Data Validation Package

July and October 2008 Water Sampling at the Naturita Processing and Disposal Sites

February 2009

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Naturita Processing Site and Disposal Site

Sampling Period: July and October, 2008

This sampling event includes sampling groundwater and surface water at the Naturita Processing Site and groundwater at the Naturita Disposal Site. Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* and the *Environmental Procedures Catalog*. Duplicate samples were collected from processing site locations 0718 and MAU07. An equipment blank was also collected during this sampling event.

The *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. Monitor wells NAT01-1, NAT02, NAT08, NAT26, MAU07, MAU08, and DM1 and surface locations 0531, 0533, 0538, SM2, and SM4 were sampled in July 2008 as specified in the plan. A new well, 0718, was sampled in October 2008. The water level was measured at each sampled well.

Time-concentration graphs show that uranium and vanadium concentrations in the point of compliance wells sampled tend to be decreasing and remain below the proposed alternate concentration limits.

Surface location 0538 is a groundwater seep that collects in a small area near the river. The uranium concentration of 0.13 milligrams per liter (mg/L) and the vanadium concentration of 0.00076 mg/L at this location are well below the action levels of 3 mg/L and 6 mg/L, respectively. Surface water results from San Miguel River locations downstream of and adjacent to the site were compared to statistical benchmark values derived using historical data from location 0531, which is located upstream of the site on the San Miguel River. As shown in Table 1, no benchmark values 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 2008 Concentrations to Benchmarks

Analyte	Benchmark Value for 0531 (mg/L)	0531 Concentration (mg/L)	SM2 Concentration (mg/L)	SM4 Concentration (mg/L)	0533 Concentration (mg/L)
Uranium	0.0045	0.00086	0.0008	0.0008	0.00087
Vanadium	0.0013	0.00058	0.00061	0.00053	0.00054

The *Long-Term Surveillance Plan for the Upper Burbank Disposal Cell Uravan, Colorado*, requires biennial monitoring to detect potential seepage from the disposal cell in three monitor wells BR95-1, BR95-2, and BR95-3. Arsenic and molybdenum are detected in these wells but

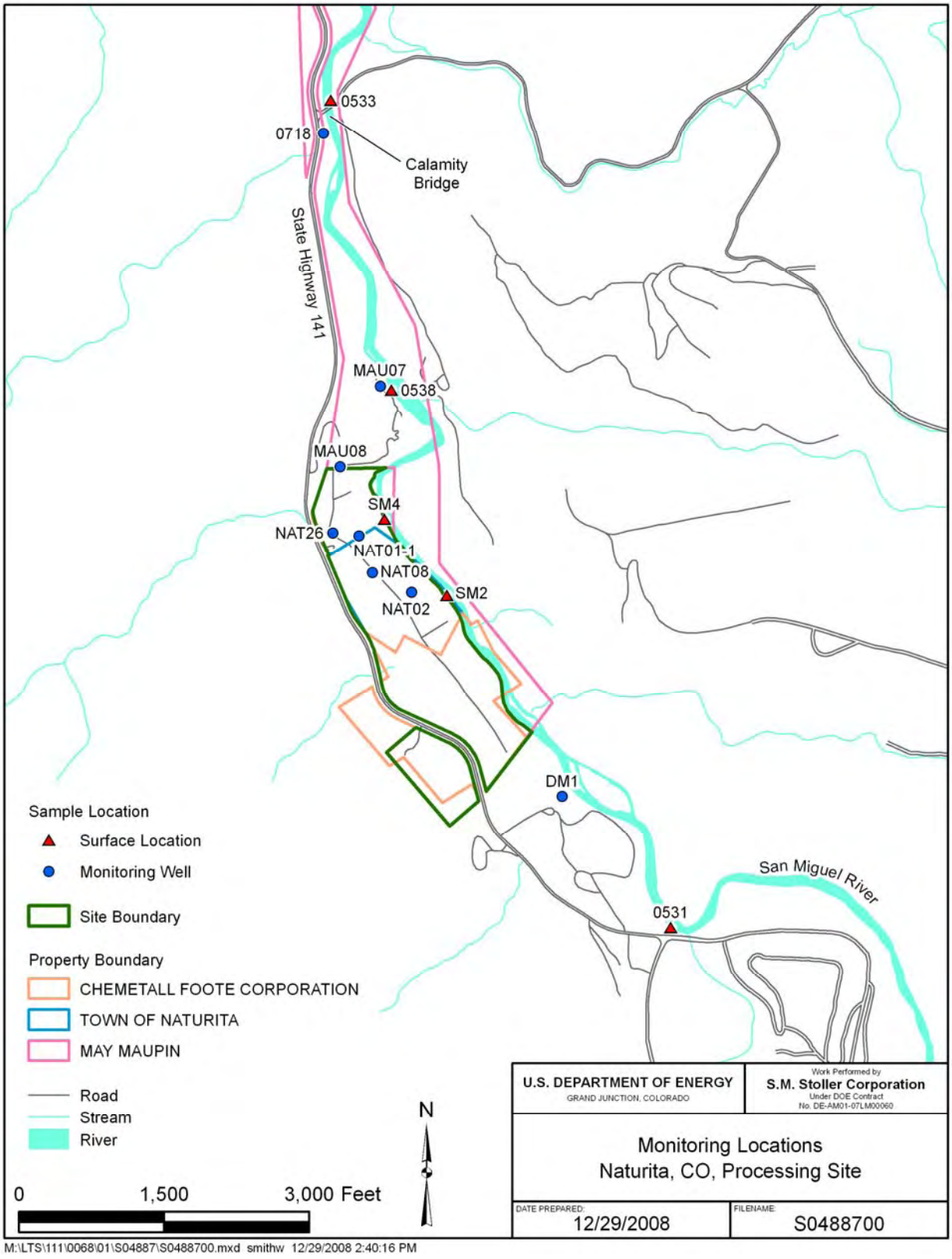
generally at an order of magnitude below the maximum concentration limit and have remained essentially constant since 2002. Uranium has been detected in samples from all three of these wells, and remains above the maximum concentration limit in wells BR95-1 and BR95-2. However, comparable concentrations of uranium have been present in samples collected since the beginning of the monitoring period (see the time-concentration graphs) and have not changed appreciably.

Additionally, in November 2006, Umetco Minerals Corporation provided DOE with results from water-quality-data samples collected at a groundwater seep that is considered (by Umetco) to be a background location for its Title II Site at Uravan and indicative of contaminant conditions for groundwater in the area. Uranium concentrations in these samples ranged from 2.00 to 2.59 mg/L, which is at least an order of magnitude greater than the highest concentrations seen in Department of Energy's BR95–series wells. The groundwater seep location sampled by Umetco is located approximately 1,900 feet NNW of well CM93-2 and issues from the base of the Salt Wash member of the Morrison Formation at the contact with the Summerville Formation. This is the same zone where the Naturita Disposal Cell BR series monitoring wells are completed.

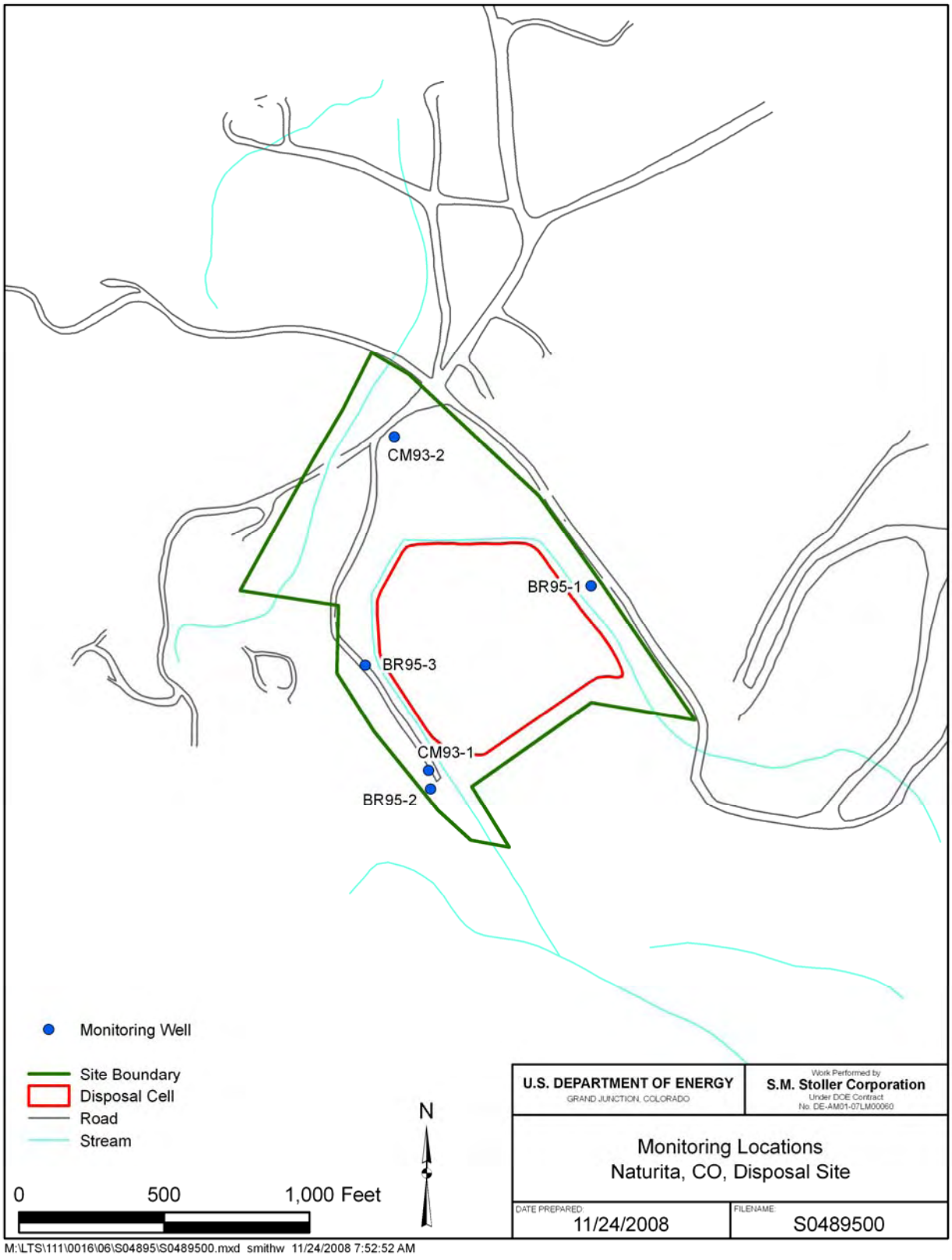
David Traub — 3-25-09

David Traub
Site Lead, S.M. Stoller

Date



Naturita, Colorado, Processing Site Sample Location Map



Naturita, Colorado, Disposal Site Sample Location Map

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Naturita, Colorado	**Date(s) of Water Sampling**	July 29-31 and October 23, 2008
Date(s) of Verification	December 17, 2008	**Name of Verifier**	Gretchen Baer

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOPs, instructions.		Work Order Letter dated June 24, 2008.
2. Were the sampling locations specified in the planning documents sampled?	No	Disposal cell wells CM93-1 and CM93-2 were not sampled due to the depth of the wells and equipment constraints.
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibrations were performed on July 25 and October 20, 2008.
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?	No	Some final measurements for sp. conductance, water level, pH, and turbidity were not recorded at locations 0533, BR95-1, BR95-2, and BR95-3. Data are qualified as "Q."
6. Was the category of the well documented?	Yes	The FDCS lists some surface water categories as "N/A." For the October sampling event, well 0718 is considered cat IV.
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?	No	At MAU08 the water level drop exceeded Category I requirements. Data are qualified as "Q."
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	No	Some final measurements for sp. conductance, water level, pH, and turbidity were not recorded at locations 0533, BR95-1, BR95-2, and BR95-3. Data are qualified as "Q."
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	NA	
Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the “Date Completed” fields (FDCS)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	08071732
Sample Event:	July 29-31, 2008
Site(s):	Naturita, Colorado
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Work Order No.:	0808014
Analysis:	Metals and Wet Chemistry
Validator:	Gretchen Baer
Review Date:	September 29, 2008

This validation was performed according to the *Environmental Procedures Catalog*, "Standard Practice for Validation of Laboratory Data," GT-9(P). 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 2.

Table 2. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Total Dissolved Solids	WCH-B-033	MCAWW 160.1	MCAWW 160.1
Metals: Arsenic, Molybdenum, 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 sections below for an explanation of the data qualifier applied.

Table 3. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
0808014-5	2517, Equip Blank	Uranium	U	Less than 5 times the method blank

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 17 water samples on August 2, 2008, under air bill number 7998 8928 1310 accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents including the COC form and the sample tickets had no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 3.8 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

Method SW-846 6020

Calibrations for molybdenum and uranium were performed on August 21, 2008, and for arsenic and vanadium on August 22, 2008, using eight 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 method detection limit (MDL). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in six verification checks for molybdenum and uranium and eight for arsenic and vanadium. 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 MCAWW 160.1

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

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 practical quantitation limits for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a “U” flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

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 spikes met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

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

Laboratory Control Sample

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

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. ICP-MS serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the practical quantitation limit. No serial dilution data required evaluation.

Detection Limits/Dilutions

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

Completeness

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

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on October 2, 2008, that included a correction to a sample preparation date. 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: 08071732 **Lab Code:** PAR **Validator:** Gretchen Baer **Validation Date:** 9/29/2008

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

# of Samples: 17 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	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

RIN: 08071732 **Lab Code:** PAR **Date Due:** 8/30/2008

Matrix: Water **Site Code:** NAT **Date Completed:** 8/28/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
ARSENIC	08/22/2008	-0.0240	1.0000	OK	OK	OK	OK	OK	92.0	90.0	89.0	1.0	98.0		112.0
MOLYBDENUM	08/21/2008	-0.0040	1.0000	OK	OK	OK	OK	OK	101.0	100.0	104.0	3.0	112.0		106.0
URANIUM	08/21/2008	-0.0010	1.0000	OK	OK	OK	OK	OK	100.0	100.0	103.0	3.0	105.0		124.0
VANADIUM	08/22/2008	-0.0150	1.0000	OK	OK	OK	OK	OK	94.0	99.0	99.0	0.0	101.0		96.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 08071732 **Lab Code:** PAR **Date Due:** 8/30/2008

Matrix: Water **Site Code:** NAT **Date Completed:** 8/28/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
TOTAL DISSOLVED SOLIDS	08/05/2008							OK	98.0			1.00	

General Information

Report Number (RIN):	08101900
Sample Event:	October 23, 2008
Site(s):	Naturita, Colorado
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Work Order No.:	0810217
Analysis:	Metals and Wet Chemistry
Validator:	Gretchen Baer
Review Date:	February 3, 2009

This validation was performed according to the *Environmental Procedures Catalog*, "Standard Practice for Validation of Laboratory Data," GT-9(P). 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
Total Dissolved Solids	WCH-B-033	MCAWW 160.1	MCAWW 160.1
Metals: Arsenic, Molybdenum, Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

None of the sample results required additional qualification.

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received two water samples on October 25, 2008, under air bill number 8605 0099 4422 accompanied by a COC form. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents including the COC form and the sample tickets had no errors or omissions, with the exception that filtration status was not indicated.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2.8 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

Method SW-846 6020

Calibrations for molybdenum and uranium were performed on November 6, 2008, and for arsenic and vanadium on November 13, 2008, using eight calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in six verification checks for molybdenum and uranium and four for arsenic and vanadium. 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 MCAWW 160.1

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

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 practical quantitation limits for all analytes. Some metals blanks exceeded the MDL but all associated sample results were greater than 5 times the blank concentrations.

Matrix Spike Analysis

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 spikes met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

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

Laboratory Control Sample

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

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. ICP-MS serial dilution data are evaluated when the concentration of the undiluted sample is greater than 100 times the practical quantitation limit. All evaluated serial dilution data were acceptable.

Detection Limits/Dilutions

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

Completeness

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

EDD File

The EDD file arrived on November 19, 2008. 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: 08101900 **Lab Code:** PAR **Validator:** Gretchen Baer **Validation Date:** 2/3/2009

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

# of Samples: 2 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** OK

Select Quality Parameters

☑ Holding Times	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	
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 08101900 **Lab Code:** PAR **Date Due:** 11/22/2008

Matrix: Water **Site Code:** NAT02 **Date Completed:** 11/20/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
ARSENIC	11/13/2008	-0.0030	1.0000	OK	OK	OK	OK	OK	88.0	92.0	94.0	1.0	97.0	7.0	70.0
ARSENIC	11/13/2008											2.0			
MOLYBDENUM	11/06/2008	-0.0050	1.0000	OK	OK	OK	OK	OK	96.0	101.0	103.0	2.0	108.0	3.0	116.0
URANIUM	11/06/2008	0.0000	1.0000	OK	OK	OK	OK	OK	99.0	98.0	101.0	1.0	104.0	0.0	102.0
URANIUM	11/06/2008											3.0	109.0		
VANADIUM	11/13/2008	0.0050	1.0000	OK	OK	OK	OK	OK	96.0	103.0	103.0	0.0	100.0		130.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 08101900 **Lab Code:** PAR **Date Due:** 11/22/2008

Matrix: Water **Site Code:** NAT02 **Date Completed:** 11/20/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
TOTAL DISSOLVED SOLIDS	10/30/2008							OK	99.00			2.00	

Sampling Quality Control Assessment

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

Sampling Protocol

July 2008: All wells were sampled with dedicated tubing using the low-flow purge procedure. Sample results for all 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:

- Some final measurements for specific conductance, water level, pH, and turbidity were not recorded at locations BR95-1, BR95-2, and BR95-3.
- The water level drop exceeded the Category I criterion for well MAU08.

The sample results for these four wells were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique. The surface water locations were sampled using a peristaltic pump and lanyard with tubing and a stainless steel weight.

October 2008: Location 0718 was a new well that was sampled after installation and development. For the October 2008 sampling event, this well was considered category IV and therefore did not require any flagging ("F" or "Q") for sampling technique. The well was sampled using dedicated tubing, which does not require the collection of an equipment blank.

Equipment Blank

An equipment blank was collected after decontamination of equipment used to collect surface water samples. Uranium was detected in the blank by the laboratory, but this analyte was qualified during data validation with a "U" flag as not detected. The equipment blank results indicate adequate decontamination of the sampling equipment.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from locations 0718 and MAU07. The duplicate results met the Environmental Protection Agency recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the practical quantitation limit, indicating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 08071732 **Lab Code:** PAR **Project:** Naturita **Validation Date:** 9/29/2008

Duplicate: 2516 **Sample:** MAU07

Analyte	Sample Result	Flag	Error	Duplicate Result	Flag	Error	RPD	RER	Units
TOTAL DISSOLVED SOLIDS	2300			2300			0		MG/L
URANIUM	770			720			6.71		UG/L
VANADIUM	0.1	U		0.1	U				UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 08101900 **Lab Code:** PAR **Project:** Naturita LTSM **Validation Date:** 2/3/2009

Duplicate: 2691 **Sample:** 0718

Analyte	Sample Result	Sample Flag	Sample Error	Duplicate Result	Duplicate Flag	Duplicate Error	RPD	RER	Units
ARSENIC	2.2			2.2			0		UG/L
MOLYBDENUM	4.4			4.4			0		UG/L
TOTAL DISSOLVED SOLIDS	950			930			2.13		MG/L
URANIUM	33			34			2.99		UG/L
VANADIUM	0.34			0.31					UG/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Steve Donivan — Date: 2-23-09

Data Validation Lead: Gretchen Baer — Date: 2/23/09

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

The total dissolved solids results for locations MAU07 and MAU08 were identified as anomalously high and are listed on the Anomalous Data Review Checksheet. The data associated with these results were further reviewed and there were no errors noted. The result for MAU07 was confirmed by the field duplicate and the MAU08 result was confirmed by the high specific conductivity measurement in the field data, which also exceeded the historical maximum. The data for both RINs are acceptable as qualified.

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Data Validation Outliers Report - No Field Parameters
Laboratory: PARAGON (Fort Collins, CO)
RIN: 08071732
Comparison: All Historical Data
Report Date: 12/17/2008

				Current			Historical Maximum			Historical Minimum			Number of Data Points		Normally Distributed	Statistical Outlier
					Qualifiers			Qualifiers			Qualifiers					
Site Code	Location Code	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect		
NAT01	DM1	07/29/2008	Total Dissolved Solids	320		F	975		F	330		F	10	0	Yes	No
NAT01	DM1	07/29/2008	Uranium	0.002		F	0.0111		F	0.0027		F	16	0	Yes	No
NAT01	MAU07	07/30/2008	Total Dissolved Solids	2300		F	2200		F	1200		F	10	0	Yes	Yes
NAT01	MAU08	07/30/2008	Total Dissolved Solids	4300		FQ	2790			2100		F	11	0	Yes	Yes
NAT01	NAT02	07/29/2008	Total Dissolved Solids	690		F	897			760		F	8	0	Yes (log)	No
NAT01	SM2	07/29/2008	Total Dissolved Solids	240			1200			290			8	0	No	No
NAT01	SM2	07/29/2008	Uranium	0.0008			0.005			0.00084			11	0	No	No
NAT01	SM4	07/29/2008	Total Dissolved Solids	240			987			310			9	0	No	No
NAT01	SM4	07/29/2008	Uranium	0.0008			0.00476			0.00084			12	0	No	No
NAT14	BR95-2	07/31/2008	Uranium	0.053		FQ	0.051		F	0.0338		L	10	0	Yes	No
NAT14	BR95-3	07/31/2008	Molybdenum	0.014		FQ	0.0309			0.0141		F	8	0	Yes (log)	No
NAT14	BR95-3	07/31/2008	Uranium	0.03		FQ	0.027		FQ	0.0133			8	0	Yes	No

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

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

W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z	Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

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

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.

Anomalous Data Review Checksheet

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Anomalous Data Review Checksheet

Site: Naturita Processing Site and Disposal Site **Sampling Data:** Water

Reviewer: Gretchen Baer (Name (print)) Signature 2/23/09 Date

Site Hydrologist: David Traub (Name (print)) David Traub Signature 2-23-09 Date

Date of Review: December 17, 2008

Loc. No.	Analyte	Type of Anomaly	Disposition
MAU07	Total Dissolved Solids	High	Result is acceptable upon further review.
MAU08	Total Dissolved Solids	High	Result is acceptable upon further review.

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Attachment 2
Data Presentation

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Processing Site
Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: DM1 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	N001	2.67	-	7.67	148		F	#		
Oxidation Reduction Potential	mV	07/29/2008	N001	2.67	-	7.67	-98.8		F	#		
pH	s.u.	07/29/2008	N001	2.67	-	7.67	7.14		F	#		
Specific Conductance	umhos /cm	07/29/2008	N001	2.67	-	7.67	520		F	#		
Temperature	C	07/29/2008	N001	2.67	-	7.67	20.77		F	#		
Total Dissolved Solids	mg/L	07/29/2008	N001	2.67	-	7.67	320		F	#	20	
Turbidity	NTU	07/29/2008	N001	2.67	-	7.67	1.86		F	#		
Uranium	mg/L	07/29/2008	N001	2.67	-	7.67	0.002		F	#	0.0000045	
Vanadium	mg/L	07/29/2008	N001	2.67	-	7.67	0.00033		F	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: MAU07 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/30/2008	N001	2.92	-	7.92	428		F	#		
Oxidation Reduction Potential	mV	07/30/2008	N001	2.92	-	7.92	-58.5		F	#		
pH	s.u.	07/30/2008	N001	2.92	-	7.92	6.95		F	#		
Specific Conductance	umhos /cm	07/30/2008	N001	2.92	-	7.92	2759		F	#		
Temperature	C	07/30/2008	N001	2.92	-	7.92	19.18		F	#		
Total Dissolved Solids	mg/L	07/30/2008	N001	2.92	-	7.92	2300		F	#	80	
Total Dissolved Solids	mg/L	07/30/2008	N002	2.92	-	7.92	2300		F	#	80	
Turbidity	NTU	07/30/2008	N001	2.92	-	7.92	0.88		F	#		
Uranium	mg/L	07/30/2008	N001	2.92	-	7.92	0.77		F	#	0.000045	
Uranium	mg/L	07/30/2008	N002	2.92	-	7.92	0.72		F	#	0.000045	
Vanadium	mg/L	07/30/2008	N001	2.92	-	7.92	0.0001	U	F	#	0.0001	
Vanadium	mg/L	07/30/2008	N002	2.92	-	7.92	0.0001	U	F	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: MAU08 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/30/2008	N001	6.17	-	11.17	488		FQ	#		
Oxidation Reduction Potential	mV	07/30/2008	N001	6.17	-	11.17	159.6		FQ	#		
pH	s.u.	07/30/2008	N001	6.17	-	11.17	7.16		FQ	#		
Specific Conductance	umhos /cm	07/30/2008	N001	6.17	-	11.17	5235		FQ	#		
Temperature	C	07/30/2008	N001	6.17	-	11.17	16.79		FQ	#		
Total Dissolved Solids	mg/L	07/30/2008	N001	6.17	-	11.17	4300		FQ	#	80	
Turbidity	NTU	07/30/2008	N001	6.17	-	11.17	8.12		FQ	#		
Uranium	mg/L	07/30/2008	N001	6.17	-	11.17	1.6		FQ	#	0.00009	
Vanadium	mg/L	07/30/2008	N001	6.17	-	11.17	0.00082		FQ	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: NAT01-1 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	N001	17	-	17.5	299		F	#		
Oxidation Reduction Potential	mV	07/29/2008	N001	17	-	17.5	-24.2		F	#		
pH	s.u.	07/29/2008	N001	17	-	17.5	7.13		F	#		
Specific Conductance	umhos /cm	07/29/2008	N001	17	-	17.5	2001		F	#		
Temperature	C	07/29/2008	N001	17	-	17.5	16.89		F	#		
Total Dissolved Solids	mg/L	07/29/2008	N001	17	-	17.5	1600		F	#	40	
Turbidity	NTU	07/29/2008	N001	17	-	17.5	4.44		F	#		
Uranium	mg/L	07/29/2008	N001	17	-	17.5	0.72		F	#	0.000045	
Vanadium	mg/L	07/29/2008	N001	17	-	17.5	0.0027		F	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: NAT02 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	N001	6.42	-	11.42	241		F	#		
Oxidation Reduction Potential	mV	07/29/2008	N001	6.42	-	11.42	182.8		F	#		
pH	s.u.	07/29/2008	N001	6.42	-	11.42	7.24		F	#		
Specific Conductance	umhos /cm	07/29/2008	N001	6.42	-	11.42	1010		F	#		
Temperature	C	07/29/2008	N001	6.42	-	11.42	17.9		F	#		
Total Dissolved Solids	mg/L	07/29/2008	N001	6.42	-	11.42	690		F	#	40	
Turbidity	NTU	07/29/2008	N001	6.42	-	11.42	1.37		F	#		
Uranium	mg/L	07/29/2008	N001	6.42	-	11.42	0.18		F	#	0.000009	
Vanadium	mg/L	07/29/2008	N001	6.42	-	11.42	0.92		F	#	0.017	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: NAT08 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	N001	6.3	-	11.3	305		F	#		
Oxidation Reduction Potential	mV	07/29/2008	N001	6.3	-	11.3	6.1		F	#		
pH	s.u.	07/29/2008	N001	6.3	-	11.3	7.2		F	#		
Specific Conductance	umhos /cm	07/29/2008	N001	6.3	-	11.3	1721		F	#		
Temperature	C	07/29/2008	N001	6.3	-	11.3	18.64		F	#		
Total Dissolved Solids	mg/L	07/29/2008	N001	6.3	-	11.3	1400		F	#	40	
Turbidity	NTU	07/29/2008	N001	6.3	-	11.3	1.49		F	#		
Uranium	mg/L	07/29/2008	N001	6.3	-	11.3	0.41		F	#	0.000022	
Vanadium	mg/L	07/29/2008	N001	6.3	-	11.3	2.6		F	#	0.034	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: NAT26 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	N001	10.67	-	15.67	410		F	#		
Oxidation Reduction Potential	mV	07/29/2008	N001	10.67	-	15.67	194.8		F	#		
pH	s.u.	07/29/2008	N001	10.67	-	15.67	7.22		F	#		
Specific Conductance	umhos /cm	07/29/2008	N001	10.67	-	15.67	3549		F	#		
Temperature	C	07/29/2008	N001	10.67	-	15.67	16.03		F	#		
Total Dissolved Solids	mg/L	07/29/2008	N001	10.67	-	15.67	2700		F	#	80	
Turbidity	NTU	07/29/2008	N001	10.67	-	15.67	0.77		F	#		
Uranium	mg/L	07/29/2008	N001	10.67	-	15.67	1.4		F	#	0.00009	
Vanadium	mg/L	07/29/2008	N001	10.67	-	15.67	0.00056		F	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 2/5/2009
Location: 0718 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	10/23/2008	N001	8.6	-	18.6	330			0		
Arsenic	mg/L	10/23/2008	N001	8.6	-	18.6	0.0022			0	0.000017	
Arsenic	mg/L	10/23/2008	N002	8.6	-	18.6	0.0022			0	0.000017	
Molybdenum	mg/L	10/23/2008	N001	8.6	-	18.6	0.0044			0	0.000045	
Molybdenum	mg/L	10/23/2008	N002	8.6	-	18.6	0.0044			0	0.000045	
Oxidation Reduction Potential	mV	10/23/2008	N001	8.6	-	18.6	83.8			0		
pH	s.u.	10/23/2008	N001	8.6	-	18.6	7.1			0		
Specific Conductance	umhos /cm	10/23/2008	N001	8.6	-	18.6	1340			0		
Temperature	C	10/23/2008	N001	8.6	-	18.6	6.57			0		
Total Dissolved Solids	mg/L	10/23/2008	N001	8.6	-	18.6	950			0	40	
Total Dissolved Solids	mg/L	10/23/2008	N002	8.6	-	18.6	930			0	40	
Turbidity	NTU	10/23/2008	N001	8.6	-	18.6	4.89			0		
Uranium	mg/L	10/23/2008	N001	8.6	-	18.6	0.033			0	0.0000036	
Uranium	mg/L	10/23/2008	N002	8.6	-	18.6	0.034			0	0.0000036	
Vanadium	mg/L	10/23/2008	N001	8.6	-	18.6	0.00034			0	0.000067	
Vanadium	mg/L	10/23/2008	N002	8.6	-	18.6	0.00031			0	0.000067	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

\# Validated according to quality assurance guidelines.

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Disposal Site
Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE NAT14, Naturita Disposal Site
REPORT DATE: 12/17/2008
Location: BR95-1 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/31/2008	N001	221	-	241	426		FQ	#		
Arsenic	mg/L	07/31/2008	N001	221	-	241	0.00045		FQ	#	0.000012	
Molybdenum	mg/L	07/31/2008	N001	221	-	241	0.0058		FQ	#	0.0002	
Total Dissolved Solids	mg/L	07/31/2008	N001	221	-	241	570		FQ	#	20	
Uranium	mg/L	07/31/2008	N001	221	-	241	0.11		FQ	#	0.000009	
Vanadium	mg/L	07/31/2008	N001	221	-	241	0.0001	U	FQ	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT14, Naturita Disposal Site
REPORT DATE: 12/17/2008
Location: BR95-2 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/31/2008	N001	163	-	183	520		FQ	#		
Arsenic	mg/L	07/31/2008	N001	163	-	183	0.0004		FQ	#	0.000012	
Molybdenum	mg/L	07/31/2008	N001	163	-	183	0.0027		FQ	#	0.0001	
pH	s.u.	07/31/2008	N001	163	-	183	7.16		FQ	#		
Specific Conductance	umhos /cm	07/31/2008	N001	163	-	183	1095		FQ	#		
Total Dissolved Solids	mg/L	07/31/2008	N001	163	-	183	620		FQ	#	20	
Uranium	mg/L	07/31/2008	N001	163	-	183	0.053		FQ	#	0.0000045	
Vanadium	mg/L	07/31/2008	N001	163	-	183	0.0046		FQ	#	0.0001	

Groundwater Quality Data by Location (USEE100) FOR SITE NAT14, Naturita Disposal Site
REPORT DATE: 12/17/2008
Location: BR95-3 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/31/2008	N001	194	-	214	359		FQ	#		
Arsenic	mg/L	07/31/2008	N001	194	-	214	0.001		FQ	#	0.000012	
Molybdenum	mg/L	07/31/2008	N001	194	-	214	0.014		FQ	#	0.0001	
pH	s.u.	07/31/2008	N001	194	-	214	7.27		FQ	#		
Specific Conductance	umhos /cm	07/31/2008	N001	194	-	214	1245		FQ	#		
Total Dissolved Solids	mg/L	07/31/2008	N001	194	-	214	790		FQ	#	20	
Uranium	mg/L	07/31/2008	N001	194	-	214	0.03		FQ	#	0.0000045	
Vanadium	mg/L	07/31/2008	N001	194	-	214	0.00041		FQ	#	0.0001	

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

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

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

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

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Processing Site
Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: 0531 SURFACE LOCATION SURFACE WATER LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	0001	92			#		
Oxidation Reduction Potential	mV	07/29/2008	N001	25			#		
pH	s.u.	07/29/2008	N001	8.73			#		
Specific Conductance	umhos/cm	07/29/2008	N001	387			#		
Temperature	C	07/29/2008	N001	22.66			#		
Total Dissolved Solids	mg/L	07/29/2008	0001	240			#	20	
Turbidity	NTU	07/29/2008	N001	19.9			#		
Uranium	mg/L	07/29/2008	0001	0.00086			#	0.0000045	
Vanadium	mg/L	07/29/2008	0001	0.00058			#	0.0001	

Surface Water Quality Data by Location (USEE102) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: 0533 SURFACE LOCATION SURFACE WATER LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/30/2008	0001	86			#		
Oxidation Reduction Potential	mV	07/30/2008	N001	34.8			#		
pH	s.u.	07/30/2008	N001	8.54			#		
Temperature	C	07/30/2008	N001	21.92			#		
Total Dissolved Solids	mg/L	07/30/2008	0001	260			#	20	
Turbidity	NTU	07/30/2008	N001	13.3			#		
Uranium	mg/L	07/30/2008	0001	0.00087			#	0.0000045	
Vanadium	mg/L	07/30/2008	0001	0.00054			#	0.0001	

Surface Water Quality Data by Location (USEE102) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: 0538 SURFACE LOCATION SURFACE LOCATION, SEEP

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/30/2008	0001	218			#		
Oxidation Reduction Potential	mV	07/30/2008	N001	-68			#		
pH	s.u.	07/30/2008	N001	7.45			#		
Specific Conductance	umhos/cm	07/30/2008	N001	1530			#		
Temperature	C	07/30/2008	N001	20.49			#		
Total Dissolved Solids	mg/L	07/30/2008	0001	1200			#	40	
Uranium	mg/L	07/30/2008	0001	0.13			#	0.000009	
Vanadium	mg/L	07/30/2008	0001	0.00076			#	0.0001	

Surface Water Quality Data by Location (USEE102) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: SM2 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	0001	78			#		
Oxidation Reduction Potential	mV	07/29/2008	N001	55			#		
pH	s.u.	07/29/2008	N001	8.64			#		
Specific Conductance	umhos/cm	07/29/2008	N001	380			#		
Temperature	C	07/29/2008	N001	21.90			#		
Total Dissolved Solids	mg/L	07/29/2008	0001	240			#	20	
Turbidity	NTU	07/29/2008	N001	31			#		
Uranium	mg/L	07/29/2008	0001	0.0008			#	0.0000045	
Vanadium	mg/L	07/29/2008	0001	0.00061			#	0.0001	

Surface Water Quality Data by Location (USEE102) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008
Location: SM4 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	07/29/2008	0001	65			#		
Oxidation Reduction Potential	mV	07/29/2008	N001	50			#		
pH	s.u.	07/29/2008	N001	8.63			#		
Specific Conductance	umhos/cm	07/29/2008	N001	391			#		
Temperature	C	07/29/2008	N001	22.03			#		
Total Dissolved Solids	mg/L	07/29/2008	0001	240			#	20	
Turbidity	NTU	07/29/2008	N001	34.7			#		
Uranium	mg/L	07/29/2008	0001	0.0008			#	0.0000045	
Vanadium	mg/L	07/29/2008	0001	0.00053			#	0.0001	

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

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

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

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

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Equipment Blank Data

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BLANKS REPORT
LAB: PARAGON (Fort Collins, CO)
RIN: 08071732
Report Date: 12/18/2008

Parameter	Site Code	Location ID	Sample Date	ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Arsenic	NAT01	0999	07/30/2008	N001	mg/L	0.000012	U		0.000012		E
Molybdenum	NAT01	0999	07/30/2008	N001	mg/L	0.0001	U		0.0001		E
Total Dissolved Solids	NAT01	0999	07/30/2008	N001	mg/L	20	U		20		E
Uranium	NAT01	0999	07/30/2008	N001	mg/L	0.000049	B	U	0.0000045		E
Vanadium	NAT01	0999	07/30/2008	N001	mg/L	0.0001	U		0.0001		E

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

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

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

SAMPLE TYPES:
- E Equipment Blank.

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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 12/17/2008

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
MAU07		5280.88	07/30/2008	12:26:10	7.4	5273.48	
MAU08		5291.19	07/30/2008	11:30:53	10.8	5280.39	
NAT01-1		5295.46	07/29/2008	13:30:46	11.21	5284.25	
NAT02		5294.09	07/29/2008	10:35:00	6.75	5287.34	
NAT08		5292.73	07/29/2008	11:20:19	7.02	5285.71	
NAT26		5300.21	07/29/2008	12:35:09	16.51	5283.7	

STATIC WATER LEVELS (USEE700) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 2/5/2009

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0718			10/23/2008	15:00:54	11.55	-11.55	

STATIC WATER LEVELS (USEE700) FOR SITE NAT14, Naturita Disposal Site
REPORT DATE: 2/3/2009

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
BR95-1	N		07/31/2008	15:03:21	211.9	-211.9	F
BR95-2	N		07/31/2008	12:05:32	172.9	-172.9	F
BR95-3	N		07/31/2008	13:07:45	211.51	-211.51	F

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

WATER LEVEL FLAGS: D Dry F FLOWING

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Hydrographs

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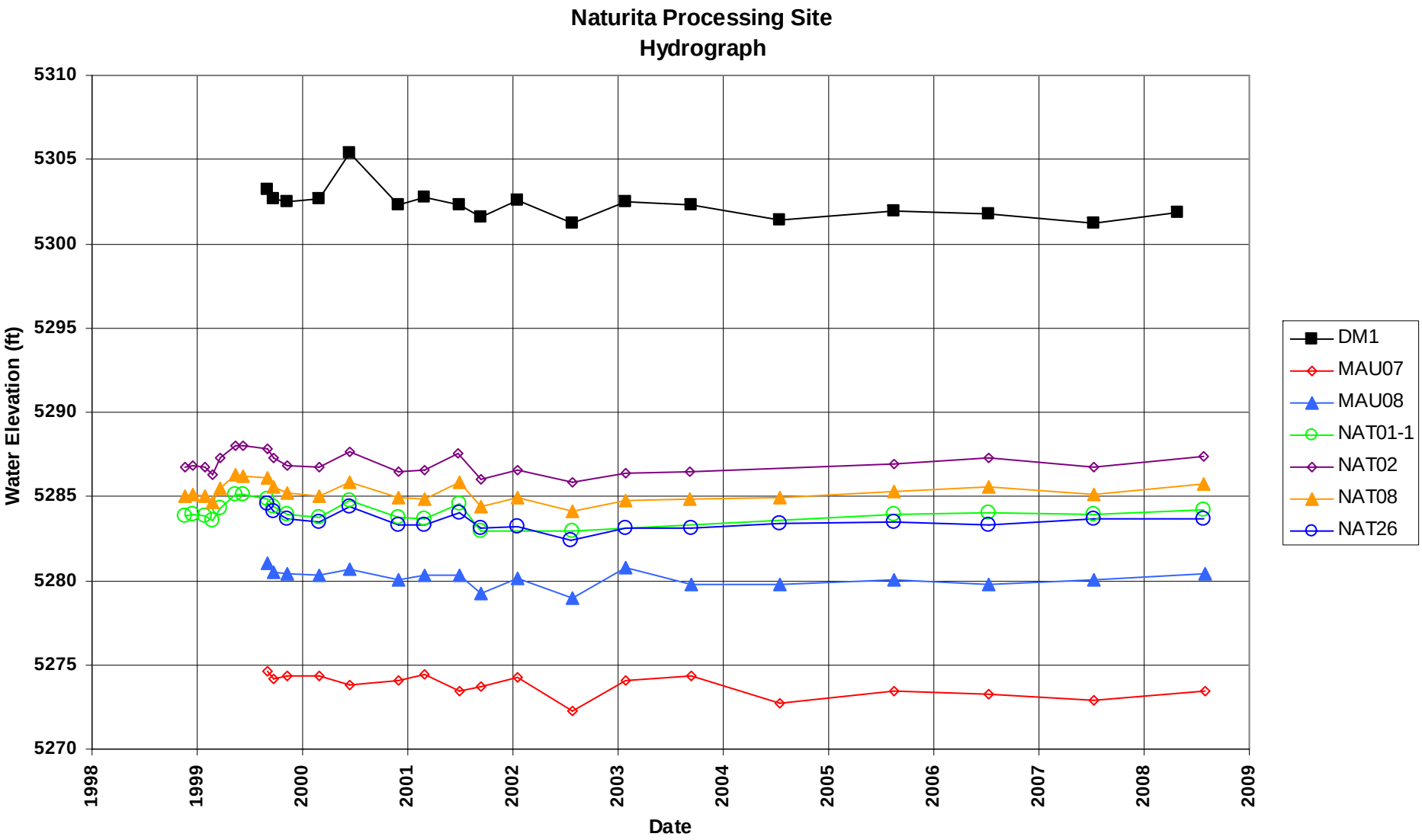
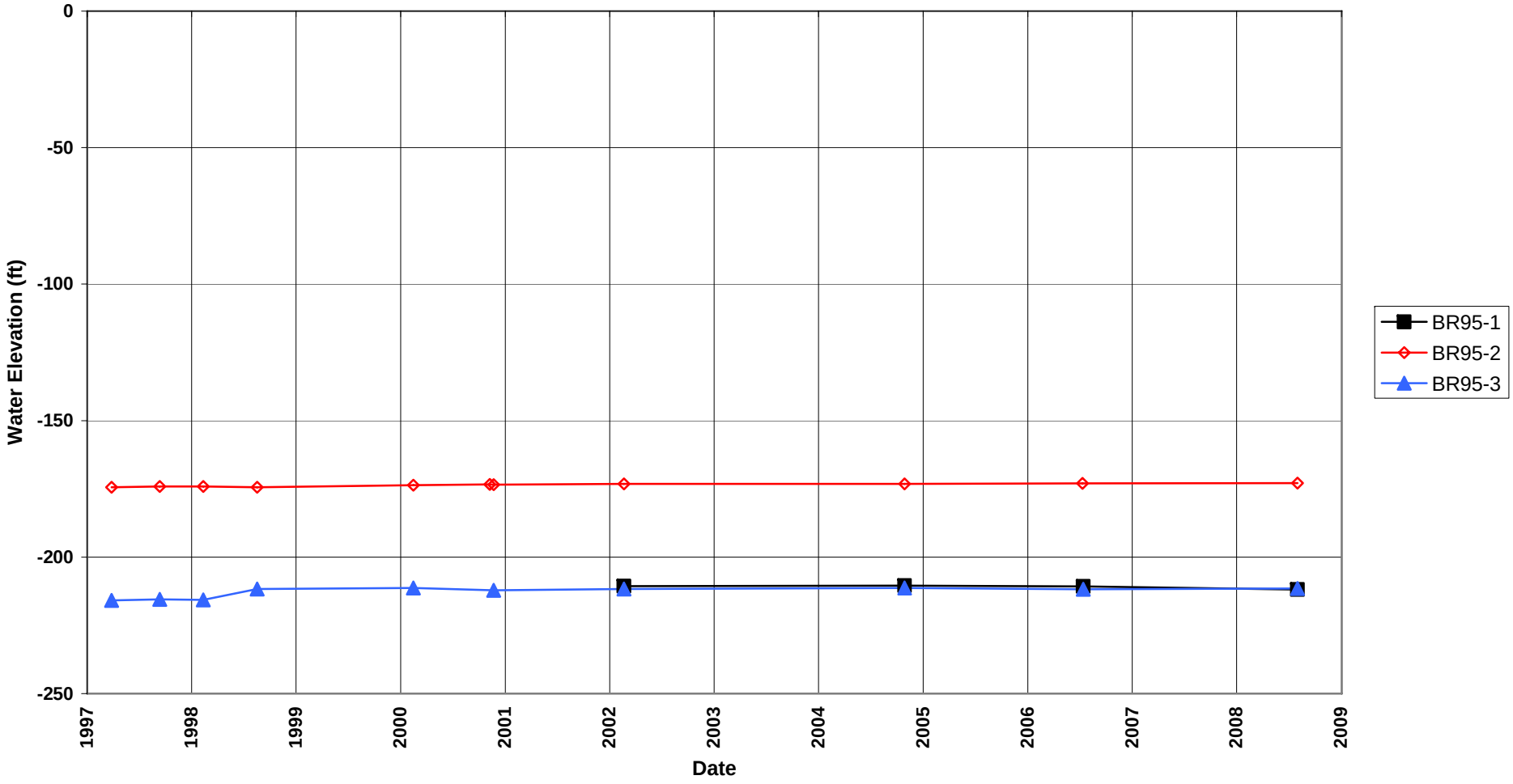

Naturita Processing Site
Hydrograph
Water Elevation (ft)
5310
5305
5300
5295
5290
5285
5280
5275
5270
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
DM1
MAU07
MAU08
NAT01-1
NAT02
NAT08
NAT26

-


Naturita Disposal Site
Hydrograph
Water Elevation (ft)
0
-50
-100
-150
-200
-250
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
BR95-1
BR95-2
BR95-3

-

Processing Site
Time-Concentration Graphs

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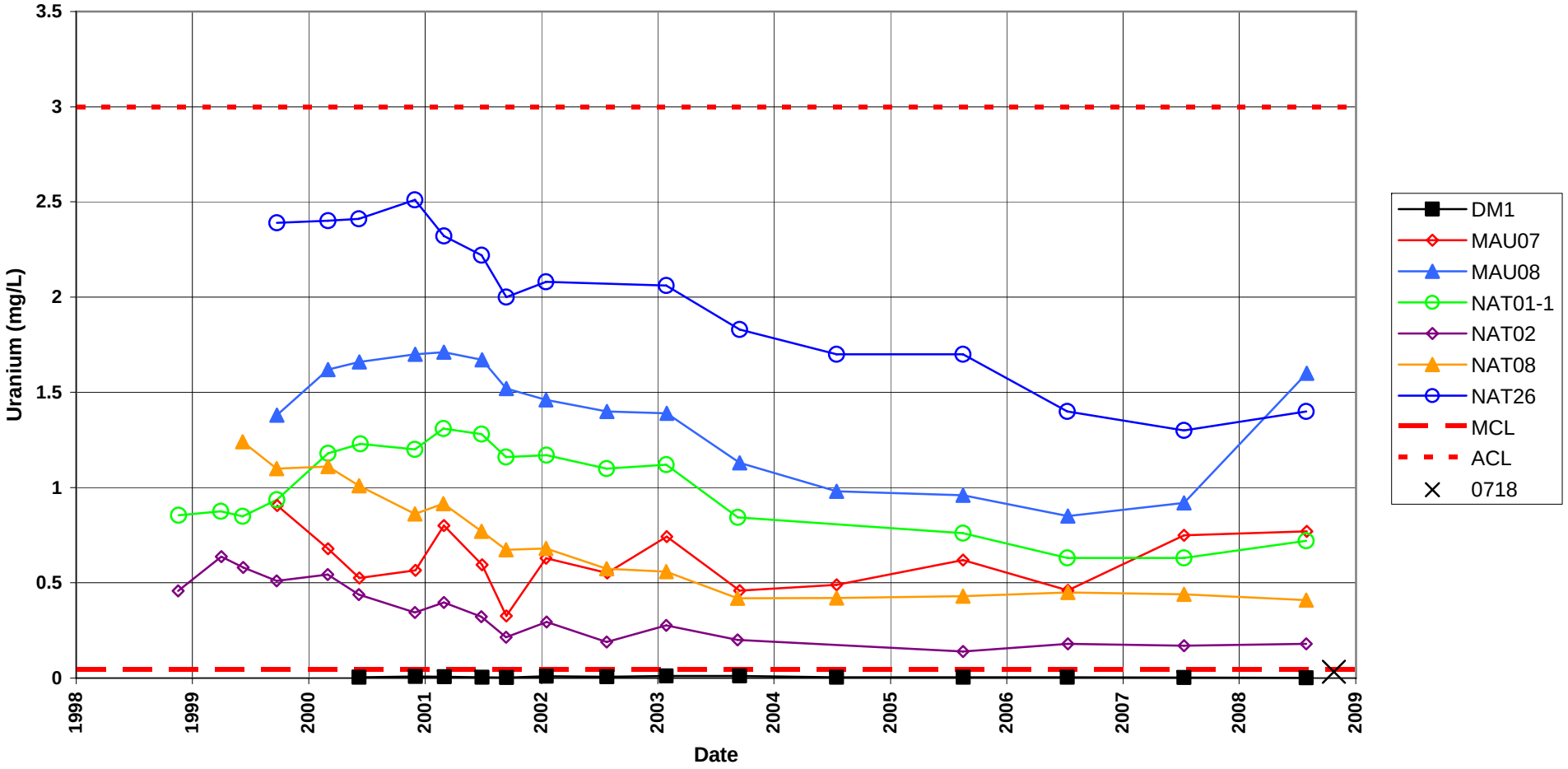
Naturita Processing Site
Uranium Concentration
Alternate Concentration Limit (ACL) = 3.0 mg/L
Maximum Contaminant Level (MCL) = 0.044 mg/L



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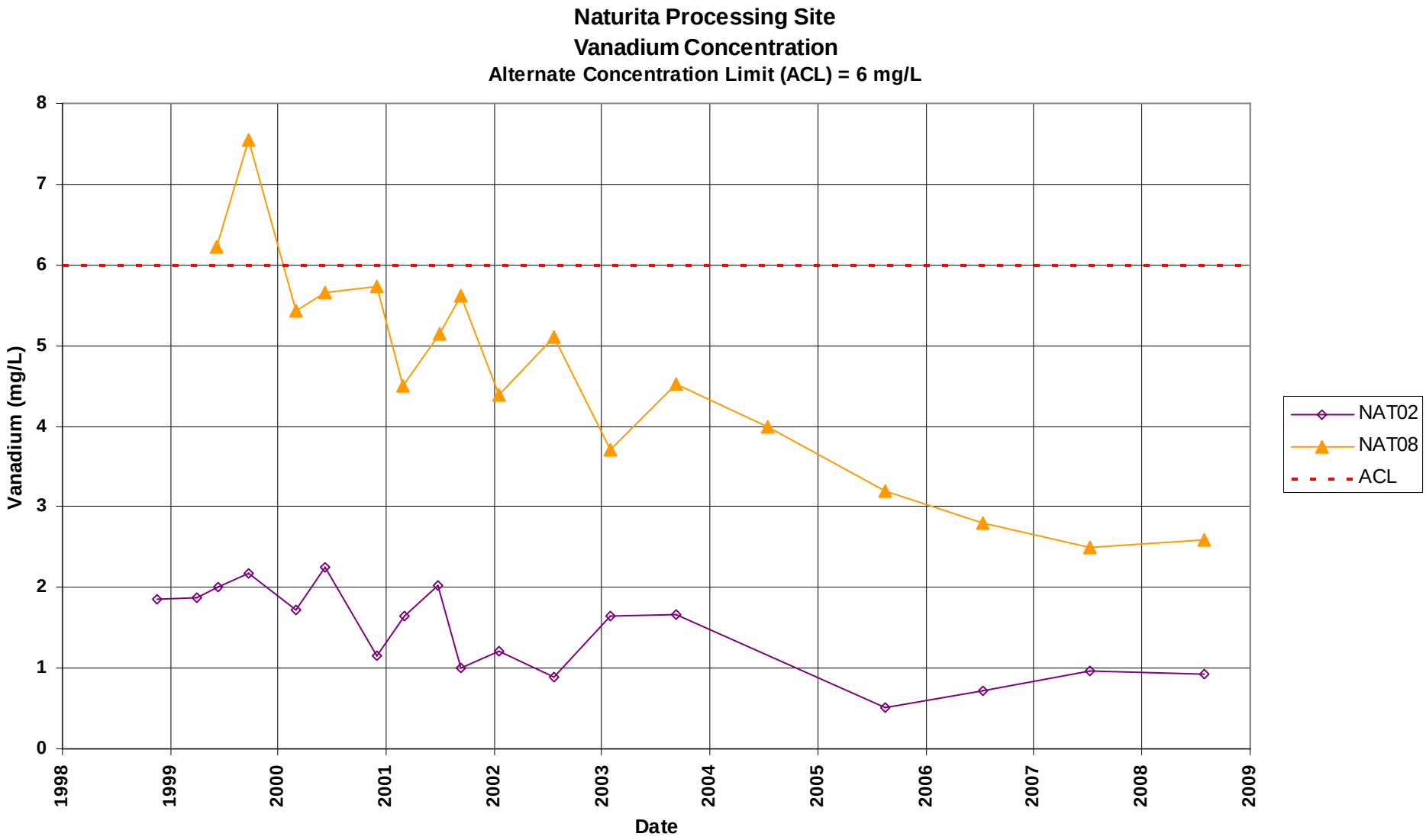
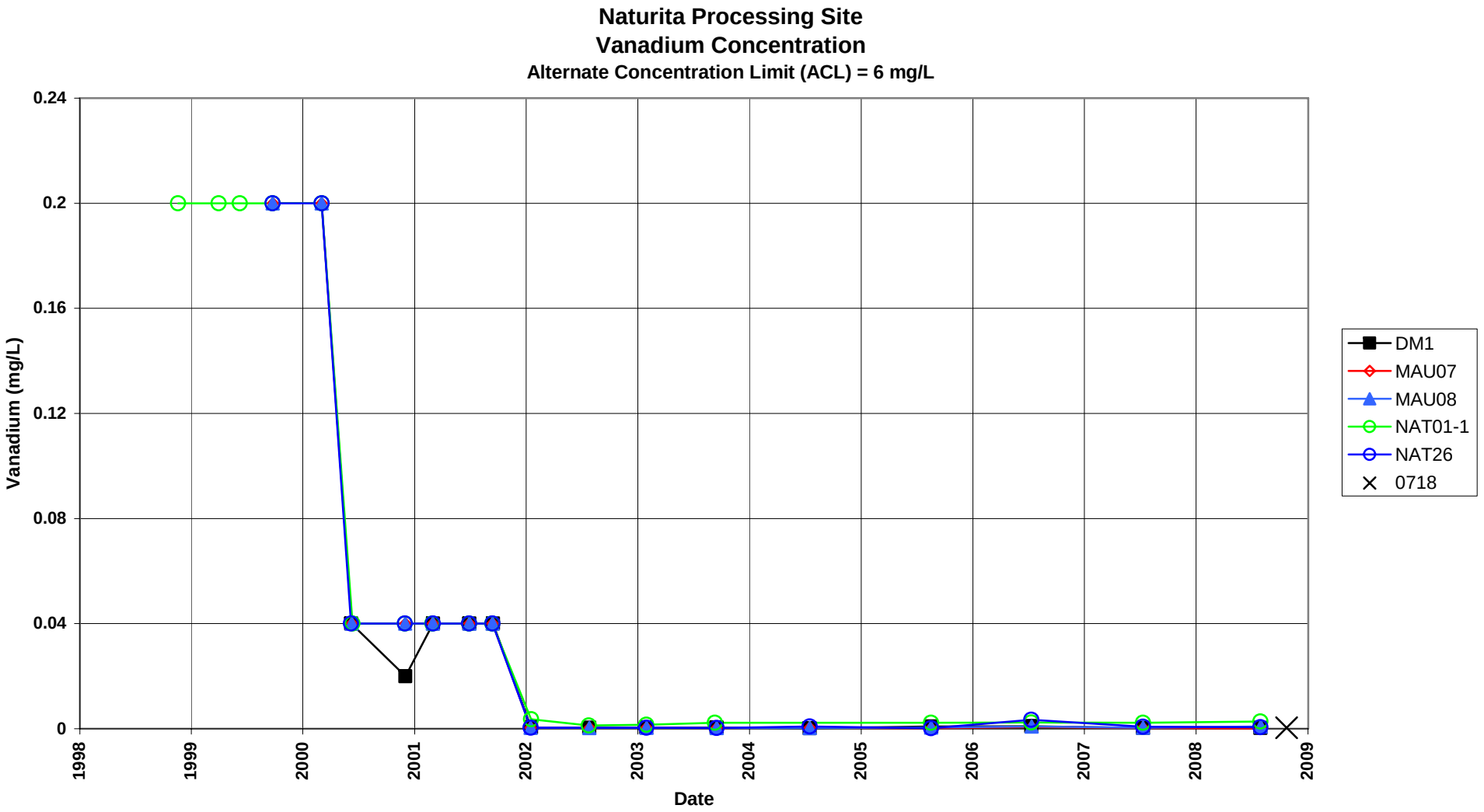

Naturita Processing Site
Vanadium Concentration
Alternate Concentration Limit (ACL) = 6 mg/L
Vanadium (mg/L)
0
1
2
3
4
5
6
7
8
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
NAT02
NAT08
ACL

-


Naturita Processing Site
Vanadium Concentration
Alternate Concentration Limit (ACL) = 6 mg/L
Vanadium (mg/L)
0.24
0.2
0.16
0.12
0.08
0.04
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
DM1
MAU07
MAU08
NAT01-1
NAT26
0718

-

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Disposal Site
Time-Concentration Graphs

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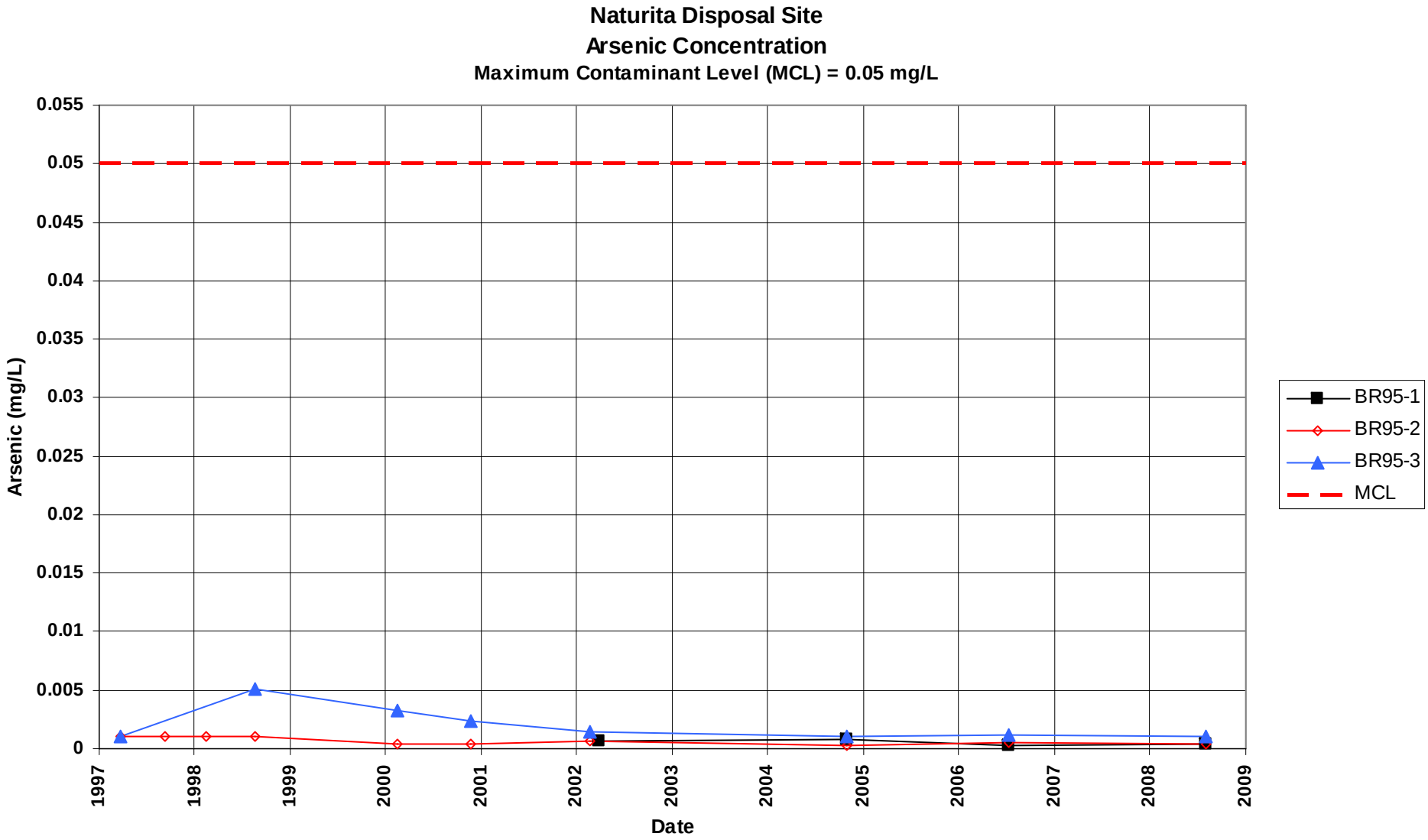
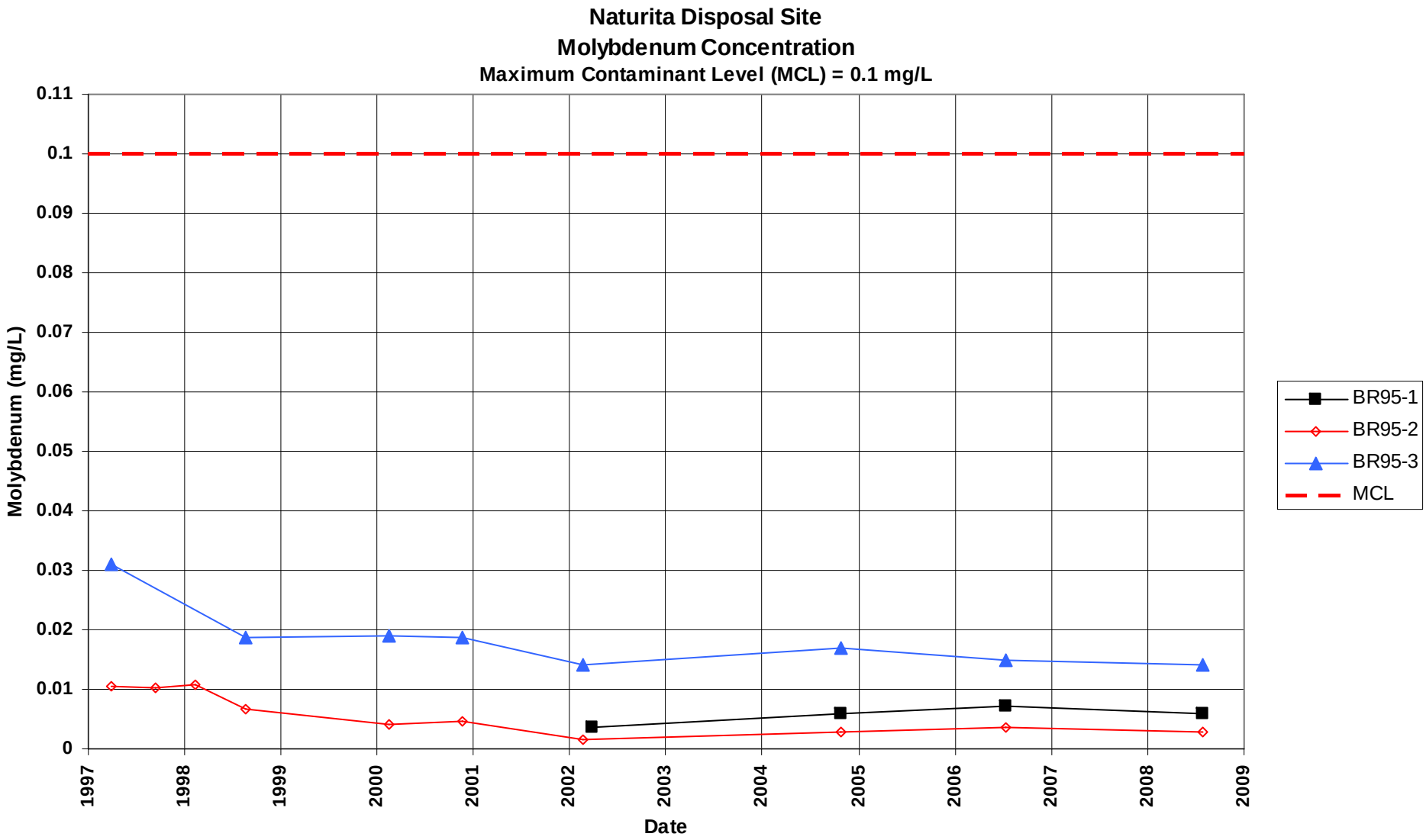
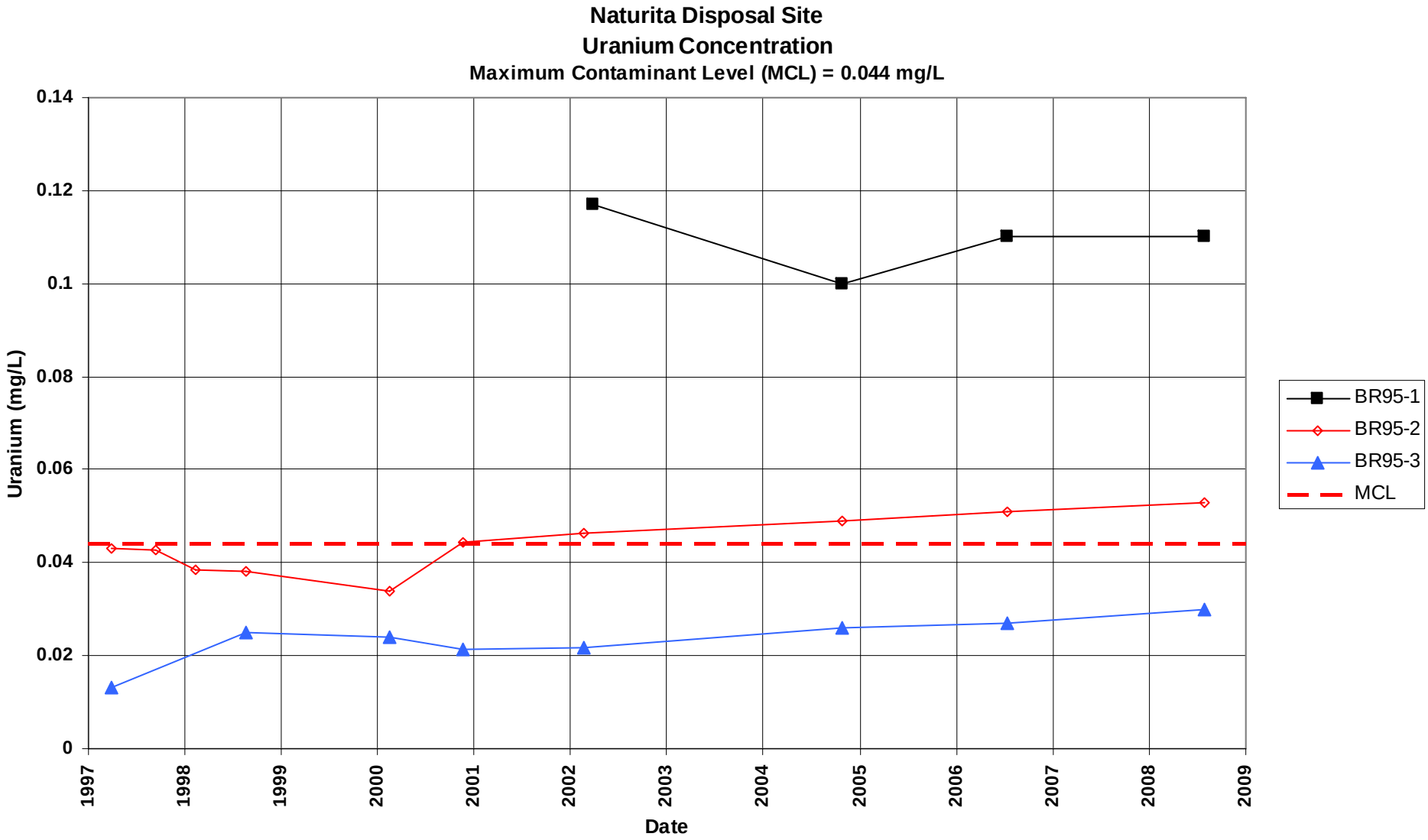

Naturita Disposal Site
Arsenic Concentration
Maximum Contaminant Level (MCL) = 0.05 mg/L
Arsenic (mg/L)
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
BR95-1
BR95-2
BR95-3
MCL

-


Naturita Disposal Site
Molybdenum Concentration
Maximum Contaminant Level (MCL) = 0.1 mg/L
Molybdenum (mg/L)
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
BR95-1
BR95-2
BR95-3
MCL

-


Naturita Disposal Site
Uranium Concentration
Maximum Contaminant Level (MCL) = 0.044 mg/L
Uranium (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
BR95-1
BR95-2
BR95-3
MCL

-

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Attachment 3
Sampling and Analysis Work Order

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Stoller established 1959

Task Order LM00-501
Control Number: 08-0446

June 24, 2008

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

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
July 2008 Environmental Sampling at Naturita, Colorado

REFERENCE: Task Order LM00-501-02-115-402, Naturita, CO, Processing and Disposal Sites

Dear Mr. Kautsky:

The purpose of this letter is to inform you of the upcoming sampling event at Naturita, Colorado. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Naturita Processing and Disposal sites. Water quality data will be collected at this site as part of the routine environmental sampling currently scheduled to begin the week of July 28, 2008.

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

Processing Site Monitor Wells*

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

Disposal Site Monitor Wells*

BR95-1 Nr	BR95-2 Nr	BR95-3 Nr	CM93-1 Wg	CM93-2 Wg

*NOTE: Al = Alluvium; Nr = No Recovery of Data For Classifying; Wg = Wingate Sandstone

Surface Locations (filtered)

0531	0533	0638	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.

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

If you have any questions, please call me at extension 6056.

Sincerely,

Ed Cotter
Site Lead

EC/lcg/hc
Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Richard Dayvault, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
EDD Delivery

cc w/o enclosures:
Records NAD 410.02 & NAP 410.02 (rc-grand.junction)

\\Condor\home\L40048\My Documents\Ground Water\NAT\0807nat-ltr.doc

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

Constituent Sampling Breakdown

Site	Naturita				
Analyte	Ground Water	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	12	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)					
Antimony					
Arsenic	BR and CM wells only		0.0001	SW-846 6020	LMM-02
Cadmium					
Calcium					
Chloride					
Chromium					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum	BR and CM wells only		0.003	SW-846 6020	LMM-02
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium					
Selenium					
Silica					
Sodium					
Strontium					
Sulfate					
Tin					
Total Dissolved Solids	X	X	10	SM2540 C	WCH-A-033
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	3			

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

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Attachment 4
Trip Report

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Stoller established 1959
Grand Junction Office

Memorandum

Control Number N/A

DATE: October 1, 2008

TO: Edward Cotter

FROM: Joe Trevino

SUBJECT: Trip Report

Site: Naturita, CO

Dates of Sampling Event: July 29–31, 2008

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

Number of Locations Sampled: 7 Processing Site monitor wells, 3 Disposal Cell monitor wells, 5 surface water locations, 1 duplicate, and 1 equipment blank for uranium, vanadium, and TDS.

Locations Not Sampled/Reason: Disposal cell wells CM93-1 and CM93-2 were not sampled due to the depth of the wells and equipment constraints.

Location Specific Information:

Date	Sample Location	Ticket Number	Sample Time	Notes	Water Levels
7/29/08	NAT26	GIQ 071	1234	Cat I	16.51
7/30/08	MAU08	GIQ 073	1130	Cat I	10.80
7/29/08	NAT01-01	GIQ 068	1330	Cat I	11.21
7/29/08	SM4	GIQ 079	1401	Surface Water	
7/30/08	2516	GIQ 080	1226	Duplicate of MAU07	
7/29/08	SM2	GIQ 078	1430	Surface Water	
7/30/08	2517	GIQ 077	1258	Equipment Blank	
7/29/08	0531	GIQ 075	1604	Surface Water	
7/30/08	MAU07	GIQ 072	1227	Cat I	7.40
7/30/08	0538	GIQ 077	1259	Surface Water	
7/29/08	DM1	GIQ 074	1520	Cat I	8.98
7/30/08	0533	GIQ 076	1411	Surface Water	
7/29/08	NAT08	GIQ 070	1120	Cat I	7.02
7/29/08	NAT02	GIQ 069	1036	Cat I	6.75
7/31/08	BR95-1	GIQ 082	1503	Cat I	211.9
7/31/08	BR95-2	GIQ 083	1205	Cat I	172.9
7/31/08	BR95-3	GIQ 084	1307	Cat I	211.51

All samples were shipped via Fed-Ex to Paragon Analytics on August 1, 2008.

Field Variance: None.

Quality Control Sample Cross Reference: Following are the false identifications assigned to the quality control samples:

False ID	True ID	Sample Type	Ticket Number
2516	MAU07	Duplicate	GIQ 080
2517	NA	Equipment Blank	GIQ 077

Requisition Numbers Assigned: All samples were assigned to report identification number (RIN) 08071732.

Water Level Measurements: Water levels were measured at all sampled monitor wells. See table above.

Well Inspection Summary: Wells in good condition.

Equipment: All wells are equipped with dedicated tubing and all were sampled with a peristaltic pump. The surface water locations were sampled using a peristaltic pump and lanyard with tubing and a stainless steel weight.

Notes: The Field Data Collection System was used for this sampling event and all field data was entered into a laptop computer.

Regulatory: N/A

Institutional Controls

Fences, Gates, Locks: OK
Signs: Not applicable.
Trespassing/Site Disturbances: None observed.

Site Issues: None observed

Disposal Cell/Drainage Structure Integrity: Not applicable.
Vegetation/Noxious Weed Concerns: Not applicable.
Maintenance Requirements: None.

Access Issues: N/A

Corrective Action Required/Taken: None.

JT/lcg

cc: (electronic)
Mark Kautsky, DOE
Cheri Bahrke, Stoller
Steve Donivan, Stoller
EDD Delivery