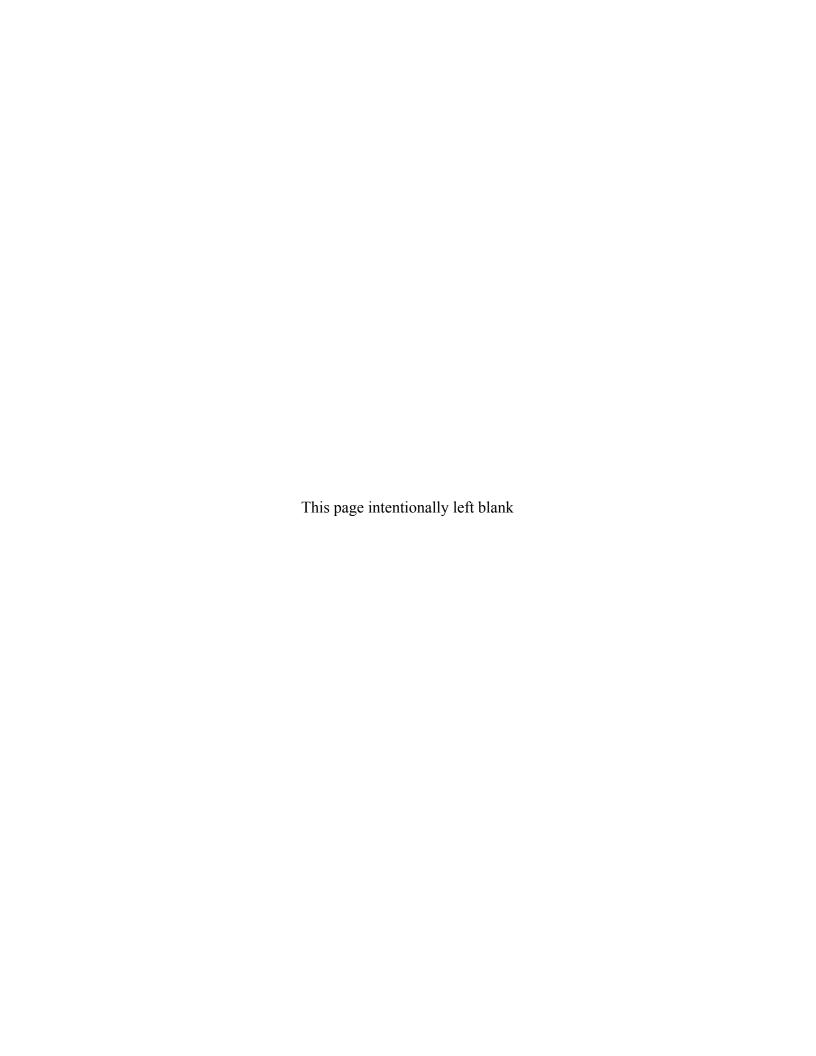
Data Validation Package

June 2014
Groundwater and Surface Water
Sampling at the
Green River, Utah, Disposal Site

August 2014





Contents

Sampling Event Summary]
Green River, Utah, Disposal Site Sample Location Map	
Data Assessment Summary	
Water Sampling Field Activities Verification Checklist	
Laboratory Performance Assessment	
Sampling Quality Control Assessment	
Certification	

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 Hydrographs Time-Concentration Graphs

Attachment 3—Sampling and Analysis Work Order

Attachment 4—Trip Report

Sampling Event Summary

Site: Green River, Utah, Disposal Site

Sampling Period: June 10 and 12, 2014

The 2011 *Groundwater Compliance Action Plan for the Green River, Utah, Disposal Site* (LMS/GRN/S07892) requires annual groundwater monitoring at the site to observe the effectiveness of the groundwater compliance strategy.

Groundwater samples were collected during the 2014 sampling event from point-of-compliance (POC) wells 0171, 0173, 0176, 0179, 0181, and 0813 to monitor the disposition of contaminants in the middle sandstone unit of the Cedar Mountain Formation. Groundwater samples also were collected from alluvium monitoring wells 0188, 0189, 0192, 0194, and 0707, and basal sandstone monitoring wells 0182, 0184, 0185, and 0588 as a best management practice. Surface locations 0846 and 0847 were sampled to monitor for degradation of water quality in the backwater area of Brown's Wash and in the Green River immediately downstream of Brown's Wash. The Green River location 0801 is upstream from the site and is sampled to determine background threshold values (BTVs). Sampling and analyses were conducted as specified in *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). Water levels were measured at each sampled well.

All six POC wells are completed in the middle sandstone unit of the Cedar Mountain Formation and are monitored to measure contaminant concentrations for comparison to proposed alternate concentration limits (ACLs), as provided in Table 1. Contaminant concentrations in the POC wells remain below their respective ACLs.

Table 1. A	\nalytical Results`	and Proposed ACL	Values for	or the POC Wells
------------	---------------------	------------------	------------	------------------

Well	A	rsenic		Nitrate + Nitrite as Nitrogen (N)		elenium	s	ulfate	Uranium	
weii	ACL	Sample Result	ACL	Sample Result	ACL	Sample Result	ACL	Sample Result	ACL	Sample Result
0171		0.0022		30		0.13		4000		0.061
0173		0.0020		88	0.058 0.77 None	0.058		5700		0.011
0176	5 0	0.00025	1.000	47		0.77	None	3800	4.4	0.0026
0179	5.0	0.00067	1,000	15	3.0	0.33	None	3600	4.4	0.17
0181		0.0016		63		0.030		6200		0.022
0813		0.037		0.020		0.0012		3700		0.034

^a Analytical results and ACLs are in milligrams per liter.

The alluvium monitoring wells are sampled as a best management practice. The results are not compared to ACLs because the alluvium is not classified as an aquifer. As expected, some of these wells continue to have elevated concentrations of nitrate and uranium because processing activities contaminated the alluvial groundwater. Analytical results for the alluvium monitoring wells are provided in Table 2. Groundwater in the basal sandstone unit has not been contaminated by site-related activities, but groundwater in this unit is monitored as a best

management practice. Analytical results for the basal sandstone monitoring wells are also provided in Table 2.

Table 2. Analytical Results^a for the Alluvium and Basal Sandstone Monitoring Wells

Well	Arsenic	Nitrate + Nitrite as N	Selenium	Sulfate	Uranium
		Alluvium Monito	ring Wells		
0188	0.00027	9.3	0.043	6,900	0.066
0189	0.00066	33	0.057	7,100	0.32
0192	0.00024	72	0.14	6,400	0.44
0194	0.0032	150	0.065	34,000	6.0
0707 (Background)	0.00030	2.5	0.079	7,600	0.026
	Ва	asal Sandstone Mo	nitoring Wells	3	
0182	0.012	ND ^b	0.00011	600	0.0007
0184 (Background)	0.0019	0.10	0.00021	670	0.0017
0185	0.0036	ND	ND	520	0.0015
0588	0.013	ND	0.000045	720	0.00021

^a Analytical results are in milligrams per liter

Surface water uranium concentrations were compared to a statistical background threshold value (BTV) derived from location 0801 data, which is located on the Green River upstream from the site. The other surface water locations (Figure 1) are in the ephemeral Brown's Wash (0847, backwater of the Green River) and at the confluence of Brown's Wash and the Green River (0846). The concentrations at the confluence of Brown's Wash and Green River (0846) are below the BTV and surface water standards, indicating no degradation of water quality resulting from contaminated groundwater discharge. The nitrate + nitrite as N, selenium, and uranium concentrations in the backwater from the Green River (0847) exceeded the BTV and surface water standards, which may be due to contaminated alluvial groundwater discharging to the surface in Brown's Wash. Surface water sample results from the 2014 sampling event for contaminants of concern are provided in Table 3.

Table 3. Analytical Results^a and Standards/Background Threshold Values for Surface Water

Location	Amm	onia as N	Arsenic			e + Nitrite as N	Sele	enium	Uranium	
	Std ^b	Sample Result	Std ^c	Sample Result	Std ^c	Sample Result	Std ^c	Sample Result	BTV ^d	Sample Result
0801 (upstream)		ND ^e		0.0012		0.093	0.0046	0.00036	0.00536	0.0015
0846	0.5	ND	0.150	0.0012		0.092		0.00051		0.0015
0847		ND		0.0011		4.8		0.0068		0.015

^a Sample results are in milligrams per liter.

^b ND = Not Detected

^b Std = Standard, in milligrams per liter

^c Standards for arsenic, nitrate, and selenium are aquatic wildlife standards from Utah Rule R317-2, Standards of Quality for Waters of the State, Table 2.14.2.

^d Uranium BTV concentration (in milligrams per liter) is based on historical data set (1997–present) from upstream Green River location (0801).

e ND = Not Detected.

Jeffrey Price, Site Lead

The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries

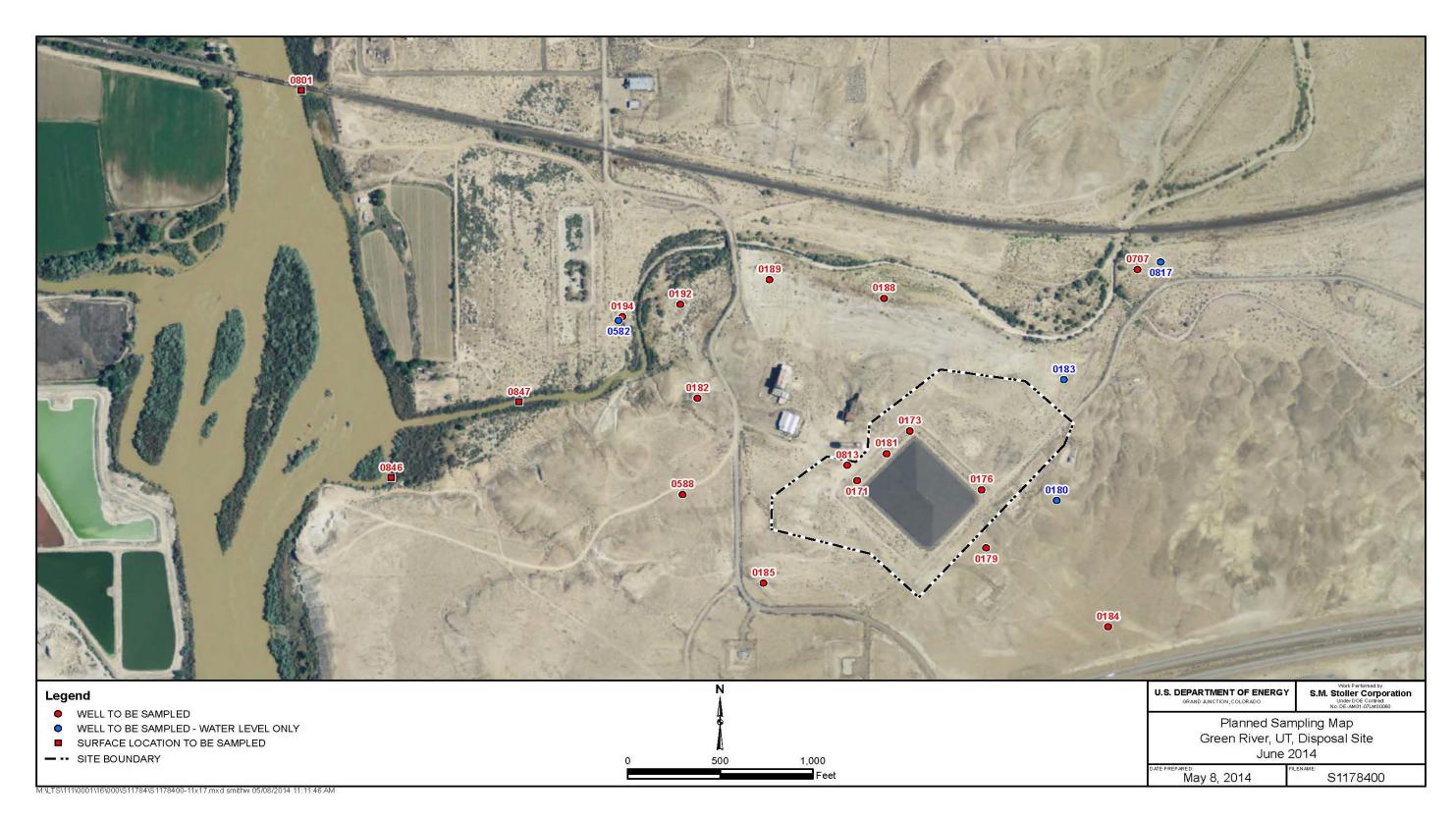
August 12, 2014

Date

David Peterson, Senior Hydrogeologist

The S.M. Stoller Corporation, a wholly owned subsidiary of Huntington Ingalls Industries

August 12, 2014



Green River, Utah, Disposal Site Sample Location Map

DVP—June 2014, Green River, Utah RIN 14066228 Page 6 U.S. Department of Energy August 2014 **Data Assessment Summary**

Water Sampling Field Activities Verification Checklist

		Date(s) of Water S	Sampling	June 10 and 12, 2014			
	Date(s) of Verification 1. Is the SAP the primary docum List any Program Directives or 2. Were the sampling locations s	July 18, 2014	Name of Verifier		Gretchen Baer		
			Response (Yes, No, NA)		Comments		
1.	. Is the SAP the primary document	directing field procedures?	Yes				
	List any Program Directives or otl	ner documents, SOPs, instructions.		Vork Order letter	dated May 12, 2014.		
2.	. Were the sampling locations spec	cified in the planning documents sampled?	YesYes				
3.	. Were calibrations conducted as s	pecified in the above-named documents?	Yes C	alibrations were	performed on June 5, 2014.		
4.	. Was an operational check of the	ield equipment conducted daily?	Yes				
	Did the operational checks meet	criteria?	Yes				
5.	. Were the number and types (alka pH, turbidity, DO, ORP) of field m	linity, temperature, specific conductance, easurements taken as specified?	Yes				
6.	. Were wells categorized correctly?		Yes				
7.	. Were the following conditions me	t when purging a Category I well:					
	Was one pump/tubing volume pu	rged prior to sampling?	Yes				
	Did the water level stabilize prior	to sampling?	Yes				
	Did pH, specific conductance, and prior to sampling?	d turbidity measurements meet criteria	Yes				
	Was the flow rate less than 500 n	nL/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?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected at location 0179.
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?	No	WLs at 0582 and 0817 were not collected because packers are installed to prevent the artesian wells from flowing. The artesian water pressure is measured with dedicated pressure transducers.

Laboratory Performance Assessment

General Information

Report Number (RIN): 14066228

Sample Event: June 10-12, 2014

Site(s): Green River, Utah; Disposal Site

Laboratory: ALS Laboratory Group, Fort Collins, Colorado

Work Order No.: 1406343

Analysis: Metals and Wet Chemistry

Validator: Gretchen Baer Review Date: July 18, 2014

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. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 4.

Table 4. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as N	WCH-A-005	EPA 350.1	EPA 350.1
Arsenic, Selenium, Uranium	LMM-02	SW-846 3005A	SW-846 6020A
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Sulfate	MIS-A-045	SW-846 9056	SW-846 9056

Data Qualifier Summary

None of the sample results required additional qualification.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 20 water samples on June 17, 2014, accompanied by a Chain of Custody form. Copies of the air bills were included in the receiving documentation. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present, indicating sample relinquishment and receipt. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced coolers at 0.4 and 1.4 °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.

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. 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 N

Calibrations were performed using six calibration standards on June 23, 2014. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria.

Method EPA 353.2, Nitrate + Nitrite as N

Calibrations were performed using seven calibration standards on June 25, 2014. The 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. All calibration checks met the acceptance criteria.

Method SW-846 6020A, Arsenic, Selenium, and Uranium

Calibrations were performed on June 20, 2014, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries were stable and within acceptable ranges.

Method SW-846 9056, Sulfate

Calibrations were performed using five calibration standards on June 15, 2014. The 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. All calibration checks met the acceptance criteria.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results were below the PQL 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 concentration. 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. The replicate results met these criteria.

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 serial dilution data evaluated met the acceptance criteria.

Completeness

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

Electronic Data Deliverable (EDD) File

The EDD file arrived on June 27, 2014. 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
IN: 14066228 Lab Co	ode: PAR Validator: Gretchen Baer Validation Date: 7/18/2014
roject: Green River	Analysis Type:
	: WATER Requested Analysis Completed: Yes
or campios mairx.	Toquested Analysis Completed.
Chain of Custody	Sample
Present: OK Signed: OK	Dated: OK Integrity: OK Preservation: OK Temperature: OK
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.

SAMPLE MANAGEMENT SYSTEM Metals Data Validation Worksheet

Page 1 of 1

RIN: 14066228 Lab Code: PAR Date Due: 7/15/2014

Matrix: Water Site Code: GRN01 Date Completed: 6/30/2014

Analyte	Method Type	Date Analyzed		ALIBRA	TION	2	Method	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
The Coulombian and the Coulombian			Int.	R^2	CCV	ССВ	Blank	33500	11.000000000000000000000000000000000000		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			200000
Arsenic	ICP/MS	06/20/2014	-0.0020	1.0000	ОК	ОК	ОК	105.0	115.0	115.0	0.0	98.0		91.0
Selenium	ICP/MS	06/20/2014	-0.0350	1.0000	OK	OK	OK	104.0	111.0	109.0	1.0	103.0	5.0	98.0
Selenium	ICP/MS	06/20/2014									5.0			
Uranium	ICP/MS	06/20/2014	0.0000	1.0000	OK	ОК	OK	106.0			2.0	100.0	1.0	110.0
Uranium	ICP/MS	06/20/2014									0.0			

SAMPLE MANAGEMENT SYSTEM Wet Chemistry Data Validation Worksheet

RIN: 14066228 **Lab Code:** <u>PAR</u> **Date Due:** <u>7/15/2014</u>

Matrix: Water Site Code: GRN01 Date Completed: 6/30/2014

Analyte	Date Analyzed	CALIBRATION				Method	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ccv	ССВ	Blank				000 004	
Ammonia as N	06/23/2014			OK	OK	ОК	102.00	98.0	92.0	7.00	
Nitrate+Nitrite as N	06/25/2014	0.000	0.9995	ОК	OK	ОК	105.00	110.0	93.0	16.00	
Sulfate	06/15/2014	0.300	0.9998								
Sulfate	06/23/2014					OK	95.00				
Sulfate	06/24/2014							123.0	111.0	2.00	

Sampling Quality Control Assessment

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

Sampling Protocol

Sample results for all monitoring wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. All wells met the Category I criteria with the following exceptions: wells 0176, 0182, 0184, 0185, 0189, and 0194 were classified as Category II or III because of water level drawdown. The sample results for these wells were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank

An equipment blank (field ID 2358) was collected after decontamination of the non-dedicated sampling equipment used at surface water locations. Arsenic was detected in the equipment blank. All associated sample results for arsenic were greater than 5 times the equipment blank, indicating that no further qualification is required. 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. A duplicate sample was collected from location 0179. 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. The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Page 1 of 1

Validation Report: Equipment/Trip Blanks

RIN:	14066228	Lab Code:	PAR	Project:	Green River	Validation Date:	7/18/2014
------	----------	-----------	-----	----------	-------------	------------------	-----------

Blank Data Blank Type Equipment Blank	Lab Sample ID 1406343-20	Lab Method SW6020	Analyte Name Arsenic	Resul 0.028		MDL 0.015	Units UG/L
Sample ID	Sample Ticket	Location	Result	Dilution Factor	Lab Qualifier	Validatio	on Qualifier
1406343-15	MHT 386	0801	1.2	1			
1406343-17	MHT 381	0846	1.2	1			
1406343-18	MHT 382	0847	1.1	5			

Page 1 of 1

SAMPLE MANAGEMENT SYSTEM Validation Report: Field Duplicates

 RIN:
 14066228
 Lab Code:
 PAR
 Project:
 Green River
 Validation Date:
 7/18/2014

Duplicate: 2357

Sample: 0179

	Sample	Duplicate									
Analyte	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution	RPD	RER	Units
AMMONIA AS N	0.1	U		1	0.1	Ü		1			MG/L
Arsenic	0.67			5	0.63			5	6.15		UG/L
Nitrate+Nitrite as N	15			20	16			25	6.45		MG/L
Selenium	330			5	340			5	2.99		UG/L
SULFATE	3600			100	3700			100	2.74		MG/L
Uranium	170			5	170			5	0		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 Danivan

P-4-2014

Data Validation Lead:

Mow to

P-4-20

Date

Attachment 1 Assessment of Anomalous Data

Potential Outliers Report

Potential Outliers Report

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

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

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

- 1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the 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 if the data are normally distributed using the Shapiro-Wilk Test.
- 2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
- 3. Scientifically review statistical outliers and decide on their disposition. The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

Two laboratory results from this sampling event were identified as potential outliers. The data associated with these results were reviewed in detail with no errors noted. The laboratory results for this RIN are acceptable as qualified.

Potential anomalies in the field parameters were also examined for evidence which would suggest a systematic error due to instrument malfunction. No such data were found. All field data from this event are acceptable.

There were no anomalies identified in the previous report (for the June 2013 sampling event) that required further review.

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 1/1/2004

Laboratory: ALS Laboratory Group

RIN: 14066228

Report Date: 7/21/2014

					Current	Qualifi	Historical Qualifiers		Historical Maximum Qualifiers		Historical Minimum Qualifiers		Number of Data Points		Statistical Outlier	
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
GRN01	0171	N001	06/10/2014	Nitrate + Nitrite as Nitrogen	30.0		F	56.0		F	35.0		F	21	0	No
GRN01	0171	N001	06/10/2014	Selenium	0.130		F	0.230	Е	JF	0.140		F	22	0	NA
GRN01	0176	N001	06/10/2014	Arsenic	0.00025		FQ	0.00120		F	0.00029		F	8	0	NA
GRN01	0176	N001	06/10/2014	Nitrate + Nitrite as Nitrogen	47.0		FQ	91.0		F	54.0		JF	8	0	No
GRN01	0179	N002	06/12/2014	Nitrate + Nitrite as Nitrogen	16.0		F	36.0		F	17.0		F	12	0	No
GRN01	0179	N001	06/12/2014	Nitrate + Nitrite as Nitrogen	15.0		F	36.0		F	17.0		F	12	0	No
GRN01	0181	N001	06/10/2014	Arsenic	0.00160		F	0.00500		F	0.00180		F	14	0	No
GRN01	0181	N001	06/10/2014	Selenium	0.0300		F	0.0210		F	0.00590		F	14	0	Yes
GRN01	0188	N001	06/12/2014	Selenium	0.0430		F	0.0340		F	0.0160		F	13	0	No
GRN01	0188	N001	06/12/2014	Uranium	0.0660		F	0.110		F	0.0680		F	13	0	No
GRN01	0192	N001	06/12/2014	Nitrate + Nitrite as Nitrogen	72.0		F	190		F	79.0		F	9	0	No
GRN01	0192	N001	06/12/2014	Selenium	0.140		F	0.110		F	0.0420		F	9	0	No
GRN01	0813	N001	06/10/2014	Arsenic	0.0370		F	0.180		F	0.0630		F	25	0	No
GRN01	0813	N001	06/10/2014	Uranium	0.0340		F	0.0330		F	0.00420	В	F	25	0	NA
GRN01	0847	0001	06/12/2014	Nitrate + Nitrite as Nitrogen	4.80			0.500			0.01000	U	J	9	4	No
GRN01	0847	0001	06/12/2014	Selenium	0.00680			0.00150		J	0.00021		U	9	1	Yes
GRN01	0847	0001	06/12/2014	Uranium	0.0150			0.0140			0.00120			9	0	No

STATISTICAL TESTS:

The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test Outliers are identified using Dixon's Test when there are 25 or fewer data points.

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

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

NA: Data are not normally or lognormally distributed.

Data Validation Outliers Report - Field Parameters Only

Comparison: All historical Data Beginning 1/1/2004

Laboratory: Field Measurements

RIN: 14066228

Report Date: 7/21/2014

					Current	Qualifiers		Historical Maximum Qualifiers		Historical Minim Qual		linimum Qualifiers		er of Points	Statistical Outlier	
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
GRN01	0171	N001	06/10/2014	Turbidity	8.02		F	3.08		F	0.170		F	20	0	Yes
GRN01	0173	N001	06/10/2014	Turbidity	4.05		F	3.55		F	0.1000		F	20	0	No
GRN01	0176	N001	06/10/2014	рН	6.63		FQ	6.88		F	6.65		F	8	0	No
GRN01	0179	N001	06/12/2014	Oxidation Reduction Potential	203		F	195			49.0		F	11	0	No
GRN01	0188	N001	06/12/2014	Oxidation Reduction Potential	205		F	203		FQ	-160		F	10	0	No
GRN01	0188	N001	06/12/2014	Turbidity	6.95		F	4.81		F	0.510		F	9	0	No
GRN01	0189	N001	06/12/2014	Alkalinity, Total (as CaCO ₃)	246		FQ	961		F	355		FQ	7	0	NA
GRN01	0813	N001	06/10/2014	Turbidity	9.39		F	3.45		F	0.380		F	20	0	Yes

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 Data Presentation

Groundwater Quality Data

This page intentionally left blank

REPORT DATE: 7/21/2014

Location: 0171 WELL POC Monitor Well (Down Gradient)

Parameter	Units	Samp	ole	Dep	th Rar	nge	Result		Qualifiers	,	Detection	Uncertainty
Faranielei	Office	Date	ID	(F	t BLS)	Nesuit	Lab	Data	QA	Limit	Officertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	N001	76	-	86	396		F	#		
Ammonia Total as N	mg/L	06/10/2014	N001	76	-	86	0.1	U	F	#	0.1	
Arsenic	mg/L	06/10/2014	N001	76	-	86	0.0022		F	#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	N001	76	-	86	30		F	#	0.25	
Oxidation Reduction Potential	mV	06/10/2014	N001	76	-	86	130		F	#		
pH	s.u.	06/10/2014	N001	76	-	86	6.79		F	#		
Selenium	mg/L	06/10/2014	N001	76	-	86	0.13		F	#	0.00016	
Specific Conductance	umhos/c m	06/10/2014	N001	76	-	86	7520		F	#		
Sulfate	mg/L	06/10/2014	N001	76	-	86	4000		F	#	25	
Temperature	С	06/10/2014	N001	76	-	86	18.8		F	#		
Turbidity	NTU	06/10/2014	N001	76	-	86	8.02		F	#		
Uranium	mg/L	06/10/2014	N001	76	-	86	0.061		F	#	0.000015	

REPORT DATE: 7/21/2014

Location: 0173 WELL POC Monitor Well (Down Gradient)

Parameter	Units	Sam	ole	Dep	th Rai	nge	Result		Qualifiers		Detection	Uncertainty
Farameter	UTIILS	Date	ID	(F	t BLS	5)	Result	Lab	Data	QA	Limit	Officertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	N001	92	-	102	552		F	#		
Ammonia Total as N	mg/L	06/10/2014	N001	92	-	102	0.1	U	F	#	0.1	
Arsenic	mg/L	06/10/2014	N001	92	-	102	0.002		F	#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	N001	92	-	102	88		F	#	1	
Oxidation Reduction Potential	mV	06/10/2014	N001	92	-	102	155		F	#		
pH	s.u.	06/10/2014	N001	92	-	102	6.92		F	#		
Selenium	mg/L	06/10/2014	N001	92	-	102	0.058		F	#	0.00016	
Specific Conductance	umhos /cm	06/10/2014	N001	92	-	102	11222		F	#		
Sulfate	mg/L	06/10/2014	N001	92	-	102	5700		F	#	50	
Temperature	С	06/10/2014	N001	92	-	102	17.2		F	#		
Turbidity	NTU	06/10/2014	N001	92	-	102	4.05		F	#		
Uranium	mg/L	06/10/2014	N001	92	-	102	0.011		F	#	0.000015	

REPORT DATE: 7/21/2014

Location: 0176 WELL POC Monitor Well (Cross Gradient)

Parameter	Linita	Sam	ole	Dep	th Ra	nge	Result		Qualifiers		Detection	Uncortainty
Parameter	Units	Date	ID	(F	t BLS	5)	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	N001	72	-	82	346		FQ	#		
Ammonia Total as N	mg/L	06/10/2014	N001	72	-	82	0.1	U	FQ	#	0.1	
Arsenic	mg/L	06/10/2014	N001	72	-	82	0.00025		FQ	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	N001	72	-	82	47		FQ	#	0.5	
Oxidation Reduction Potential	mV	06/10/2014	N001	72	-	82	175		FQ	#		
pH	s.u.	06/10/2014	N001	72	-	82	6.63		FQ	#		
Selenium	mg/L	06/10/2014	N001	72	-	82	0.77		FQ	#	0.00032	
Specific Conductance	umhos /cm	06/10/2014	N001	72	-	82	7810		FQ	#		
Sulfate	mg/L	06/10/2014	N001	72	-	82	3800		FQ	#	50	
Temperature	С	06/10/2014	N001	72	-	82	18.5		FQ	#		
Turbidity	NTU	06/10/2014	N001	72	-	82	1.97		FQ	#		
Uranium	mg/L	06/10/2014	N001	72	-	82	0.0026		FQ	#	0.000029	

REPORT DATE: 7/21/2014

Location: 0179 WELL POC Monitor Well (Up Gradient)

Parameter	Units	Sam Date	iple ID		th Rai		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	N001	78	-	88	484		F	#		
Ammonia Total as N	mg/L	06/12/2014	N001	78	-	88	0.1	U	F	#	0.1	
Ammonia Total as N	mg/L	06/12/2014	N002	78	-	88	0.1	U	F	#	0.1	
Arsenic	mg/L	06/12/2014	N001	78	-	88	0.00067		F	#	0.000074	
Arsenic	mg/L	06/12/2014	N002	78	-	88	0.00063		F	#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N001	78	-	88	15		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N002	78	-	88	16		F	#	0.25	
Oxidation Reduction Potential	mV	06/12/2014	N001	78	-	88	203		F	#		
рН	s.u.	06/12/2014	N001	78	-	88	6.62		F	#		
Selenium	mg/L	06/12/2014	N001	78	-	88	0.33		F	#	0.00016	
Selenium	mg/L	06/12/2014	N002	78	-	88	0.34		F	#	0.00016	
Specific Conductance	umhos /cm	06/12/2014	N001	78	-	88	7390		F	#		
Sulfate	mg/L	06/12/2014	N001	78	-	88	3600		F	#	50	
Sulfate	mg/L	06/12/2014	N002	78	-	88	3700		F	#	50	
Temperature	С	06/12/2014	N001	78	-	88	18.9		F	#		
Turbidity	NTU	06/12/2014	N001	78	-	88	3.48		F	#		
Uranium	mg/L	06/12/2014	N001	78	-	88	0.17		F	#	0.000015	
Uranium	mg/L	06/12/2014	N002	78	-	88	0.17		F	#	0.000015	

REPORT DATE: 7/21/201 Location: 0181 WELL

Parameter	Units	Sam	ple	Dep	th Ra	nge	Result		Qualifiers		Detection	Uncertainty
raiailletei	Ullits	Date	ID	(F	Ft BLS	S)	Resuit	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	N001	77	-	92	450		F	#		
Ammonia Total as N	mg/L	06/10/2014	N001	77	-	92	0.1	U	F	#	0.1	
Arsenic	mg/L	06/10/2014	N001	77	-	92	0.0016		F	#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	N001	77	-	92	63		F	#	1	
Oxidation Reduction Potential	mV	06/10/2014	N001	77	-	92	150		F	#		
рН	s.u.	06/10/2014	N001	77	-	92	7.07		F	#		
Selenium	mg/L	06/10/2014	N001	77	-	92	0.03		F	#	0.00016	
Specific Conductance	umhos /cm	06/10/2014	N001	77	-	92	11505		F	#		
Sulfate	mg/L	06/10/2014	N001	77	-	92	6200		F	#	50	
Temperature	С	06/10/2014	N001	77	-	92	17.5		F	#		
Turbidity	NTU	06/10/2014	N001	77	-	92	1.89		F	#		
Uranium	mg/L	06/10/2014	N001	77	-	92	0.022		F	#	0.000015	

Location: 0182 WELL

Parameter	Units	Sam	Sample	Dep	th Ra	ange	Result		Qualifiers		Detection	Uncertainty
Falailletei	Offics	Date	ID	(F	t BL	S)	Result	Lab	Data	QA	Limit	Oncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	0001	140	-	150	560		FQ	#		
Ammonia Total as N	mg/L	06/10/2014	0001	140	-	150	0.18		FQ	#	0.1	
Arsenic	mg/L	06/10/2014	0001	140	-	150	0.012		FQ	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	0001	140	-	150	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	06/10/2014	N001	140	-	150	-20		FQ	#		
рН	s.u.	06/10/2014	N001	140	-	150	7.9		FQ	#		
Selenium	mg/L	06/10/2014	0001	140	-	150	0.00011		FQ	#	0.000032	
Specific Conductance	umhos /cm	06/10/2014	N001	140	-	150	2800		FQ	#		
Sulfate	mg/L	06/10/2014	0001	140	-	150	600		FQ	#	10	
Temperature	С	06/10/2014	N001	140	-	150	17.8		FQ	#		
Turbidity	NTU	06/10/2014	N001	140	-	150	30.2		FQ	#		
Uranium	mg/L	06/10/2014	0001	140	-	150	0.0007		FQ	#	0.0000029	

REPORT DATE: 7/21/2014 Location: 0184 WELL

Parameter	Units	Sample	Dep	th Ra	inge	Result		Qualifiers		Detection	Uncertainty	
Falailletei	Offics	Date	ID	(F	t BLS	S)	Nesuit	Lab	Data	QA	Limit	Oncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	0001	169	-	184	484		FQ	#		
Ammonia Total as N	mg/L	06/10/2014	0001	169	-	184	0.1	U	FQ	#	0.1	
Arsenic	mg/L	06/10/2014	0001	169	-	184	0.0019		FQ	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	0001	169	-	184	0.1		FQ	#	0.01	
Oxidation Reduction Potential	mV	06/10/2014	N001	169	-	184	5		FQ	#		
рН	s.u.	06/10/2014	N001	169	-	184	7.91		FQ	#		
Selenium	mg/L	06/10/2014	0001	169	-	184	0.00021		FQ	#	0.000032	
Specific Conductance	umhos /cm	06/10/2014	N001	169	-	184	2720		FQ	#		
Sulfate	mg/L	06/10/2014	0001	169	-	184	670		FQ	#	10	
Temperature	С	06/10/2014	N001	169	-	184	18.4		FQ	#		
Turbidity	NTU	06/10/2014	N001	169	-	184	19.2		FQ	#		
Uranium	mg/L	06/10/2014	0001	169	-	184	0.0017		FQ	#	0.0000029	

REPORT DATE: 7/21/201 Location: 0185 WELL

Parameter	Units	Sai Date	mple ID	•	th R	ange	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
All II II T () () ()				<u> </u>		-		Lab			Lilling	
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	0001	131	-	141	560		FQ	#		
Ammonia Total as N	mg/L	06/10/2014	0001	131	-	141	0.1	U	FQ	#	0.1	
Arsenic	mg/L	06/10/2014	0001	131	-	141	0.0036		FQ	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	0001	131	-	141	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	06/10/2014	N001	131	-	141	50		FQ	#		
рН	s.u.	06/10/2014	N001	131	-	141	8.35		FQ	#		
Selenium	mg/L	06/10/2014	0001	131	-	141	0.000032	U	FQ	#	0.000032	
Specific Conductance	umhos /cm	06/10/2014	N001	131	-	141	2625		FQ	#		
Sulfate	mg/L	06/10/2014	0001	131	-	141	520		FQ	#	10	
Temperature	С	06/10/2014	N001	131	-	141	17.6		FQ	#		
Turbidity	NTU	06/10/2014	N001	131	-	141	15.2		FQ	#		
Uranium	mg/L	06/10/2014	0001	131	-	141	0.0015		FQ	#	0.0000029	

Location: 0188 WELL

Parameter	Units	Sam	ple	Dep	th Ra	inge	Result		Qualifiers		Detection	Uncertainty
i arametei	Offics	Date	ID	(F	t BL	S)	Nesuit	Lab	Data	QA	Limit	Officertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	N001	7.5	-	12.5	368		F	#		
Ammonia Total as N	mg/L	06/12/2014	N001	7.5	-	12.5	11		F	#	1	
Arsenic	mg/L	06/12/2014	N001	7.5	-	12.5	0.00027		F	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N001	7.5	-	12.5	9.3		F	#	0.2	
Oxidation Reduction Potential	mV	06/12/2014	N001	7.5	-	12.5	205		F	#		
рН	s.u.	06/12/2014	N001	7.5	-	12.5	7.05		F	#		
Selenium	mg/L	06/12/2014	N001	7.5	-	12.5	0.043		F	#	0.000032	
Specific Conductance	umhos /cm	06/12/2014	N001	7.5	-	12.5	11580		F	#		
Sulfate	mg/L	06/12/2014	N001	7.5	-	12.5	6900		F	#	50	
Temperature	С	06/12/2014	N001	7.5	-	12.5	16.4		F	#		
Turbidity	NTU	06/12/2014	N001	7.5	-	12.5	6.95		F	#		
Uranium	mg/L	06/12/2014	N001	7.5	-	12.5	0.066		F	#	0.000029	

REPORT DATE: 7/21/2014 Location: 0189 WELL

Darameter	Units	Sam	ple	Dep	th Ra	nge	Decult		Qualifiers		Detection	Lincortointy
Parameter	Units	Date	ID	(I	Ft BLS	S)	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	N001	14	-	19	246		FQ	#		
Ammonia Total as N	mg/L	06/12/2014	N001	14	-	19	44		FQ	#	2	
Arsenic	mg/L	06/12/2014	N001	14	-	19	0.00066		FQ	#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N001	14	-	19	33		FQ	#	0.25	
Oxidation Reduction Potential	mV	06/12/2014	N001	14	-	19	205		FQ	#		
рН	s.u.	06/12/2014	N001	14	-	19	7.08		FQ	#		
Selenium	mg/L	06/12/2014	N001	14	-	19	0.057		FQ	#	0.00016	
Specific Conductance	umhos /cm	06/12/2014	N001	14	-	19	12470		FQ	#		
Sulfate	mg/L	06/12/2014	N001	14	-	19	7100		FQ	#	50	
Temperature	С	06/12/2014	N001	14	-	19	17.7		FQ	#		
Turbidity	NTU	06/12/2014	N001	14	-	19	3.2		FQ	#		
Uranium	mg/L	06/12/2014	N001	14	-	19	0.32		FQ	#	0.000015	

REPORT DATE: 7/21/2014 Location: 0192 WELL

Parameter	Units	Sam	ple	Depth	n Rai	nge	Dogult		Qualifiers		Detection	Lincortainty
Parameter	Units	Date	ID	(Ft	BLS	5)	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	N001	5.02	-	9.96	340		F	#		
Ammonia Total as N	mg/L	06/12/2014	N001	5.02	-	9.96	2.5		F	#	0.1	
Arsenic	mg/L	06/12/2014	N001	5.02	-	9.96	0.00024		F	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N001	5.02	-	9.96	72		F	#	1	
Oxidation Reduction Potential	mV	06/12/2014	N001	5.02	-	9.96	200		F	#		
рН	s.u.	06/12/2014	N001	5.02	-	9.96	6.95		F	#		
Selenium	mg/L	06/12/2014	N001	5.02	-	9.96	0.14		F	#	0.000032	
Specific Conductance	umhos /cm	06/12/2014	N001	5.02	-	9.96	11650		F	#		
Sulfate	mg/L	06/12/2014	N001	5.02	-	9.96	6400		F	#	50	
Temperature	С	06/12/2014	N001	5.02	-	9.96	16.8		F	#		
Turbidity	NTU	06/12/2014	N001	5.02	-	9.96	0.79		F	#		
Uranium	mg/L	06/12/2014	N001	5.02	-	9.96	0.44		F	#	0.000029	

REPORT DATE: 7/21/2014 Location: 0194 WELL

Parameter	Units	Sam	ple	Depth R	ange	Result		Qualifiers		Detection	Uncertainty
Farameter	Ullits	Date	ID	(Ft Bl	-S)	Result	Lab	Data	QA	Limit	Oncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	N001	12.5 -	17.5	1360		FQ	#		
Ammonia Total as N	mg/L	06/12/2014	N001	12.5 -	17.5	0.1	U	FQ	#	0.1	
Arsenic	mg/L	06/12/2014	N001	12.5 -	17.5	0.0032		FQ	#	0.00015	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N001	12.5 -	17.5	150		FQ	#	2	
Oxidation Reduction Potential	mV	06/12/2014	N001	12.5 -	17.5	225		FQ	#		
рН	s.u.	06/12/2014	N001	12.5 -	17.5	7.58		FQ	#		
Selenium	mg/L	06/12/2014	N001	12.5 -	17.5	0.065		FQ	#	0.00032	
Specific Conductance	umhos /cm	06/12/2014	N001	12.5 -	17.5	44305		FQ	#		
Sulfate	mg/L	06/12/2014	N001	12.5 -	17.5	34000		FQ	#	250	
Temperature	С	06/12/2014	N001	12.5 -	17.5	18.4		FQ	#	·	
Turbidity	NTU	06/12/2014	N001	12.5 -	17.5	6.47		FQ	#		
Uranium	mg/L	06/12/2014	N001	12.5 -	17.5	6		FQ	#	0.00058	

REPORT DATE: 7/21/2014 Location: 0588 WELL

Parameter	Units	Sam	ple	Dep	th Ra	inge	Result	Qualifiers			Detection	Uncertainty
Farameter	Office	Date	ID	(F	t BLS	S)	Nesuit	Lab	Data	QA	Limit	Officertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	N001	123	-	143	580		F	#		
Ammonia Total as N	mg/L	06/10/2014	N001	123	-	143	0.13		F	#	0.1	
Arsenic	mg/L	06/10/2014	N001	123	-	143	0.013		F	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	N001	123	-	143	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/10/2014	N001	123	-	143	-140		F	#		
pH	s.u.	06/10/2014	N001	123	-	143	7.9		F	#		
Selenium	mg/L	06/10/2014	N001	123	-	143	0.000045	В	F	#	0.000032	
Specific Conductance	umhos /cm	06/10/2014	N001	123	-	143	2880		F	#		
Sulfate	mg/L	06/10/2014	N001	123	-	143	720		F	#	10	
Temperature	С	06/10/2014	N001	123	-	143	17.4		F	#		
Turbidity	NTU	06/10/2014	N001	123	-	143	9.86		F	#		
Uranium	mg/L	06/10/2014	N001	123	-	143	0.00021		F	#	0.0000029	

REPORT DATE: 7/21/2014 Location: 0707 WELL

Parameter	Units	Sample		Dep	Depth Range		Decult	Qualifiers			Detection	Lincortainty
Parameter	Units	Date	ID	(I	Ft BLS	5)	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	N001	9	-	15	152		F	#		
Ammonia Total as N	mg/L	06/12/2014	N001	9	-	15	0.1	U	F	#	0.1	
Arsenic	mg/L	06/12/2014	N001	9	-	15	0.0003		F	#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	N001	9	-	15	2.5		F	#	0.1	
Oxidation Reduction Potential	mV	06/12/2014	N001	9	-	15	205		F	#		
рН	s.u.	06/12/2014	N001	9	-	15	7.52		F	#		
Selenium	mg/L	06/12/2014	N001	9	-	15	0.079		F	#	0.000032	
Specific Conductance	umhos /cm	06/12/2014	N001	9	-	15	11980		F	#		
Sulfate	mg/L	06/12/2014	N001	9	-	15	7600		F	#	50	
Temperature	С	06/12/2014	N001	9	-	15	16.1		F	#		
Turbidity	NTU	06/12/2014	N001	9	-	15	3.16		F	#		
Uranium	mg/L	06/12/2014	N001	9	-	15	0.026		F	#	0.0000029	

REPORT DATE: 7/21/2014 Location: 0813 WELL

Parameter	Units	Sam	ple	Depth F	Range	Result	Qualifiers			Detection	Uncertainty
Parameter	Units	Date	ID	(Ft B	LS)	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/10/2014	N001	77.7 -	97.7	660		F	#		
Ammonia Total as N	mg/L	06/10/2014	N001	77.7 -	97.7	0.22		F	#	0.1	
Arsenic	mg/L	06/10/2014	N001	77.7 -	97.7	0.037		F	#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/10/2014	N001	77.7 -	97.7	0.02		F	#	0.01	
Oxidation Reduction Potential	mV	06/10/2014	N001	77.7 -	97.7	83		F	#		
pH	s.u.	06/10/2014	N001	77.7 -	97.7	6.74		F	#		
Selenium	mg/L	06/10/2014	N001	77.7 -	97.7	0.0012		F	#	0.00016	
Specific Conductance	umhos /cm	06/10/2014	N001	77.7 -	97.7	7305		F	#		
Sulfate	mg/L	06/10/2014	N001	77.7 -	97.7	3700		F	#	50	
Temperature	С	06/10/2014	N001	77.7 -	97.7	18		F	#		
Turbidity	NTU	06/10/2014	N001	77.7 -	97.7	9.39		F	#		
Uranium	mg/L	06/10/2014	N001	77.7 -	97.7	0.034		F	#	0.000015	

SAMPLE ID CODES: $000X = Filtered sample (0.45 \mu m)$. 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

- Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC). > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. Ν
- Ρ
- U Analytical result below detection limit.
- Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. W
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- 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.
- Parameter analyzed for but was not detected. U X Location is undefined.

QA QUALIFIER:

Validated according to quality assurance guidelines.

Surface Water Quality Data

This page intentionally left blank

REPORT DATE: 7/21/2014

Location: 0801 SURFACE LOCATION GREEN RIVER

Parameter	Units	Sample		Result	•	Qualifiers		Detection	Uncertainty
Parameter	Units	Date	ID	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	0001	84			#		
Ammonia Total as N	mg/L	06/12/2014	0001	0.1	U		#	0.1	
Arsenic	mg/L	06/12/2014	0001	0.0012			#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	0001	0.093			#	0.01	
Oxidation Reduction Potential	mV	06/12/2014	N001	95			#		
рН	s.u.	06/12/2014	N001	8.03			#		
Selenium	mg/L	06/12/2014	0001	0.00036			#	0.000032	
Specific Conductance	umhos/cm	06/12/2014	N001	460			#		
Sulfate	mg/L	06/12/2014	0001	78			#	0.5	
Temperature	С	06/12/2014	N001	18.9			#		
Turbidity	NTU	06/12/2014	N001	565			#		
Uranium	mg/L	06/12/2014	0001	0.0015			#	0.0000029	

REPORT DATE: 7/21/2014

Location: 0846 SURFACE LOCATION

Demonster	Lleite	Samp	ole	Desult	•	Qualifiers		Detection	Uncertainty
Parameter	Units	Date	ID	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	0001	110			#		
Ammonia Total as N	mg/L	06/12/2014	0001	0.1	U		#	0.1	
Arsenic	mg/L	06/12/2014	0001	0.0012			#	0.000015	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	0001	0.092			#	0.01	
Oxidation Reduction Potential	mV	06/12/2014	N001	100			#		
pH	s.u.	06/12/2014	N001	7.9			#		
Selenium	mg/L	06/12/2014	0001	0.00051			#	0.000032	
Specific Conductance	umhos/cm	06/12/2014	N001	370			#		
Sulfate	mg/L	06/12/2014	0001	69	N		#	0.5	
Temperature	С	06/12/2014	N001	21.2			#		
Turbidity	NTU	06/12/2014	N001	401			#		
Uranium	mg/L	06/12/2014	0001	0.0015			#	0.0000029	

REPORT DATE: 7/21/2014

Location: 0847 SURFACE LOCATION

Doromotor	Units	Sample		Dogult	Qualifiers			Detection	Uncertainty
Parameter	Units	Date	ID	Result	Lab	Data	QA	Limit	Uncertainty
Alkalinity, Total (as CaCO ₃)	mg/L	06/12/2014	0001	170			#		
Ammonia Total as N	mg/L	06/12/2014	0001	0.1	U		#	0.1	
Arsenic	mg/L	06/12/2014	0001	0.0011			#	0.000074	
Nitrate + Nitrite as Nitrogen	mg/L	06/12/2014	0001	4.8			#	0.05	
Oxidation Reduction Potential	mV	06/12/2014	N001	110			#		
pH	s.u.	06/12/2014	N001	8.17			#		
Selenium	mg/L	06/12/2014	0001	0.0068			#	0.00016	
Specific Conductance	umhos/cm	06/12/2014	N001	835			#		
Sulfate	mg/L	06/12/2014	0001	270			#	5	
Temperature	С	06/12/2014	N001	25.8			#		
Turbidity	NTU	06/12/2014	N001	325			#		
Uranium	mg/L	06/12/2014	0001	0.015			#	0.000015	

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. >
- Α
- TIC is a suspected aldol-condensation product.
 Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
 Pesticide result confirmed by GC-MS. В
- С
- D Analyte determined in diluted sample.
- Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS. Ε
- Н
- Holding time expired, value suspect.
 Increased detection limit due to required dilution.
- Estimated

- Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC). > 25% difference in detected pesticide or Aroclor concentrations between 2 columns. Ν
- Ρ
- U Analytical result below detection limit.
- Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance. W
- X,Y,Z Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

- 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.
- Parameter analyzed for but was not detected. U X Location is undefined.

QA QUALIFIER:

Validated according to quality assurance guidelines.

Equipment Blank Data

This page intentionally left blank

BLANKS REPORT

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

RIN: 14066228

Report Date: 7/21/2014

Parameter	Site Code	Location ID	Sample Date	e ID	Units	Result	Qua Lab	lifiers Data	Detection Limit	Uncertainty	Sample Type
Ammonia Total as N	GRN01	0999	06/12/2014	N001	mg/L	0.1	U		0.1		E
Arsenic	GRN01	0999	06/12/2014	N001	mg/L	0.000028	В		0.000015		E
Nitrate + Nitrite as Nitrogen	GRN01	0999	06/12/2014	N001	mg/L	0.01	U		0.01		E
Selenium	GRN01	0999	06/12/2014	N001	mg/L	0.000032	U		0.000032		E
Sulfate	GRN01	0999	06/12/2014	N001	mg/L	0.5	U		0.5		E
Uranium	GRN01	0999	06/12/2014	N001	mg/L	0.0000029	U		0.0000029		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.
 - Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9. J Estimated value.
- Q Qualitative result due to sampling technique. R Unusable result.
- X Location is undefined.

SAMPLE TYPES:

L

E Equipment Blank.

This page intentionally left blank

Static Water Level Data

This page intentionally left blank

STATIC WATER LEVELS (USEE700) FOR SITE GRN01, Green River Disposal Site REPORT DATE: 7/21/2014

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measure Date	ement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0171	D	4140.10	06/10/2014	11:10:29	57.22	4082.88	
0173	D	4141.23	06/10/2014	12:05:37	58.31	4082.92	
0176	D	4143.40	06/10/2014	13:45:41	58.91	4084.49	
0179	С	4161.39	06/12/2014	11:00:52	76.88	4084.51	
0180	С	4159.11	06/12/2014	11:12:00	57.35	4101.76	
0181	D	4141.10	06/10/2014	11:40:34	57.90	4083.20	
0182	D	4101.52	06/10/2014	14:45:38	15.70	4085.82	
0183	С	4100.60	06/12/2014	11:30:00	16.09	4084.51	
0184	С	4192.98	06/10/2014	16:10:15	106.56	4086.42	
0185	U	4135.46	06/10/2014	10:20:34	49.94	4085.52	
0188	0	4075.11	06/12/2014	12:05:46	11.85	4063.26	
0189	0	4075.96	06/12/2014	12:25:06	19.14	4056.82	
0192	0	4065.83	06/12/2014	12:50:29	11.42	4054.41	
0194	D	4067.76	06/12/2014	13:15:28	18.36	4049.40	
0582	С	4067.00					
0588	U	4113.92	06/10/2014	15:25:35	28.48	4085.44	
0707	U	4083.03	06/12/2014	11:40:23	13.94	4069.09	
0813	D	4136.36	06/10/2014	14:20:54	53.48	4082.88	
0817	С	4085.31					

FLOW CODES: B BACKGROUND N UNKNOWN

C CROSS GRADIENT O ONSITE D DOWN GRADIENT U UPGRADIENT F OFFSITE

WATER LEVEL FLAGS: D Dry

F Flowing

B Below top of pump

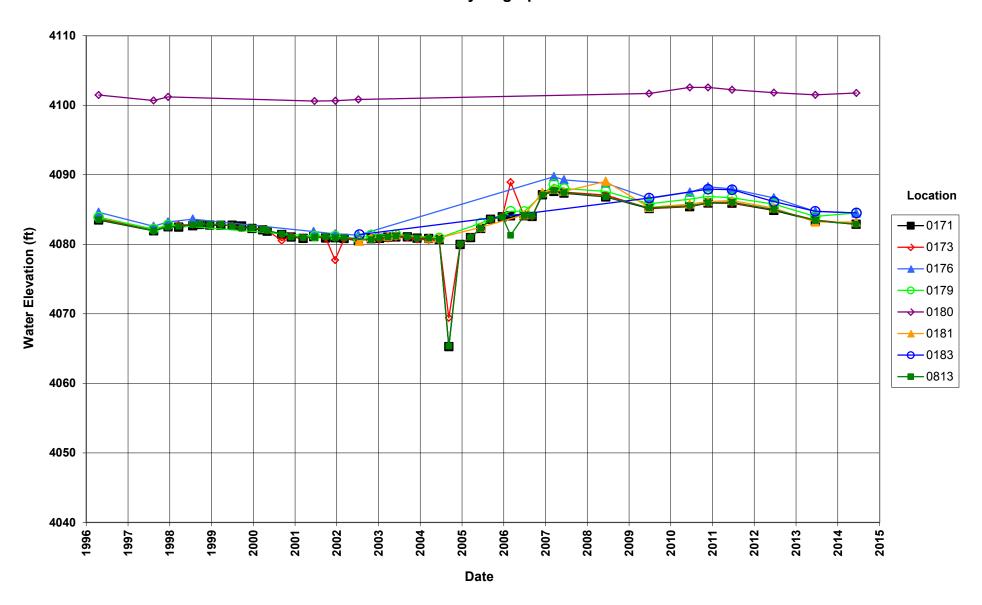
0582 and 0817 were not collected because packers are installed to prevent the artesian wells from flowing. The artesian water pressure is measured with dedicated pressure transducers.

This page intentionally left blank

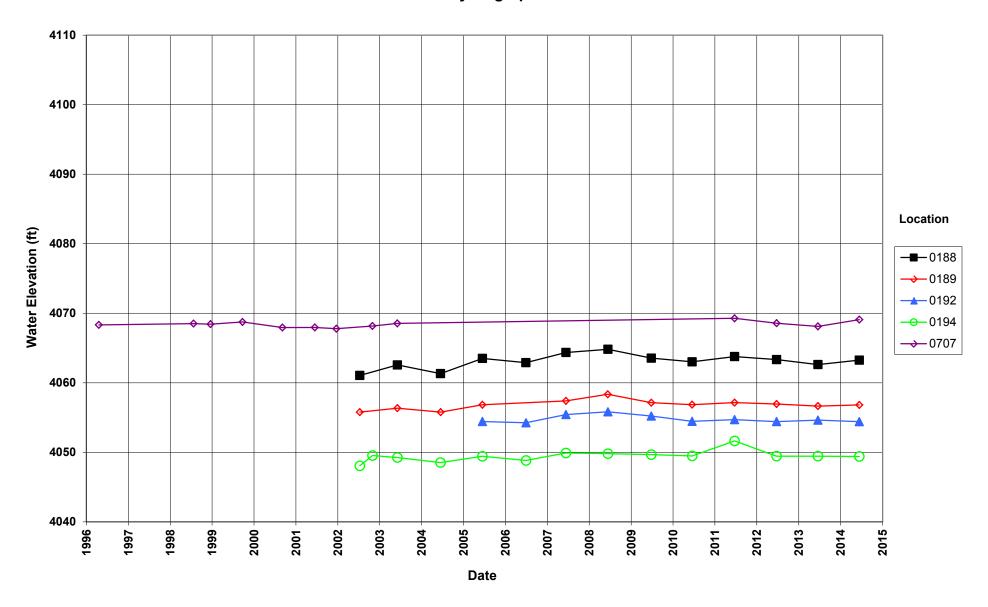
Hydrographs

This page intentionally left blank

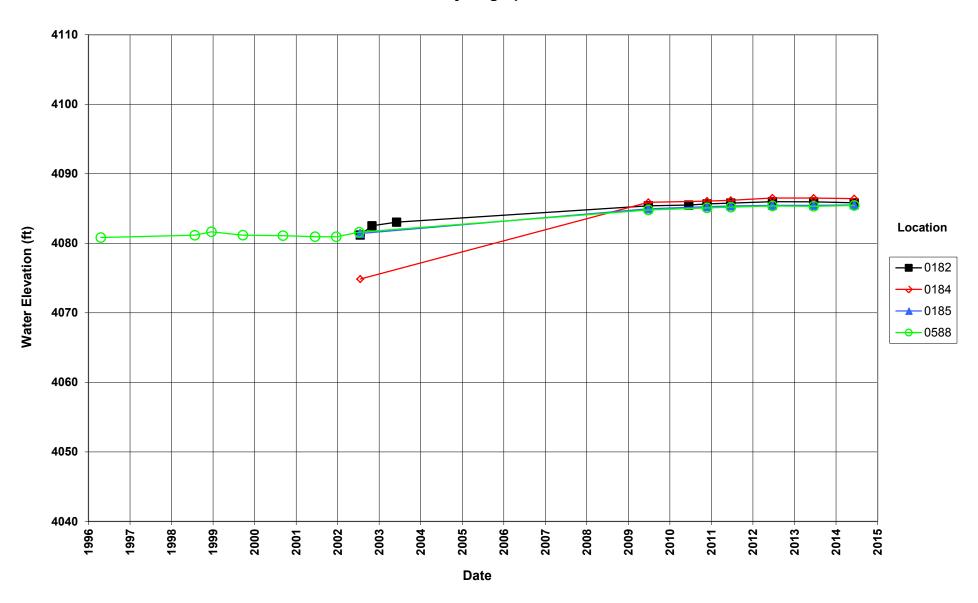
Green River Disposal Site Middle Sandstone Unit Wells Hydrograph



Green River Disposal Site Alluvium Wells Hydrograph



Green River Disposal Site Basal Sandstone Wells Hydrograph



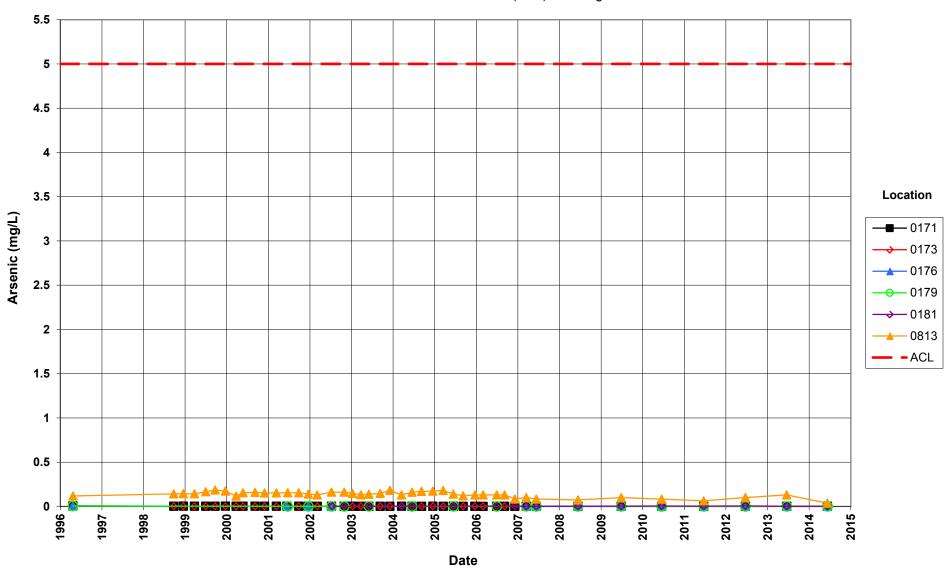
This page intentionally left blank

Time-Concentration Graphs

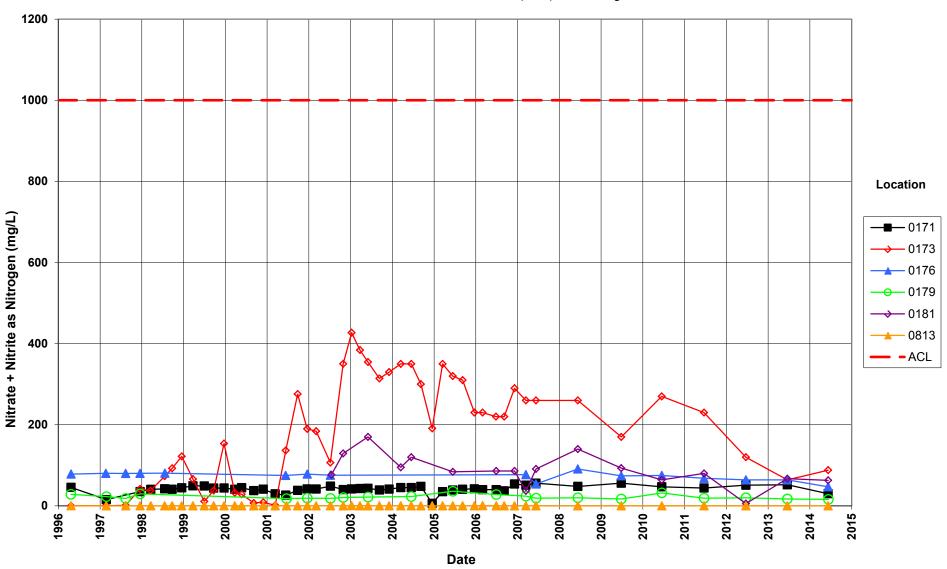
This page intentionally left blank

Green River Disposal Site Point of Compliance Wells Arsenic Concentration

Alternate Concentration Limit (ACL) = 5.0 mg/L

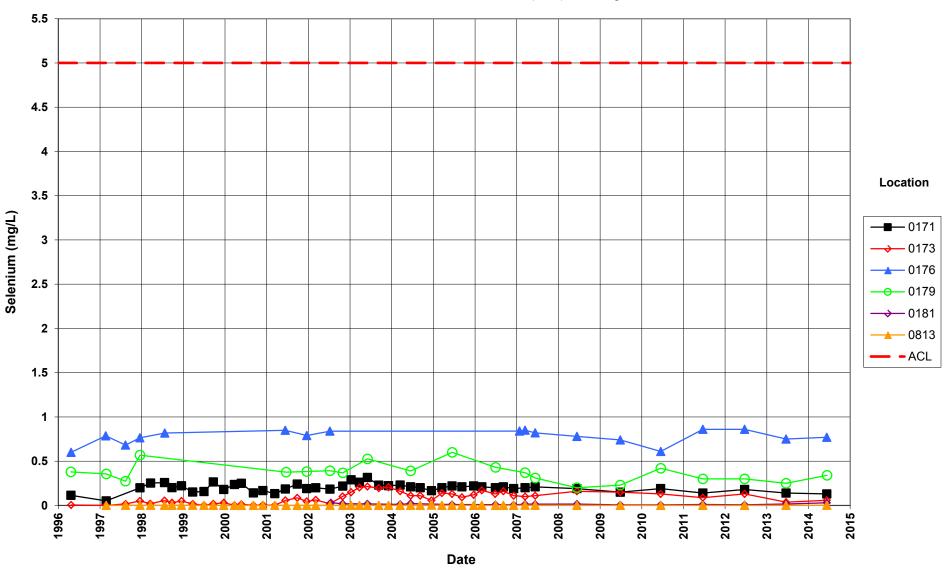


Green River Disposal Site Point of Compliance Wells Nitrate + Nitrite as Nitrogen Concentration Alternate Concentration Limit (ACL) = 1000 mg/L

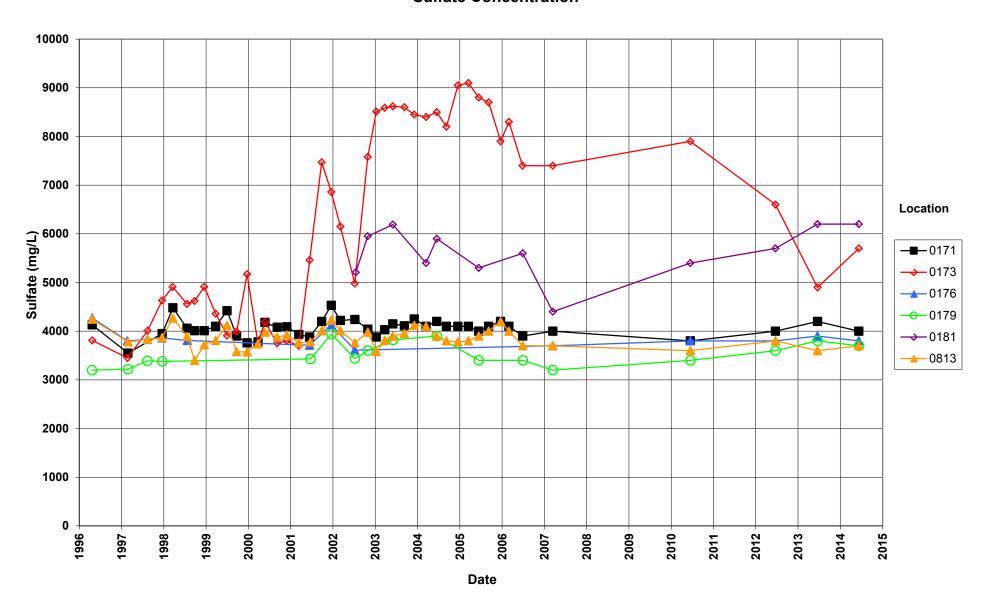


Green River Disposal Site Point of Compliance Wells Selenium Concentration

Alternate Concentration Limit (ACL) = 5.0 mg/L

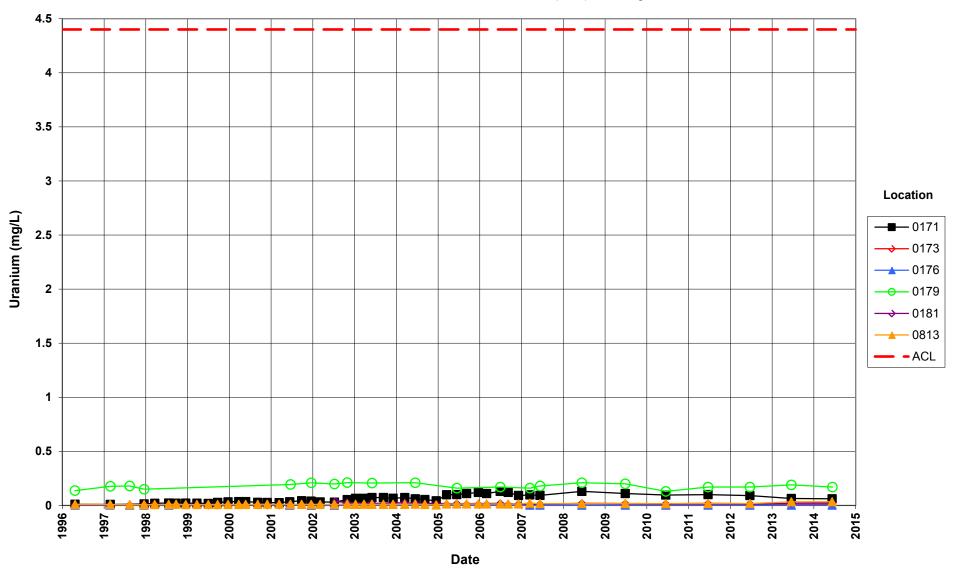


Green River Disposal Site Point of Compliance Wells Sulfate Concentration

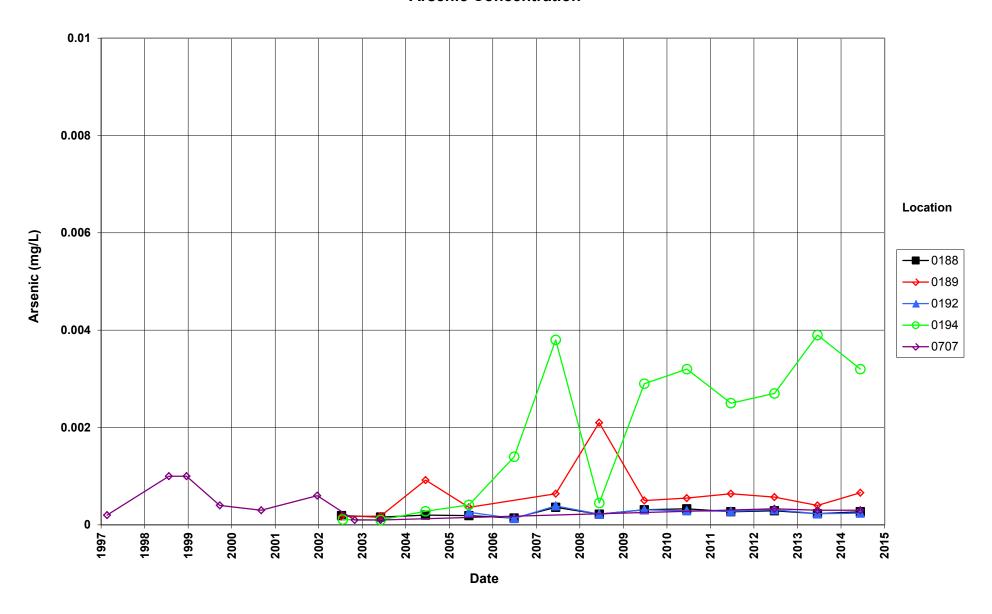


Green River Disposal Site Point of Compliance Wells Uranium Concentration

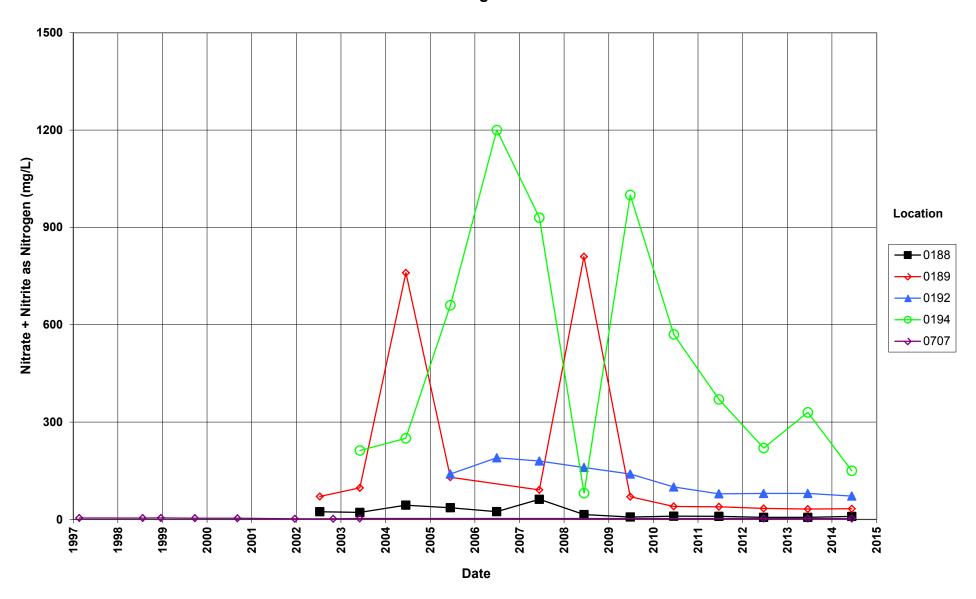
Alternate Concentration Limit (ACL) = 4.4 mg/L



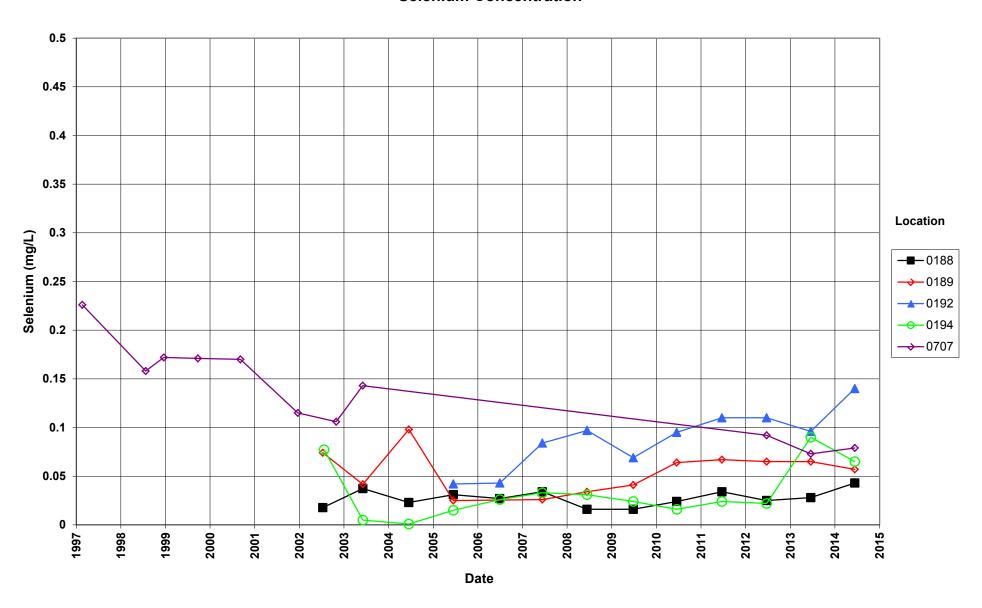
Green River Disposal Site Alluvium Wells Arsenic Concentration



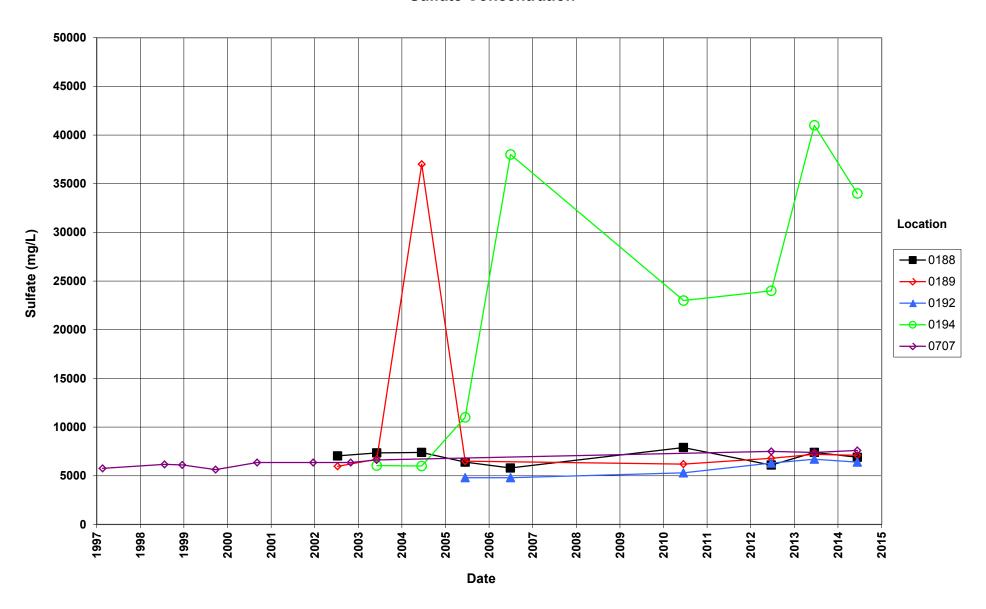
Green River Disposal Site Alluvium Wells Nitrate + Nitrite as Nitrogen Concentration



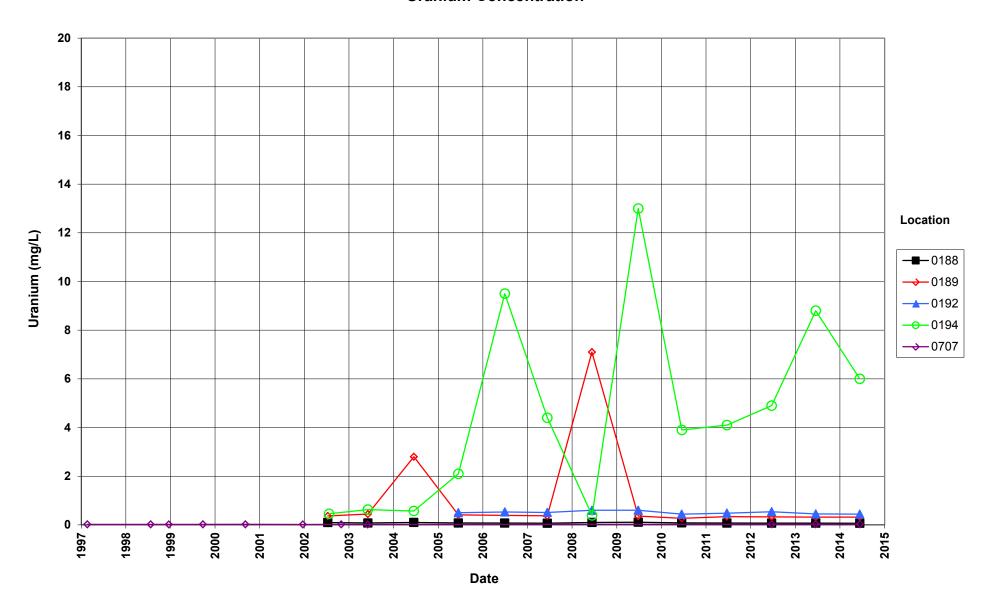
Green River Disposal Site Alluvium Wells Selenium Concentration



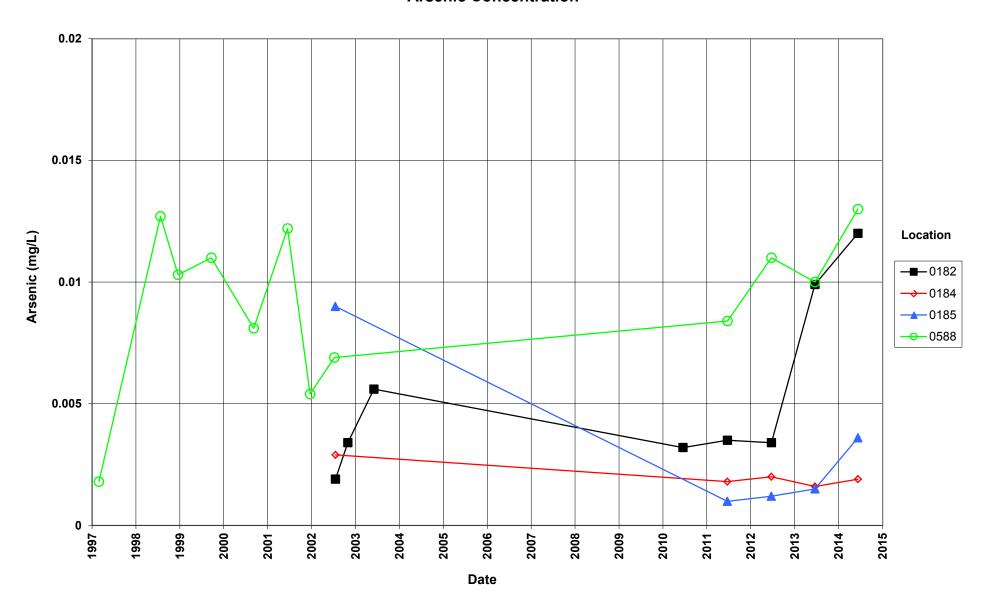
Green River Disposal Site Alluvium Wells Sulfate Concentration



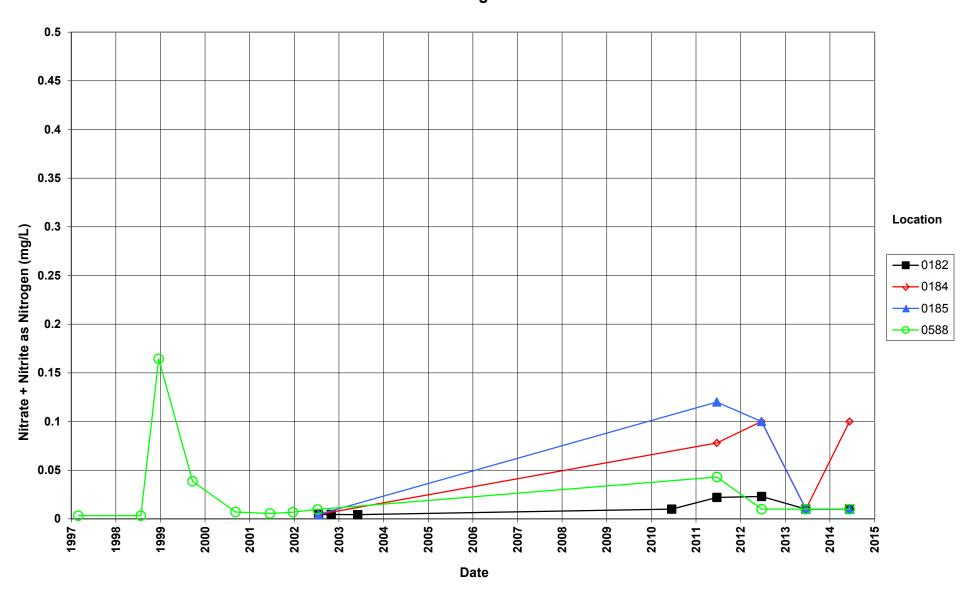
Green River Disposal Site Alluvium Wells Uranium Concentration



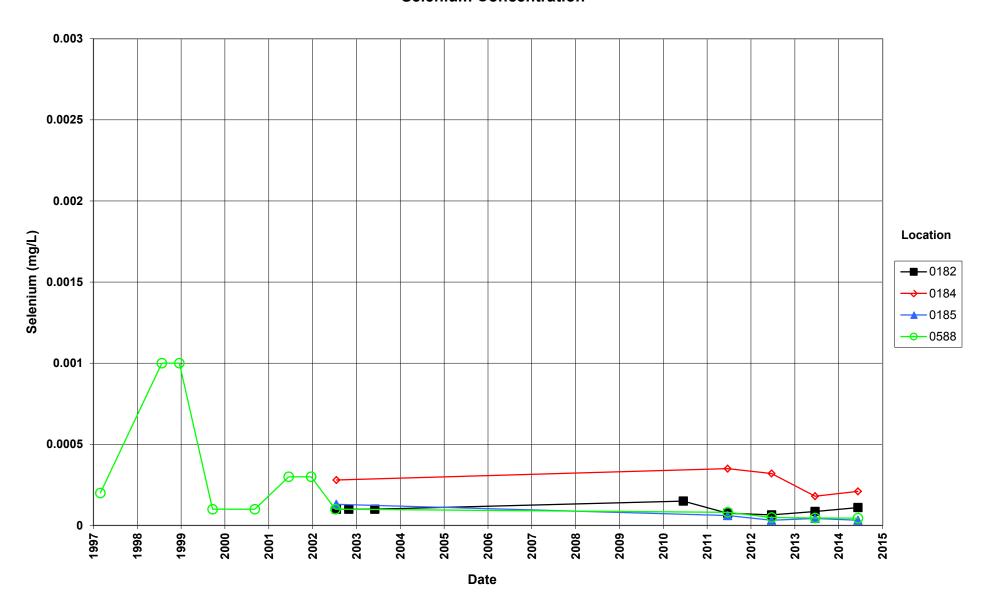
Green River Disposal Site Basal Sandstone Wells Arsenic Concentration



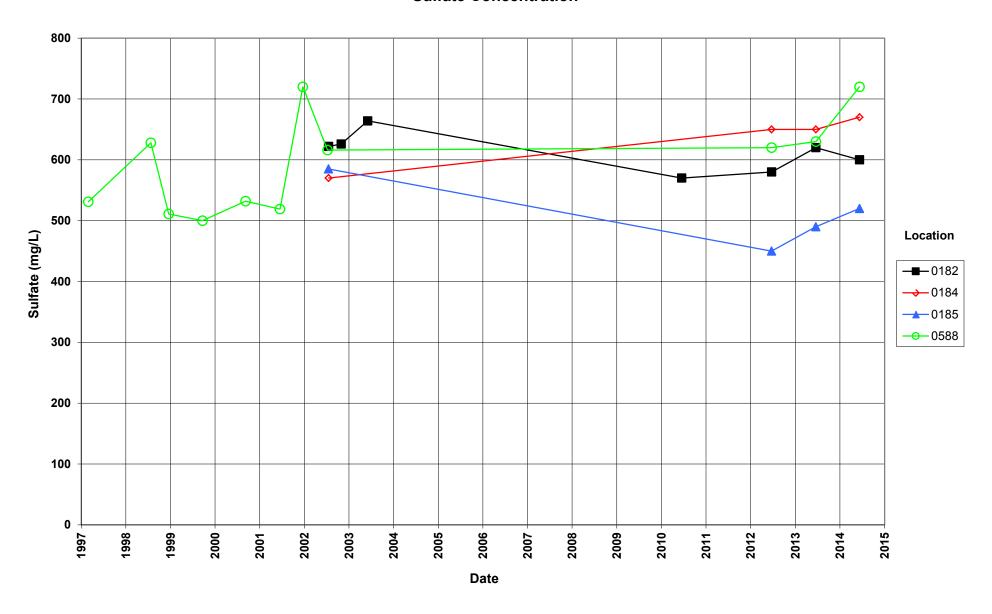
Green River Disposal Site Basal Sandstone Wells Nitrate + Nitrite as Nitrogen Concentration



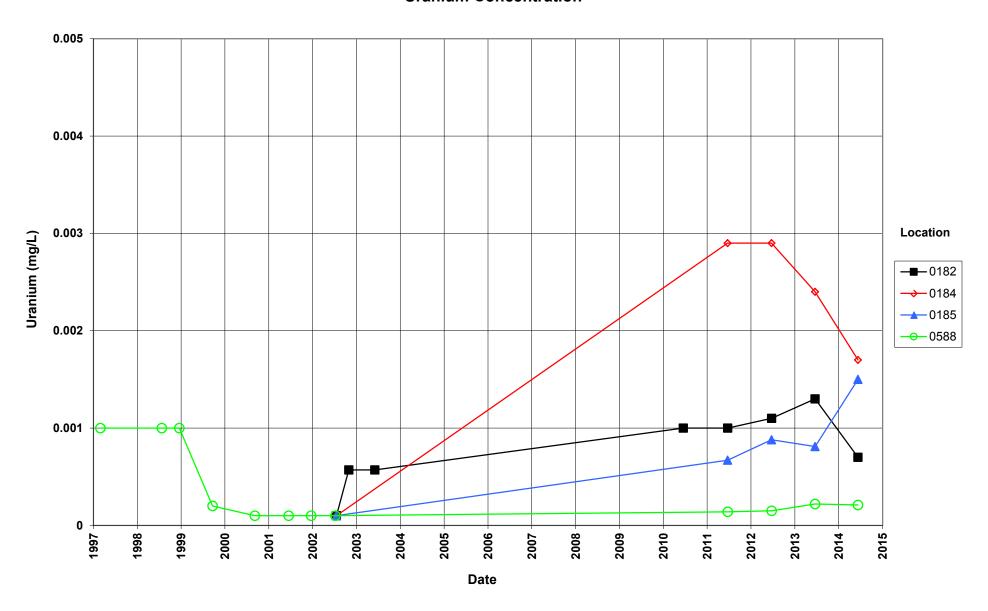
Green River Disposal Site Basal Sandstone Wells Selenium Concentration



Green River Disposal Site Basal Sandstone Wells Sulfate Concentration



Green River Disposal Site Basal Sandstone Wells Uranium Concentration



This page intentionally left blank

Attachment 3 Sampling and Analysis Work Order

This page intentionally left blank



May 12, 2014

Task Order LM00-501 Control Number 14-0565

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

SUBJECT:

Contract No. DE-AM01-07LM00060, The S.M. Stoller Corporation, a wholly

owned subsidiary of Huntington Ingalls Industries (Stoller)

June 2014 Environmental Sampling at Green River, Utah, Disposal Site

REFERENCE: Task Order LM00-501-02-107-402, Green River, Utah, Disposal Site

Dear Mr. Kautsky:

The purpose of this letter is to inform you of the upcoming sampling event at Green River, Utah. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Green River disposal site. Water quality data will be collected at this site as part of the routine environmental sampling currently scheduled to begin the week of June 9, 2014.

MONITORING WELLS

171 Cm	179 Cm	182 Cb	185 Cb	189 Al	194 Al	707 Al
173 Cm	181 Cm	184 Cb	188 Al	192 A1	588 Cb	813 Cm
176 Cm						0.00 0.111

^{*}NOTE: Al = Alluvium; Cb = Cedar Mountain Basal Sandstone Member; Cm = Middle Sandstone Unit

SURFACE LOCATIONS

801 846 847

Water levels will be collected from additional (non-sampled) wells as shown in the enclosure. All samples will be collected as directed in the Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites.

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES

Mark Kautsky Control Number 14-6565 Page 2

Please contact me at (970) 248-6592 if you have any questions.

Sincerely,

Jeffrey E. Price Site Lead

JEP/lcg/lb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Jeffrey Price, Stoller
EDD Delivery
rc-grand.junction
File: GRN 410.02(A)

1.2. Pmi

Constituent Sampling Breakdown

Site	Green River		1		
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	15	3		10	
Field Measurements					
Alkalinity	Х	Х			
Dissolved Oxygen					
Redox Potential	X	Х			
рН	Х	Х			
Specific Conductance	Х	Х			
Turbidity	Х	Х			
Temperature	Х	Х	a a constant		
Laboratory Measurements			-		
Aluminum					
Ammonia as N (NH3-N)	Х	Х	0.1	EPA 350.1	WCH-A-005
Arsenic	Х	Х	0.0001	SW-846 6020	LMM-02
Calcium					
Chloride					
Chromium					
Gross Alpha					
Gross Beta					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63 Nitrate + Nitrite as N (NO3+NO2)-N	V	V	0.05	EDA 252.4)A(OLL A 000
	Х	Х	0.05	EPA 353.1	WCH-A-022
Potassium Radium-226					
Radium-228					
Selenium	Х	Х	0.0001	SW-846 6020	LMM-02
Silica	Λ		0.0001	077-040 0020	LIVIIVI-02
Sodium					
Strontium					
Sulfate	X	Х	0.5	SW-846 9056	MIS-A-044
Sulfide	Α.	^	0.5	344-040 3030	W110-74-044
Total Dissolved Solids					
Total Organic Carbon					
Uranium		-	0.0001	SW-846 6020	LMM-02
1340133437177000	Х	Х	0.0001	344-040 0020	LIVIIVI-UZ
Vanadium					
Zinc					
Total No. of Analytes	6	6			

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

Sampling Frequencies for Locations at Green River, Utah

Location						
ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring	y Wells				570.	
171			X			Telemetry
173			X			Telemetry
176			X			Telemetry
179			Х			Telemetry
180					Х	Telemetry
181			Х			
182			X			Telemetry
183					Х	Telemetry; WL only
184			X			Telemetry;
185			X			Telemetry
188			X			
189			X			
192			Х			
194			Х			
582					X	Telemetry; WL only
588			X			Telemetry
707			X			
813			Х			Telemetry
817					X	Telemetry; WL only
Surface Lo	ocations				•	
801			Х	l î		
846			X			
847			Х			

Annual sampling conducted in June

Attachment 4
Trip Report

This page intentionally left blank



Memorandum

DATE: June 25, 2014

TO: Jeff Price

FROM: Tashina Jasso

SUBJECT: Well Sampling Report

Site: Green River, Utah, Disposal Site

Dates of Event: June 10 and 12, 2014

Team Members: Jeff Price, Tashina Jasso

Number of Locations Sampled: 15 monitoring wells and 3 surface water samples were collected for arsenic, uranium, selenium, ammonia as N, nitrate + nitrite as N, and sulfate.

Locations Not Sampled/Reason: All locations were sampled.

Location Specific Information: Surface water location 0847 was collected approximately 1,300 feet upstream of the confluence with the Green River. This location varies dependent on the stage of the river and outflow into Browns Wash.

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
2357	MHT 388	0179	Duplicate	Groundwater
2358	MHT 389	Associated with 0801, 0846, 0847	Rinsate/EQ Blank	Surface Water

Report Identification Number (RIN) Assigned: All samples were assigned to RIN 14066228.

Sample Shipment: Samples were shipped from Grand Junction to ALS Laboratory Group on June 16, 2014.

Water Level Measurements: Water levels were measured at all wells. Water level only measurements were collected for 2 out of 4 locations; 0582 and 0817 were not collected because packers are installed to prevent the artesian wells from flowing. The artesian water pressure is measured with dedicated pressure transducers.

Jeff Price June 25, 2014 Page 2

Well Inspection Summary: All sampled wells were in adequate condition.

Field Variance: None.

Equipment: All equipment functioned properly. Wells were sampled with a peristaltic pump and dedicated tubing or dedicated tubing and bladder pump. Water level measurements were collected with the Dipper-T water level meter. Additionally 0.45 μm filters were used for samples with turbidity measurements that did not meet the minimum criteria of 10 NTUs. The equipment blank was collected after decontamination of non-dedicated tubing.

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

Regulatory: Dean Henderson, Hydrogeologist with the State of Utah Department of Environmental Quality was present on June 10th. Mr. Henderson observed the sampling operations being performed within the disposal cell area.

Institutional Controls: No issues identified.

Disposal Cell/ Drainage Structure Integrity: No issues observed. **Fences, Gates, Locks:** All appeared to be in working condition.

Trespassing/Site Disturbances: Nothing to note.

Site Issues:

Vegetation/Noxious Weed Concerns: None observed.

Maintenance Requirements: None observed.

Access Issues: None Safety Issues: None

Corrective Action Taken: None.

(TJ/lcg)

cc: (electronic)
Mark Kautsky, DOE
Steve Donivan, Stoller
Jeff Price, Stoller
EDD Delivery