

# Data Validation Package

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January 2012  
Water Sampling at the  
Grand Junction, Colorado, Office Site

March 2012



U.S. DEPARTMENT OF  
**ENERGY**

Legacy  
Management

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# Sampling Event Summary

**Site:** Grand Junction, Colorado, Office Site

**Sampling Period:** January 5-6, 2012

This event consisted of sampling seven monitoring wells and six surface water locations at the Grand Junction, Colorado, Office Site (Grand Junction site). Long-term monitoring at the Grand Junction site is prescribed in the 2006 *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site*. Groundwater and surface water samples were analyzed for manganese (groundwater only), molybdenum, selenium, sulfate, and uranium. These constituents were selected on the basis of historical data and consideration of groundwater standards (molybdenum, selenium, and uranium), secondary drinking water standards (sulfate and manganese), human health risk (manganese), and Colorado Department of Public Health and the Environment input.

Although groundwater quality at the Grand Junction site has improved, analyte concentrations in the alluvial aquifer still exceed U.S. Environmental Protection Agency (EPA) groundwater standards (40 CFR 192), with the uranium standard equaled or exceeded in all seven of the wells in the monitoring network (Table 1).

*Table 1. Locations with Samples that Equaled or Exceeded EPA Groundwater Standards in January 2012*

Analyte	Standard <sup>a</sup>	Groundwater		Surface Water	
		Location	Concentration	Location	Concentration
Molybdenum	0.1	14-13NA	0.10	-----	-----
		8-4S	0.13		
Selenium	0.01	6-2N	0.027	-----	-----
		8-4S	0.020		
		GJ01-01	0.024		
Uranium	0.044	10-19N	0.15	North Pond South Pond Wetland Area	0.10 0.22 0.38
		11-1S	0.044		
		14-13NA	0.31		
		6-2N	0.07		
		8-4S	0.50		
		GJ01-01	0.31		
		GJ84-04	0.34		

<sup>a</sup>Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; concentrations are in milligrams per liter (mg/L).

Surface water features located at the Grand Junction site, which include the North Pond, the South Pond, and the Wetland Area, receive discharge of contaminated alluvial groundwater; therefore, elevated concentrations of groundwater contaminants are expected in these ponds. Because these locations are recharged by groundwater, results from these locations were evaluated by comparing them to groundwater standards. Surface water locations with sample concentrations that exceeded groundwater standards are listed in Table 1.

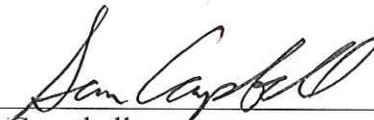
Surface water results from Gunnison River locations adjacent to and downstream of the site were compared to statistical benchmark values derived using historical data from the Upper Gunnison sampling location, which is located upstream of the site on the Gunnison River. As shown in Table 2, no benchmark values were exceeded during this event, which indicates that the site is having no measurable impact on river water quality. However, there is a slight increase in analyte concentrations downstream, indicating that natural flushing is occurring.

Table 2. Comparison of Gunnison River Concentrations to Benchmarks

Analyte	Benchmark <sup>a</sup> (mg/L)	2012 Upper Mid Gunnison Concentration (mg/L)	2012 Lower Gunnison Concentration (mg/L)
Molybdenum	0.0053	0.0019	0.0021
Selenium	0.0148	0.0032	0.0032
Sulfate	542	220	260
Uranium	0.0115	0.0049	0.0068

<sup>a</sup> Results from 1996–present were used to calculate benchmark values.

Sampling results indicate that natural flushing is progressing with analyte concentrations generally declining as shown in the time-concentration graphs, included in the Data Presentation section.

  
 \_\_\_\_\_  
 Sam Campbell  
 Site Lead, S.M. Stoller Corporation

5/30/2012  
 \_\_\_\_\_  
 Date



<b>Legend</b> ● Well to be Sampled ■ Surface Location to be Sampled ○ Existing Well - - Site Boundary		U.S. DEPARTMENT OF ENERGY <small>GRAND JUNCTION, COLORADO</small>	<small>Work Performed by</small> <b>S.M. Stoller Corporation</b> <small>Under DOE Contract No. DE-AC01-01-MD0000</small>
		<b>Planned Sampling Map</b> <b>Grand Junction, CO, Site</b> <b>February 2011</b>	
DATE PREPARED: <b>January 7, 2011</b>		FILENAME: <b>S0731500</b>	

M:\LTS\111\0001\16\000\S07315\S0731500\_11x17.mxd smithw 1/7/2011 10:08:59 AM

Grand Junction 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>Grand Junction, Colorado</u>	<b>Date(s) of Water Sampling</b>	<u>January 5-6, 2012</u>
<b>Date(s) of Verification</b>	<u>February 22, 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 January 5, 2012.</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 calibrations were performed January 4, 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>	
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>	<u>Turbidity was &gt;10 NTUs at GJ84-04; samples were filtered per the SAP.</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?	NA	All wells met Category I criteria.
Was one pump/tubing volume removed prior to sampling?	NA	All wells met Category I criteria.
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected at location 8-4S.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	One equipment blank was collected.
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 IDs 2310 and 2311 were used for QC samples.
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): 12014285  
Sample Event: January 5-6, 2012  
Site(s): Grand Junction Office, Colorado  
Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
Work Order No.: 1201085  
Analysis: Metals and Wet Chemistry  
Validator: Gretchen Baer  
Review Date: February 22, 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 3.

Table 3. Analytes and Methods

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

### Data Qualifier Summary

Analytical results were qualified as listed in Table 4. Refer to the sections below for an explanation of the data qualifiers applied.

Table 4. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1201085-10	Upper Mid Gunnison	Molybdenum	J	Less than 5 times the equipment blank

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 15 water samples on January 10, 2012, accompanied by a Chain of Custody (COC) form. A copy of the air bill was included in the receiving documentation. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were

present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions.

### Preservation and Holding Times

The sample shipment was received intact with the temperature in the iced cooler at 0.1 °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.

### 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 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*

Calibrations were performed on January 24, 2012, using three calibration standards. The correlation coefficient value was greater than 0.995. The absolute value of the intercept was only slightly above 3 times the MDL, which is acceptable. Initial and continuing calibration verification checks were made at the required frequency resulting in six verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

#### *Method SW-846 6020A, Molybdenum, Selenium, and Uranium*

Calibrations were performed on January 25, 26, and 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 24 verification checks. All calibration checks associated with the samples met the acceptance criteria. Reporting limit

verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

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

Calibrations were performed on January 5, 2012, using five 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 four verification checks. All 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 blank results associated with the samples were below the PQLs for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a “U” flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

#### 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 samples are used to measure method performance in the sample matrix. The matrix spike and matrix spike duplicate data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

#### Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision. The relative percent difference for replicate results that are greater than 5 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 Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable.

### Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable.

### Completeness

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

### Chromatography Peak Integration

The integration of analytes peaks was reviewed for all sulfate data. There were no manual integrations performed for sulfate and all peak integrations were satisfactory.

### Electronic Data Deliverable (EDD) File

The EDD file arrived on January 31, 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: 12014285      Lab Code: PAR      Validator: Gretchen Baer      Validation Date: 2/23/2012  
Project: Grand Junction Office(GJO)      Analysis Type:  Metals     General Chem     Rad     Organics  
# of Samples: 15      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 trip/equipment blank evaluated.

There was 1 duplicate evaluated.

**SAMPLE MANAGEMENT SYSTEM  
Metals Data Validation Worksheet**

RIN: 12014285      Lab Code: PAR      Date Due: 2/7/2012  
 Matrix: Water      Site Code: GJO      Date Completed: 2/2/2012

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	01/24/2012	-0.4000	1.0000	OK	OK	OK	OK	OK	101.0	102.0	100.0	0.0	96.0	4.0	106.0
Manganese	ICP/ES	01/24/2012											1.0	97.0		109.0
Molybdenum	ICP/MS	01/25/2012	-0.0040	1.0000	OK	OK	OK	OK	OK	90.0	96.0	93.0	2.0			
Molybdenum	ICP/MS	01/25/2012											0.0			
Selenium	ICP/MS	01/25/2012	-0.0280	1.0000	OK	OK	OK	OK			100.0	100.0	0.0			
Selenium	ICP/MS	01/30/2012	-0.0520	1.0000	OK	OK	OK	OK	OK	93.0			1.0			
Uranium	ICP/MS	01/25/2012	-0.0010	1.0000	OK	OK	OK	OK	OK	98.0			1.0			
Uranium	ICP/MS	01/25/2012											2.0			
Uranium	ICP/MS	01/26/2012	-0.0030	1.0000	OK	OK	OK	OK					2.0			

## SAMPLE MANAGEMENT SYSTEM

### Wet Chemistry Data Validation Worksheet

**RIN:** 12014285      **Lab Code:** PAR      **Date Due:** 2/7/2012  
**Matrix:** Water      **Site Code:** GJO      **Date Completed:** 2/2/2012

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	01/05/2012	0.107	1.0000	OK		OK							
SULFATE	01/12/2012				OK		OK	OK	99.00	103.0	102.0	0	

## **Sampling Quality Control Assessment**

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

### Sampling Protocol

All monitoring wells met the Category I low-flow sampling criteria. Sample results for these wells were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Surface water locations were sampled using a peristaltic pump and tubing reel.

### Equipment Blank

An equipment blank (field ID 2311) was collected after decontamination of the hose reel used to collect the surface water samples. Manganese and molybdenum were detected in this blank at concentrations below the PQL. The associated sample results for manganese were greater than 10 times the blank concentration, not requiring qualification. Sample results for molybdenum that are less than 5 times the equipment blank concentration are qualified with a “J” flag (estimated). The equipment blank results indicate adequate decontamination of the sampling equipment.

### Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from location 8-4S (field duplicate ID 2310). The duplicate results met the criteria, demonstrating acceptable overall precision.

**SAMPLE MANAGEMENT SYSTEM**  
**Validation Report: Equipment/Trip Blanks**

Page 1 of 1

RIN: 12014285 Lab Code: PAR Project: Grand Junction Office(GJO) Validation Date: 2/23/2012

**Blank Data**

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1201085-15	SW6010	Manganese	1.1	B	0.11	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
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**Blank Data**

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1201085-15	SW6020	Molybdenum	0.39	B	0.32	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1201085-10	KCQ 723	Upper Mid Gunnison	1.9	10		J
1201085-11	KCQ 724	North Pond	3.4	10		
1201085-12	KCQ 725	Lower Gunnison	2.1	10		
1201085-13	KCQ 726	Wetland Area	27	10		
1201085-8	KCQ 721	Upper Gunnison	2.1	10		
1201085-9	KCQ 722	South Pond	40	10		

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

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RIN: 12014285    Lab Code: PAR    Project: Grand Junction Office(GJO)    Validation Date: 2/23/2012

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Duplicate: 2310

Sample: 8-4S

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Manganese	1300			1	1200			1	8.00		UG/L
Molybdenum	130			10	120			10	8.00		UG/L
Selenium	20			10	19			10	5.13		UG/L
SULFATE	630			20	610			20	3.23		MG/L
Uranium	500			10	490			10	2.02		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  
Steve Donovan

3-19-2012  
Date

Data Validation Lead:

Gretchen Baer  
Gretchen Baer

3/19/12  
Date

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**Attachment 1**  
**Assessment of Anomalous Data**

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# Potential Outliers Report

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## Potential Outliers Report

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

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

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

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

There were no potential outliers identified and the data for this sampling event are acceptable as qualified.

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**Data Validation Outliers Report - No Field Parameters**

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 12014285

Report Date: 2/29/2012

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers <i>Lab Data</i>	Result	Qualifiers <i>Lab Data</i>	Result	Qualifiers <i>Lab Data</i>	N	N Below Detect			
GJO01	6-2N	N001	01/05/2012	Molybdenum	0.023	F	0.15			0.027	F	35	0	No	
GJO01	8-4S	N002	01/05/2012	Sulfate	610	F	2200			611	FJ	54	0	No	
GJO01	GJ01-01	N001	01/06/2012	Molybdenum	0.076	F	0.162	F		0.0803	N F	12	0	No	
GJO01	GJ01-01	N001	01/06/2012	Uranium	0.31	F	0.507	F		0.319	F	12	0	No	
GJO01	GJ84-04	0001	01/05/2012	Manganese	4.8	F	4.35			0.638		61	0	No	
GJO01	GJ84-04	0001	01/05/2012	Molybdenum	0.068	F	0.413			0.0729	N F	62	0	No	

**Data Validation Outliers Report - Field Parameters Only**

**Comparison: All Historical Data**

Laboratory: Field Measurements

RIN: 12014285

Report Date: 2/29/2012

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers <i>Lab Data</i>		Result	Qualifiers <i>Lab Data</i>		Result	Qualifiers <i>Lab Data</i>		N	N Below Detect	
GJO01	8-4S	N001	01/05/2012	Specific Conductance	1672	F		4614	F		1720	F		53	0	No
GJO01	GJ01-01	N001	01/06/2012	Oxidation Reduction Potential	26.8	F		233	F		27.2	F		10	0	No
GJO01	GJ84-04	N001	01/05/2012	Turbidity	13.4	F		8.12	F		0.31			18	0	No
GJO01	Upper Mid Gunnison	N001	01/06/2012	Turbidity	3.84			184			4.92			8	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 GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: 10-19N WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Manganese	mg/L	01/06/2012	N001	-	3		F #	0.00011	
Molybdenum	mg/L	01/06/2012	N001	-	0.029		F #	0.00032	
Oxidation Reduction Potential	mV	01/06/2012	N001	-	42		F #		
pH	s.u.	01/06/2012	N001	-	7.06		F #		
Selenium	mg/L	01/06/2012	N001	-	0.00076		F #	0.000032	
Specific Conductance	umhos /cm	01/06/2012	N001	-	5810		F #		
Sulfate	mg/L	01/06/2012	N001	-	3000		F #	25	
Temperature	C	01/06/2012	N001	-	13.06		F #		
Turbidity	NTU	01/06/2012	N001	-	9.9		F #		
Uranium	mg/L	01/06/2012	N001	-	0.15		F #	0.000029	

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**Groundwater Quality Data by Location (USEE100) FOR SITE GJ001, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: 11-1S WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Manganese	mg/L	01/06/2012	N001	-	1.3		F #	0.00011	
Molybdenum	mg/L	01/06/2012	N001	-	0.015		F #	0.00032	
Oxidation Reduction Potential	mV	01/06/2012	N001	-	30.3		F #		
pH	s.u.	01/06/2012	N001	-	7.21		F #		
Selenium	mg/L	01/06/2012	N001	-	0.00014		F #	0.000032	
Specific Conductance	umhos /cm	01/06/2012	N001	-	988		F #		
Sulfate	mg/L	01/06/2012	N001	-	370		F #	5	
Temperature	C	01/06/2012	N001	-	12.62		F #		
Turbidity	NTU	01/06/2012	N001	-	1.98		F #		
Uranium	mg/L	01/06/2012	N001	-	0.044		F #	0.000029	

**Groundwater Quality Data by Location (USEE100) FOR SITE GJ001, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: 14-13NA WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Manganese	mg/L	01/05/2012	N001	-	3.9		F #	0.00011	
Molybdenum	mg/L	01/05/2012	N001	-	0.1		F #	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	-	59		F #		
pH	s.u.	01/05/2012	N001	-	7.05		F #		
Selenium	mg/L	01/05/2012	N001	-	0.00045		F #	0.000032	
Specific Conductance	umhos /cm	01/05/2012	N001	-	3169		F #		
Sulfate	mg/L	01/05/2012	N001	-	1400		F #	25	
Temperature	C	01/05/2012	N001	-	14.08		F #		
Turbidity	NTU	01/05/2012	N001	-	2.69		F #		
Uranium	mg/L	01/05/2012	N001	-	0.31		F #	0.000029	

**Groundwater Quality Data by Location (USEE100) FOR SITE GJ001, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: 6-2N WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Manganese	mg/L	01/05/2012	N001	-	0.84		F #	0.00011	
Molybdenum	mg/L	01/05/2012	N001	-	0.023		F #	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	-	105.8		F #		
pH	s.u.	01/05/2012	N001	-	7.62		F #		
Selenium	mg/L	01/05/2012	N001	-	0.027		F #	0.00032	
Specific Conductance	umhos /cm	01/05/2012	N001	-	2389		F #		
Sulfate	mg/L	01/05/2012	N001	-	1000		F #	10	
Temperature	C	01/05/2012	N001	-	15.58		F #		
Turbidity	NTU	01/05/2012	N001	-	0.42		F #		
Uranium	mg/L	01/05/2012	N001	-	0.07		F #	0.000029	

**Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: 8-4S WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data QA		
Manganese	mg/L	01/05/2012	N001	-	1.3		F #	0.00011	
Manganese	mg/L	01/05/2012	N002	-	1.2		F #	0.00011	
Molybdenum	mg/L	01/05/2012	N001	-	0.13		F #	0.00032	
Molybdenum	mg/L	01/05/2012	N002	-	0.12		F #	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	-	78		F #		
pH	s.u.	01/05/2012	N001	-	7.25		F #		
Selenium	mg/L	01/05/2012	N001	-	0.02		F #	0.00032	
Selenium	mg/L	01/05/2012	N002	-	0.019		F #	0.00032	
Specific Conductance	umhos /cm	01/05/2012	N001	-	1672		F #		
Sulfate	mg/L	01/05/2012	N001	-	630		F #	10	
Sulfate	mg/L	01/05/2012	N002	-	610		F #	10	
Temperature	C	01/05/2012	N001	-	14.07		F #		
Turbidity	NTU	01/05/2012	N001	-	5.14		F #		
Uranium	mg/L	01/05/2012	N001	-	0.5		F #	0.000029	
Uranium	mg/L	01/05/2012	N002	-	0.49		F #	0.000029	

**Groundwater Quality Data by Location (USEE100) FOR SITE GJ001, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: GJ01-01 WELL South of Building 20

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Manganese	mg/L	01/06/2012	N001	15.5 - 25.5	0.51		F	#	0.00011	
Molybdenum	mg/L	01/06/2012	N001	15.5 - 25.5	0.076		F	#	0.00032	
Oxidation Reduction Potential	mV	01/06/2012	N001	15.5 - 25.5	26.8		F	#		
pH	s.u.	01/06/2012	N001	15.5 - 25.5	7.36		F	#		
Selenium	mg/L	01/06/2012	N001	15.5 - 25.5	0.024		F	#	0.00032	
Specific Conductance	umhos/cm	01/06/2012	N001	15.5 - 25.5	1616		F	#		
Sulfate	mg/L	01/06/2012	N001	15.5 - 25.5	530		F	#	10	
Temperature	C	01/06/2012	N001	15.5 - 25.5	15.03		F	#		
Turbidity	NTU	01/06/2012	N001	15.5 - 25.5	4.99		F	#		
Uranium	mg/L	01/06/2012	N001	15.5 - 25.5	0.31		F	#	0.000029	

**Groundwater Quality Data by Location (USEE100) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: GJ84-04 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	01/05/2012	0001	-	4.8		F	#	0.00011	
Molybdenum	mg/L	01/05/2012	0001	-	0.068		F	#	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	-	44.9		F	#		
pH	s.u.	01/05/2012	N001	-	7.08		F	#		
Selenium	mg/L	01/05/2012	0001	-	0.00036		F	#	0.000032	
Specific Conductance	umhos/cm	01/05/2012	N001	-	3598		F	#		
Sulfate	mg/L	01/05/2012	0001	-	1700		F	#	25	
Temperature	C	01/05/2012	N001	-	12.55		F	#		
Turbidity	NTU	01/05/2012	N001	-	13.4		F	#		
Uranium	mg/L	01/05/2012	0001	-	0.34		F	#	0.000029	

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

**LAB QUALIFIERS:**

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

**DATA QUALIFIERS:**

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

**QA QUALIFIER:**

- # Validated according to quality assurance guidelines.

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## **Surface Water Quality Data**

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**Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: Lower Gunnison SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	01/06/2012	N001	0.0021			#	0.00032	
Oxidation Reduction Potential	mV	01/06/2012	N001	60.2			#		
pH	s.u.	01/06/2012	N001	8.33			#		
Selenium	mg/L	01/06/2012	N001	0.0032			#	0.000032	
Specific Conductance	umhos/cm	01/06/2012	N001	713			#		
Sulfate	mg/L	01/06/2012	N001	260			#	2.5	
Temperature	C	01/06/2012	N001	3.88			#		
Turbidity	NTU	01/06/2012	N001	5.89			#		
Uranium	mg/L	01/06/2012	N001	0.0068			#	0.000029	

**Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: North Pond SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	01/05/2012	N001	0.0034			#	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	103.4			#		
pH	s.u.	01/05/2012	N001	7.69			#		
Selenium	mg/L	01/05/2012	N001	0.0016			#	0.000032	
Specific Conductance	umhos/cm	01/05/2012	N001	4258			#		
Sulfate	mg/L	01/05/2012	N001	2100			#	25	
Temperature	C	01/05/2012	N001	6.97			#		
Turbidity	NTU	01/05/2012	N001	8.04			#		
Uranium	mg/L	01/05/2012	N001	0.1			#	0.000029	

**Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: South Pond SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	01/05/2012	N001	0.04			#	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	12.7			#		
pH	s.u.	01/05/2012	N001	7.23			#		
Selenium	mg/L	01/05/2012	N001	0.00058			#	0.000032	
Specific Conductance	umhos/cm	01/05/2012	N001	2865			#		
Sulfate	mg/L	01/05/2012	N001	1300			#	25	
Temperature	C	01/05/2012	N001	6.15			#		
Turbidity	NTU	01/05/2012	N001	7.39			#		
Uranium	mg/L	01/05/2012	N001	0.22			#	0.000029	

**Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: Upper Gunnison SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	01/05/2012	N001	0.0021			#	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	60.6			#		
pH	s.u.	01/05/2012	N001	8.4			#		
Selenium	mg/L	01/05/2012	N001	0.0033			#	0.000032	
Specific Conductance	umhos/cm	01/05/2012	N001	690			#		
Sulfate	mg/L	01/05/2012	N001	220			#	2.5	
Temperature	C	01/05/2012	N001	3.69			#		
Turbidity	NTU	01/05/2012	N001	6.03			#		
Uranium	mg/L	01/05/2012	N001	0.0051			#	0.000029	

**Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: Upper Mid Gunnison SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	01/06/2012	N001	0.0019		J	#	0.00032	
Oxidation Reduction Potential	mV	01/06/2012	N001	48			#		
pH	s.u.	01/06/2012	N001	8.27			#		
Selenium	mg/L	01/06/2012	N001	0.0032			#	0.000032	
Specific Conductance	umhos/cm	01/06/2012	N001	674			#		
Sulfate	mg/L	01/06/2012	N001	220			#	2.5	
Temperature	C	01/06/2012	N001	3.16			#		
Turbidity	NTU	01/06/2012	N001	3.84			#		
Uranium	mg/L	01/06/2012	N001	0.0049			#	0.000029	

**Surface Water Quality Data by Location (USEE102) FOR SITE GJO01, Grand Junction Site**

REPORT DATE: 2/29/2012

Location: Wetland Area SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	01/05/2012	N001	0.027			#	0.00032	
Oxidation Reduction Potential	mV	01/05/2012	N001	131.5			#		
pH	s.u.	01/05/2012	N001	7.79			#		
Selenium	mg/L	01/05/2012	N001	0.00055			#	0.000032	
Specific Conductance	umhos/cm	01/05/2012	N001	9162			#		
Sulfate	mg/L	01/05/2012	N001	4900			#	50	
Temperature	C	01/05/2012	N001	2.66			#		
Turbidity	NTU	01/05/2012	N001	5.96			#		
Uranium	mg/L	01/05/2012	N001	0.38			#	0.000029	

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

**LAB QUALIFIERS:**

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

**DATA QUALIFIERS:**

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

**QA QUALIFIER:**

- # Validated according to quality assurance guidelines.

## **Equipment Blank Data**

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**BLANKS REPORT**

LAB: PARAGON/ALS LABORATORY GROUP (Fort Collins, CO)

RIN: 12014285

Report Date: 2/29/2012

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Manganese	GJO01	0999	01/05/2012	N001	mg/L	0.0011	B	0.00011		E
Molybdenum	GJO01	0999	01/05/2012	N001	mg/L	0.00039	B	0.00032		E
Selenium	GJO01	0999	01/05/2012	N001	mg/L	0.000032	U	0.000032		E
Sulfate	GJO01	0999	01/05/2012	N001	mg/L	0.5	U	0.5		E
Uranium	GJO01	0999	01/05/2012	N001	mg/L	0.000029	U	0.000029		E

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

## LAB QUALIFIERS:

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

## DATA QUALIFIERS:

- F Low flow sampling method used.
- 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.

## SAMPLE TYPES:

- E Equipment Blank.

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## **Static Water Level Data**

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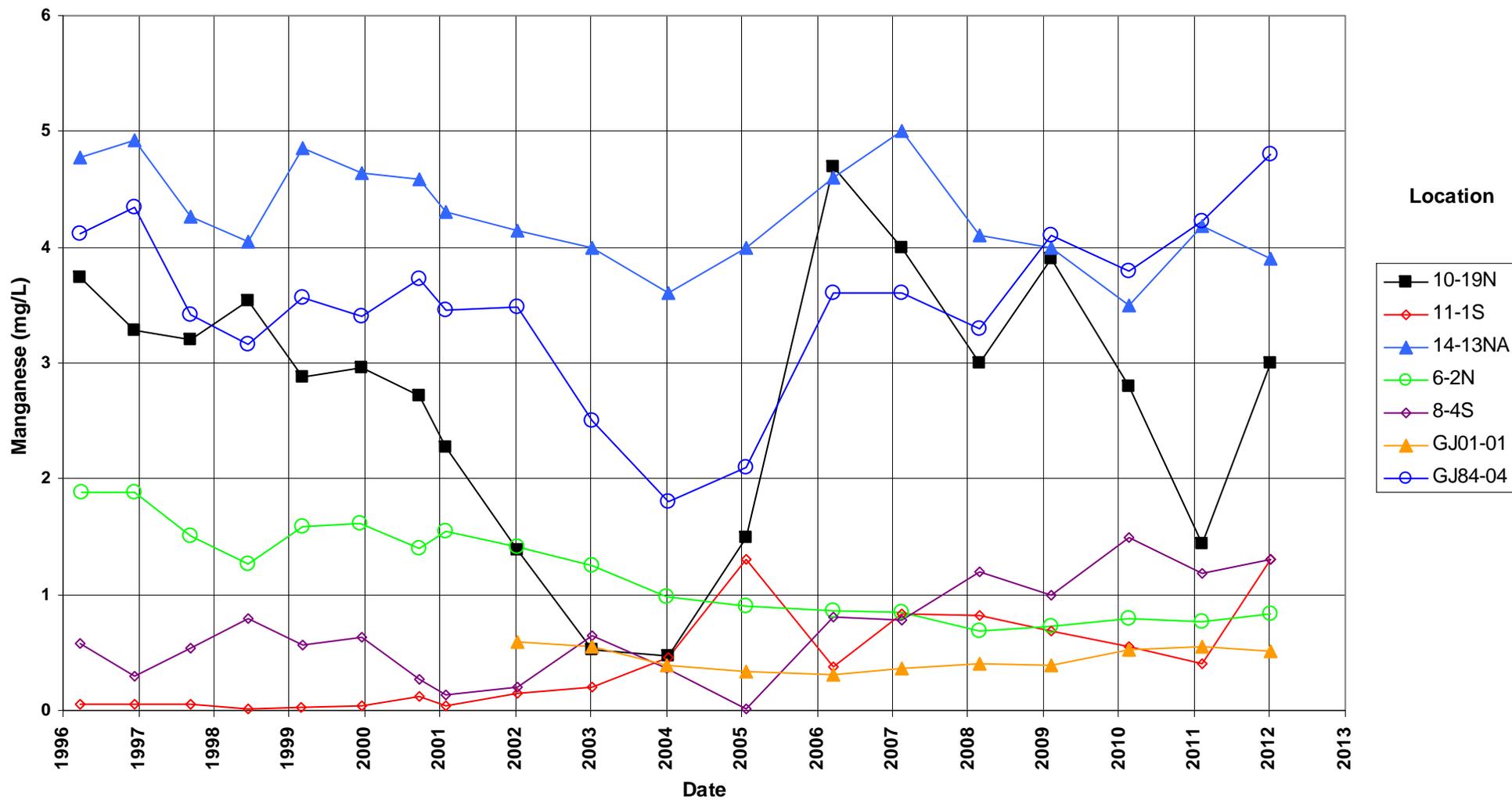


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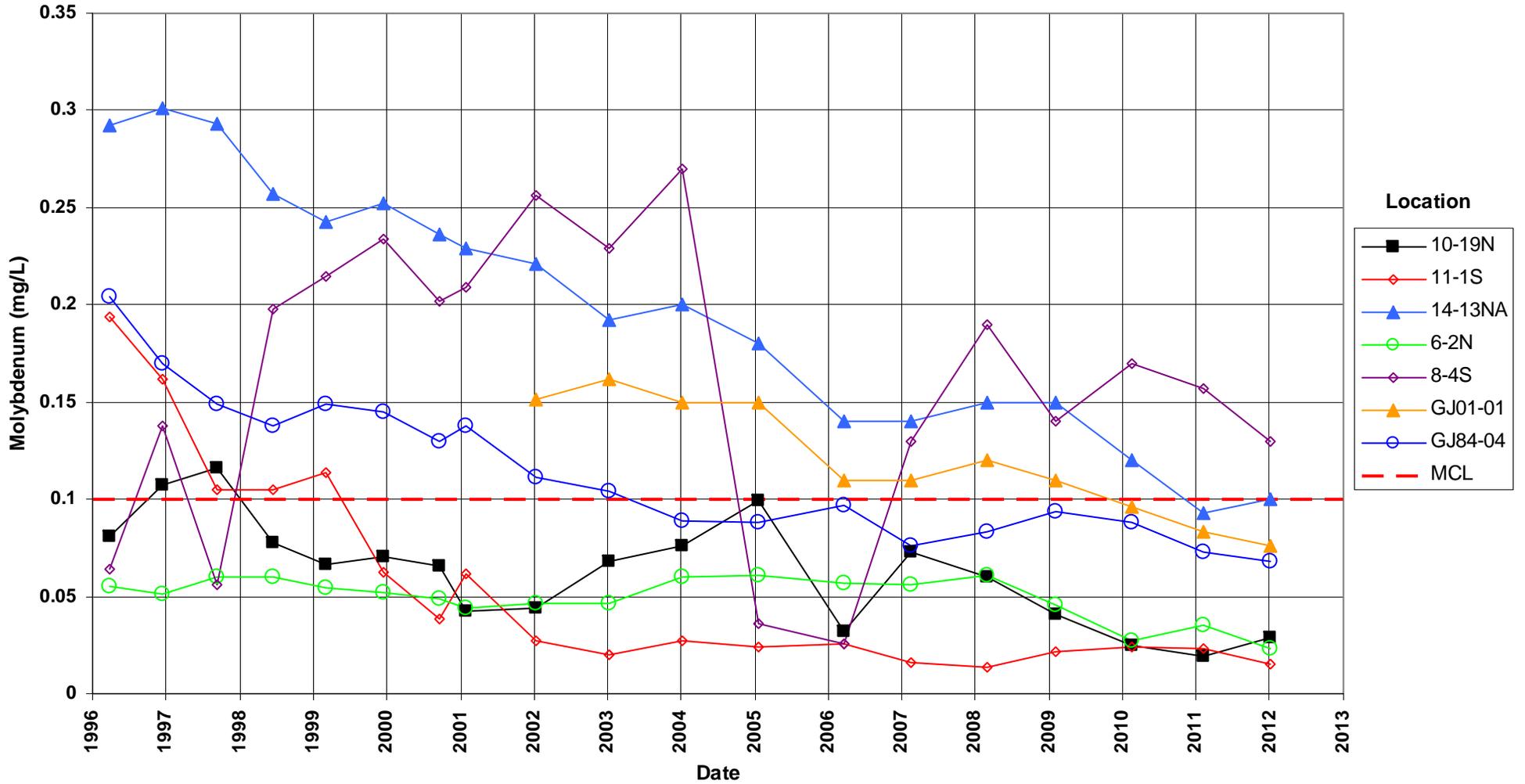
# **Time-Concentration Graphs Groundwater Locations**

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## Grand Junction Site Manganese Concentration

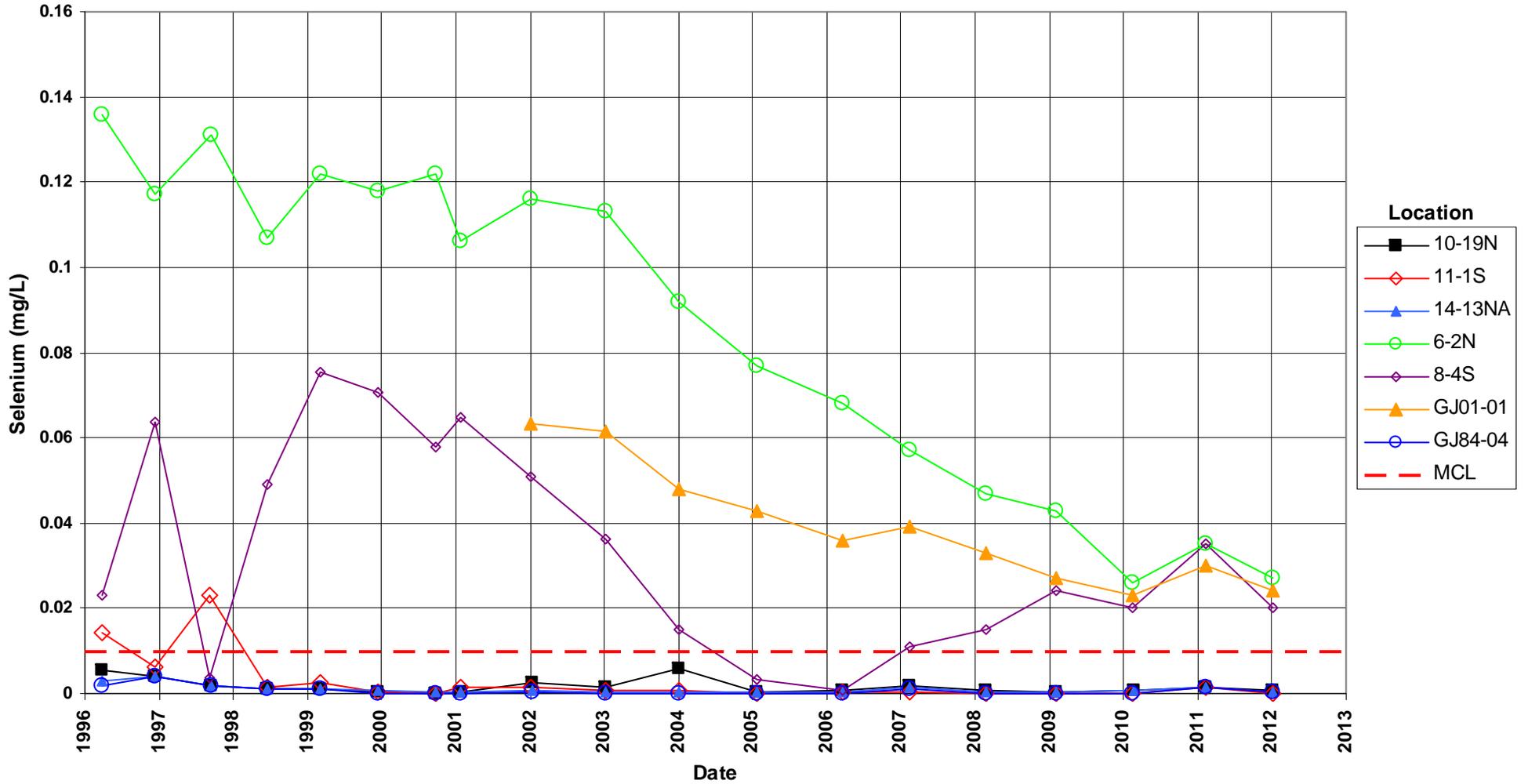


**Grand Junction Site**  
**Molybdenum Concentration**  
 Maximum Contaminant Level (MCL) = 0.1 mg/L



# Grand Junction Site Selenium Concentration

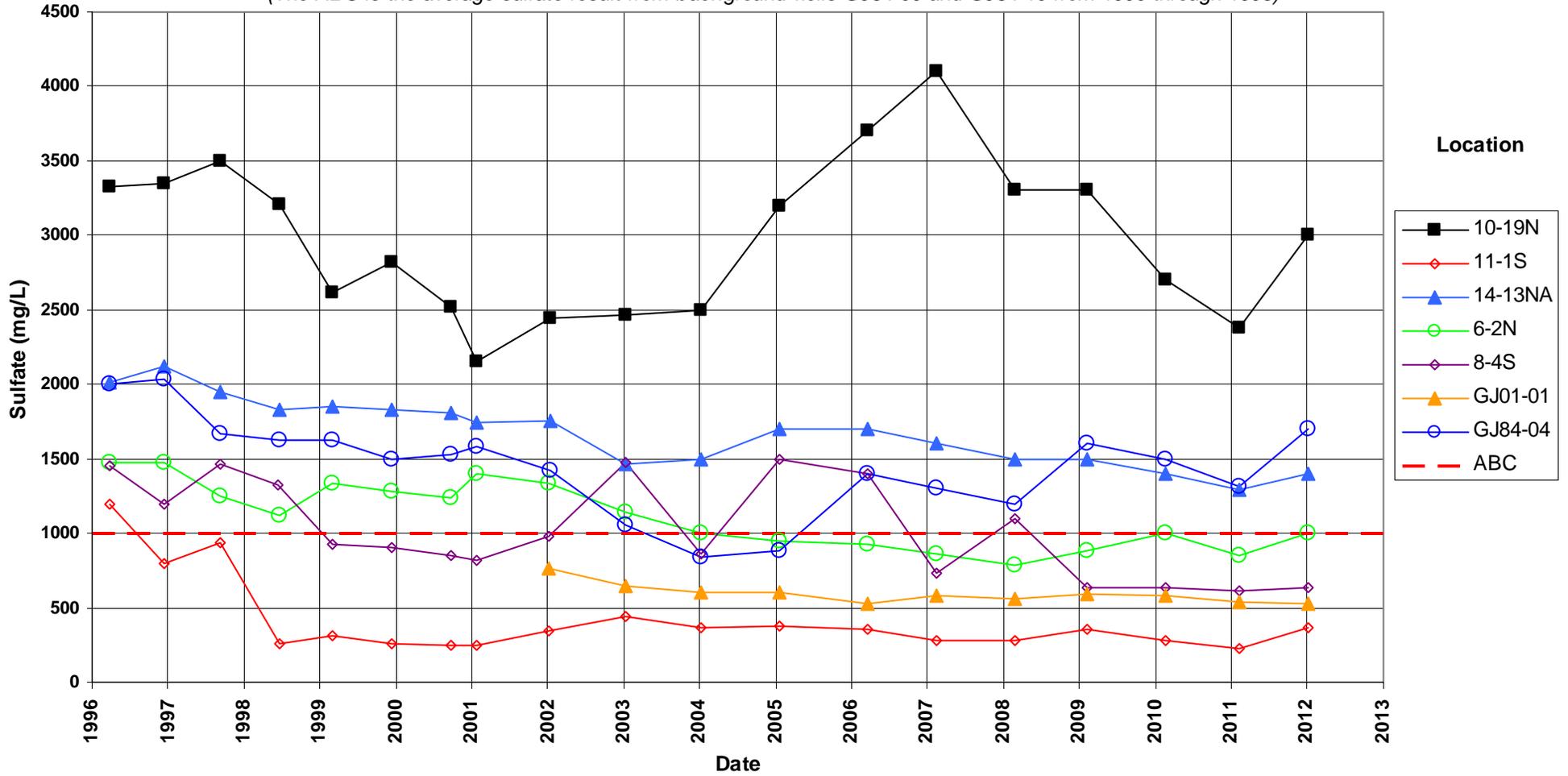
Maximum Contaminant Level (MCL) = 0.01 mg/L



## Grand Junction Site Sulfate Concentration

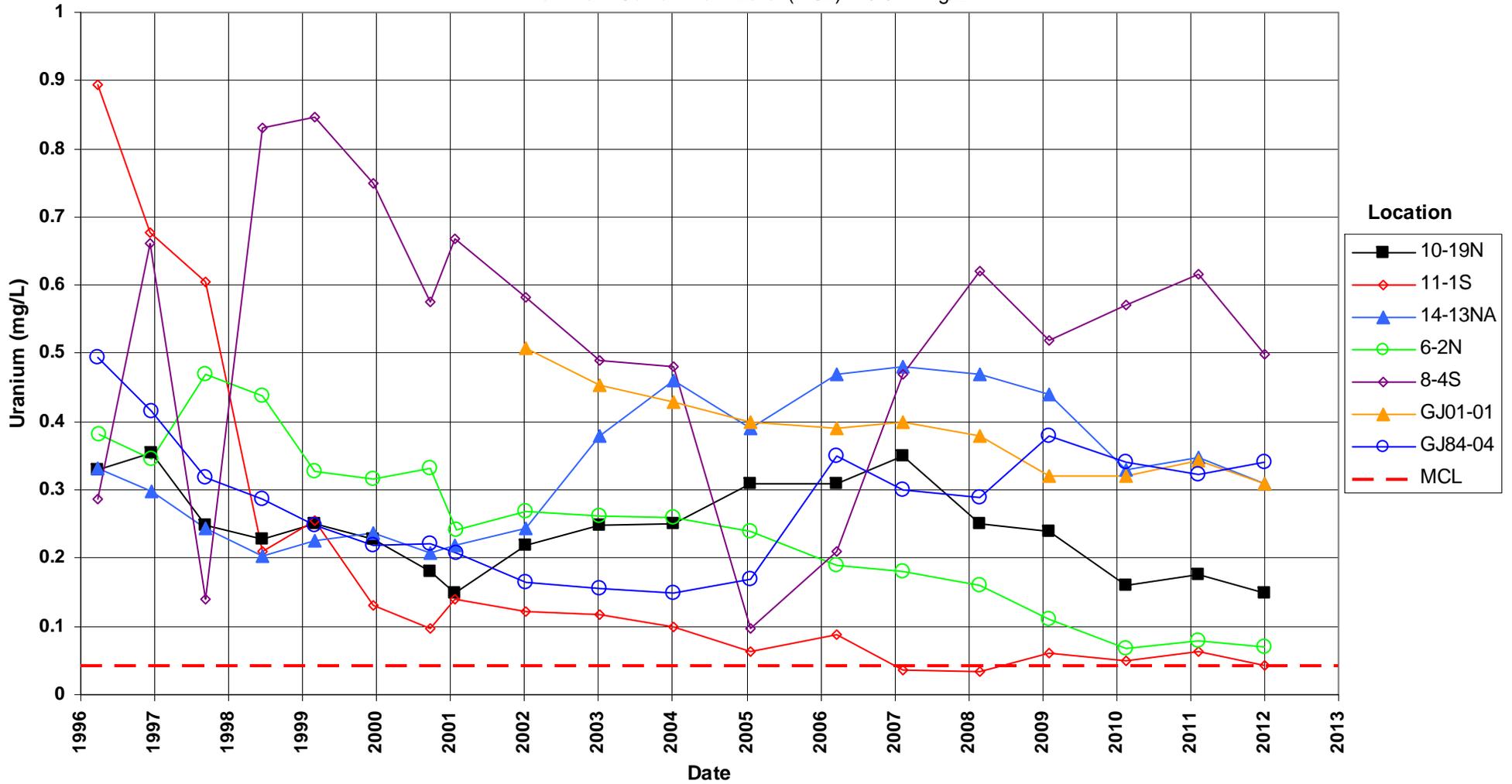
Average Background Concentration (ABC) in Background Wells = 1003 mg/L

*(The ABC is the average sulfate result from background wells GJ84-09 and GJ84-10 from 1990 through 1995)*



# Grand Junction Site Uranium Concentration

Maximum Contaminant Level (MCL) = 0.044 mg/L



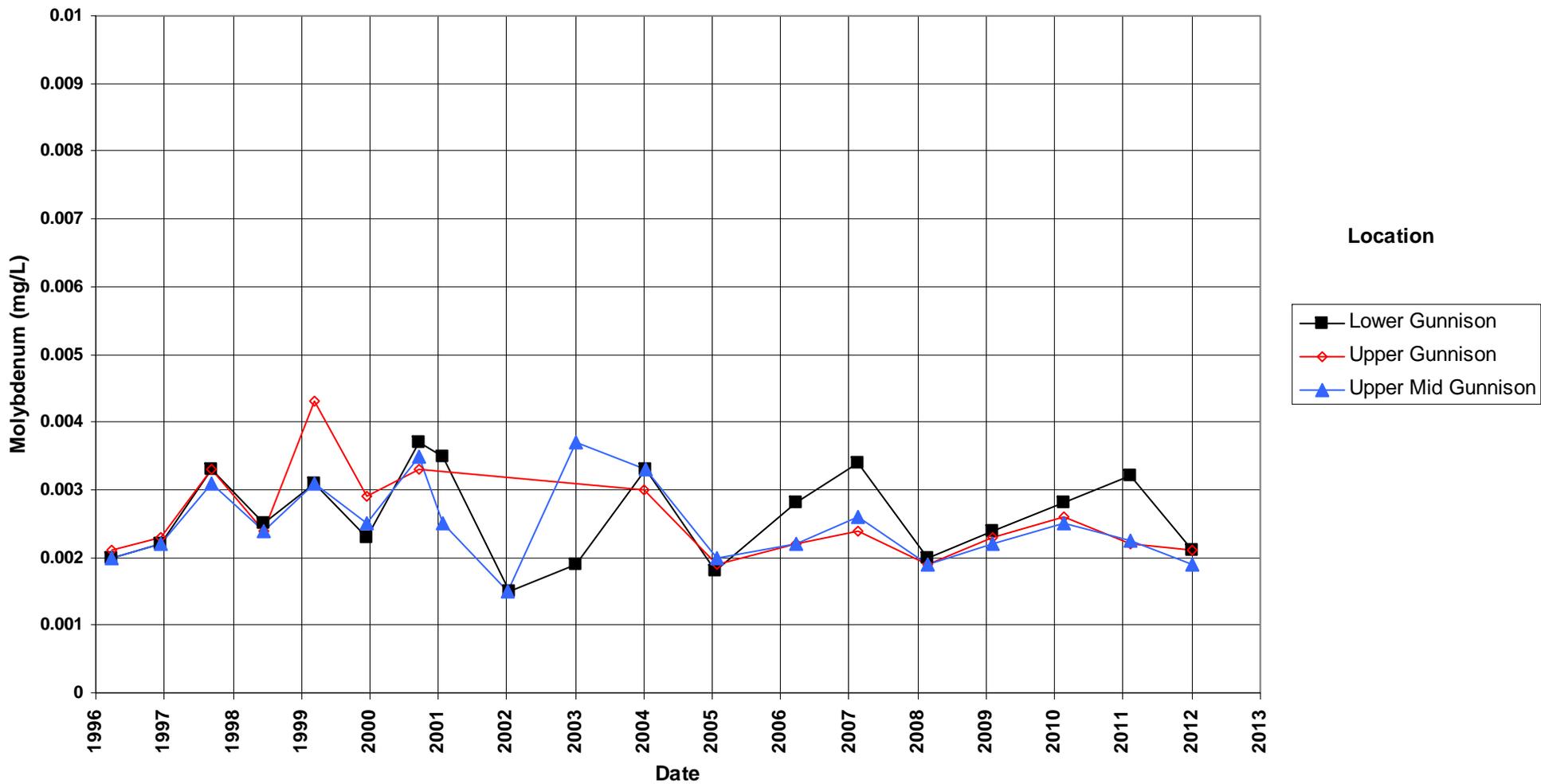
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## **Time-Concentration Graphs Surface Water Locations**

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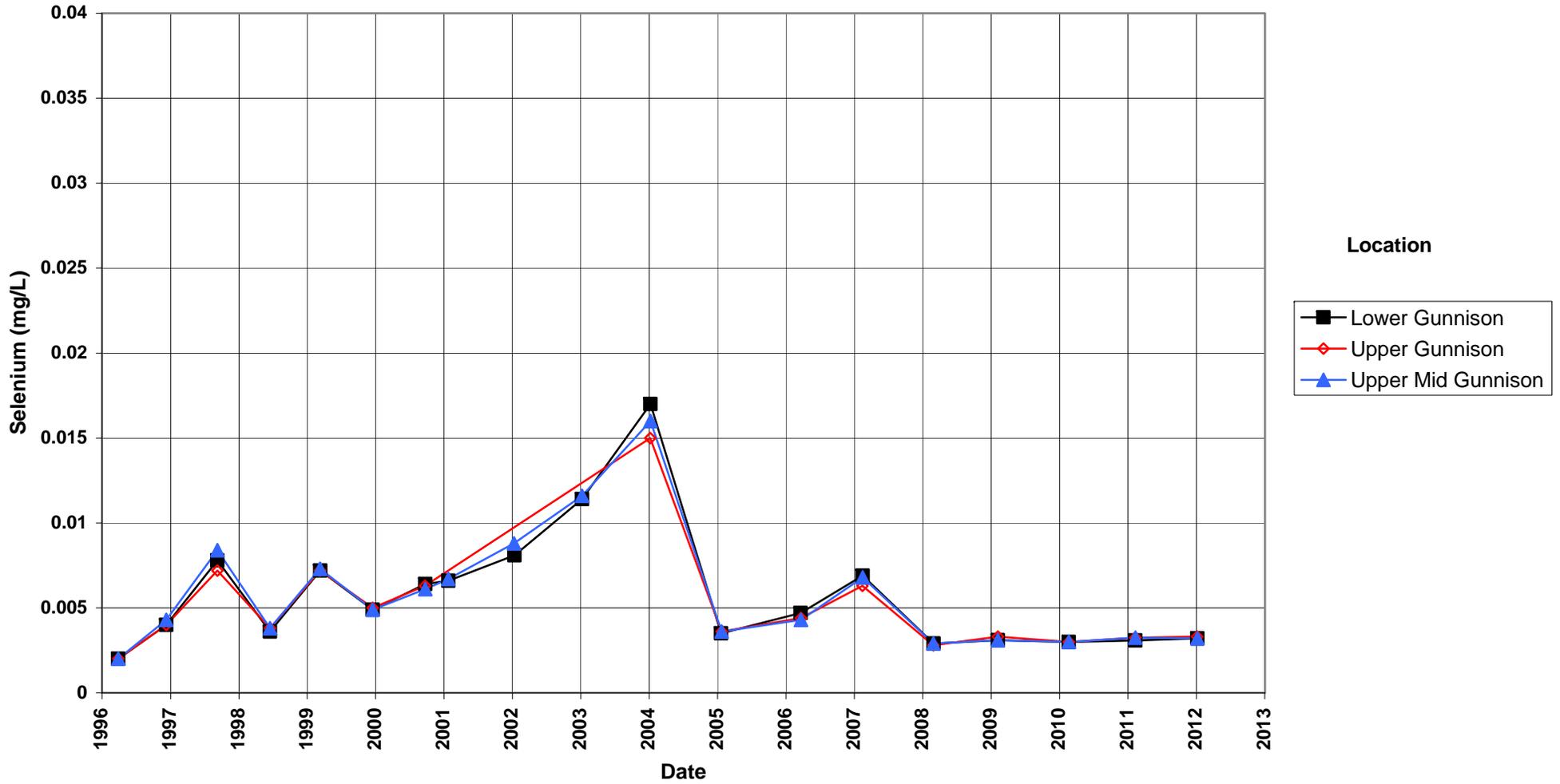
# Grand Junction Site Molybdenum Concentration

River Locations



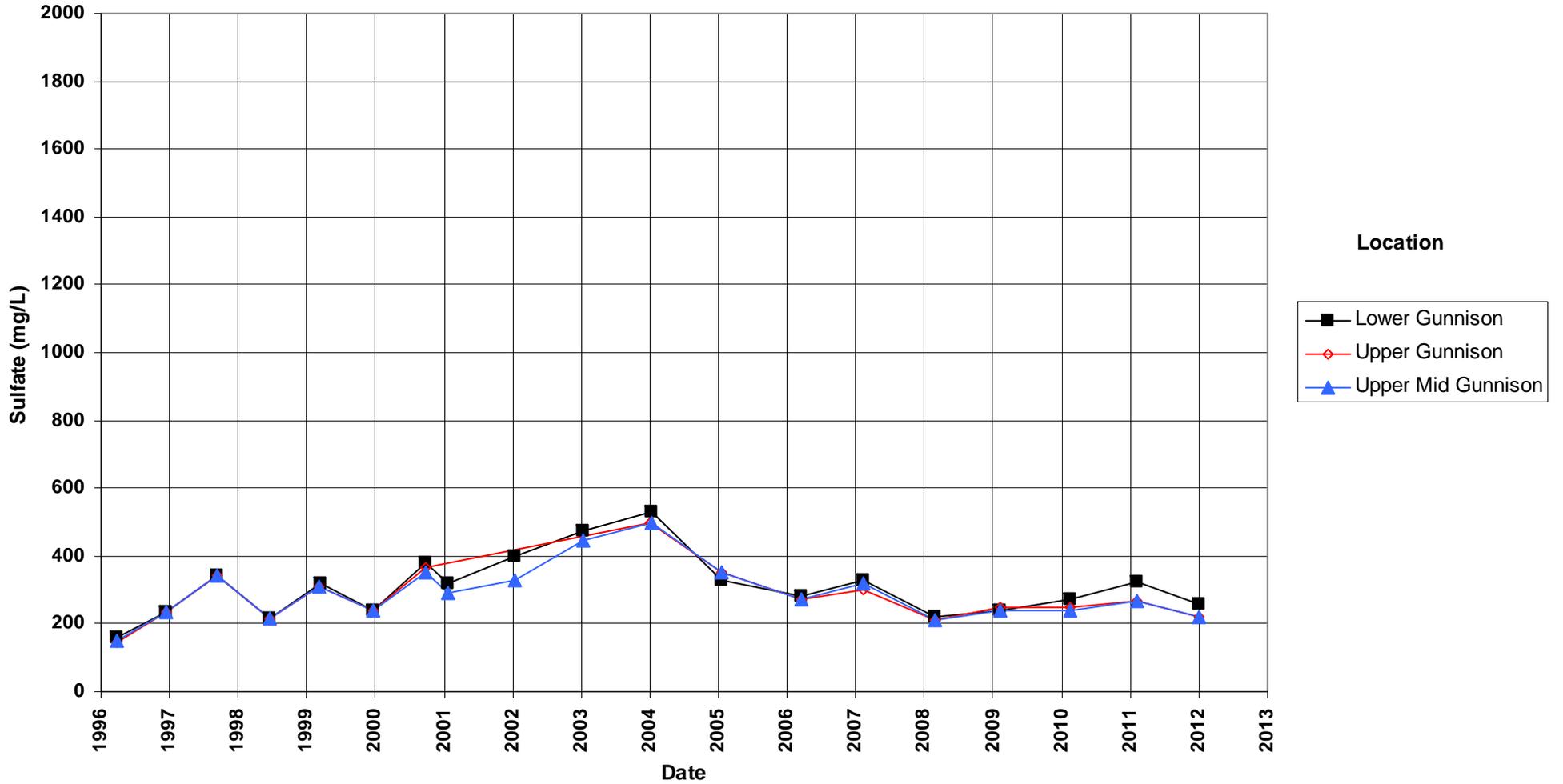
# Grand Junction Site Selenium Concentration

River Locations



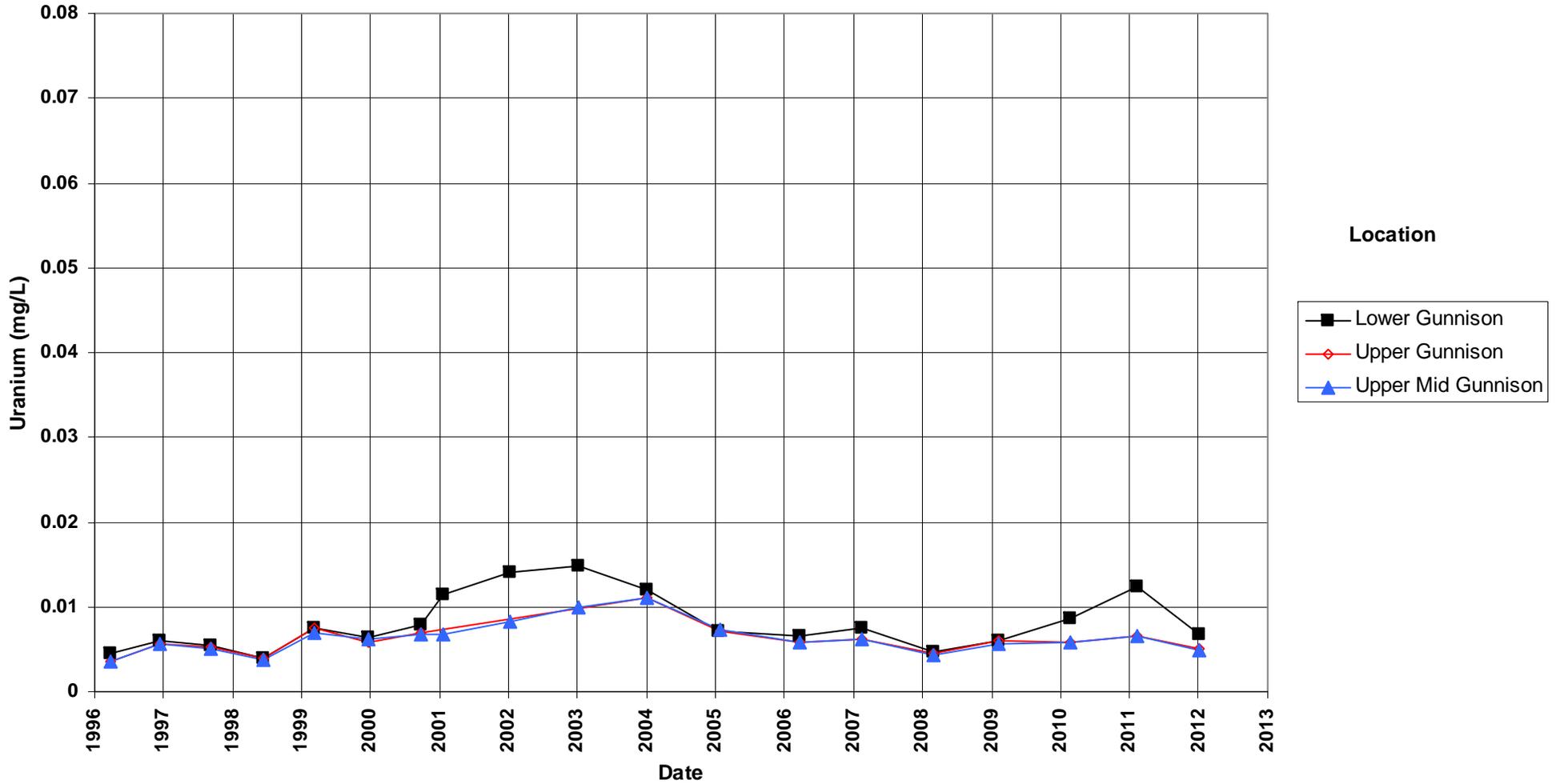
# Grand Junction Site Sulfate Concentration

River Locations

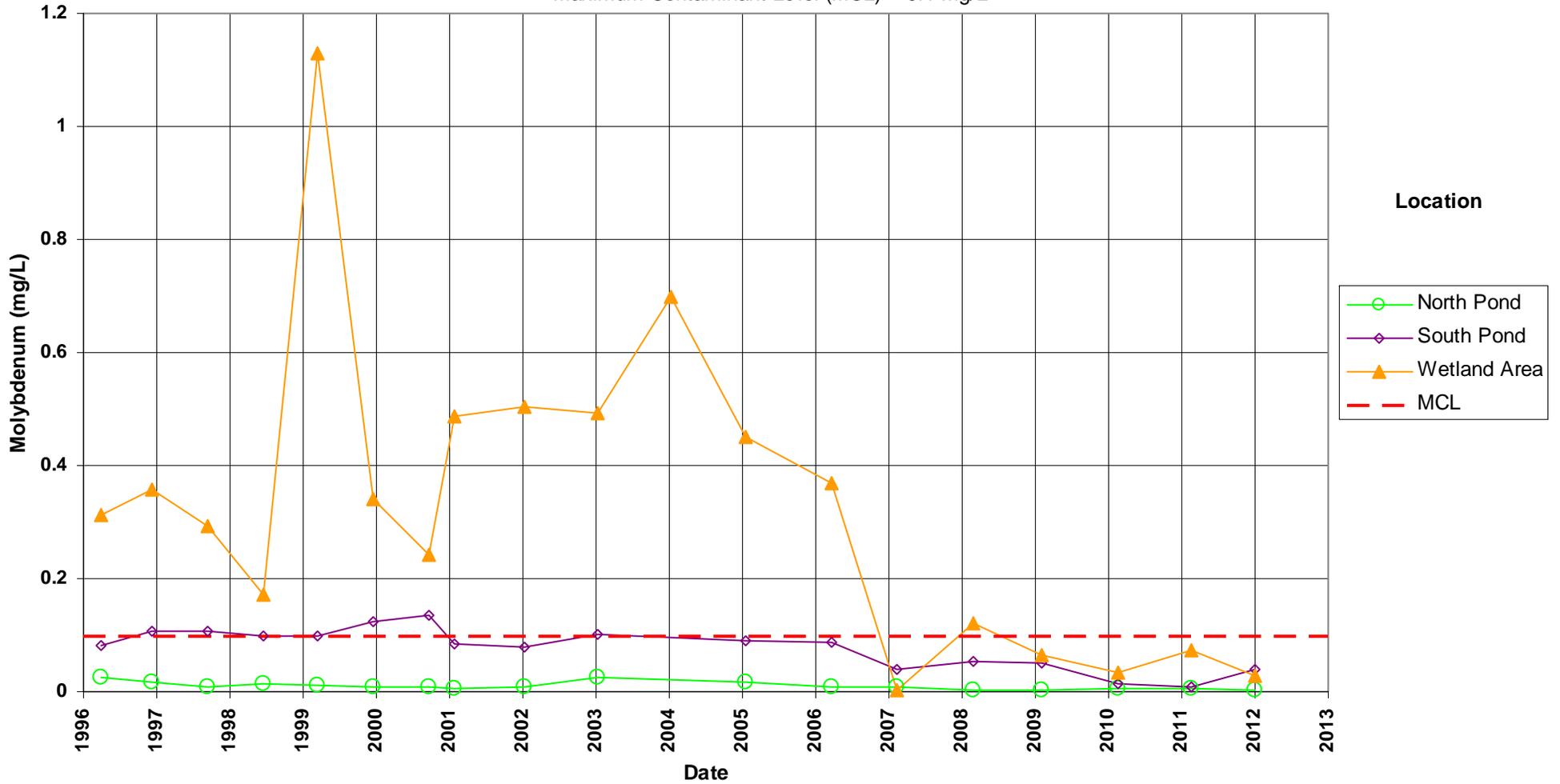


# Grand Junction Site Uranium Concentration

River Locations



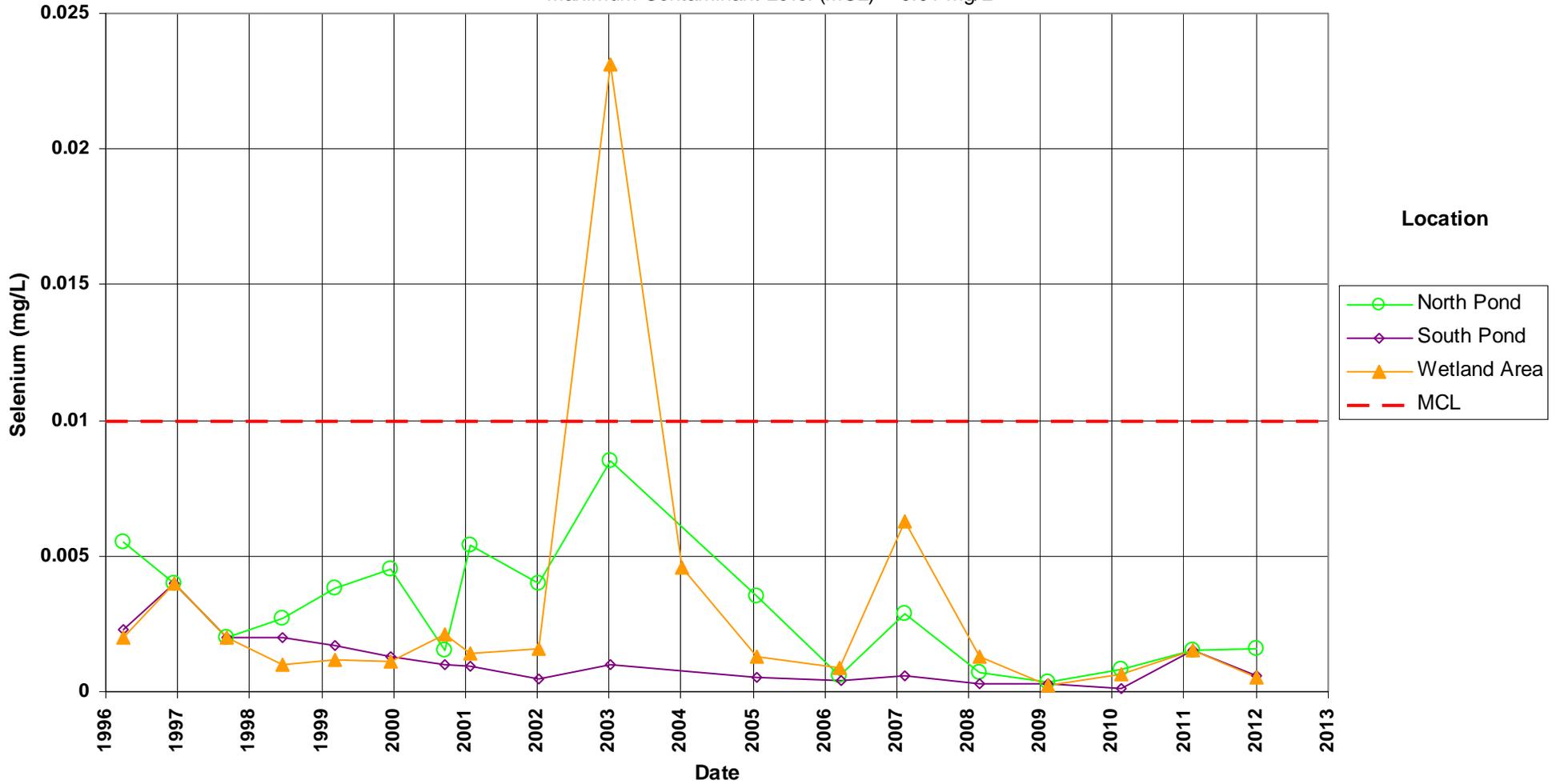
**Grand Junction Site**  
**Molybdenum Concentration**  
Pond and Wetland Locations  
Maximum Contaminant Level (MCL) = 0.1 mg/L



# Grand Junction Site Selenium Concentration

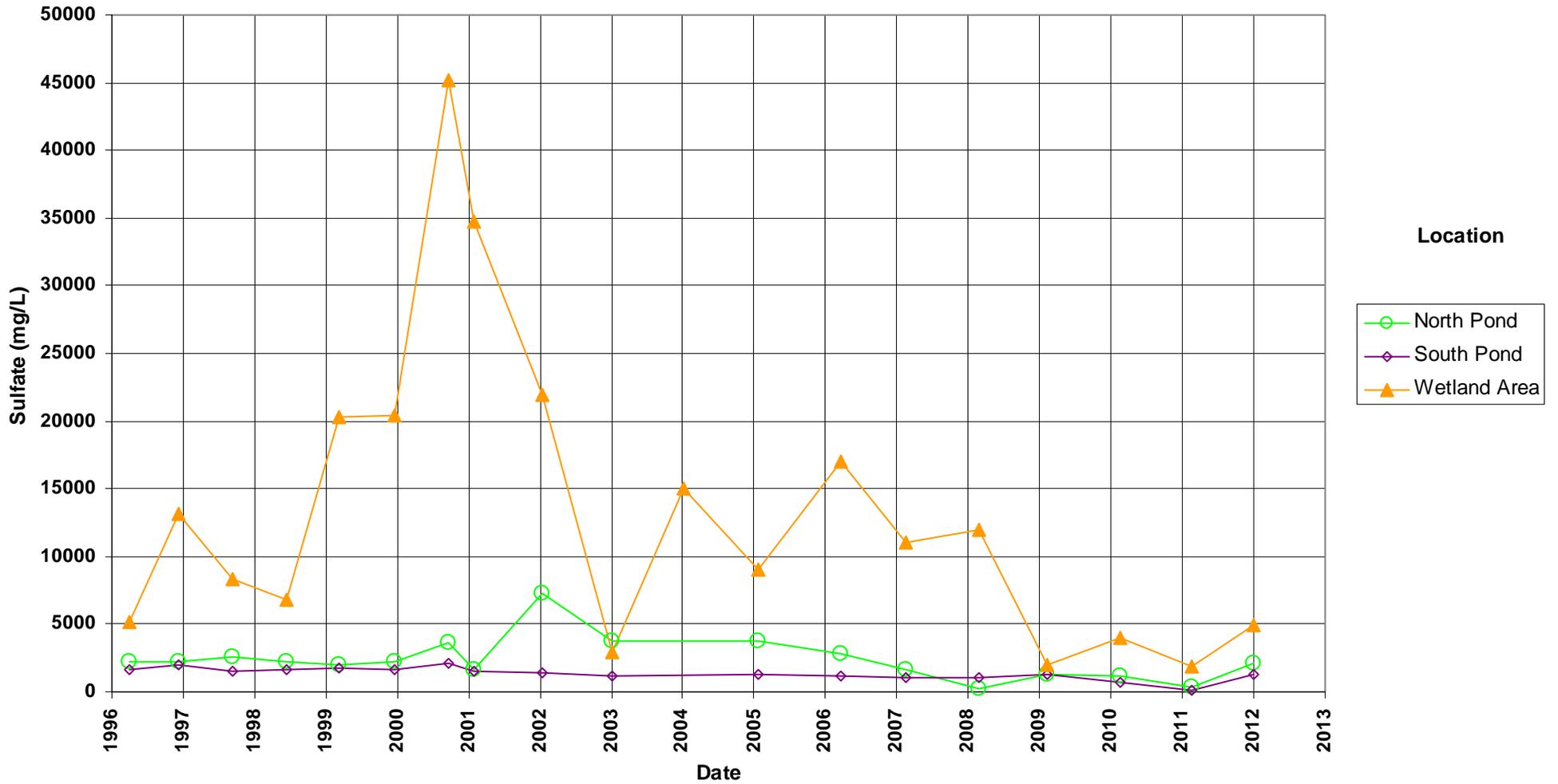
Pond and Wetland Locations

Maximum Contaminant Level (MCL) = 0.01 mg/L



# Grand Junction Site Sulfate Concentration

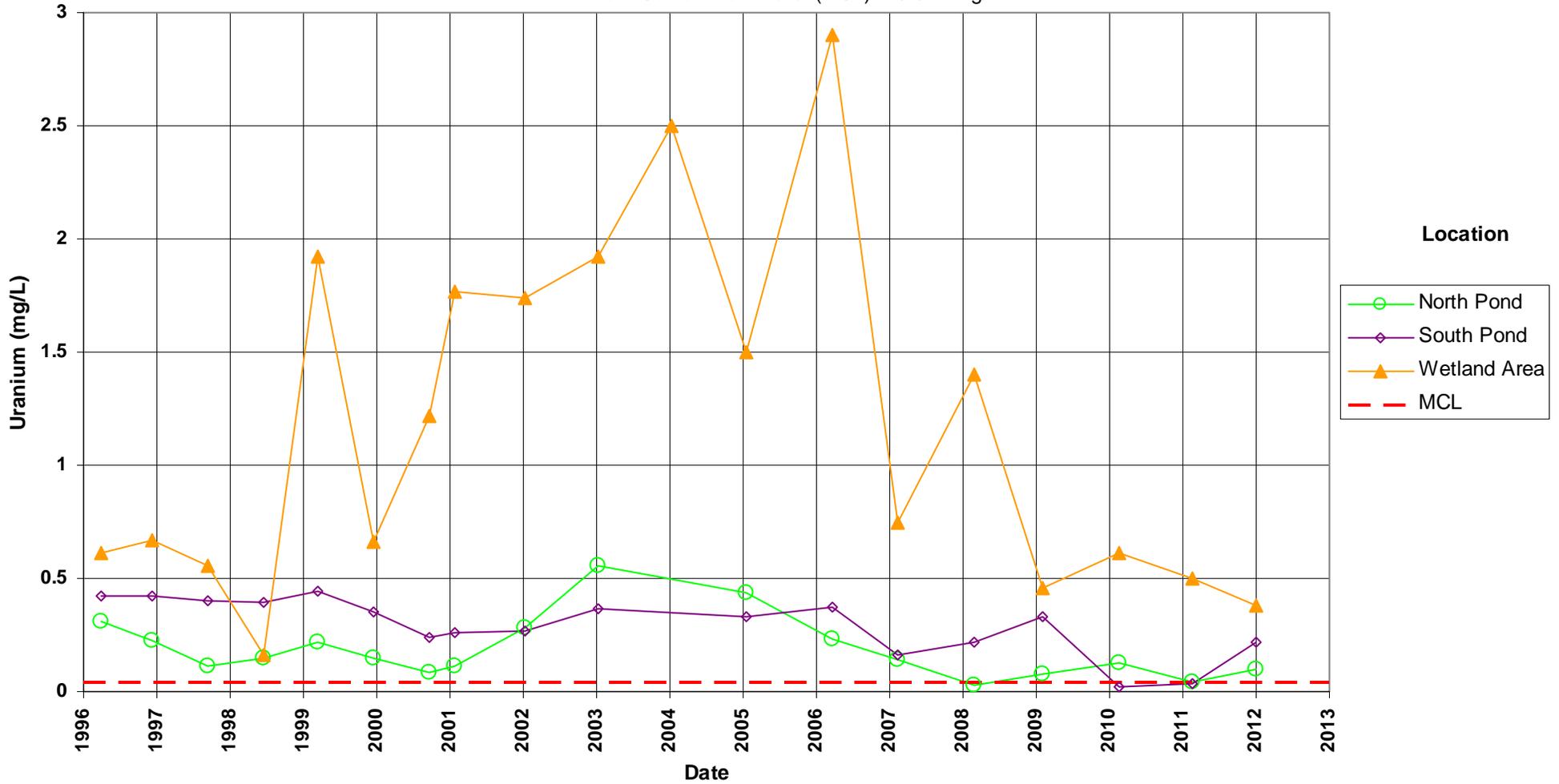
Pond and Wetland Locations



# Grand Junction Site Uranium Concentration

Pond and Wetland Locations

Maximum Contaminant Level (MCL) = 0.044 mg/L



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

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established 1959

Task Order LM00-501  
Control Number 12-0260

January 5, 2012

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)  
January 2012 Environmental Sampling at the Grand Junction, Colorado, Site

REFERENCE: Task Order LM00-501-04-302-402, Grand Junction, Colorado, Site

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at the Grand Junction, Colorado site. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring. Water quality data will be collected from this site as part of the environmental sampling currently scheduled to begin the week of January 2, 2012.

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

**Monitoring Wells\***

8-4S Nr      11-1S Nr      6-2N Nr      14-13NA Nr      GJ84-04 Nr      GJ01-01 AI      10-19N Nr

\*NOTE: AI = Alluvium; Nr = No recovery of data for classifying

**Surface locations**

Upper Gunnison      Upper Middle Gunnison      Lower Gunnison      Wetland Area  
South Pond      North Pond

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. The Access Agreement for the site is in place, which will allow access to all monitoring locations.

The S.M. Stoller Corporation      2597 B ¼ Road      Grand Junction, CO 81503      (970) 248-6000      Fax: (970) 248-6040

Richard Bush  
Control Number 12-0260  
Page 2

Please call me at (970) 248-6654 if you have any questions.

Sincerely,



Sam Campbell  
Site Lead

SC/lcg/lb

Enclosures (3)

cc: (electronic)

Karl Stoeckle, DOE  
Sam Campbell, Stoller  
Steve Donovan, Stoller  
Bev Gallagher, Stoller  
Lauren Goodknight, Stoller  
EDD Delivery  
re-grand.junction  
File: GJO 410.02(A)

### Sampling Frequencies for Locations at Grand Junction Office Facility, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
<b>Monitoring Wells</b>						
8-4S			X			
11-1S			X			
6-2N			X			
14-13NA			X			
GJ84-04			X			
GJ01-01			X			
10-19N			X			
<b>Surface Locations</b>						
Upper Gunnison			X			
Upper Middle Gunnison			X			
Lower Gunnison			X			
South Pond			X			
North Pond			X			
Wetland Area			X			

Sampling conducted in February

### Constituent Sampling Breakdown

Site	Grand Junction Office Facility		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
	Groundwater	Surface Water			
<b>Analyte</b>					
<b>Approx. No. Samples/yr</b>	7	6			
<i>Field Measurements</i>					
Alkalinity					
Dissolved Oxygen					
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride					
Chromium					
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese	X		0.005	SW-846 6010	LMM-01
Molybdenum	X	X	0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO <sub>3</sub> +NO <sub>2</sub> )-N					
Potassium					
Radium-226					
Radium-228					
Selenium	X	X	0.0001	SW-846 6020	LMM-02
Silica					
Sodium					
Strontium					
Sulfate	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
<b>Total No. of Analytes</b>	5	4			

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:** January 24, 2012

**TO:** Sam Campbell

**FROM:** David Atkinson

**SUBJECT:** Trip Report

**Site:** Grand Junction Site

**Dates of Sampling Event:** 1/5/2012 – 1/6/2012

**Team Members:** Sam Campbell, Joe Trevino, Kent Moe, David Atkinson

**Number of Locations Sampled:** 7 Monitoring wells and 6 surface-water locations.

**Locations Not Sampled/Reason:** None.

**Location Specific Information:**

- Monitoring well GJ84-04 had a large amount of fine alluvial-sand in the well and several liters of water had to be pumped out in order to reach turbidity stability criteria.
- DOE and COPHD representatives observed groundwater sampling at monitoring wells GJ84-04 and 14-13NA.
- A groundwater sampling demonstration was provided for DOE and Stoller personnel at monitoring well 6-2N.
- The North Pond was sampled approximately 40 yards north of the normal sampling location due to ice covering a large portion of the pond.

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

False ID	True ID	Ticket Number	Sample Type	Associated Matrix
2310	8-4S	KCQ 727	Duplicate	Groundwater
2311	N/A	KCQ 728	Equipment blank	Water

**RIN Number Assigned:** All samples were assigned to RIN 12014285.

**Sample Shipment:** Samples were shipped overnight via FedEx to ALS Laboratory Group, Fort Collins, CO, from Grand Junction, CO, on January 9, 2012.

**Water Level Measurements:** Water levels were measured at all wells prior to the start of sampling.

**Well Inspection Summary:** All wells appeared to be in good condition with the exception of sand in monitoring well GJ84-04.

**Field Variance:** None.

**Equipment:** All equipment functioned properly.

**Institutional Controls:**

**Fences, Gates, Locks:** No issues identified.

**Trespassing/Site Disturbances:** None observed.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** N/A

**Vegetation/Noxious Weed Concerns:** Willows have overgrown the edge of the road leading to monitoring well location 14-13NA and need to be trimmed.

**Maintenance Requirements:** None.

**Access Issues:** None.

**Corrective Action Required:** Sand needs to be pumped out of monitoring well GJ84-04, and a camera survey conducted to assess the integrity of the well screen.

cc: (electronic)  
Rich Bush, DOE  
Steve Donovan, Stoller  
EDD Delivery