LMS/NAP/S00715

Data Validation Package

July 2015
Groundwater and Surface Water Sampling at the Naturita, Colorado, Processing Site

October 2015

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Naturita, Colorado, Processing Site

Sampling Period: July 23, 2015

This event includes sampling groundwater and surface water at the Naturita Processing Site. 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). Duplicate samples were collected from locations 0531 and DM1.

The 2002 *Ground Water Compliance Action Plan for the Naturita, Colorado, UMTRA Project Site* requires annual monitoring to observe the effectiveness of the groundwater compliance strategy at the site. The sampling conducted included monitoring wells DM1, MAU07, MAU08, NAT01-1, NAT02, NAT08, NAT26, and 0718, and surface locations 0531, 0533, SM2, and SM4. Well location 0715 was not sampled due to access issues. The water level was measured at each sampled well with the exception of MAU08. Equipment installed by Stanford Linear Accelerator Center (SLAC) in that well prevents water level measurements from being obtained.

The analytical data and associated qualifiers can be viewed in environmental database reports and are also available for viewing with dynamic mapping via the GEMS (Geospatial Environmental Mapping System) website at http://gems.lm.doe.gov/#.

Surface water results from San Miguel River locations downstream of and adjacent to the site were compared to statistical background threshold values (BTVs) using historical data from location 0531, which is located upstream of the site on the San Miguel River. As shown in Table 1, no BTVs were exceeded during this event, which indicates that the site is having no measurable impact on river water quality.

Table 1. Comparison of San Miguel River July 2015 Concentrations to Background Threshold Values

Analyte	BTV[a] for 0531 (mg/L)	0531 Concentration (mg/L)	SM2 Concentration (mg/L)	SM4 Concentration (mg/L)	0533 Concentration (mg/L)
Uranium	0.0051	0.0012	0.0019	0.0012	0.0012
Vanadium	0.0028	ND[b]	ND[b]	ND[b]	ND[b]

[a] BTV = background threshold values based on historical data set from upstream location 0531. BTV values are calculated using ProUCL version 5.0 as provided by EPA.
[b] ND = Not detected

David Traub

David Traub, Site Lead
Navarro Research and Engineering, Inc.

April 22, 2016
Date

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Naturita, Colorado	**Date(s) of Water Sampling**	July 23, 2015
Date(s) of Verification	September 24, 2015	**Name of Verifier**	Stephen Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Work Order letter dated June 29, 2015.
2. Were the sampling locations specified in the planning documents sampled?	No	Well location 0715 was not sampled due to access issues.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed on July 22, 2015.
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. 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	There were no Category II wells.
Was one pump/tubing volume removed prior to sampling?		
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from well 0718.
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 Number (RIN):	15077222
Sample Event:	July 23, 2015
Site(s):	Naturita, CO, Processing Site
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1507463
Analysis:	Metals and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	September 24, 2015

This validation was performed according "Standard Practice for Validation of Environmental Data" found in Appendix A of *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). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see Figures 1, 2, and 3, Data Validation Worksheets). The DQIs comparability, completeness, and sensitivity are also evaluated in the sections to follow.

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
Total Dissolved Solids (TDS)	WCH-A-033	EPA 160.1	EPA 160.1
Metals: Arsenic, Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

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

Table 3. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
All	All	TDS	J	Sample preservation
1507463-1	0531	Vanadium	U	Less than 5 times the method blank
1507463-2	0533	Vanadium	U	Less than 5 times the calibration blank

Table 3 (continued). Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1507463-3	0718	Vanadium	U	Less than 5 times the method blank
1507463-4	0718 Duplicate	Vanadium	U	Less than 5 times the method blank
1507463-5	Equipment blank	Vanadium	U	Less than 5 times the method blank
1507463-6	DM1	Vanadium	U	Less than 5 times the method blank
1507463-7	MAU07	Vanadium	U	Less than 5 times the method blank
1507463-8	MAU08	Vanadium	U	Less than 5 times the method blank
1507463-9	NAT01-1	Vanadium	U	Less than 5 times the method blank
1507463-13	SM2	Vanadium	U	Less than 5 times the method blank
1507463-14	SM4	Vanadium	U	Less than 5 times the method blank

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 14 water samples on July 27, 2015, accompanied by a Chain of Custody form. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times; signatures and dates were present to indicate sample relinquishment and receipt. The Chain of Custody form was complete with no errors or omissions. A copy of the air waybill was included with the receiving documentation.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 13.8°C, which does not comply with requirements. The samples were shipped on a Friday without requesting Saturday delivery and were received the following Monday. The TDS results are qualified with a "J" flag as estimated values. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

A method detection limit (MDL) is defined in 40 CFR 136 as 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 MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and found to be in compliance with contractual requirements.

The practical quantitation limit (PQL) for an analyte, defined as 5 times the MDL, is the lowest concentration that can be quantitatively measured, and is used when evaluating laboratory method performance in the sections below.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial Calibration Verification (ICV) demonstrates that the instrument is capable of

acceptable performance at the beginning of the analytical run. Continuing Calibration Verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method EPA 160.1
There are no calibration requirements associated with the determination of total dissolved solids.

Method SW-846 6020
Calibrations were performed on July 29, 2015, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL as required by the cited method. The ICV and CCV checks were made at the required frequency. 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. 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 and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where a blank concentration exceeds or equals the MDL, the associated sample results are qualified with a “U” flag (not detected) when the dilution-factor-corrected 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 are analyzed to verify the instrumental interelement and background correction factors and assess any bias due to interelement interferences. Interference check samples were analyzed at the required frequency with all results meeting the acceptance criteria.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which known concentration of analyte has been added before analysis. Matrix spike and matrix-spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. 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 acceptance criteria for all analytes.

Laboratory Replicate Analysis

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

Laboratory Control 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. Method 6020 serial-dilution data are evaluated to access bias 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.

Electronic Data Deliverable (EDD) File

The EDD file was received on July 31, 2015. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM
General Data Validation Report

RIN: 15077222 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 09/24/2015

Project: Naturita Monitoring **Analysis Type:** ☑ Metals ☑ General Chem ☐ Rad ☐ Organics

# of Samples: 14 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody
Present: OK **Signed:** OK **Dated:** OK

Sample
Integrity: OK **Preservation:** OK **Temperature:** NO

Select Quality Parameters

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

Figure 1. General Validation Worksheet

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 15077222 **Lab Code:** PAR **Date Due:** 08/24/2015

Matrix: Water **Site Code:** NAT01 **Date Completed:** 08/03/2015

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								
Arsenic	ICP/MS	07/29/2015	0.0000	1.0000	OK	OK	OK	98.0	100.0	99.0	1.0	103.0		105.0
Uranium	ICP/MS	07/29/2015	0.0000	1.0000	OK	OK	OK	109.0	110.0	107.0	2.0	104.0		90.0
Uranium	ICP/MS	07/29/2015									2.0			
Vanadium	ICP/MS	07/29/2015	0.0000	1.0000	OK	OK	OK	101.0	102.0	97.0	4.0	101.0		86.0

Int. Calibration curve intercept
R^2 calibration curve correlation coefficient
CCV Continuing calibration verification
CCB Continuing calibration blank
LCS Laboratory control sample
MS Matrix spike
MSD Matrix spike duplicate
RPD Relative percent difference
ISCAB Interference check solution
CRI Reporting limit verification check

Figure 2. Metals Validation Worksheet

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15077222 **Lab Code:** PAR **Date Due:** 08/24/2015

Matrix: Water **Site Code:** NAT01 **Date Completed:** 08/03/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
TOTAL DISSOLVED SOLIDS	07/30/2015					OK	99.00			1.00	

Int. Calibration curve intercept
R^2 calibration curve correlation coefficient
CCV Continuing calibration verification
CCB Continuing calibration blank
LCS Laboratory control sample
MS Matrix spike
MSD Matrix spike duplicate
RPD Relative percent difference

Figure 3. Wet Chemistry Validation Worksheet

Sampling Quality Control Assessment

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

Sampling Protocol

Monitoring well NAT01-1 was sampled using the casing-volume method because the water level could not be monitored during the purge. All other wells were sampled with dedicated tubing using the low-flow purge procedure, which meets the Category I criteria. Results from these wells were qualified with a "F" flag in the database, to indicate the wells were purged and sampled using the low-flow sampling method. Surface water locations were sampled using a peristaltic pump and hose reel.

Equipment Blank Assessment

Equipment blanks are prepared and analyzed to document contamination attributable to the sample collection process. One equipment blank was submitted with these samples. Uranium was detected in the equipment blank at a concentration less than one tenth of the associated samples, requiring no qualification (Figure 4).

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 0718 (field duplicate ID 2510). The duplicate results met the criteria demonstrating acceptable overall precision (Figure 5).

SAMPLE MANAGEMENT SYSTEM

Validation Report: Equipment/Trip Blanks

RIN: 15077222 **Lab Code:** PAR **Project:** Naturita Monitoring **Validation Date:** 09/24/2015

Blank Data

Blank Type	Lab Sample ID	Lab Method	Analyte Name	Result	Qualifier	MDL	Units
Equipment Blank	1507463-5	SW6020	Uranium	0.09	J	0.029	UG/L

Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validation Qualifier
1507463-1	NIY 972	0531	1.2	10		
1507463-13	NIY 974	SM2	1.9	10		
1507463-14	NIY 975	SM4	1.2	10		
1507463-2	NIY 973	0533	1.2	10		
1507463-8	NIY 971	MAU08	540	10		

Figure 4. Equipment Blanks Worksheet

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 15077222 **Lab Code:** PAR **Project:** Naturita Monitoring **Validation Date:** 09/24/2015

Duplicate: 2510 **Sample:** 0718

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Arsenic	2.4			10	2.1			10	13.33		UG/L
TOTAL DISSOLVED SOLIDS	1700			1	1800			1	5.71		MG/L
Uranium	83			10	80			10	3.68		UG/L
Vanadium	0.65	J		10	0.92	J		10			UG/L

Figure 5. Field Duplicates Worksheet

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 Donivan — Date: 4-22-2016

Data Validation Lead: Stephen Donivan — Date: 4-22-2016

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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 Data Validation Outliers Report (see below) 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 historical range and 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. Data that are not normally distributed are identified on the report with "NA" in the Statistical Outlier column.
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.

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

Data Validation Outliers Report - No Field Parameters
Comparison: All Historical Data
Laboratory: ALS Laboratory Group
RIN: 15077222
Report Date: 4/7/2016

					Current			**Historical Maximum**			**Historical Minimum**			**Number of Data Points**		**Statistical Outlier**
						Qualifiers			*Qualifiers*			*Qualifiers*				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
NAT01	0718	N002	07/23/2015	Arsenic	0.00210		F	0.00440		F	0.00220			10	0	No
NAT01	DM1	N001	07/23/2015	Uranium	0.00170		F	0.0111		F	0.00200		F	24	0	No
NAT01	MAU08	N001	07/23/2015	Total Dissolved Solids	1300		FJ	4300		FQ	1400		F	19	0	No
NAT01	NAT02	N001	07/23/2015	Arsenic	0.00380		F	0.0103			0.00590		F	14	0	NA
NAT01	NAT08	N001	07/23/2015	Arsenic	0.0200		F	0.0640			0.0210		F	18	0	NA
NAT01	NAT08	N001	07/23/2015	Vanadium	1.60		F	5.73	DI		1.80		F	24	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.

Attachment 2

Sampling and Analysis Work Order

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Stoller Newport News Nuclear

June 29, 2015

Task Assignment 103
Control Number 15-0632

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

SUBJECT: Contract No. DE-LM0000415, Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc.
Task Assignment 103 LTS&M - UMTRCA TI & TII, D&D, Others, and AS&T
July 2015 Environmental Sampling at the Naturita, Colorado, Processing Site

REFERENCE: Task Assignment 103, 3-103-1-02-115, Naturita, Colorado, Processing Site

Dear Mr. Linard:

The purpose of this letter is to inform you of the upcoming sampling event at the Naturita, Colorado, processing site. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the site. Water quality data will be collected at this site as part of the routine environmental sampling currently scheduled to begin the week of July 20, 2015.

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

MONITORING WELLS

NAT01-1 Al	NAT 02 Al	NAT08 Al	NAT26 Al	0715 Al	0718 Al
MAU07 Al	MAU08 Al	DM1 Al			

*NOTE: Al = Alluvium

SURFACE LOCATIONS

0531	0533	SM2	SM4

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.

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

Please contact me at (970) 248-6557 if you have any questions.

Sincerely,

David Traub

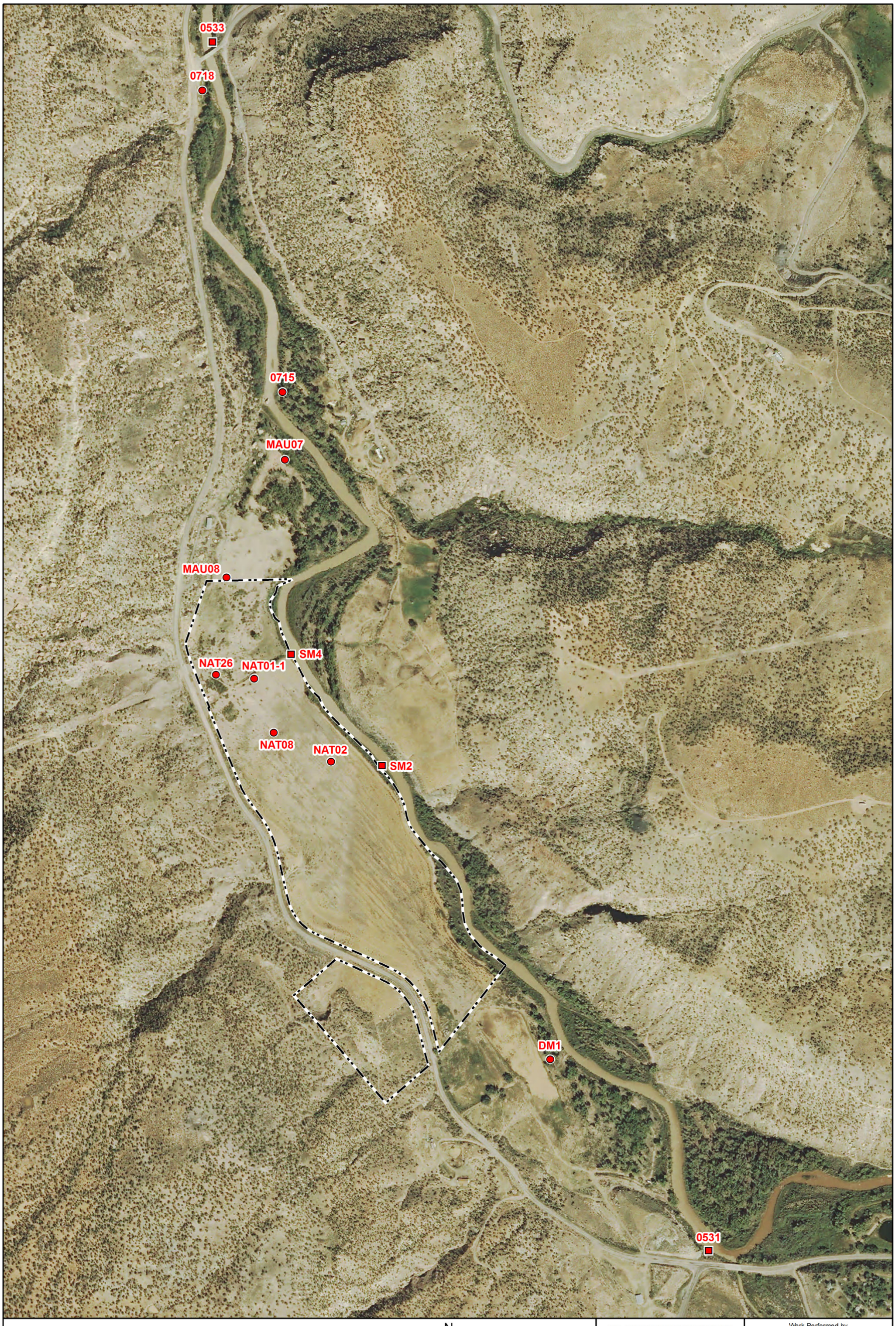
David Traub
Site Lead

DT/lcg/bkb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Steve Donivan, SN3
Lauren Goodknight, SN3
Diana Osborne, SN3
David Traub, SN3
EDD Delivery
rc-grand.junction
File: NAP 410.02

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040



LEGEND

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

N

0 700 1,400 Feet

U.S. DEPARTMENT OF ENERGY
OFFICE OF LEGACY MANAGEMENT

Work Performed by
Stoller Newport News Nuclear, Inc.
Under DOE Contract Number DE-LM0000415

Planned Sampling Map
Naturita, CO, Processing Site
July 2015

DATE PREPARED: June 15, 2015

FILE NAME: S1305500-11x17

\\LM\ess\EnvProjects\EBM\LTS\111\0001\16\002\S13055\S1305500-11x17.mxd smithw 06/15/2015 12:22:26 PM

Naturita, Colorado, Processing Site, Sample Location Map

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Sampling Frequencies for Locations at Naturita, Colorado

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
NAT01						
715			X			
718			X			
NAT01-1			X			
NAT02			X			
NAT08			X			
NAT26			X			
MAU07			X			
MAU08			X			
DM1			X			
NAT14						
BR95-1				Even year		On hold
BR95-2				Even year		On hold
BR95-3				Even year		On hold
Surface Locations						
531			X			
533			X			
SM2			X			
SM4			X			

Annual sampling conducted in July

Biennial sampling conducted in July

Constituent Sampling Breakdown

Site	Naturita				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	14	5			
Field Measurements					
Alkalinity	X	X			
Dissolved Oxygen					
Redox Potential	X	X			
pH	X	X			
Specific Conductance	X	X			
Turbidity	X				
Temperature	X	X			
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)					
Arsenic	X	X	0.0001	SW-846 6020	LMM-02
Calcium					
Chloride					
Chromium					
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum	BR and CM wells only		0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium					
Radium-226					
Radium-228					
Selenium					
Silica					
Sodium					
Strontium					
Sulfate					
Sulfide					
Total Dissolved Solids	X	X	10	SM2540 C	WCH-A-033
Total Organic Carbon					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	0.0003	SW-846 6020	LMM-02
Zinc					
Total No. of Analytes	5	4			

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

Attachment 3

Trip Report

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Stoller Newport News Nuclear

Memorandum

DATE: July 30, 2015

TO: David Traub

FROM: Gretchen Baer

SUBJECT: Trip Report

Site: Naturita, CO, Processing Site

Date of Sampling Event: July 23, 2015

Team Members: Gretchen Baer and David Atkinson

Number of Locations Sampled: Samples were collected from 12 of the 13 locations identified on the sampling notification letter.

Locations Not Sampled/Reason: Monitoring well 0715 was not sampled. Access to that location through private land was blocked by a locked gate.

Location Specific Information:

Location IDs	Comments
MAU08	SLAC sample equipment is installed in this well. The equipment prevents water level measurements from being taken. The sample was collected through the tubing marked "Middle" at 11.5 feet (which is near middle of screen interval). The well was sampled using Category I stability criteria. A QC volume was collected for TDS analysis. Sampled thru non-dedicated pumphead tubing.
NAT01-1	This is a multiple-completion well (NAT01-2 is the other casing). NAT01-1 is a 0.5 inch casing, which prevents WL measurements during the purge. (The casing is too narrow to accommodate both downhole tubing and a WL probe.) To take the initial WL, the dedicated downhole tubing was removed and the WL was allowed to stabilize for ~30 min before measurement. The tubing was re-installed and the well was sampled using casing volumes method: 3 casing volumes were purged (1.04L), readings were taken every 3 minutes, and Cat I stability was met. Well was categorized as "HV" in field notes.

All groundwater locations sampled for this event are sampled with a peristaltic pump and dedicated downhole tubing. The tubing was marked for sampling depth and the intake depth was measured and recorded (see table below). The intake depths were entered into the Excel worksheet, 'LM Sites Pump and Sampling Intake Data.xlsx' found in <\\lm\projects\SamplingProg\Sampling Data>

Well ID	Intake Depth (from TOC)	Depth to Top of Screen	Depth to Bottom of Screen	Screen Length	Comment
0715	?	*5.49 (BGS)*	*10.49 (BGS)*	5	Well could not be accessed this event. Screen depths are BGS. Casing stickup above ground surface is unknown.
0718	17.7	11.5	21.5	10	TD is BGS in database. The TD (TOC) is 21.7 feet according to the well completion log.
DM1 *	8.4	5.9	10.9	5	
MAU07 *	8.9	5.69	10.69	5	
MAU08	?	9.09	14.09	5	Well has SLAC equipment installed this event.
NAT01-1	19.6	19.62	20.12	0.5	
NAT02	12.1	8.53	13.53	5	
NAT08	11.8	7.9	12.9	5	
NAT26 *	17.3	12.98	17.98	5	

All units are in feet
TOC=Top of casing, BGS= Below ground surface, TD=Total depth
Depths that are italicized & underlined are BGS. All others are TOC.
*For this event, the initial water level was below the top of the screen.

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
2510	NIY 978	0718	Duplicate	Groundwater	--
2655	NIY 980	--	Equipment Blank	Surface water & non-ded tubing at groundwater locations	0531, 0533, SM2, SM4, and MAU08

Requisition Index Number (RIN) Assigned: Samples were assigned to RIN 15077222. Field data sheets can be found in \\crow\RAApps\SMS\15077222\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Grand Junction, CO, to ALS Laboratory Group on July 24, 2015.

Water Level Measurements: Water levels were measured in all sampled wells, with the exception of MAU08. SLAC equipment installed in that well prevents water level measurements from being obtained. The SLAC equipment cannot be removed, even briefly, because the SLAC measurements would be affected.

Well Inspection Summary: No issues were identified.

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:

- Monitoring well NAT01-1 was sampled using the casing-volume method because the water level could not be monitored during the purge. All other Category I criteria were met (flow rate and parameter stabilization).

- SLAC sample equipment is installed in montoring well MAU08. The equipment prevents water level measurements from being obtained. All other category I criteria were met (flow rate and parameter stabilization).

Equipment: All equipment functioned properly.

Stakeholder/Regulatory/DOE: Nothing to note.

Institutional Controls:

Fences, Gates, and Locks: The gate leading to monitoring well 0715 was locked with non-DOE locks, which prevented this well from being sampled. All other gates were in fair condition. While on-site, the samplers kept all gates closed because there was evidence of the presence of horses in some areas.
Signs: N/A
Trespassing/Site Disturbances: None observed.
Disposal Cell/Drainage Structure Integrity: N/A

Safety Issues: None.

Access Issues:

- The gate leading to monitoring well 0715 was locked, which prevented this well from being sampled.
- At all 4 river locations, the riverbank is difficult to access because of heavy brush. Location SM2 was especially difficult: for future events, this location may become impossible to reach as the willows and Russian olive continue to thicken.
- Despite recent heavy rainstorms in the area, the site was dry during the event.

General Information: On July 15, 2015, some parts of the town of Naturia were damaged by a flash flood. No damage or erosion associated with that storm was noted at the site.

Immediate Actions Taken: None.

Future Actions Required or Suggested:

- After the SLAC equipment is removed from MAU08, new downhole and pumphead tubing will need to be installed. Sampling intake will also have to be measured and recorded.
- A path to river locations, especially SM2, should be cleared before the next event.

GB/lcg

cc: (electronic)
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EDD Delivery

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