Data Validation Package

December 2012
Groundwater and Surface Water Sampling at the Monument Valley, Arizona Processing Site

April 2013

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Monument Valley, Arizona, Processing Site

Sampling Period: December 11–13, 2012

Forty-five groundwater samples and one surface water sample were collected at the Monument Valley, Arizona, Processing Site to monitor groundwater contaminants for evaluating the effectiveness of the proposed compliance strategy as specified in the 1999 *Final Site Observational Work Plan for the UMTRA Project Site at Monument Valley, Arizona*. Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated). Samples were collected for metals, anions, nitrate + nitrite as N, and ammonia as N at all locations. Samples were also collected for tritium (enrichment method), stable isotopes of hydrogen and oxygen, and uranium isotopes at a select set of wells.

The uranium data from well 0618 were rejected because of the large variation of uranium concentration noted between sample aliquots collected from this well.

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

Table 1. Monument Valley Locations That Exceed Standards

Analyte	Standard[a] (mg/L)	Site Code	Location	Concentration (mg/L)
Nitrate + Nitrite as Nitrogen	10	MON01	0606	230
			0648	87
			0653	45
			0655	250
			0656	15
			0657	12
			0669	21
			0735	14
			0740	19
			0741	110
			0742	110
			0743	57
			0744	160
			0761	33
			0762	110
			0764	42
			0765	81
			0766	140
			0770	15
			0771	190
Uranium	0.044	MON01	0657	0.49
			0662	0.17
			0734	0.14
			0735	0.21

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.
mg/L = milligrams per liter.

The Navajo Nation's proposed cleanup standard for sulfate is 250 milligrams per liter (mg/L). The ratios of sulfate-to-chloride concentrations vary depending on whether the source of the sulfate is related to past millsite activities or if it is from natural sources. Tailings fluids were enriched in nitrate and sulfate but had relatively low chloride concentrations. A sulfate-to-chloride ratio greater than 10 usually is an indication of groundwater contamination resulting from milling activities. The proposed sulfate treatment goal for Monument Valley will incorporate both criteria. The treatment goal will be achieved when the sulfate concentration is less than 250 mg/L *or* the sulfate-to-chloride ratio is less than 10. Table 2 lists sulfate concentrations and sulfate-to-chloride ratios.

Table 2. Sulfate Results

Location	Sulfate Concentration (mg/L)	Sulfate/Chloride Ratio	Treatment Goal Achieved?
0402	14	1	Yes
0602	110	8	Yes
0603	110	8	Yes
0604	110	10	Yes
0605	110	6	Yes
0606	430	13	No
0618	13	3	Yes
0619	31	5	Yes
0623	45	4	Yes
0648	1100	37	No
0650	390	20	No
0651	120	9	Yes
0652	69	4	Yes
0653	1000	40	No
0655	680	43	No
0656	150	10	Yes
0657	730	66	No
0662	220	18	Yes
0669	120	13	Yes
0711	120	9	Yes
0715	72	7	Yes
0719	120	8	Yes
0727	83	8	Yes
0733	79	12	Yes
0734	77	14	Yes
0735	1400	438	No
0738	180	12	Yes
0739	180	11	Yes
0740	1400	37	No
0741	540	26	No
0742	530	25	No
0743	600	30	No
0744	430	24	No
0760	86	9	Yes
0761	440	31	No
0762	1600	22	No
0764	250	23	No
0765	600	27	No
0766	420	23	No
0767	33	6	Yes

Table 2 (continued). Sulfate Results

Location	Sulfate Concentration (mg/L)	Sulfate/Chloride Ratio	Treatment Goal Achieved?
0768	62	5	Yes
0770	190	13	Yes
0771	1600	76	No
0772	110	8	Yes
0775	25	4	Yes
0776	30	5	Yes

Time-concentration plots for ammonia as nitrogen, chloride, nitrate + nitrite as nitrogen, sulfate, uranium, and vanadium are included with the results data.

David Miller
Site Lead, S.M. Stoller Corporation

4/2/13
Date

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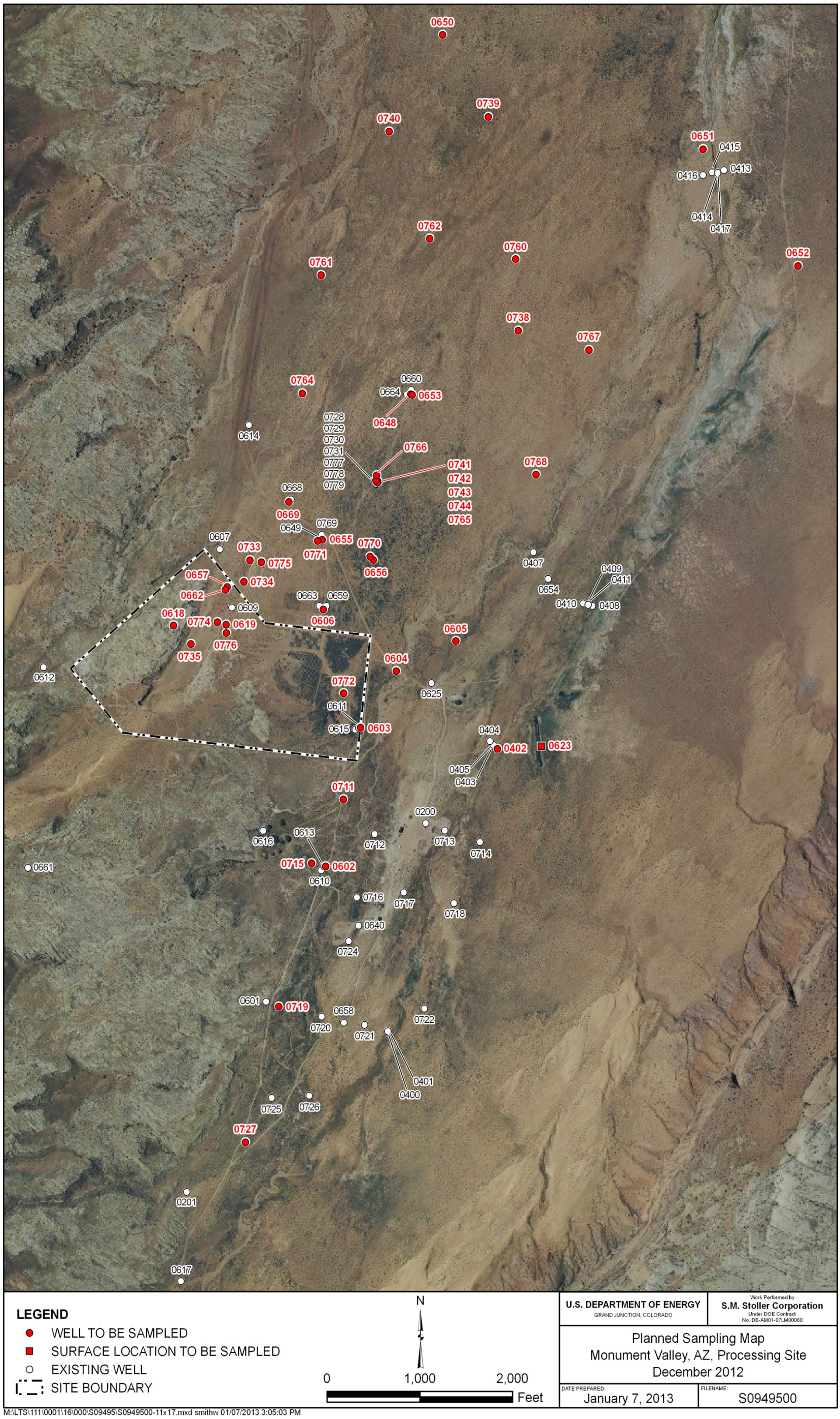

Monument Valley, Arizona, Processing Site Sample Location Map

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Monument Valley, Arizona	**Date(s) of Water Sampling**	December 11–13, 2012
Date(s) of Verification	March 7, 2013	**Name of Verifier**	Stephen Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Work Order letter dated November 13, 2012. Work Order letter was amended on December 6, 2012, to include additional locations and analytes.
2. Were the sampling locations specified in the planning documents sampled?	No	Well 0774 was dry.
3. Were calibrations conducted as specified in the above-named documents?	Yes	
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	Work Order letter was amended to include alkalinity and pH measurement at all locations.
6. Were wells categorized correctly?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from locations 0619, 0669, and 0772.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	An equipment blank was not required.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Numbers (RINs):	12124998
Sample Event:	December 11–13, 2012
Site(s):	Monument Valley, Arizona
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1212245
Analysis:	Metals, Radiochemistry, and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	March 7, 2013

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 3, Data Validation. 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 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as Nitrogen	WCH-A-005	EPA 350.1	EPA 350.1
Arsenic, Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020A
Calcium, Magnesium, Potassium, Sodium	LMM-01	SW-846 3005A	SW-846 6010B
Chloride, Sulfate	MIS-A-045	SW-856 9056	SW-856 9056
Nitrite + Nitrate as Nitrogen	WCH-A-022	EPA 353.2	EPA 353.2
Uranium Isotopes	LMR-02	SOP 776, 778	SOP 714

Data Qualifier Summary

Analytical results were qualified as listed in Table 4. Refer to the sections below for an explanation of the data qualifiers applied.

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1212245-7	0618	Uranium-234	R	Bottle to bottle variation
1212245-7	0618	Uranium-235	R	Bottle to bottle variation
1212245-7	0618	Uranium-238	R	Bottle to bottle variation
1212245-7	0618	Total Uranium	R	Bottle to bottle variation
1212245-8	0619	Uranium-235	J	Less than the Determination Limit
1212245-10	0648	Potassium	J	Matrix spike recovery
1212245-10	0648	Sodium	J	Matrix spike recovery
1212245-24	0733	Uranium-235	J	Less than the Determination Limit

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1212245-32	0743	Arsenic	J	Serial dilution result
1212245-32	0743	Potassium	J	Serial dilution result
1212245-45	0775	Uranium-235	J	Less than the Determination Limit
1212245-46	0776	Uranium-235	U	Less than the Decision Level Concentration
1212245-49	0619 Duplicate	Uranium-235	J	Less than the Determination Limit

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 49 water samples on December 21, 2012, accompanied by a Chain of Custody form. Copies of the air bills were included in the receiving documentation. The Chain of Custody was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody was complete with no errors or omissions, with one exception. An incorrect bottle set was listed for location 2079, which is a field duplicate. The correct bottle set was collected; the error was limited to the Chain of Custody. The laboratory noted the error and all analyses proceeded as requested.

Preservation and Holding Times

The sample shipment was received intact with the temperatures inside the iced coolers at 0.6 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 metal and wet chemical 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.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the minimum detectable concentration (MDC), Decision Level Concentration (DLC), and Determination Limit (DL). The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC 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, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a "U" flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as 3 times the MDC. Results not previously "U" qualified that are less than the DL are qualified with a "J" flag as estimated values.

The reported MDLs for all metal and wet chemical analytes; and MDCs for radiochemical analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

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

Method EPA 350.1, Ammonia as Nitrogen
Calibrations were performed using six calibration standards on December 28, 2012. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria.

Method EPA 353.2, Nitrite + Nitrate as Nitrogen
Calibrations were performed using seven calibration standards on December 29, 2012. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria.

Method SW-846 6010B, Calcium, Magnesium, Potassium, Sodium
Calibrations were performed on December 28, 2012, using three standards. The correlation coefficient values were greater than 0.995. The absolute values of the intercepts were less than or only slightly above 3 times the MDL, with the exception of the intercepts for calcium, magnesium, potassium, and sodium. These intercepts were less than 3 times the reporting limits and all results were above the reporting limits. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 6020A, Arsenic, Uranium, Vanadium
Calibrations were performed on December 28, 2012, using four standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056, Chloride, Sulfate
Calibrations were performed using six calibration standards on December 20, 2012. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency with all calibration checks meeting the acceptance criteria.

Radiochemical Analysis

Alpha Spectrometry
Alpha spectrometry calibrations and instrument backgrounds were performed within a month prior to sample analysis. Daily instrument checks met the acceptance criteria. The tracer recoveries met the acceptance criteria of 30 to 110 percent for all samples with two exceptions. The tracer recoveries for location 0657 and a method blank were below 30 percent. A high concentration of uranium in the field sample resulted in low chemical recovery and the method blank had low recovery because the sample was split during analysis. The tracer area counts were greater than 400 and all results are acceptable without further qualification. The full width at half maximum (FWHM) was reviewed to evaluate the spectral resolution. All internal standard FWHM values were below 100 kiloelectron volts (keV) demonstrating acceptable resolution. All internal standard peaks were within 50 keV of the expected position. The regions of interest (ROIs) for analyte peaks were reviewed. All ROIs were satisfactory and all integrations were performed correctly.

A comparison was made between the uranium isotopic data, converted to mg/L, and the uranium concentration measured by method SW-846 6020A. The uranium isotopic concentrations were in agreement with the total uranium concentration reported for all samples with the exception of the sample from well 0618. On February 7, 2013, the laboratory was requested to analyze the uranium isotopic aliquot and the metals aliquot for total uranium to determine if there was a bottle to bottle variation. The results of the re-analysis indicated that the uranium concentration in the metals aliquot was about 10 times greater than the uranium concentration in the uranium isotopic aliquot. The total uranium and uranium isotopic data for this well are qualified with an "R" flag as rejected because of the large variation of analyte concentration from bottle to bottle. The concentration of the other metals analytes were in agreement between the two aliquots, and sample results were not qualified.

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 PQLs 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. For some metals, some blanks were negative and the absolute values were greater than the MDL but less than the PQL. The associated results less than 5 times the MDL are qualified with a "J" flag as estimated values. The radiochemistry method blank results were less than the DLC.

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 result met the recovery and precision acceptance criteria with the following exception. The potassium and sodium spike recoveries from sample 0648 did not meet the acceptance criteria. The associated sample potassium and sodium results are qualified with a "J" flag as estimated values. In some cases, the chloride and sulfate spike recoveries were outside the laboratory acceptance range, but within the validation range of 70 percent to 125 percent, requiring no qualification.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for non-radiochemical 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. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

Laboratory Control Sample

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

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable with the following exceptions. The serial dilutions prepared for potassium from samples 0648 and 0743 and for arsenic from sample 0743 did not meet the acceptance criteria. The associated results are qualified with a "J" flag as estimated values.

Completeness

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

Chromatography Peak Integration

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

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on January 2, 2013, that included results for arsenic and molybdenum at two locations, which were missing in the original EDD. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure that all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 12124998 **Lab Code:** PAR **Validator:** Stephen Donivan **Validation Date:** 02/07/2013

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

# of Samples: 49 **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 were 3 duplicates evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 12124998 **Lab Code:** PAR **Date Due:** 01/18/2013

Matrix: Water **Site Code:** MON01 **Date Completed:** 01/08/2013

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Arsenic	ICP/MS	12/28/2012	0.0000	1.0000	OK	OK	OK	107.0	113.0	111.0	2.0	102.0	6.0	128.0
Arsenic	ICP/MS	12/28/2012					OK	112.0	110.0	113.0	3.0	104.0	11.0	110.0
Arsenic	ICP/MS	12/28/2012					OK	113.0					2.0	
Arsenic	ICP/MS	12/31/2012	0.0000	1.0000	OK	OK			112.0	110.0	2.0			
Calcium	ICP/ES	12/28/2012			OK	OK	OK	102.0	102.0	100.0	0.0	104.0	1.0	105.0
Calcium	ICP/ES	12/28/2012					OK	102.0	107.0	105.0	1.0	103.0	0.0	104.0
Calcium	ICP/ES	12/28/2012					OK	98.0	98.0	98.0	0.0		0.0	
Magnesium	ICP/ES	12/28/2012			OK	OK	OK	103.0	103.0	101.0	0.0	105.0	3.0	104.0
Magnesium	ICP/ES	12/28/2012					OK	102.0	105.0	103.0	1.0	104.0	2.0	103.0
Magnesium	ICP/ES	12/28/2012					OK	98.0	97.0	97.0	0.0		0.0	
Potassium	ICP/ES	12/28/2012			OK	OK	OK	106.0	132.0	131.0	0.0		34.0	78.0
Potassium	ICP/ES	12/28/2012					OK	104.0	120.0	117.0	2.0		27.0	76.0
Potassium	ICP/ES	12/28/2012					OK	96.0	112.0	112.0	1.0			
Sodium	ICP/ES	12/28/2012			OK	OK	OK	97.0	170.0	174.0	1.0		7.0	81.0
Sodium	ICP/ES	12/28/2012					OK	95.0	101.0	98.0	1.0		0.0	81.0
Sodium	ICP/ES	12/28/2012					OK	91.0	98.0	96.0	1.0		7.0	
Uranium	ICP/MS	12/28/2012	0.0000	1.0000	OK	OK	OK	102.0	104.0	103.0	1.0	103.0	4.0	120.0
Uranium	ICP/MS	12/28/2012					OK	109.0	103.0	109.0	3.0	103.0	0.0	80.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 12124998 **Lab Code:** PAR **Date Due:** 01/18/2013

Matrix: Water **Site Code:** MON01 **Date Completed:** 01/08/2013

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Uranium	ICP/MS	12/28/2012					OK	108.0					2.0	
Uranium	ICP/MS	12/31/2012	0.0000	1.0000	OK	OK			114.0	106.0	2.0			
Vanadium	ICP/MS	12/28/2012	0.0000	1.0000	OK	OK	OK	100.0	103.0	104.0	1.0	100.0	1.0	76.0
Vanadium	ICP/MS	12/28/2012					OK	103.0	105.0	113.0	8.0	99.0		108.0
Vanadium	ICP/MS	12/28/2012					OK	103.0						
Vanadium	ICP/MS	12/31/2012	0.0000	1.0000	OK	OK			104.0	100.0	3.0			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 12124998 **Lab Code:** PAR **Date Due:** 01/18/2013

Matrix: Water **Site Code:** MON01 **Date Completed:** 01/08/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0618	U-234	12/29/2012			66.6			
0619	U-234	12/29/2012			65.6			
0657	U-234	12/29/2012			39.0			
0662	U-234	12/29/2012			79.6			
0733	U-234	12/29/2012			62.9			
0734	U-234	12/29/2012			70.8			
0735	U-234	12/29/2012			80.9			
0775	U-234	12/29/2012			79.7			
0776	U-234	12/29/2012			50.4			
2856	U-234	12/29/2012			82.7			
0734	U-234	12/29/2012			81.9			0.31
Blank_Spike	U-234	12/29/2012			60.9	90.40		
Blank	U-234	12/29/2012	-0.0040	U	76.1			
Blank	U-235	12/29/2012	-0.0040	U				
Blank	U-238	12/29/2012	0.0090	U				
0734	Uranium-235	12/29/2012						0.65
0734	Uranium-238	12/29/2012						0.16
Blank_Spike	Uranium-238	12/29/2012				92.30		

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 12124998 **Lab Code:** PAR **Date Due:** 01/18/2013

Matrix: Water **Site Code:** MON01 **Date Completed:** 01/08/2013

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
AMMONIA AS N	12/28/2012	0.000	1.0000	OK	OK	OK	97.00	79.0	81.0	2.00	
AMMONIA AS N	12/28/2012					OK	94.00	102.0	102.0	0	
AMMONIA AS N	12/28/2012					OK	98.00	92.0	92.0	1.00	
CHLORIDE	12/26/2012	0.000	1.0000	OK	OK	OK	100.00	116.0	116.0	0	
CHLORIDE	12/27/2012							116.0			
CHLORIDE	12/28/2012			OK	OK	OK	100.00	115.0	112.0	1.00	
CHLORIDE	12/28/2012					OK	96.00	110.0	110.0	0	
CHLORIDE	12/28/2012							113.0			
CHLORIDE	12/28/2012							114.0			
Nitrate+Nitrite as N	12/29/2012	0.000	1.0000	OK	OK	OK	101.00	118.0	97.0	14.00	
Nitrate+Nitrite as N	12/29/2012	0.000	0.9999	OK	OK	OK	104.00	99.0	100.0	0	
Nitrate+Nitrite as N	12/29/2012					OK	101.00	102.0	98.0	4.00	
SULFATE	12/26/2012	0.000	1.0000	OK	OK	OK	103.00	118.0	118.0	0	
SULFATE	12/27/2012							115.0			
SULFATE	12/28/2012			OK	OK	OK	102.00	118.0	115.0	1.00	
SULFATE	12/28/2012					OK	97.00	109.0	110.0	0	

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 12124998 **Lab Code:** PAR **Date Due:** 01/18/2013

Matrix: Water **Site Code:** MON01 **Date Completed:** 01/08/2013

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
SULFATE	12/28/2012							113.0			
SULFATE	12/28/2012							113.0			

General Information

RIN:	12125005
Sample Event:	December 11–12, 2012
Site(s):	Monument Valley
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	317003
Analysis:	Radiochemistry
Validator:	Steve Donivan
Review Date:	March 21, 2013

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 5.

Table 5. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Tritium, Enrichment Method	LMR-17	HASL 300, Modified	HASL 300, Modified

Data Qualifier Summary

Analytical results were qualified as listed in Table 6. Refer to the sections below for an explanation of the data qualifiers applied.

Table 6. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
317003004	0662	Tritium	J	Less than the determination limit
317003005	0773	Tritium	J	Less than the determination limit
317003006	0734	Tritium	J	Less than the determination limit

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received ten water samples on December 19, 2012, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC form was checked to confirm that the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact at ambient temperature 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 MDL was reported for all metal and wet chemical 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.

For radiochemical analytes (those measured by radiometric counting) the MDL and PQL are not applicable, and these results are evaluated using the MDC, DLC, and DL. The MDC is a measure of radiochemical method performance and was calculated and reported as specified in *Quality Systems for Analytical Services*. The DLC 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, and is estimated as 3 times the one-sigma total propagated uncertainty. Results that are greater than the MDC, but less than the DLC are qualified with a "U" flag (not detected). The DL for radiochemical results is the lowest concentration that can be reliably measured, and is defined as 3 times the MDC. Results not previously "U" qualified that are less than the DL are qualified with a "J" flag as estimated values.

The reported MDCs for radiochemical analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

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

Radiochemical Analysis

Tritium
The tritium quench calibration curve was generated on July 23, 2012, for quench numbers ranging from 578 to 761. Sample quench values were within the calibration range for all samples. Daily calibration checks were performed on February 18–21, 2013.

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. The radiochemistry method blank results were less than the DLC.

Matrix Spike Analysis

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

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative error ratio for radiochemical replicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, 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.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDC for all analytes and all required supporting documentation.

EDD File

The EDD file arrived on March 18, 2013. 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: 12125005 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 03/21/2013

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

# of Samples: 10 **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	There are 0 detection limit failures.
☐ Field/Trip Blanks	
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 12125005 **Lab Code:** GEN **Date Due:** 03/19/2013

Matrix: Water **Site Code:** MON01 **Date Completed:** 03/15/2013

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0618	Tritium	02/18/2013			64.0			
0619	Tritium	02/18/2013			64.0			
0775	Tritium	02/19/2013			64.0			
Blank_Spike	Tritium	02/19/2013			64.0	108.00		0.80
0657	Tritium	02/20/2013			64.0			
0662	Tritium	02/20/2013			64.0			
0733	Tritium	02/20/2013			64.0			
0734	Tritium	02/20/2013			64.0			
0735	Tritium	02/20/2013			64.0			
0776	Tritium	02/21/2013			64.0			
2349	Tritium	02/21/2013			64.0			
Blank	Tritium	02/21/2013	-0.2400	U	64.0			

General Information

RIN:	12125006
Sample Event:	December 11–12, 2012
Site(s):	Monument Valley
Laboratory:	Reston Stable Isotope Laboratory, Reston, Virginia
Analysis:	Stable Isotopes
Validator:	Stephen Donivan
Review Date:	February 11, 2013

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325), "Standard Practice for Validation of Laboratory Data." The procedure was applied at Level 1, Data Deliverables Examination. 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 7.

Table 7. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
H-2/H-1 and O-18/O-16 Isotope Ratios	LMW-08	NA	Mass Spectrometry
S-34/S-32 Isotope Ratios	LMW-09	NA	Mass Spectrometry

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

The Reston Stable Isotope Laboratory in Reston, Virginia received nine water samples on December 19, 2012 submitted for the determination of stable hydrogen, oxygen, and sulfur isotope ratios. The analytical report was checked to confirm that all of the samples scheduled were received and analyzed.

Preservation and Holding Times

The sample shipment was received intact with all samples in the correct container types preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Laboratory Analysis

Hydrogen-isotope-ratio analyses was performed using a hydrogen equilibration technique (Coplen and others, 1991; Revesz and Coplen, 2008a) which is based on measuring the deuterium activity. Water samples are measured for delta O-18 using the CO2 equilibration technique of Epstein and Mayeda (1953), which has been automated (Revesz and Coplen, 2008b). Therefore, both oxygen and hydrogen isotopic ratio measurements are reported as activities.

Oxygen and hydrogen isotopic results are reported in per mill relative to VSMOW (Vienna Standard Mean Ocean Water) and normalized (Coplen, 1994) on scales such that the oxygen and hydrogen isotopic values of SLAP (Standard Light Antarctic Precipitation) are -55.5 per mill and -428 per mill, respectively. The 2-sigma uncertainties of oxygen and hydrogen isotopic results are 0.2 per mill and 2 per mill, respectively, unless otherwise indicated.

Sulfur isotope samples prepared for isotopic analysis using the methods of Carmody and others (1997). For sulfur isotope ratio measurements, dissolved sulfate is converted to BaSO4, which is analyzed by conversion to sulfur dioxide with an elemental analyzer and subsequent analysis with a continuous flow isotope ratio mass spectrometer (Brenna, 1997). Samples are analyzed simultaneously with BaSO4 isotopic reference materials. No correction for oxygen isotopic composition is made to reported data.

Sulfur isotope ratios are reported in parts per thousand (per mill) relative to VCDT, defined by assigning a value of -0.3 per mill exactly (Coplen and Krouse, 1998) to IAEA-S-1 silver sulfide (previously known as NZ-1).

The 2-sigma uncertainty of sulfur isotopic results is 0.4 per mill, unless otherwise indicated.

Completeness

The electronic data deliverable was the only deliverable received for this RIN.

EDD File

The EDD files arrived on January 18, 2013 and February 1, 2013.

Sampling Quality Control Assessment

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

Sampling Protocol

Wells were sampled with a peristaltic pump and dedicated tubing, a dedicated bladder pump, or a dedicated submersible pump. The surface water location was sampled by container immersion. With the exception of well 0618, which was sampled from the pump tap, all sample results for monitoring wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Wells 0402, 0602, 0606, 0735, 0764, and 0771 were qualified with a "Q" flag, indicating the data are qualitative because these wells were classified as Category II.

Equipment Blank Assessment

No equipment blanks were taken because all samples were collected using dedicated equipment.

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from locations 0619, 0669, and 0772. The non-radiochemical duplicate results met the criteria, demonstrating acceptable overall precision. The relative error ratio for radiochemical duplicate results (calculated using the one-sigma total propagated uncertainty) was less than 3, indicating acceptable precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 12124998 **Lab Code:** PAR **Project:** Monument Valley **Validation Date:** 02/07/2013

Duplicate: 2079 **Sample:** 0772

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
AMMONIA AS N	1.5			1	1.4			1	6.90		MG/L
Calcium	23000			1	23000			1	0		UG/L
CHLORIDE	14			5	14			5	0		MG/L
Magnesium	16000			1	16000			1	0		UG/L
Nitrate+Nitrite as N	1.8			1	1.6			1	11.76		MG/L
Potassium	810	B		1	840	B		1	3.64		UG/L
Sodium	87000			1	85000			1	2.33		UG/L
SULFATE	110			5	110			5	0		MG/L
Uranium	6.4			1	6.4			1	0		UG/L
Vanadium	21			1	22			1	4.65		UG/L

Duplicate: 2434 **Sample:** 0669

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
AMMONIA AS N	4.7			1	4.2			1	11.24		MG/L
Calcium	59000			1	52000			1	12.61		UG/L
CHLORIDE	9.5			5	9.2			5	3.21		MG/L
Magnesium	43000			1	37000			1	15.00		UG/L
Nitrate+Nitrite as N	21			20	21			20	0		MG/L
Potassium	4800			1	4200			1	13.33		UG/L
Sodium	31000			1	27000			1	13.79		UG/L
SULFATE	120			5	120			5	0		MG/L
Uranium	6.4			1	6.6			1	3.08		UG/L
Vanadium	51			1	52			1	1.94		UG/L

Duplicate: 2856 **Sample:** 0619

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
AMMONIA AS N	0.1	U		1	0.1	U		1			MG/L
Calcium	25000			1	22000			1	12.77		UG/L
CHLORIDE	5.7			1	5.5			5	3.57		MG/L
Magnesium	24000			1	20000			1	18.18		UG/L
Nitrate+Nitrite as N	0.85			1	0.86			1	1.17		MG/L
Potassium	2000			1	1900			1	5.13		UG/L
Sodium	19000			1	16000			1	17.14		UG/L
SULFATE	31			1	29			5	6.67		MG/L
U-234	2.22		0.398	1	2.31		0.402	1	3.97	0.3	pCi/L
Uranium	5.3			1	5.5			1	3.70		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 12124998 **Lab Code:** PAR **Project:** Monument Valley **Validation Date:** 02/07/2013

Duplicate: 2856 **Sample:** 0619

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Uranium-235	0.0846		0.0532	1	0.0576		0.037	1		0.8	pCi/L
Uranium-238	1.67		0.311	1	1.78		0.32	1	6.38	0.5	pCi/L
Vanadium	19			1	21			1	10.00		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 12125005 **Lab Code:** GEN **Project:** Monument Valley **Validation Date:** 03/21/2013

Duplicate: 2349 **Sample:** 0619

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Tritium	0.331	U	1.60	1.00	0.313	U	1.63	1.00		0	pCi/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 Donivan 4-1-2013
Stephen Donivan

Data Validation Lead: Stephen Donivan 4-1-2013
Stephen Donivan

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 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.

The nitrate + nitrite as N result from location 0655 was identified as potentially anomalous. The nitrate + nitrite as N concentration is following an upward trend at this location and there were no errors noted during the review of these data. The data for this RIN are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2003

Laboratory: ALS Laboratory Group

RIN: 12124998

Report Date: 03/07/2013

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
MON01	0402	0001	12/11/2012	Chloride	16		FQ	15		FQ	12		FQ	8	0	No
MON01	0402	0001	12/11/2012	Sulfate	14		FQ	21		FQ	14.3		FQ	8	0	No
MON01	0602	N001	12/11/2012	Uranium	0.0035		FQ	0.004		FQ	0.00359		FQ	7	0	No
MON01	0602	N001	12/11/2012	Vanadium	0.0007		FQ	0.015	U	FQ	0.00071		F	7	2	No
MON01	0603	N001	12/11/2012	Ammonia Total as N	0.35		F	0.348		F	0.14		F	8	0	No
MON01	0605	N001	12/13/2012	Ammonia Total as N	0.48		F	0.43		F	0.31		F	8	0	No
MON01	0605	N001	12/13/2012	Chloride	17		F	65.6		F	18		F	8	0	No
MON01	0606	N001	12/11/2012	Ammonia Total as N	90		FQ	140		F	95		FQ	15	0	No
MON01	0606	N001	12/11/2012	Vanadium	0.00026	B	FQ	0.015	U	FQ	0.00033		F	15	5	No
MON01	0618	N001	12/11/2012	Calcium	61			56			32.6			5	0	No
MON01	0618	N001	12/11/2012	Magnesium	36			32			17.4			5	0	No
MON01	0618	N001	12/11/2012	Potassium	1.7			1.5			1.3		FQ	5	0	No
MON01	0618	N001	12/11/2012	Sodium	12			10	E	J	6.94			5	0	No
MON01	0618	N001	12/11/2012	Sulfate	13			123			13.7			6	0	No
MON01	0618	N001	12/11/2012	Uranium	0.08		R	0.046			0.00522			5	0	No
MON01	0619	N001	12/11/2012	Uranium-234	2.22		F	11.3		F	2.29		F	8	0	No
MON01	0619	N001	12/11/2012	Uranium-235	0.0846		FJ	0.471		F	0.0868		F	6	0	No
MON01	0619	N002	12/11/2012	Uranium-235	0.0576		FJ	0.471		F	0.0868		F	6	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2003
Laboratory: ALS Laboratory Group
RIN: 12124998
Report Date: 03/07/2013

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
MON01	0619	N001	12/11/2012	Uranium-238	1.67		F	10.2		F	1.69		F	8	0	No
MON01	0623	0001	12/11/2012	Vanadium	0.00044			0.015	U		0.00069		U	8	3	No
MON01	0648	N001	12/12/2012	Chloride	30		F	29		F	21		F	9	0	No
MON01	0648	N001	12/12/2012	Sulfate	1100		F	990		F	824		F	9	0	No
MON01	0650	N001	12/13/2012	Chloride	20		F	18		F	9		F	11	0	No
MON01	0650	N001	12/13/2012	Nitrate + Nitrite as Nitrogen	4.3		F	4		F	0.53		F	11	0	No
MON01	0650	N001	12/13/2012	Sulfate	390		F	330		F	41		F	11	0	No
MON01	0650	N001	12/13/2012	Uranium	0.0025		F	0.0024		F	0.002		F	11	0	No
MON01	0651	N001	12/13/2012	Chloride	14		F	13		F	11		F	8	0	No
MON01	0652	N001	12/13/2012	Chloride	16		F	15		F	13.9		F	8	0	No
MON01	0655	N001	12/11/2012	Nitrate + Nitrite as Nitrogen	250		F	190		F	95		F	16	0	Yes
MON01	0655	N001	12/11/2012	Sulfate	680		F	1900		F	720		F	17	0	No
MON01	0657	N001	12/11/2012	Chloride	11		F	9.69		F	5.49		F	14	0	No
MON01	0657	N001	12/11/2012	Nitrate + Nitrite as Nitrogen	12		F	8.8		F	2.6		F	14	0	No
MON01	0657	N001	12/11/2012	Sulfate	730		F	490		F	30		F	14	0	No
MON01	0657	N001	12/11/2012	Uranium	0.49		F	0.39		F	0.0047		F	14	0	No
MON01	0657	N001	12/11/2012	Uranium-234	154		F	120		F	1.95		F	6	0	No
MON01	0657	N001	12/11/2012	Uranium-235	7.73		F	5.58		F	0.0421		FJ	5	0	No

Data Validation Outliers Report - No Field Parameters

Comparison: All historical Data Beginning 01/01/2003

Laboratory: ALS Laboratory Group

RIN: 12124998

Report Date: 03/07/2013

					Current			**Historical Maximum**			**Historical Minimum**			**Number of Data Points**		**Statistical Outlier**
						Qualifiers			*Qualifiers*			*Qualifiers*				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
MON01	0657	N001	12/11/2012	Uranium-238	153		F	119		F	1.26		F	6	0	No
MON01	0669	N001	12/11/2012	Ammonia Total as N	4.7		F	3.88		F	1.5		F	17	0	No
MON01	0669	N002	12/11/2012	Ammonia Total as N	4.2		F	3.88		F	1.5		F	17	0	No
MON01	0669	N002	12/11/2012	Nitrate + Nitrite as Nitrogen	21		F	20.4		FQ	5.5		F	17	0	No
MON01	0669	N001	12/11/2012	Nitrate + Nitrite as Nitrogen	21		F	20.4		FQ	5.5		F	17	0	No
MON01	0740	N001	12/13/2012	Chloride	38		F	44		F	38.2		F	5	0	No
MON01	0740	N001	12/13/2012	Nitrate + Nitrite as Nitrogen	19		F	15.8		F	12		F	5	0	No
MON01	0740	N001	12/13/2012	Sulfate	1400		F	1200		F	973		F	5	0	No
MON01	0740	N001	12/13/2012	Uranium	0.039		F	0.034		F	0.0124		F	5	0	No
MON01	0764	0001	12/13/2012	Sulfate	250		FQ	381		FQ	260		FQ	15	0	No
MON01	0767	N001	12/13/2012	Vanadium	0.000051	B	F	0.015	U	F	0.000052	B	F	16	12	No
MON01	0772	N002	12/11/2012	Sodium	85		F	110		F	86	E	JF	6	0	No
MON01	0775	N001	12/12/2012	Chloride	5.9		F	5.4		F	4.62		F	7	0	No
MON01	0775	N001	12/12/2012	Vanadium	0.00059		F	0.015	U	F	0.0006		F	7	3	No
MON01	0776	N001	12/11/2012	Chloride	5.7		F	5.4		F	4.8		F	7	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.

Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 03/21/2013

Location: 0402 WELL Tribal Well No. 08-0643.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	5.17 - 9.63	251		FQ	#		
Ammonia Total as N	mg/L	12/11/2012	0001	5.17 - 9.63	0.1	U	FQ	#	0.1	
Calcium	mg/L	12/11/2012	0001	5.17 - 9.63	15		FQ	#	0.012	
Chloride	mg/L	12/11/2012	0001	5.17 - 9.63	16		FQ	#	0.2	
Magnesium	mg/L	12/11/2012	0001	5.17 - 9.63	33		FQ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	0001	5.17 - 9.63	0.15		FQ	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	5.17 - 9.63	35.4		FQ	#		
pH	s.u.	12/11/2012	N001	5.17 - 9.63	7.84		FQ	#		
Potassium	mg/L	12/11/2012	0001	5.17 - 9.63	3		FQ	#	0.11	
Sodium	mg/L	12/11/2012	0001	5.17 - 9.63	54		FQ	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	5.17 - 9.63	553		FQ	#		
Sulfate	mg/L	12/11/2012	0001	5.17 - 9.63	14		FQ	#	0.5	
Temperature	C	12/11/2012	N001	5.17 - 9.63	15.48		FQ	#		
Turbidity	NTU	12/11/2012	N001	5.17 - 9.63	28.8		FQ	#		
Uranium	mg/L	12/11/2012	0001	5.17 - 9.63	0.000007	B	FQ	#	0.0000029	
Vanadium	mg/L	12/11/2012	0001	5.17 - 9.63	0.000078	B	FQ	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0600 WELL Former Processing Site well discovered 10/24/2011

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/13/2012	0001	120 - 120	0.21			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0602 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	19.5 - 29.5	192		FQ	#		
Ammonia Total as N	mg/L	12/11/2012	N001	19.5 - 29.5	0.1	U	FQ	#	0.1	
Calcium	mg/L	12/11/2012	N001	19.5 - 29.5	25		FQ	#	0.012	
Chloride	mg/L	12/11/2012	N001	19.5 - 29.5	13		FQ	#	2	
Magnesium	mg/L	12/11/2012	N001	19.5 - 29.5	17		FQ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	19.5 - 29.5	0.76		FQ	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	19.5 - 29.5	51.3		FQ	#		
pH	s.u.	12/11/2012	N001	19.5 - 29.5	7.58		FQ	#		
Potassium	mg/L	12/11/2012	N001	19.5 - 29.5	2.1		FQ	#	0.11	
Sodium	mg/L	12/11/2012	N001	19.5 - 29.5	86		FQ	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	19.5 - 29.5	652		FQ	#		
Sulfate	mg/L	12/11/2012	N001	19.5 - 29.5	110		FQ	#	5	
Temperature	C	12/11/2012	N001	19.5 - 29.5	14.7		FQ	#		
Turbidity	NTU	12/11/2012	N001	19.5 - 29.5	3.94		FQ	#		
Uranium	mg/L	12/11/2012	N001	19.5 - 29.5	0.0035		FQ	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	19.5 - 29.5	0.0007		FQ	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0603 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	43	-	53	182		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	43	-	53	0.35		F	#	0.1	
Calcium	mg/L	12/11/2012	N001	43	-	53	18		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	43	-	53	13		F	#	2	
Magnesium	mg/L	12/11/2012	N001	43	-	53	15		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	43	-	53	0.36		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	43	-	53	-113.2		F	#		
pH	s.u.	12/11/2012	N001	43	-	53	7.58		F	#		
Potassium	mg/L	12/11/2012	N001	43	-	53	2.7		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	43	-	53	90		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	43	-	53	629		F	#		
Sulfate	mg/L	12/11/2012	N001	43	-	53	110		F	#	5	
Temperature	C	12/11/2012	N001	43	-	53	15.12		F	#		
Turbidity	NTU	12/11/2012	N001	43	-	53	3.83		F	#		
Uranium	mg/L	12/11/2012	N001	43	-	53	0.003		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	43	-	53	0.00062		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0604 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	13 - 28	177		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	13 - 28	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	13 - 28	19		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	13 - 28	11	N	F	#	2	
Magnesium	mg/L	12/11/2012	N001	13 - 28	11		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	13 - 28	0.019		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	13 - 28	-87.8		F	#		
pH	s.u.	12/11/2012	N001	13 - 28	7.89		F	#		
Potassium	mg/L	12/11/2012	N001	13 - 28	1.9		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	13 - 28	91		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	13 - 28	608		F	#		
Sulfate	mg/L	12/11/2012	N001	13 - 28	110	N	F	#	5	
Temperature	C	12/11/2012	N001	13 - 28	15.27		F	#		
Turbidity	NTU	12/11/2012	N001	13 - 28	2.57		F	#		
Uranium	mg/L	12/11/2012	N001	13 - 28	0.0024		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	13 - 28	0.0019		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0605 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	14 - 29	208		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	14 - 29	0.48		F	#	0.1	
Calcium	mg/L	12/13/2012	N001	14 - 29	31		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	14 - 29	17		F	#	2	
Magnesium	mg/L	12/13/2012	N001	14 - 29	23		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	14 - 29	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	14 - 29	-134.5		F	#		
pH	s.u.	12/13/2012	N001	14 - 29	8.2		F	#		
Potassium	mg/L	12/13/2012	N001	14 - 29	2		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	14 - 29	77		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	14 - 29	619		F	#		
Sulfate	mg/L	12/13/2012	N001	14 - 29	110		F	#	5	
Temperature	C	12/13/2012	N001	14 - 29	15.88		F	#		
Turbidity	NTU	12/13/2012	N001	14 - 29	7.68		F	#		
Uranium	mg/L	12/13/2012	N001	14 - 29	0.000094		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	14 - 29	0.00022	B	F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0606 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	32 - 42	183		FQ	#		
Ammonia Total as N	mg/L	12/11/2012	N001	32 - 42	90		FQ	#	10	
Calcium	mg/L	12/11/2012	N001	32 - 42	210		FQ	#	0.012	
Chloride	mg/L	12/11/2012	N001	32 - 42	32		FQ	#	4	
Magnesium	mg/L	12/11/2012	N001	32 - 42	96		FQ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	32 - 42	230		FQ	#	2	
Oxidation Reduction Potential	mV	12/11/2012	N001	32 - 42	99.6		FQ	#		
pH	s.u.	12/11/2012	N001	32 - 42	6.73		FQ	#		
Potassium	mg/L	12/11/2012	N001	32 - 42	6.2		FQ	#	0.11	
Sodium	mg/L	12/11/2012	N001	32 - 42	97		FQ	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	32 - 42	2890		FQ	#		
Sulfate	mg/L	12/11/2012	N001	32 - 42	430		FQ	#	10	
Temperature	C	12/11/2012	N001	32 - 42	15.79		FQ	#		
Turbidity	NTU	12/11/2012	N001	32 - 42	3.26		FQ	#		
Uranium	mg/L	12/11/2012	N001	32 - 42	0.0088		FQ	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	32 - 42	0.00026	B	FQ	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0618 WELL 12" DIA Steel CSG. Old Mill Well??

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	-	153			#		
Ammonia Total as N	mg/L	12/11/2012	N001	-	0.1	U		#	0.1	
Calcium	mg/L	12/11/2012	N001	-	61			#	0.012	
Chloride	mg/L	12/11/2012	N001	-	4			#	0.2	
Magnesium	mg/L	12/11/2012	N001	-	36			#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	-	0.9			#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	-	158.1			#		
pH	s.u.	12/11/2012	N001	-	7.72			#		
Potassium	mg/L	12/11/2012	N001	-	1.7			#	0.11	
Sodium	mg/L	12/11/2012	N001	-	12			#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	-	321			#		
H2/H1	‰	12/11/2012	0002	-	-76.7			#		
O18/O16	‰	12/11/2012	0002	-	-10.4			#		
S-34/S-32	‰	12/11/2012	0002	-	1.46			#		
Sulfate	mg/L	12/11/2012	N001	-	13			#	0.5	
Temperature	C	12/11/2012	N001	-	14.2			#		
Tritium	pCi/L	12/11/2012	N003	-	2.16	U		#	2.78	1.76
Turbidity	NTU	12/11/2012	N001	-	9.93			#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0618 WELL 12" DIA Steel CSG. Old Mill Well??

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/11/2012	N001	-	0.08		R	#	0.000029	
Uranium-234	pCi/L	12/11/2012	N001	-	3.25		R	#	0.06	0.556
Uranium-235	pCi/L	12/11/2012	N001	-	0.166		R	#	0.047	0.0665
Uranium-238	pCi/L	12/11/2012	N001	-	2.69		R	#	0.052	0.47
Vanadium	mg/L	12/11/2012	N001	-	0.051			#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 03/21/2013

Location: 0619 WELL Water Use Permit No. 92-082.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	103.9 - 153.9	163		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	103.9 - 153.9	0.1	U	F	#	0.1	
Ammonia Total as N	mg/L	12/11/2012	N002	103.9 - 153.9	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	103.9 - 153.9	25		F	#	0.012	
Calcium	mg/L	12/11/2012	N002	103.9 - 153.9	22		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	103.9 - 153.9	5.7		F	#	0.2	
Chloride	mg/L	12/11/2012	N002	103.9 - 153.9	5.5		F	#	1	
Magnesium	mg/L	12/11/2012	N001	103.9 - 153.9	24		F	#	0.013	
Magnesium	mg/L	12/11/2012	N002	103.9 - 153.9	20		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	103.9 - 153.9	0.85		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N002	103.9 - 153.9	0.86		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	103.9 - 153.9	109.4		F	#		
pH	s.u.	12/11/2012	N001	103.9 - 153.9	7.71		F	#		
Potassium	mg/L	12/11/2012	N001	103.9 - 153.9	2		F	#	0.11	
Potassium	mg/L	12/11/2012	N002	103.9 - 153.9	1.9		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	103.9 - 153.9	19		F	#	0.0066	
Sodium	mg/L	12/11/2012	N002	103.9 - 153.9	16		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	103.9 - 153.9	383		F	#		
H2/H1	‰	12/11/2012	0003	103.9 - 153.9	-77.62		F	#		
O18/O16	‰	12/11/2012	0003	103.9 - 153.9	-10.22		F	#		
S-34/S-32	‰	12/11/2012	0003	103.9 - 153.9	-7.79		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 03/21/2013

Location: 0619 WELL Water Use Permit No. 92-082.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	12/11/2012	N001	103.9 - 153.9	31		F	#	0.5	
Sulfate	mg/L	12/11/2012	N002	103.9 - 153.9	29		F	#	2.5	
Temperature	C	12/11/2012	N001	103.9 - 153.9	16.07		F	#		
Tritium	pCi/L	12/11/2012	N004	103.9 - 153.9	0.331	U	F	#	2.82	1.6
Tritium	pCi/L	12/11/2012	N005	103.9 - 153.9	0.313	U	F	#	2.84	1.63
Turbidity	NTU	12/11/2012	N001	103.9 - 153.9	0.38		F	#		
Uranium	mg/L	12/11/2012	N001	103.9 - 153.9	0.0053		F	#	0.0000029	
Uranium	mg/L	12/11/2012	N002	103.9 - 153.9	0.0055		F	#	0.0000029	
Uranium-234	pCi/L	12/11/2012	N001	103.9 - 153.9	2.22		F	#	0.072	0.398
Uranium-234	pCi/L	12/11/2012	N002	103.9 - 153.9	2.31		F	#	0.056	0.402
Uranium-235	pCi/L	12/11/2012	N001	103.9 - 153.9	0.0846		FJ	#	0.063	0.0532
Uranium-235	pCi/L	12/11/2012	N002	103.9 - 153.9	0.0576		FJ	#	0.039	0.037
Uranium-238	pCi/L	12/11/2012	N001	103.9 - 153.9	1.67		F	#	0.048	0.311
Uranium-238	pCi/L	12/11/2012	N002	103.9 - 153.9	1.78		F	#	0.04	0.32
Vanadium	mg/L	12/11/2012	N001	103.9 - 153.9	0.019		F	#	0.000015	
Vanadium	mg/L	12/11/2012	N002	103.9 - 153.9	0.021		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0648 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	38.5 - 88.5	201		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	38.5 - 88.5	1.4		F	#	0.1	
Arsenic	mg/L	12/12/2012	N001	38.5 - 88.5	0.0022		F	#	0.000015	
Calcium	mg/L	12/12/2012	N001	38.5 - 88.5	160		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	38.5 - 88.5	30		F	#	4	
Magnesium	mg/L	12/12/2012	N001	38.5 - 88.5	190		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	38.5 - 88.5	87		F	#	0.5	
Oxidation Reduction Potential	mV	12/12/2012	N001	38.5 - 88.5	155.3		F	#		
pH	s.u.	12/12/2012	N001	38.5 - 88.5	7.45		F	#		
Potassium	mg/L	12/12/2012	N001	38.5 - 88.5	5.7	EN	FJ	#	0.11	
Sodium	mg/L	12/12/2012	N001	38.5 - 88.5	160	N	FJ	#	0.033	
Specific Conductance	umhos /cm	12/12/2012	N001	38.5 - 88.5	2668		F	#		
Sulfate	mg/L	12/12/2012	N001	38.5 - 88.5	1100		F	#	10	
Temperature	C	12/12/2012	N001	38.5 - 88.5	15.5		F	#		
Turbidity	NTU	12/12/2012	N001	38.5 - 88.5	1.19		F	#		
Uranium	mg/L	12/12/2012	N001	38.5 - 88.5	0.012		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	38.5 - 88.5	0.011		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0650 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	77.5 - 97.5	165		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	77.5 - 97.5	0.1	U	F	#	0.1	
Calcium	mg/L	12/13/2012	N001	77.5 - 97.5	38		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	77.5 - 97.5	20		F	#	1	
Magnesium	mg/L	12/13/2012	N001	77.5 - 97.5	27		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	77.5 - 97.5	4.3		F	#	0.05	
Oxidation Reduction Potential	mV	12/13/2012	N001	77.5 - 97.5	0		F	#		
pH	s.u.	12/13/2012	N001	77.5 - 97.5	7.97		F	#		
Potassium	mg/L	12/13/2012	N001	77.5 - 97.5	2.2		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	77.5 - 97.5	150		F	#	0.013	
Specific Conductance	umhos /cm	12/13/2012	N001	77.5 - 97.5	1135		F	#		
Sulfate	mg/L	12/13/2012	N001	77.5 - 97.5	390		F	#	2.5	
Temperature	C	12/13/2012	N001	77.5 - 97.5	16.1		F	#		
Turbidity	NTU	12/13/2012	N001	77.5 - 97.5	1.86		F	#		
Uranium	mg/L	12/13/2012	N001	77.5 - 97.5	0.0025		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	77.5 - 97.5	0.0029		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0651 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	20	-	80	184		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	20	-	80	0.1	U	F	#	0.1	
Calcium	mg/L	12/13/2012	N001	20	-	80	12		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	20	-	80	14		F	#	1	
Magnesium	mg/L	12/13/2012	N001	20	-	80	5.5		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	20	-	80	0.15		F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	20	-	80	52.8		F	#		
pH	s.u.	12/13/2012	N001	20	-	80	8.18		F	#		
Potassium	mg/L	12/13/2012	N001	20	-	80	2.5		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	20	-	80	110		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	20	-	80	638		F	#		
Sulfate	mg/L	12/13/2012	N001	20	-	80	120		F	#	2.5	
Temperature	C	12/13/2012	N001	20	-	80	15.87		F	#		
Turbidity	NTU	12/13/2012	N001	20	-	80	1.52		F	#		
Uranium	mg/L	12/13/2012	N001	20	-	80	0.0022		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	20	-	80	0.011		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0652 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	34 - 54	160		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	34 - 54	0.1	U	F	#	0.1	
Calcium	mg/L	12/13/2012	N001	34 - 54	23		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	34 - 54	16		F	#	2	
Magnesium	mg/L	12/13/2012	N001	34 - 54	9.6		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	34 - 54	4.7		F	#	0.05	
Oxidation Reduction Potential	mV	12/13/2012	N001	34 - 54	21.2		F	#		
pH	s.u.	12/13/2012	N001	34 - 54	7.85		F	#		
Potassium	mg/L	12/13/2012	N001	34 - 54	3		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	34 - 54	82		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	34 - 54	568		F	#		
Sulfate	mg/L	12/13/2012	N001	34 - 54	69		F	#	5	
Temperature	C	12/13/2012	N001	34 - 54	15.52		F	#		
Turbidity	NTU	12/13/2012	N001	34 - 54	0.57		F	#		
Uranium	mg/L	12/13/2012	N001	34 - 54	0.0041		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	34 - 54	0.0089		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0653 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	56 - 76	205		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	56 - 76	0.1	U	F	#	0.1	
Calcium	mg/L	12/12/2012	N001	56 - 76	170		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	56 - 76	25	N	F	#	4	
Magnesium	mg/L	12/12/2012	N001	56 - 76	140		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	56 - 76	45		F	#	0.5	
Oxidation Reduction Potential	mV	12/12/2012	N001	56 - 76	154.1		F	#		
pH	s.u.	12/12/2012	N001	56 - 76	7.35		F	#		
Potassium	mg/L	12/12/2012	N001	56 - 76	5.1		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	56 - 76	170		F	#	0.033	
Specific Conductance	umhos /cm	12/12/2012	N001	56 - 76	2306		F	#		
Sulfate	mg/L	12/12/2012	N001	56 - 76	1000		F	#	10	
Temperature	C	12/12/2012	N001	56 - 76	15.55		F	#		
Turbidity	NTU	12/12/2012	N001	56 - 76	1.05		F	#		
Uranium	mg/L	12/12/2012	N001	56 - 76	0.01		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	56 - 76	0.008		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0655 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	38	-	58	276		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	38	-	58	130		F	#	10	
Calcium	mg/L	12/11/2012	N001	38	-	58	270		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	38	-	58	16		F	#	1	
Magnesium	mg/L	12/11/2012	N001	38	-	58	130		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	38	-	58	250		F	#	2	
Oxidation Reduction Potential	mV	12/11/2012	N001	38	-	58	87.9		F	#		
pH	s.u.	12/11/2012	N001	38	-	58	6.96		F	#		
Potassium	mg/L	12/11/2012	N001	38	-	58	18		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	38	-	58	87		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	38	-	58	3399		F	#		
Sulfate	mg/L	12/11/2012	N001	38	-	58	680		F	#	25	
Temperature	C	12/11/2012	N001	38	-	58	15.93		F	#		
Turbidity	NTU	12/11/2012	N001	38	-	58	0.75		F	#		
Uranium	mg/L	12/11/2012	N001	38	-	58	0.016		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	38	-	58	0.0068		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0656 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	38 - 58	249		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	38 - 58	41		F	#	2	
Calcium	mg/L	12/12/2012	N001	38 - 58	23		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	38 - 58	15		F	#	1	
Magnesium	mg/L	12/12/2012	N001	38 - 58	19		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	38 - 58	15		F	#	0.1	
Oxidation Reduction Potential	mV	12/12/2012	N001	38 - 58	176.2		F	#		
pH	s.u.	12/12/2012	N001	38 - 58	7.76		F	#		
Potassium	mg/L	12/12/2012	N001	38 - 58	6.7		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	38 - 58	74		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	38 - 58	953		F	#		
Sulfate	mg/L	12/12/2012	N001	38 - 58	150		F	#	2.5	
Temperature	C	12/12/2012	N001	38 - 58	15.27		F	#		
Turbidity	NTU	12/12/2012	N001	38 - 58	0.69		F	#		
Uranium	mg/L	12/12/2012	N001	38 - 58	0.0054		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	38 - 58	0.00051		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0657 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	121	-	136	245		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	121	-	136	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	121	-	136	190		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	121	-	136	11		F	#	1	
Magnesium	mg/L	12/11/2012	N001	121	-	136	120		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	121	-	136	12		F	#	0.1	
Oxidation Reduction Potential	mV	12/11/2012	N001	121	-	136	180.5		F	#		
pH	s.u.	12/11/2012	N001	121	-	136	7.13		F	#		
Potassium	mg/L	12/11/2012	N001	121	-	136	3.5		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	121	-	136	32		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	121	-	136	1588		F	#		
H2/H1	‰	12/11/2012	0002	121	-	136	-76.11		F	#		
O18/O16	‰	12/11/2012	0002	121	-	136	-10.04		F	#		
S-34/S-32	‰	12/11/2012	0002	121	-	136	13.34		F	#		
Sulfate	mg/L	12/11/2012	N001	121	-	136	730		F	#	10	
Temperature	C	12/11/2012	N001	121	-	136	15.63		F	#		
Tritium	pCi/L	12/11/2012	N003	121	-	136	10.5		F	#	3.15	3.22
Turbidity	NTU	12/11/2012	N001	121	-	136	0.59		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0657 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/11/2012	N001	121 - 136	0.49		F	#	0.00015	
Uranium-234	pCi/L	12/11/2012	N001	121 - 136	154		F	#	0.09	24.7
Uranium-235	pCi/L	12/11/2012	N001	121 - 136	7.73		F	#	0.065	1.34
Uranium-238	pCi/L	12/11/2012	N001	121 - 136	153		F	#	0.02	24.6
Vanadium	mg/L	12/11/2012	N001	121 - 136	0.053		F	#	0.00076	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0662 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	37.5 - 67.5	193		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	37.5 - 67.5	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	37.5 - 67.5	83		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	37.5 - 67.5	12		F	#	1	
Magnesium	mg/L	12/11/2012	N001	37.5 - 67.5	45		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	37.5 - 67.5	8		F	#	0.05	
Oxidation Reduction Potential	mV	12/11/2012	N001	37.5 - 67.5	166.4		F	#		
pH	s.u.	12/11/2012	N001	37.5 - 67.5	7.36		F	#		
Potassium	mg/L	12/11/2012	N001	37.5 - 67.5	1.6		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	37.5 - 67.5	27		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	37.5 - 67.5	811		F	#		
H2/H1	‰	12/11/2012	0002	37.5 - 67.5	-78.45		F	#		
O18/O16	‰	12/11/2012	0002	37.5 - 67.5	-10.5		F	#		
S-34/S-32	‰	12/11/2012	0002	37.5 - 67.5	6.2		F	#		
Sulfate	mg/L	12/11/2012	N001	37.5 - 67.5	220		F	#	2.5	
Temperature	C	12/11/2012	N001	37.5 - 67.5	15.49		F	#		
Tritium	pCi/L	12/11/2012	N003	37.5 - 67.5	6.84		FJ	#	2.31	2.26
Turbidity	NTU	12/11/2012	N001	37.5 - 67.5	1.14		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0662 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/11/2012	N001	37.5 - 67.5	0.17		F	#	0.000029	
Uranium-234	pCi/L	12/11/2012	N001	37.5 - 67.5	57.9		F	#	0.093	8.96
Uranium-235	pCi/L	12/11/2012	N001	37.5 - 67.5	2.78		F	#	0.052	0.481
Uranium-238	pCi/L	12/11/2012	N001	37.5 - 67.5	57.7		F	#	0.048	8.93
Vanadium	mg/L	12/11/2012	N001	37.5 - 67.5	0.03		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0669 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	34 - 54	194		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	34 - 54	4.7		F	#	0.1	
Ammonia Total as N	mg/L	12/11/2012	N002	34 - 54	4.2		F	#	0.1	
Calcium	mg/L	12/11/2012	N001	34 - 54	59		F	#	0.012	
Calcium	mg/L	12/11/2012	N002	34 - 54	52		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	34 - 54	9.5		F	#	1	
Chloride	mg/L	12/11/2012	N002	34 - 54	9.2		F	#	1	
Magnesium	mg/L	12/11/2012	N001	34 - 54	43		F	#	0.013	
Magnesium	mg/L	12/11/2012	N002	34 - 54	37		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	34 - 54	21		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N002	34 - 54	21		F	#	0.2	
Oxidation Reduction Potential	mV	12/11/2012	N001	34 - 54	90.9		F	#		
pH	s.u.	12/11/2012	N001	34 - 54	7.35		F	#		
Potassium	mg/L	12/11/2012	N001	34 - 54	4.8		F	#	0.11	
Potassium	mg/L	12/11/2012	N002	34 - 54	4.2		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	34 - 54	31		F	#	0.0066	
Sodium	mg/L	12/11/2012	N002	34 - 54	27		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	34 - 54	781		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0669 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	12/11/2012	N001	34	-	54	120		F	#	2.5	
Sulfate	mg/L	12/11/2012	N002	34	-	54	120		F	#	2.5	
Temperature	C	12/11/2012	N001	34	-	54	15.73		F	#		
Turbidity	NTU	12/11/2012	N001	34	-	54	0.36		F	#		
Uranium	mg/L	12/11/2012	N001	34	-	54	0.0064		F	#	0.0000029	
Uranium	mg/L	12/11/2012	N002	34	-	54	0.0066		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	34	-	54	0.051		F	#	0.000015	
Vanadium	mg/L	12/11/2012	N002	34	-	54	0.052		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0711 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	25.5 - 30.5	190		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	25.5 - 30.5	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	25.5 - 30.5	27		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	25.5 - 30.5	14		F	#	1	
Magnesium	mg/L	12/11/2012	N001	25.5 - 30.5	17		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	25.5 - 30.5	0.59		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	25.5 - 30.5	-13.1		F	#		
pH	s.u.	12/11/2012	N001	25.5 - 30.5	7.59		F	#		
Potassium	mg/L	12/11/2012	N001	25.5 - 30.5	2.2		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	25.5 - 30.5	92		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	25.5 - 30.5	686		F	#		
Sulfate	mg/L	12/11/2012	N001	25.5 - 30.5	120	N	F	#	2.5	
Temperature	C	12/11/2012	N001	25.5 - 30.5	15.48		F	#		
Turbidity	NTU	12/11/2012	N001	25.5 - 30.5	2.39		F	#		
Uranium	mg/L	12/11/2012	N001	25.5 - 30.5	0.004		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	25.5 - 30.5	0.0012		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0715 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	16 - 21	177		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	16 - 21	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	16 - 21	21		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	16 - 21	9.8		F	#	1	
Magnesium	mg/L	12/11/2012	N001	16 - 21	20		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	16 - 21	0.77		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	16 - 21	95.7		F	#		
pH	s.u.	12/11/2012	N001	16 - 21	7.6		F	#		
Potassium	mg/L	12/11/2012	N001	16 - 21	2.4		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	16 - 21	60		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	16 - 21	533		F	#		
Sulfate	mg/L	12/11/2012	N001	16 - 21	72		F	#	2.5	
Temperature	C	12/11/2012	N001	16 - 21	15.35		F	#		
Turbidity	NTU	12/11/2012	N001	16 - 21	1.19		F	#		
Uranium	mg/L	12/11/2012	N001	16 - 21	0.0029		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	16 - 21	0.00077		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0719 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	19.35 - 24.35	219		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	19.35 - 24.35	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	19.35 - 24.35	29		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	19.35 - 24.35	15		F	#	1	
Magnesium	mg/L	12/11/2012	N001	19.35 - 24.35	20		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	19.35 - 24.35	0.79		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	19.35 - 24.35	-15.7		F	#		
pH	s.u.	12/11/2012	N001	19.35 - 24.35	7.49		F	#		
Potassium	mg/L	12/11/2012	N001	19.35 - 24.35	1.2		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	19.35 - 24.35	93		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	19.35 - 24.35	718		F	#		
Sulfate	mg/L	12/11/2012	N001	19.35 - 24.35	120		F	#	2.5	
Temperature	C	12/11/2012	N001	19.35 - 24.35	15.52		F	#		
Turbidity	NTU	12/11/2012	N001	19.35 - 24.35	4.7		F	#		
Uranium	mg/L	12/11/2012	N001	19.35 - 24.35	0.0037		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	19.35 - 24.35	0.0044		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0727 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	23.73 - 28.78	184		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	23.73 - 28.78	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	23.73 - 28.78	25		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	23.73 - 28.78	10		F	#	1	
Magnesium	mg/L	12/11/2012	N001	23.73 - 28.78	14		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	23.73 - 28.78	0.83		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	23.73 - 28.78	10.9		F	#		
pH	s.u.	12/11/2012	N001	23.73 - 28.78	7.56		F	#		
Potassium	mg/L	12/11/2012	N001	23.73 - 28.78	2		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	23.73 - 28.78	71		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	23.73 - 28.78	560		F	#		
Sulfate	mg/L	12/11/2012	N001	23.73 - 28.78	83		F	#	2.5	
Temperature	C	12/11/2012	N001	23.73 - 28.78	15.12		F	#		
Turbidity	NTU	12/11/2012	N001	23.73 - 28.78	4.1		F	#		
Uranium	mg/L	12/11/2012	N001	23.73 - 28.78	0.0019		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	23.73 - 28.78	0.0024		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0733 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	49 - 54	197		F	#		
Ammonia Total as N	mg/L	12/12/2012	0001	49 - 54	0.1	U	F	#	0.1	
Calcium	mg/L	12/12/2012	0001	49 - 54	52		F	#	0.012	
Chloride	mg/L	12/12/2012	0001	49 - 54	6.5		F	#	1	
Magnesium	mg/L	12/12/2012	0001	49 - 54	36		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	0001	49 - 54	5.3		F	#	0.05	
Oxidation Reduction Potential	mV	12/12/2012	N001	49 - 54	166.4		F	#		
pH	s.u.	12/12/2012	N001	49 - 54	7.56		F	#		
Potassium	mg/L	12/12/2012	0001	49 - 54	1.8		F	#	0.11	
Sodium	mg/L	12/12/2012	0001	49 - 54	14		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	49 - 54	556		F	#		
H2/H1	‰	12/12/2012	0002	49 - 54	-77.76		F	#		
O18/O16	‰	12/12/2012	0002	49 - 54	-10.61		F	#		
S-34/S-32	‰	12/12/2012	0002	49 - 54	-.18		F	#		
Sulfate	mg/L	12/12/2012	0001	49 - 54	79		F	#	2.5	
Temperature	C	12/12/2012	N001	49 - 54	12.54		F	#		
Tritium	pCi/L	12/12/2012	N003	49 - 54	6.09		FJ	#	2.86	2.38
Turbidity	NTU	12/12/2012	N001	49 - 54	29.5		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0733 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/12/2012	0001	49	-	54	0.0058		F	#	0.0000029	
Uranium-234	pCi/L	12/12/2012	0001	49	-	54	2.95		F	#	0.063	0.519
Uranium-235	pCi/L	12/12/2012	0001	49	-	54	0.0908		FJ	#	0.053	0.0527
Uranium-238	pCi/L	12/12/2012	0001	49	-	54	1.92		F	#	0.058	0.356
Vanadium	mg/L	12/12/2012	0001	49	-	54	0.046		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0734 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	50	-	80	188		F	#		
Ammonia Total as N	mg/L	12/11/2012	0001	50	-	80	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	0001	50	-	80	45		F	#	0.012	
Chloride	mg/L	12/11/2012	0001	50	-	80	5.5		F	#	1	
Magnesium	mg/L	12/11/2012	0001	50	-	80	32		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	0001	50	-	80	2.9		F	#	0.05	
Oxidation Reduction Potential	mV	12/11/2012	N001	50	-	80	141.4		F	#		
pH	s.u.	12/11/2012	N001	50	-	80	7.58		F	#		
Potassium	mg/L	12/11/2012	0001	50	-	80	2.2		F	#	0.11	
Sodium	mg/L	12/11/2012	0001	50	-	80	14		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	50	-	80	506		F	#		
H2/H1	‰	12/11/2012	0002	50	-	80	-77.56		F	#		
O18/O16	‰	12/11/2012	0002	50	-	80	-10.58		F	#		
S-34/S-32	‰	12/11/2012	0002	50	-	80	3.62		F	#		
Sulfate	mg/L	12/11/2012	0001	50	-	80	77		F	#	2.5	
Temperature	C	12/11/2012	N001	50	-	80	15.07		F	#		
Tritium	pCi/L	12/11/2012	N003	50	-	80	5.46		FJ	#	2.78	2.24
Turbidity	NTU	12/11/2012	N001	50	-	80	13.1		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0734 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/11/2012	0001	50	-	80	0.14		F	#	0.000029	
Uranium-234	pCi/L	12/11/2012	0001	50	-	80	47.1		F	#	0.088	7.36
Uranium-235	pCi/L	12/11/2012	0001	50	-	80	2.02		F	#	0.072	0.376
Uranium-238	pCi/L	12/11/2012	0001	50	-	80	47.2		F	#	0.07	7.38
Vanadium	mg/L	12/11/2012	0001	50	-	80	0.02		F	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0735 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	53.5 - 58.5	104		FQ	#		
Ammonia Total as N	mg/L	12/11/2012	N001	53.5 - 58.5	0.1	U	FQ	#	0.1	
Calcium	mg/L	12/11/2012	N001	53.5 - 58.5	330		FQ	#	0.012	
Chloride	mg/L	12/11/2012	N001	53.5 - 58.5	3.2		FQ	#	0.4	
Magnesium	mg/L	12/11/2012	N001	53.5 - 58.5	170		FQ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	53.5 - 58.5	14		FQ	#	0.1	
Oxidation Reduction Potential	mV	12/11/2012	N001	53.5 - 58.5	178		FQ	#		
pH	s.u.	12/11/2012	N001	53.5 - 58.5	7.3		FQ	#		
Potassium	mg/L	12/11/2012	N001	53.5 - 58.5	2.3		FQ	#	0.11	
Sodium	mg/L	12/11/2012	N001	53.5 - 58.5	39		FQ	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	53.5 - 58.5	2178		FQ	#		
H2/H1	‰	12/11/2012	0002	53.5 - 58.5	-67.59		FQ	#		
O18/O16	‰	12/11/2012	0002	53.5 - 58.5	-8.87		FQ	#		
S-34/S-32	‰	12/11/2012	0002	53.5 - 58.5	19.36		FQ	#		
Sulfate	mg/L	12/11/2012	N001	53.5 - 58.5	1400		FQ	#	10	
Temperature	C	12/11/2012	N001	53.5 - 58.5	14.82		FQ	#		
Tritium	pCi/L	12/11/2012	N003	53.5 - 58.5	13.5		FQ	#	2.7	3.64
Turbidity	NTU	12/11/2012	N001	53.5 - 58.5	9.25		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0735 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/11/2012	N001	53.5	-	58.5	0.21		FQ	#	0.000029	
Uranium-234	pCi/L	12/11/2012	N001	53.5	-	58.5	66.4		FQ	#	0.051	10.3
Uranium-235	pCi/L	12/11/2012	N001	53.5	-	58.5	3.08		FQ	#	0.049	0.532
Uranium-238	pCi/L	12/11/2012	N001	53.5	-	58.5	64.7		FQ	#	0.036	10
Vanadium	mg/L	12/11/2012	N001	53.5	-	58.5	0.025		FQ	#	0.00015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0738 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	26 - 31	194		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	26 - 31	0.1	U	F	#	0.1	
Calcium	mg/L	12/13/2012	N001	26 - 31	22		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	26 - 31	15		F	#	1	
Magnesium	mg/L	12/13/2012	N001	26 - 31	19		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	26 - 31	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	26 - 31	16		F	#		
pH	s.u.	12/13/2012	N001	26 - 31	8.11		F	#		
Potassium	mg/L	12/13/2012	N001	26 - 31	2.4		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	26 - 31	110		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	26 - 31	775		F	#		
Sulfate	mg/L	12/13/2012	N001	26 - 31	180		F	#	2.5	
Temperature	C	12/13/2012	N001	26 - 31	15.45		F	#		
Turbidity	NTU	12/13/2012	N001	26 - 31	9.86		F	#		
Uranium	mg/L	12/13/2012	N001	26 - 31	0.00028		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	26 - 31	0.00083		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0739 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	0001	33 - 38	210		F	#		
Ammonia Total as N	mg/L	12/13/2012	0001	33 - 38	0.63		F	#	0.1	
Calcium	mg/L	12/13/2012	0001	33 - 38	26		F	#	0.012	
Chloride	mg/L	12/13/2012	0001	33 - 38	16		F	#	1	
Magnesium	mg/L	12/13/2012	0001	33 - 38	23		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	0001	33 - 38	1.1		F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	33 - 38	-110		F	#		
pH	s.u.	12/13/2012	N001	33 - 38	7.95		F	#		
Potassium	mg/L	12/13/2012	0001	33 - 38	2.9		F	#	0.11	
Sodium	mg/L	12/13/2012	0001	33 - 38	110		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	33 - 38	810		F	#		
Sulfate	mg/L	12/13/2012	0001	33 - 38	180		F	#	2.5	
Temperature	C	12/13/2012	N001	33 - 38	15.3		F	#		
Turbidity	NTU	12/13/2012	N001	33 - 38	20		F	#		
Uranium	mg/L	12/13/2012	0001	33 - 38	0.004		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	0001	33 - 38	0.0095		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0740 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	30 - 35	77		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	30 - 35	0.1	U	F	#	0.1	
Calcium	mg/L	12/13/2012	N001	30 - 35	150		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	30 - 35	38		F	#	4	
Magnesium	mg/L	12/13/2012	N001	30 - 35	180		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	30 - 35	19		F	#	0.2	
Oxidation Reduction Potential	mV	12/13/2012	N001	30 - 35	55		F	#		
pH	s.u.	12/13/2012	N001	30 - 35	7.44		F	#		
Potassium	mg/L	12/13/2012	N001	30 - 35	3.1		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	30 - 35	210		F	#	0.033	
Specific Conductance	umhos /cm	12/13/2012	N001	30 - 35	2605		F	#		
Sulfate	mg/L	12/13/2012	N001	30 - 35	1400		F	#	10	
Temperature	C	12/13/2012	N001	30 - 35	15.1		F	#		
Turbidity	NTU	12/13/2012	N001	30 - 35	2.93		F	#		
Uranium	mg/L	12/13/2012	N001	30 - 35	0.039		F	#	0.000015	
Vanadium	mg/L	12/13/2012	N001	30 - 35	0.022		F	#	0.000076	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0741 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	50 - 80	197		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	50 - 80	110		F	#	10	
Arsenic	mg/L	12/12/2012	N001	50 - 80	0.0019		F	#	0.000015	
Calcium	mg/L	12/12/2012	N001	50 - 80	110		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	50 - 80	21		F	#	4	
Magnesium	mg/L	12/12/2012	N001	50 - 80	84		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	50 - 80	110		F	#	1	
Oxidation Reduction Potential	mV	12/12/2012	N001	50 - 80	174.2		F	#		
pH	s.u.	12/12/2012	N001	50 - 80	7.09		F	#		
Potassium	mg/L	12/12/2012	N001	50 - 80	15		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	50 - 80	89		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	50 - 80	2388		F	#		
Sulfate	mg/L	12/12/2012	N001	50 - 80	540		F	#	10	
Temperature	C	12/12/2012	N001	50 - 80	6.75		F	#		
Turbidity	NTU	12/12/2012	N001	50 - 80	7.61		F	#		
Uranium	mg/L	12/12/2012	N001	50 - 80	0.01		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	50 - 80	0.0071		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0742 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	50 - 80	267		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	50 - 80	120		F	#	10	
Calcium	mg/L	12/12/2012	N001	50 - 80	100		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	50 - 80	21		F	#	4	
Magnesium	mg/L	12/12/2012	N001	50 - 80	86		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	50 - 80	110		F	#	1	
Oxidation Reduction Potential	mV	12/12/2012	N001	50 - 80	151.2		F	#		
pH	s.u.	12/12/2012	N001	50 - 80	7.22		F	#		
Potassium	mg/L	12/12/2012	N001	50 - 80	17		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	50 - 80	90		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	50 - 80	2441		F	#		
Sulfate	mg/L	12/12/2012	N001	50 - 80	530		F	#	10	
Temperature	C	12/12/2012	N001	50 - 80	14.54		F	#		
Turbidity	NTU	12/12/2012	N001	50 - 80	1.2		F	#		
Uranium	mg/L	12/12/2012	N001	50 - 80	0.0098		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	50 - 80	0.0078		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0743 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	0001	45 - 75	266		F	#		
Ammonia Total as N	mg/L	12/12/2012	0001	45 - 75	78		F	#	10	
Arsenic	mg/L	12/12/2012	0001	45 - 75	0.0048	E	FJ	#	0.000015	
Calcium	mg/L	12/12/2012	0001	45 - 75	120		F	#	0.012	
Chloride	mg/L	12/12/2012	0001	45 - 75	20		F	#	4	
Magnesium	mg/L	12/12/2012	0001	45 - 75	67		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	0001	45 - 75	57		F	#	0.5	
Oxidation Reduction Potential	mV	12/12/2012	N001	45 - 75	-107.4		F	#		
pH	s.u.	12/12/2012	N001	45 - 75	7.46		F	#		
Potassium	mg/L	12/12/2012	0001	45 - 75	15	E	FJ	#	0.11	
Sodium	mg/L	12/12/2012	0001	45 - 75	89		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	45 - 75	2053		F	#		
Sulfate	mg/L	12/12/2012	0001	45 - 75	600		F	#	10	
Temperature	C	12/12/2012	N001	45 - 75	14.72		F	#		
Turbidity	NTU	12/12/2012	N001	45 - 75	11.9		F	#		
Uranium	mg/L	12/12/2012	0001	45 - 75	0.033		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	0001	45 - 75	0.00028	B	F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0744 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	31 - 61	250		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	31 - 61	120		F	#	10	
Calcium	mg/L	12/12/2012	N001	31 - 61	96		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	31 - 61	18		F	#	4	
Magnesium	mg/L	12/12/2012	N001	31 - 61	74		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	31 - 61	160		F	#	1	
Oxidation Reduction Potential	mV	12/12/2012	N001	31 - 61	-12.4		F	#		
pH	s.u.	12/12/2012	N001	31 - 61	7.17		F	#		
Potassium	mg/L	12/12/2012	N001	31 - 61	15		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	31 - 61	84		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	31 - 61	2465		F	#		
Sulfate	mg/L	12/12/2012	N001	31 - 61	430		F	#	10	
Temperature	C	12/12/2012	N001	31 - 61	14.76		F	#		
Turbidity	NTU	12/12/2012	N001	31 - 61	2.58		F	#		
Uranium	mg/L	12/12/2012	N001	31 - 61	0.0096		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	31 - 61	0.0072		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0760 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	0001	55 - 75	168		F	#		
Ammonia Total as N	mg/L	12/13/2012	0001	55 - 75	0.15		F	#	0.1	
Calcium	mg/L	12/13/2012	0001	55 - 75	22		F	#	0.012	
Chloride	mg/L	12/13/2012	0001	55 - 75	9.6		F	#	1	
Magnesium	mg/L	12/13/2012	0001	55 - 75	15		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	0001	55 - 75	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	55 - 75	-190		F	#		
pH	s.u.	12/13/2012	N001	55 - 75	8.05		F	#		
Potassium	mg/L	12/13/2012	0001	55 - 75	2.2		F	#	0.11	
Sodium	mg/L	12/13/2012	0001	55 - 75	64		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	55 - 75	525		F	#		
Sulfate	mg/L	12/13/2012	0001	55 - 75	86		F	#	2.5	
Temperature	C	12/13/2012	N001	55 - 75	15.5		F	#		
Turbidity	NTU	12/13/2012	N001	55 - 75	125		F	#		
Uranium	mg/L	12/13/2012	0001	55 - 75	0.00025		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	0001	55 - 75	0.0001	B	F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0761 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	39 - 49	203		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	39 - 49	0.1	U	F	#	0.1	
Calcium	mg/L	12/13/2012	N001	39 - 49	130		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	39 - 49	14		F	#	2	
Magnesium	mg/L	12/13/2012	N001	39 - 49	91		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	39 - 49	33		F	#	0.2	
Oxidation Reduction Potential	mV	12/13/2012	N001	39 - 49	125		F	#		
pH	s.u.	12/13/2012	N001	39 - 49	7.23		F	#		
Potassium	mg/L	12/13/2012	N001	39 - 49	0.56	B	F	#	0.11	
Sodium	mg/L	12/13/2012	N001	39 - 49	49		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	39 - 49	1360		F	#		
Sulfate	mg/L	12/13/2012	N001	39 - 49	440		F	#	5	
Temperature	C	12/13/2012	N001	39 - 49	15		F	#		
Turbidity	NTU	12/13/2012	N001	39 - 49	6.18		F	#		
Uranium	mg/L	12/13/2012	N001	39 - 49	0.028		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	39 - 49	0.0021		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0762 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	29 - 49	246		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	29 - 49	0.1	U	F	#	0.1	
Calcium	mg/L	12/12/2012	N001	29 - 49	210		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	29 - 49	72		F	#	10	
Magnesium	mg/L	12/12/2012	N001	29 - 49	170		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	29 - 49	110		F	#	1	
Oxidation Reduction Potential	mV	12/12/2012	N001	29 - 49	166.8		F	#		
pH	s.u.	12/12/2012	N001	29 - 49	7.39		F	#		
Potassium	mg/L	12/12/2012	N001	29 - 49	5.7		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	29 - 49	420		F	#	0.066	
Specific Conductance	umhos /cm	12/12/2012	N001	29 - 49	3828		F	#		
Sulfate	mg/L	12/12/2012	N001	29 - 49	1600		F	#	25	
Temperature	C	12/12/2012	N001	29 - 49	14.92		F	#		
Turbidity	NTU	12/12/2012	N001	29 - 49	6.65		F	#		
Uranium	mg/L	12/12/2012	N001	29 - 49	0.013		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	29 - 49	0.0072		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0764 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	0001	47 - 52	200		FQ	#		
Ammonia Total as N	mg/L	12/13/2012	0001	47 - 52	0.1	U	FQ	#	0.1	
Calcium	mg/L	12/13/2012	0001	47 - 52	93		FQ	#	0.012	
Chloride	mg/L	12/13/2012	0001	47 - 52	11		FQ	#	2	
Magnesium	mg/L	12/13/2012	0001	47 - 52	75		FQ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	0001	47 - 52	42		FQ	#	0.5	
Oxidation Reduction Potential	mV	12/13/2012	N001	47 - 52	175		FQ	#		
pH	s.u.	12/13/2012	N001	47 - 52	7.43		FQ	#		
Potassium	mg/L	12/13/2012	0001	47 - 52	1.2		FQ	#	0.11	
Sodium	mg/L	12/13/2012	0001	47 - 52	37		FQ	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	47 - 52	1185		FQ	#		
Sulfate	mg/L	12/13/2012	0001	47 - 52	250		FQ	#	5	
Temperature	C	12/13/2012	N001	47 - 52	13		FQ	#		
Turbidity	NTU	12/13/2012	N001	47 - 52	21		FQ	#		
Uranium	mg/L	12/13/2012	0001	47 - 52	0.011		FQ	#	0.0000029	
Vanadium	mg/L	12/13/2012	0001	47 - 52	0.012		FQ	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0765 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	58.6 - 88.7	274		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	58.6 - 88.7	110		F	#	10	
Arsenic	mg/L	12/12/2012	N001	58.6 - 88.7	0.001		F	#	0.000015	
Calcium	mg/L	12/12/2012	N001	58.6 - 88.7	110		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	58.6 - 88.7	22		F	#	4	
Magnesium	mg/L	12/12/2012	N001	58.6 - 88.7	86		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	58.6 - 88.7	81		F	#	0.5	
Oxidation Reduction Potential	mV	12/12/2012	N001	58.6 - 88.7	-104.8		F	#		
pH	s.u.	12/12/2012	N001	58.6 - 88.7	7.06		F	#		
Potassium	mg/L	12/12/2012	N001	58.6 - 88.7	16		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	58.6 - 88.7	89		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	58.6 - 88.7	2314		F	#		
Sulfate	mg/L	12/12/2012	N001	58.6 - 88.7	600		F	#	10	
Temperature	C	12/12/2012	N001	58.6 - 88.7	14.27		F	#		
Turbidity	NTU	12/12/2012	N001	58.6 - 88.7	1.5		F	#		
Uranium	mg/L	12/12/2012	N001	58.6 - 88.7	0.011		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	58.6 - 88.7	0.0036		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0766 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	47.2 - 57.2	259		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	47.2 - 57.2	130		F	#	10	
Calcium	mg/L	12/12/2012	N001	47.2 - 57.2	84		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	47.2 - 57.2	18		F	#	4	
Magnesium	mg/L	12/12/2012	N001	47.2 - 57.2	71		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	47.2 - 57.2	140		F	#	1	
Oxidation Reduction Potential	mV	12/12/2012	N001	47.2 - 57.2	177.9		F	#		
pH	s.u.	12/12/2012	N001	47.2 - 57.2	7.45		F	#		
Potassium	mg/L	12/12/2012	N001	47.2 - 57.2	18		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	47.2 - 57.2	87		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	47.2 - 57.2	2344		F	#		
Sulfate	mg/L	12/12/2012	N001	47.2 - 57.2	420		F	#	10	
Temperature	C	12/12/2012	N001	47.2 - 57.2	12.06		F	#		
Turbidity	NTU	12/12/2012	N001	47.2 - 57.2	9.72		F	#		
Uranium	mg/L	12/12/2012	N001	47.2 - 57.2	0.01		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	47.2 - 57.2	0.0043		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0767 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	43.5 - 63.5	172		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	43.5 - 63.5	0.13		F	#	0.1	
Calcium	mg/L	12/13/2012	N001	43.5 - 63.5	37		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	43.5 - 63.5	5.8		F	#	1	
Magnesium	mg/L	12/13/2012	N001	43.5 - 63.5	17		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	43.5 - 63.5	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	43.5 - 63.5	-80		F	#		
pH	s.u.	12/13/2012	N001	43.5 - 63.5	7.91		F	#		
Potassium	mg/L	12/13/2012	N001	43.5 - 63.5	2.4		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	43.5 - 63.5	22		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	43.5 - 63.5	402		F	#		
Sulfate	mg/L	12/13/2012	N001	43.5 - 63.5	33		F	#	2.5	
Temperature	C	12/13/2012	N001	43.5 - 63.5	15.5		F	#		
Turbidity	NTU	12/13/2012	N001	43.5 - 63.5	0.91		F	#		
Uranium	mg/L	12/13/2012	N001	43.5 - 63.5	0.00064		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	43.5 - 63.5	0.000051	B	F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0768 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/13/2012	N001	24.4 - 44.4	180		F	#		
Ammonia Total as N	mg/L	12/13/2012	N001	24.4 - 44.4	0.51		F	#	0.1	
Calcium	mg/L	12/13/2012	N001	24.4 - 44.4	27		F	#	0.012	
Chloride	mg/L	12/13/2012	N001	24.4 - 44.4	12		F	#	1	
Magnesium	mg/L	12/13/2012	N001	24.4 - 44.4	21		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2012	N001	24.4 - 44.4	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/13/2012	N001	24.4 - 44.4	-166		F	#		
pH	s.u.	12/13/2012	N001	24.4 - 44.4	8.07		F	#		
Potassium	mg/L	12/13/2012	N001	24.4 - 44.4	1.9		F	#	0.11	
Sodium	mg/L	12/13/2012	N001	24.4 - 44.4	41		F	#	0.0066	
Specific Conductance	umhos /cm	12/13/2012	N001	24.4 - 44.4	471		F	#		
Sulfate	mg/L	12/13/2012	N001	24.4 - 44.4	62		F	#	2.5	
Temperature	C	12/13/2012	N001	24.4 - 44.4	15.47		F	#		
Turbidity	NTU	12/13/2012	N001	24.4 - 44.4	3.42		F	#		
Uranium	mg/L	12/13/2012	N001	24.4 - 44.4	0.000046		F	#	0.0000029	
Vanadium	mg/L	12/13/2012	N001	24.4 - 44.4	0.00025	B	F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0770 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	54.9 - 64.9	230		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	54.9 - 64.9	29		F	#	2	
Arsenic	mg/L	12/12/2012	N001	54.9 - 64.9	0.0021		F	#	0.000015	
Calcium	mg/L	12/12/2012	N001	54.9 - 64.9	31		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	54.9 - 64.9	15		F	#	1	
Magnesium	mg/L	12/12/2012	N001	54.9 - 64.9	27		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	54.9 - 64.9	15		F	#	0.1	
Oxidation Reduction Potential	mV	12/12/2012	N001	54.9 - 64.9	129.6		F	#		
pH	s.u.	12/12/2012	N001	54.9 - 64.9	7.53		F	#		
Potassium	mg/L	12/12/2012	N001	54.9 - 64.9	5		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	54.9 - 64.9	76		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	54.9 - 64.9	973		F	#		
Sulfate	mg/L	12/12/2012	N001	54.9 - 64.9	190		F	#	2.5	
Temperature	C	12/12/2012	N001	54.9 - 64.9	15.34		F	#		
Turbidity	NTU	12/12/2012	N001	54.9 - 64.9	1.88		F	#		
Uranium	mg/L	12/12/2012	N001	54.9 - 64.9	0.0054		F	#	0.0000029	
Vanadium	mg/L	12/12/2012	N001	54.9 - 64.9	0.00065		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0771 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	57.4 - 77.4	292		FQ	#		
Ammonia Total as N	mg/L	12/11/2012	N001	57.4 - 77.4	240		FQ	#	10	
Calcium	mg/L	12/11/2012	N001	57.4 - 77.4	270		FQ	#	0.012	
Chloride	mg/L	12/11/2012	N001	57.4 - 77.4	21		FQ	#	1	
Magnesium	mg/L	12/11/2012	N001	57.4 - 77.4	190		FQ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	57.4 - 77.4	190		FQ	#	1	
Oxidation Reduction Potential	mV	12/11/2012	N001	57.4 - 77.4	120.7		FQ	#		
pH	s.u.	12/11/2012	N001	57.4 - 77.4	7.08		FQ	#		
Potassium	mg/L	12/11/2012	N001	57.4 - 77.4	49		FQ	#	0.11	
Sodium	mg/L	12/11/2012	N001	57.4 - 77.4	100		FQ	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	57.4 - 77.4	4551		FQ	#		
Sulfate	mg/L	12/11/2012	N001	57.4 - 77.4	1600		FQ	#	25	
Temperature	C	12/11/2012	N001	57.4 - 77.4	15.36		FQ	#		
Turbidity	NTU	12/11/2012	N001	57.4 - 77.4	0.52		FQ	#		
Uranium	mg/L	12/11/2012	N001	57.4 - 77.4	0.016		FQ	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	57.4 - 77.4	0.0081		FQ	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0772 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	7.4 - 27.4	2.36		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	7.4 - 27.4	1.5		F	#	0.1	
Ammonia Total as N	mg/L	12/11/2012	N002	7.4 - 27.4	1.4		F	#	0.1	
Calcium	mg/L	12/11/2012	N001	7.4 - 27.4	23		F	#	0.012	
Calcium	mg/L	12/11/2012	N002	7.4 - 27.4	23		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	7.4 - 27.4	14		F	#	1	
Chloride	mg/L	12/11/2012	N002	7.4 - 27.4	14		F	#	1	
Magnesium	mg/L	12/11/2012	N001	7.4 - 27.4	16		F	#	0.013	
Magnesium	mg/L	12/11/2012	N002	7.4 - 27.4	16		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	7.4 - 27.4	1.8		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N002	7.4 - 27.4	1.6		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	7.4 - 27.4	-64.9		F	#		
pH	s.u.	12/11/2012	N001	7.4 - 27.4	7.55		F	#		
Potassium	mg/L	12/11/2012	N001	7.4 - 27.4	0.81	B	F	#	0.11	
Potassium	mg/L	12/11/2012	N002	7.4 - 27.4	0.84	B	F	#	0.11	
Sodium	mg/L	12/11/2012	N001	7.4 - 27.4	87		F	#	0.0066	
Sodium	mg/L	12/11/2012	N002	7.4 - 27.4	85		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	7.4 - 27.4	708		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0772 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	12/11/2012	N001	7.4 - 27.4	110		F	#	2.5	
Sulfate	mg/L	12/11/2012	N002	7.4 - 27.4	110		F	#	2.5	
Temperature	C	12/11/2012	N001	7.4 - 27.4	15.73		F	#		
Turbidity	NTU	12/11/2012	N001	7.4 - 27.4	2.46		F	#		
Uranium	mg/L	12/11/2012	N001	7.4 - 27.4	0.0064		F	#	0.0000029	
Uranium	mg/L	12/11/2012	N002	7.4 - 27.4	0.0064		F	#	0.0000029	
Vanadium	mg/L	12/11/2012	N001	7.4 - 27.4	0.021		F	#	0.000015	
Vanadium	mg/L	12/11/2012	N002	7.4 - 27.4	0.022		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0775 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/12/2012	N001	142 - 167	184		F	#		
Ammonia Total as N	mg/L	12/12/2012	N001	142 - 167	0.1	U	F	#	0.1	
Calcium	mg/L	12/12/2012	N001	142 - 167	20		F	#	0.012	
Chloride	mg/L	12/12/2012	N001	142 - 167	5.9		F	#	1	
Magnesium	mg/L	12/12/2012	N001	142 - 167	20		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/12/2012	N001	142 - 167	0.59		F	#	0.01	
Oxidation Reduction Potential	mV	12/12/2012	N001	142 - 167	156.6		F	#		
pH	s.u.	12/12/2012	N001	142 - 167	7.8		F	#		
Potassium	mg/L	12/12/2012	N001	142 - 167	2.1		F	#	0.11	
Sodium	mg/L	12/12/2012	N001	142 - 167	24		F	#	0.0066	
Specific Conductance	umhos /cm	12/12/2012	N001	142 - 167	393		F	#		
H2/H1	‰	12/12/2012	0002	142 - 167	-81.31		F	#		
O18/O16	‰	12/12/2012	0002	142 - 167	-10.93		F	#		
S-34/S-32	‰	12/12/2012	0002	142 - 167	-7.94		F	#		
Sulfate	mg/L	12/12/2012	N001	142 - 167	25		F	#	2.5	
Temperature	C	12/12/2012	N001	142 - 167	15.35		F	#		
Tritium	pCi/L	12/12/2012	N003	142 - 167	0	U	F	#	2.76	1.55
Turbidity	NTU	12/12/2012	N001	142 - 167	2.85		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0775 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/12/2012	N001	142	-	167	0.003		F	#	0.0000029	
Uranium-234	pCi/L	12/12/2012	N001	142	-	167	1.61		F	#	0.068	0.298
Uranium-235	pCi/L	12/12/2012	N001	142	-	167	0.0765		FJ	#	0.035	0.0423
Uranium-238	pCi/L	12/12/2012	N001	142	-	167	1.07		F	#	0.03	0.212
Vanadium	mg/L	12/12/2012	N001	142	-	167	0.00059		F	#	0.000015	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0776 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	99.5 - 149.5	104		F	#		
Ammonia Total as N	mg/L	12/11/2012	N001	99.5 - 149.5	0.1	U	F	#	0.1	
Calcium	mg/L	12/11/2012	N001	99.5 - 149.5	23		F	#	0.012	
Chloride	mg/L	12/11/2012	N001	99.5 - 149.5	5.7		F	#	1	
Magnesium	mg/L	12/11/2012	N001	99.5 - 149.5	23		F	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	N001	99.5 - 149.5	0.78		F	#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	99.5 - 149.5	172.2		F	#		
pH	s.u.	12/11/2012	N001	99.5 - 149.5	7.79		F	#		
Potassium	mg/L	12/11/2012	N001	99.5 - 149.5	2		F	#	0.11	
Sodium	mg/L	12/11/2012	N001	99.5 - 149.5	19		F	#	0.0066	
Specific Conductance	umhos /cm	12/11/2012	N001	99.5 - 149.5	389		F	#		
H2/H1	‰	12/11/2012	0002	99.5 - 149.5	-79.82		F	#		
O18/O16	‰	12/11/2012	0002	99.5 - 149.5	-10.77		F	#		
S-34/S-32	‰	12/11/2012	0002	99.5 - 149.5	-7.29		F	#		
Sulfate	mg/L	12/11/2012	N001	99.5 - 149.5	30		F	#	2.5	
Temperature	C	12/11/2012	N001	99.5 - 149.5	14.72		F	#		
Tritium	pCi/L	12/11/2012	N003	99.5 - 149.5	0.0724	U	F	#	2.63	1.5
Turbidity	NTU	12/11/2012	N001	99.5 - 149.5	2.11		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 03/21/2013
Location: 0776 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	12/11/2012	N001	99.5 - 149.5	0.0069		F	#	0.0000029	
Uranium-234	pCi/L	12/11/2012	N001	99.5 - 149.5	2.91		F	#	0.095	0.535
Uranium-235	pCi/L	12/11/2012	N001	99.5 - 149.5	0.0742		UF	#	0.055	0.0527
Uranium-238	pCi/L	12/11/2012	N001	99.5 - 149.5	2.19		F	#	0.017	0.419
Vanadium	mg/L	12/11/2012	N001	99.5 - 149.5	0.018		F	#	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.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier, see case narrative.

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

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

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Surface Water Quality Data

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Surface Water Quality Data by Location (USEE102) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 03/07/2013

Location: 0623 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/11/2012	N001	244			#		
Ammonia Total as N	mg/L	12/11/2012	0001	0.1	U		#	0.1	
Calcium	mg/L	12/11/2012	0001	50			#	0.012	
Chloride	mg/L	12/11/2012	0001	12			#	1	
Magnesium	mg/L	12/11/2012	0001	27			#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	12/11/2012	0001	0.011			#	0.01	
Oxidation Reduction Potential	mV	12/11/2012	N001	-101.6			#		
pH	s.u.	12/11/2012	N001	7.05			#		
Potassium	mg/L	12/11/2012	0001	3.9			#	0.11	
Sodium	mg/L	12/11/2012	0001	37			#	0.0066	
Specific Conductance	umhos/cm	12/11/2012	N001	620			#		
Sulfate	mg/L	12/11/2012	0001	45			#	2.5	
Temperature	C	12/11/2012	N001	2.32			#		
Turbidity	NTU	12/11/2012	N001	11.3			#		
Uranium	mg/L	12/11/2012	0001	0.0025			#	0.0000029	
Vanadium	mg/L	12/11/2012	0001	0.00044			#	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.
- 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.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 03/21/2013

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
0402	U	4840.3	12/11/2012	12:25:46	5.05	4835.25	
0602	U	4864.43	12/11/2012	10:10:13	9.99	4854.44	
0603	U	4849.41	12/11/2012	11:35:36	11.63	4837.78	
0604	C	4840.42	12/11/2012	12:05:46	9.79	4830.63	
0605	C	4835.07	12/13/2012	10:35:22	11.59	4823.48	
0606	D	4864.73	12/11/2012	15:55:31	36.99	4827.74	
0619	O	4888.63	12/11/2012	14:48:57	61.28	4827.35	
0648	N	4835.14	12/12/2012	14:40:52	35.44	4799.7	
0650	D	4794.28	12/13/2012	12:05:17	20.89	4773.39	
0651	C	4787.88	12/13/2012	12:40:35	9.12	4778.76	
0652	C	4808.93	12/13/2012	12:10:23	19.32	4789.61	
0653	D	4837.08	12/12/2012	14:15:00	37.21	4799.87	
0655	D	4862.06	12/11/2012	13:55:07	41.85	4820.21	
0656	D	4856.33	12/12/2012	12:25:43	38.19	4818.14	
0657	O	4878.99	12/11/2012	12:57:45	54.47	4824.52	
0662	D	4878.56	12/11/2012	12:02:56	54.05	4824.51	
0669	D	4867.19	12/11/2012	16:30:38	52.25	4814.94	
0711		NA	12/11/2012	11:10:13	11.89	NA	
0715		NA	12/11/2012	10:45:16	11.33	NA	
0719		NA	12/11/2012	09:50:32	12.78	NA	
0727		NA	12/11/2012	09:25:24	14.84	NA	
0733		NA	12/12/2012	09:01:43	52.72	NA	
0734		NA	12/11/2012	15:46:42	54.21	NA	
0735		NA	12/11/2012	10:50:56	55.15	NA	
0738		NA	12/13/2012	13:45:31	17.15	NA	
0739		NA	12/13/2012	11:20:47	23.4	NA	
0740		NA	12/13/2012	12:30:54	28.05	NA	
0741		NA	12/12/2012	11:00:27	37.29	NA	
0742		NA	12/12/2012	11:25:41	37.53	NA	

STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site

REPORT DATE: 03/21/2013

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
0743		NA	12/12/2012	12:30:55	37.12	NA	
0744		NA	12/12/2012	13:00:00	37.42	NA	
0760	D	4814.8	12/13/2012	13:10:59	26.52	4788.28	
0761	D	4835.02	12/13/2012	10:40:20	44.7	4790.32	
0762	D	4820.74	12/12/2012	15:15:45	33.52	4787.22	
0764	D	4851.53	12/13/2012	09:55:31	51.3	4800.23	
0765	D	4848.45	12/12/2012	13:30:54	37.15	4811.3	
0766	D	4847.97	12/12/2012	09:55:06	37.74	4810.23	
0767	D	4808.25	12/13/2012	11:35:49	7.57	4800.68	
0768	D	4820.73	12/13/2012	11:10:54	15.41	4805.32	
0770	D	4857.26	12/12/2012	12:51:41	34.47	4822.79	
0771	D	4863.26	12/11/2012	14:55:14	43.93	4819.33	
0772	O	4847.6	12/11/2012	15:28:07	12.42	4835.18	
0774	O	4880.14	12/11/2012	14:14:00			D
0775	D	4879.68	12/12/2012	10:46:09	54.11	4825.57	
0776	O	4883.33	12/11/2012	09:25:15	57.05	4826.28	

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 B Below top of pump

Time-Concentration Graphs

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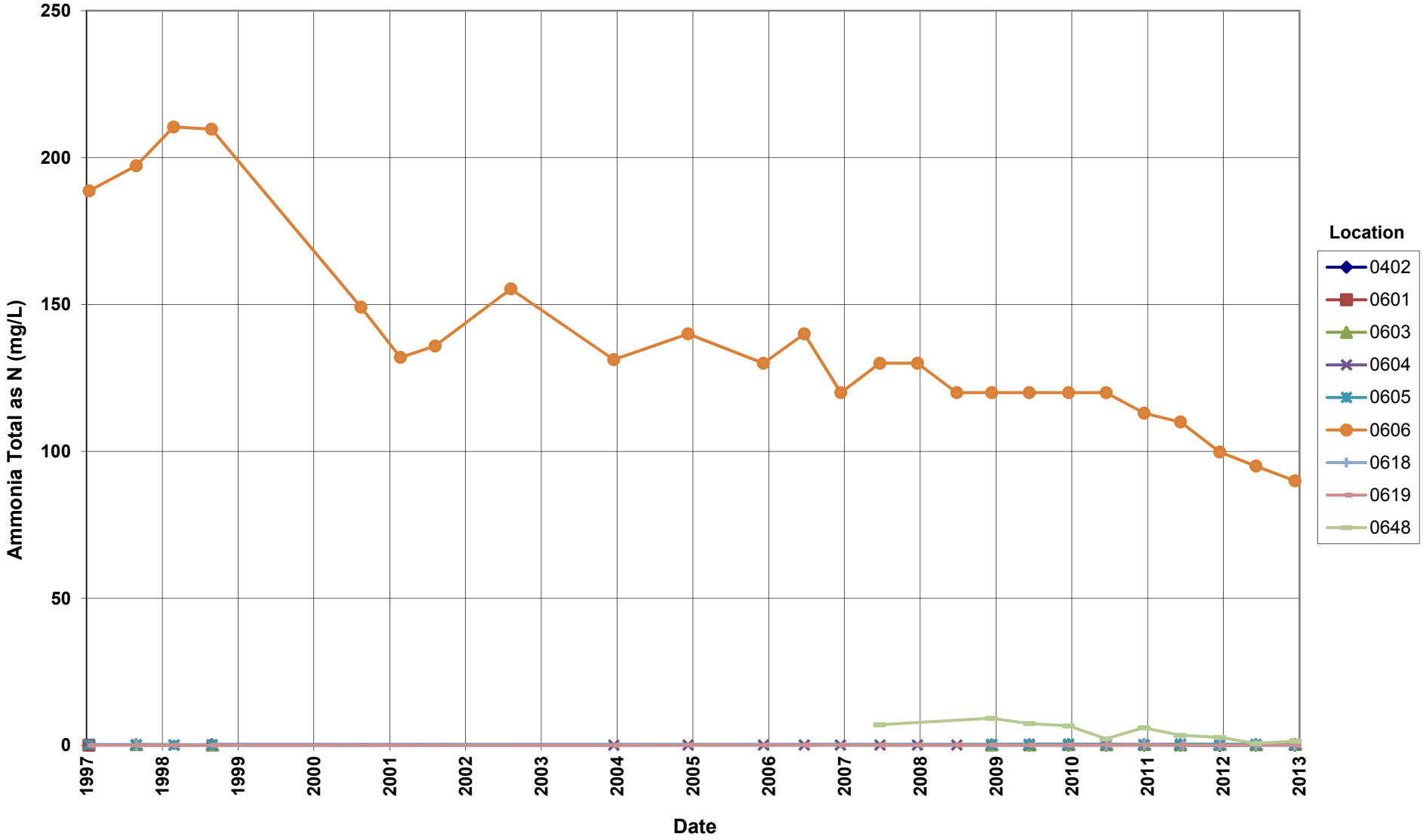
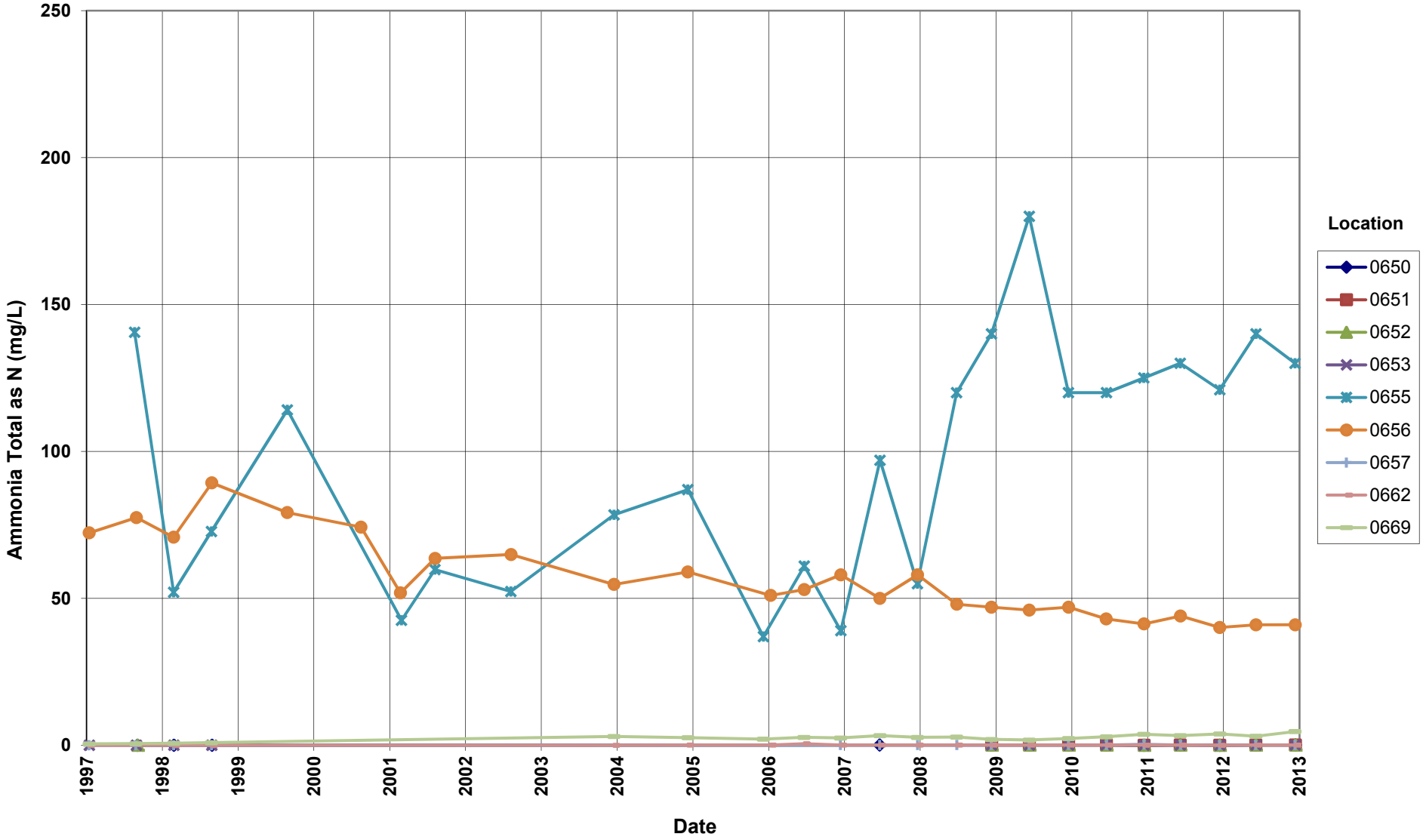
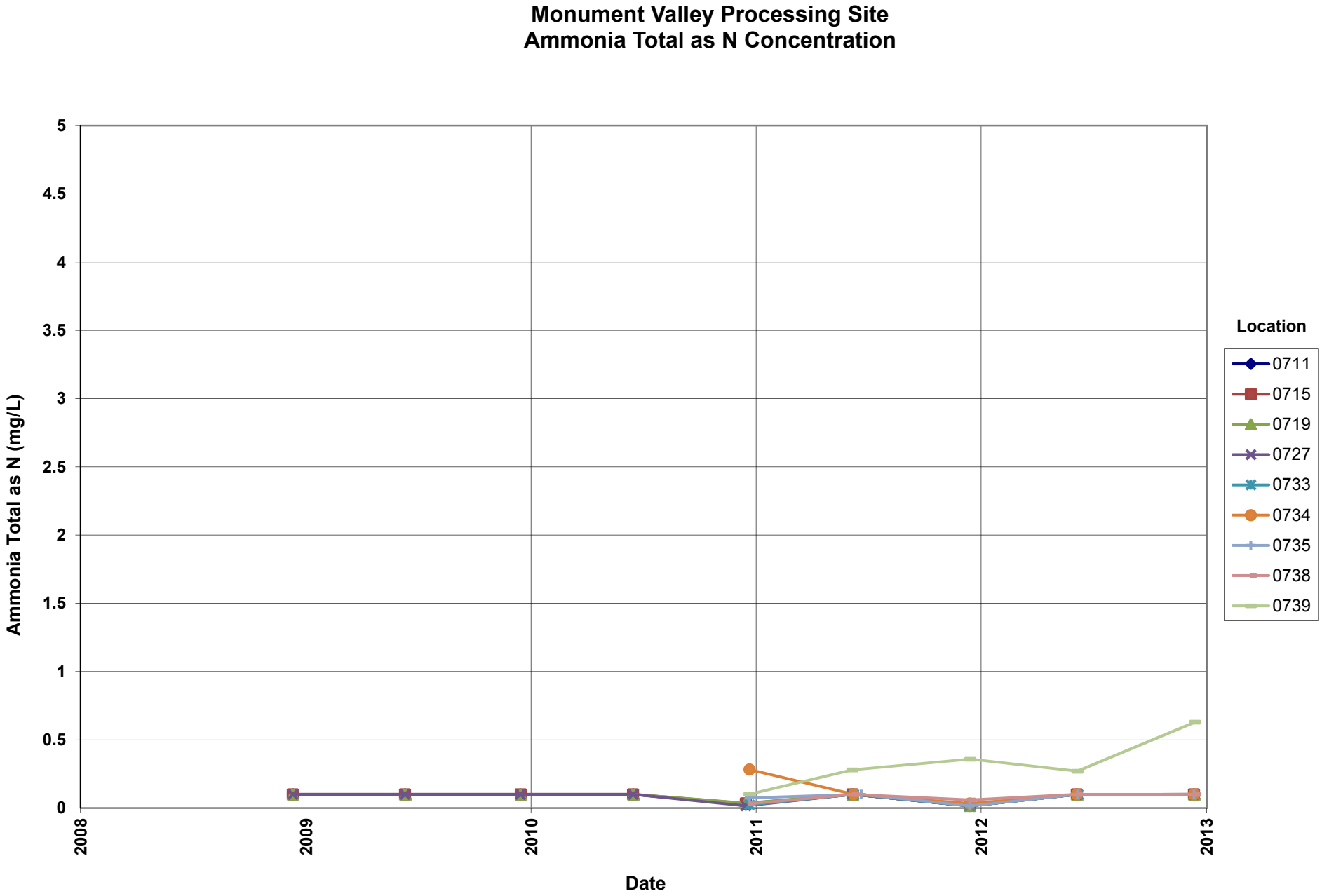
Monument Valley Processing Site
Ammonia Total as N Concentration

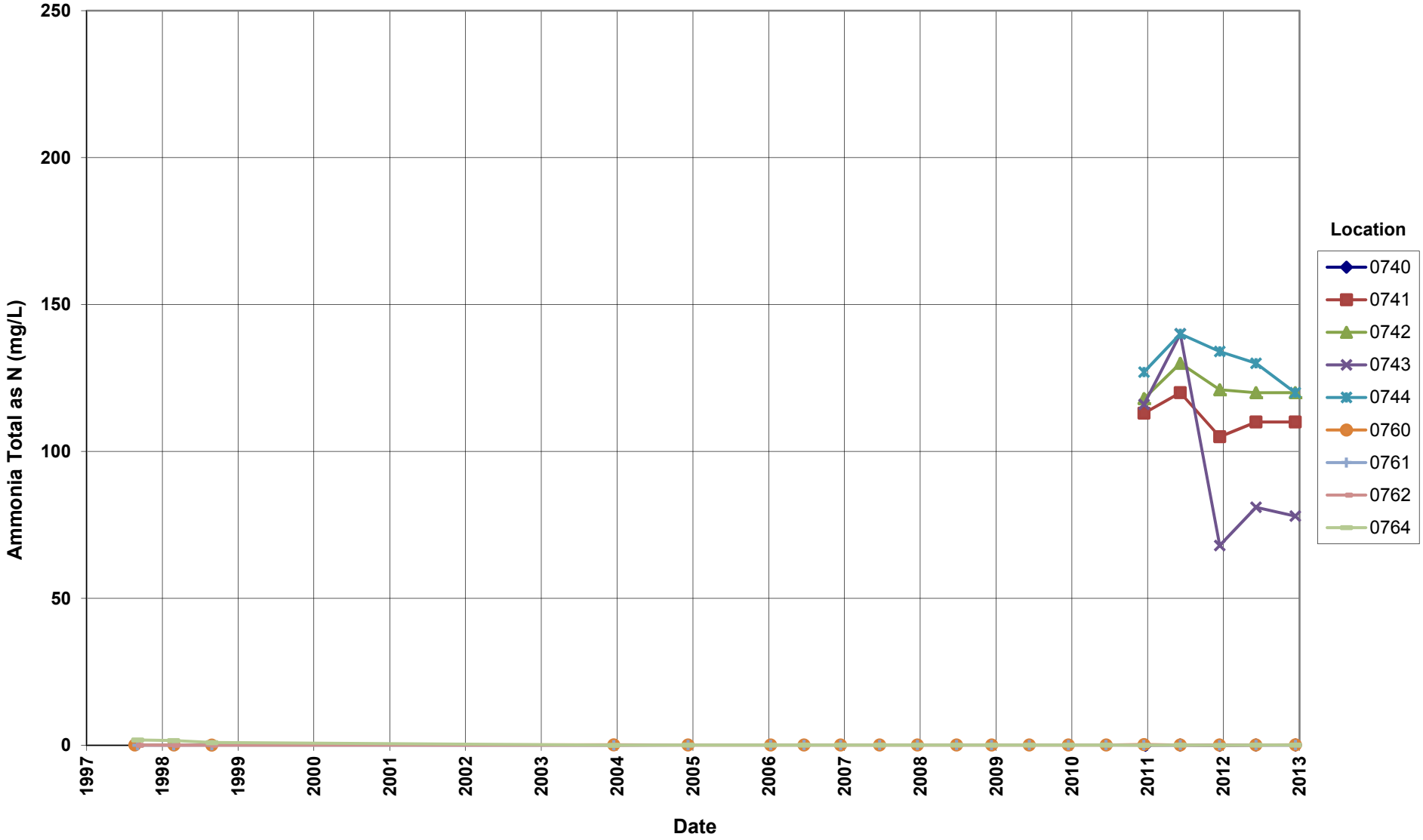


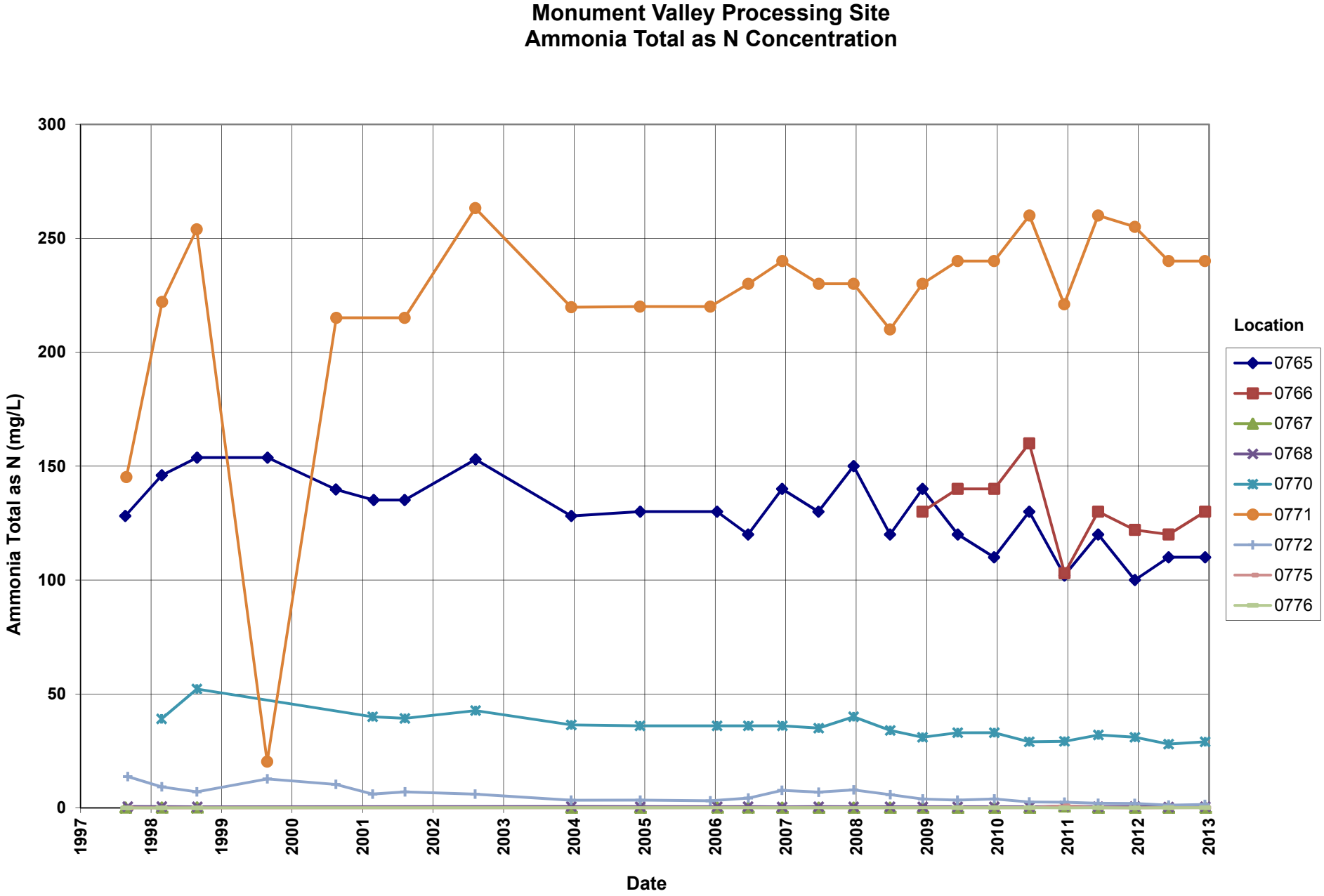
Monument Valley Processing Site
Ammonia Total as N Concentration

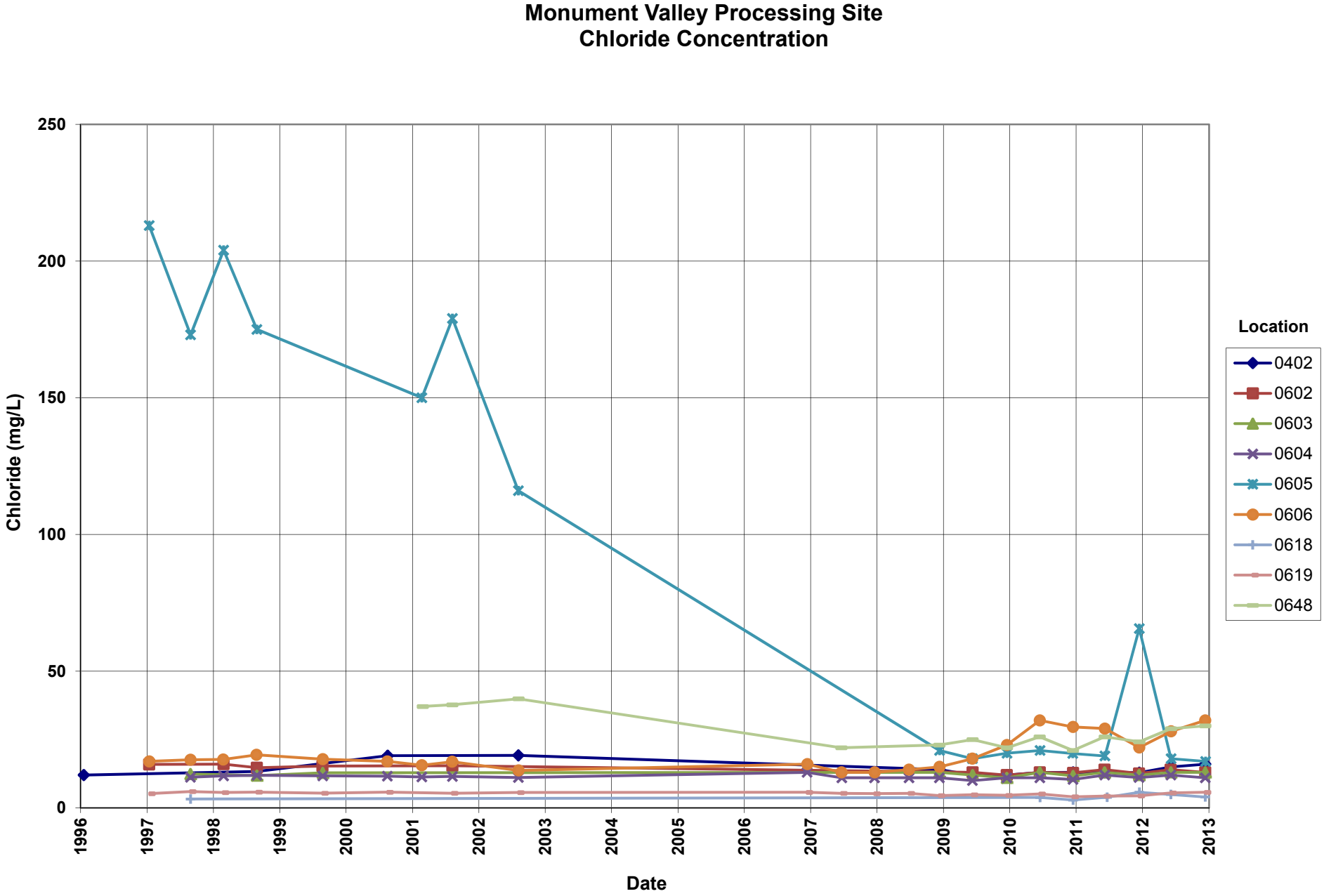


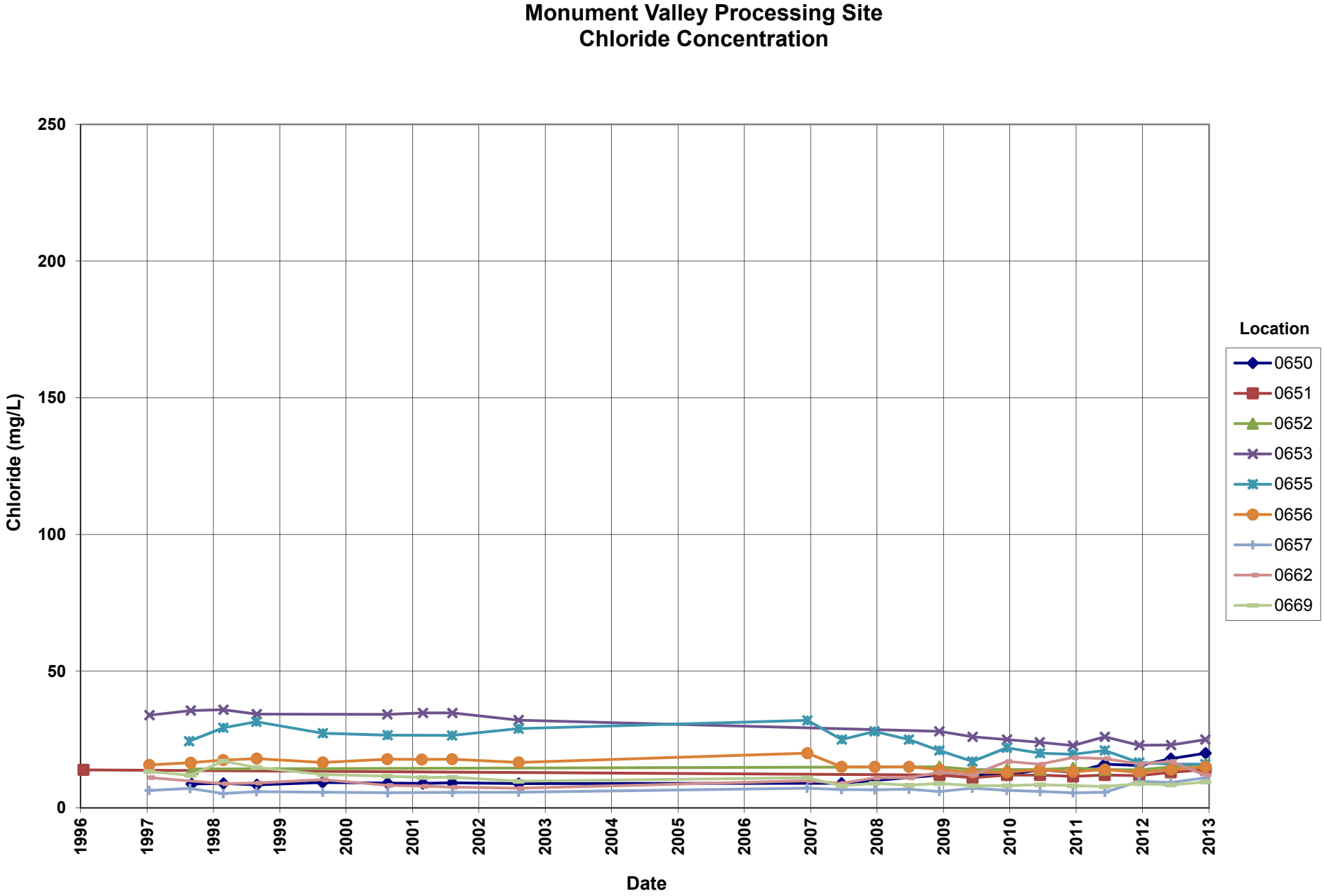

Monument Valley Processing Site
Ammonia Total as N Concentration
Ammonia Total as N (mg/L)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
2008
2009
2010
2011
2012
2013
Date
Location
0711
0715
0719
0727
0733
0734
0735
0738
0739

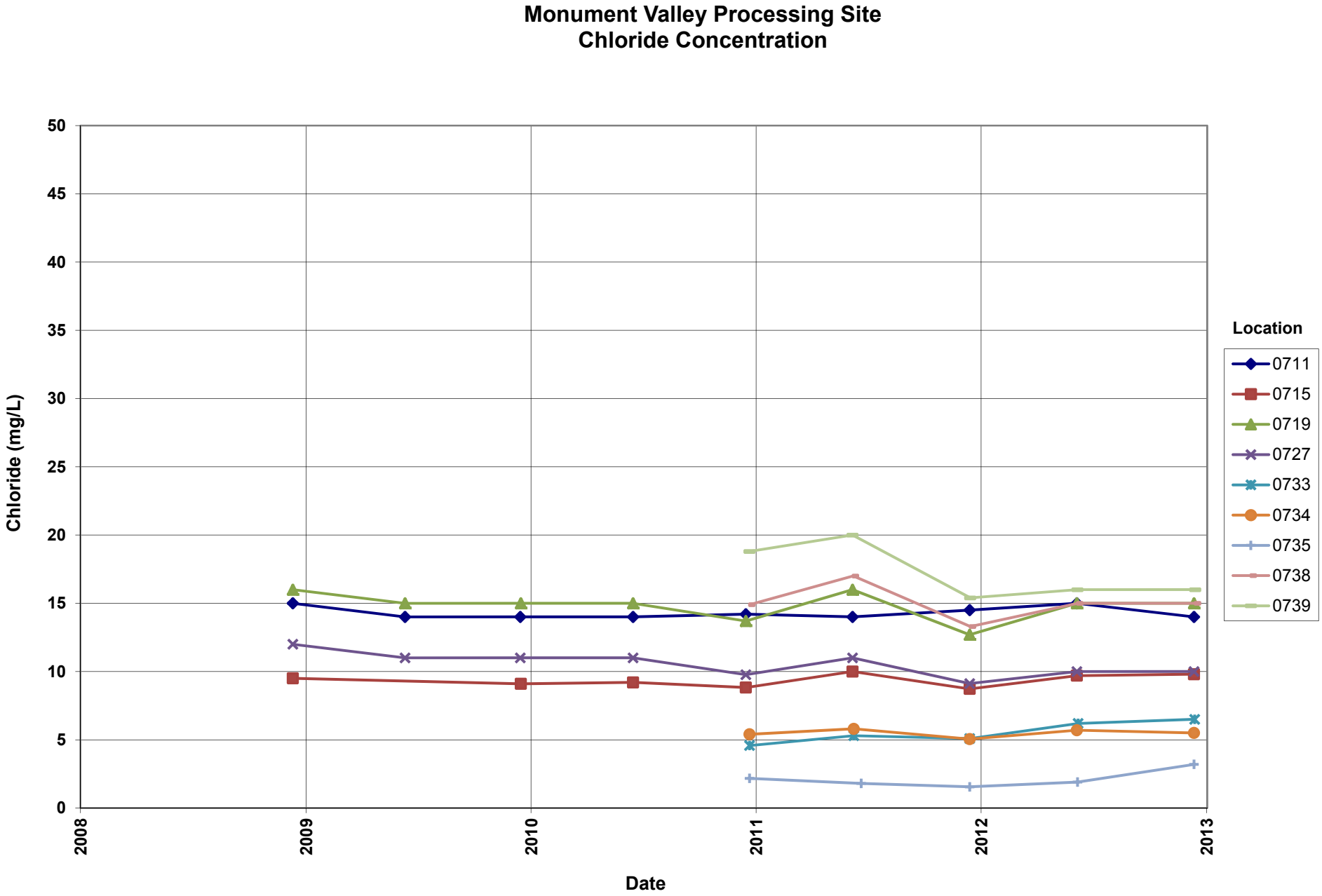
Monument Valley Processing Site
Ammonia Total as N Concentration

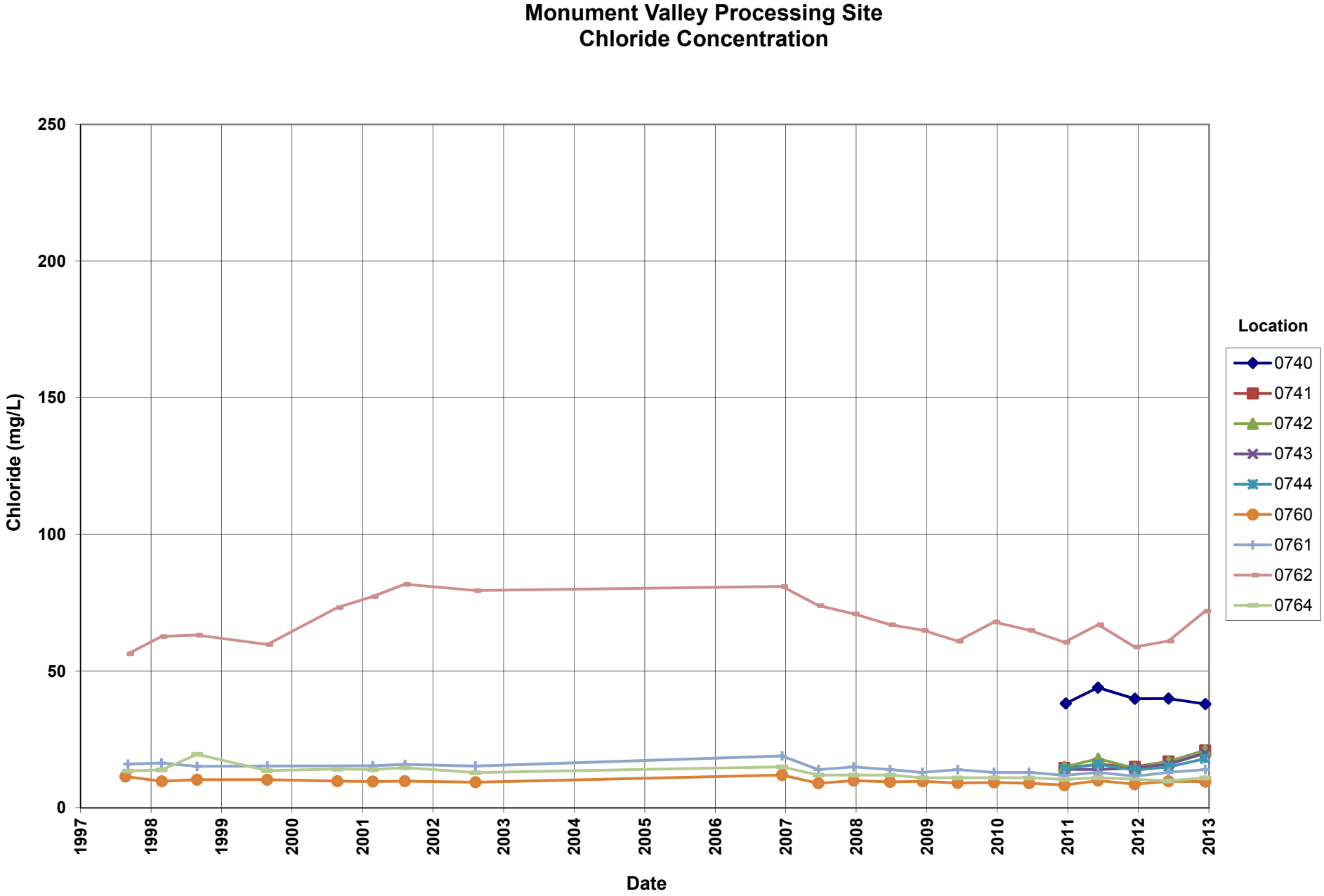


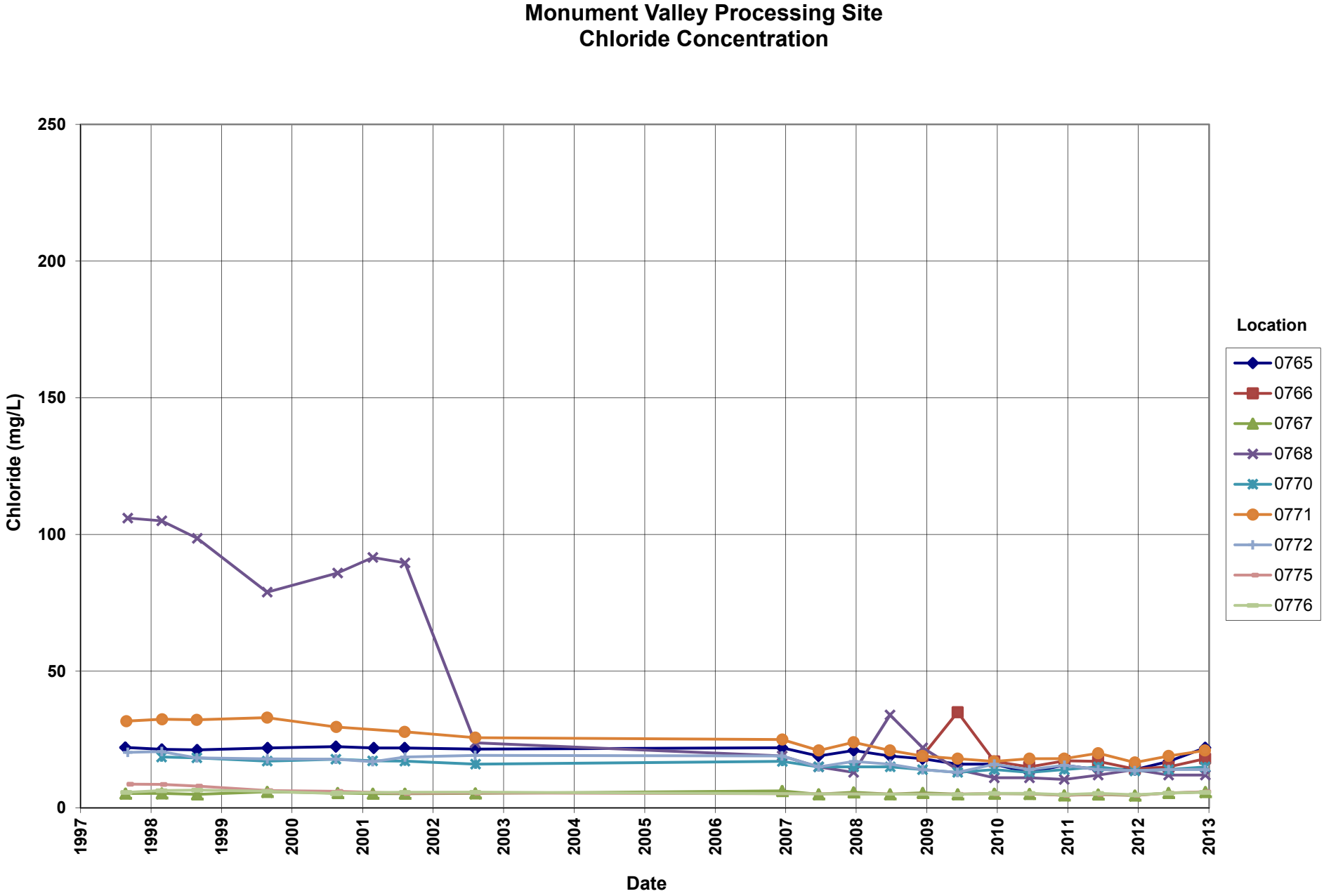

Monument Valley Processing Site
Ammonia Total as N Concentration
Ammonia Total as N (mg/L)
300
250
200
150
100
50
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0765
0766
0767
0768
0770
0771
0772
0775
0776


Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
250
200
150
100
50
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0402
0602
0603
0604
0605
0606
0618
0619
0648

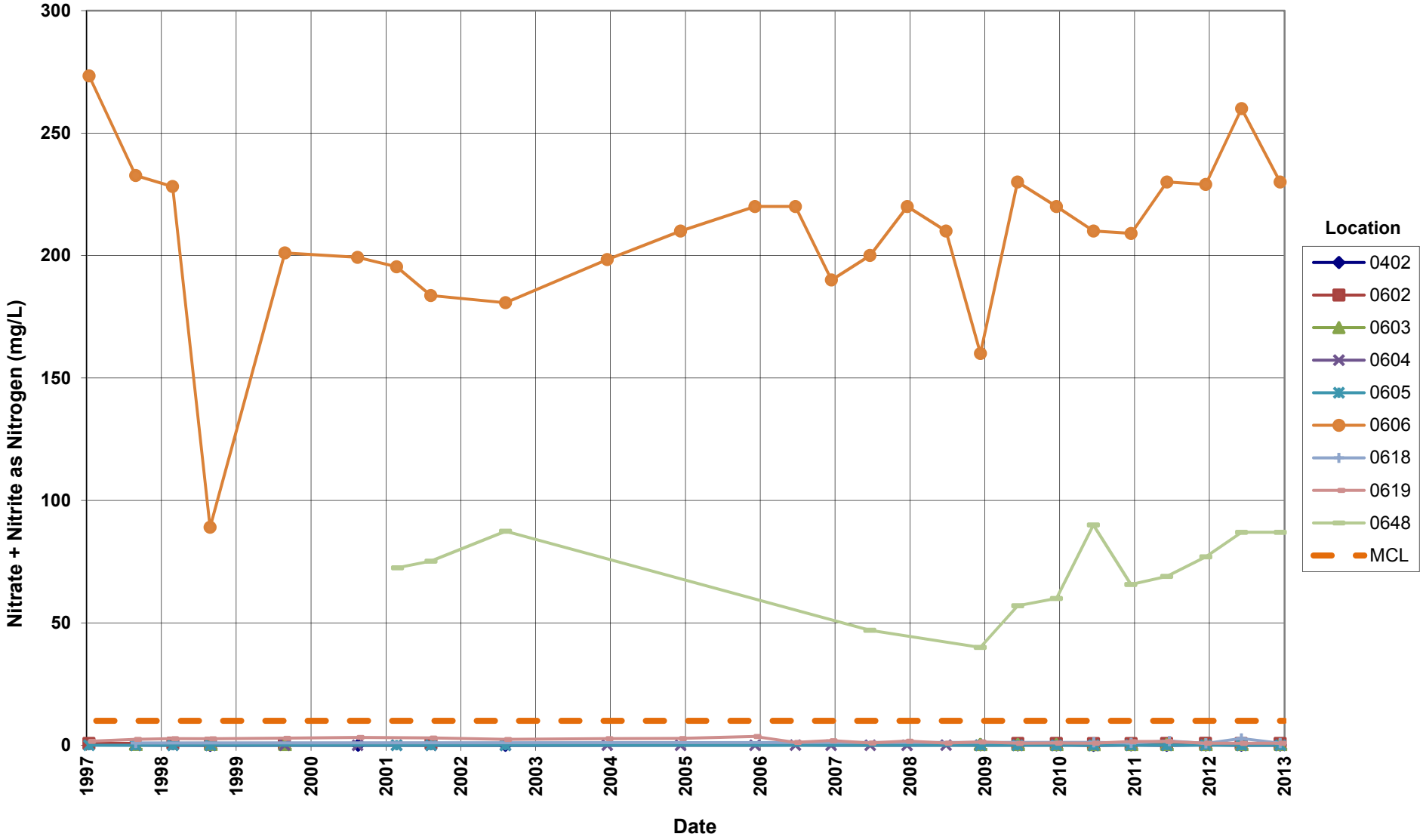

Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
250
200
150
100
50
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0650
0651
0652
0653
0655
0656
0657
0662
0669


Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
50
45
40
35
30
25
20
15
10
5
0
2008
2009
2010
2011
2012
2013
Date
Location
0711
0715
0719
0727
0733
0734
0735
0738
0739

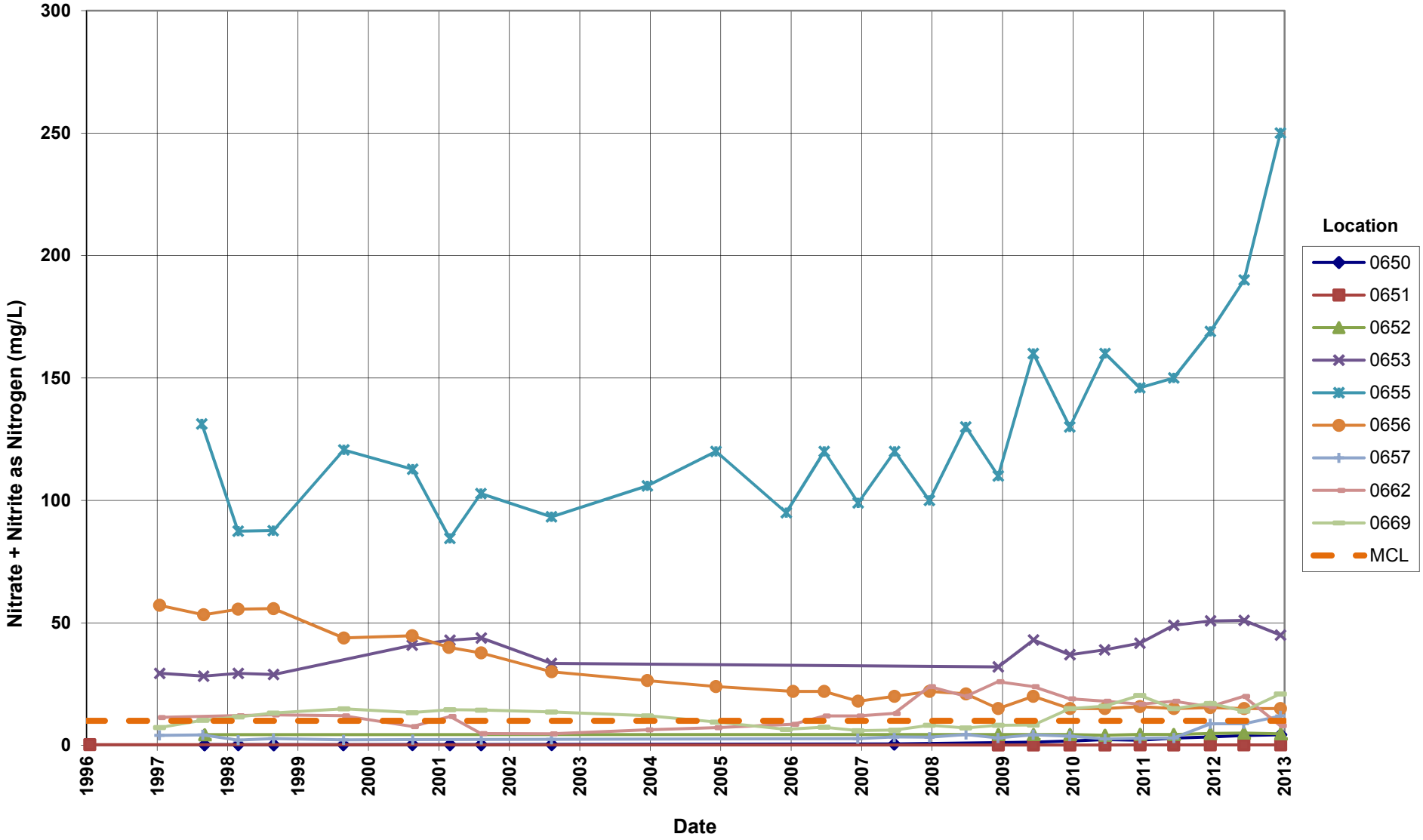

Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
250
200
150
100
50
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0740
0741
0742
0743
0744
0760
0761
0762
0764


Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
250
200
150
100
50
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0765
0766
0767
0768
0770
0771
0772
0775
0776

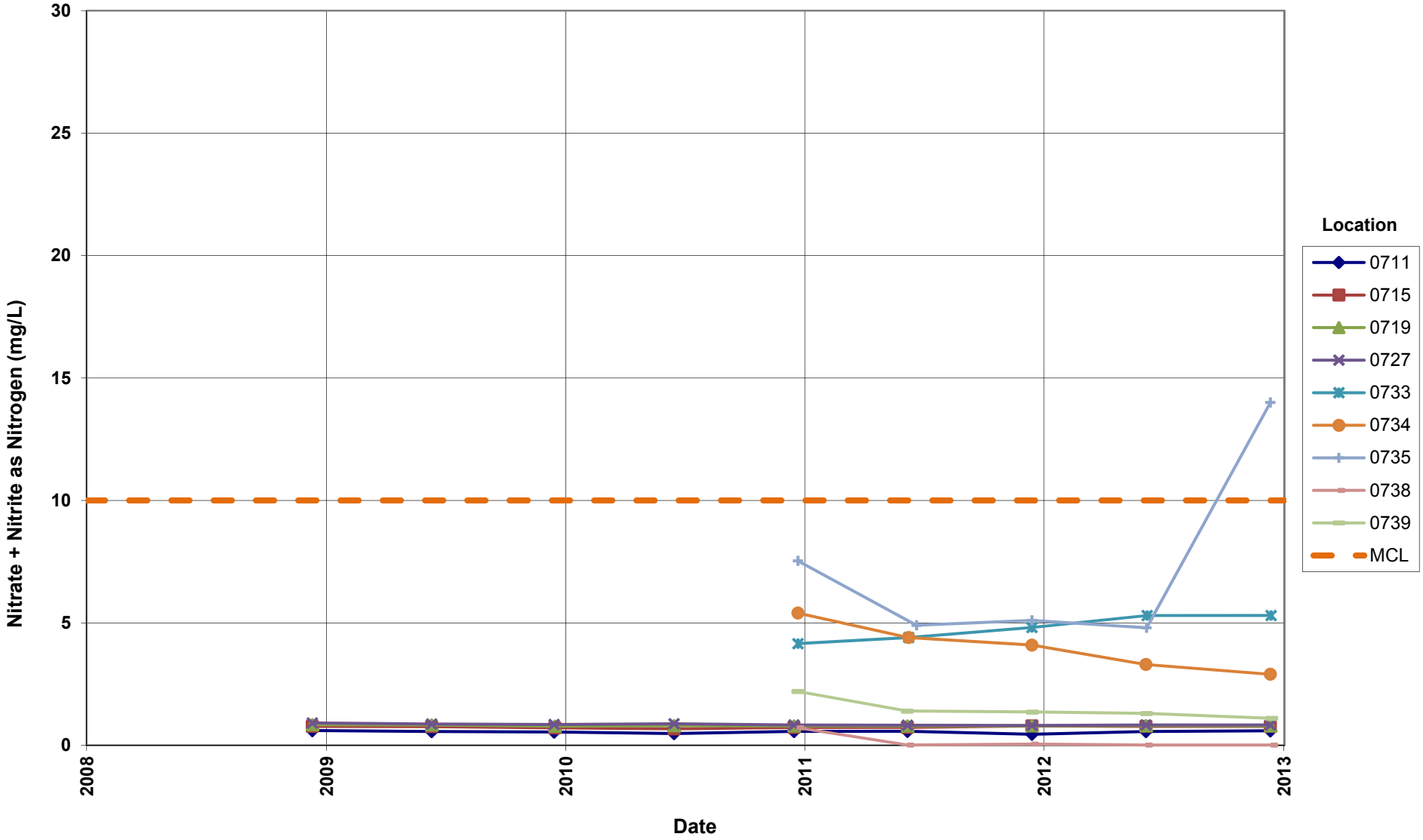
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit (MCL) = 10 mg/L

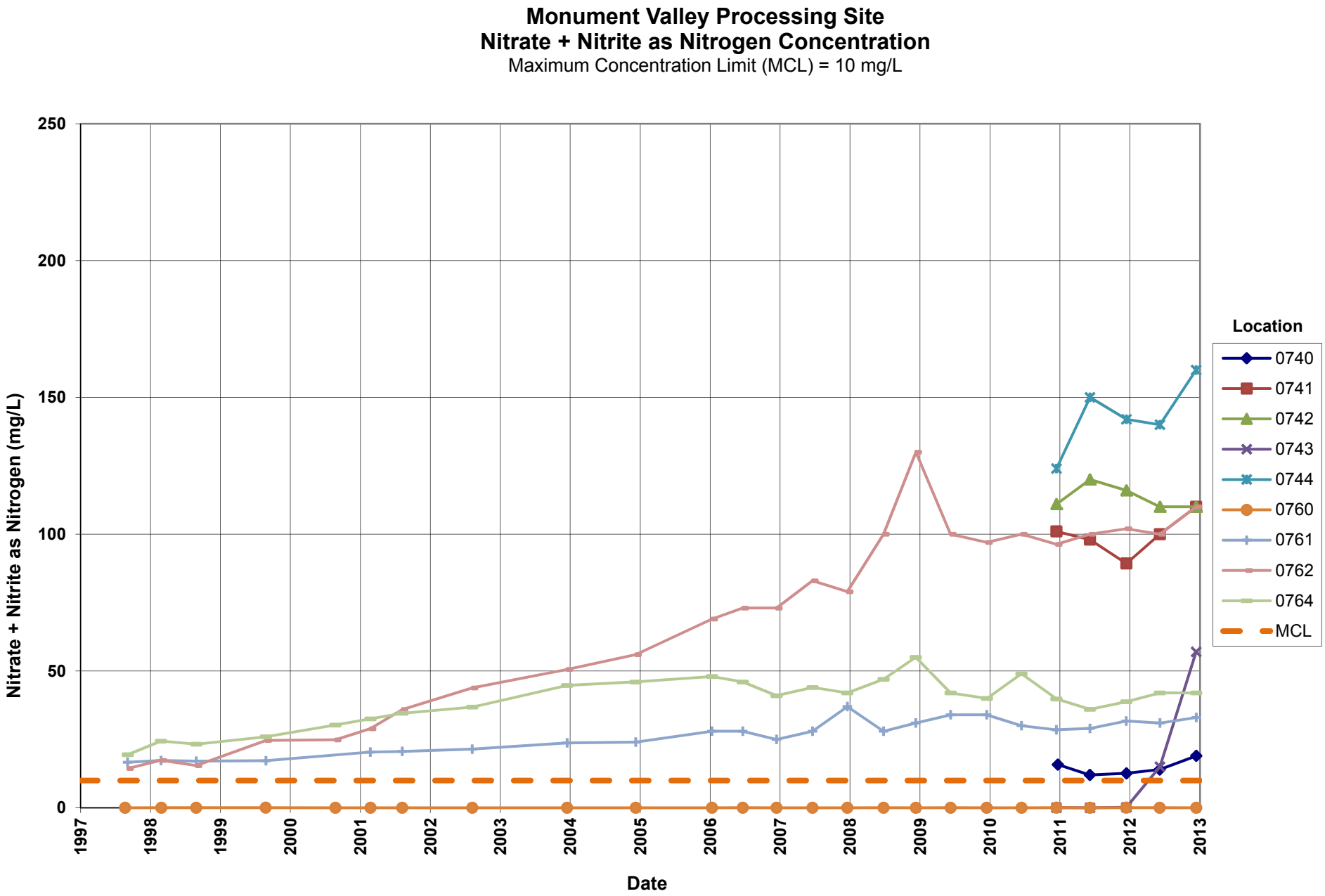


Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit (MCL) = 10 mg/L

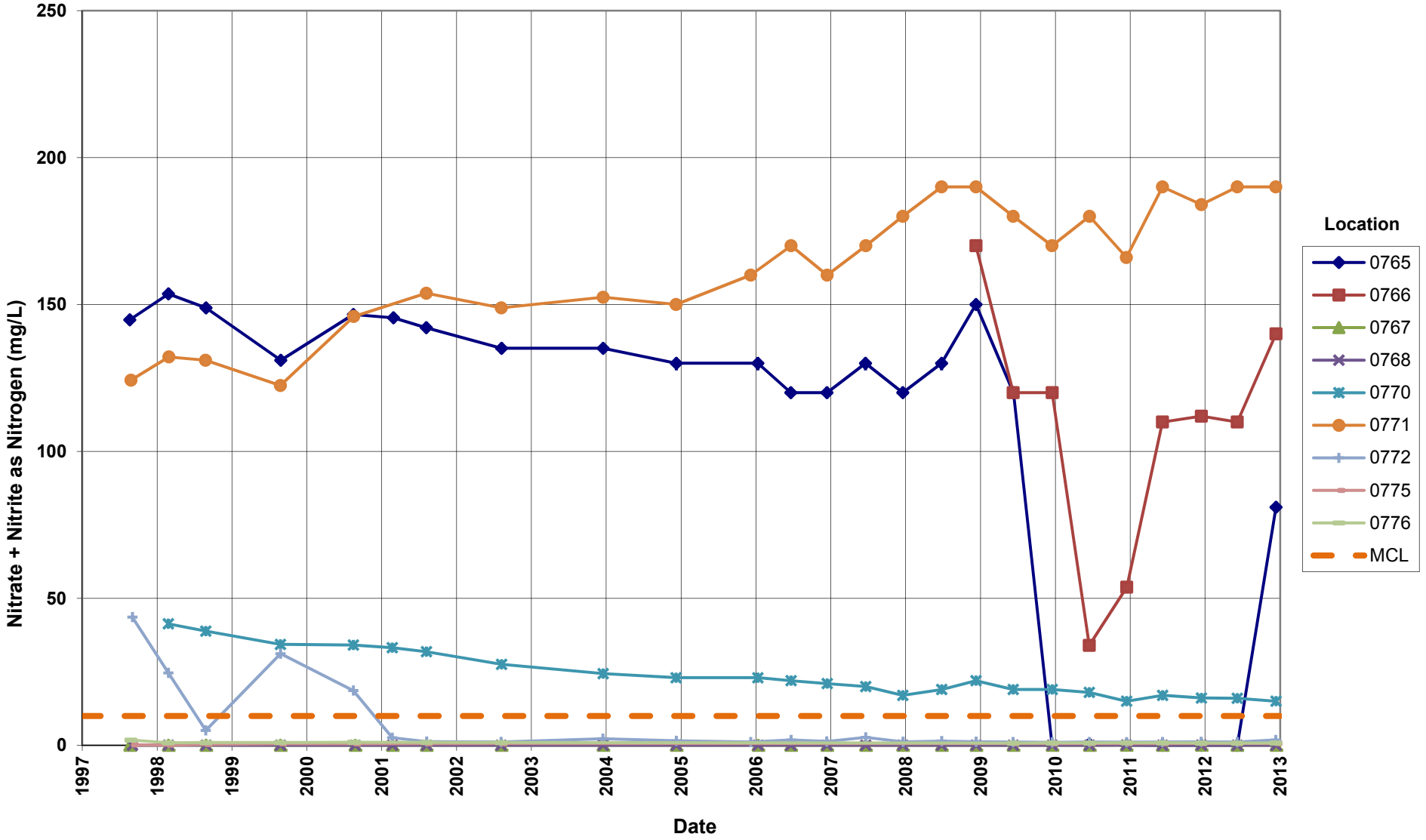


Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit (MCL) = 10 mg/L

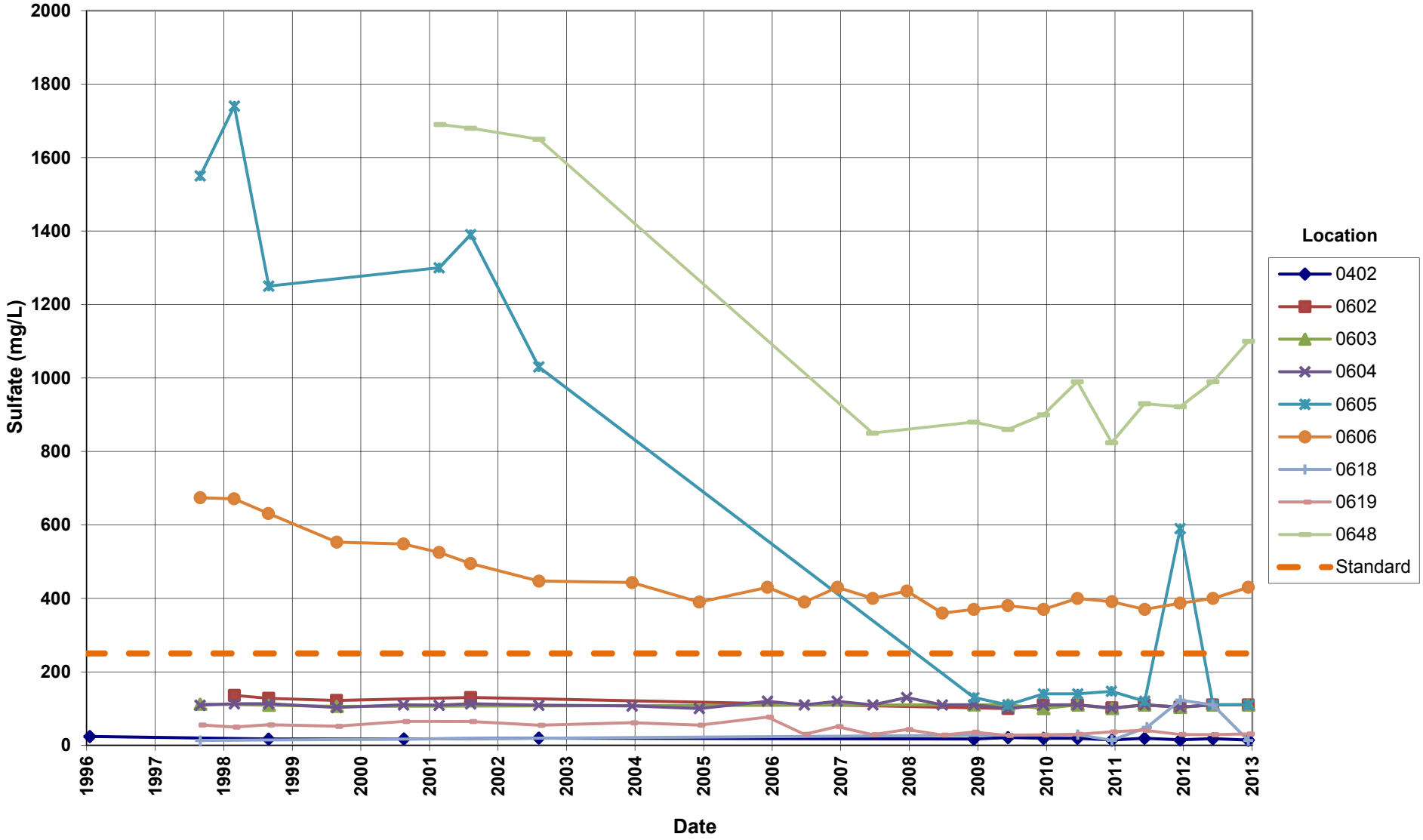



Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit (MCL) = 10 mg/L
Nitrate + Nitrite as Nitrogen (mg/L)
250
200
150
100
50
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0740
0741
0742
0743
0744
0760
0761
0762
0764
MCL

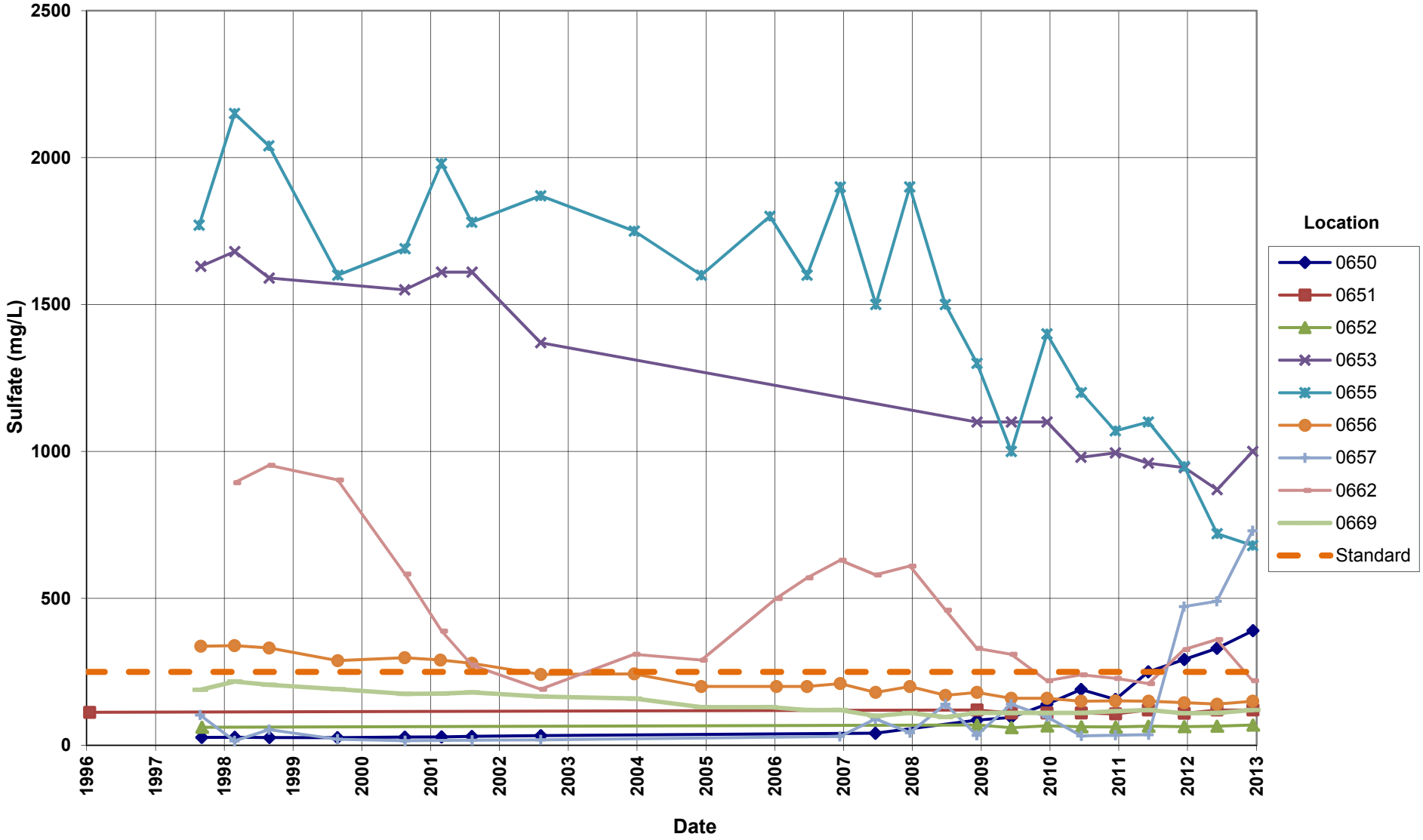
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit (MCL) = 10 mg/L

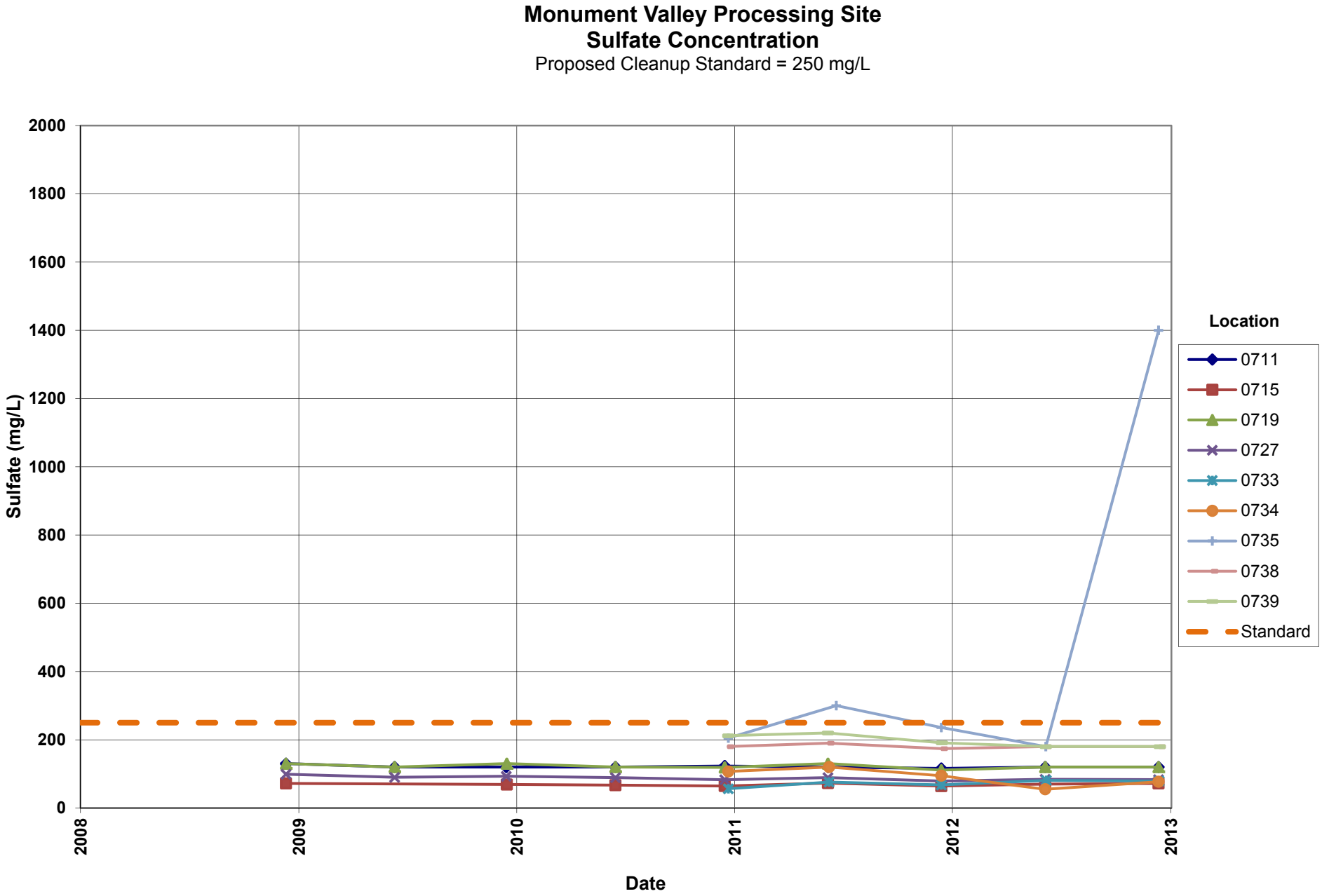


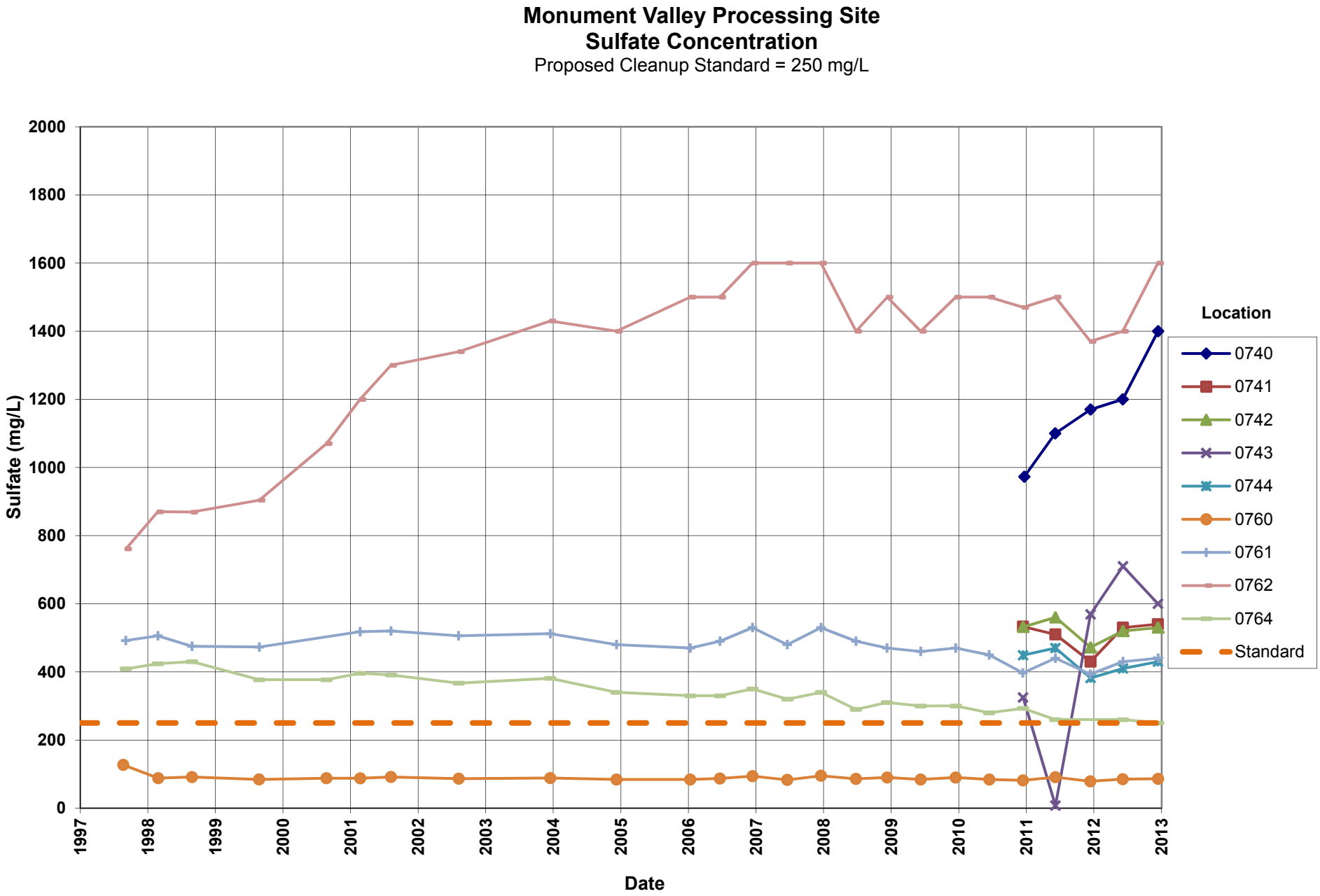
Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L

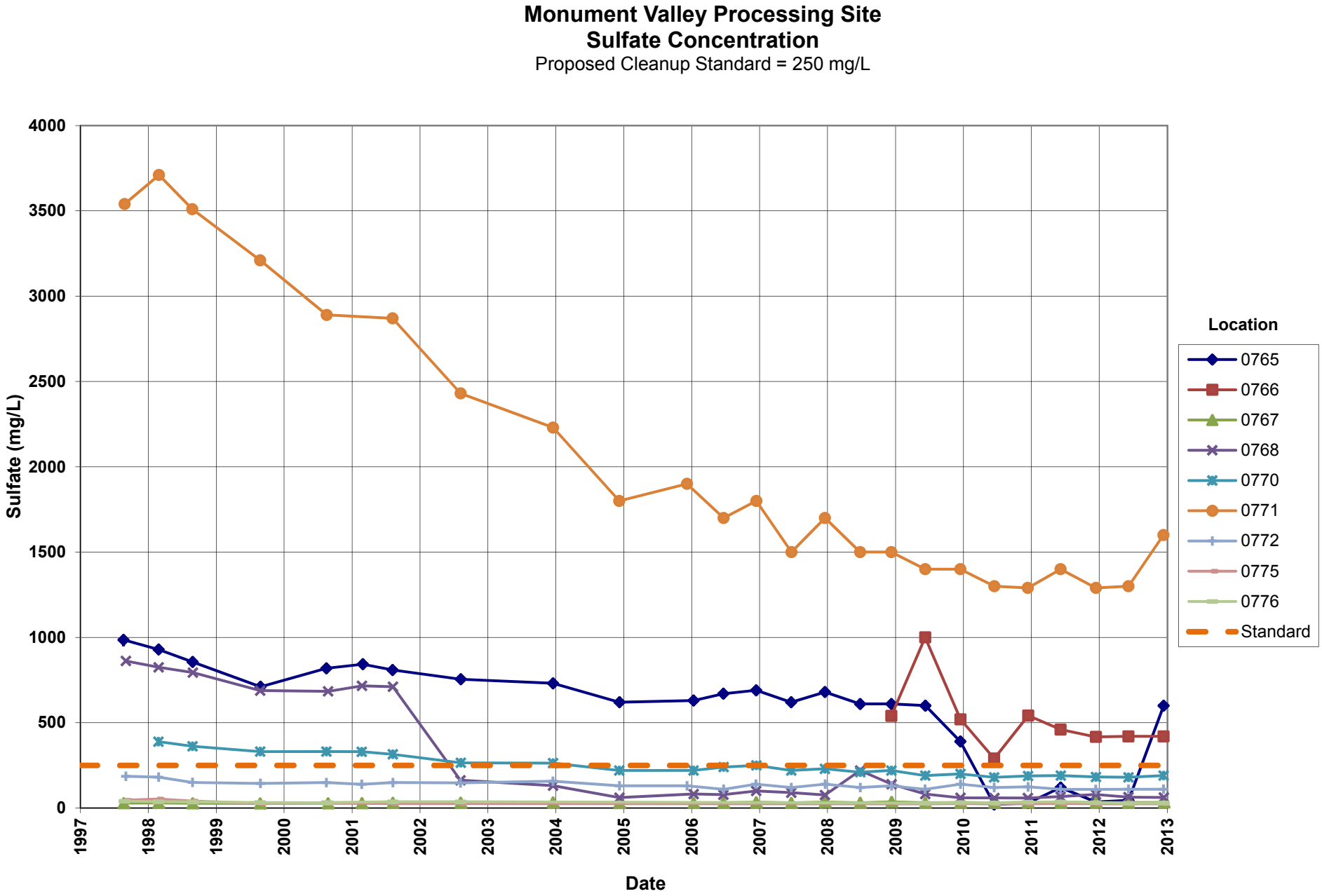


Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L

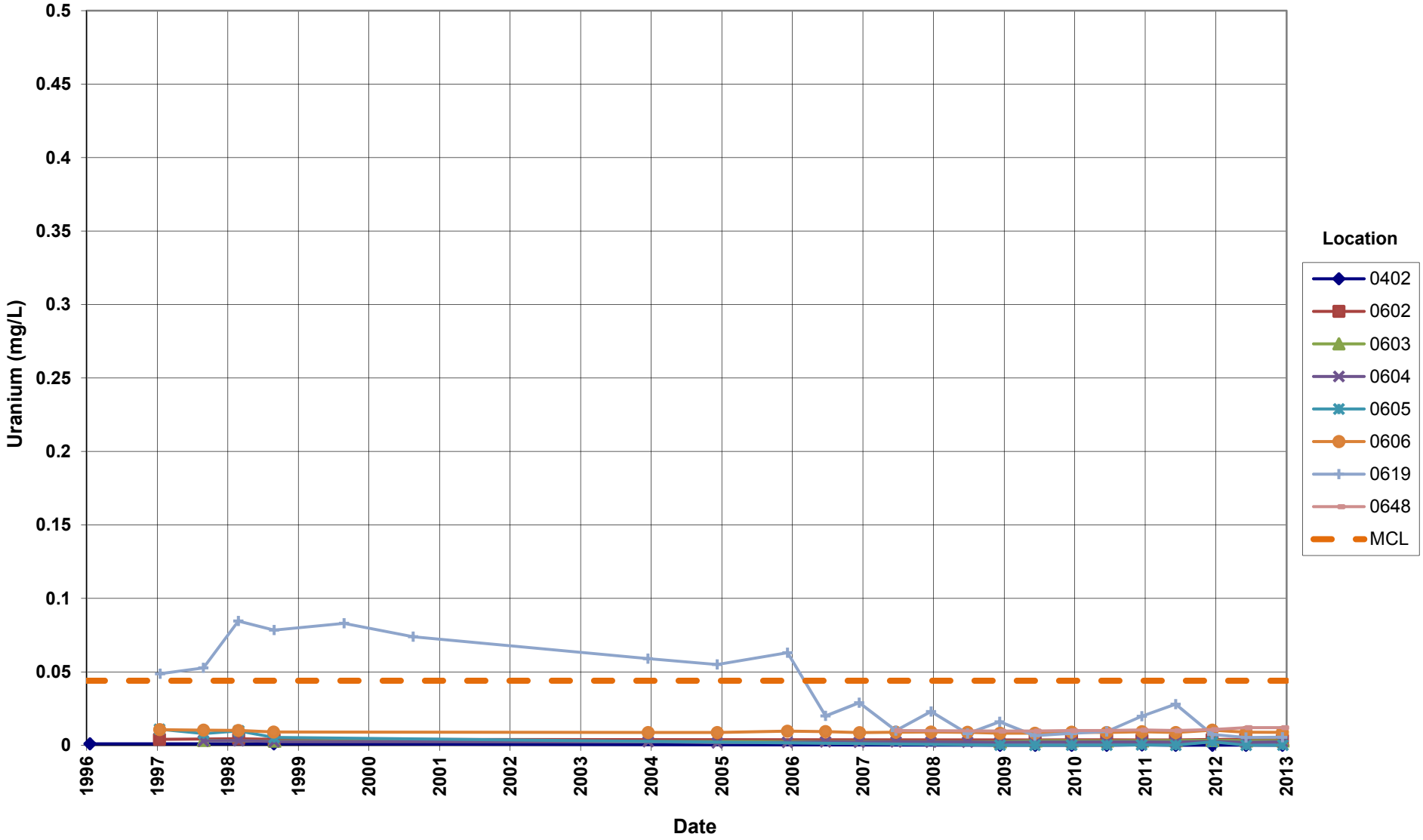



Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L
Sulfate (mg/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2008
2009
2010
2011
2012
2013
Date
Location
0711
0715
0719
0727
0733
0734
0735
0738
0739
Standard

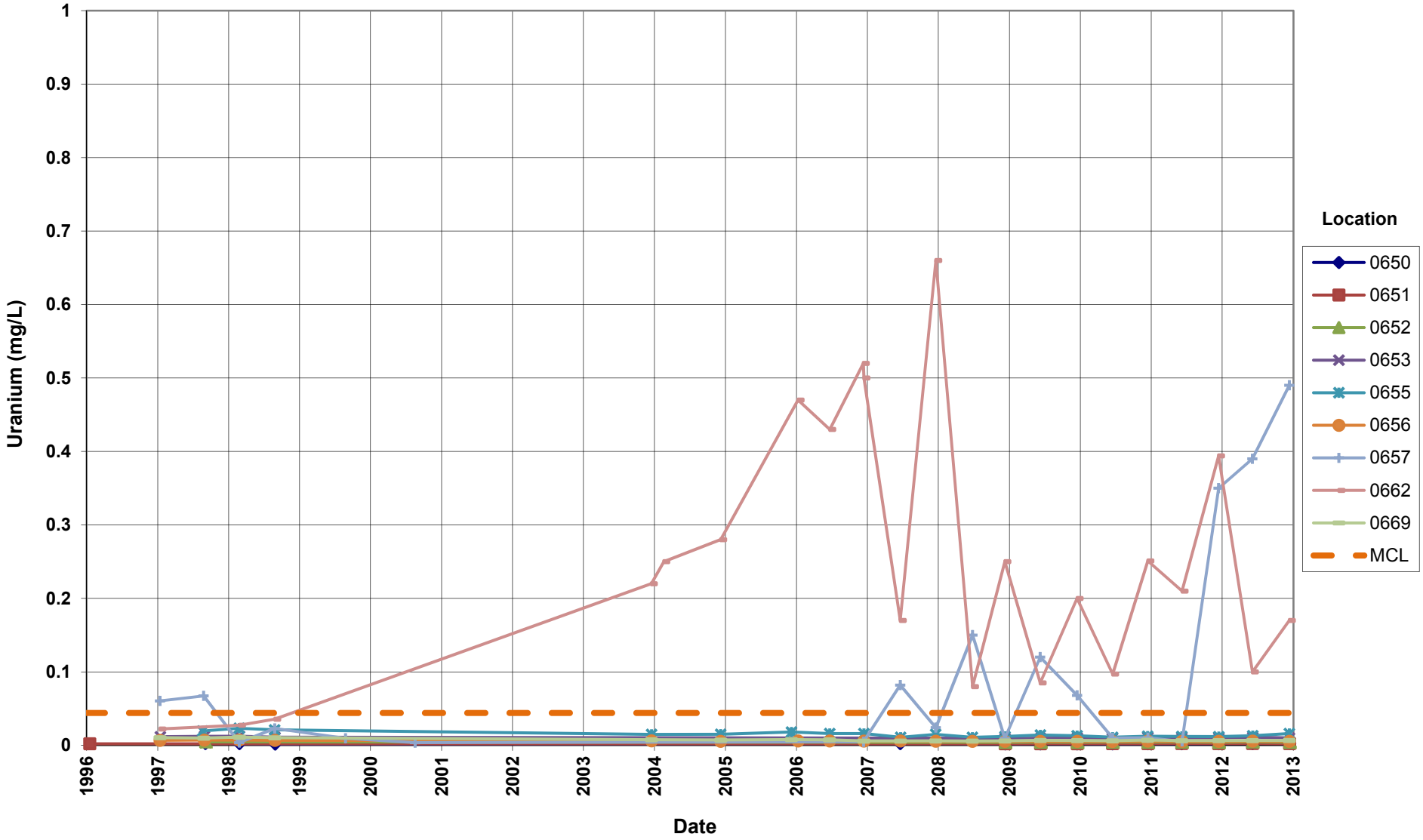

Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L
Sulfate (mg/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0740
0741
0742
0743
0744
0760
0761
0762
0764
Standard

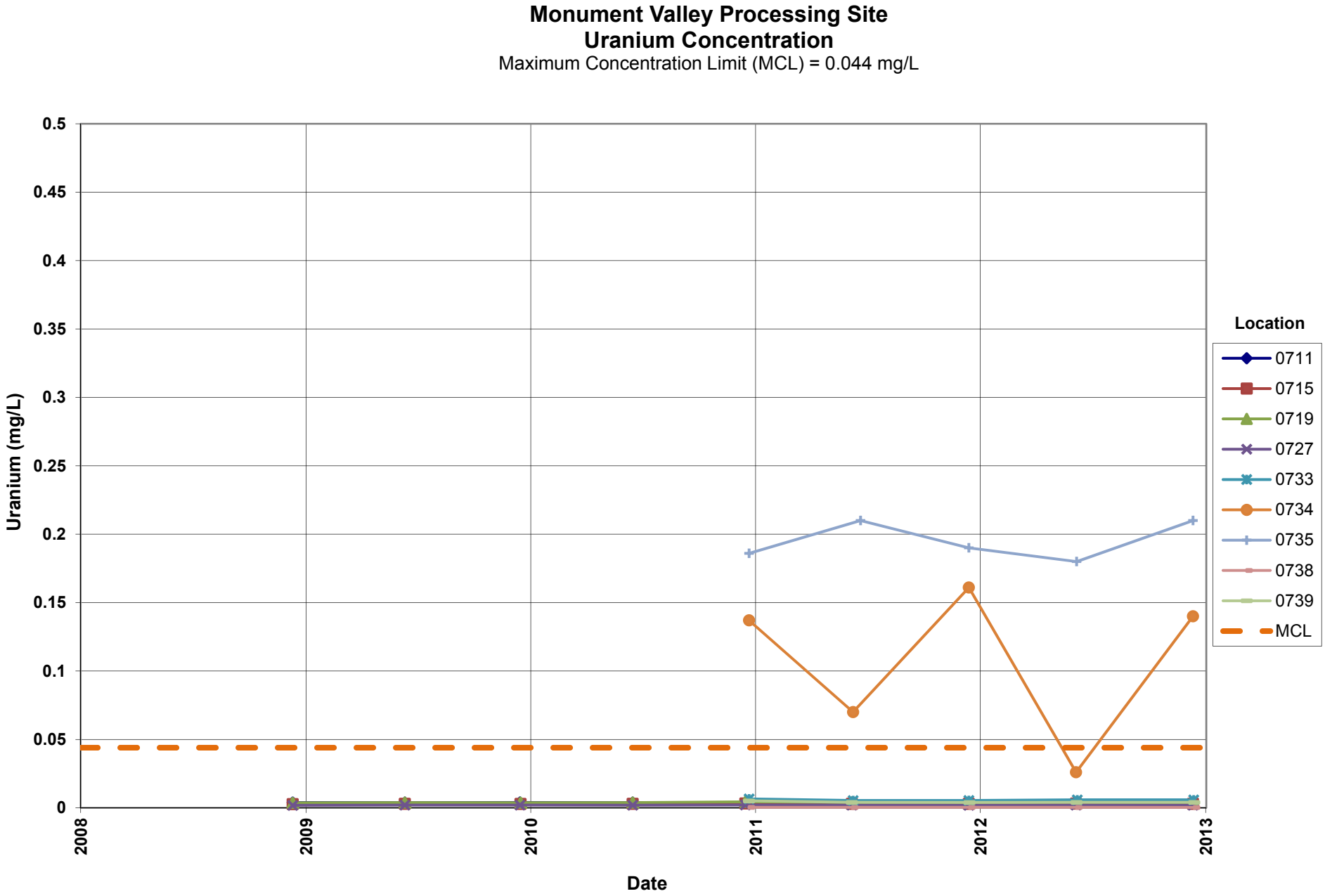

Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L
Sulfate (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0765
0766
0767
0768
0770
0771
0772
0775
0776
Standard

Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L

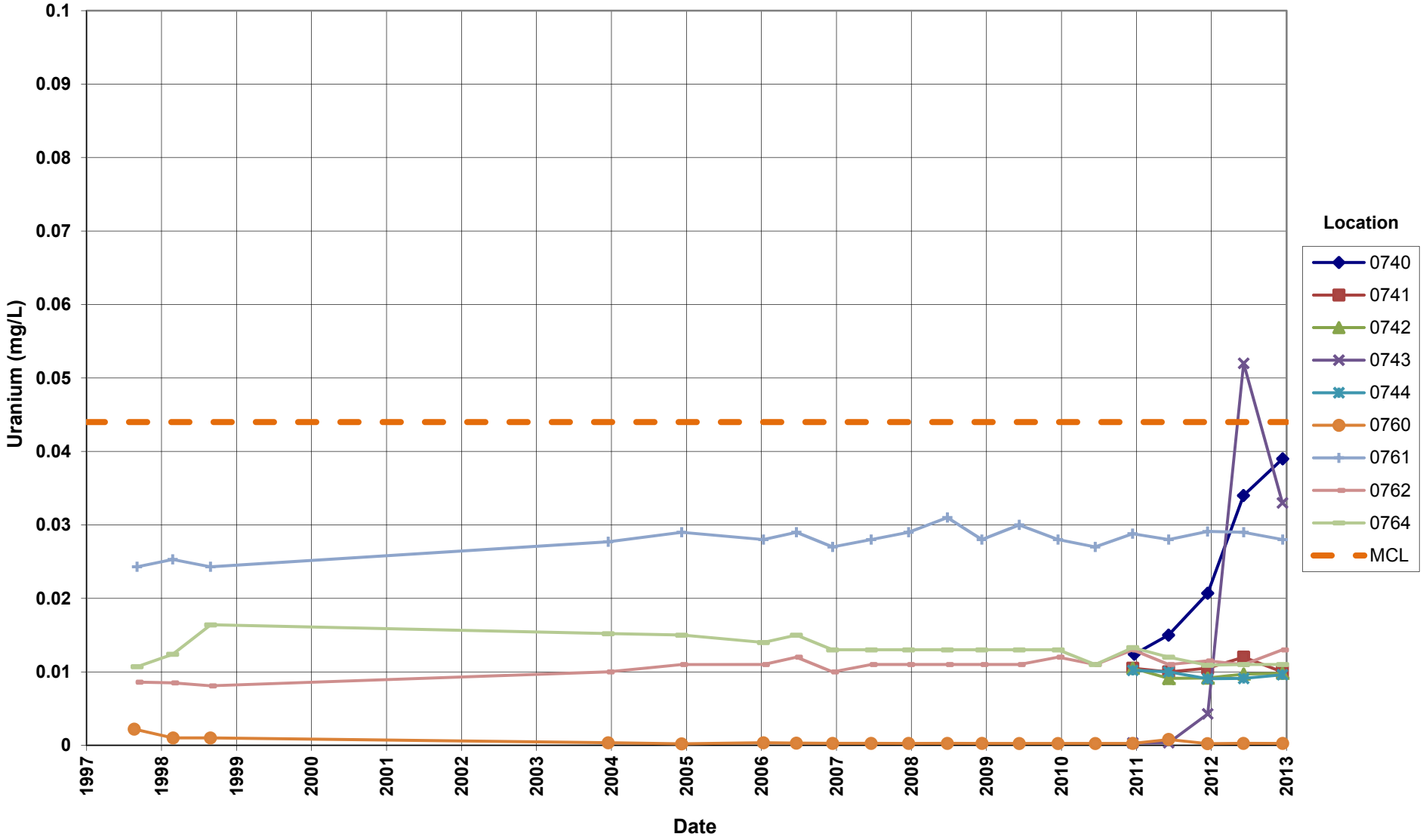


Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L

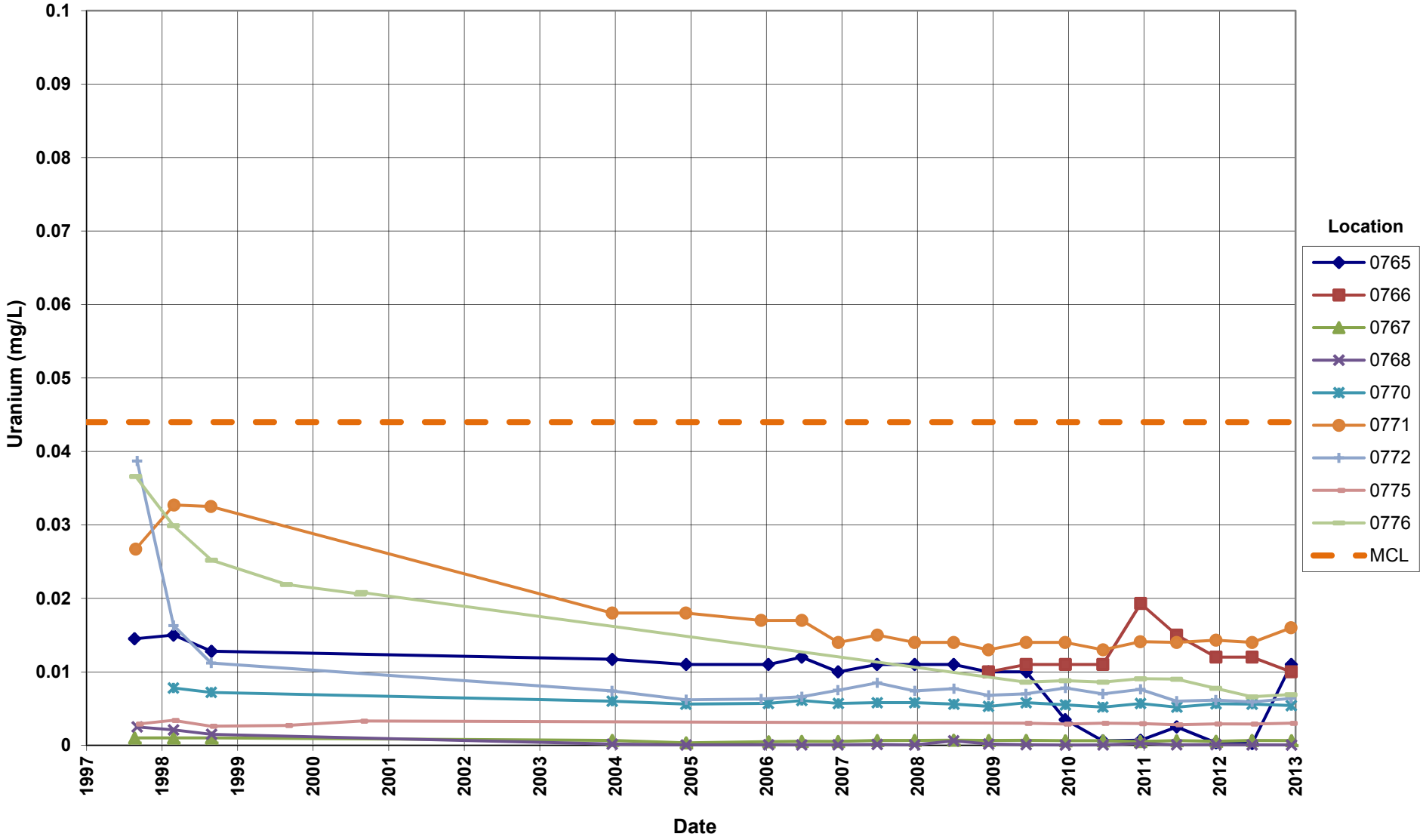


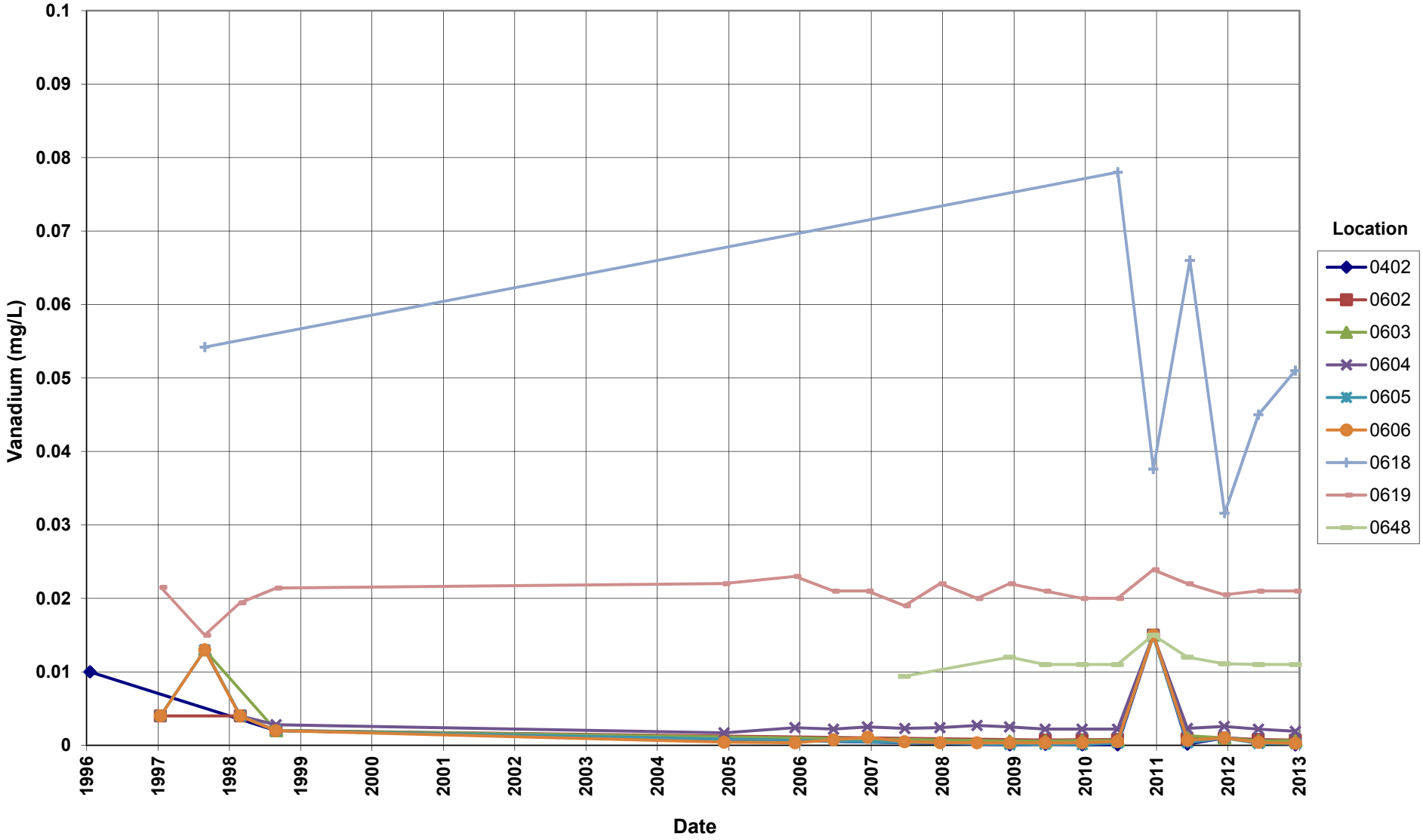

Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L
Uranium (mg/L)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2008
2009
2010
2011
2012
2013
Date
Location
0711
0715
0719
0727
0733
0734
0735
0738
0739
MCL

Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L

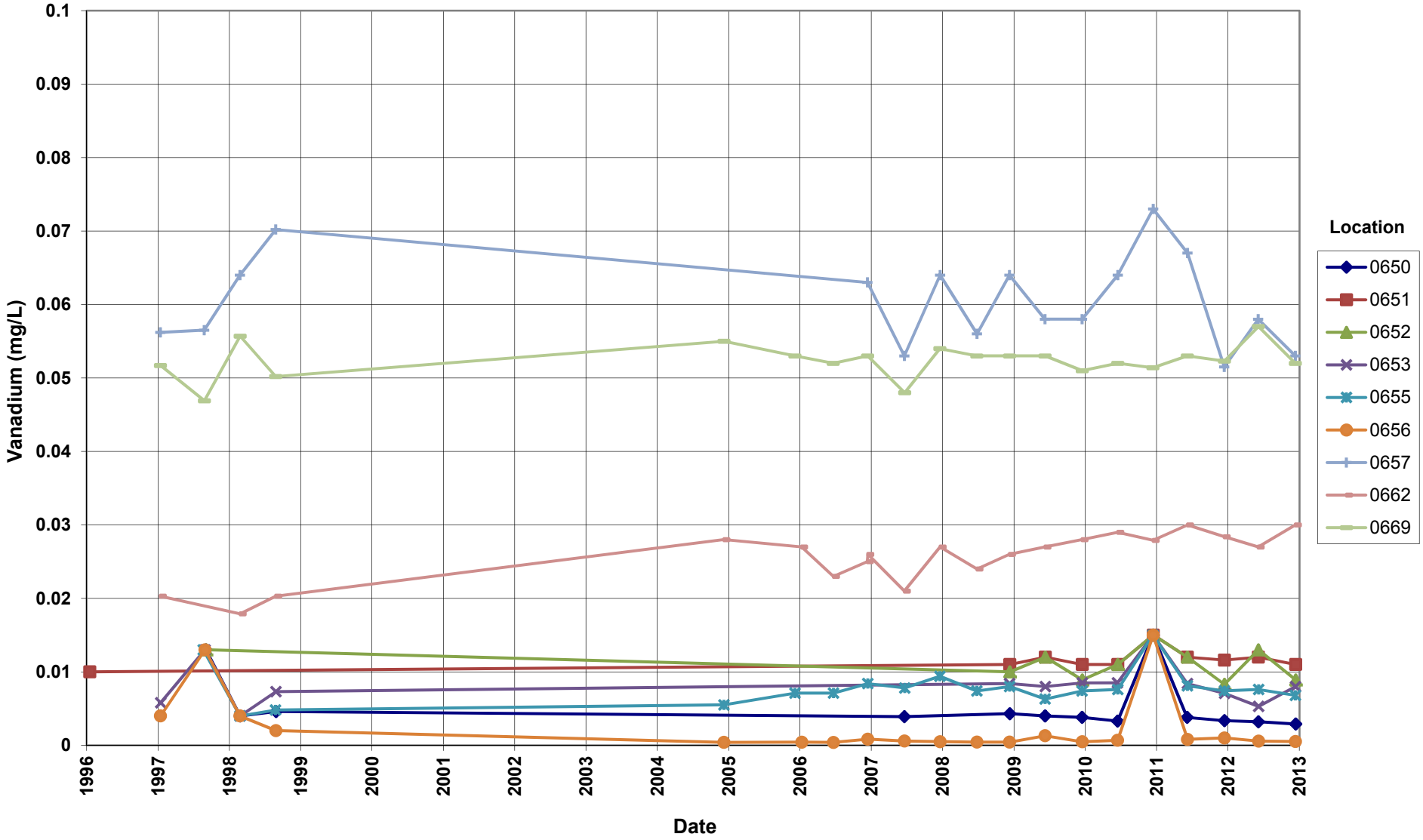


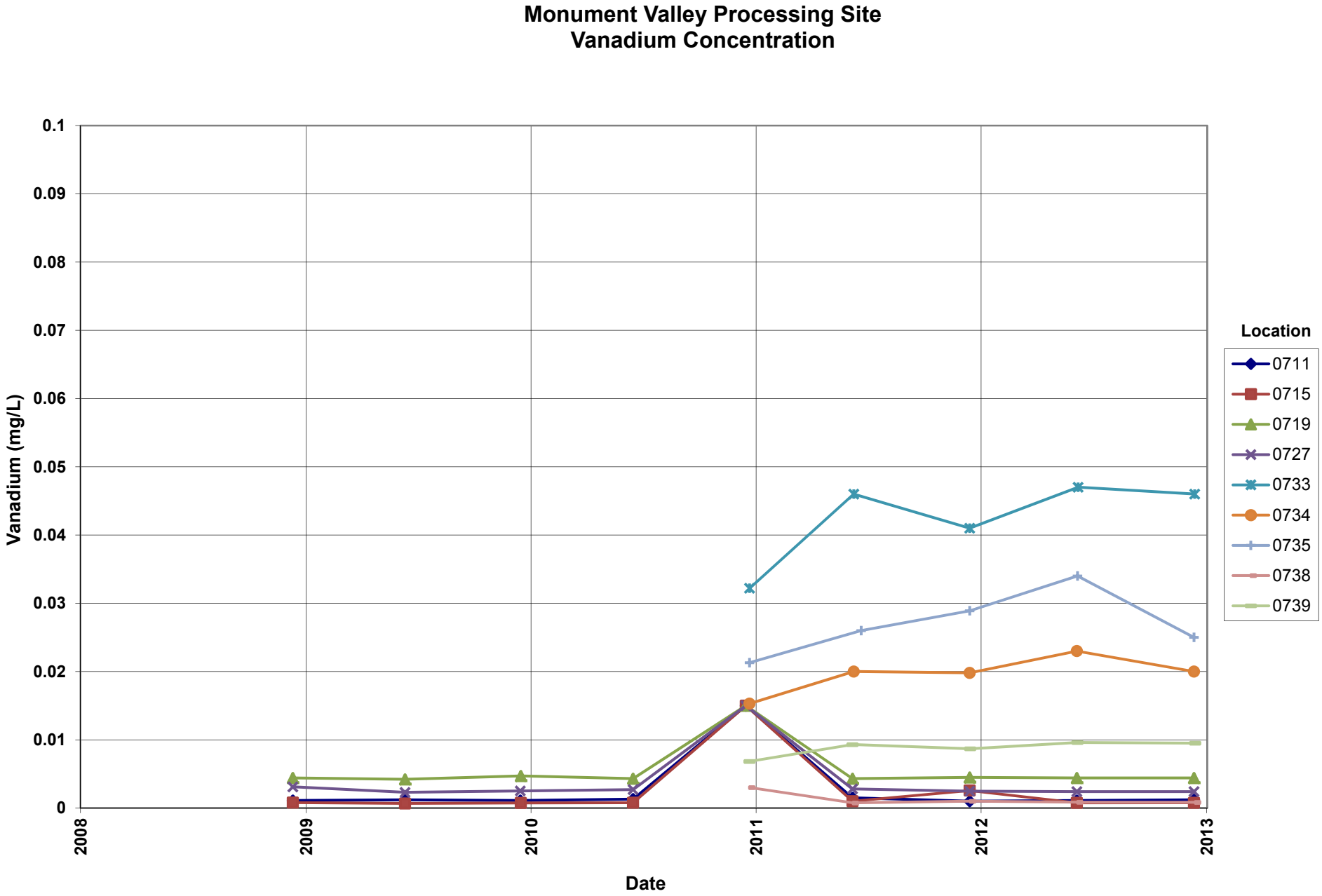
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit (MCL) = 0.044 mg/L

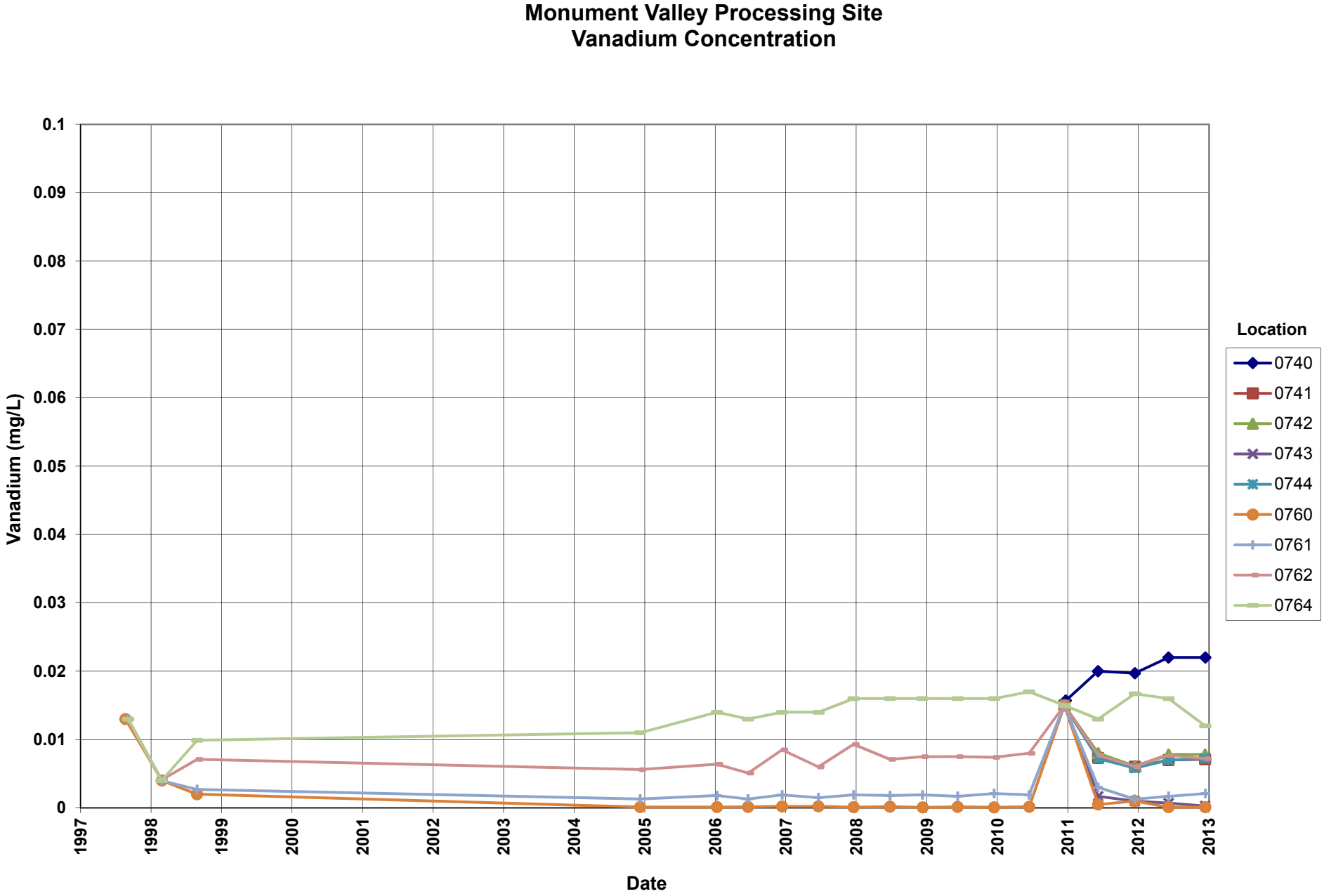



Monument Valley Processing Site
Vanadium Concentration
Vanadium (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Date
Location
0402
0602
0603
0604
0605
0606
0618
0619
0648

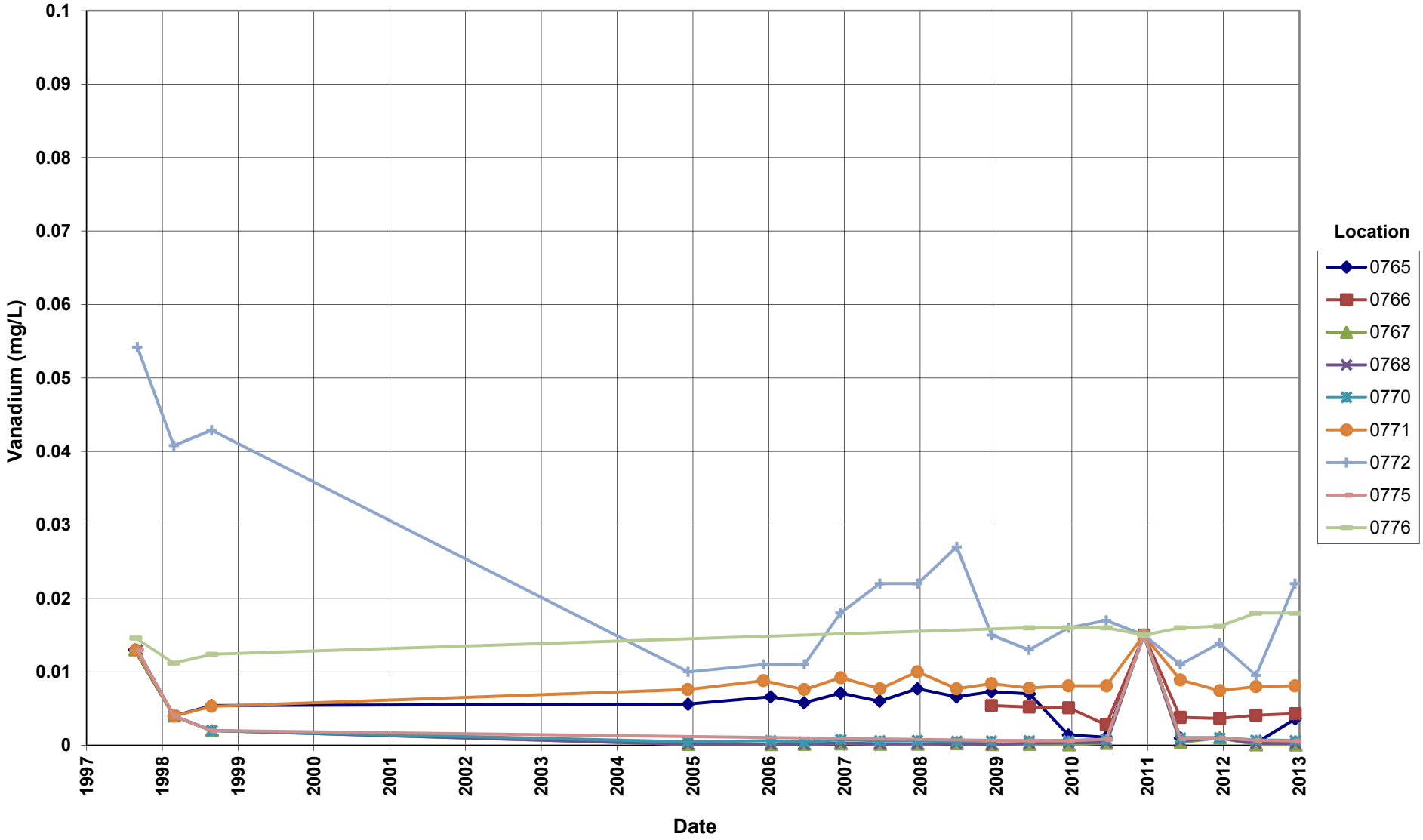
Monument Valley Processing Site
Vanadium Concentration




Monument Valley Processing Site
Vanadium Concentration
Vanadium (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
2008
2009
2010
2011
2012
2013
Date
Location
0711
0715
0719
0727
0733
0734
0735
0738
0739


Monument Valley Processing Site
Vanadium Concentration
Vanadium (mg/L)
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
2010
2011
2012
2013
Date
Location
0740
0741
0742
0743
0744
0760
0761
0762
0764

Monument Valley Processing Site
Vanadium Concentration



Attachment 3
Sampling and Analysis Work Order

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Stoller

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Task Order LM00-501
Control Number 13-0115

November 13, 2012

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller) December 2012 Environmental Sampling at the Monument Valley, Arizona Processing Site

REFERENCE: Task Order LM-501-02-114-402, Monument Valley, Arizona, Processing Site

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Monument Valley, Arizona. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Monument Valley processing site. Water quality data will be collected from monitoring wells and surface locations at this site as part of the routine environmental sampling currently scheduled to begin the week of December 10, 2012.

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

Monitoring Wells*

402 Al	619 Dc	656 Al	727 Nr	741 Al	762 Al	770 Al
602 Al	648 Al	657 Dc	733 Al	742 Al	764 Al	771 Al
603 Al	650 Al	662 Al	734 Al	743 Al	765 Al	772 Al
604 Al	651 Al	669 Al	735 Al	744 Al	766 Al	774 Al
605 Al	652 Al	711 Nr	738 Al	760 Al	767 Al	775 Dc
606 Al	653 Al	715 Nr	739 Al	761 Al	768 Al	776 Dc
618 Al	655 Al	719 Nr	740 Al			

*NOTE: Al = Alluvium; Dc = Dechelley Member of the Cutler Formation; Nr = no recovery of data for classifying

Surface Location
623

The S.M. Stoller Corporation 2597 Legacy Way Grand Junction, CO 81503 (970) 248-6000 Fax (970) 248-6040

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 covered under the cooperative agreement.

Please contact me at (970) 248-6652 if you have any questions or concerns.

Sincerely,

David Miller
Site Lead

DM/lcg/lb

Enclosures (3)

cc: (electronic)
Karl Stoeckle, DOE
Steve Donivan, Stoller
Lauren Goodknight, Stoller
Dave Miller, Stoller
EDD Delivery
rc-grand.junction
File: MON 410.02 (A)

The S.M. Stoller Corporation 2597 Legacy Way Grand Junction, CO 81503 (970) 248-6000 Fax (970) 248-6040

Sampling Frequencies for Locations at Monument Valley, Arizona

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
402		X				
602		X				
603		X				
604		X				
605		X				
606		X				
618		X				
619		X				
648		X				
650		X				
651		X				
652		X				
653		X				
655		X				
656		X				
657		X				
662		X				
669		X				
711		X				
715		X				
719		X				
727		X				
733		X				
734		X				
735		X				
738		X				
739		X				
740		X				
741		X				
742		X				
743		X				
744		X				
760		X				
761		X				
762		X				
764		X				
765		X				
766		X				
767		X				
768		X				

Sampling Frequencies for Locations at Monument Valley, Arizona (continued)

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
770		X				
771		X				
772		X				
774		X				
775		X				
776		X				
Surface Locations						
623		X				

Sampling conducted in December and June

Constituent Sampling Breakdown

Site	Monument Valley				
Analyte	**Groundwater**	**Surface Water**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	68	1			
Field Measurements					
Alkalinity	0603, 0611, 0615, 0618, and 0772 only				
Dissolved Oxygen					
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)	X	X	0.1	EPA 350.1	WCH-A-005
Arsenic	0603, 0611, 0615, 0618, and 0772 only		0.0001	SW-846 6020	LMM-02
Calcium	0603, 0611, 0615, 0618, and 0772 only		5	SW-846 6010	LMM-01
Chloride	X	X	0.5	SW-846 9056	MIS-A_039
Chromium					
Gross Beta					
Iron	0603, 0611, 0615, 0618, and 0772 only		0.05	SW-846 6020	LMM-02
Lead					
Magnesium	0603, 0611, 0615, 0618, and 0772 only		5	SW-846 6010	LMM-01
Manganese	0603, 0611, 0615, 0618, and 0772 only		0.005	SW-846 6010	LMM-01
Molybdenum	0603, 0611, 0615, 0618, and 0772 only		0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	X	X	0.05	EPA 353.1	WCH-A-022

Constituent Sampling Breakdown (continued)

Site	Monument Valley				
Analyte	**Groundwater**	**Surface Water**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	68	1			
Potassium	0603, 0611, 0615, 0618, and 0772 only		1	SW-846 6010	LMM-01
Selenium					
Silica					
Sodium	0603, 0611, 0615, 0618, and 0772 only		1	SW-846 6010	LMM-01
Strontium					
Sulfate	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	0.0003	SW-846 6020	IMM-02
Zinc					
Total No. of Analytes	14	6			

Attachment 4
Trip Report

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Stoller
Grand Junction Office
established 1959

Memorandum

DATE: December 21, 2012

TO: David Miller

FROM: Gretchen Baer

SUBJECT: Sampling Trip Report

Site: Monument Valley, Arizona, Processing Site

Dates of Sampling Event: December 10-13, 2012

Team Members: David Atkinson, Gretchen Baer, Kent Moe, Jeff Price, Joe Treviño, and Jeff Walters

Number of Locations Sampled: Water samples for metals, anions, nitrate + nitrite as N, and ammonia as N (normal analyte set), were collected from 45 monitoring wells and one surface location; samples were also collected for isotopic uranium, d-H2, d-O18, d-S34, and enriched H-3 (in addition to the normal analyte set) from a select set of wells. One water sample and three soil samples were collected for uranium at well 0600 during maintenance activities.

Locations Not Sampled/Reason: Well 0774 was dry.

Location Specific Information:

Location IDs	Comments
0402, 0764	Category II wells with turbidity >10 NTU.
0606	Roots in the well affect the water level probe access.
0648	The elevation was erroneously provided in FDCS as the 'Total Depth.'
0733, 0734, 0739, 0743, 0760	Category I wells with turbidity >10 NTU.
0739	The brass fitting, which had been leaking air, was tightened.
0741	The pump has an air leak. At the beginning of the purge, the flow rate was very slow (<10mL/min). The flow rate slowed to a stop before all sample volumes were collected. All bottles were filled to 50 percent.
0743	Small rust colored particles in the purge water.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites*.

Field Variance:

- Turbidity requirements could not be met at these Category I wells: 0733, 0734, 0739, 0743, and 0760. These samples were filtered. (Enriched tritium aliquots were not filtered, per analytical requirements.)
- Due to limited available volume, the alkalinity measurement at location 0741 was performed on water from the purge bucket.

Requisition Identification Number (RIN) Assigned: 12124998 for the normal analyte set and isotopic uranium (ALS Laboratory Group); 12125005 for enriched tritium (GEL Laboratories); 12125006 for d-O18, d-H2, and d-S34 (Reston Stable Isotope Laboratories); and 12125007 for uranium (ALS Laboratory Group). Field data sheets can be found in the sample management system on Crow under requisition number 12124998 in the Field Data folder.

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

RIN	False ID	True ID	Ticket Number	Sample Type	Associated Matrix
12124998	2079	0772	KNX 928	Duplicate	Groundwater
	2434	0669	KNX 930	Duplicate	Groundwater
	2856	0619	KNX 918	Duplicate	Groundwater
12125005	2349	0619	KNY 103	Duplicate	Groundwater

Duplicates were not required for RINs 12125006 and 12125007.

Sample Shipment: Samples were shipped from Grand Junction to their respective laboratories on December 18, 2012.

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

Well Inspection Summary: Pump check valves are leaking in wells 0619, 0657, 0733, 0734, 0760, and 0776; however, not so severely that the wells could not be purged and sampled. Wind has undermined the pads at wells 0651, 0734, 0766, and 0767.

Equipment: Wells were sampled with a peristaltic pump and dedicated tubing or a dedicated bladder pump. The surface water location was sampled with a peristaltic pump and dedicated tubing. Because all equipment was dedicated, equipment blanks were not required. All equipment functioned properly.

Institutional Controls:

Fences, Gates, Locks: All were in good condition.
Signs: Not applicable.
Trespassing/Site Disturbances: None.

Site Issues: Cell phone service was weak but available at the site.

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

- Well pads and check valves mentioned above. The pumps with leaky valves should be pulled and examined so that they can be cleaned or replaced. The pump at 0741 must be repaired or replaced before the next sampling event. Well 0606 has roots.
- Routine well development should be completed, particularly at wells where turbidity requirements could not be met (listed in table above).

Access Issues: None.
Safety Issues: None.
Maintenance Actions: The Geoprobe rig, driving a 3.5 inch diameter 5 feet long sampler, was used to remove 30 feet of sediment from bedrock well 0600. Soil samples, which will be analyzed for uranium content, were collected from 10 foot composites at 100'-110', 110'-120', and 120'-130'. The soil, which had accumulated from years of uncontrolled surface run-off infiltration, consisted of damp to wet fine grain sand and clay to black organic rich clay. The water table was encountered at 125 feet, which caused the soil to become non-cohesive and could not be retained within the sampler core barrel. Soil removal ceased at 130'. A water sample was collected from the 5 feet of standing water and will be analyzed for uranium content.

Corrective Action Taken: None.

GB/lcg

cc: (electronic)
Rich Bush, DOE
Steve Donivan, Stoller
David Miller, Stoller
EDD Delivery

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