

# Data Validation Package

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**January 2016  
Groundwater and Surface Water  
Sampling at the  
Grand Junction, Colorado,  
Processing Site**

**March 2016**



**U.S. DEPARTMENT OF  
ENERGY**

Legacy  
Management

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## **Attachment 1—Assessment of Anomalous Data**

Potential Outliers Report

## **Attachment 2—Data Presentation**

Groundwater Quality Data  
Surface Water Quality Data  
Equipment Blank Data  
Static Water Level Data  
Hydrograph  
Time-Concentration Graphs

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

## **Attachment 4—Trip Report**

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# Sampling Event Summary

**Site:** Grand Junction, Colorado, Processing Site

**Sampling Period:** January 5, 2016

As specified in the 1999 *Final Site Observational Work Plan for the UMTRA Project Site at Grand Junction, Colorado*, the groundwater compliance strategy for the Grand Junction Processing Site is no remediation and the application of supplemental standards based on limited-use of the groundwater. Supplemental standards are typically applied at locations where groundwater is classified as limited use (not a current or potential source of drinking water) because of widespread ambient contamination not related to milling activities. A limited groundwater monitoring program is conducted at the site with samples collected once every 5 years. Sampling at 5-year intervals will continue until all analytes are below their respective maximum concentration limits, within the range of background values, or until the monitoring program is modified.

The five monitoring wells listed on the Work Order letter (Attachment 3) were sampled at the Grand Junction, Colorado, Processing Site to monitor groundwater contaminants. Two nearby surface water locations were also sampled (see Trip Report, Attachment 4). Sampling and analyses were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated, <http://energy.gov/lm/downloads/sampling-and-analysis-plan-us-department-energy-office-legacy-management-sites>). Per DOE direction, groundwater and surface water samples were also analyzed for calcium, chloride, iron, manganese, magnesium, nitrate + nitrite as N, potassium, selenium, silica, sodium, strontium, sulfate, total organic carbon, and vanadium to provide additional water quality data. One duplicate sample was collected from location 1001. Water levels were measured at each sampled well.

Wells with analyte concentrations that exceeded U.S. Environmental Protection Agency groundwater standards are listed in Table 1.


*Table 1. Grand Junction Processing Site Locations that Exceed Standards*


Analyte	Standard, mg/L <sup>a</sup>	Location	Concentration, mg/L
Molybdenum	0.1	1001	0.17
		1014	0.14
		1036	0.13
Nitrate/Nitrite-N	10	0748	15
		1001	16
Selenium	0.01	0748	0.17
		1001	0.065
		1014	0.012
Uranium	0.044	0590	0.13
		0748	0.045
		1001	0.37
		1014	2.3
		1036	2.3

<sup>a</sup> Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.

Where there are sufficient data (molybdenum, ammonia-N, uranium) concentrations are shown in the time-concentration plots that are included in the data presentation section.

The results from surface water location 2016, which is downstream from the site on the Colorado River, were compared to the results from location 2015, which is upstream from the site. The nearly identical results for the two locations indicate negligible impact to Colorado River water quality.

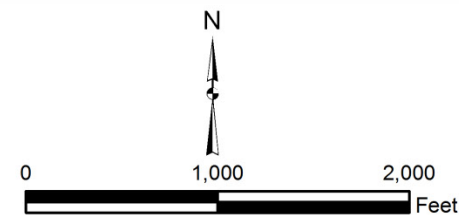
  
\_\_\_\_\_  
Gary Baur, Site Lead  
Navarro Research and Engineering, Inc.

  
\_\_\_\_\_  
Date



**Legend**

- WELL TO BE SAMPLED
- SURFACE LOCATION TO BE SAMPLED
- - - SITE BOUNDARY



U.S. DEPARTMENT OF ENERGY OFFICE OF LEGACY MANAGEMENT	Work Performed by <b>Navarro Research &amp; Engineering, Inc.</b> <small>Under DOE Contract Number DE-LM0000421</small>
<b>Planned Sampling Map</b> Grand Junction, CO, Processing Site January 2016	
<small>DATE PREPARED:</small> December 29, 2015	<small>FILE NAME:</small> S1358800-11x17

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*Grand Junction, Colorado, Processing Site Sample Location Map*

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# **Data Assessment Summary**

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### Water Sampling Field Activities Verification Checklist

<b>Project</b>	Grand Junction, Colorado	<b>Date(s) of Water Sampling</b>	January 5, 2016
<b>Date(s) of Verification</b>	March 1, 2016	<b>Name of Verifier</b>	Stephen Donovan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?  List any Program Directives or other documents, SOPs, instructions.	Yes	Work Order letter dated December 1, 2015.
2. Were the sampling locations specified in the planning documents sampled?	No	Surface water locations 2015 and 2016 replaced locations 0423 and 0427.
3. Were field equipment calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed on December 30, 2015.
4. Was an operational check of the field equipment conducted daily?  Did the operational checks meet criteria?	Yes	Yes
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	
7. Were the following conditions met when purging a Category I well:  Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

### 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 monitoring wells were Category I.
Was one pump/tubing volume removed prior to sampling?		
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected at location 1001.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	Yes	One equipment blank was collected.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	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. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	

## Laboratory Performance Assessment

### General Information

Report Numbers (RINs): 15127576  
 Sample Event: January 5, 2016  
 Site(s): Grand Junction, Colorado, Processing Site  
 Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
 Work Order No.: 1601045  
 Analysis: Metals and Wet Chemistry  
 Validator: Stephen Donovan  
 Review Date: March 1, 2016

This validation was performed according to the *Environmental Procedures Catalog* (LMS/POL/S04325, continually updated), “Standard Practice for Validation of Environmental Data.” The procedure was applied at Level 3, Data Validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 2.

*Table 2. Analytes and Methods*

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as Nitrogen	WCH-A-005	EPA 350.1	EPA 350.1
Chloride, Sulfate	MIS-A-045	SW-856 9056	SW-856 9056
Nitrate + Nitrite as Nitrogen	WCH-A-022	EPA 353.2	EPA 353.2
Metals: Ca, Fe, K, Mg, Mn, Na, SiO <sub>2</sub> , Sr	LMM-01	SW-846 3005A	SW-846 6010
Metals: Mo, Se, U, V	LMM-02	SW-846 3005A	SW-846 6020
Total Dissolved Solids (TDS)	WCH-A-033	EPA 160.1	EPA 160.1
Total Organic Carbon (TOC)	WCH-A-025	EPA 415.1	EPA 415.1

### Data Qualifier Summary

Analytical results were qualified as listed in Table 3. Refer to the sections below for an explanation of the data qualifiers applied.

*Table 3. Data Qualifier Summary*

Sample Number	Location	Analyte	Flag	Reason
All	All	TDS	J	Missed holding time
1601045-6	2015	Iron	U	Less than 5 times the calibration blank
1601045-6	2015	Selenium	J	Equipment blank result
1601045-6	2015	Vanadium	U	Less than 5 times the calibration blank
1601045-7	2016	Iron	U	Less than 5 times the calibration blank
1601045-7	2016	Selenium	J	Equipment blank result

Table 3 (continued). Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1601045-7	2016	Vanadium	U	Less than 5 times the calibration blank
1601045-9	Equipment Blank	Calcium	U	Less than 5 times the calibration blank
1601045-9	Equipment Blank	Manganese	U	Less than 5 times the calibration blank
1601045-9	Equipment Blank	Vanadium	U	Less than 5 times the calibration blank

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received nine water samples on January 7, 2016, accompanied by a Chain of Custody form. Copies of the air bills were included in the receiving documentation. The Chain of Custody was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody was complete with no errors or omissions.

### Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 1.6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times with the following exception. The TDS analyses were performed out of holding time due to an analyst error. The sample TDS results are qualified with a “J” flag as estimated values.

### 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 EPA 350.1, Ammonia as Nitrogen*

Calibrations were performed using six calibration standards on January 12, 2016. 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 with all calibration checks meeting the acceptance criteria.

*Method EPA 353.2, Nitrate + Nitrite as Nitrogen*

Calibrations were performed using seven calibration standards on January 8, 2016. 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 with all calibration checks meeting the acceptance criteria.

*Method EPA 415.1, Total Organic Carbon*

Calibrations were performed using six calibration standards on June 11, 2015. 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 with all calibration checks meeting the acceptance criteria.

*Method SW-846 6010, Metals*

Calibrations were performed on January 11, 2016, using three 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 with all calibration checks meeting 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 6020, Metals*

Calibrations were performed on January 11, 2016 using four 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 with all calibration checks meeting 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, Chloride, Sulfate*

Calibrations were performed using six calibration standards on January 4, 2016. 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 with all calibration checks meeting the acceptance criteria.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and

during sample analysis. All method, initial calibration, and continuing calibration blank (CCB) results associated with the samples were below the practical quantitation limits 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 Interference Check Sample Analysis

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

#### Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated.

#### Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. All replicate results met these criteria demonstrating 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 50 times the MDL. All evaluated serial dilution data were acceptable.

#### Completeness

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



## Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. All peak integrations were satisfactory.

## Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter (meq/L). Table 4 shows the total anion and cation results in the samples from this event and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference less than or equal to 10 percent is considered acceptable.

*Table 4. Comparison of Major Anions and Cations*

Location	Location Type	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
0590	Groundwater	99.82	101.97	1.06
0748	Groundwater	76.98	75.88	0.72
1001	Groundwater	103.33	106.29	1.41
1014	Groundwater	106.86	110.50	1.67
1036	Groundwater	98.96	56.41	6.55 (27.38)
2015	Surface Water	14.05	14.47	1.47
2016	Surface Water	13.82	14.50	2.40

Sample 1036 originally had a charge balance of 27.4 percent, leading to the identification of a laboratory error. Reanalysis of sample 1036 for chloride and sulfate was requested on March 1, 2016. The charge balance calculated using the results of the reanalysis was an acceptable 6.55 percent.

## Electronic Data Deliverable (EDD) File

The revised EDD file with correction to the errors identified by the charge balance calculations arrived on March 4, 2016. 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 that 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: 15127576    Lab Code: PAR    Validator: Stephen Donovan    Validation Date: 02/29/2016  
Project: Grand Junction Disp/Proc Sites    Analysis Type:  Metals     General Chem     Rad     Organics  
# of Samples: 9    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

There are 9 holding time failures.

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**

RIN: 15127576      Lab Code: PAR

**Non-Compliance Report: Holding Times**

Project: Grand Junction Disp/Proc Sites

Validation Date: 02/29/2016

Ticket	Location	Lab Sample ID	Method Code	Holding Times			Criteria			Reported Dates		
				Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection to Preparation	Preparation to Analysis	Collection to Analysis	Collection Date	Preparation Date	Analysis Date
NNS 247	0590	1601045-1	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 248	0748	1601045-2	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 249	1001	1601045-3	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 250	1014	1601045-4	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 251	1036	1601045-5	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 253	2016	1601045-7	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 254	2816	1601045-8	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
NNS 255	2817	1601045-9	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016
OCS 608	2015	1601045-6	WCH-A-033		8			7		01/05/2016	01/13/2016	01/14/2016

**SAMPLE MANAGEMENT SYSTEM**  
**Metals Data Validation Worksheet**

RIN: 15127576      Lab Code: PAR      Date Due: 02/04/2016  
 Matrix: Water      Site Code: GRJ03      Date Completed: 01/21/2016

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	CCV	CCB								
Calcium	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	101.0	97.0	94.0	1.0	96.0	2.0	104.0
Iron	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	99.0	99.0	100.0	1.0	97.0		94.0
Magnesium	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	102.0	100.0	101.0	0.0	98.0	0.0	104.0
Manganese	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	102.0	103.0	105.0	2.0	101.0	1.0	98.0
Molybdenum	ICP/MS	01/12/2016	0.0000	1.0000	OK	OK	OK	94.0	101.0	98.0	2.0	102.0		86.0
Potassium	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	101.0	104.0	106.0	2.0		1.0	93.0
Selenium	ICP/MS	01/12/2016	0.0000	1.0000	OK	OK	OK	108.0	98.0	98.0	1.0	105.0		86.0
Silicon	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	101.0	92.0	96.0	1.0	101.0	5.0	111.0
Sodium	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	103.0	82.0	105.0	4.0		3.0	91.0
Strontium	ICP/ES	01/11/2016	0.0000	1.0000	OK	OK	OK	106.0	99.0	103.0	1.0	104.0	0.0	102.0
Uranium	ICP/MS	01/12/2016	0.0000	1.0000	OK	OK	OK	100.0	98.0	100.0	1.0	101.0	1.0	90.0
Vanadium	ICP/MS	01/12/2016	0.0000	1.0000	OK	OK	OK	103.0	109.0	106.0	3.0	105.0		84.0

**SAMPLE MANAGEMENT SYSTEM**  
**Wet Chemistry Data Validation Worksheet**

**RIN:** 15127576      **Lab Code:** PAR      **Date Due:** 02/04/2016  
**Matrix:** Water      **Site Code:** GRJ03      **Date Completed:** 01/21/2016

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
AMMONIA AS N	01/12/2016	0.000	0.9997	OK	OK	OK	99.00	115.0	121.0	5.00	
CHLORIDE	01/08/2016	0.000	1.0000	OK	OK	OK	98.00	114.0	110.0	1.00	
Nitrate+Nitrite as N	01/08/2016	0.000	1.0000	OK	OK	OK	94.00	102.0	101.0	1.00	
SULFATE	01/08/2016	0.000	0.9998	OK	OK	OK	96.00	112.0	108.0	2.00	
TOTAL DISSOLVED SOLIDS	01/14/2016					OK	86.00			1.00	
Total Organic Carbon	01/11/2016	0.000	0.9998	OK	OK	OK	104.00	94.0	94.0	0	
Total Organic Carbon	01/11/2016							118.0	118.0	1.00	

## **Sampling Quality Control Assessment**

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

### Sampling Protocol

Surface water locations 2015 and 2016 were sampled using a peristaltic pump and hose reel. All monitoring wells were sampled with a peristaltic pump and dedicated tubing. Sample results from these wells were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

### Equipment Blank Assessment

An equipment blank (field ID 2817) was collected after decontamination of the hose reel used to collect the surface water samples. Potassium, selenium, and sodium were detected in this blank at concentrations below the PQLs. The associated sample selenium results that are greater than the MDL but less than 5 times the blank concentration are qualified with a “J” flag as estimated values. Sample potassium and sodium results were greater than 10 times the blank concentration, not requiring qualification. The equipment blank results indicate adequate decontamination of the sampling equipment.

### Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 1001. The duplicate results met the criteria, demonstrating acceptable overall precision.

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

RIN: 15127576    Lab Code: PAR    Project: Grand Junction Disp/Proc Sites    Validation Date: 02/29/2016

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1601045-9	SW6010	Potassium	90	J	52	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1601045-6	OCS 608	2015	5000	1		
1601045-7	NNS 253	2016	5100	1		

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1601045-9	SW6010	Sodium	98	J	47	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1601045-6	OCS 608	2015	170000	1		
1601045-7	NNS 253	2016	170000	1		

Blank Data							
Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1601045-9	SW6020	Selenium	0.55	J	0.32	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1601045-6	OCS 608	2015	2	10		J
1601045-7	NNS 253	2016	1.2	10		J

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

RIN: 15127576    Lab Code: PAR    Project: Grand Junction Disp/Proc Sites    Validation Date: 02/29/2016

Duplicate: 2816

Sample: 1001

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIAAS N	6.9			10	9.4			10	30.67		MG/L
Calcium	570000			5	560000			5	1.77		UG/L
CHLORIDE	940			100	940			100	0		MG/L
Iron	240	J		5	220	J		5	8.70		UG/L
Magnesium	410000			5	400000			5	2.47		UG/L
Manganese	2500			5	2400			5	4.08		UG/L
Molybdenum	170			10	160			10	6.06		UG/L
Nitrate+Nitrite as N	16			50	16			50	0		MG/L
Potassium	36000			5	34000			5	5.71		UG/L
Selenium	65			10	78			10	18.18		UG/L
Silica	23000			5	22000			5	4.44		UG/L
Silicon	11000			5	10000			5	9.52		UG/L
Sodium	910000			5	890000			5	2.22		UG/L
Strontium	7400			5	7200			5	2.74		UG/L
SULFATE	3500			100	3500			100	0		MG/L
TOTAL DISSOLVED SOLIDS	6300			1	6300			1	0		MG/L
Total Organic Carbon	7			1	6.8			1	2.90		MG/L
Uranium	370			10	370			10	0		UG/L
Vanadium	180			10	220			10	20.00		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: Stephen Donovan 3-17-2016  
Stephen Donovan Date

Data Validation Lead: Stephen Donovan 3-17-2016  
Stephen Donovan 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 can result from transcription errors, data-coding errors, or measurement system problems. However, outliers can also represent true extreme values of a distribution and can 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.** Do this by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made as to whether the data are normally distributed using the Shapiro-Wilk Test.
2. **Apply the appropriate statistical test.** Dixon's Test for extreme values is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. **Scientifically review statistical outliers and decide on their disposition.** The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

Two laboratory results for location 1001 and two for location 1014 were identified as potentially anomalous. All data associated with these results were reviewed in detail with no errors noted. Location 1001 was sampled in duplicate with good agreement between the sample and duplicate results, confirming the reported manganese and selenium results are not erroneous. The charge balance results indicate that the reported results for location 1014 are acceptable. The laboratory results for this RIN are acceptable as qualified.

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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 15127576

Report Date: 03/01/2016

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
GRJ01	0590	N001	01/05/2016	Manganese	0.310		F	2.84			1.22			16	0	No
GRJ01	0590	N001	01/05/2016	Total Organic Carbon	5.80		F	159			9.00		J	9	0	NA
GRJ01	1001	N001	01/05/2016	Ammonia Total as N	6.90		F	70.0	B	F	33.0		F	6	0	No
GRJ01	1001	0001	01/05/2016	Chloride	940		F	866			680			6	0	No
GRJ01	1001	N001	01/05/2016	Iron	0.240	J	F	10.3			3.27			6	0	No
GRJ01	1001	N001	01/05/2016	Magnesium	410		F	368			305			6	0	No
GRJ01	1001	N001	01/05/2016	Manganese	2.50		F	4.54			4.30			6	0	Yes
GRJ01	1001	N001	01/05/2016	Selenium	0.0650		F	0.0130			0.001		U	6	2	Yes
GRJ01	1001	N001	01/05/2016	Sodium	910		F	878			781			6	0	No
GRJ01	1014	0001	01/05/2016	Chloride	1100		F	895			836			5	0	Yes
GRJ01	1014	N001	01/05/2016	Iron	0.220	J	F	3.08			1.94			5	0	No
GRJ01	1014	N001	01/05/2016	Manganese	1.90		F	3.29			2.81			5	0	Yes
GRJ01	1014	N001	01/05/2016	Molybdenum	0.140		F	0.440		F	0.246			18	0	NA
GRJ01	1014	N001	01/05/2016	Potassium	24.0		F	38.2	E	J	32.0			5	0	No
GRJ01	1014	N001	01/05/2016	Selenium	0.0120		F	0.00800			0.00430		B	5	0	No
GRJ01	1014	N001	01/05/2016	Sodium	1000		F	972			847			5	0	No
GRJ01	1014	0001	01/05/2016	Sulfate	3400		F	4010			3580			5	0	No
GRJ01	1014	0001	01/05/2016	Total Dissolved Solids	6300		F	8010		F	6800			16	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.

NA: Data are not normally or lognormally distributed.

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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 GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 0590 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	7.2	-	15.5	434		F	#		
Ammonia Total as N	mg/L	01/05/2016	N001	7.2	-	15.5	6.1		F	#	1	
Calcium	mg/L	01/05/2016	N001	7.2	-	15.5	500		F	#	0.12	
Chloride	mg/L	01/05/2016	0001	7.2	-	15.5	1000		F	#	20	
Dissolved Oxygen	mg/L	01/05/2016	N001	7.2	-	15.5	0.95		F	#		
Iron	mg/L	01/05/2016	N001	7.2	-	15.5	0.091	J	F	#	0.033	
Magnesium	mg/L	01/05/2016	N001	7.2	-	15.5	390		F	#	0.15	
Manganese	mg/L	01/05/2016	N001	7.2	-	15.5	0.31		F	#	0.0012	
Molybdenum	mg/L	01/05/2016	N001	7.2	-	15.5	0.042		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	7.2	-	15.5	7.5		F	#	0.5	
Oxidation Reduction Potential	mV	01/05/2016	N001	7.2	-	15.5	72.4		F	#		
pH	s.u.	01/05/2016	N001	7.2	-	15.5	6.91		F	#		
Potassium	mg/L	01/05/2016	N001	7.2	-	15.5	18		F	#	0.26	
Selenium	mg/L	01/05/2016	N001	7.2	-	15.5	0.002		F	#	0.00032	
Silica	mg/L	01/05/2016	N001	7.2	-	15.5	20		F	#	0.1	
Silicon	mg/L	01/05/2016	N001	7.2	-	15.5	9.1		F	#	0.048	
Sodium	mg/L	01/05/2016	N001	7.2	-	15.5	960		F	#	0.23	
Specific Conductance	umhos/cm	01/05/2016	N001	7.2	-	15.5	7830		F	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 0590 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Strontium	mg/L	01/05/2016	N001	7.2	-	15.5	6.3		F	#	0.0013	
Sulfate	mg/L	01/05/2016	0001	7.2	-	15.5	3100		F	#	50	
Temperature	C	01/05/2016	N001	7.2	-	15.5	12.88		F	#		
Total Dissolved Solids	mg/L	01/05/2016	0001	7.2	-	15.5	6500		FJ	#	80	
Total Organic Carbon	mg/L	01/05/2016	N001	7.2	-	15.5	5.8		F	#	1	
Turbidity	NTU	01/05/2016	N001	7.2	-	15.5	2.34		F	#		
Uranium	mg/L	01/05/2016	N001	7.2	-	15.5	0.13		F	#	0.000029	
Vanadium	mg/L	01/05/2016	N001	7.2	-	15.5	0.0012	J	F	#	0.00015	



**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 0748 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	9.05	-	13.55	334		F	#		
Ammonia Total as N	mg/L	01/05/2016	N001	9.05	-	13.55	11		F	#	1	
Calcium	mg/L	01/05/2016	N001	9.05	-	13.55	490		F	#	0.12	
Chloride	mg/L	01/05/2016	0001	9.05	-	13.55	570		F	#	20	
Dissolved Oxygen	mg/L	01/05/2016	N001	9.05	-	13.55	0.86		F	#		
Iron	mg/L	01/05/2016	N001	9.05	-	13.55	0.14	J	F	#	0.033	
Magnesium	mg/L	01/05/2016	N001	9.05	-	13.55	340		F	#	0.15	
Manganese	mg/L	01/05/2016	N001	9.05	-	13.55	0.82		F	#	0.0012	
Molybdenum	mg/L	01/05/2016	N001	9.05	-	13.55	0.032		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	9.05	-	13.55	15		F	#	0.5	
Oxidation Reduction Potential	mV	01/05/2016	N001	9.05	-	13.55	80.3		F	#		
pH	s.u.	01/05/2016	N001	9.05	-	13.55	6.89		F	#		
Potassium	mg/L	01/05/2016	N001	9.05	-	13.55	6.9		F	#	0.26	
Selenium	mg/L	01/05/2016	N001	9.05	-	13.55	0.17		F	#	0.00032	
Silica	mg/L	01/05/2016	N001	9.05	-	13.55	20		F	#	0.1	
Silicon	mg/L	01/05/2016	N001	9.05	-	13.55	9.4		F	#	0.048	
Sodium	mg/L	01/05/2016	N001	9.05	-	13.55	540		F	#	0.23	
Specific Conductance	umhos/cm	01/05/2016	N001	9.05	-	13.55	5771		F	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 0748 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Strontium	mg/L	01/05/2016	N001	9.05	-	13.55	5		F	#	0.0013	
Sulfate	mg/L	01/05/2016	0001	9.05	-	13.55	2500		F	#	50	
Temperature	C	01/05/2016	N001	9.05	-	13.55	12.8		F	#		
Total Dissolved Solids	mg/L	01/05/2016	0001	9.05	-	13.55	5200		FJ	#	80	
Total Organic Carbon	mg/L	01/05/2016	N001	9.05	-	13.55	6.6		F	#	1	
Turbidity	NTU	01/05/2016	N001	9.05	-	13.55	7.74		F	#		
Uranium	mg/L	01/05/2016	N001	9.05	-	13.55	0.045		F	#	0.000029	
Vanadium	mg/L	01/05/2016	N001	9.05	-	13.55	0.036		F	#	0.00015	

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1001 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	6.6	-	11.6	288		F	#		
Ammonia Total as N	mg/L	01/05/2016	N001	6.6	-	11.6	6.9		F	#	1	
Ammonia Total as N	mg/L	01/05/2016	N002	6.6	-	11.6	9.4		F	#	1	
Calcium	mg/L	01/05/2016	N001	6.6	-	11.6	570		F	#	0.12	
Calcium	mg/L	01/05/2016	N002	6.6	-	11.6	560		F	#	0.12	
Chloride	mg/L	01/05/2016	0001	6.6	-	11.6	940		F	#	20	
Chloride	mg/L	01/05/2016	0002	6.6	-	11.6	940		F	#	20	
Dissolved Oxygen	mg/L	01/05/2016	N001	6.6	-	11.6	0.96		F	#		
Iron	mg/L	01/05/2016	N001	6.6	-	11.6	0.24	J	F	#	0.033	
Iron	mg/L	01/05/2016	N002	6.6	-	11.6	0.22	J	F	#	0.033	
Magnesium	mg/L	01/05/2016	N001	6.6	-	11.6	410		F	#	0.15	
Magnesium	mg/L	01/05/2016	N002	6.6	-	11.6	400		F	#	0.15	
Manganese	mg/L	01/05/2016	N001	6.6	-	11.6	2.5		F	#	0.0012	
Manganese	mg/L	01/05/2016	N002	6.6	-	11.6	2.4		F	#	0.0012	
Molybdenum	mg/L	01/05/2016	N001	6.6	-	11.6	0.17		F	#	0.00032	
Molybdenum	mg/L	01/05/2016	N002	6.6	-	11.6	0.16		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	6.6	-	11.6	16		F	#	0.5	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N002	6.6	-	11.6	16		F	#	0.5	

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1001 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Oxidation Reduction Potential	mV	01/05/2016	N001	6.6	-	11.6	138.5		F	#		
pH	s.u.	01/05/2016	N001	6.6	-	11.6	6.97		F	#		
Potassium	mg/L	01/05/2016	N001	6.6	-	11.6	36		F	#	0.26	
Potassium	mg/L	01/05/2016	N002	6.6	-	11.6	34		F	#	0.26	
Selenium	mg/L	01/05/2016	N001	6.6	-	11.6	0.065		F	#	0.00032	
Selenium	mg/L	01/05/2016	N002	6.6	-	11.6	0.078		F	#	0.00032	
Silica	mg/L	01/05/2016	N001	6.6	-	11.6	23		F	#	0.1	
Silica	mg/L	01/05/2016	N002	6.6	-	11.6	22		F	#	0.1	
Silicon	mg/L	01/05/2016	N001	6.6	-	11.6	11		F	#	0.048	
Silicon	mg/L	01/05/2016	N002	6.6	-	11.6	10		F	#	0.048	
Sodium	mg/L	01/05/2016	N001	6.6	-	11.6	910		F	#	0.23	
Sodium	mg/L	01/05/2016	N002	6.6	-	11.6	890		F	#	0.23	
Specific Conductance	umhos/cm	01/05/2016	N001	6.6	-	11.6	7859		F	#		
Strontium	mg/L	01/05/2016	N001	6.6	-	11.6	7.4		F	#	0.0013	
Strontium	mg/L	01/05/2016	N002	6.6	-	11.6	7.2		F	#	0.0013	
Sulfate	mg/L	01/05/2016	0001	6.6	-	11.6	3500		F	#	50	
Sulfate	mg/L	01/05/2016	0002	6.6	-	11.6	3500		F	#	50	
Temperature	C	01/05/2016	N001	6.6	-	11.6	11.71		F	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1001 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Total Dissolved Solids	mg/L	01/05/2016	0001	6.6	-	11.6	6300		FJ	#	200	
Total Dissolved Solids	mg/L	01/05/2016	0002	6.6	-	11.6	6300		FJ	#	200	
Total Organic Carbon	mg/L	01/05/2016	N001	6.6	-	11.6	7		F	#	1	
Total Organic Carbon	mg/L	01/05/2016	N002	6.6	-	11.6	6.8		F	#	1	
Turbidity	NTU	01/05/2016	N001	6.6	-	11.6	2.4		F	#		
Uranium	mg/L	01/05/2016	N001	6.6	-	11.6	0.37		F	#	0.000029	
Uranium	mg/L	01/05/2016	N002	6.6	-	11.6	0.37		F	#	0.000029	
Vanadium	mg/L	01/05/2016	N001	6.6	-	11.6	0.18		F	#	0.00015	
Vanadium	mg/L	01/05/2016	N002	6.6	-	11.6	0.22		F	#	0.00015	

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1014 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	7.75	-	17.75	427		F	#		
Ammonia Total as N	mg/L	01/05/2016	N001	7.75	-	17.75	36		F	#	2.5	
Calcium	mg/L	01/05/2016	N001	7.75	-	17.75	560		F	#	0.12	
Chloride	mg/L	01/05/2016	0001	7.75	-	17.75	1100		F	#	20	
Dissolved Oxygen	mg/L	01/05/2016	N001	7.75	-	17.75	1.19		F	#		
Iron	mg/L	01/05/2016	N001	7.75	-	17.75	0.22	J	F	#	0.033	
Magnesium	mg/L	01/05/2016	N001	7.75	-	17.75	390		F	#	0.15	
Manganese	mg/L	01/05/2016	N001	7.75	-	17.75	1.9		F	#	0.0012	
Molybdenum	mg/L	01/05/2016	N001	7.75	-	17.75	0.14		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	7.75	-	17.75	1.9		F	#	0.1	
Oxidation Reduction Potential	mV	01/05/2016	N001	7.75	-	17.75	142.2		F	#		
pH	s.u.	01/05/2016	N001	7.75	-	17.75	6.91		F	#		
Potassium	mg/L	01/05/2016	N001	7.75	-	17.75	24		F	#	0.26	
Selenium	mg/L	01/05/2016	N001	7.75	-	17.75	0.012		F	#	0.00032	
Silica	mg/L	01/05/2016	N001	7.75	-	17.75	19		F	#	0.1	
Silicon	mg/L	01/05/2016	N001	7.75	-	17.75	8.9		F	#	0.048	
Sodium	mg/L	01/05/2016	N001	7.75	-	17.75	1000		F	#	0.23	
Specific Conductance	umhos/cm	01/05/2016	N001	7.75	-	17.75	8414		F	#		

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1014 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Strontium	mg/L	01/05/2016	N001	7.75	-	17.75	7.1		F	#	0.0013	
Sulfate	mg/L	01/05/2016	0001	7.75	-	17.75	3400		F	#	50	
Temperature	C	01/05/2016	N001	7.75	-	17.75	12.02		F	#		
Total Dissolved Solids	mg/L	01/05/2016	0001	7.75	-	17.75	6300		FJ	#	200	
Total Organic Carbon	mg/L	01/05/2016	N001	7.75	-	17.75	6.9		F	#	1	
Turbidity	NTU	01/05/2016	N001	7.75	-	17.75	6.72		F	#		
Uranium	mg/L	01/05/2016	N001	7.75	-	17.75	2.3		F	#	0.00015	
Vanadium	mg/L	01/05/2016	N001	7.75	-	17.75	0.21		F	#	0.00015	

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1036 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	8.85	-	13.35	388		F	#		
Ammonia Total as N	mg/L	01/05/2016	N001	8.85	-	13.35	51		F	#	2.5	
Calcium	mg/L	01/05/2016	N001	8.85	-	13.35	520		F	#	0.12	
Chloride	mg/L	01/05/2016	0001	8.85	-	13.35	920		F	#	20	
Dissolved Oxygen	mg/L	01/05/2016	N001	8.85	-	13.35	0.56		F	#		
Iron	mg/L	01/05/2016	N001	8.85	-	13.35	3.5		F	#	0.033	
Magnesium	mg/L	01/05/2016	N001	8.85	-	13.35	390		F	#	0.15	
Manganese	mg/L	01/05/2016	N001	8.85	-	13.35	2.9		F	#	0.0012	
Molybdenum	mg/L	01/05/2016	N001	8.85	-	13.35	0.13		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	8.85	-	13.35	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	01/05/2016	N001	8.85	-	13.35	-43.8		F	#		
pH	s.u.	01/05/2016	N001	8.85	-	13.35	7.07		F	#		
Potassium	mg/L	01/05/2016	N001	8.85	-	13.35	24		F	#	0.26	
Selenium	mg/L	01/05/2016	N001	8.85	-	13.35	0.00032	U	F	#	0.00032	
Silica	mg/L	01/05/2016	N001	8.85	-	13.35	22		F	#	0.1	
Silicon	mg/L	01/05/2016	N001	8.85	-	13.35	10		F	#	0.048	
Sodium	mg/L	01/05/2016	N001	8.85	-	13.35	840		F	#	0.23	
Specific Conductance	umhos/cm	01/05/2016	N001	8.85	-	13.35	7717		F	#		



---

**Groundwater Quality Data by Location (USEE100) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 1036 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Strontium	mg/L	01/05/2016	N001	8.85	-	13.35	6.3		F	#	0.0013	
Sulfate	mg/L	01/05/2016	0001	8.85	-	13.35	3800		F	#	50	
Temperature	C	01/05/2016	N001	8.85	-	13.35	14.12		F	#		
Total Dissolved Solids	mg/L	01/05/2016	0001	8.85	-	13.35	5800		FJ	#	200	
Total Organic Carbon	mg/L	01/05/2016	N001	8.85	-	13.35	6.7		F	#	1	
Turbidity	NTU	01/05/2016	N001	8.85	-	13.35	9.94		F	#		
Uranium	mg/L	01/05/2016	N001	8.85	-	13.35	2.3		F	#	0.00015	
Vanadium	mg/L	01/05/2016	N001	8.85	-	13.35	0.065		F	#	0.00015	

---

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

## **Surface Water Quality Data**

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**Surface Water Quality Data by Location (USEE102) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 2015 SURFACE LOCATION Upstream location sampling location

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	150			#		
Ammonia Total as N	mg/L	01/05/2016	N001	0.1	U		#	0.1	
Calcium	mg/L	01/05/2016	0001	89			#	0.024	
Chloride	mg/L	01/05/2016	0001	280			#	5	
Dissolved Oxygen	mg/L	01/05/2016	N001	14.37			#		
Iron	mg/L	01/05/2016	0001	0.0077	J	U	#	0.0067	
Magnesium	mg/L	01/05/2016	0001	25			#	0.03	
Manganese	mg/L	01/05/2016	0001	0.022			#	0.00024	
Molybdenum	mg/L	01/05/2016	0001	0.0062			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	0.4			#	0.01	
Oxidation Reduction Potential	mV	01/05/2016	N001	84.1			#		
pH	s.u.	01/05/2016	N001	8.44			#		
Potassium	mg/L	01/05/2016	0001	5			#	0.052	
Selenium	mg/L	01/05/2016	0001	0.002		J	#	0.00032	
Silica	mg/L	01/05/2016	0001	11			#	0.021	
Silicon	mg/L	01/05/2016	0001	5.3			#	0.0097	
Sodium	mg/L	01/05/2016	0001	170			#	0.047	
Specific Conductance	umhos/cm	01/05/2016	N001	1475			#		

**Surface Water Quality Data by Location (USEE102) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 2015 SURFACE LOCATION Upstream location sampling location

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Strontium	mg/L	01/05/2016	0001	0.89			#	0.00026	
Sulfate	mg/L	01/05/2016	0001	170			#	2.5	
Temperature	C	01/05/2016	N001	0.82			#		
Total Dissolved Solids	mg/L	01/05/2016	0001	730		J	#	40	
Total Organic Carbon	mg/L	01/05/2016	N001	2			#	1	
Turbidity	NTU	01/05/2016	N001	15.3			#		
Uranium	mg/L	01/05/2016	0001	0.0041			#	0.000029	
Vanadium	mg/L	01/05/2016	0001	0.0022	J	U	#	0.00015	

**Surface Water Quality Data by Location (USEE102) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 2016 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	01/05/2016	N001	162			#		
Ammonia Total as N	mg/L	01/05/2016	N001	0.1	U		#	0.1	
Calcium	mg/L	01/05/2016	0001	86			#	0.024	
Chloride	mg/L	01/05/2016	0001	280			#	5	
Dissolved Oxygen	mg/L	01/05/2016	N001	14.53			#		
Iron	mg/L	01/05/2016	0001	0.012	J	U	#	0.0067	
Magnesium	mg/L	01/05/2016	0001	24			#	0.03	
Manganese	mg/L	01/05/2016	0001	0.019			#	0.00024	
Molybdenum	mg/L	01/05/2016	0001	0.0068			#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	01/05/2016	N001	0.39			#	0.01	
Oxidation Reduction Potential	mV	01/05/2016	N001	74.8			#		
pH	s.u.	01/05/2016	N001	8.53			#		
Potassium	mg/L	01/05/2016	0001	5.1			#	0.052	
Selenium	mg/L	01/05/2016	0001	0.0012			#	0.00032	
Silica	mg/L	01/05/2016	0001	11			#	0.021	
Silicon	mg/L	01/05/2016	0001	5.1			#	0.0097	
Sodium	mg/L	01/05/2016	0001	170			#	0.047	
Specific Conductance	umhos/cm	01/05/2016	N001	1455			#		

**Surface Water Quality Data by Location (USEE102) FOR SITE GRJ01, Grand Junction Processing Site**

REPORT DATE: 03/07/2016

Location: 2016 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID		Lab	Data	QA		
Strontium	mg/L	01/05/2016	0001	0.87			#	0.00026	
Sulfate	mg/L	01/05/2016	0001	160			#	2.5	
Temperature	C	01/05/2016	N001	0.48			#		
Total Dissolved Solids	mg/L	01/05/2016	0001	760		J	#	40	
Total Organic Carbon	mg/L	01/05/2016	N001	1.9			#	1	
Turbidity	NTU	01/05/2016	N001	16.5			#		
Uranium	mg/L	01/05/2016	0001	0.0041			#	0.000029	
Vanadium	mg/L	01/05/2016	0001	0.0018	J	UJ	#	0.00015	



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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## **Equipment Blank Data**

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**BLANKS REPORT**

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

RIN: 15127576

Report Date: 03/01/2016

Parameter	Site Code	Location ID	Sample		Units	Result	Qualifiers		Detection Limit	Uncertainty	Sample Type
			Date	ID			Lab	Data			
Ammonia Total as N	GRJ01	0999	01/05/2016	N001	mg/L	0.1	U		0.1		E
Calcium	GRJ01	0999	01/05/2016	N001	mg/L	0.061	J	U	0.024		E
Chloride	GRJ01	0999	01/05/2016	0001	mg/L	0.2	U		0.2		E
Iron	GRJ01	0999	01/05/2016	N001	mg/L	0.0067	U		0.0067		E
Magnesium	GRJ01	0999	01/05/2016	N001	mg/L	0.03	U		0.03		E
Manganese	GRJ01	0999	01/05/2016	N001	mg/L	0.00032	J	U	0.00024		E
Molybdenum	GRJ01	0999	01/05/2016	N001	mg/L	0.00032	U		0.00032		E
Nitrate + Nitrite as Nitrogen	GRJ01	0999	01/05/2016	N001	mg/L	0.01	U		0.01		E
Potassium	GRJ01	0999	01/05/2016	N001	mg/L	0.09	J		0.052		E
Selenium	GRJ01	0999	01/05/2016	N001	mg/L	0.00055	J		0.00032		E
Silica	GRJ01	0999	01/05/2016	N001	mg/L	0.021	U		0.021		E
Silicon	GRJ01	0999	01/05/2016	N001	mg/L	0.0097	U		0.0097		E
Sodium	GRJ01	0999	01/05/2016	N001	mg/L	0.098	J		0.047		E
Strontium	GRJ01	0999	01/05/2016	N001	mg/L	0.00026	U		0.00026		E
Sulfate	GRJ01	0999	01/05/2016	0001	mg/L	0.5	U		0.5		E
Total Dissolved Solids	GRJ01	0999	01/05/2016	0001	mg/L	20	U		20		E
Total Organic Carbon	GRJ01	0999	01/05/2016	N001	mg/L	1	U		1		E
Uranium	GRJ01	0999	01/05/2016	N001	mg/L	0.000029	U		0.000029		E
Vanadium	GRJ01	0999	01/05/2016	N001	mg/L	0.0013	J	U	0.00015		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.                     | G | Possible grout contamination, pH > 9.         | J | Estimated value. |
| L | Less than 3 bore volumes purged prior to sampling. | Q | Qualitative result due to sampling technique. | R | Unusable result. |
| U | Parameter analyzed for but was not detected.       | X | Location is undefined.                        |   |                  |

SAMPLE TYPES:

- E Equipment Blank.

## **Static Water Level Data**

**STATIC WATER LEVELS (USEE700) FOR SITE GRJ01, Grand Junction Processing Site**  
**REPORT DATE: 03/01/2016**

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
0590	D	4566.69	01/05/2016	15:15:55	9.87	4556.82	
0748		4582.49	01/05/2016	13:35:57	10.81	4571.68	
1001	O	4569.69	01/05/2016	14:40:05	9.32	4560.37	
1014	O	4572.9	01/05/2016	10:20:51	9.94	4562.96	
1036		4570.64	01/05/2016	13:05:59	8.11	4562.53	

FLOW CODES: B BACKGROUND    C CROSS GRADIENT    D DOWNGRADIENT    F OFFSITE  
                   N UNKNOWN                    O ONSITE                    U UPGRADIENT

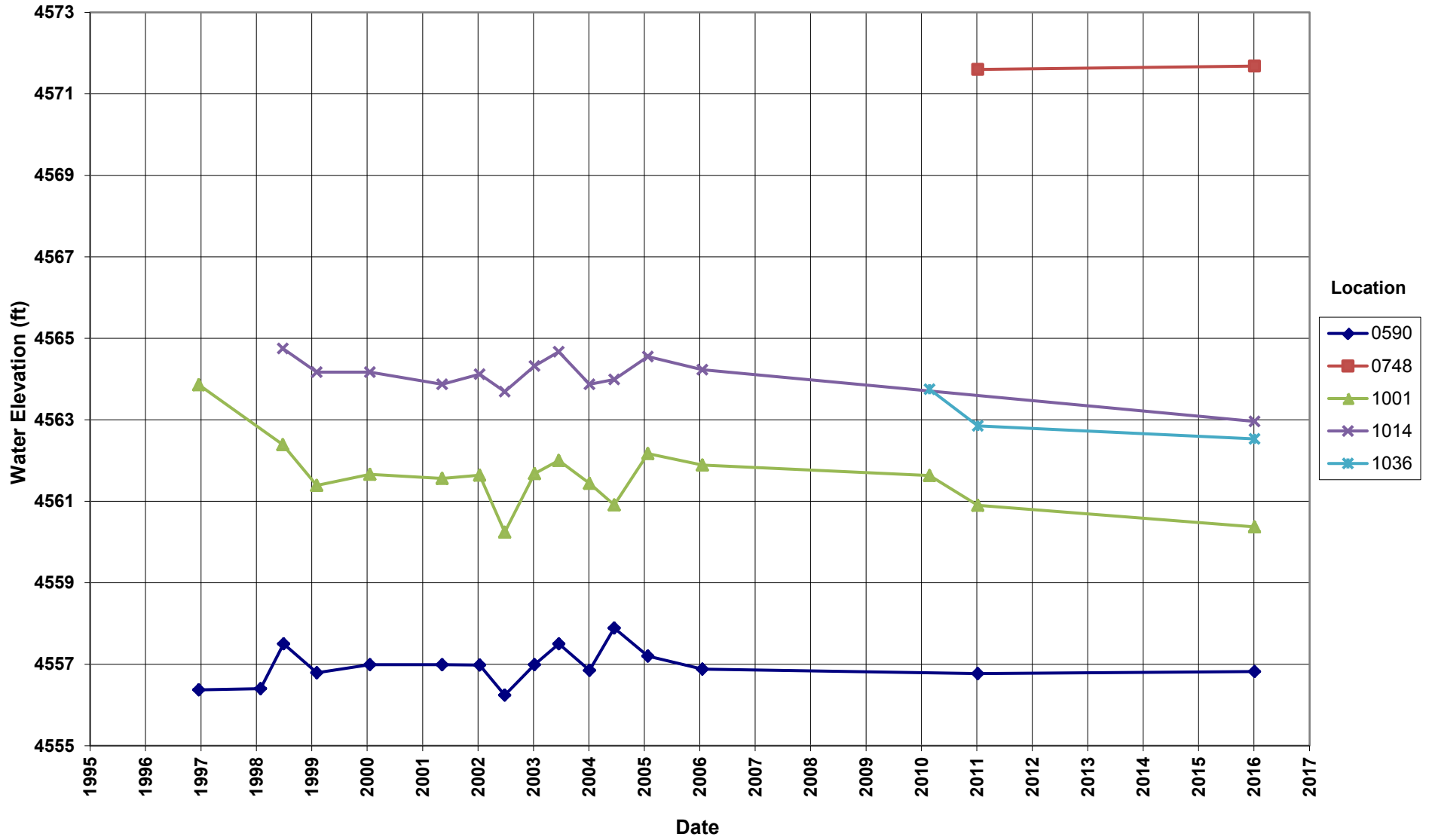
WATER LEVEL FLAGS: D Dry    F Flowing    B Below top of pump



# Hydrograph

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# Grand Junction Processing Site Hydrograph

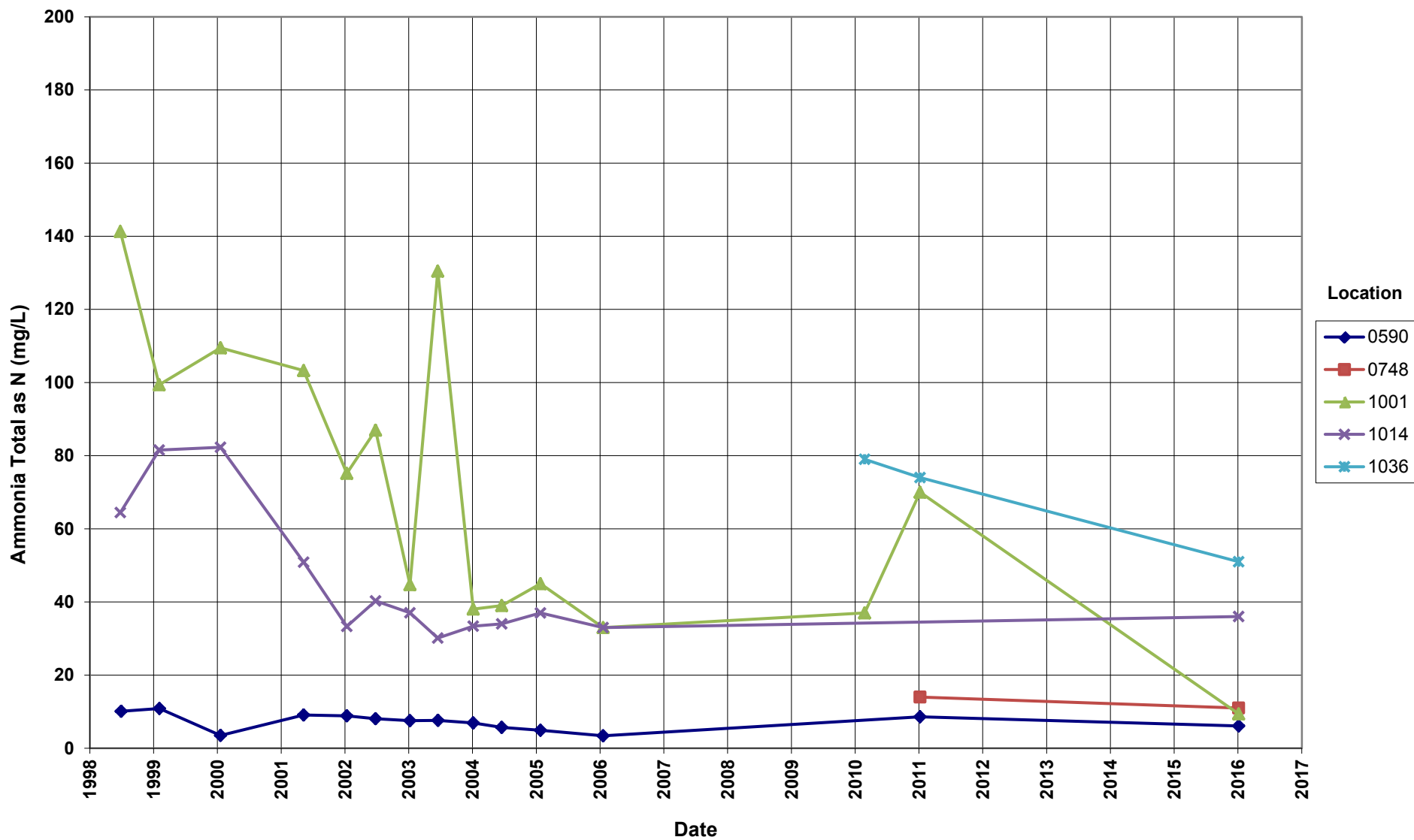


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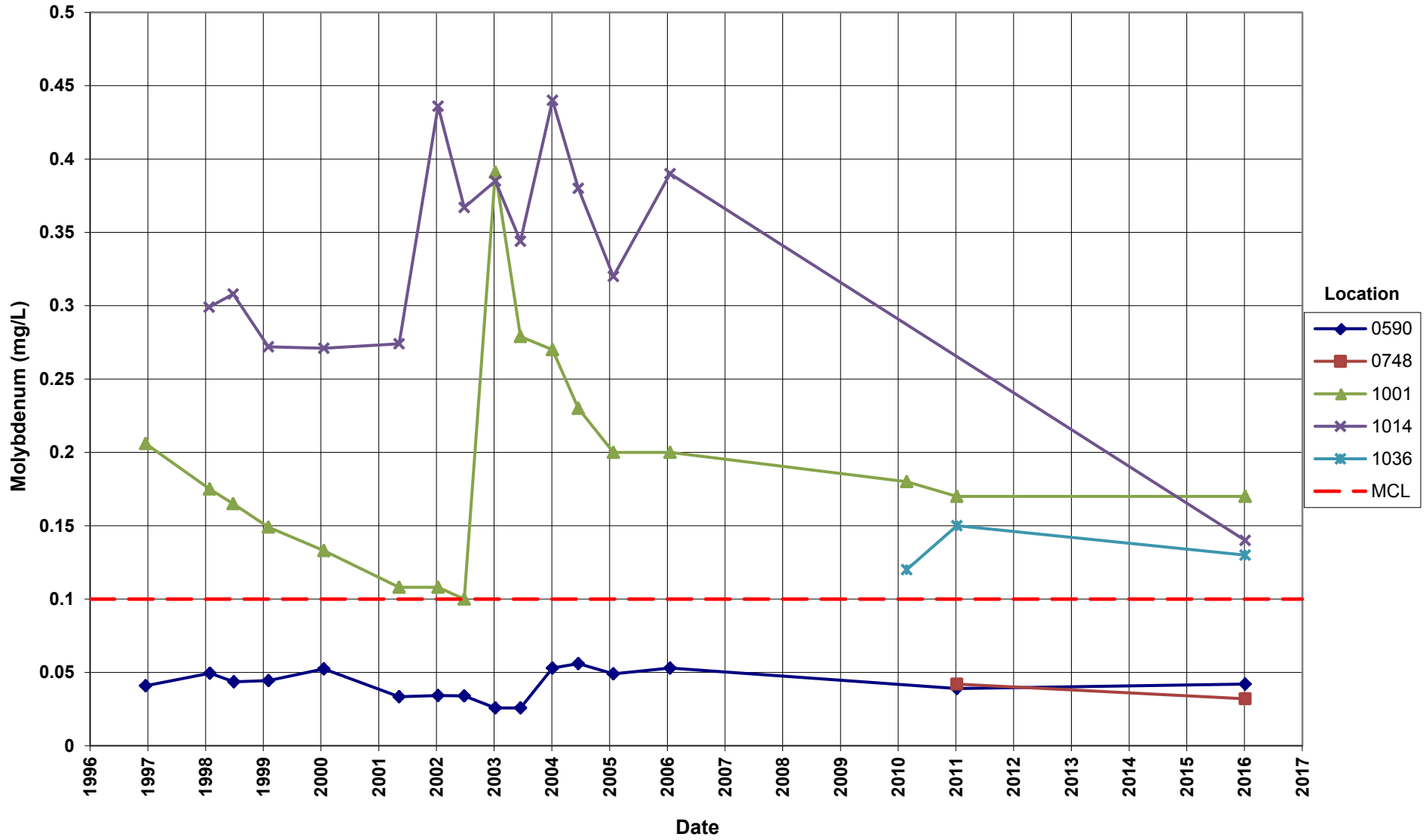
## **Time-Concentration Graphs**

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### Grand Junction Processing Site Ammonia Total as N Concentration

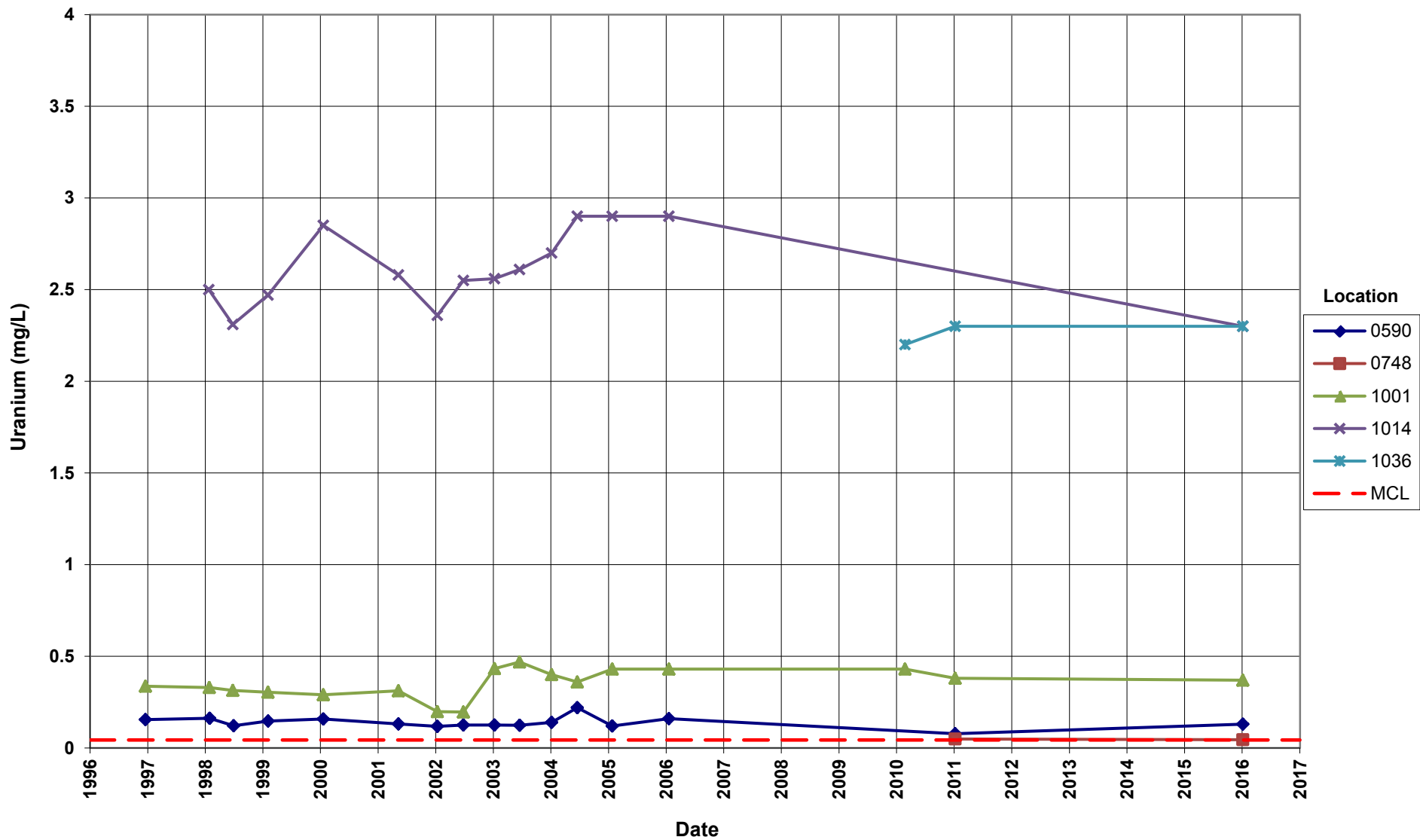


**Grand Junction Processing Site  
Molybdenum Concentration**  
Maximum Contaminant Level (MCL) = 0.1 mg/L





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



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## **Attachment 3**

# **Sampling and Analysis Work Order**

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December 1, 2015

Task Assignment 103  
Control Number 16-0148

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

SUBJECT: Contract No. DE-LM0000421, Navarro Research & Engineering, Inc. (Navarro)  
Task Assignment 103 LTS&M-UMTRCA TI & TII Sites, D&D Sites, Other  
Sites, and Other  
January 2016 Environmental Sampling at the Grand Junction, Colorado,  
Processing Site

REFERENCE: Task Assignment 103, 1-103-1-02-106, Grand Junction, Colorado, Processing  
Site

Dear Mr. Dam:

The purpose of this letter is to inform you of the upcoming sampling event at the Grand Junction, Colorado, processing site. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring at the Grand Junction processing site. Water quality data will be collected from this site as part of the environmental sampling currently scheduled to begin the week of January 4, 2016.

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

**Monitoring Wells**

590 AI            748 AI            1001 AI            1014 AI            1036 AI

\*NOTE: AI = Alluvium

**Surface Locations**

423                    427

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are being reviewed and are expected to be complete by the beginning of fieldwork.

Monitoring well 1014 is in a hazardous location in the bike lane of Riverside Parkway, and will require traffic control by a professional traffic control company.

William Dam  
Control Number 16-0148  
Page 2

Please contact me at (970) 248-6391 if you have any questions.

Sincerely,

  
Gary K. Baur  
Site Lead

GKB/bkb

Enclosures (3)

cc: (electronic)

Christina Pennal, DOE  
Gary Baur, Navarro  
Jeff Carman, Navarro  
Beverly Cook, Navarro  
Steve Donovan, Navarro  
Lauren Goodknight, Navarro  
Diana Osborne, Navarro  
EDD Delivery  
rc-grand.junction  
File: GJT 400.02

**Sampling Frequencies for Locations at  
Grand Junction Processing Site, Colorado**

Location ID	Quarterly	Semiannually	Annually	Every 5 Years	Not Sampled	Notes
<b>Monitoring Wells</b>						
590				X		Download data logger; next sampling in 1/2016
748				X		Next sampling in 1/2016
1001				X		Download data logger; next sampling in 1/2016
1014				X		in the bike Path of the Parkway, Safety Hazard, Traffic Control will be provided;next sampling in 1/2016
1036				X		Next sampling in 1/2016
<b>Surface Locations</b>						
423				X		Next sampling in 1/2016
427				X		Next sampling in 1/2016

Sampling conducted in January

### Constituent Sampling Breakdown

Site	Grand Junction Processing Site		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
	Groundwater	Surface Water			
Approx. No. Samples/yr	4	2			
<i>Field Measurements</i>					
Alkalinity	X	X			
Dissolved Oxygen	X	X			
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X				
Temperature	X	X			
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH3-N)	X	X	0.1	EPA 350.1	WCH-A-005
Calcium	X	X	5	SW-846 6010	LMM-01
Chloride	X	X	0.5	SW-846 9056	WCH-A-039
Chromium					
Gross Alpha					
Gross Beta					
Iron	X	X	0.1	SW-846 6020	LMM-01
Lead					
Magnesium	X	X	5	SW-846 6010	LMM-01
Manganese	X	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	X	X	0.05	EPA 353.1	WCH-A-022
Potassium	X	X	1	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium	X	X	0.0001	SW-846 6020	LMM-02
Silica	X	X	0.1	SW-846 6010	LMM-01
Sodium	X	X	1	SW-846 6010	LMM-01
Strontium	X	X	0.2	SW-846 6010	LMM-01
Sulfate	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	X	X	10	SM2540 C	WCH-A-033
Total Organic Carbon	X	X	1.0	SM5310	WCH-A-025
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	0.0003	SW-846 6020	LMM-02
Zinc					
<b>Total No. of Analytes</b>	18	18			

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 12, 2016

TO: Gary Baur

FROM: Jennifer Graham

SUBJECT: Trip Report

**Site:** Grand Junction Processing Site

**Dates of Sampling Event:** January 5, 2016

**Team Members:** Jennifer Graham and Samantha Tigar. Joey Gillespie and employees from CC Enterprises were on site during sampling activities for safety oversight at location 1014.

**Number of Locations Sampled:** Samples were collected from all 5 of the monitoring well locations identified on the sampling notification letter. Additionally, samples were taken at two new surface water locations (2015 and 2016) that replaced surface water locations listed on the sampling notification letter.

New surface water location 2015 was established prior to sampling event, per direction of DOE and Navarro site leads, to replace location 0423 as an up gradient location. Location 0423 required access across private land. Location 2015 is located on public lands where access is already included as part of the City of Grand Junction access agreement. GPS data was collected in the field for upload to the database. Location 2015 is located near the west side of the pedestrian bridge from Los Colonias Park to Orchard Mesa over the Colorado River and can be seen on Figure 1.

New surface water location 2016 was established as a down gradient surface location during the sampling event for safety reasons. It is located at the west end of Watson Island, near the mouth of a side channel that contains location 0427. A gentle slope to the river's edge makes 2016 safer and more accessible. This location was sampled as 0427 before the decision to establish a new surface water location was made. An Issue Trak has been submitted to change the location number in FDACS to correctly reflect the sampling of location 2016. Samples were shipped to ALS laboratory with the correct location on the labels. GPS data was collected in the field for upload to the data base. Location 2016 can be seen on Figure 1.

**Locations Not Sampled/Reason:** Location 0427 was not sampled during this event. The sampling team was concerned about safety and access issues at this surface water location. The channel was frozen over, a considerable amount of wood debris had accumulated, and the drop-off to the river was approximately 6 feet high. Gary Baur and Bill Dam (DOE) were consulted and approved sampling the river slightly up gradient from the original location.

Figure 1: Map of New Surface Locations



\\m\gis\Data\Sites\CO\GrandJunctionProcessing\GPS\RoverFiles\20160106\_Graham\_New\_Surface Location\GJPS\_New\_Site\_Locations.mxd HyattT 01/06/2016 3:23:23 PM

**Location Specific Information:**

Location IDs	Comments
0590	Roots and other particulates were found in the purge water.
1014	There is evidence of the well casing being crushed. Sampling team replaced downhole tubing and pump head with 1/4" ID. Tubing has been marked for sampling depth at the center of the screened interval. At 100ml/min water level dropping slightly but still within Cat I criterion. Well may need to be redeveloped.

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

False ID	Ticket Number	True ID	Sample Type	Associated Matrix	Associated Samples
2816	NNS 254	1001	Duplicate	Ground water	N/A
2817	NNS 255	0999	Equipment Blank	Surface water	2015 and 2016

**Requisition Index Number (RIN) Assigned:** Samples were assigned to RIN 15127576. Field data sheets can be found in \\crow\RAApps\SMS\15127576\FieldData.

**Sample Shipment:** Samples were shipped overnight via FedEx from Grand Junction, CO, to ALS Laboratory Group in Ft. Collins, CO, on January 6, 2016.

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

**Well Inspection Summary:** Well 1014 is crimped approximately 2- 3 feet downhole causing a bow in the well casing. PVC well casing does not appear to be shattered. The well appears to be serviceable and sampling was not prevented.

**Sampling Method:** Samples were collected according to the *Sampling and Analysis Plan (SAP) for the U. S. Department of Energy Office of Legacy Management Sites (LMS/PRO/S04351, continually updated).*

**Field Variance:** None.

**Equipment:** All equipment functioned properly.

**Stakeholder/Regulatory/DOE:** Bill Dam with DOE was on site and observed sampling operations.

**Institutional Controls:**

**Fences, Gates, and Locks:** N/A

**Signs:** No issues were observed

**Trespassing/Site Disturbances:** N/A

**Safety Issues:** Well 1014, sampled during this event, is located in the public right-of-way along the Riverside Parkway. CC Enterprises provided traffic control during well access. Team members took every precaution to stay clear of traffic and off the right-of-way as much as possible to complete work.

**Access Issues:** None

**General Information:** Nothing to note.

**Immediate Actions Taken:** Downhole and pump head tubing was replaced at location 1014. New tubing was marked at a mid-screen sampling depth. All other sampled monitoring well tubing, except 0590, were a marked at a mid-screen sampling depth.

**Future Actions Required or Suggested:** All sampled monitoring wells showed evidence of orange organics, roots, or other fine particulates. It is the sampling team's recommendation that sampled wells be placed on a regular schedule to be redeveloped prior to future sampling events. Additionally, we would suggest redeveloping these wells, if possible, in the near future to clear any organic slime and improve well contact with ground water.

Well 1014 experiences a poor flow rate capacity along with fine particulates in water and needs to be redeveloped prior to any additional sampling.

JG/lcg

cc: (electronic)  
William Dam, DOE  
Gary Baur, Navarro  
Steve Donovan, Navarro  
EDD Delivery