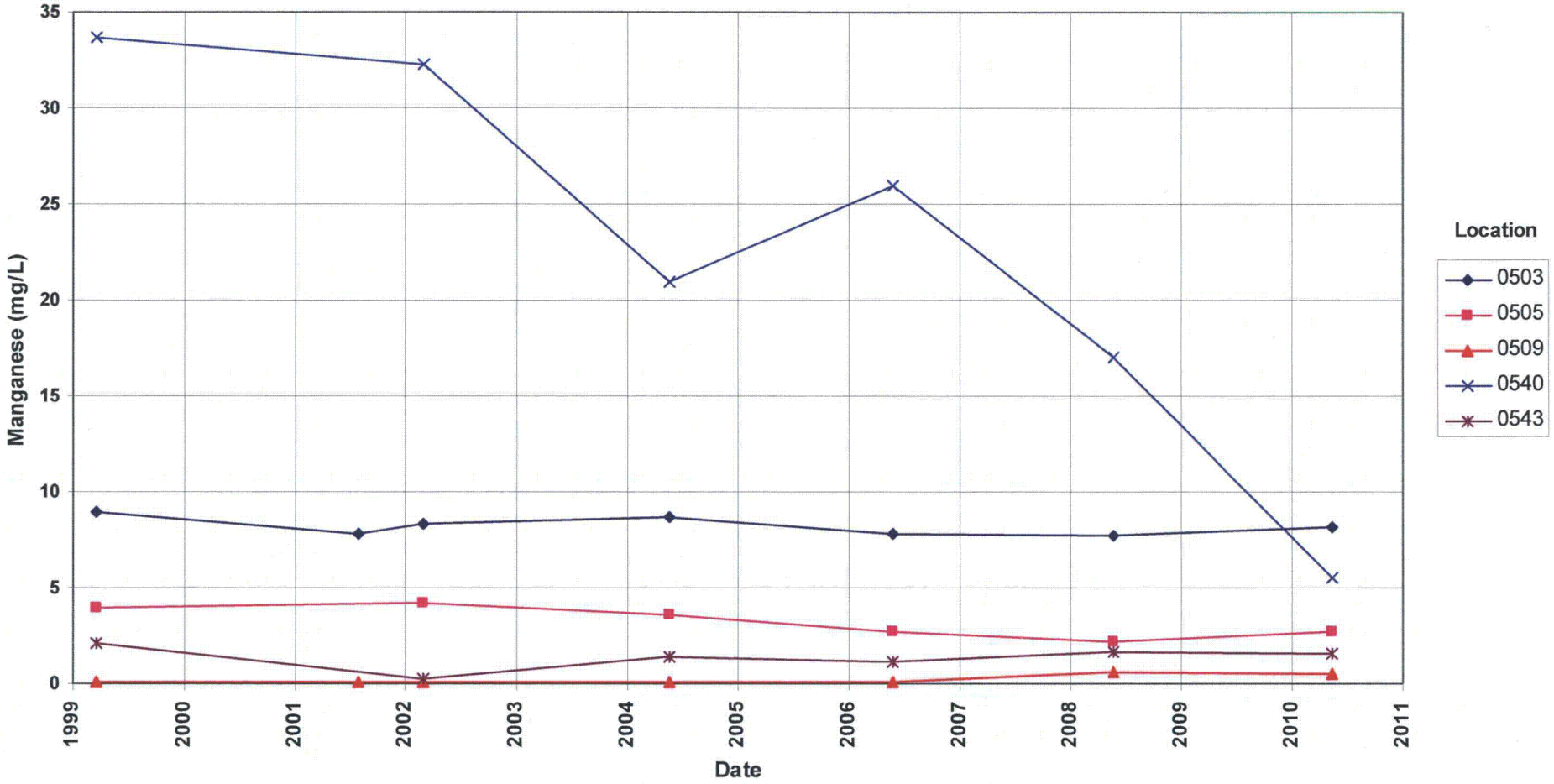
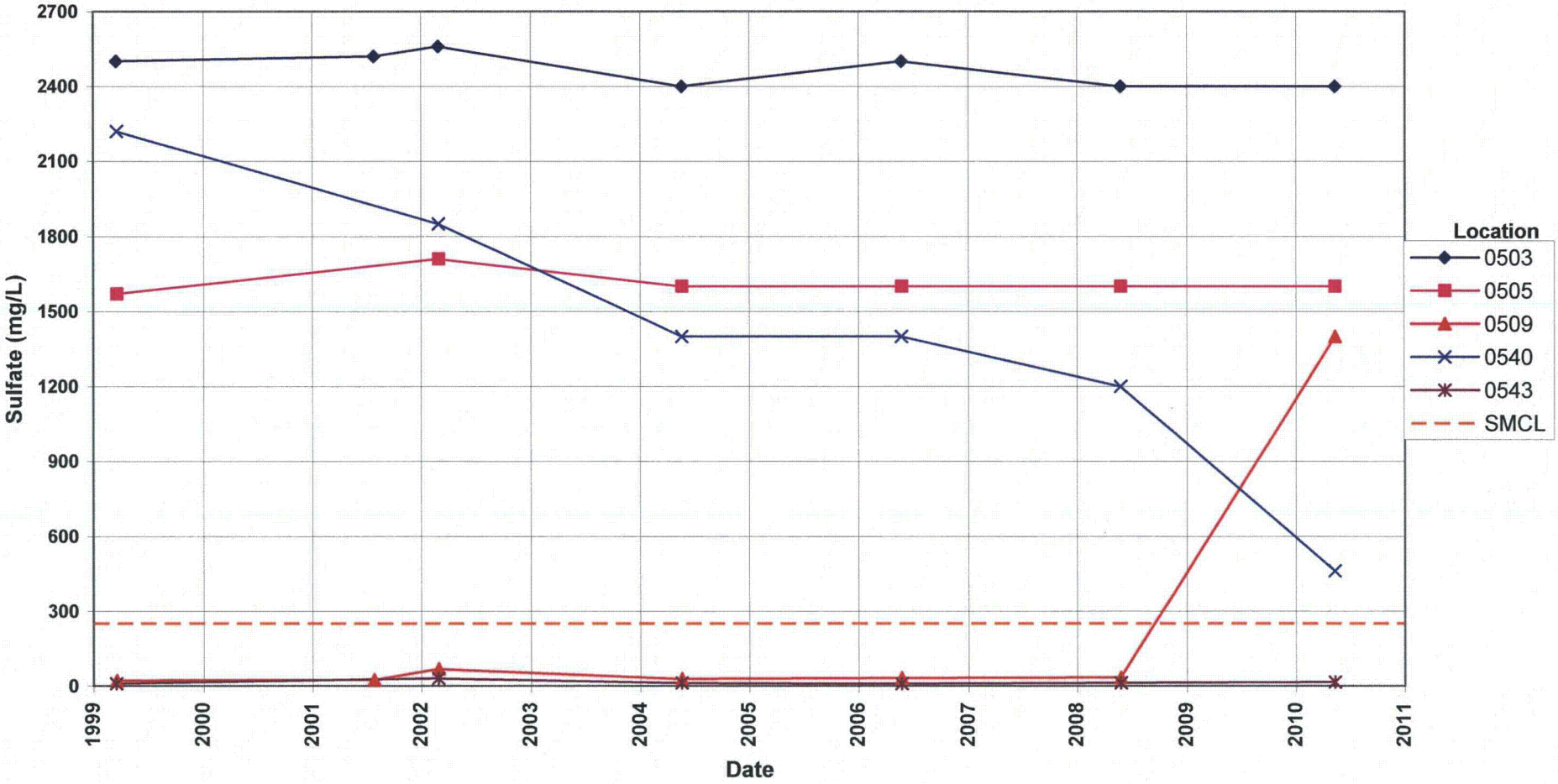
Lakeview Processing Site
Manganese Concentration

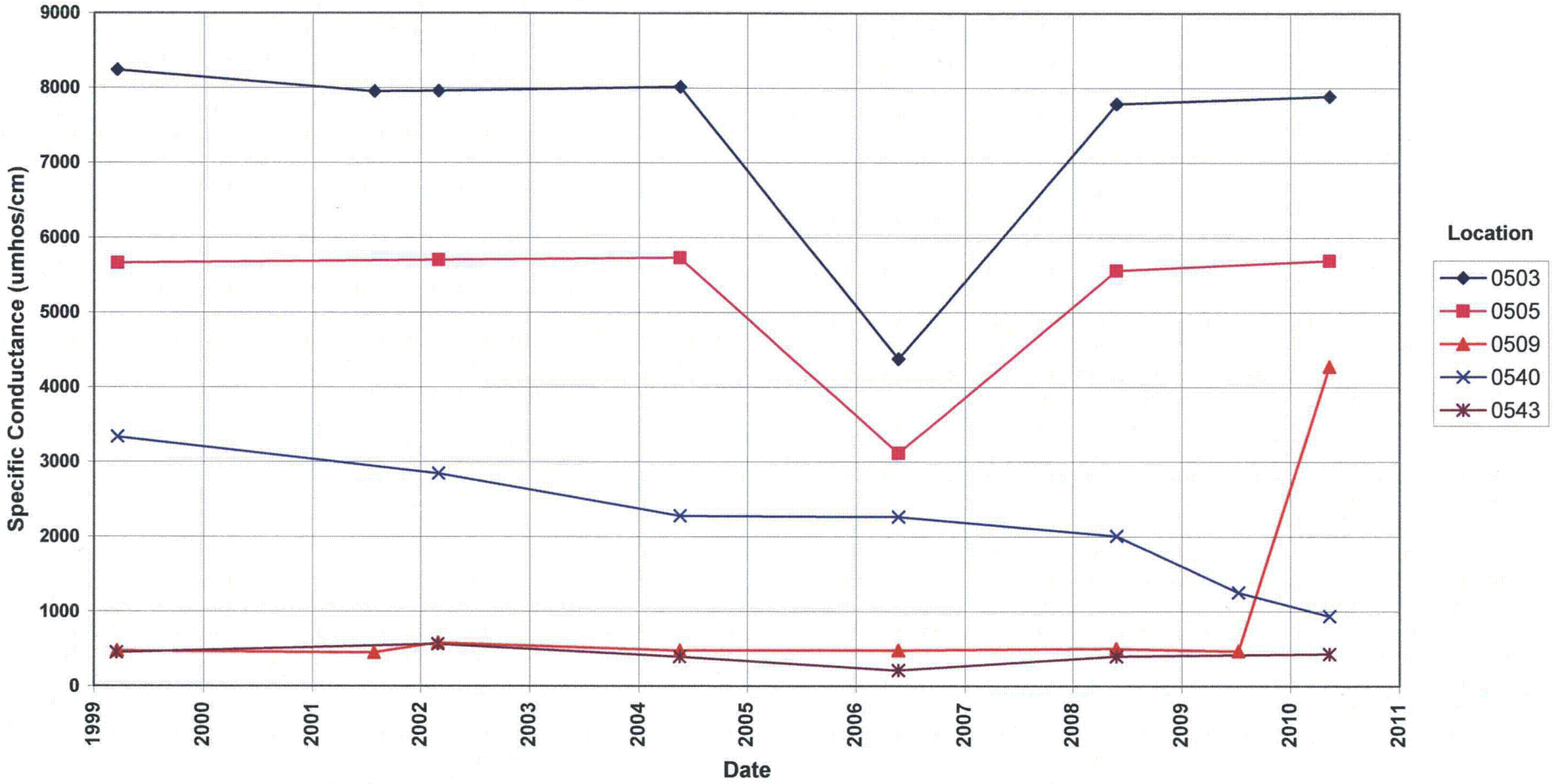
Secondary Maximum Contaminant Level (SMCL) = 0.05 mg/L

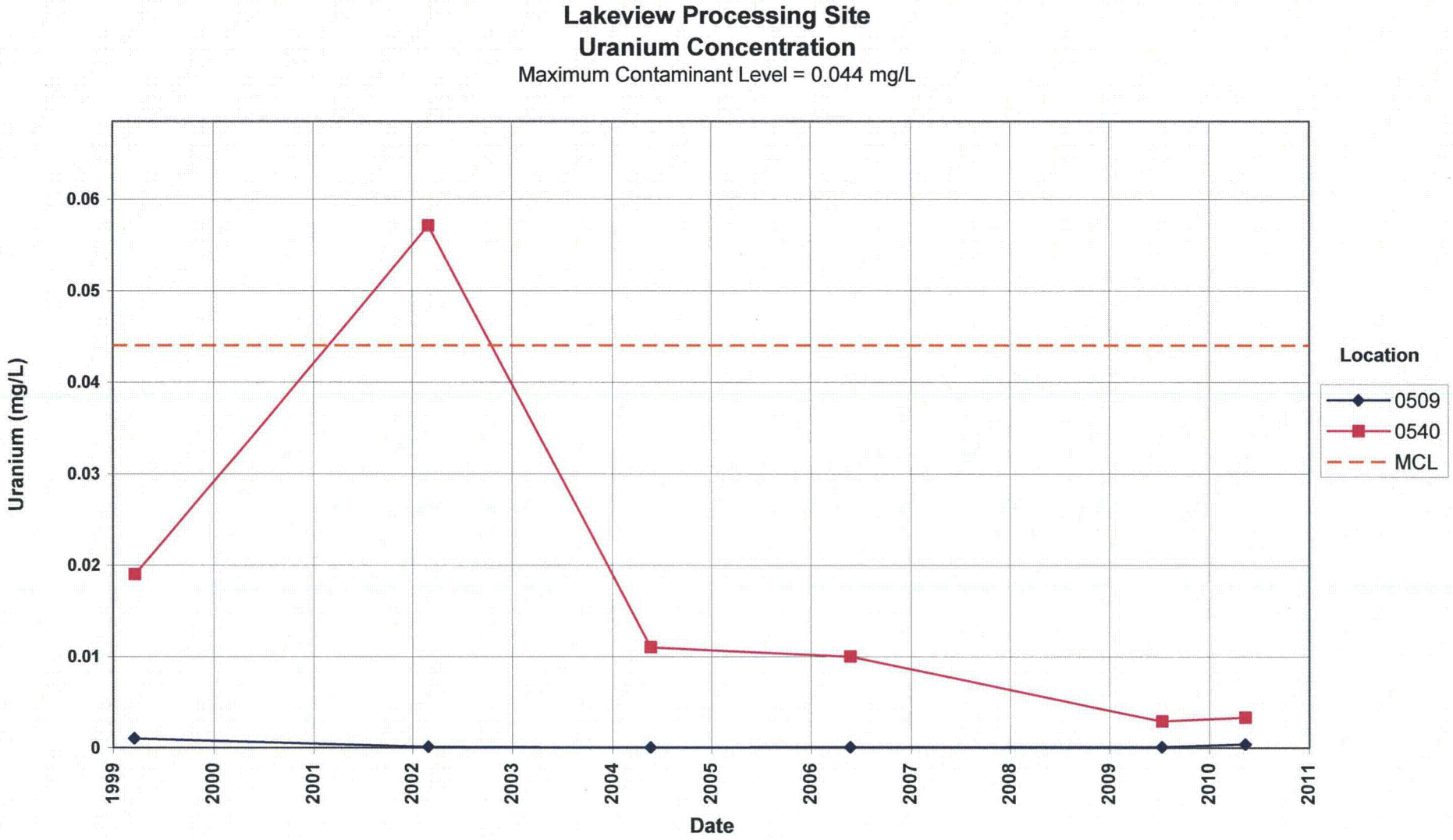


Lakeview Processing Site
Sulfate Concentration
Secondary Maximum Contaminant Level = 250 mg/L



Lakeview Processing Site
Specific Conductance Concentration




Lakeview Processing Site
Uranium Concentration
Maximum Contaminant Level = 0.044 mg/L
Uranium (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Date
Location
0509
0540
MCL

Attachment 3
Sampling and Analysis Work Order

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Stoller

established 1959

Task Order LM00-501
Control Number 10-0519

April 19, 2010

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

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
May 2010 Environmental Sampling at Lakeview, Oregon

REFERENCE: Task Order LM-501-02-109-402, Lakeview, OR, 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 maps and tables specifying sample locations and analytes for groundwater monitoring at the Lakeview Processing Site. Water quality data will be collected at the Processing Site as part of the routine environmental sampling currently scheduled to occur between May 12 and May 18, 2010.

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.*

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

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

Sincerely,

Ann M. Houska

Ann M. Houska
Site Lead

AH/lcg/lb

Enclosures (5)

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

Sampling Frequencies for Locations at Lakeview, Oregon

Location ID	Quarterly	Semiannually	Annually	Biennially	Every 5 years	Notes
Monitoring Wells						
LKV01 - Processing Site						
503				Even year		Next sampling in 5/2010
505				Even year		Next sampling in 5/2010
509				Even year		Next sampling in 5/2010
540				Even year		Next sampling in 5/2010
LKV02 - Disposal Site						
515					X	Every 5 years; next in 7/2014
602					X	Every 5 years; next in 7/2014
603					X	Every 5 years; next in 7/2014
604					X	Every 5 years; next in 7/2014
605					X	Every 5 years; next in 7/2014
606					X	Every 5 years; next in 7/2014
607					X	Every 5 years; next in 7/2014
608					X	Every 5 years; next in 7/2014
609					X	Every 5 years; next in 7/2014
Private Wells						
LKV01 - Processing Site						
543				Even year		Next sampling in 5/2010

Biennial sampling conducted in May; every 5 years in July.

Constituent Sampling Breakdown

Site	Lakeview			
Analyte	**Groundwater**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	5			
Field Measurements				
Alkalinity	X			
Dissolved Oxygen				
Redox Potential	X			
pH	X			
Specific Conductance	X			
Turbidity	X			
Temperature	X			
Laboratory Measurements	***Processing Site***			
Aluminum				
Ammonia as N (NH3-N)				
Arsenic		0.0001	SW-846 6020	LMM-02
Cadmium		0.001	SW-846 6020	LMM-02
Calcium		5	SW-846 6010	LMM-01
Chloride		0.5	SW-846 9056	WCH-A-039
Gross Alpha				
Gross Beta				
Iron		0.05	SW-846 6020	LMM-02
Lead				
Magnesium		5	SW-846 6010	LMM-01
Manganese	X	0.005	SW-846 6010	LMM-01
Molybdenum				
Nickel				
Nickel-63				
Nitrate + Nitrite as N (NO3+NO2)-N				
Potassium		1	SW-846 6010	LMM-01
Radium-226				
Radium-228				
Selenium				
Silica		0.1	SW-846 6010	LMM-01
Sodium		1	SW-846 6010	LMM-01
Strontium				
Sulfate	X	0.5	SW-846 9056	MIS-A-044
Sulfide				
Total Dissolved Solids		10	SM2540 C	WCH-A-033
Total Organic Carbon				
Uranium	0509 and 0540 only	0.0001	SW-846 6020	LMM-02
Vanadium				
Zinc				
Total No. of Analytes	3			

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

Attachment 4
Trip Report

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Stoller

established 1959

Grand Junction Office

Memorandum

DATE: May 20, 2010

TO: Ann Houska

FROM: Gretchen Baer

SUBJECT: Sampling Trip Report

Site: Lakeview, Oregon, Processing Site

Date of Sampling Event: May 12, 2010

Team Members: Sam Campbell and Gretchen Baer.

Number of Locations Sampled: Samples were collected from 4 monitoring wells and 1 domestic well.

Location Specific Information:

Location IDs	Comments
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 **0510**, which was not scheduled for sampling. This undermining has not worsened significantly since it was observed in 2009.
0503 0540	Turbidity criterion was difficult to achieve and water level was difficult to maintain in these Cat I wells. Wells need to be re-developed.

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

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2931	0540	Duplicate	Groundwater	IGS 607

RIN Number Assigned: Samples were assigned to RIN 10053038.

Sample Shipment: Samples were shipped from Grand Junction to ALS Laboratory Group on May 17, 2010.

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.

Equipment: All monitoring wells were sampled using the low-flow procedure with a peristaltic pump, dedicated downhole and pumphead tubing. All equipment was dedicated and no equipment blanks were required. All instrumentation functioned properly.

Stakeholder/Regulatory: Jalena Dayvault (DOE) conducted a safety assessment while observing sampling activities. No issues were identified.

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

Field Variance: None.

Institutional Controls

Fences, Gates, Locks: All barbed-wire gates used to access the wells were kept closed during and after sampling.
Signs: N/A
Trespassing/Site Disturbances: None observed.

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

Disposal Cell/Drainage Structure Integrity: N/A
Vegetation/Noxious Weed Concerns: None observed.
Maintenance Requirements: None observed.
Safety Issues: None.

Access Issues:

- All monitoring wells are located in areas that were surrounded by standing water due to irrigation or recent snow melt. Access to well 0540 was impeded by water in the ditches. Hip waders or similar should be worn to access these locations.
- Domestic well location 0543 was sampled from a spigot located on the front of the house.

Corrective Action Required/Taken: N/A.

(GB/lcg)

cc: (electronic)
Jalena Dayvault, DOE
Cheri Bahrke, Stoller
Steve Donivan, Stoller
EDD Delivery

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