

# Data Validation Package

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**February 2010**  
**Water Sampling at the**  
**Grand Junction, Colorado, Office Site**

**May 2010**

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# Sampling Event Summary

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

**Sampling Period:** February 18-19, 2010

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 exceeded in all seven of the wells in the monitoring network (Table 1).

*Table 1. Locations with Samples that Exceeded EPA Groundwater Standards in February 2010*

Analyte	Standard <sup>a</sup>	Groundwater		Surface Water	
		Location	Concentration	Location	Concentration
Molybdenum	0.1	14-13NA	0.12	-----	-----
		8-4S	0.17		
Selenium	0.01	6-2N	0.026	-----	-----
		8-4S	0.02		
		GJ01-01	0.023		
Uranium	0.044	10-19N	0.16	North Pond Wetland Area	0.13 0.61
		11-1S	0.049		
		14-13NA	0.33		
		6-2N	0.068		
		8-4S	0.57		
		GJ01-01	0.32		
		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 minimal impact to Gunnison River water quality from discharge of contaminated alluvial groundwater.

*Table 2. Comparison of Gunnison River Concentrations to Benchmarks*

<b>Analyte</b>	<b>Benchmark (mg/L)</b>	<b>2010 Upper Mid Gunnison Concentration (mg/L)</b>	<b>2010 Lower Gunnison Concentration (mg/L)</b>
Molybdenum	0.0500	0.0025	0.0028
Selenium	0.0150	0.003	0.003
Sulfate	510	240	270
Uranium	0.0116	0.0059	0.0086

Groundwater modeling predicts that natural flushing of the alluvial aquifer at the Grand Junction site will reduce molybdenum, selenium, and uranium concentrations below EPA groundwater standards (40 CFR 192) within 50 to 80 years; approximately 20 years have elapsed in the 50- to 80-year timeframe predicted by the 1989 model. 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.

To assess the progress of natural flushing and determine if groundwater is flushing according to model predictions, additional data analyses were conducted. Trend analysis using the Mann-Kendall test was performed using data from 1990 through 2010 to assess contaminant concentrations. The Mann-Kendall test determines if an upward trend, downward trend, or no trend exists. As displayed in Table 3, results of the Mann-Kendall testing show that 21 out of 28 tests (7 wells tested for 4 analytes each) show a downward trend, 6 tests show no trend, and 1 test showed an upward trend.

In addition to trend analysis, curve-fitting techniques were used to provide an estimate of flushing time to determine if natural flushing is progressing according to model predictions. If a downward trend was indicated for molybdenum, selenium, sulfate, or uranium (with a minimum of 10 data points from 1990 through 2010), then a best-fit curve was drawn using Excel to approximate the actual data as shown in the trend line graphs included in the Data Presentation section. Though not shown on the figures, the curve was extrapolated to the point where it intercepts the standard. (For sulfate, a background level of 1,003 mg/L was calculated by averaging sulfate results from background wells GJ84-09 and GJ84-10 starting 1990). The corresponding time when the curve meets the standard provides an estimate of flushing time. Curves described by an exponential equation or a power equation were selected based on their correlation coefficient. If a significant difference in the *r* values existed, the curve with the highest *r* value was selected. Estimates of flushing time are displayed in Table 3.

Results of Mann-Kendall testing and curve fitting indicate natural flushing is generally progressing as predicted by the model. Generally, analyte concentrations continue to decline across the aquifer, trends are generally downward, and estimated flushing times are within model predictions. Flushing times generated from curve fitting and data from this sampling event show

that 18 out of 28 observations (7 wells tested for 4 analytes each) are currently or are projected to be within model predictions.

Table 3. Trend Analysis of Wells with Estimates of Flushing Times

Analyte	Well ID	Trend <sup>a</sup>	n <sup>b</sup>	Curve Type	r <sup>c</sup>	Limit <sup>d</sup> (mg/L)	Estimated Completion (Years from 1990)
Molybdenum	10-19N	Down	21	Exponential	0.81	0.1	8
Molybdenum	11-1S	Down	21	Exponential	0.89	0.1	8
Molybdenum	14-13NA	Down	20	Exponential	0.51	0.1	40
Molybdenum	6-2N	None	17	No trend; Results below limit		0.1	0
Molybdenum	8-4S	Down	24	Power	0.54	0.1	26
Molybdenum	GJ01-01	Down	9	Fewer than 10 points		0.1	
Molybdenum	GJ84-04	Down	21	Exponential	0.96	0.1	15
Selenium	10-19N	Down	21	Results are below the limit		0.01	0
Selenium	11-1S	Down	21	Results are below the limit		0.01	0
Selenium	14-13NA	Down	20	Results are below the limit		0.01	0
Selenium	6-2N	Down	15	Exponential	0.92	0.01	34
Selenium	8-4S	Down	21	Exponential	0.60	0.01	18
Selenium	GJ01-01	Down	9	Fewer than 10 points		0.01	
Selenium	GJ84-04	Down	21	Results are below the limit		0.01	0
Sulfate	10-19N	Down	21	Exponent	0.26	1003	134
Sulfate	11-1S	Down	21	Results are below the limit		1003	0
Sulfate	14-13NA	None	20	No Trend		1003	
Sulfate	6-2N	Down	15	Exponent	0.84	1003	15
Sulfate	8-4S	Down	21	Exponent	0.51	1003	13
Sulfate	GJ01-01	Down	9	Results are below the limit		1003	0
Sulfate	GJ84-04	None	21	No Trend		1003	
Uranium	10-19N	None	21	No Trend		0.044	
Uranium	11-1S	Down	21	Exponential	0.93	0.044	18
Uranium	14-13NA	Up	20	Upward Trend		0.044	
Uranium	6-2N	Down	17	Exponential	0.92	0.044	29
Uranium	8-4S	None	21	No Trend		0.044	
Uranium	GJ01-01	Down	9	Fewer than 10 points		0.044	
Uranium	GJ84-04	None	21	No Trend		0.044	

<sup>a</sup>Data collected from 1990 to 2010.

<sup>b</sup>n=number of observations.

<sup>c</sup>r=Correlation coefficient – a value of 1 represents a perfect correlation.

<sup>d</sup>Limit= Standards listed in 40 CFR 192.02 Table 1 to Subpart A. For sulfate, a background level of 1,003 mg/L was calculated by averaging historical sulfate results from wells GJ84-09 and GJ84-10 starting in 1990.

N/A=Not applicable.



Sam Campbell  
Site Lead, S.M. Stoller

5-18-2010  
Date



<b>Legend</b> Location Sampled ● Well ▲ Surface Location --- Site Boundary Wetland 0 500 1,000 Feet 	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-AM01-07LM00060</small>
	<b>Grand Junction Office          Data Validation</b>	
DATE PREPARED: <b>March 5, 2009</b>	FILENAME: <b>S0524600</b>	

M:\LTS\1111\0036\18\000\S0524600\S0524600.mxd smithw 3/5/2009 11:42:14 AM

*Grand Junction Site, Sample Location Map*

# Data Assessment Summary

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### Water Sampling Field Activities Verification Checklist

<b>Project</b>	<u>Grand Junction, CO, Office Site</u>	<b>Date(s) of Water Sampling</b>	<u>February 18-19, 2010</u>
<b>Date(s) of Verification</b>	<u>April 15, 2010</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 20, 2010.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibration performed on February 17, 2010.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u>	<u>pH pre-trip calibration: the A-B span was slightly out of range, which is acceptable.</u>
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>No</u>	<u>Sp Cond reading at "Lower Gunnison" was very low. This suggests that tubing to the flow cell was attached incorrectly, causing the cell to only partially fill, which affects the sp cond measurement. The sp cond result is qualified as "R" (rejected).</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?	NA	
Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	One duplicate taken @ 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 taken for surface water reel.
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	
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	Yes	QC samples are also listed in trip report.
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?	N/A	

## Laboratory Performance Assessment

### General Information

Report Number (RIN): 10022849  
 Sample Event: February 18-19, 2010  
 Site(s): Grand Junction Office, Colorado  
 Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
 Work Order No.: 1002219  
 Analysis: Metals and Wet Chemistry  
 Validator: Gretchen Baer  
 Review Date: April 15, 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 4.

*Table 4. 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 5. Refer to the sections below for an explanation of the data qualifiers applied.

*Table 5. Data Qualifiers*

Sample Number	Location	Analyte	Flag	Reason
1002219-2	11-1S	Selenium	U	Less than 5 times the calibration blank
1002219-5	GJ84-04	Selenium	U	Less than 5 times the calibration blank
1002219-8	Upper Gunnison	Selenium	J	Serial dilution failure
1002219-9	South Pond	Selenium	U	Less than 5 times the calibration blank
1002219-10	Upper Mid Gunnison	Selenium	J	Serial dilution failure
1002219-12	Lower Gunnison	Selenium	J	Serial dilution failure
1002219-15	2311 (Equip Blank)	Manganese	U	Less than 5 times the calibration blank
1002219-15	2311 (Equip Blank)	Molybdenum	U	Less than 5 times the calibration blank
1002219-15	2311 (Equip Blank)	Selenium	U	Less than 5 times the calibration blank
1002219-15	2311 (Equip Blank)	Uranium	U	Less than 5 times the calibration blank

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 15 water samples on February 24, 2010, 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 cool and intact at a temperature of 0.4 °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.

### 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.

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

Calibrations were performed on March 15, 2010, using four calibration standards. The correlation coefficient value was greater than 0.995. The absolute value of the intercept was only slightly above 3 times the method detection limit (MDL), which is acceptable. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 15 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 practical quantitation limit and all results were within the acceptance range.

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

Calibrations were performed on March 16, 2010, using eight calibration standards. The calibration curve correlation coefficient values were greater than 0.995. The absolute values of the calibration curve intercepts were less than 3 times the MDL, with the exception of selenium. The selenium intercept was only slightly above the limit and is acceptable for this project. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in seven 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 practical quantitation limit 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 February 16, 2010, using six 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. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 11 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 practical quantitation limits for all analytes. In cases where a blank concentration exceeds the method detection limit (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 (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

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the practical quantitation limit, indicating acceptable precision.

### Laboratory Control Sample

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

### Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the practical quantitation limit (PQL) for ICP-MS or greater than 50 times the PQL for ICP. All evaluated serial dilution data were acceptable with one exception. The serial dilution for selenium did not meet the acceptance criteria. The associated result (at location “Upper Gunnison”) is qualified with a “J” flag as an estimated value. The locations “Upper Mid Gunnison” and “Lower Gunnison” are likely to have similar matrix effects and these selenium results were also qualified.

### Detection Limits/Dilutions

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

### Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. In the manganese raw data package, some of the sample identifiers were incorrect. These incorrect names can be cross-referenced to the correct laboratory identifiers, so no corrective action by the laboratory is necessary.

### 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

A revised EDD file arrived on March 30, 2010, that included corrections to the ticket numbers. 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. Errors were detected in the original EDD file: the ticket number prefix of “IDU” was erroneously entered as “IDIU”. This error is repeated throughout the data package, but was corrected in the revised EDD. 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: 10022849      Lab Code: PAR      Validator: Gretchen Baer      Validation Date: 4/15/2010  
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: 10022849Lab Code: PARDate Due: 3/24/2010Matrix: WaterSite Code: GJODate Completed: 3/22/2010

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	03/15/2010	-0.1270	1.0000	OK	OK	OK	OK	OK	103.0	96.0	98.0	1.0	97.0	2.0	103.0
MANGANESE	03/15/2010											1.0	96.0		106.0
MANGANESE	03/15/2010												95.0		101.0
MANGANESE	03/15/2010												93.0		102.0
MOLYBDENUM	03/16/2010	-0.0040	1.0000	OK	OK	OK	OK	OK	103.0	101.0	106.0	3.0	110.0	7.0	115.0
MOLYBDENUM	03/16/2010											1.0			
SELENIUM	03/16/2010	-0.0870	0.9999	OK	OK	OK	OK	OK	90.0	87.0	86.0	1.0	93.0	29.0	84.0
SELENIUM	03/16/2010											2.0			
URANIUM	03/16/2010	0.0000	1.0000	OK	OK	OK	OK	OK	104.0	98.0	104.0	2.0	108.0	3.0	109.0
URANIUM	03/16/2010											1.0			

## SAMPLE MANAGEMENT SYSTEM

### Wet Chemistry Data Validation Worksheet

**RIN:** 10022849      **Lab Code:** PAR      **Date Due:** 3/24/2010  
**Matrix:** Water      **Site Code:** GJO      **Date Completed:** 3/22/2010

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	02/16/2010	0.382	0.9999	OK		OK							
SULFATE	02/24/2010				OK	OK	OK	98.00					
SULFATE	02/25/2010								101.0	96.0	2.00		

## **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, molybdenum, selenium, and uranium were detected in the blank by the laboratory, but these analytes were qualified during data validation with a “U” flag as not detected. 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. Duplicate samples were collected from location 8-4S (field duplicate ID 2310). The duplicate results met the Environmental Protection Agency recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the practical quantitation limit, indicating acceptable overall precision.

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

Page 1 of 1

RIN: 10022849    Lab Code: PAR    Project: Grand Junction Office(GJO)    Validation Date: 4/15/2010

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Duplicate: 2310

Sample: 8-4S

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
MANGANESE	1400			1	1500			1	6.90	UG/L	
MOLYBDENUM	170			100	150			100	12.50	UG/L	
SELENIUM	20			2	20			2	0	UG/L	
SULFATE	630			20	630			20	0	MG/L	
URANIUM	570			100	530			100	7.27	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  
Steve Donivan

5-17-2010  
Date

Data Validation Lead:

Gretchen Baer  
Gretchen Baer

5/17/10  
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 laboratory results from this sampling event were identified as potential outliers. The field measurement for specific conductance at surface water location "Lower Gunnison" was recorded as 24  $\mu\text{mhos/cm}$ . This value is much lower than the historical minimum at this location and the specific conductance readings at the other Gunnison River locations, which had recorded values of  $\sim 740 \mu\text{mhos/cm}$ . All other specific conductance measurements by the field equipment for this sampling event are acceptable, which indicates that the flow cell was not filled sufficiently high to cover the specific conductance probe at this location only. The specific conductance result for "Lower Gunnison" is qualified with an "R" flag as rejected.

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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 10022849

Report Date: 4/15/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Current Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
GJO01	10-19N	N001	02/19/2010	Molybdenum	0.025		F	0.541			0.032		F	63	0	No
GJO01	14-13NA	N001	02/19/2010	Molybdenum	0.12		F	0.57			0.14		F	48	0	No
GJO01	6-2N	N001	02/18/2010	Molybdenum	0.027		F	0.15			0.0441		F	33	0	No
GJO01	6-2N	N001	02/18/2010	Selenium	0.026		F	0.14			0.034			33	0	No
GJO01	6-2N	N001	02/18/2010	Uranium	0.068		F	1.1			0.11		F	33	0	No
GJO01	8-4S	N002	02/18/2010	Sulfate	630		F	2200			640		F	51	0	No
GJO01	8-4S	N001	02/18/2010	Sulfate	630		F	2200			640		F	51	0	No
GJO01	GJ01-01	N001	02/18/2010	Molybdenum	0.096		F	0.162		F	0.11		F	9	0	No
GJO01	GJ01-01	N001	02/18/2010	Selenium	0.023		F	0.0634		F	0.027		F	9	0	No

**STATISTICAL TESTS:**

The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test

Outliers are identified using Dixon's Test when there are 25 or fewer data points.

Outliers are identified using Rosner's Test when there are 26 or more data points.

See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

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# **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: 4/27/2010

Location: 10-19N WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	02/19/2010	N001	-	2.8		F	#	0.00011	
Molybdenum	mg/L	02/19/2010	N001	-	0.025		F	#	0.000088	
Oxidation Reduction Potential	mV	02/19/2010	N001	-	31.4		F	#		
pH	s.u.	02/19/2010	N001	-	7.13		F	#		
Selenium	mg/L	02/19/2010	N001	-	0.00071		F	#	0.000023	
Specific Conductance	umhos /cm	02/19/2010	N001	-	5319		F	#		
Sulfate	mg/L	02/19/2010	N001	-	2700		F	#	25	
Temperature	C	02/19/2010	N001	-	10.77		F	#		
Turbidity	NTU	02/19/2010	N001	-	8.89		F	#		
Uranium	mg/L	02/19/2010	N001	-	0.16		F	#	0.0000035	

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

REPORT DATE: 4/27/2010

Location: 11-1S WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	02/18/2010	N001	-	0.55		F	#	0.00011	
Molybdenum	mg/L	02/18/2010	N001	-	0.024		F	#	0.000044	
Oxidation Reduction Potential	mV	02/18/2010	N001	-	39.2		F	#		
pH	s.u.	02/18/2010	N001	-	7.3		F	#		
Selenium	mg/L	02/18/2010	N001	-	0.00012		UF	#	0.000023	
Specific Conductance	umhos /cm	02/18/2010	N001	-	851		F	#		
Sulfate	mg/L	02/18/2010	N001	-	280		F	#	5	
Temperature	C	02/18/2010	N001	-	12.41		F	#		
Turbidity	NTU	02/18/2010	N001	-	1.87		F	#		
Uranium	mg/L	02/18/2010	N001	-	0.049		F	#	0.0000018	

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

REPORT DATE: 4/27/2010

Location: 14-13NA WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	02/19/2010	N001	-	3.5		F	#	0.00011	
Molybdenum	mg/L	02/19/2010	N001	-	0.12		F	#	0.00022	
Oxidation Reduction Potential	mV	02/19/2010	N001	-	119.7		F	#		
pH	s.u.	02/19/2010	N001	-	6.98		F	#		
Selenium	mg/L	02/19/2010	N001	-	0.00061		F	#	0.000023	
Specific Conductance	umhos /cm	02/19/2010	N001	-	2999		F	#		
Sulfate	mg/L	02/19/2010	N001	-	1400		F	#	25	
Temperature	C	02/19/2010	N001	-	12.65		F	#		
Turbidity	NTU	02/19/2010	N001	-	1.21		F	#		
Uranium	mg/L	02/19/2010	N001	-	0.33		F	#	0.0000088	

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

REPORT DATE: 4/27/2010

Location: 6-2N WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	02/18/2010	N001	-	0.79		F	#	0.00011	
Molybdenum	mg/L	02/18/2010	N001	-	0.027		F	#	0.000044	
Oxidation Reduction Potential	mV	02/18/2010	N001	-	56.8		F	#		
pH	s.u.	02/18/2010	N001	-	7.64		F	#		
Selenium	mg/L	02/18/2010	N001	-	0.026		F	#	0.000047	
Specific Conductance	umhos /cm	02/18/2010	N001	-	2408		F	#		
Sulfate	mg/L	02/18/2010	N001	-	1000		F	#	10	
Temperature	C	02/18/2010	N001	-	17.48		F	#		
Turbidity	NTU	02/18/2010	N001	-	2.97		F	#		
Uranium	mg/L	02/18/2010	N001	-	0.068		F	#	0.0000018	

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

REPORT DATE: 4/27/2010

Location: 8-4S WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	02/18/2010	N001	-	1.4		F	#	0.00011	
Manganese	mg/L	02/18/2010	N002	-	1.5		F	#	0.00011	
Molybdenum	mg/L	02/18/2010	N001	-	0.17		F	#	0.00044	
Molybdenum	mg/L	02/18/2010	N002	-	0.15		F	#	0.00044	
Oxidation Reduction Potential	mV	02/18/2010	N001	-	91.3		F	#		
pH	s.u.	02/18/2010	N001	-	7.11		F	#		
Selenium	mg/L	02/18/2010	N001	-	0.02		F	#	0.000047	
Selenium	mg/L	02/18/2010	N002	-	0.02		F	#	0.000047	
Specific Conductance	umhos /cm	02/18/2010	N001	-	1720		F	#		
Sulfate	mg/L	02/18/2010	N001	-	630		F	#	10	
Sulfate	mg/L	02/18/2010	N002	-	630		F	#	10	
Temperature	C	02/18/2010	N001	-	12.29		F	#		
Turbidity	NTU	02/18/2010	N001	-	4.78		F	#		
Uranium	mg/L	02/18/2010	N001	-	0.57		F	#	0.000018	
Uranium	mg/L	02/18/2010	N002	-	0.53		F	#	0.000018	

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

REPORT DATE: 4/27/2010

Location: GJ01-01 WELL South of Building 20

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Manganese	mg/L	02/18/2010	N001	15.5	- 25.5	0.53		F	#	0.00011	
Molybdenum	mg/L	02/18/2010	N001	15.5	- 25.5	0.096		F	#	0.00022	
Oxidation Reduction Potential	mV	02/18/2010	N001	15.5	- 25.5	72		F	#		
pH	s.u.	02/18/2010	N001	15.5	- 25.5	7.31		F	#		
Selenium	mg/L	02/18/2010	N001	15.5	- 25.5	0.023		F	#	0.000047	
Specific Conductance	umhos /cm	02/18/2010	N001	15.5	- 25.5	1706		F	#		
Sulfate	mg/L	02/18/2010	N001	15.5	- 25.5	580		F	#	10	
Temperature	C	02/18/2010	N001	15.5	- 25.5	13.51		F	#		
Turbidity	NTU	02/18/2010	N001	15.5	- 25.5	2.13		F	#		
Uranium	mg/L	02/18/2010	N001	15.5	- 25.5	0.32		F	#	0.0000088	

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

REPORT DATE: 4/27/2010

Location: GJ84-04 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Manganese	mg/L	02/18/2010	N001	-	3.8		F	#	0.00011	
Molybdenum	mg/L	02/18/2010	N001	-	0.088		F	#	0.00022	
Oxidation Reduction Potential	mV	02/18/2010	N001	-	46.4		F	#		
pH	s.u.	02/18/2010	N001	-	7.14		F	#		
Selenium	mg/L	02/18/2010	N001	-	0.00013		UF	#	0.000023	
Specific Conductance	umhos /cm	02/18/2010	N001	-	3228		F	#		
Sulfate	mg/L	02/18/2010	N001	-	1500		F	#	25	
Temperature	C	02/18/2010	N001	-	12.04		F	#		
Turbidity	NTU	02/18/2010	N001	-	8.12		F	#		
Uranium	mg/L	02/18/2010	N001	-	0.34		F	#	0.0000088	

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: 4/27/2010

Location: Lower Gunnison SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Molybdenum	mg/L	02/19/2010	N001	0.0028			#	0.000044	
Oxidation Reduction Potential	mV	02/19/2010	N001	-17.9			#		
pH	s.u.	02/19/2010	N001	8.19			#		
Selenium	mg/L	02/19/2010	N001	0.003		J	#	0.000023	
Specific Conductance	umhos/cm	02/19/2010	N001	24		R	#		
Sulfate	mg/L	02/19/2010	N001	270			#	5	
Temperature	C	02/19/2010	N001	7.61			#		
Turbidity	NTU	02/19/2010	N001	4.88			#		
Uranium	mg/L	02/19/2010	N001	0.0086			#	0.0000018	

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

REPORT DATE: 4/27/2010

Location: North Pond SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Molybdenum	mg/L	02/19/2010	0001	0.0055		#	0.000088	
Selenium	mg/L	02/19/2010	0001	0.00085		#	0.000023	
Sulfate	mg/L	02/19/2010	0001	1200		#	25	
Uranium	mg/L	02/19/2010	0001	0.13		#	0.0000035	
Oxidation Reduction Potential	mV	02/19/2010	N001	89.2		#		
pH	s.u.	02/19/2010	N001	7.41		#		
Specific Conductance	umhos/cm	02/19/2010	N001	2765		#		
Temperature	C	02/19/2010	N001	0.97		#		
Turbidity	NTU	02/19/2010	N001	68.5		#		

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

REPORT DATE: 4/27/2010

Location: South Pond SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data		
Molybdenum	mg/L	02/18/2010	0001	0.014			#	0.000044
Selenium	mg/L	02/18/2010	0001	0.00014		U	#	0.000023
Sulfate	mg/L	02/18/2010	0001	650			#	10
Uranium	mg/L	02/18/2010	0001	0.018			#	0.0000018
Oxidation Reduction Potential	mV	02/18/2010	N001	-98.1			#	
pH	s.u.	02/18/2010	N001	6.59			#	
Specific Conductance	umhos/cm	02/18/2010	N001	1561			#	
Temperature	C	02/18/2010	N001	3.2			#	
Turbidity	NTU	02/18/2010	N001	24.7			#	

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

REPORT DATE: 4/27/2010

Location: Upper Gunnison SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	02/18/2010	N001	0.0026			#	0.000044	
Oxidation Reduction Potential	mV	02/18/2010	N001	16.9			#		
pH	s.u.	02/18/2010	N001	8.48			#		
Selenium	mg/L	02/18/2010	N001	0.003	E	J	#	0.000023	
Specific Conductance	umhos/cm	02/18/2010	N001	747			#		
Sulfate	mg/L	02/18/2010	N001	250			#	5	
Temperature	C	02/18/2010	N001	4.57			#		
Turbidity	NTU	02/18/2010	N001	5.31			#		
Uranium	mg/L	02/18/2010	N001	0.0058			#	0.0000018	

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

REPORT DATE: 4/27/2010

Location: Upper Mid Gunnison SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Molybdenum	mg/L	02/18/2010	N001	0.0025			#	0.000044	
Oxidation Reduction Potential	mV	02/18/2010	N001	57.4			#		
pH	s.u.	02/18/2010	N001	8.6			#		
Selenium	mg/L	02/18/2010	N001	0.003		J	#	0.000023	
Specific Conductance	umhos/cm	02/18/2010	N001	742			#		
Sulfate	mg/L	02/18/2010	N001	240			#	5	
Temperature	C	02/18/2010	N001	8.2			#		
Turbidity	NTU	02/18/2010	N001	4.92			#		
Uranium	mg/L	02/18/2010	N001	0.0059			#	0.0000018	

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

REPORT DATE: 4/27/2010

Location: Wetland Area SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Molybdenum	mg/L	02/19/2010	N001	0.033			#	0.00044	
Oxidation Reduction Potential	mV	02/19/2010	N001	-53.7			#		
pH	s.u.	02/19/2010	N001	7.7			#		
Selenium	mg/L	02/19/2010	N001	0.00062			#	0.000023	
Specific Conductance	umhos/cm	02/19/2010	N001	7921			#		
Sulfate	mg/L	02/19/2010	N001	4000			#	50	
Temperature	C	02/19/2010	N001	5.68			#		
Turbidity	NTU	02/19/2010	N001	7.29			#		
Uranium	mg/L	02/19/2010	N001	0.61			#	0.000018	

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: 10022849

Report Date: 4/27/2010

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Data	Detection Limit	Uncertainty	Sample Type
Manganese	GJO01	0999	02/19/2010	N001	mg/L	0.00079	B	U	0.00011		E
Molybdenum	GJO01	0999	02/19/2010	N001	mg/L	0.000055	B	U	0.000044		E
Selenium	GJO01	0999	02/19/2010	N001	mg/L	0.000035	B	U	0.000023		E
Sulfate	GJO01	0999	02/19/2010	N001	mg/L	0.5	U		0.5		E
Uranium	GJO01	0999	02/19/2010	N001	mg/L	0.000015	B	U	0.000018		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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**STATIC WATER LEVELS (USEE700) FOR SITE GJ001, Grand Junction Site**  
**REPORT DATE: 4/27/2010**

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
10-19N	O	4566.62	02/19/2010	12:35:25	13.35	4553.27	
11-1S	O	4572.83	02/18/2010	14:45:13	16.61	4556.22	
14-13NA	O	4560.58	02/19/2010	10:55:20	6.11	4554.47	
6-2N	O	4569.89	02/18/2010	14:00:45	13.9	4555.99	
8-4S	O	4568.59	02/18/2010	09:50:06	11.98	4556.61	
GJ01-01		4568.37	02/18/2010	10:25:37	12.35	4556.02	
GJ84-04	D	4563.24	02/18/2010	15:25:24	9.51	4553.73	

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

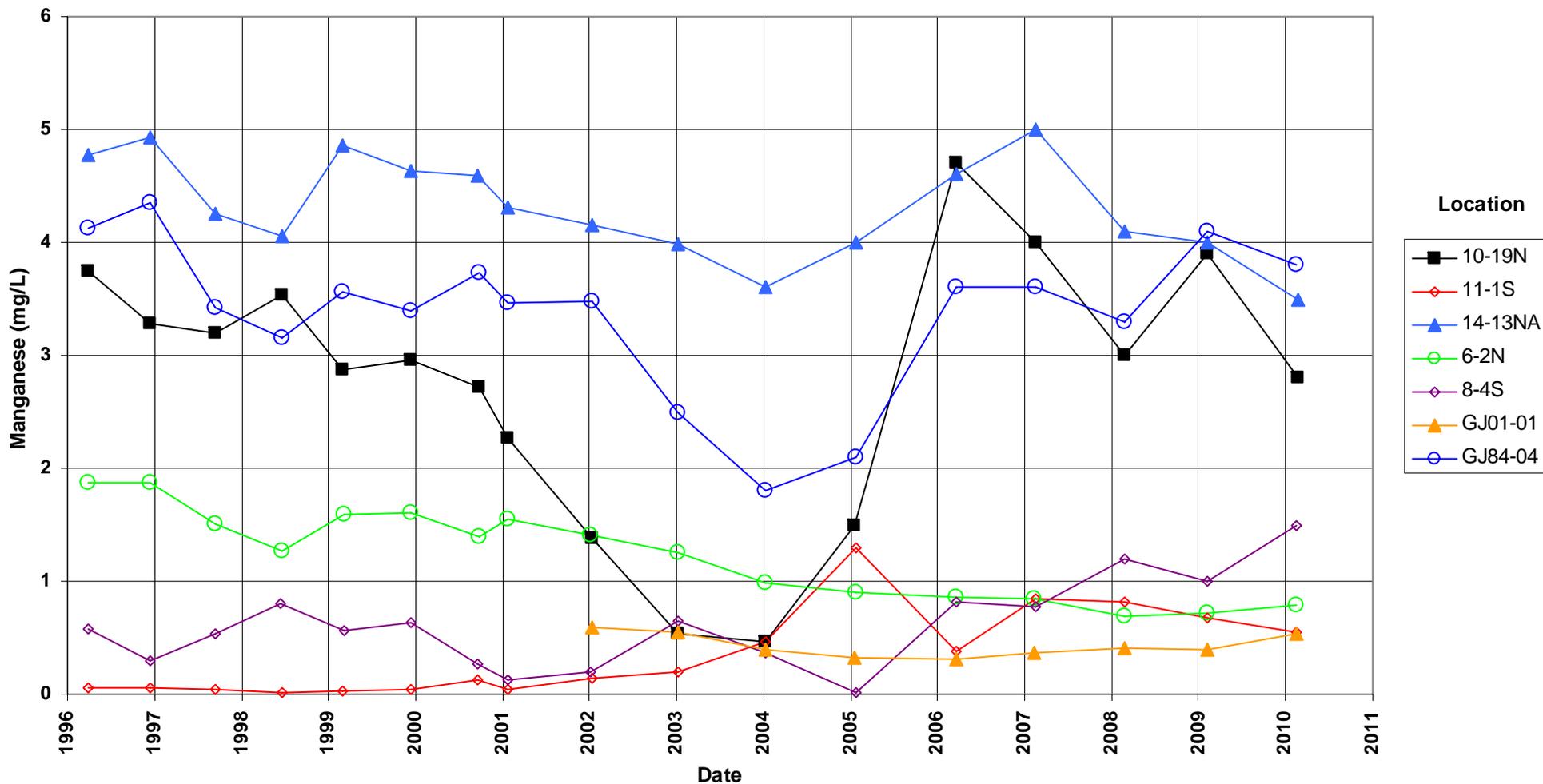
WATER LEVEL FLAGS: D Dry      F FLOWING

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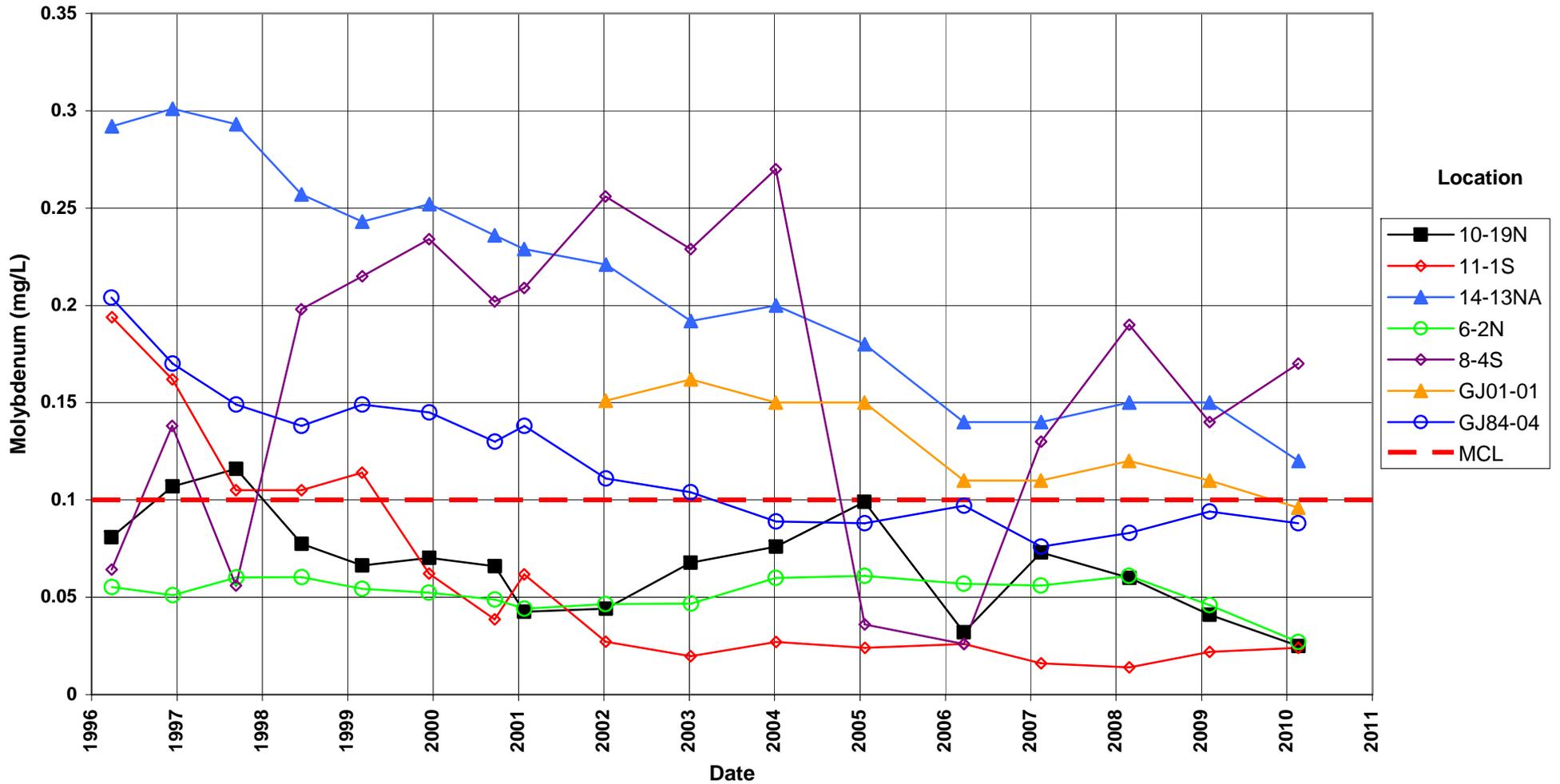
# **Time-Concentration Graphs Groundwater Locations**

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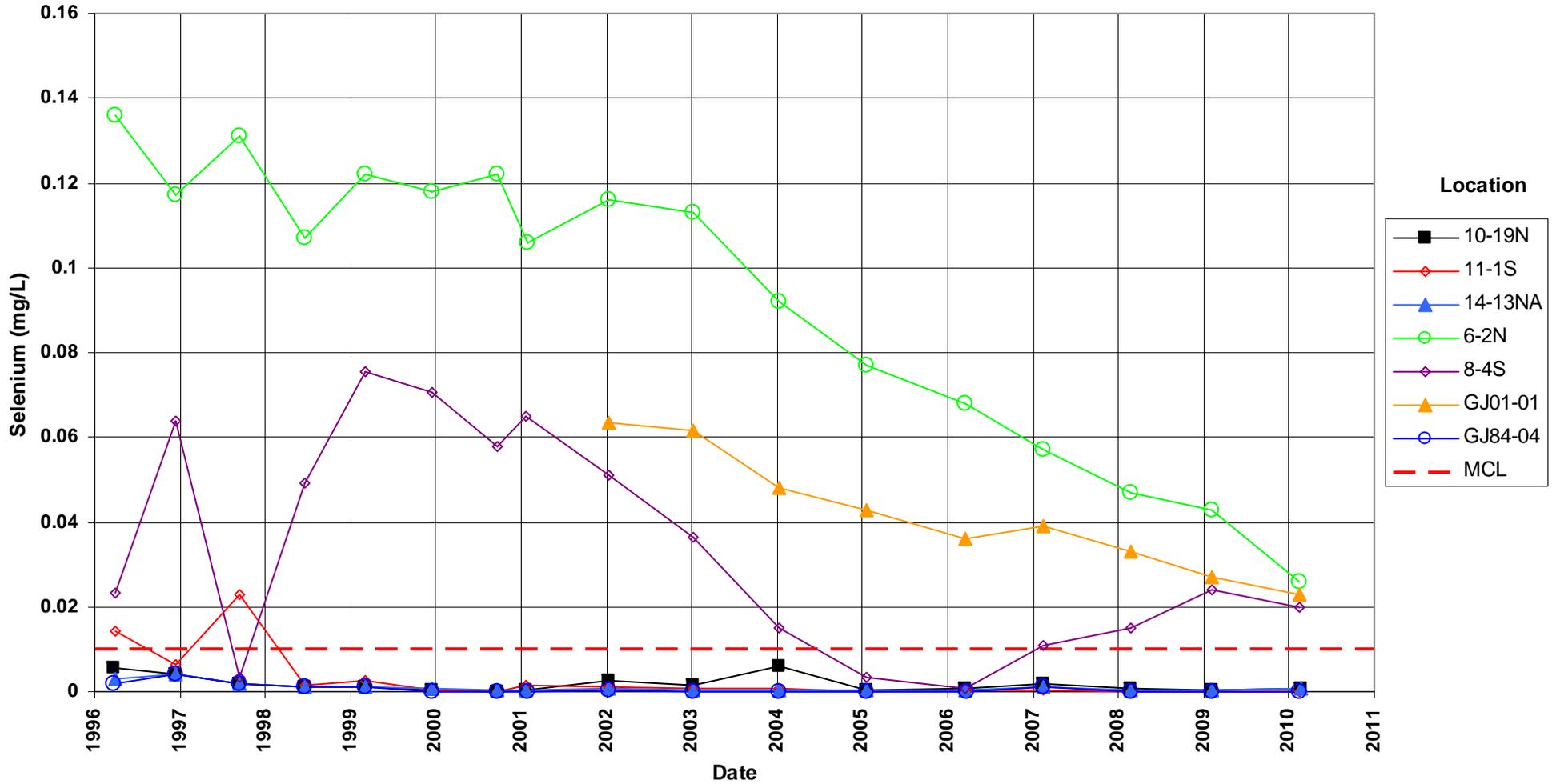
## Grand Junction Site Manganese Concentration



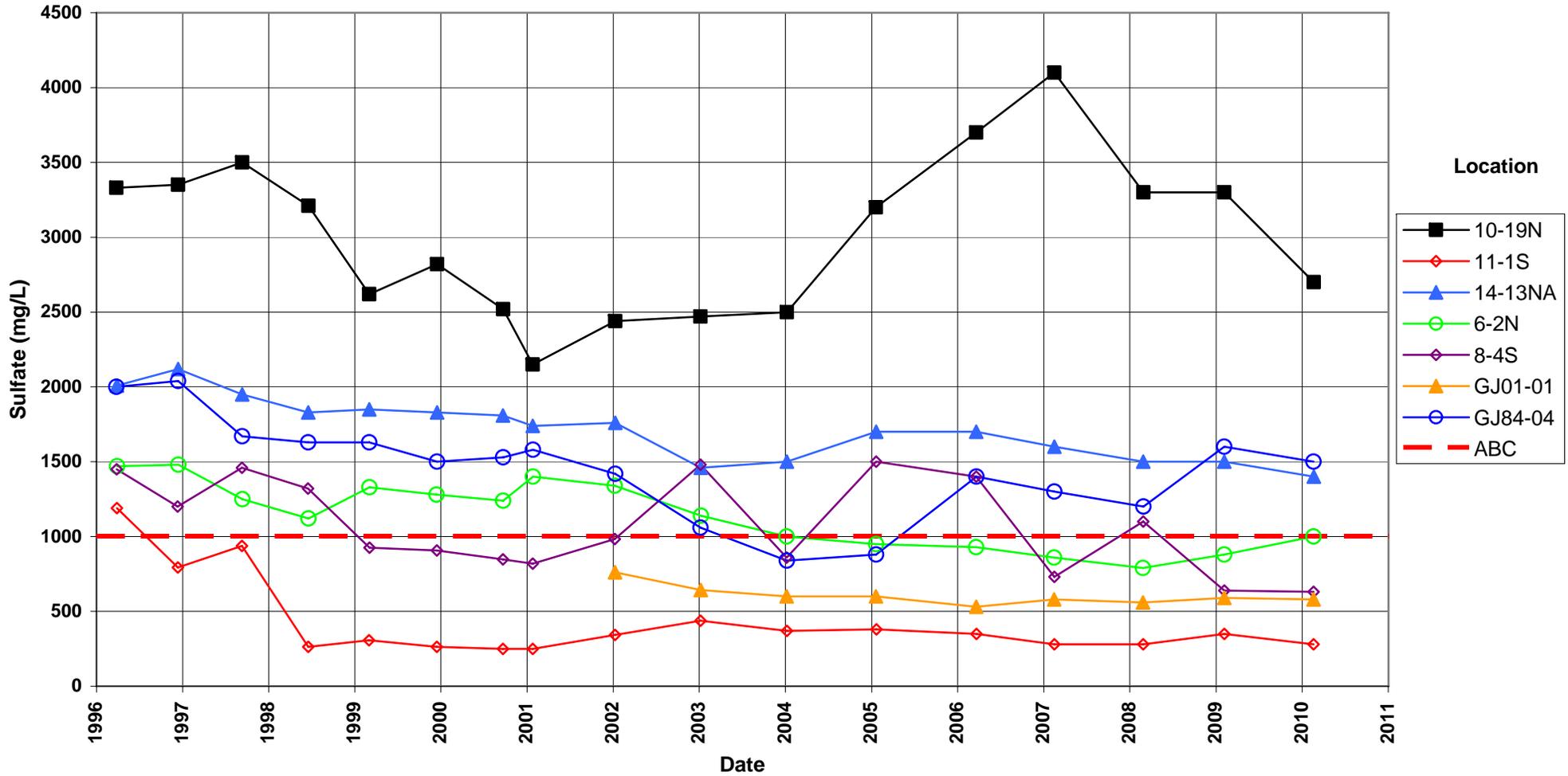
**Grand Junction Site  
Molybdenum Concentration  
Maximum Contaminant Level (MCL) = 0.1 mg/L**



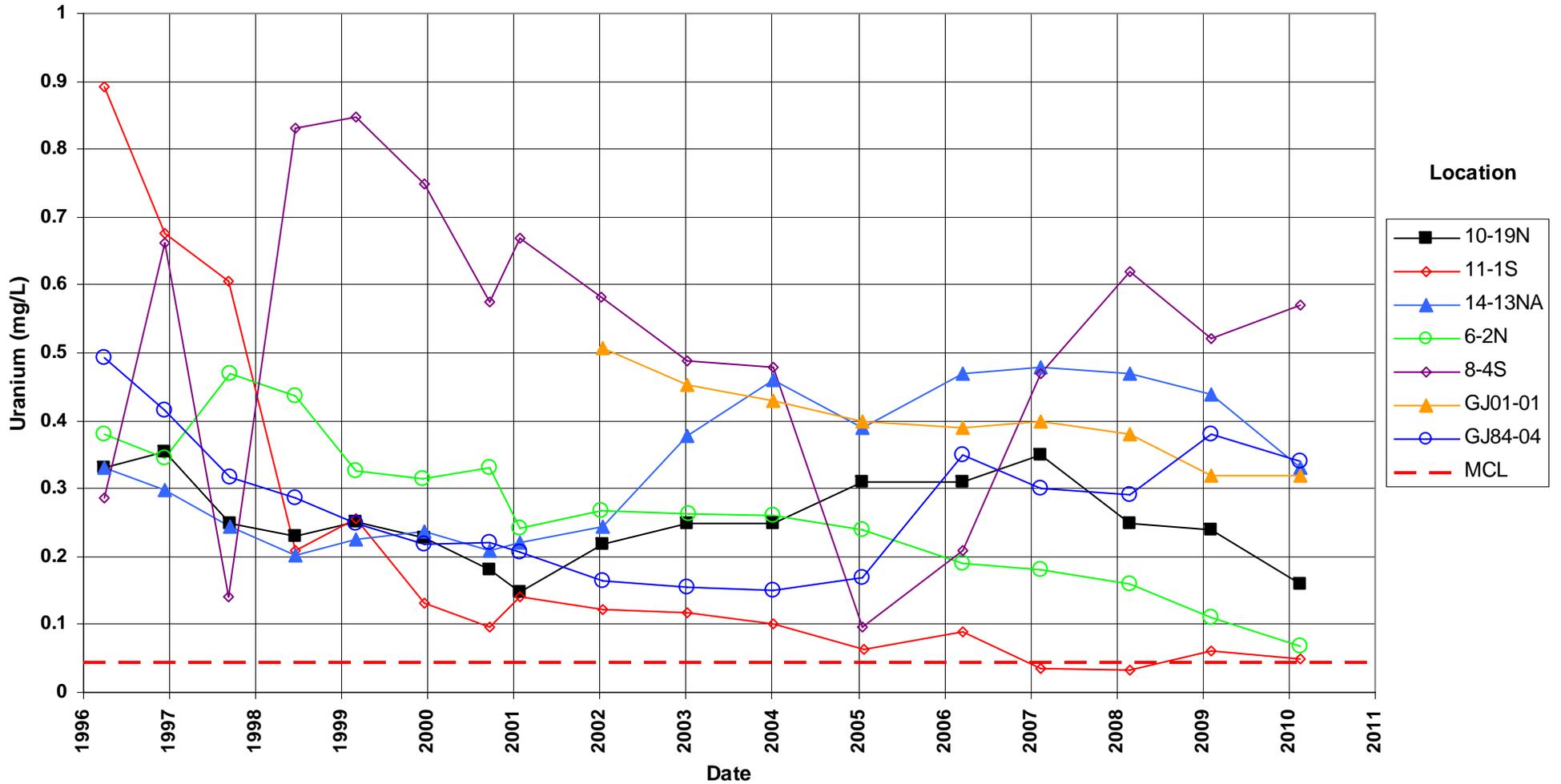
**Grand Junction Site  
Selenium Concentration  
Maximum Contaminant Level (MCL) = 0.01 mg/L**



**Grand Junction Site  
Sulfate Concentration**  
Average Background Concentration (ABC) in Background Wells = 1003 mg/L



**Grand Junction Site  
Uranium Concentration  
Maximum Contaminant Level (MCL) = 0.044 mg/L**

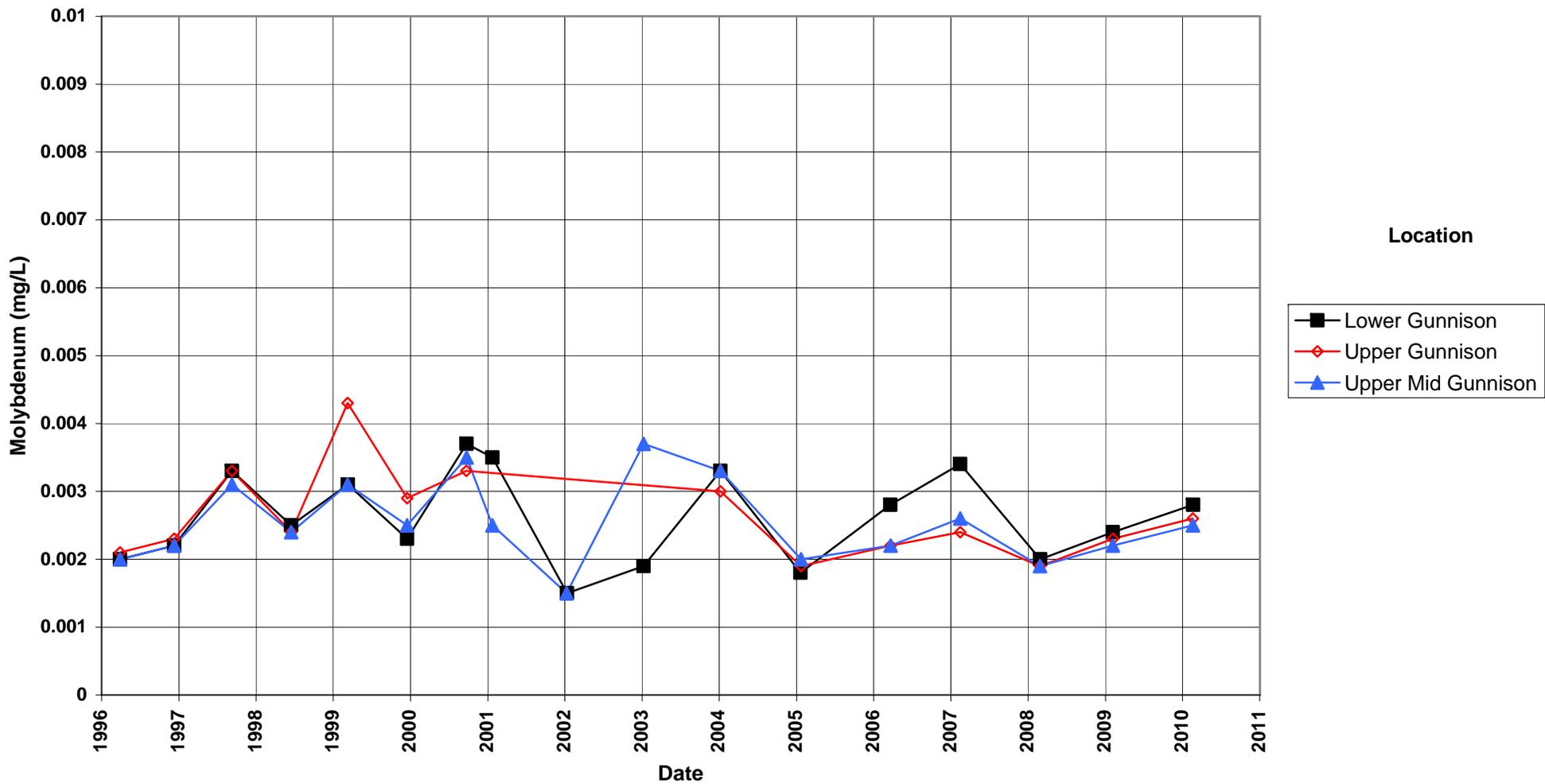


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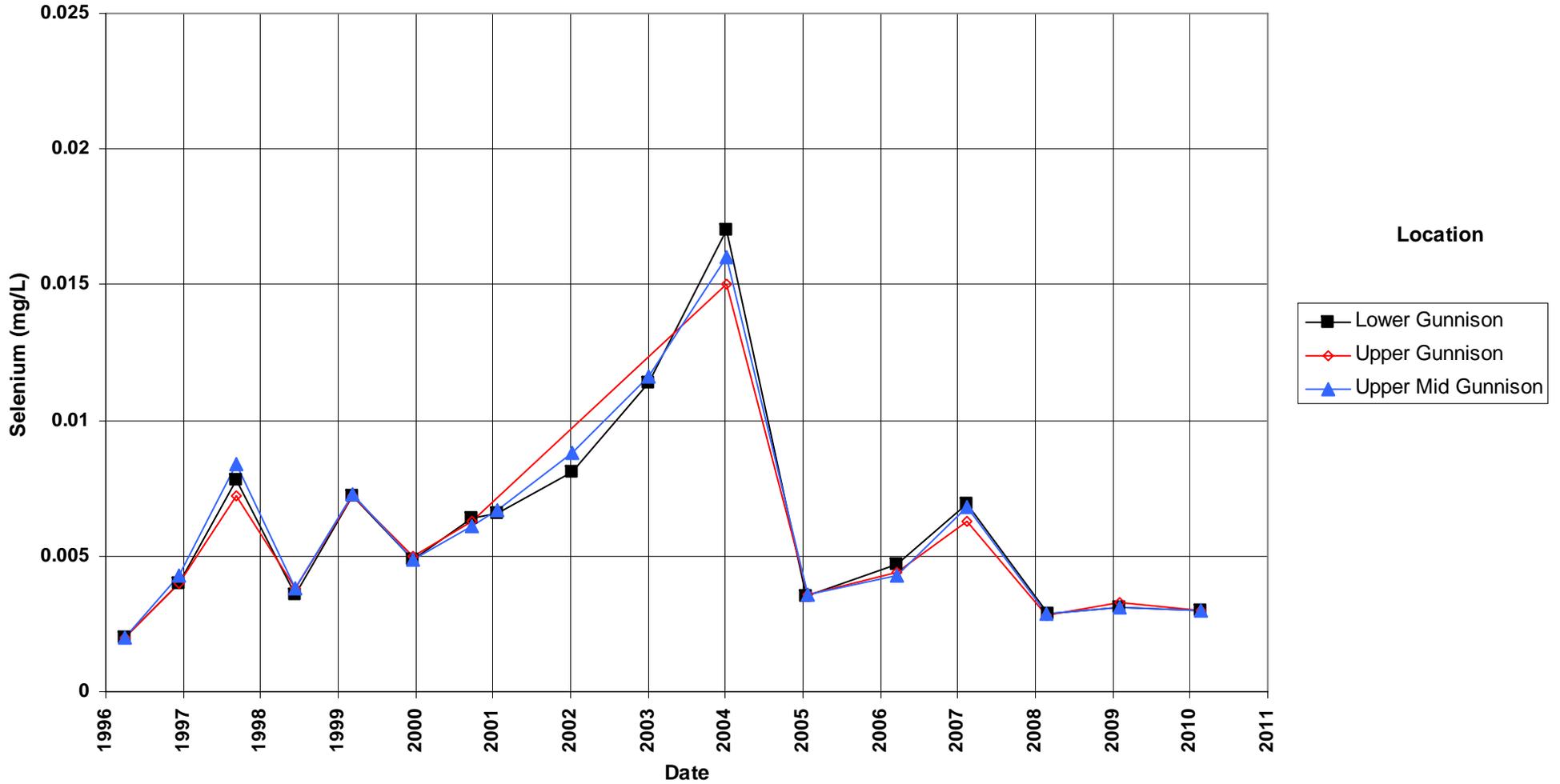
## **Time-Concentration Graphs Surface Water Locations**

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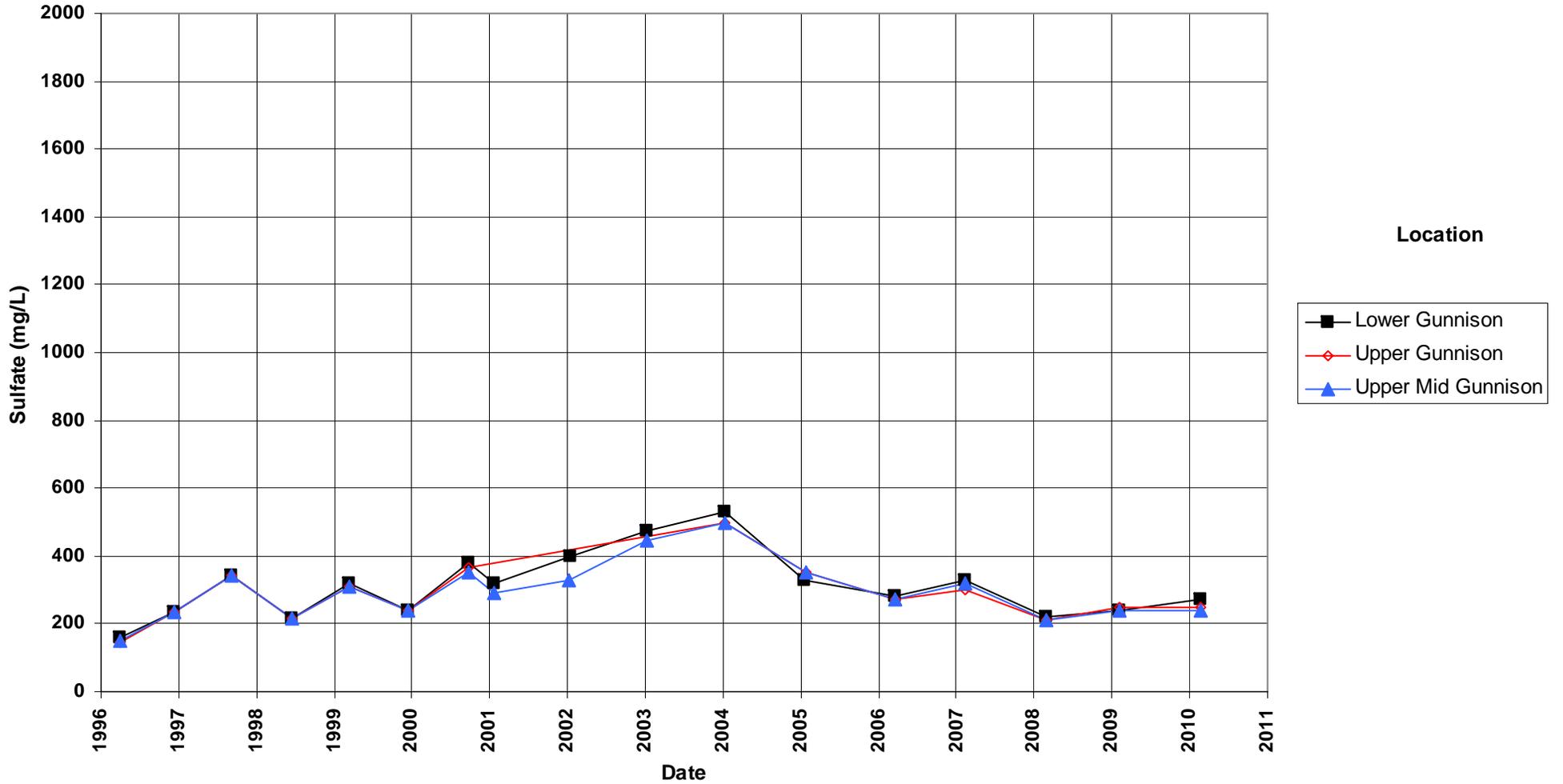
### Grand Junction Site Molybdenum Concentration River Locations



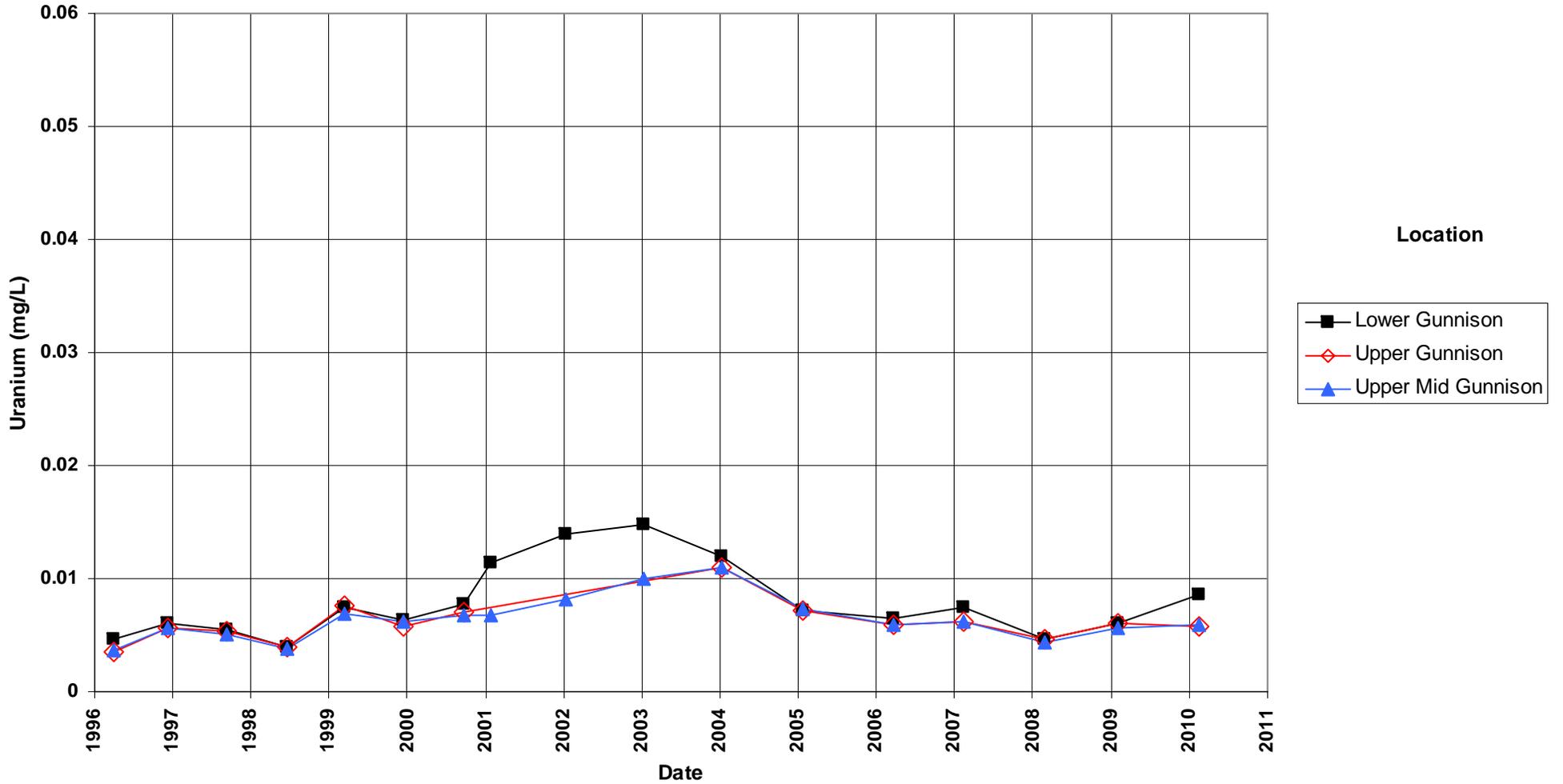
### Grand Junction Site Selenium Concentration River Locations



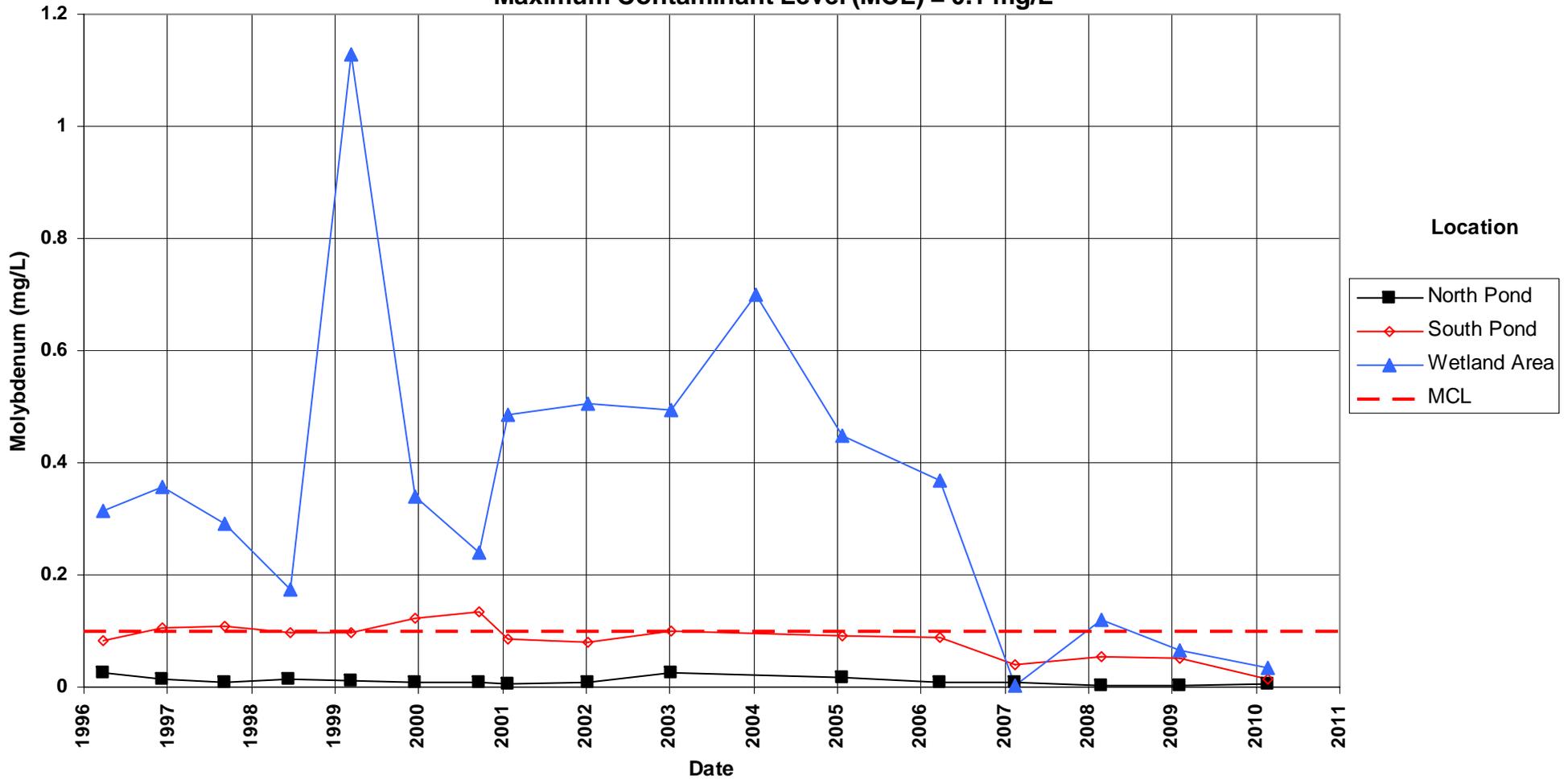
### Grand Junction Site Sulfate Concentration River Locations



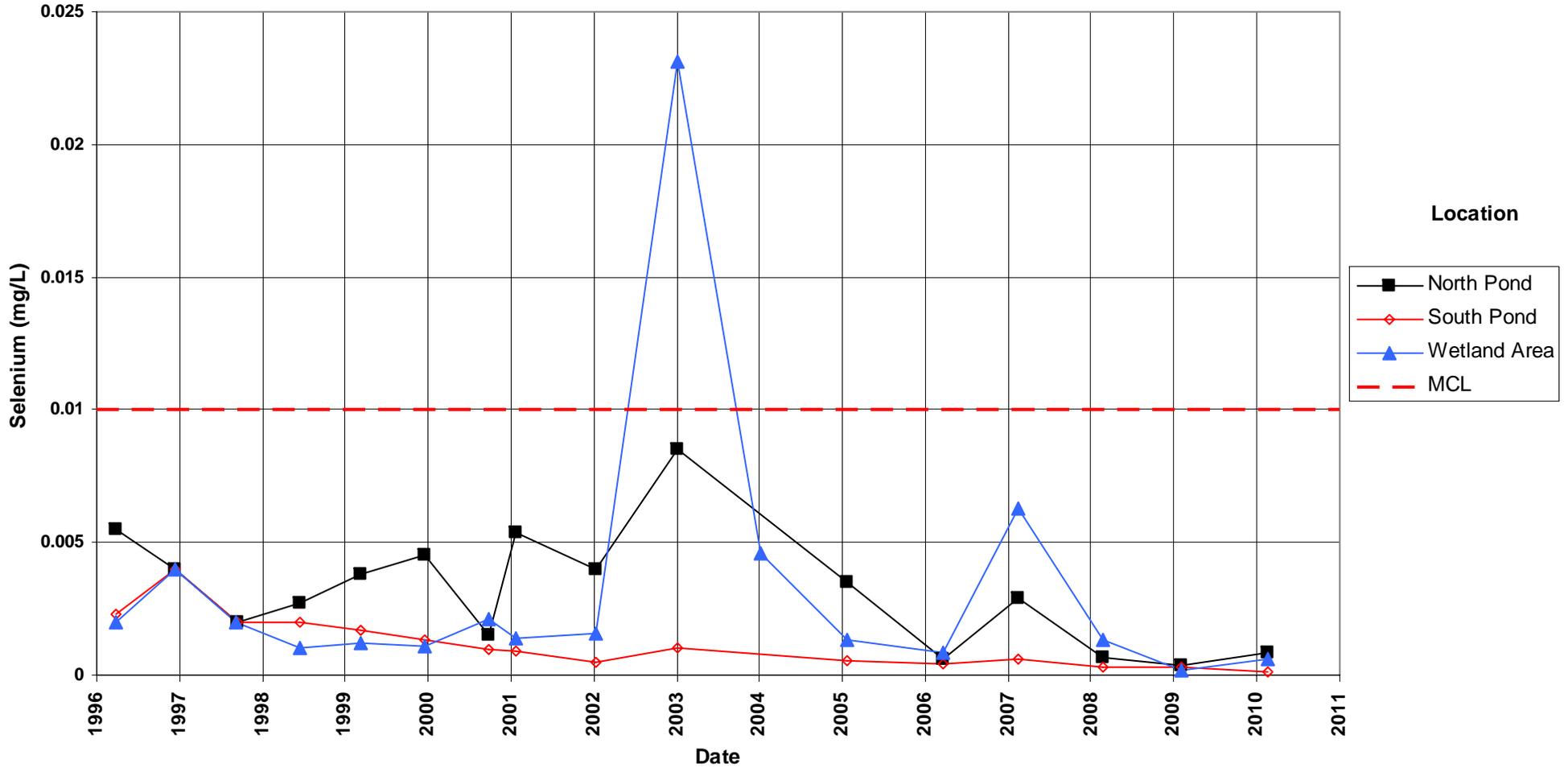
### Grand Junction Site Uranium Concentration River Locations



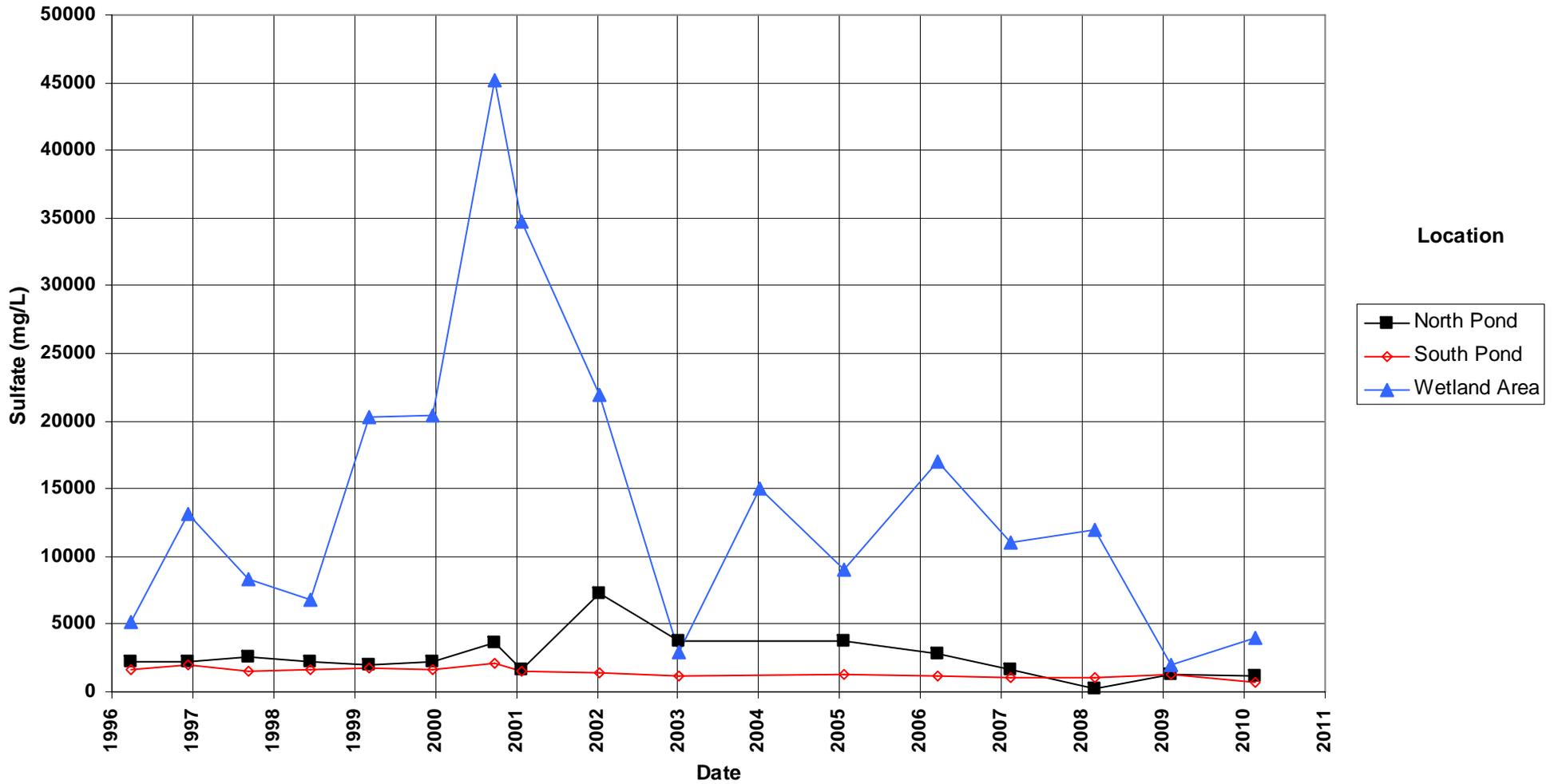
**Grand Junction Site  
Molybdenum Concentration  
Pond and Wetland Locations  
Maximum Contaminant Level (MCL) = 0.1 mg/L**



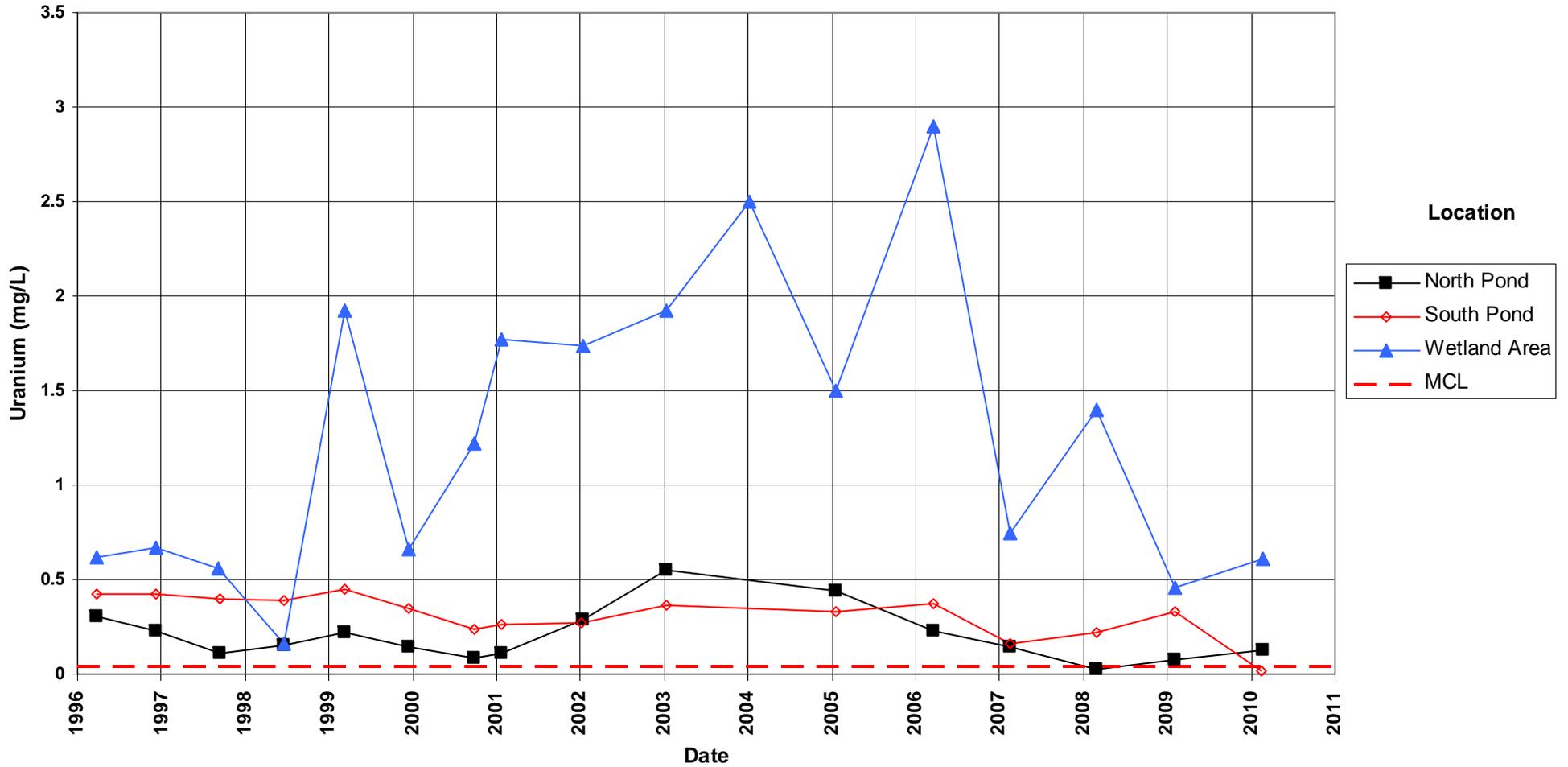
**Grand Junction Site  
Selenium Concentration  
Pond and Wetland Locations  
Maximum Contaminant Level (MCL) = 0.01 mg/L**



### Grand Junction Site Sulfate Concentration Pond and Wetland Locations

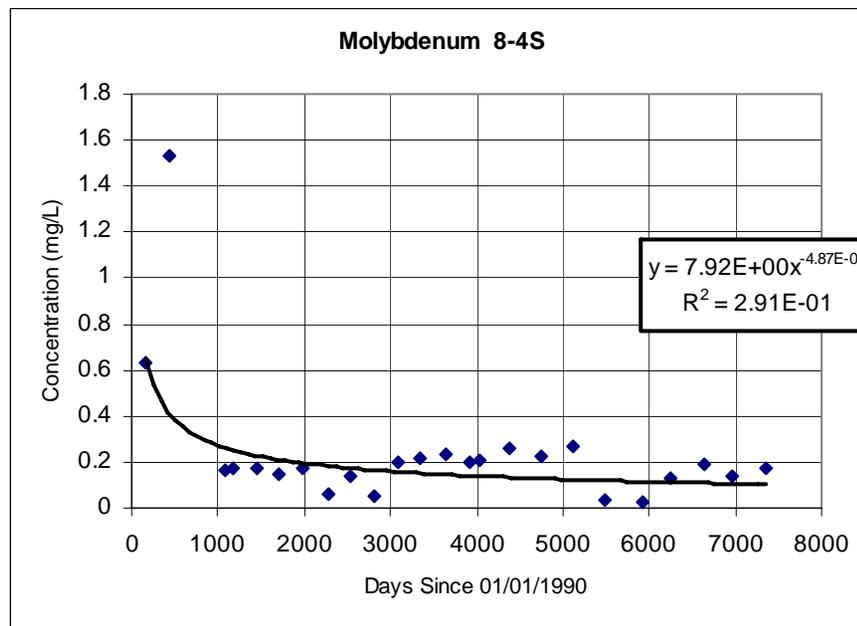
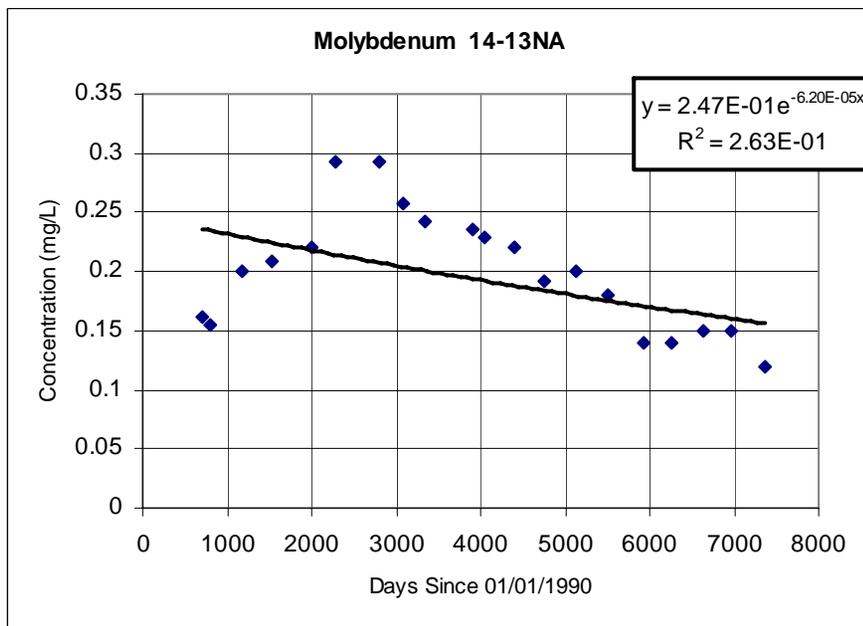
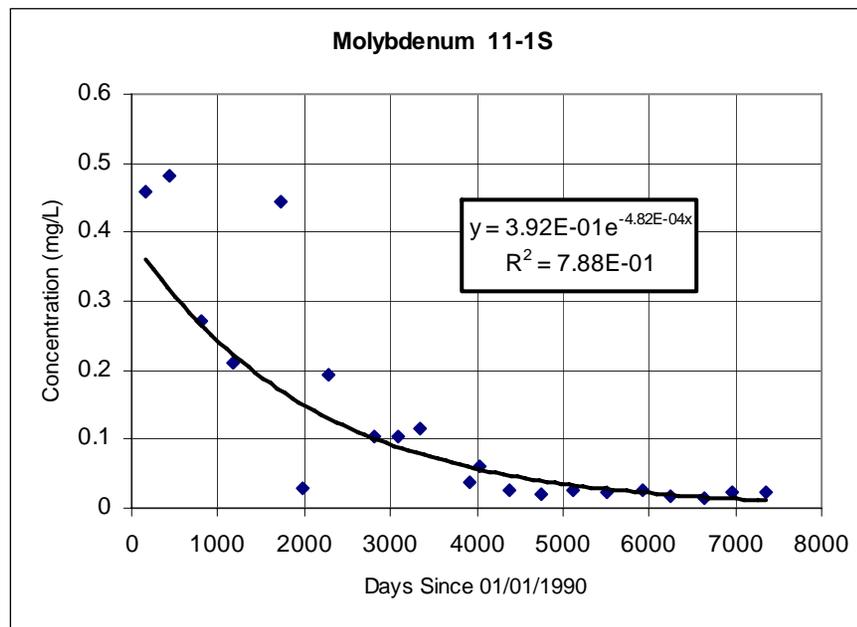
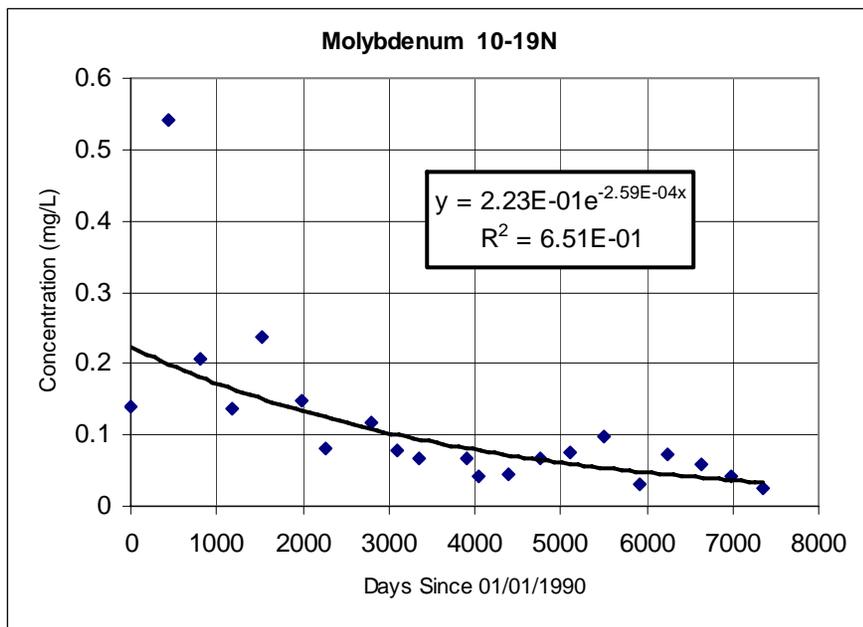


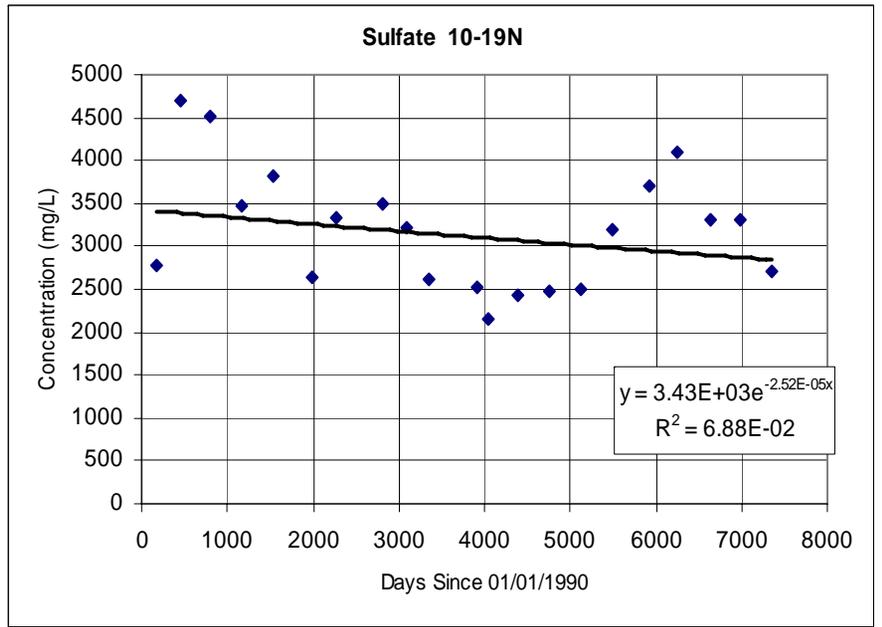
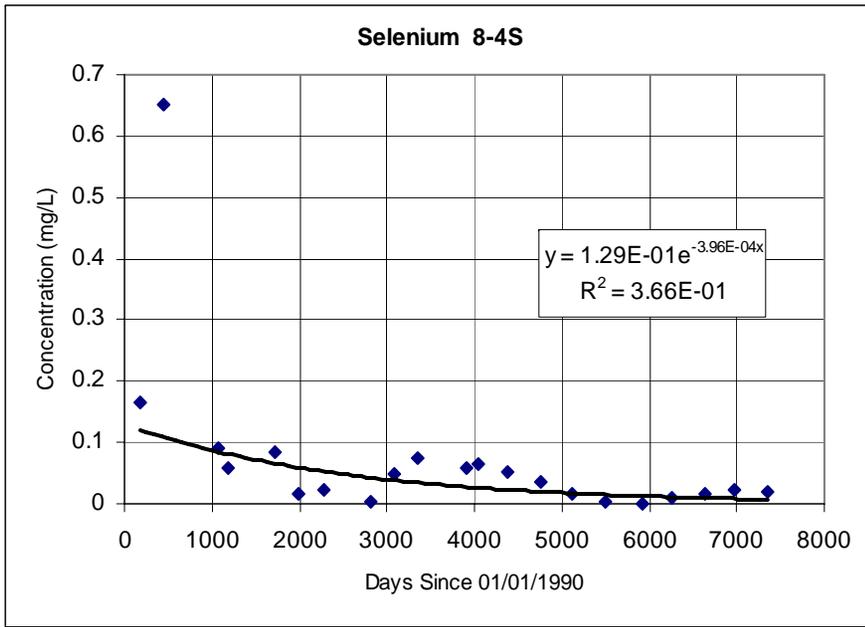
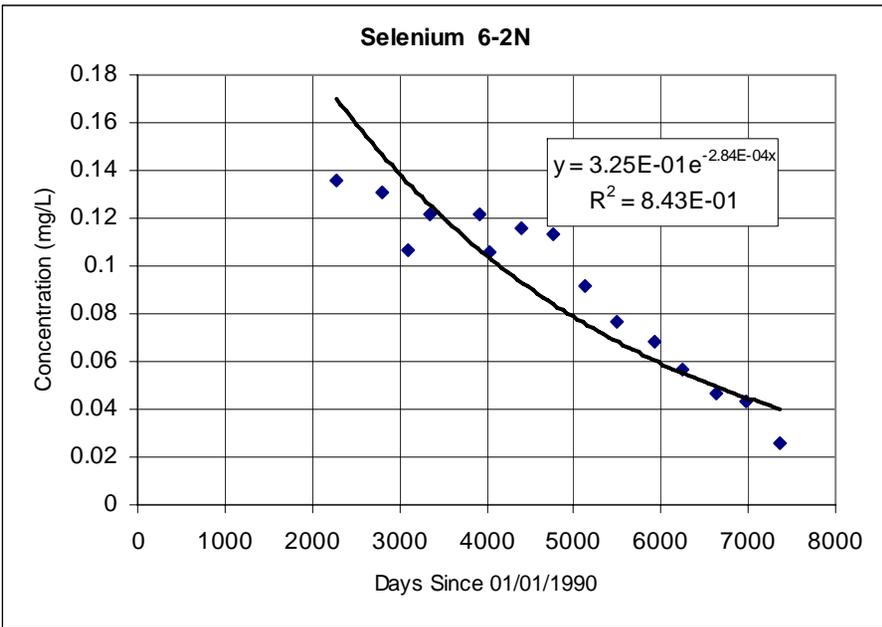
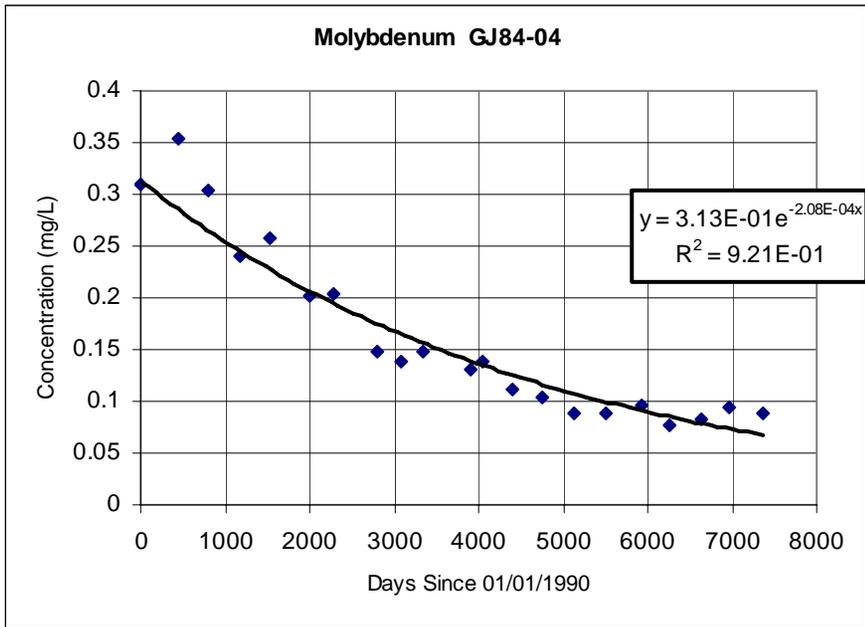
**Grand Junction Site  
Uranium Concentration  
Pond and Wetland Locations  
Maximum Contaminant Level (MCL) = 0.044 mg/L**

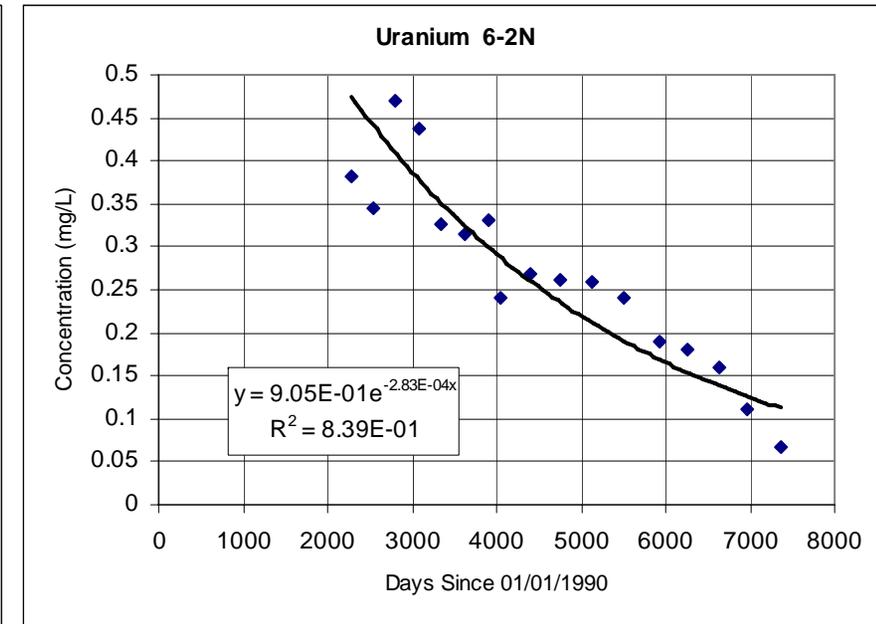
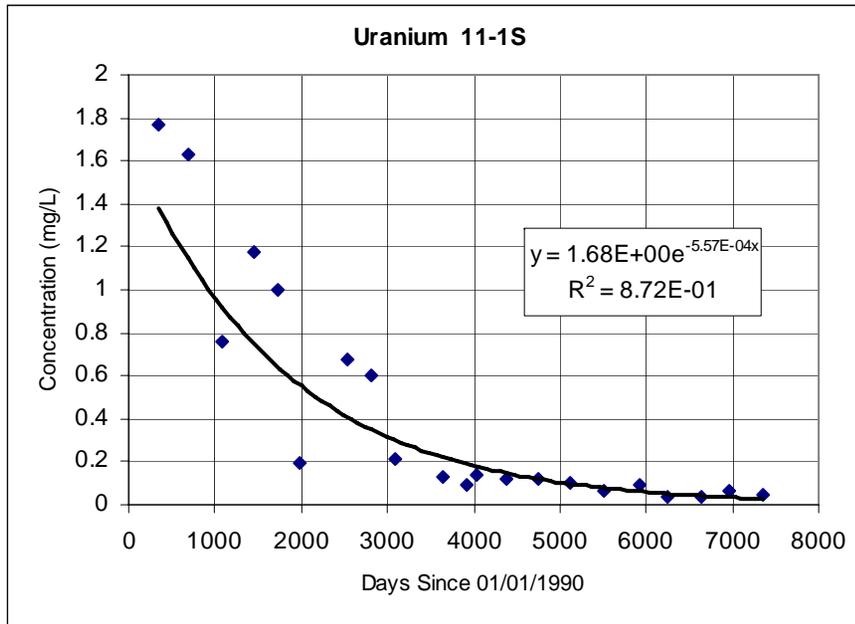
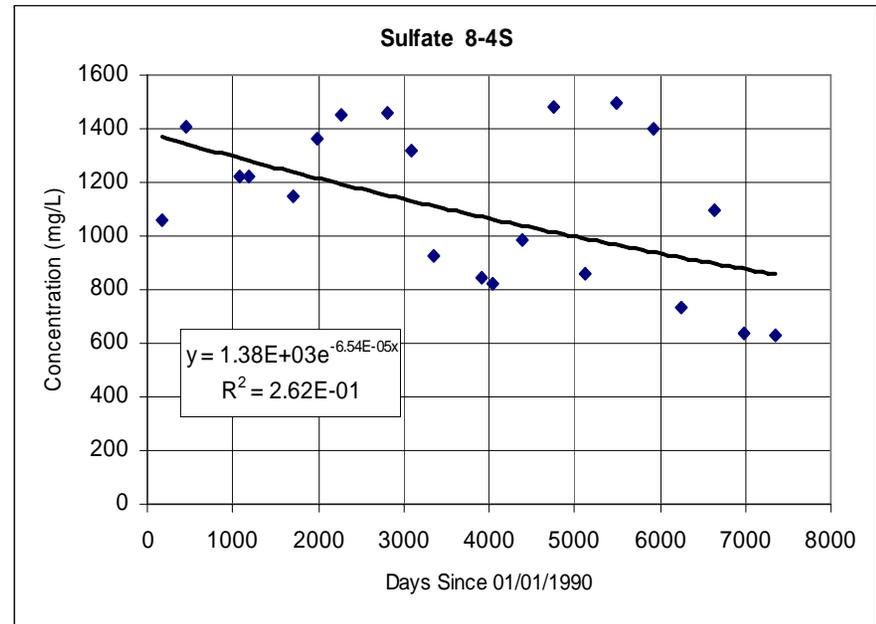
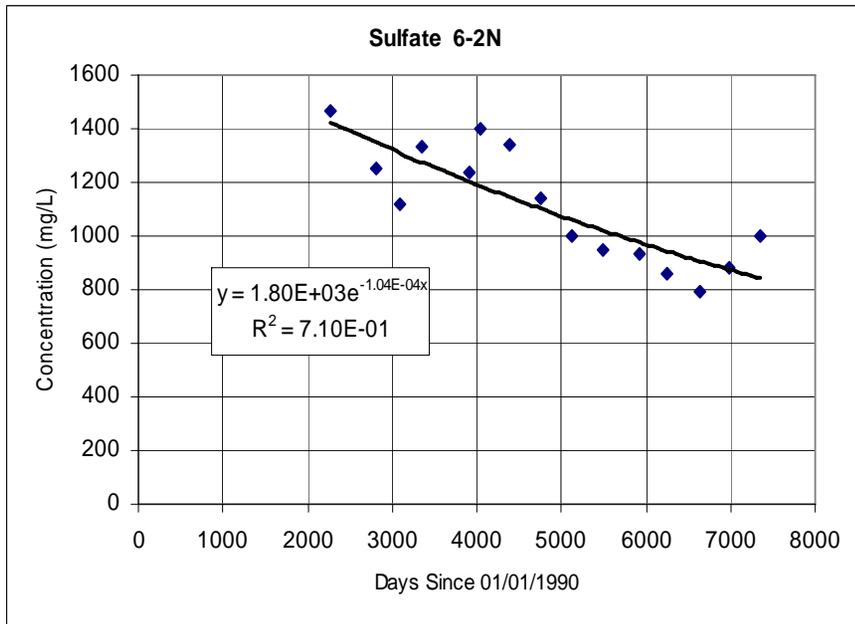


# **Trend Line Graphs**

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

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established 1959

Task Order LM00-501  
Control Number 10-0324

January 20, 2010

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

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller  
February 2010 Environmental Sampling at the Grand Junction, Colorado, Site

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

Dear Mr. Desormeau:

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 February 15, 2010.

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

**Monitor 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.

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

Sincerely,

Sam Campbell  
Site Lead

The S.M. Stoller Corporation      2597 B ¾ Road      Grand Junction, CO 81503      (970) 248-6000      Fax: (970) 248-6040

Joseph Desormeau  
Control Number 10-0324  
Page 2

SC/lcg/lb

Enclosures (3)

cc: (electronic)  
Cheri Bahrke, Stoller  
Sam Campbell, Stoller  
Steve Donovan, Stoller  
Bev Gallagher, Stoller  
Lauren Goodknight, Stoller  
Michele Miller, Stoller  
EDD Delivery  
rc-grand.junction

### Constituent Sampling Breakdown

Site	Grand Junction Office Facility		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
	Groundwater	Surface Water			
Analyte					
Approx. No. Samples/yr	7	6			
<b>Field Measurements</b>					
Alkalinity					
Dissolved Oxygen					
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X	X			
Temperature	X	X			
<b>Laboratory Measurements</b>					
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 (NO3+NO2)-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>	<b>5</b>	<b>4</b>			

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.

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# **Attachment 4 Trip Report**

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*Memorandum*

DATE: March 22, 2010

TO: Sam Campbell

FROM: David Atkinson

SUBJECT: Trip Report

**Site:** Grand Junction Office Site

**Dates of Sampling Event:** February 18 – 19, 2010

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

**Number of Locations Sampled:** 7 monitoring wells, 6 surface locations, 1 duplicate, and 1 equipment blank.

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

**Location Specific Information:** Monitoring well 10–19N was full of rust-colored debris.

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

False ID	True ID	Sample Type	Ticket Number
2310	8-4S	Groundwater	IDU 894
2311	Lower Gunnison	Equipment Blank	IDU 895

**RIN Number Assigned:** All samples were assigned to RIN 10022849.

**Sample Shipment:** Samples were shipped overnight via FedEx to ALS Laboratory Group, Fort Collins, CO, from Grand Junction, CO, on Monday February 22, 2010.

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

**Well Inspection Summary:** All wells appeared to be in nominal condition.

**Field Variance:** None.

**Equipment:** Samples were collected via dedicated tubing and a peristaltic pump. Surface water samples were collected using a peristaltic pump and a length of tubing on a hose reel and weight. All equipment functioned properly.

**Institutional Controls:**

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

**Signs:** Signs around the ponds were not inspected; they will be examined as a part of the site inspection.

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

**Site Issues:**

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

**Vegetation/Noxious Weed Concern:** None.

**Maintenance Requirements:** None.

**Access Issues:** None.

**Safety Issues:** None.

**Corrective Action Taken:** None.

DA/lcg

cc: (electronic)  
Joe Desormeau, DOE  
Cheri Bahrke, Stoller  
Steve Donovan, Stoller  
Michele Miller, Stoller  
EDD Delivery