

# Data Validation Package

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**June 2011**  
**Water Sampling at the**  
**Monument Valley, Arizona,**  
**Processing Site**

**August 2011**



**U.S. DEPARTMENT OF**  
**ENERGY**

Legacy  
Management

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

Potential Outliers Report

## **Attachment 2—Data Presentation**

Groundwater Quality Data  
Surface Water Quality Data  
Static Water Level Data  
Time-Concentration Graphs

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

## **Attachment 4—Trip Report**

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# Sampling Event Summary

**Site:** Monument Valley, Arizona, Processing Site

**Sampling Period:** June 6–8 and 20, 2011

Forty-six groundwater samples and one surface water sample were collected at the Monument Valley, Arizona, Processing Site to monitor groundwater contaminants 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). Water levels were measured at each sampled well.

Time-concentration plots for ammonia as nitrogen, chloride, nitrate + nitrite as nitrogen, sulfate, uranium, and vanadium are included with the results data. The data from this sampling event are consistent with values previously obtained.

- Widely fluctuating uranium concentrations in wells 0657 and 0662 have been noted previously. To better define the uranium concentration in this area, new wells 0733, 0734, and 0735 were installed. The uranium concentration in well 0733 was below the standard, but above in wells 0734 and 0735.
- Nitrate + nitrite as nitrogen concentrations in wells 0662, 0761, 0762, 0764, and 0771 had been increasing through 2008, which was consistent with downgradient movement of the contaminant plume. Results from the 2009, 2010, and 2011 events, however, demonstrate that nitrate + nitrite as nitrogen concentrations are leveling off or decreasing in these wells. New wells (0738, 0739, and 0740) were installed to better define the downgradient edge of the nitrate + nitrite as N plume. The concentrations in wells 0738 and 0739 were below the standard, but slightly above the standard in well 0740 on the west side of the valley.
- A de-nitrification treatment of well 0765 in September 2009 by the University of Arizona has decreased concentrations for most analytes at that location. Nitrate + nitrite as nitrogen and sulfate in nearby well 0766 also initially decreased after the treatment at 0765, but these concentrations have increased in the December 2010 and June 2011 events. The sulfate concentration in another nearby well, 0743, dropped sharply since December 2010.

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 <sup>a</sup> (mg/L)	Site Code	Location	Concentration (mg/L)
Nitrate + Nitrite as Nitrogen	10	MON01	0606	230
			0648	69
			0653	49
			0655	150
			0656	15
			0662	18
			0662	18
			0669	15
			0740	12
			0741	98
			0742	120
			0744	150
			0761	29
			0762	100
			0764	36
Uranium	0.044	MON01	0662	0.21
			0662	0.21
			0734	0.07
			0735	0.21

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

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 is related to past millsite activities or if it occurs naturally. 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	Treatment Goal Achieved?
0402	19	1	Yes
0602	110	8	Yes
0603	110	8	Yes
0604	110	9	Yes
0605	120	6	Yes
0606	370	13	No
0618	49	13	Yes
0619	41	10	Yes
0623	36	5	Yes

Table 2 (continued). Sulfate Results

Location	Sulfate Concentration (mg/L)	Sulfate/Chloride	Treatment Goal Achieved?
0648	930	36	No
0650	250	16	Yes
0651	120	10	Yes
0652	65	5	Yes
0653	980	37	No
0655	1100	52	No
0656	150	11	Yes
0657	36	6	Yes
0662	210	12	Yes
0669	120	15	Yes
0711	120	9	Yes
0715	73	7	Yes
0719	130	8	Yes
0727	89	8	Yes
0733	76	14	Yes
0734	120	21	Yes
0735	300	167	No
0738	190	11	Yes
0739	220	11	Yes
0740	1100	25	No
0741	510	32	No
0742	560	31	No
0743	7.8	1	Yes
0744	470	29	No
0760	91	9	Yes
0761	440	34	No
0762	1500	22	No
0764	260	24	No
0765	120	9	Yes
0766	460	27	No
0767	34	7	Yes
0768	62	5	Yes
0770	190	13	Yes
0771	1400	70	No
0772	110	8	Yes
0774	42	10	Yes
0775	26	5	Yes
0776	36	7	Yes



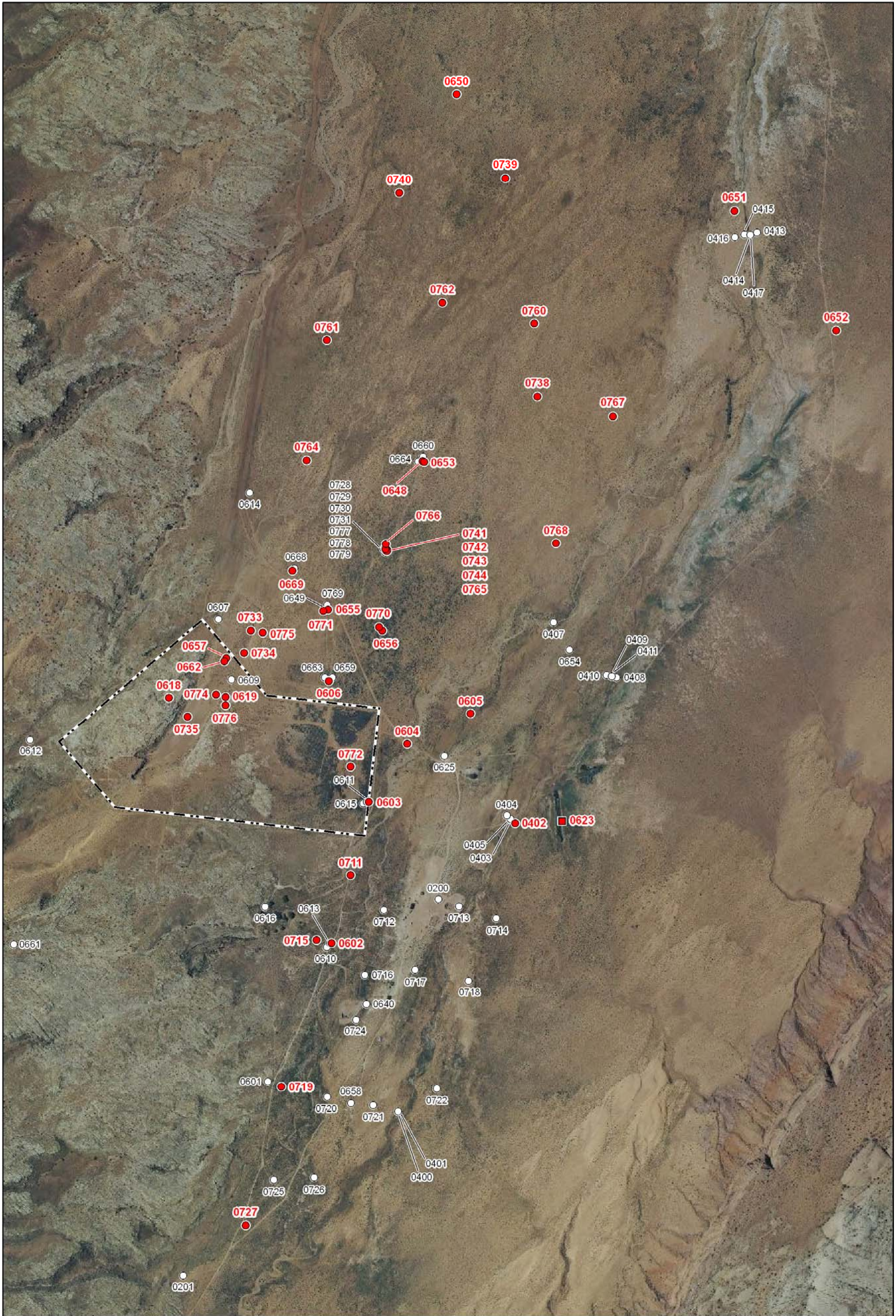
David Miller  
Site Lead, S.M. Stoller Corporation

9/7/11

Date

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<b>LEGEND</b> ● WELL TO BE SAMPLED ■ SURFACE LOCATION TO BE SAMPLED ○ EXISTING WELL - - - SITE BOUNDARY		U.S. DEPARTMENT OF ENERGY <small>GRAND JUNCTION, COLORADO</small>	<small>Work Performed by</small> <b>S.M. Stoller Corporation</b> <small>Under DOE Contract          No. DE-AM01-07-LM00090</small>
		<b>Planned Sampling Map</b> Monument Valley, AZ, Processing Site June 2011	
		<small>DATE PREPARED:</small> April 20, 2011	<small>FILENAME:</small> S0771200-11x17

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Monument Valley, Arizona, Processing Site Sample Locations



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# Data Assessment Summary

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### Water Sampling Field Activities Verification Checklist

<b>Project</b>	<u>Monument Valley, Arizona</u>	<b>Date(s) of Water Sampling</b>	<u>June 6–8 and 20, 2011</u>
<b>Date(s) of Verification</b>	<u>August 2, 2011</u>	<b>Name of Verifier</b>	<u>Gretchen Baer</u>

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order letter dated May 6, 2011.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibrations were performed on July 2 and 16, 2011.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u>	<u>There was an entry error for the ORP check on June 20, 2011. Instrument performance was acceptable.</u>
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>Yes</u>	
6. Was the category of the well documented?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	<u>Yes</u>	
Did the water level stabilize prior to sampling?	<u>Yes</u>	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	<u>No</u>	<u>The specific conductivity measurement did not stabilize at 0738; the final recorded measurement may have been an entry error. The turbidity criterion was not met for 7 wells. Samples from these wells were filtered.</u>
Was the flow rate less than 500 mL/min?	<u>Yes</u>	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>NA</u>	

### 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 sample was collected from locations 0619, 0662, and 0768.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	All samples were collected with dedicated equipment.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number? Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDSC) report?	Yes	Location IDs 2079, 2711, and 2856 were used for the duplicate samples.
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDSC) report?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the "Date Signed" fields (FDSC)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

## Laboratory Performance Assessment

### General Information

Report Numbers (RINs): 11053841 and 11063901  
 Sample Event: June 6–8 and 20, 2011  
 Site(s): Monument Valley, Arizona  
 Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
 Work Order Nos.: 1106157 and 1106297  
 Analysis: Metals and Wet Chemistry  
 Validator: Gretchen Baer  
 Review Date: August 2, 2011

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	MCAWW 350.1	MCAWW 350.1
Calcium, Iron, Magnesium, Manganese, Potassium, Sodium	LMM-01	SW-846 3005A	SW-846 6010B
Chloride	MIS-A-039	SW-856 9056	SW-856 9056
Nitrite + Nitrate as Nitrogen	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Sulfate	MIS-A-044	SW-856 9056	SW-856 9056
Arsenic, Molybdenum, Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020A

### 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
1106157-1	0402	Vanadium	J	Intercept greater than 3 times MDL
1106157-2	0602	Vanadium	J	Intercept greater than 3 times MDL
1106157-3	0603	Magnesium	J	Serial dilution failure
1106157-3	0603	Molybdenum	J	Serial dilution failure
1106157-5	0605	Vanadium	J	Intercept greater than 3 times MDL
1106157-6	0606	Vanadium	J	Intercept greater than 3 times MDL

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
1106157-8	0623	Vanadium	J	Intercept greater than 3 times MDL
1106157-15	0656	Vanadium	U	Less than 5 times the calibration blank
1106157-15	0656	Vanadium	J	Intercept greater than 3 times MDL
1106157-20	0715	Vanadium	U	Less than 5 times the calibration blank
1106157-20	0715	Vanadium	J	Intercept greater than 3 times MDL
1106157-25	0738	Vanadium	J	Intercept greater than 3 times MDL
1106157-32	0760	Vanadium	U	Less than 5 times the calibration blank
1106157-32	0760	Vanadium	J	Intercept greater than 3 times MDL
1106157-36	0765	Vanadium	U	Less than 5 times the calibration blank
1106157-36	0765	Vanadium	J	Intercept greater than 3 times MDL
1106157-38	0767	Vanadium	U	Less than 5 times the calibration blank
1106157-38	0767	Vanadium	J	Intercept greater than 3 times MDL
1106157-39	0768	Vanadium	J	Intercept greater than 3 times MDL
1106157-40	0770	Vanadium	J	Intercept greater than 3 times MDL
1106157-42	0772	Iron	J	Negative calibration blank
1106157-42	0772	Magnesium	J	Serial dilution failure
1106157-42	0772	Molybdenum	J	Serial dilution failure
1106157-44	0775	Vanadium	J	Intercept greater than 3 times MDL
1106157-47	0768 Dup, 2711	Vanadium	J	Intercept greater than 3 times MDL
1106297-1	0618	Sodium	J	Serial dilution failure

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 48 water samples on June 10, 2011, and two water samples on June 22, 2011, accompanied by Chain of Custody forms. Copies of the air bills were included in the receiving documentation. The Chain of Custody forms were 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 forms were complete with no errors or omissions.

### Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 1.4, 1.8, and 3.8 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses, with the following exception. The metals and the nitrate + nitrite/ammonia as N bottles for sample 0743 were received with a pH of 3, which is slightly above the acceptance range. The laboratory adjusted the pH of the samples upon receipt. All samples were analyzed within the applicable holding times.



## Laboratory Instrument Calibration

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

### *Method MCAWW 350.1, Ammonia as Nitrogen*

Calibrations were performed using six calibration standards on June 15 and 23, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the method detection limit (MDL). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 14 verification checks. All calibration checks met the acceptance criteria.

### *Method MCAWW 353.2, Nitrite + Nitrate as Nitrogen*

Calibrations were performed using seven calibration standards on June 16 and 27, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in nine verification checks. All calibration checks met the acceptance criteria.

### *Method SW-846 6010, Calcium, Iron, Magnesium, Manganese, Potassium, Sodium*

Calibrations were performed on June 24 and 29, 2011, using three calibration standards. The correlation coefficient values were greater than 0.995. The absolute values of most intercepts were greater than 3 times the MDL. These intercepts were less than 3 times the reporting limits and all results were near or above the reporting limits. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 21 verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit (PQL) and all results were within the acceptance range.

### *Method SW-846 6020A, Arsenic, Molybdenum, Uranium, Vanadium*

Calibrations were performed on June 27 and 28, 2011, using four standards. The calibration curve correlation coefficient values were greater than 0.995 and—with the exception of vanadium—the absolute values of the intercepts were less than 3 times the MDL. For vanadium, all associated detects less than 3 times the intercept are qualified with a “J” flag (estimated). (An intercept for molybdenum was only slightly higher than the MDL; the associated result was greater than 3 times the intercept). Calibration and laboratory spike standards were prepared

from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 18 verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range, with the following exceptions. A molybdenum and uranium check result was above the acceptance range. All affected results were greater than 5 times the PQL, so no qualification is necessary. 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 June 14 and 15, 2011. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 11 verification checks. All calibration checks met the acceptance criteria.

#### Method and Calibration Blanks

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

#### 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 spikes met the recovery and precision criteria for all analytes evaluated. At 81 percent, a MS recovery sulfate exceeded the laboratory’s acceptance criteria, but was within the  $\pm 25$  percent requirement.

### Laboratory Replicate Analysis

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

### Laboratory Control Sample

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

### Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the PQL for method 6010 or greater than 100 times the PQL for method 6020. Some serial dilution results for magnesium, molybdenum, and sodium did not meet the acceptance criteria. Associated results are qualified with a “J” flag as estimated values. All other evaluated serial dilution data were acceptable. The laboratory flagged a manganese and a vanadium result for serial dilution failure, but the sample concentration was less than 50 times the PQL, so no further qualification is necessary.

### Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes.

### Completeness

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

### Chromatography Peak Integration

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

### Electronic Data Deliverable (EDD) File

EDD files arrived on July 1 and 12, 2011. The data were loaded into SEEPro on July 27, 2011. 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: 11053841      Lab Code: PAR      Validator: Gretchen Baer      Validation Date: 8/1/2011

Project: Monument Valley      Analysis Type:  Metals     General Chem     Rad     Organics

# of Samples: 48      Matrix: WATER      Requested Analysis Completed: Yes

· Chain of Custody

Present: OK    Signed: OK    Dated: OK

· Sample

Integrity: OK    Preservation: OK    Temperature: OK

**Select Quality Parameters**

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

The reported detection limits are equal to or below contract requirements.

There were 3 duplicates evaluated.

**SAMPLE MANAGEMENT SYSTEM**  
**General Data Validation Report**

RIN: 11063901      Lab Code: PAR      Validator: Gretchen Baer      Validation Date: 8/1/2011

Project: Monument Valley      Analysis Type:  Metals     General Chem     Rad     Organics

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

· Chain of Custody

Present: OK    Signed: OK    Dated: OK

· Sample

Integrity: OK    Preservation: OK    Temperature: OK

**Select Quality Parameters**

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

The reported detection limits are equal to or below contract requirements.

## SAMPLE MANAGEMENT SYSTEM

### Metals Data Validation Worksheet

RIN: 11053841Lab Code: PARDate Due: 7/8/2011Matrix: WaterSite Code: MONDate Completed: 7/5/2011

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	ICV	CCV	ICB	CCB								
Calcium	ICP/ES	06/24/2011	55.0000	0.9999	OK	OK	OK	OK	OK	96.0	96.0	94.0	1.0	102.0	1.0	100.0
Calcium	ICP/ES	06/24/2011											0.0			
Calcium	ICP/ES	06/24/2011							OK	97.0	97.0	96.0	1.0	99.0	2.0	98.0
Calcium	ICP/ES	06/24/2011											1.0			
Iron	ICP/ES	06/24/2011							OK	96.0	98.0	99.0	1.0	102.0		98.0
Iron	ICP/ES	06/24/2011	11.0000	1.0000	OK	OK	OK	OK	OK	97.0	97.0	95.0	1.0	106.0		100.0
Magnesium	ICP/ES	06/24/2011											1.0			
Magnesium	ICP/ES	06/24/2011							OK	100.0	98.0	97.0	1.0	103.0	13.0	108.0
Magnesium	ICP/ES	06/24/2011											1.0			
Magnesium	ICP/ES	06/24/2011	99.9990	0.9999	OK	OK	OK	OK	OK	101.0	99.0	97.0	1.0	103.0	13.0	108.0
Manganese	ICP/ES	06/24/2011	-0.8000	1.0000	OK	OK	OK	OK	OK	99.0	98.0	97.0	1.0	93.0		103.0
Manganese	ICP/ES	06/24/2011							OK	97.0	96.0	95.0	1.0	96.0		106.0
Potassium	ICP/ES	06/24/2011							OK	99.0	116.0	115.0	1.0			75.0
Potassium	ICP/ES	06/24/2011	99.9990	1.0000	OK	OK	OK	OK	OK	98.0	116.0	114.0	2.0			75.0
Sodium	ICP/ES	06/24/2011											1.0			
Sodium	ICP/ES	06/24/2011							OK	97.0	95.0	92.0	1.0		4.0	82.0
Sodium	ICP/ES	06/24/2011	99.9990	1.0000	OK	OK	OK	OK	OK	99.0	96.0	90.0	2.0		4.0	80.0

## SAMPLE MANAGEMENT SYSTEM

### Metals Data Validation Worksheet

RIN: 11053841Lab Code: PARDate Due: 7/8/2011Matrix: WaterSite Code: MONDate Completed: 7/5/2011

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	ICV	CCV	ICB	CCB								
Sodium	ICP/ES	06/24/2011										1.0				
Arsenic	ICP/MS	06/27/2011						OK	98.0	104.0	104.0	1.0		2.0	98.0	
Arsenic	ICP/MS	06/27/2011	-0.0070	1.0000	OK	OK	OK	OK	105.0	100.0	105.0	4.0	107.0	6.0	120.0	
Arsenic	ICP/MS	06/27/2011										1.0				
Arsenic	ICP/MS	06/27/2011										2.0				
Molybdenum	ICP/MS	06/27/2011	-0.0320	1.0000	OK	OK	OK	OK	106.0	103.0	104.0	1.0	103.0	56.0	132.0	
Molybdenum	ICP/MS	06/27/2011						OK	94.0	104.0	105.0	0.0		66.0	101.0	
Molybdenum	ICP/MS	06/27/2011										2.0				
Molybdenum	ICP/MS	06/27/2011										6.0				
Uranium	ICP/MS	06/27/2011										5.0		0.0		
Uranium	ICP/MS	06/27/2011						OK	97.0	103.0	104.0	1.0		1.0	95.0	
Uranium	ICP/MS	06/27/2011	-0.0010	1.0000	OK	OK	OK	OK	102.0	106.0	106.0	0.0	104.0	4.0	110.0	
Uranium	ICP/MS	06/27/2011										2.0				
Uranium	ICP/MS	06/27/2011						OK	100.0	97.0	106.0	6.0				
Uranium	ICP/MS	06/27/2011										0.0				
Vanadium	ICP/MS	06/27/2011						OK	98.0	102.0	103.0	1.0		1.0		
Vanadium	ICP/MS	06/27/2011						OK	94.0	100.0	100.0	0.0			112.0	

### SAMPLE MANAGEMENT SYSTEM Metals Data Validation Worksheet

**RIN:** 11053841                      **Lab Code:** PAR                      **Date Due:** 7/8/2011  
**Matrix:** Water                      **Site Code:** MON                      **Date Completed:** 7/5/2011

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	ICV	CCV	ICB	CCB								
Vanadium	ICP/MS	06/27/2011	-0.3950	1.0000	OK	OK	OK	OK	OK	96.0	102.0	102.0	0.0	105.0	7.0	103.0
Vanadium	ICP/MS	06/27/2011											4.0			
Vanadium	ICP/MS	06/27/2011											5.0			



## SAMPLE MANAGEMENT SYSTEM

### Metals Data Validation Worksheet

RIN: 11063901Lab Code: PARDate Due: 7/20/2011Matrix: WaterSite Code: MONDate Completed: 7/13/2011

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	ICV	CCV	ICB	CCB								
Calcium	ICP/ES	06/29/2011											1.0	102.0		99.0
Calcium	ICP/ES	06/29/2011	37.0000	1.0000	OK	OK	OK	OK	OK	101.0	100.0	103.0	1.0	100.0	1.0	99.0
Iron	ICP/ES	06/29/2011	-6.0000	1.0000	OK	OK	OK	OK	OK	102.0	92.0	92.0	0.0	105.0		100.0
Iron	ICP/ES	06/29/2011												107.0		100.0
Magnesium	ICP/ES	06/29/2011	57.8000	1.0000	OK	OK	OK	OK	OK	101.0	99.0	101.0	1.0	102.0	0.0	101.0
Magnesium	ICP/ES	06/29/2011											2.0	104.0		101.0
Manganese	ICP/ES	06/29/2011	-0.5000	1.0000	OK	OK	OK	OK	OK	99.0	96.0	97.0	1.0	92.0		105.0
Manganese	ICP/ES	06/29/2011												94.0		104.0
Potassium	ICP/ES	06/29/2011	99.9990	1.0000	OK	OK	OK	OK	OK	98.0	102.0	102.0	0.0			79.0
Potassium	ICP/ES	06/29/2011														79.0
Sodium	ICP/ES	06/29/2011	99.9990	1.0000	OK	OK	OK	OK	OK	99.0	101.0	102.0	0.0		22.0	81.0
Sodium	ICP/ES	06/29/2011											3.0			82.0
Arsenic	ICP/MS	06/28/2011	-0.0130	1.0000	OK	OK	OK	OK	OK	101.0	104.0	104.0	0.0	108.0	4.0	116.0
Arsenic	ICP/MS	06/28/2011											4.0			111.0
Molybdenum	ICP/MS	06/28/2011											0.0			71.0
Molybdenum	ICP/MS	06/28/2011	-0.1170	1.0000	OK	OK	OK	OK	OK	98.0	104.0	104.0	0.0	101.0	2.0	92.0
Uranium	ICP/MS	06/28/2011											1.0			120.0

## SAMPLE MANAGEMENT SYSTEM

## Metals Data Validation Worksheet

RIN: 11063901Lab Code: PARDate Due: 7/20/2011Matrix: WaterSite Code: MONDate Completed: 7/13/2011

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	ICV	CCV	ICB	CCB								
Uranium	ICP/MS	06/28/2011	-0.0010	1.0000	OK	OK	OK	OK	OK	114.0	124.0	124.0	0.0	114.0	4.0	140.0
Vanadium	ICP/MS	06/28/2011											2.0			102.0
Vanadium	ICP/MS	06/28/2011	-0.5320	1.0000	OK	OK	OK	OK	OK	96.0	102.0	102.0	0.0	103.0	2.0	108.0

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

RIN: 11053841      Lab Code: PAR      Date Due: 7/8/2011  
 Matrix: Water      Site Code: MON      Date Completed: 7/5/2011

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
AMMONIA AS N	06/15/2011	0.002	0.9999	OK	OK	OK	OK	OK	99.00	89.0	87.0	2.00	
AMMONIA AS N	06/15/2011							OK	101.00	85.0	85.0	1.00	
AMMONIA AS N	06/15/2011							OK	92.00				
CHLORIDE	06/14/2011	0.067	0.9996	OK	OK	OK	OK	OK	92.00				
CHLORIDE	06/15/2011	0.019	1.0000	OK	OK	OK	OK	OK	91.00	104.0	98.0	2.00	
CHLORIDE	06/15/2011							OK	94.00	86.0	97.0	0	
CHLORIDE	06/15/2011							OK	95.00	96.0	94.0	1.00	
CHLORIDE	06/15/2011									96.0			
CHLORIDE	06/15/2011									97.0			
CHLORIDE	06/16/2011									98.0			
Nitrate+Nitrite as N	06/16/2011	0.000	1.0000	OK	OK	OK	OK	OK	96.00	104.0	101.0	3.00	
Nitrate+Nitrite as N	06/16/2011	0.000	0.9998	OK	OK	OK	OK	OK	95.00	102.0	100.0	1.00	
Nitrate+Nitrite as N	06/16/2011							OK	95.00				
SULFATE	06/14/2011	0.883	0.9995	OK	OK	OK	OK	OK	91.00				
SULFATE	06/15/2011	0.331	0.9999	OK	OK	OK	OK	OK	90.00	105.0	101.0	2.00	

## SAMPLE MANAGEMENT SYSTEM

### Wet Chemistry Data Validation Worksheet

**RIN:** 11053841      **Lab Code:** PAR      **Date Due:** 7/8/2011  
**Matrix:** Water      **Site Code:** MON      **Date Completed:** 7/5/2011

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
SULFATE	06/15/2011							OK	93.00	85.0	98.0	0	
SULFATE	06/15/2011							OK	95.00	98.0	93.0	1.00	
SULFATE	06/15/2011									81.0			
SULFATE	06/15/2011									97.0			
SULFATE	06/16/2011									102.0			

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

**RIN:** 11063901      **Lab Code:** PAR      **Date Due:** 7/20/2011  
**Matrix:** Water      **Site Code:** MON      **Date Completed:** 7/13/2011

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
AMMONIA AS N	06/23/2011	0.003	1.0000	OK	OK	OK	OK	OK	98.00	82.0	82.0	0	
CHLORIDE	06/22/2011	0.019	1.0000	OK	OK	OK	OK	OK	98.00	104.0	107.0	1.00	
Nitrate+Nitrite as N	06/27/2011	0.000	0.9999	OK	OK	OK	OK	OK	100.00				
SULFATE	06/22/2011	0.331	0.9999	OK	OK	OK	OK	OK	94.00	99.0	98.0	1.00	

## **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 pumping directly from the pond with dedicated tubing. 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, 0733, 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 RPD for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than the PQL, the range should be no greater than the PQL. Duplicate samples were collected from locations 0619, 0662, and 0768. With one exception, the duplicate results met the criteria, demonstrating acceptable overall precision. The RPD for uranium at well 0768 was above the acceptance criteria. There were no analytical errors identified during the review of the data and the field notes did not describe any unusual conditions during sampling at this location.

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

Page 1 of 1

RIN: 11053841    Lab Code: PAR    Project: Monument Valley    Validation Date: 8/1/2011

Duplicate: 2079

Sample: 0662

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIA AS N	0.1	U		1	0.1	U		1			MG/L
CHLORIDE	18			2	18			5	0		MG/L
Nitrate+Nitrite as N	18			10	18			10	0		MG/L
SULFATE	210			5	210			5	0		MG/L
Uranium	210			5	210			5	0		UG/L
Vanadium	30			5	30			5	0		UG/L

Duplicate: 2711

Sample: 0768

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIA AS N	0.5			1	0.48			1			MG/L
CHLORIDE	12			1	12			1	0		MG/L
Nitrate+Nitrite as N	0.01	U		1	0.01	U		1			MG/L
SULFATE	62			1	67			1	7.75		MG/L
Uranium	0.048			1	0.068			1	34.48		UG/L
Vanadium	0.61			1	0.58			1	5.04		UG/L

Duplicate: 2856

Sample: 0619

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
AMMONIA AS N	0.1	U		1	0.1	U		1			MG/L
CHLORIDE	4.2			1	4.3			1	2.35		MG/L
Nitrate+Nitrite as N	1.6			1	1.6			1	0		MG/L
SULFATE	41			1	41			1	0		MG/L
Uranium	28			1	27			1	3.64		UG/L
Vanadium	22			1	22			1	0		UG/L

### Certification

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

Laboratory Coordinator: Steve Donovan 9-8-11  
Steve Donovan Date

Data Validation Lead: Gretchen Baer 9/8/11  
Gretchen Baer Date



**Attachment 1**  
**Assessment of Anomalous Data**

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# Potential Outliers Report

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## Potential Outliers Report

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

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

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

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

One laboratory result was identified as potentially anomalous. The sulfate result for 0618 was identified as a potential outlier because there is low variability in the few historical data points at this location. There were no errors identified with the sulfate data, and the results from this sampling event are acceptable as qualified.

The field measurements for oxidation reduction potential at locations 0619 and 0657 and temperature at 0653 were identified as potentially anomalous. The associated field data were further reviewed. There were no errors noted and the instrument operational checks were acceptable.

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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 11053841

Report Date: 8/2/2011

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab	Data	Result	Qualifiers Lab	Data	Result	Qualifiers Lab	Data	N	N Below Detect	
MON01	0402	0001	06/07/2011	Uranium	0.0000029	U	FQ	0.001	U	F	0.00001	B	FQ	7	6	No
MON01	0603	N001	06/06/2011	Iron	0.16		F	0.12		J	0.0093	B	F	10	6	No
MON01	0603	N001	06/06/2011	Magnesium	15	E	JF	14.4			13			13	0	No
MON01	0605	N001	06/08/2011	Uranium	0.000062		F	0.032			0.000075	B	UF	24	4	No
MON01	0606	N001	06/08/2011	Ammonia Total as N	110		F	140		F	113		FQ	12	0	No
MON01	0650	N001	06/06/2011	Chloride	16		F	14		F	6		GF	22	0	No
MON01	0650	N001	06/06/2011	Nitrate + Nitrite as Nitrogen	2.9		F	2.3		F	0.53		F	7	0	No
MON01	0650	N001	06/06/2011	Sulfate	250		F	190		F	25.5		F	22	0	No
MON01	0727	N001	06/06/2011	Nitrate + Nitrite as Nitrogen	0.82		F	0.91		F	0.83		F	5	0	No
MON01	0764	N001	06/07/2011	Nitrate + Nitrite as Nitrogen	36		FQ	55		FQ	39.8		FQ	12	0	No
MON01	0764	N001	06/07/2011	Sulfate	260		FQ	430		L	280		FQ	21	0	No
MON01	0765	0001	06/07/2011	Nitrate + Nitrite as Nitrogen	0.011		F	150		F	0.045		FQ	12	1	No
MON01	0765	0001	06/07/2011	Vanadium	0.001		UJF	0.015	U	F	0.0011		JFQ	15	3	No
MON01	0772	N001	06/07/2011	Ammonia Total as N	2		F	7.9		F	2.28		F	14	0	No
MON01	0772	N001	06/07/2011	Potassium	0.64	B	F	1.9		F	0.799	B	F	7	0	No
MON01	0772	N001	06/07/2011	Sodium	93		F	232			94		JF	7	0	No
MON01	0772	N001	06/07/2011	Uranium	0.006		F	0.0387			0.0062		F	18	0	No

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

**Comparison: All Historical Data**

Laboratory: ALS Laboratory Group

RIN: 11063901

Report Date: 8/2/2011

Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Current Qualifiers		Historical Maximum Qualifiers			Historical Minimum Qualifiers			Number of Data Points		Statistical Outlier
						Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
MON01	0618	N001	06/20/2011	Calcium	39			35.7						7	0	No
MON01	0618	N001	06/20/2011	Iron	0.11			0.1	U		0.0078	B	FQ	6	2	No
MON01	0618	N001	06/20/2011	Magnesium	23			20		FQ	17			7	0	No
MON01	0618	N001	06/20/2011	Sulfate	49			29		FQ	12			7	0	Yes
MON01	0618	N001	06/20/2011	Uranium	0.013			0.0093		FQ	0.0038			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.



**Data Validation Outliers Report - Field Parameters Only**

**Comparison: All Historical Data**

Laboratory: Field Measurements

RIN: 11053841

Report Date: 8/2/2011

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	N	N Below Detect			
MON01	0402	N001	06/07/2011	Specific Conductance	620	FQ	618		FQ	358		F	9	0	No
MON01	0603	N001	06/06/2011	Specific Conductance	676	F	663			415			17	0	No
MON01	0603	N001	06/06/2011	Turbidity	8.9	F	6.7		F	0.51			8	0	No
MON01	0619	N001	06/07/2011	Oxidation Reduction Potential	-18.9	F	447			36		F	24	0	Yes
MON01	0623	N001	06/07/2011	Oxidation Reduction Potential	-50.6		438			13			12	0	No
MON01	0653	N001	06/07/2011	Temperature	20.45	F	18.7			14.9		F	33	0	Yes
MON01	0655	N001	06/07/2011	Oxidation Reduction Potential	-73.1	F	460			-20		L	24	0	No
MON01	0657	N001	06/08/2011	Oxidation Reduction Potential	5.8	F	447			36		F	21	0	Yes
MON01	0669	N001	06/07/2011	Oxidation Reduction Potential	-95.5	F	410		GF	8		L	23	0	No
MON01	0711	N001	06/06/2011	Specific Conductance	729	F	716		F	642			6	0	No
MON01	0715	N001	06/06/2011	Specific Conductance	585	F	548		F	493		F	6	0	No
MON01	0715	N001	06/06/2011	Temperature	16.82	F	16.11		F	14.79		F	5	0	No
MON01	0719	N001	06/06/2011	Specific Conductance	761	F	750		F	680			6	0	No
MON01	0727	N001	06/06/2011	Specific Conductance	622	F	604		F	575		F	6	0	No
MON01	0727	N001	06/06/2011	Temperature	18.07	F	16.91		F	15.84		F	5	0	No
MON01	0762	N001	06/07/2011	Specific Conductance	3930	F	3894		F	2010			21	0	No
MON01	0764	N001	06/07/2011	Oxidation Reduction Potential	30.6	FQ	227		L	37.2		FQ	21	0	No

**Data Validation Outliers Report - Field Parameters Only**

**Comparison: All Historical Data**

Laboratory: Field Measurements

RIN: 11053841

Report Date: 8/2/2011

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers		Result	Qualifiers		Result	Qualifiers		N	N Below Detect	
MON01	0765	N001	06/07/2011	Oxidation Reduction Potential	-282.5		F	218		F	-257.6		F	21	0	No
MON01	0766	N001	06/07/2011	Oxidation Reduction Potential	-97.3		F	194		F	-49.7		FQ	5	0	No
MON01	0766	N001	06/07/2011	pH	7.57		F	7.56		FQ	6.72		FQ	5	0	No
MON01	0766	N001	06/07/2011	Turbidity	6.22		F	26.3		FQ	7.72		F	5	0	No
MON01	0771	N001	06/07/2011	Oxidation Reduction Potential	-72.5		FQ	217		F	-30		L	20	0	No
MON01	0776	N001	06/07/2011	Oxidation Reduction Potential	-31.3		F	214.2		F	23			11	0	No
MON01	0776	N001	06/07/2011	Specific Conductance	463		F	443			368		F	11	0	No

**Data Validation Outliers Report - Field Parameters Only**

**Comparison: All Historical Data**

Laboratory: Field Measurements

RIN: 11063901

Report Date: 8/2/2011

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers		Result	Qualifiers		Result	Qualifiers		N	N Below Detect	
MON01	0618	N001	06/20/2011	pH	7.9			7.67			7.05			6	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: 8/2/2011

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

Parameter	Units	Sample		Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID					Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	0001	5.17	-	9.63	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/07/2011	0001	5.17	-	9.63	13		FQ	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	0001	5.17	-	9.63	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	5.17	-	9.63	-6.4		FQ	#		
pH	s.u.	06/07/2011	N001	5.17	-	9.63	8.26		FQ	#		
Specific Conductance	umhos/cm	06/07/2011	N001	5.17	-	9.63	620		FQ	#		
Sulfate	mg/L	06/07/2011	0001	5.17	-	9.63	19		FQ	#	0.5	
Temperature	C	06/07/2011	N001	5.17	-	9.63	16.7		FQ	#		
Turbidity	NTU	06/07/2011	N001	5.17	-	9.63	20		FQ	#		
Uranium	mg/L	06/07/2011	0001	5.17	-	9.63	0.0000029	U	FQ	#	0.0000029	
Vanadium	mg/L	06/07/2011	0001	5.17	-	9.63	0.00017	B	JFQ	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0602 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	19.5 - 29.5	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/06/2011	N001	19.5 - 29.5	14		FQ	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	19.5 - 29.5	0.76		FQ	#	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	19.5 - 29.5	89.1		FQ	#		
pH	s.u.	06/06/2011	N001	19.5 - 29.5	7.76		FQ	#		
Specific Conductance	umhos/cm	06/06/2011	N001	19.5 - 29.5	703		FQ	#		
Sulfate	mg/L	06/06/2011	N001	19.5 - 29.5	110		FQ	#	1	
Temperature	C	06/06/2011	N001	19.5 - 29.5	17.34		FQ	#		
Turbidity	NTU	06/06/2011	N001	19.5 - 29.5	3		FQ	#		
Uranium	mg/L	06/06/2011	N001	19.5 - 29.5	0.0036		FQ	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	19.5 - 29.5	0.00088		JFQ	#	0.000015	



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

REPORT DATE: 8/2/2011

Location: 0603 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	06/06/2011	N001	43 - 53	194		F	#		
Ammonia Total as N	mg/L	06/06/2011	N001	43 - 53	0.2		F	#	0.1	
Arsenic	mg/L	06/06/2011	N001	43 - 53	0.0033		F	#	0.000015	
Calcium	mg/L	06/06/2011	N001	43 - 53	18		F	#	0.012	
Chloride	mg/L	06/06/2011	N001	43 - 53	13		F	#	0.2	
Iron	mg/L	06/06/2011	N001	43 - 53	0.16		F	#	0.0049	
Magnesium	mg/L	06/06/2011	N001	43 - 53	15	E	JF	#	0.013	
Manganese	mg/L	06/06/2011	N001	43 - 53	0.013	E	F	#	0.00011	
Molybdenum	mg/L	06/06/2011	N001	43 - 53	0.0029	E	JF	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	43 - 53	0.38		F	#	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	43 - 53	18.1		F	#		
pH	s.u.	06/06/2011	N001	43 - 53	7.81		F	#		
Potassium	mg/L	06/06/2011	N001	43 - 53	2.6		F	#	0.11	
Sodium	mg/L	06/06/2011	N001	43 - 53	90		F	#	0.0066	
Specific Conductance	umhos/cm	06/06/2011	N001	43 - 53	676		F	#		
Sulfate	mg/L	06/06/2011	N001	43 - 53	110		F	#	1	
Temperature	C	06/06/2011	N001	43 - 53	16.82		F	#		
Turbidity	NTU	06/06/2011	N001	43 - 53	8.9		F	#		
Uranium	mg/L	06/06/2011	N001	43 - 53	0.0031		F	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	43 - 53	0.0013	E	F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0604 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	13 - 28	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	13 - 28	12		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	13 - 28	0.062		F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	13 - 28	-7.3		F	#		
pH	s.u.	06/07/2011	N001	13 - 28	8.22		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	13 - 28	659		F	#		
Sulfate	mg/L	06/07/2011	N001	13 - 28	110		F	#	1	
Temperature	C	06/07/2011	N001	13 - 28	15.26		F	#		
Turbidity	NTU	06/07/2011	N001	13 - 28	6.34		F	#		
Uranium	mg/L	06/07/2011	N001	13 - 28	0.0021		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	13 - 28	0.0023		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0605 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/08/2011	N001	14 - 29	0.41		F	#	0.1	
Chloride	mg/L	06/08/2011	N001	14 - 29	19		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	14 - 29	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/08/2011	N001	14 - 29	-81		F	#		
pH	s.u.	06/08/2011	N001	14 - 29	8.08		F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	14 - 29	615		F	#		
Sulfate	mg/L	06/08/2011	N001	14 - 29	120		F	#	1	
Temperature	C	06/08/2011	N001	14 - 29	18.08		F	#		
Turbidity	NTU	06/08/2011	N001	14 - 29	1.9		F	#		
Uranium	mg/L	06/08/2011	N001	14 - 29	0.000062		F	#	0.0000029	
Vanadium	mg/L	06/08/2011	N001	14 - 29	0.00035		JF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0606 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/08/2011	N001	32 - 42	110		F	#	5	
Chloride	mg/L	06/08/2011	N001	32 - 42	29		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	32 - 42	230		F	#	2	
Oxidation Reduction Potential	mV	06/08/2011	N001	32 - 42	65.2		F	#		
pH	s.u.	06/08/2011	N001	32 - 42	7.06		F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	32 - 42	2902		F	#		
Sulfate	mg/L	06/08/2011	N001	32 - 42	370		F	#	10	
Temperature	C	06/08/2011	N001	32 - 42	18.6		F	#		
Turbidity	NTU	06/08/2011	N001	32 - 42	2.21		F	#		
Uranium	mg/L	06/08/2011	N001	32 - 42	0.0087		F	#	0.0000029	
Vanadium	mg/L	06/08/2011	N001	32 - 42	0.00069		JF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0618 WELL 12" DIA Steel CSG. Old Mill Well??

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	06/20/2011	N001	-	143			#		
Ammonia Total as N	mg/L	06/20/2011	N001	-	0.1	U		#	0.1	
Arsenic	mg/L	06/20/2011	N001	-	0.0017			#	0.000015	
Calcium	mg/L	06/20/2011	N001	-	39			#	0.012	
Chloride	mg/L	06/20/2011	N001	-	3.9			#	0.2	
Iron	mg/L	06/20/2011	N001	-	0.11			#	0.0049	
Magnesium	mg/L	06/20/2011	N001	-	23			#	0.013	
Manganese	mg/L	06/20/2011	N001	-	0.0022	B		#	0.00011	
Molybdenum	mg/L	06/20/2011	N001	-	0.0044			#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2011	N001	-	1.7			#	0.01	
Oxidation Reduction Potential	mV	06/20/2011	N001	-	164.1			#		
pH	s.u.	06/20/2011	N001	-	7.9			#		
Potassium	mg/L	06/20/2011	N001	-	1.4			#	0.11	
Sodium	mg/L	06/20/2011	N001	-	7.7	E	J	#	0.0066	
Specific Conductance	umhos/cm	06/20/2011	N001	-	382			#		
Sulfate	mg/L	06/20/2011	N001	-	49			#	0.5	
Temperature	C	06/20/2011	N001	-	19.37			#		
Turbidity	NTU	06/20/2011	N001	-	6.4			#		
Uranium	mg/L	06/20/2011	N001	-	0.013			#	0.0000029	
Vanadium	mg/L	06/20/2011	N001	-	0.066			#	0.000015	

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

REPORT DATE: 8/2/2011

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

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	103.9 - 153.9	0.1	U	F	#	0.1	
Ammonia Total as N	mg/L	06/07/2011	N002	103.9 - 153.9	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	103.9 - 153.9	4.2		F	#	0.2	
Chloride	mg/L	06/07/2011	N002	103.9 - 153.9	4.3		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	103.9 - 153.9	1.6		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N002	103.9 - 153.9	1.6		F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	103.9 - 153.9	-18.9		F	#		
pH	s.u.	06/07/2011	N001	103.9 - 153.9	7.78		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	103.9 - 153.9	455		F	#		
Sulfate	mg/L	06/07/2011	N001	103.9 - 153.9	41		F	#	0.5	
Sulfate	mg/L	06/07/2011	N002	103.9 - 153.9	41		F	#	0.5	
Temperature	C	06/07/2011	N001	103.9 - 153.9	17.85		F	#		
Turbidity	NTU	06/07/2011	N001	103.9 - 153.9	0.83		F	#		
Uranium	mg/L	06/07/2011	N001	103.9 - 153.9	0.028		F	#	0.000029	
Uranium	mg/L	06/07/2011	N002	103.9 - 153.9	0.027		F	#	0.000029	
Vanadium	mg/L	06/07/2011	N001	103.9 - 153.9	0.022		F	#	0.000015	
Vanadium	mg/L	06/07/2011	N002	103.9 - 153.9	0.022		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0648 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	38.5	-	88.5	3.4	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	38.5	-	88.5	26	F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	38.5	-	88.5	69	F	#	0.5	
Oxidation Reduction Potential	mV	06/07/2011	N001	38.5	-	88.5	91.9	F	#		
pH	s.u.	06/07/2011	N001	38.5	-	88.5	7.33	F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	38.5	-	88.5	2488	F	#		
Sulfate	mg/L	06/07/2011	N001	38.5	-	88.5	930	F	#	10	
Temperature	C	06/07/2011	N001	38.5	-	88.5	17.92	F	#		
Turbidity	NTU	06/07/2011	N001	38.5	-	88.5	1.1	F	#		
Uranium	mg/L	06/07/2011	N001	38.5	-	88.5	0.01	F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	38.5	-	88.5	0.012	F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0650 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	77.5 - 97.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/06/2011	N001	77.5 - 97.5	16		F	#	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	77.5 - 97.5	2.9		F	#	0.05	
Oxidation Reduction Potential	mV	06/06/2011	N001	77.5 - 97.5	33.9		F	#		
pH	s.u.	06/06/2011	N001	77.5 - 97.5	8.03		F	#		
Specific Conductance	umhos/cm	06/06/2011	N001	77.5 - 97.5	925		F	#		
Sulfate	mg/L	06/06/2011	N001	77.5 - 97.5	250		F	#	2.5	
Temperature	C	06/06/2011	N001	77.5 - 97.5	17.67		F	#		
Turbidity	NTU	06/06/2011	N001	77.5 - 97.5	1.35		F	#		
Uranium	mg/L	06/06/2011	N001	77.5 - 97.5	0.0022		F	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	77.5 - 97.5	0.0038		F	#	0.000015	



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

REPORT DATE: 8/2/2011

Location: 0651 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	20 - 80	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	20 - 80	12		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	20 - 80	0.14		F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	20 - 80	91.7		F	#		
pH	s.u.	06/07/2011	N001	20 - 80	8.09		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	20 - 80	649		F	#		
Sulfate	mg/L	06/07/2011	N001	20 - 80	120		F	#	1	
Temperature	C	06/07/2011	N001	20 - 80	17		F	#		
Turbidity	NTU	06/07/2011	N001	20 - 80	9.33		F	#		
Uranium	mg/L	06/07/2011	N001	20 - 80	0.0023		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	20 - 80	0.012		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0652 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	34 - 54	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	34 - 54	14		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	34 - 54	4.4		F	#	0.05	
Oxidation Reduction Potential	mV	06/07/2011	N001	34 - 54	82.2		F	#		
pH	s.u.	06/07/2011	N001	34 - 54	7.78		F	#		
Specific Conductance	umhos /cm	06/07/2011	N001	34 - 54	574		F	#		
Sulfate	mg/L	06/07/2011	N001	34 - 54	65		F	#	0.5	
Temperature	C	06/07/2011	N001	34 - 54	16.95		F	#		
Turbidity	NTU	06/07/2011	N001	34 - 54	1.38		F	#		
Uranium	mg/L	06/07/2011	N001	34 - 54	0.0044		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	34 - 54	0.012		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0653 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	56 - 76	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	56 - 76	26		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	56 - 76	49		F	#	0.5	
Oxidation Reduction Potential	mV	06/07/2011	N001	56 - 76	73.8		F	#		
pH	s.u.	06/07/2011	N001	56 - 76	7.31		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	56 - 76	2367		F	#		
Sulfate	mg/L	06/07/2011	N001	56 - 76	960		F	#	10	
Temperature	C	06/07/2011	N001	56 - 76	20.45		F	#		
Turbidity	NTU	06/07/2011	N001	56 - 76	3.2		F	#		
Uranium	mg/L	06/07/2011	N001	56 - 76	0.0099		F	#	0.000029	
Vanadium	mg/L	06/07/2011	N001	56 - 76	0.0084		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0655 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	38 - 58	130		F #	5	
Chloride	mg/L	06/07/2011	N001	38 - 58	21		F #	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	38 - 58	150		F #	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	38 - 58	-73.1		F #		
pH	s.u.	06/07/2011	N001	38 - 58	7.19		F #		
Specific Conductance	umhos/cm	06/07/2011	N001	38 - 58	3447		F #		
Sulfate	mg/L	06/07/2011	N001	38 - 58	1100		F #	10	
Temperature	C	06/07/2011	N001	38 - 58	20.32		F #		
Turbidity	NTU	06/07/2011	N001	38 - 58	0.62		F #		
Uranium	mg/L	06/07/2011	N001	38 - 58	0.012		F #	0.0000029	
Vanadium	mg/L	06/07/2011	N001	38 - 58	0.0081		F #	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0656 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/08/2011	N001	38 - 58	44		F #	2	
Chloride	mg/L	06/08/2011	N001	38 - 58	14		F #	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	38 - 58	15		F #	0.1	
Oxidation Reduction Potential	mV	06/08/2011	N001	38 - 58	129.5		F #		
pH	s.u.	06/08/2011	N001	38 - 58	7.66		F #		
Specific Conductance	umhos/cm	06/08/2011	N001	38 - 58	991		F #		
Sulfate	mg/L	06/08/2011	N001	38 - 58	150		F #	2.5	
Temperature	C	06/08/2011	N001	38 - 58	17.2		F #		
Turbidity	NTU	06/08/2011	N001	38 - 58	1.41		F #		
Uranium	mg/L	06/08/2011	N001	38 - 58	0.0053		F #	0.000029	
Vanadium	mg/L	06/08/2011	N001	38 - 58	0.0008		UJF #	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0657 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/08/2011	N001	121 - 136	0.1	U	F	#	0.1	
Chloride	mg/L	06/08/2011	N001	121 - 136	5.7		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	121 - 136	3		F	#	0.05	
Oxidation Reduction Potential	mV	06/08/2011	N001	121 - 136	5.8		F	#		
pH	s.u.	06/08/2011	N001	121 - 136	7.78		F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	121 - 136	458		F	#		
Sulfate	mg/L	06/08/2011	N001	121 - 136	36		F	#	0.5	
Temperature	C	06/08/2011	N001	121 - 136	17.96		F	#		
Turbidity	NTU	06/08/2011	N001	121 - 136	0.93		F	#		
Uranium	mg/L	06/08/2011	N001	121 - 136	0.0053		F	#	0.0000029	
Vanadium	mg/L	06/08/2011	N001	121 - 136	0.067		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0662 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID					Lab	Data	QA		
Ammonia Total as N	mg/L	06/08/2011	N001	37.5	-	67.5	0.1	U	F	#	0.1	
Ammonia Total as N	mg/L	06/08/2011	N002	37.5	-	67.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/08/2011	N001	37.5	-	67.5	18		F	#	0.4	
Chloride	mg/L	06/08/2011	N002	37.5	-	67.5	18		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	37.5	-	67.5	18		F	#	0.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N002	37.5	-	67.5	18		F	#	0.1	
Oxidation Reduction Potential	mV	06/08/2011	N001	37.5	-	67.5	34.2		F	#		
pH	s.u.	06/08/2011	N001	37.5	-	67.5	7.38		F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	37.5	-	67.5	967		F	#		
Sulfate	mg/L	06/08/2011	N001	37.5	-	67.5	210		F	#	2.5	
Sulfate	mg/L	06/08/2011	N002	37.5	-	67.5	210		F	#	2.5	
Temperature	C	06/08/2011	N001	37.5	-	67.5	17.3		F	#		
Turbidity	NTU	06/08/2011	N001	37.5	-	67.5	0.91		F	#		
Uranium	mg/L	06/08/2011	N001	37.5	-	67.5	0.21		F	#	0.000015	
Uranium	mg/L	06/08/2011	N002	37.5	-	67.5	0.21		F	#	0.000015	
Vanadium	mg/L	06/08/2011	N001	37.5	-	67.5	0.03		F	#	0.000076	
Vanadium	mg/L	06/08/2011	N002	37.5	-	67.5	0.03		F	#	0.000076	

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

REPORT DATE: 8/2/2011

Location: 0669 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	34 - 54	3.3		F #	0.1	
Chloride	mg/L	06/07/2011	N001	34 - 54	7.8		F #	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	34 - 54	15		F #	0.1	
Oxidation Reduction Potential	mV	06/07/2011	N001	34 - 54	-95.5		F #		
pH	s.u.	06/07/2011	N001	34 - 54	7.52		F #		
Specific Conductance	umhos/cm	06/07/2011	N001	34 - 54	779		F #		
Sulfate	mg/L	06/07/2011	N001	34 - 54	120		F #	1	
Temperature	C	06/07/2011	N001	34 - 54	19.16		F #		
Turbidity	NTU	06/07/2011	N001	34 - 54	0.63		F #		
Uranium	mg/L	06/07/2011	N001	34 - 54	0.0064		F #	0.0000029	
Vanadium	mg/L	06/07/2011	N001	34 - 54	0.053		F #	0.000015	



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

REPORT DATE: 8/2/2011

Location: 0711 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	25.5 - 30.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/06/2011	N001	25.5 - 30.5	14		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	25.5 - 30.5	0.57		F	#	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	25.5 - 30.5	95.5		F	#		
pH	s.u.	06/06/2011	N001	25.5 - 30.5	7.78		F	#		
Specific Conductance	umhos/cm	06/06/2011	N001	25.5 - 30.5	729		F	#		
Sulfate	mg/L	06/06/2011	N001	25.5 - 30.5	120		F	#	1	
Temperature	C	06/06/2011	N001	25.5 - 30.5	17.34		F	#		
Turbidity	NTU	06/06/2011	N001	25.5 - 30.5	3.23		F	#		
Uranium	mg/L	06/06/2011	N001	25.5 - 30.5	0.0038		F	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	25.5 - 30.5	0.0015		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0715 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	16 - 21	0.1	U	F	#	0.1	
Chloride	mg/L	06/06/2011	N001	16 - 21	10		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	16 - 21	0.73		F	#	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	16 - 21	103.6		F	#		
pH	s.u.	06/06/2011	N001	16 - 21	7.8		F	#		
Specific Conductance	umhos/cm	06/06/2011	N001	16 - 21	585		F	#		
Sulfate	mg/L	06/06/2011	N001	16 - 21	73		F	#	0.5	
Temperature	C	06/06/2011	N001	16 - 21	16.82		F	#		
Turbidity	NTU	06/06/2011	N001	16 - 21	2.54		F	#		
Uranium	mg/L	06/06/2011	N001	16 - 21	0.0029		F	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	16 - 21	0.001		UJF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0719 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	19.35 - 24.35	0.1	U	F	#	0.1	
Chloride	mg/L	06/06/2011	N001	19.35 - 24.35	16		F	#	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	19.35 - 24.35	0.79		F	#	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	19.35 - 24.35	71.5		F	#		
pH	s.u.	06/06/2011	N001	19.35 - 24.35	7.71		F	#		
Specific Conductance	umhos/cm	06/06/2011	N001	19.35 - 24.35	761		F	#		
Sulfate	mg/L	06/06/2011	N001	19.35 - 24.35	130		F	#	1	
Temperature	C	06/06/2011	N001	19.35 - 24.35	16.98		F	#		
Turbidity	NTU	06/06/2011	N001	19.35 - 24.35	1.84		F	#		
Uranium	mg/L	06/06/2011	N001	19.35 - 24.35	0.0039		F	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	19.35 - 24.35	0.0043		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0727 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	23.73 - 28.78	0.1	U	F	#	0.1	
Chloride	mg/L	06/06/2011	N001	23.73 - 28.78	11		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	23.73 - 28.78	0.82		F	#	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	23.73 - 28.78	69.9		F	#		
pH	s.u.	06/06/2011	N001	23.73 - 28.78	7.79		F	#		
Specific Conductance	umhos/cm	06/06/2011	N001	23.73 - 28.78	622		F	#		
Sulfate	mg/L	06/06/2011	N001	23.73 - 28.78	89		F	#	0.5	
Temperature	C	06/06/2011	N001	23.73 - 28.78	18.07		F	#		
Turbidity	NTU	06/06/2011	N001	23.73 - 28.78	9.08		F	#		
Uranium	mg/L	06/06/2011	N001	23.73 - 28.78	0.002		F	#	0.0000029	
Vanadium	mg/L	06/06/2011	N001	23.73 - 28.78	0.0028		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0733 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/08/2011	0001	49 - 54	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/08/2011	0001	49 - 54	5.3		FQ	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	0001	49 - 54	4.4		FQ	#	0.05	
Oxidation Reduction Potential	mV	06/08/2011	N001	49 - 54	49.2		FQ	#		
pH	s.u.	06/08/2011	N001	49 - 54	7.51		FQ	#		
Specific Conductance	umhos/cm	06/08/2011	N001	49 - 54	545		FQ	#		
Sulfate	mg/L	06/08/2011	0001	49 - 54	76		FQ	#	0.5	
Temperature	C	06/08/2011	N001	49 - 54	19.42		FQ	#		
Turbidity	NTU	06/08/2011	N001	49 - 54	50.8		FQ	#		
Uranium	mg/L	06/08/2011	0001	49 - 54	0.0053		FQ	#	0.0000029	
Vanadium	mg/L	06/08/2011	0001	49 - 54	0.046		FQ	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0734 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/08/2011	0001	50 - 80	0.1	U	F	#	0.1	
Chloride	mg/L	06/08/2011	0001	50 - 80	5.8		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	0001	50 - 80	4.4		F	#	0.05	
Oxidation Reduction Potential	mV	06/08/2011	N001	50 - 80	47.7		F	#		
pH	s.u.	06/08/2011	N001	50 - 80	7.54		F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	50 - 80	601		F	#		
Sulfate	mg/L	06/08/2011	0001	50 - 80	120		F	#	1	
Temperature	C	06/08/2011	N001	50 - 80	17.87		F	#		
Turbidity	NTU	06/08/2011	N001	50 - 80	62.3		F	#		
Uranium	mg/L	06/08/2011	0001	50 - 80	0.07		F	#	0.0000029	
Vanadium	mg/L	06/08/2011	0001	50 - 80	0.02		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0735 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	06/20/2011	N001	53.5 - 58.5	77		F	#		
Ammonia Total as N	mg/L	06/20/2011	0001	53.5 - 58.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/20/2011	0001	53.5 - 58.5	1.8		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2011	0001	53.5 - 58.5	4.9		F	#	0.05	
Oxidation Reduction Potential	mV	06/20/2011	N001	53.5 - 58.5	171		F	#		
pH	s.u.	06/20/2011	N001	53.5 - 58.5	7.5		F	#		
Specific Conductance	umhos/cm	06/20/2011	N001	53.5 - 58.5	813		F	#		
Sulfate	mg/L	06/20/2011	0001	53.5 - 58.5	300		F	#	2.5	
Temperature	C	06/20/2011	N001	53.5 - 58.5	20.08		F	#		
Turbidity	NTU	06/20/2011	N001	53.5 - 58.5	27.5		F	#		
Uranium	mg/L	06/20/2011	0001	53.5 - 58.5	0.21		F	#	0.000015	
Vanadium	mg/L	06/20/2011	0001	53.5 - 58.5	0.026		F	#	0.000076	

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

REPORT DATE: 8/2/2011

Location: 0738 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	0001	26 - 31	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	0001	26 - 31	17		F	#	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	0001	26 - 31	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	26 - 31	9.8		F	#		
pH	s.u.	06/07/2011	N001	26 - 31	7.95		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	26 - 31	737		F	#		
Sulfate	mg/L	06/07/2011	0001	26 - 31	190		F	#	1	
Temperature	C	06/07/2011	N001	26 - 31	17.85		F	#		
Turbidity	NTU	06/07/2011	N001	26 - 31	20.7		F	#		
Uranium	mg/L	06/07/2011	0001	26 - 31	0.00032		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	0001	26 - 31	0.00075		JF	#	0.000015	



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

REPORT DATE: 8/2/2011

Location: 0739 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/06/2011	0001	33 - 38	0.28		F #	0.1	
Chloride	mg/L	06/06/2011	0001	33 - 38	20		F #	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	0001	33 - 38	1.4		F #	0.01	
Oxidation Reduction Potential	mV	06/06/2011	N001	33 - 38	-3.4		F #		
pH	s.u.	06/06/2011	N001	33 - 38	7.9		F #		
Specific Conductance	umhos/cm	06/06/2011	N001	33 - 38	912		F #		
Sulfate	mg/L	06/06/2011	0001	33 - 38	220		F #	2.5	
Temperature	C	06/06/2011	N001	33 - 38	18.8		F #		
Turbidity	NTU	06/06/2011	N001	33 - 38	95.6		F #		
Uranium	mg/L	06/06/2011	0001	33 - 38	0.004		F #	0.0000029	
Vanadium	mg/L	06/06/2011	0001	33 - 38	0.0093		F #	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0740 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/06/2011	N001	30 - 35	0.1	U	F	#	0.1	
Chloride	mg/L	06/06/2011	N001	30 - 35	44		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/06/2011	N001	30 - 35	12		F	#	0.1	
Oxidation Reduction Potential	mV	06/06/2011	N001	30 - 35	88.8		F	#		
pH	s.u.	06/06/2011	N001	30 - 35	7.45		F	#		
Specific Conductance	umhos/cm	06/06/2011	N001	30 - 35	2396		F	#		
Sulfate	mg/L	06/06/2011	N001	30 - 35	1100		F	#	10	
Temperature	C	06/06/2011	N001	30 - 35	21.82		F	#		
Turbidity	NTU	06/06/2011	N001	30 - 35	3.58		F	#		
Uranium	mg/L	06/06/2011	N001	30 - 35	0.015		F	#	0.000029	
Vanadium	mg/L	06/06/2011	N001	30 - 35	0.02		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0741 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	0001	50 - 80	120		F #	5	
Chloride	mg/L	06/07/2011	0001	50 - 80	16		F #	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	0001	50 - 80	98		F #	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	50 - 80	-113		F #		
pH	s.u.	06/07/2011	N001	50 - 80	7.41		F #		
Specific Conductance	umhos/cm	06/07/2011	N001	50 - 80	2364		F #		
Sulfate	mg/L	06/07/2011	0001	50 - 80	510		F #	10	
Temperature	C	06/07/2011	N001	50 - 80	18.65		F #		
Turbidity	NTU	06/07/2011	N001	50 - 80	17.9		F #		
Uranium	mg/L	06/07/2011	0001	50 - 80	0.01		F #	0.000029	
Vanadium	mg/L	06/07/2011	0001	50 - 80	0.0073		F #	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0742 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	50 - 80	130		F #	5	
Chloride	mg/L	06/07/2011	N001	50 - 80	18		F #	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	50 - 80	120		F #	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	50 - 80	-104.5		F #		
pH	s.u.	06/07/2011	N001	50 - 80	7.35		F #		
Specific Conductance	umhos/cm	06/07/2011	N001	50 - 80	2484		F #		
Sulfate	mg/L	06/07/2011	N001	50 - 80	560		F #	10	
Temperature	C	06/07/2011	N001	50 - 80	19.82		F #		
Turbidity	NTU	06/07/2011	N001	50 - 80	2.65		F #		
Uranium	mg/L	06/07/2011	N001	50 - 80	0.0091		F #	0.0000029	
Vanadium	mg/L	06/07/2011	N001	50 - 80	0.008		F #	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0743 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	45 - 75	140		F #	5	
Chloride	mg/L	06/07/2011	N001	45 - 75	14		F #	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	45 - 75	0.012		F #	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	45 - 75	-278.9		F #		
pH	s.u.	06/07/2011	N001	45 - 75	6.78		F #		
Specific Conductance	umhos/cm	06/07/2011	N001	45 - 75	5274		F #		
Sulfate	mg/L	06/07/2011	N001	45 - 75	7.8		F #	2.5	
Temperature	C	06/07/2011	N001	45 - 75	18.84		F #		
Turbidity	NTU	06/07/2011	N001	45 - 75	8.35		F #		
Uranium	mg/L	06/07/2011	N001	45 - 75	0.00035		F #	0.000029	
Vanadium	mg/L	06/07/2011	N001	45 - 75	0.0017		F #	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0744 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID			Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	31 - 61	140	F	#	5	
Chloride	mg/L	06/07/2011	N001	31 - 61	16	F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	31 - 61	150	F	#	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	31 - 61	-155.1	F	#		
pH	s.u.	06/07/2011	N001	31 - 61	7.34	F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	31 - 61	2607	F	#		
Sulfate	mg/L	06/07/2011	N001	31 - 61	470	F	#	10	
Temperature	C	06/07/2011	N001	31 - 61	18.76	F	#		
Turbidity	NTU	06/07/2011	N001	31 - 61	2.51	F	#		
Uranium	mg/L	06/07/2011	N001	31 - 61	0.01	F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	31 - 61	0.0072	F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0760 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	0001	55 - 75	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	0001	55 - 75	10		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	0001	55 - 75	0.015		F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	55 - 75	-23.1		F	#		
pH	s.u.	06/07/2011	N001	55 - 75	8.04		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	55 - 75	540		F	#		
Sulfate	mg/L	06/07/2011	0001	55 - 75	91		F	#	0.5	
Temperature	C	06/07/2011	N001	55 - 75	18.1		F	#		
Turbidity	NTU	06/07/2011	N001	55 - 75	70.2		F	#		
Uranium	mg/L	06/07/2011	0001	55 - 75	0.00079		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	0001	55 - 75	0.0005		UJF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0761 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	39 - 49	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	39 - 49	13		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	39 - 49	29		F	#	0.2	
Oxidation Reduction Potential	mV	06/07/2011	N001	39 - 49	116.4		F	#		
pH	s.u.	06/07/2011	N001	39 - 49	7.14		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	39 - 49	1395		F	#		
Sulfate	mg/L	06/07/2011	N001	39 - 49	440		F	#	5	
Temperature	C	06/07/2011	N001	39 - 49	16.59		F	#		
Turbidity	NTU	06/07/2011	N001	39 - 49	9.68		F	#		
Uranium	mg/L	06/07/2011	N001	39 - 49	0.028		F	#	0.000029	
Vanadium	mg/L	06/07/2011	N001	39 - 49	0.003		F	#	0.000015	



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

REPORT DATE: 8/2/2011

Location: 0762 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	29 - 49	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	29 - 49	67		F	#	10	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	29 - 49	100		F	#	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	29 - 49	162.6		F	#		
pH	s.u.	06/07/2011	N001	29 - 49	7.33		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	29 - 49	3930		F	#		
Sulfate	mg/L	06/07/2011	N001	29 - 49	1500		F	#	25	
Temperature	C	06/07/2011	N001	29 - 49	17.48		F	#		
Turbidity	NTU	06/07/2011	N001	29 - 49	4.24		F	#		
Uranium	mg/L	06/07/2011	N001	29 - 49	0.011		F	#	0.000029	
Vanadium	mg/L	06/07/2011	N001	29 - 49	0.0077		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0764 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	47 - 52	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/07/2011	N001	47 - 52	11		FQ	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	47 - 52	36		FQ	#	0.2	
Oxidation Reduction Potential	mV	06/07/2011	N001	47 - 52	30.6		FQ	#		
pH	s.u.	06/07/2011	N001	47 - 52	7.5		FQ	#		
Specific Conductance	umhos/cm	06/07/2011	N001	47 - 52	1190		FQ	#		
Sulfate	mg/L	06/07/2011	N001	47 - 52	260		FQ	#	5	
Temperature	C	06/07/2011	N001	47 - 52	20.46		FQ	#		
Turbidity	NTU	06/07/2011	N001	47 - 52	2.85		FQ	#		
Uranium	mg/L	06/07/2011	N001	47 - 52	0.012		FQ	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	47 - 52	0.013		FQ	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0765 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	0001	58.6	-	88.7	120	F	#	5	
Chloride	mg/L	06/07/2011	0001	58.6	-	88.7	14	F	#	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	0001	58.6	-	88.7	0.011	F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	58.6	-	88.7	-282.5	F	#		
pH	s.u.	06/07/2011	N001	58.6	-	88.7	6.62	F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	58.6	-	88.7	1974	F	#		
Sulfate	mg/L	06/07/2011	0001	58.6	-	88.7	120	F	#	1	
Temperature	C	06/07/2011	N001	58.6	-	88.7	19.56	F	#		
Turbidity	NTU	06/07/2011	N001	58.6	-	88.7	16.8	F	#		
Uranium	mg/L	06/07/2011	0001	58.6	-	88.7	0.0025	F	#	0.0000029	
Vanadium	mg/L	06/07/2011	0001	58.6	-	88.7	0.001	UJF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0766 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID				Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	47.2 - 57.2	130		F	#	5	
Chloride	mg/L	06/07/2011	N001	47.2 - 57.2	17		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	47.2 - 57.2	110		F	#	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	47.2 - 57.2	-97.3		F	#		
pH	s.u.	06/07/2011	N001	47.2 - 57.2	7.57		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	47.2 - 57.2	2324		F	#		
Sulfate	mg/L	06/07/2011	N001	47.2 - 57.2	460		F	#	10	
Temperature	C	06/07/2011	N001	47.2 - 57.2	17.77		F	#		
Turbidity	NTU	06/07/2011	N001	47.2 - 57.2	6.22		F	#		
Uranium	mg/L	06/07/2011	N001	47.2 - 57.2	0.015		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	47.2 - 57.2	0.0038		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0767 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	43.5 - 63.5	0.1		F	#	0.1	
Chloride	mg/L	06/07/2011	N001	43.5 - 63.5	4.9		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	43.5 - 63.5	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	43.5 - 63.5	1.9		F	#		
pH	s.u.	06/07/2011	N001	43.5 - 63.5	7.81		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	43.5 - 63.5	416		F	#		
Sulfate	mg/L	06/07/2011	N001	43.5 - 63.5	34		F	#	0.5	
Temperature	C	06/07/2011	N001	43.5 - 63.5	19		F	#		
Turbidity	NTU	06/07/2011	N001	43.5 - 63.5	2.37		F	#		
Uranium	mg/L	06/07/2011	N001	43.5 - 63.5	0.00064		F	#	0.000029	
Vanadium	mg/L	06/07/2011	N001	43.5 - 63.5	0.0004		UJF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0768 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	24.4 - 44.4	0.5		F	#	0.1	
Ammonia Total as N	mg/L	06/07/2011	N002	24.4 - 44.4	0.48		F	#	0.1	
Chloride	mg/L	06/07/2011	N001	24.4 - 44.4	12		F	#	0.2	
Chloride	mg/L	06/07/2011	N002	24.4 - 44.4	12		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	24.4 - 44.4	0.01	U	F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N002	24.4 - 44.4	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	24.4 - 44.4	-97.8		F	#		
pH	s.u.	06/07/2011	N001	24.4 - 44.4	8.05		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	24.4 - 44.4	483		F	#		
Sulfate	mg/L	06/07/2011	N001	24.4 - 44.4	62		F	#	0.5	
Sulfate	mg/L	06/07/2011	N002	24.4 - 44.4	67		F	#	0.5	
Temperature	C	06/07/2011	N001	24.4 - 44.4	19.15		F	#		
Turbidity	NTU	06/07/2011	N001	24.4 - 44.4	6.3		F	#		
Uranium	mg/L	06/07/2011	N001	24.4 - 44.4	0.000048		F	#	0.000029	
Uranium	mg/L	06/07/2011	N002	24.4 - 44.4	0.000068		F	#	0.000029	
Vanadium	mg/L	06/07/2011	N001	24.4 - 44.4	0.00061		JF	#	0.000015	
Vanadium	mg/L	06/07/2011	N002	24.4 - 44.4	0.00058		JF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0770 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data QA		
Ammonia Total as N	mg/L	06/08/2011	N001	54.9	-	64.9	32	F	#	2	
Chloride	mg/L	06/08/2011	N001	54.9	-	64.9	15	F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	54.9	-	64.9	17	F	#	0.1	
Oxidation Reduction Potential	mV	06/08/2011	N001	54.9	-	64.9	110.1	F	#		
pH	s.u.	06/08/2011	N001	54.9	-	64.9	7.43	F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	54.9	-	64.9	1030	F	#		
Sulfate	mg/L	06/08/2011	N001	54.9	-	64.9	190	F	#	5	
Temperature	C	06/08/2011	N001	54.9	-	64.9	17.51	F	#		
Turbidity	NTU	06/08/2011	N001	54.9	-	64.9	2.03	F	#		
Uranium	mg/L	06/08/2011	N001	54.9	-	64.9	0.0052	F	#	0.0000029	
Vanadium	mg/L	06/08/2011	N001	54.9	-	64.9	0.001	JF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0771 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	06/07/2011	N001	57.4	- 77.4	260		FQ	#	20	
Chloride	mg/L	06/07/2011	N001	57.4	- 77.4	20		FQ	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	57.4	- 77.4	190		FQ	#	1	
Oxidation Reduction Potential	mV	06/07/2011	N001	57.4	- 77.4	-72.5		FQ	#		
pH	s.u.	06/07/2011	N001	57.4	- 77.4	7.22		FQ	#		
Specific Conductance	umhos/cm	06/07/2011	N001	57.4	- 77.4	4171		FQ	#		
Sulfate	mg/L	06/07/2011	N001	57.4	- 77.4	1400	N	FQ	#	10	
Temperature	C	06/07/2011	N001	57.4	- 77.4	18.9		FQ	#		
Turbidity	NTU	06/07/2011	N001	57.4	- 77.4	0.62		FQ	#		
Uranium	mg/L	06/07/2011	N001	57.4	- 77.4	0.014		FQ	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	57.4	- 77.4	0.0089		FQ	#	0.000015	



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

REPORT DATE: 8/2/2011

Location: 0772 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	06/07/2011	N001	7.4 - 27.4	211		F	#		
Ammonia Total as N	mg/L	06/07/2011	N001	7.4 - 27.4	2		F	#	0.1	
Arsenic	mg/L	06/07/2011	N001	7.4 - 27.4	0.0018		F	#	0.000015	
Calcium	mg/L	06/07/2011	N001	7.4 - 27.4	22		F	#	0.012	
Chloride	mg/L	06/07/2011	N001	7.4 - 27.4	14		F	#	0.4	
Iron	mg/L	06/07/2011	N001	7.4 - 27.4	0.0049	U	JF	#	0.0049	
Magnesium	mg/L	06/07/2011	N001	7.4 - 27.4	16	E	JF	#	0.013	
Manganese	mg/L	06/07/2011	N001	7.4 - 27.4	0.0055		F	#	0.00011	
Molybdenum	mg/L	06/07/2011	N001	7.4 - 27.4	0.0031	E	JF	#	0.000032	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	7.4 - 27.4	1.1		F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	7.4 - 27.4	91.9		F	#		
pH	s.u.	06/07/2011	N001	7.4 - 27.4	7.8		F	#		
Potassium	mg/L	06/07/2011	N001	7.4 - 27.4	0.64	B	F	#	0.11	
Sodium	mg/L	06/07/2011	N001	7.4 - 27.4	93		F	#	0.0066	
Specific Conductance	umhos/cm	06/07/2011	N001	7.4 - 27.4	736		F	#		
Sulfate	mg/L	06/07/2011	N001	7.4 - 27.4	110		F	#	1	
Temperature	C	06/07/2011	N001	7.4 - 27.4	14.41		F	#		
Turbidity	NTU	06/07/2011	N001	7.4 - 27.4	2.28		F	#		
Uranium	mg/L	06/07/2011	N001	7.4 - 27.4	0.006		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	7.4 - 27.4	0.011		F	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0774 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers		Detection Limit	Uncertainty
								Data	QA		
Ammonia Total as N	mg/L	06/08/2011	N001	45	-	55	0.1	U	F	#	0.1
Chloride	mg/L	06/08/2011	N001	45	-	55	4.4		F	#	0.2
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	45	-	55	1.7		F	#	0.01
Oxidation Reduction Potential	mV	06/08/2011	N001	45	-	55	41.3		F	#	
pH	s.u.	06/08/2011	N001	45	-	55	7.73		F	#	
Specific Conductance	umhos/cm	06/08/2011	N001	45	-	55	463		F	#	
Sulfate	mg/L	06/08/2011	N001	45	-	55	42		F	#	0.5
Temperature	C	06/08/2011	N001	45	-	55	17.55		F	#	
Turbidity	NTU	06/08/2011	N001	45	-	55	2.1		F	#	
Uranium	mg/L	06/08/2011	N001	45	-	55	0.032		F	#	0.000029
Vanadium	mg/L	06/08/2011	N001	45	-	55	0.02		F	#	0.000015

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

REPORT DATE: 8/2/2011

Location: 0775 WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ammonia Total as N	mg/L	06/08/2011	N001	142 - 167	0.1	U	F	#	0.1	
Chloride	mg/L	06/08/2011	N001	142 - 167	5		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/08/2011	N001	142 - 167	0.59		F	#	0.01	
Oxidation Reduction Potential	mV	06/08/2011	N001	142 - 167	55.2		F	#		
pH	s.u.	06/08/2011	N001	142 - 167	7.74		F	#		
Specific Conductance	umhos/cm	06/08/2011	N001	142 - 167	398		F	#		
Sulfate	mg/L	06/08/2011	N001	142 - 167	26		F	#	0.5	
Temperature	C	06/08/2011	N001	142 - 167	18.25		F	#		
Turbidity	NTU	06/08/2011	N001	142 - 167	0.06		F	#		
Uranium	mg/L	06/08/2011	N001	142 - 167	0.0028		F	#	0.0000029	
Vanadium	mg/L	06/08/2011	N001	142 - 167	0.00091		JF	#	0.000015	

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

REPORT DATE: 8/2/2011

Location: 0776 WELL

Parameter	Units	Sample		Depth Range			Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Lab	Data	QA		
Ammonia Total as N	mg/L	06/07/2011	N001	99.5	-	149.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/07/2011	N001	99.5	-	149.5	5.3		F	#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	99.5	-	149.5	0.86		F	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	99.5	-	149.5	-31.3		F	#		
pH	s.u.	06/07/2011	N001	99.5	-	149.5	7.86		F	#		
Specific Conductance	umhos/cm	06/07/2011	N001	99.5	-	149.5	463		F	#		
Sulfate	mg/L	06/07/2011	N001	99.5	-	149.5	36		F	#	0.5	
Temperature	C	06/07/2011	N001	99.5	-	149.5	18.29		F	#		
Turbidity	NTU	06/07/2011	N001	99.5	-	149.5	0.88		F	#		
Uranium	mg/L	06/07/2011	N001	99.5	-	149.5	0.009		F	#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	99.5	-	149.5	0.016		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.                     | G | Possible grout contamination, pH > 9.         | J | Estimated value. |
| L | Less than 3 bore volumes purged prior to sampling. | Q | Qualitative result due to sampling technique. | R | Unusable result. |
| U | Parameter analyzed for but was not detected.       | X | Location is undefined.                        |   |                  |

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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## **Surface Water Quality Data**

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

REPORT DATE: 8/2/2011

Location: 0623 SURFACE LOCATION

Parameter	Units	Sample		Result	Qualifiers		Detection Limit	Uncertainty
		Date	ID		Lab	Data QA		
Ammonia Total as N	mg/L	06/07/2011	N001	0.1	U	#	0.1	
Chloride	mg/L	06/07/2011	N001	7.6		#	0.2	
Nitrate + Nitrite as Nitrogen	mg/L	06/07/2011	N001	0.01	U	#	0.01	
Oxidation Reduction Potential	mV	06/07/2011	N001	-50.6		#		
pH	s.u.	06/07/2011	N001	7.63		#		
Specific Conductance	umhos/cm	06/07/2011	N001	672		#		
Sulfate	mg/L	06/07/2011	N001	36		#	0.5	
Temperature	C	06/07/2011	N001	13.62		#		
Turbidity	NTU	06/07/2011	N001	5.13		#		
Uranium	mg/L	06/07/2011	N001	0.0011		#	0.0000029	
Vanadium	mg/L	06/07/2011	N001	0.001		J #	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: 8/2/2011**

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	06/07/2011	09:35:59	4.88	4835.42	
0602	U	4864.43	06/06/2011	16:25:10	9.75	4854.68	
0603	U	4849.41	06/06/2011	17:40:21	11.57	4837.84	
0604	C	4840.42	06/07/2011	09:20:09	9.77	4830.65	
0605	C	4835.07	06/08/2011	11:45:21	11.19	4823.88	
0606	D	4864.73	06/08/2011	11:55:13	36.75	4827.98	
0618	O	4924.81	06/20/2011	17:20:53	120	4804.81	
0619	O	4888.63	06/07/2011	17:00:01	58.15	4830.48	
0648	N	4835.14	06/07/2011	17:35:03	35.16	4799.98	
0650	D	4794.28	06/06/2011	17:30:22	20.35	4773.93	
0651	C	4787.88	06/07/2011	14:35:43	8.85	4779.03	
0652	C	4808.93	06/07/2011	14:00:49	19.1	4789.83	
0653	D	4837.08	06/07/2011	17:55:55	36.86	4800.22	
0655	D	4862.06	06/07/2011	15:35:00	40.99	4821.07	
0656	D	4856.33	06/08/2011	11:15:21	38.41	4817.92	
0657	O	4878.99	06/08/2011	11:20:48	50.8	4828.19	
0662	D	4878.56	06/08/2011	10:50:45	50.22	4828.34	
0669	D	4867.19	06/07/2011	15:05:23	50.89	4816.3	
0711			06/06/2011	17:05:00	11.59	NA	E
0715			06/06/2011	16:45:22	11.06	NA	E
0719			06/06/2011	16:05:07	12.55	NA	E
0727			06/06/2011	15:30:51	14.62	NA	E
0733			06/08/2011	09:50:11	50	NA	E
0734			06/08/2011	09:35:07	51.25	NA	E
0735			06/20/2011	17:35:33	52.33	NA	E
0738			06/07/2011	11:59:30	16.65	NA	E
0739			06/06/2011	17:05:23	22.94	NA	E
0740			06/06/2011	16:20:21	27.5	NA	E

**STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site**  
**REPORT DATE: 8/2/2011**

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
0741			06/07/2011	14:15:31	37.12	NA	E
0742			06/07/2011	13:20:02	37.38	NA	E
0743			06/07/2011	12:05:40	36.93	NA	E
0744			06/07/2011	12:40:52	37.3	NA	E
0760	D	4814.8	06/07/2011	11:10:14	26.1	4788.7	
0761	D	4835.02	06/07/2011	09:30:38	44.16	4790.86	
0762	D	4820.74	06/07/2011	10:05:54	33.05	4787.69	
0764	D	4851.53	06/07/2011	16:55:52	50.73	4800.8	
0765	D	4848.45	06/07/2011	11:30:09	36.95	4811.5	
0766	D	4847.97	06/07/2011	14:35:45	37.52	4810.45	
0767	D	4808.25	06/07/2011	15:10:32	7.22	4801.03	
0768	D	4820.73	06/07/2011	15:40:22	14.73	4806	
0770	D	4857.26	06/08/2011	11:00:24	34.29	4822.97	
0771	D	4863.26	06/07/2011	15:55:16	42.91	4820.35	
0772	O	4847.6	06/07/2011	08:50:05	12.54	4835.06	
0774	O	4880.14	06/08/2011	10:35:33	50.02	4830.12	
0775	D	4879.68	06/08/2011	10:35:06	50.29	4829.39	
0776	O	4883.33	06/07/2011	17:50:10	53.98	4829.35	

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

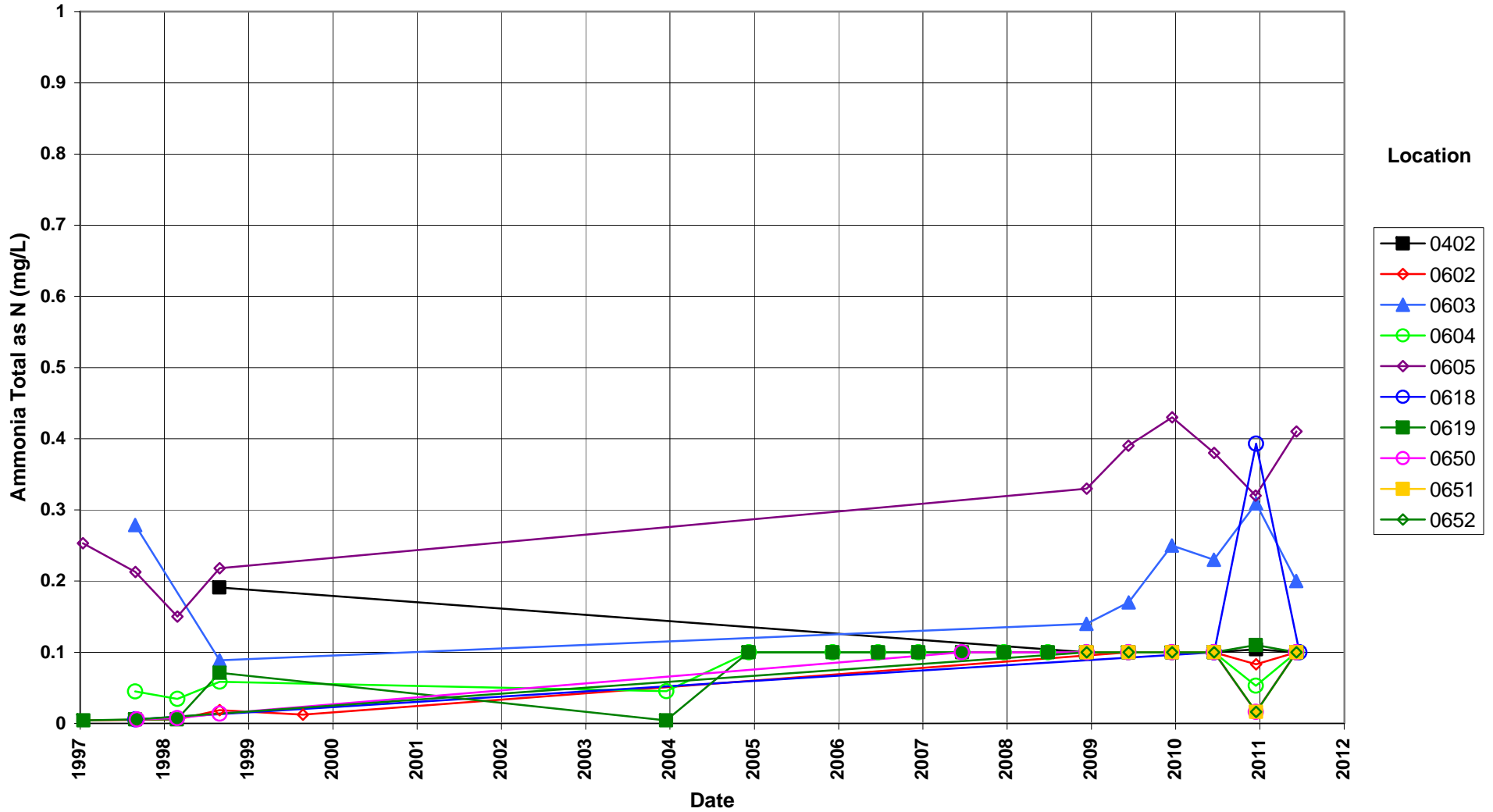
WATER LEVEL FLAGS: D Dry      F FLOWING      E TOP OF CASING ELEVATION DATA NOT AVAILABLE

## **Time-Concentration Graphs**

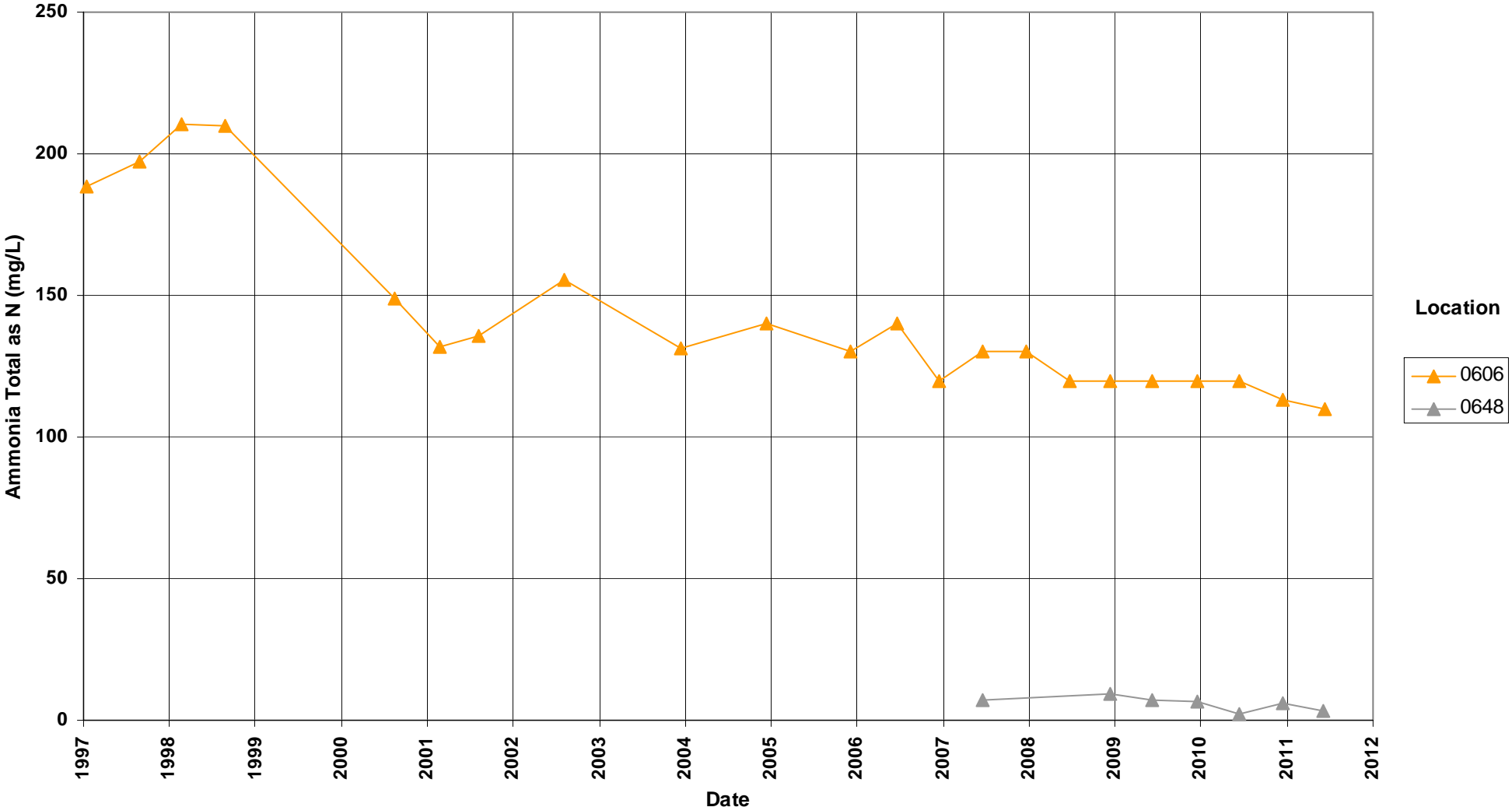
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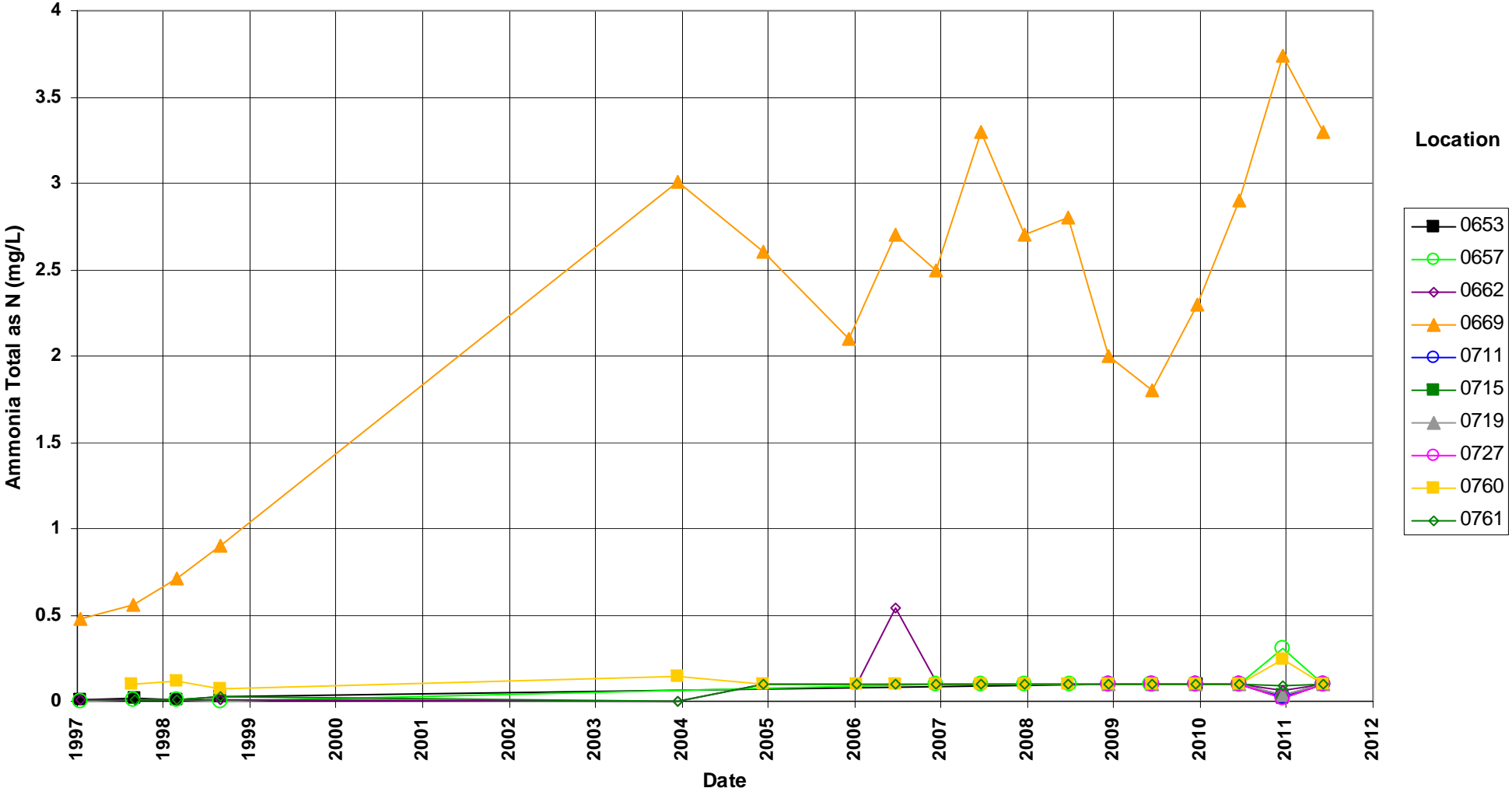
### Monument Valley Processing Site Ammonia Total as N Concentration



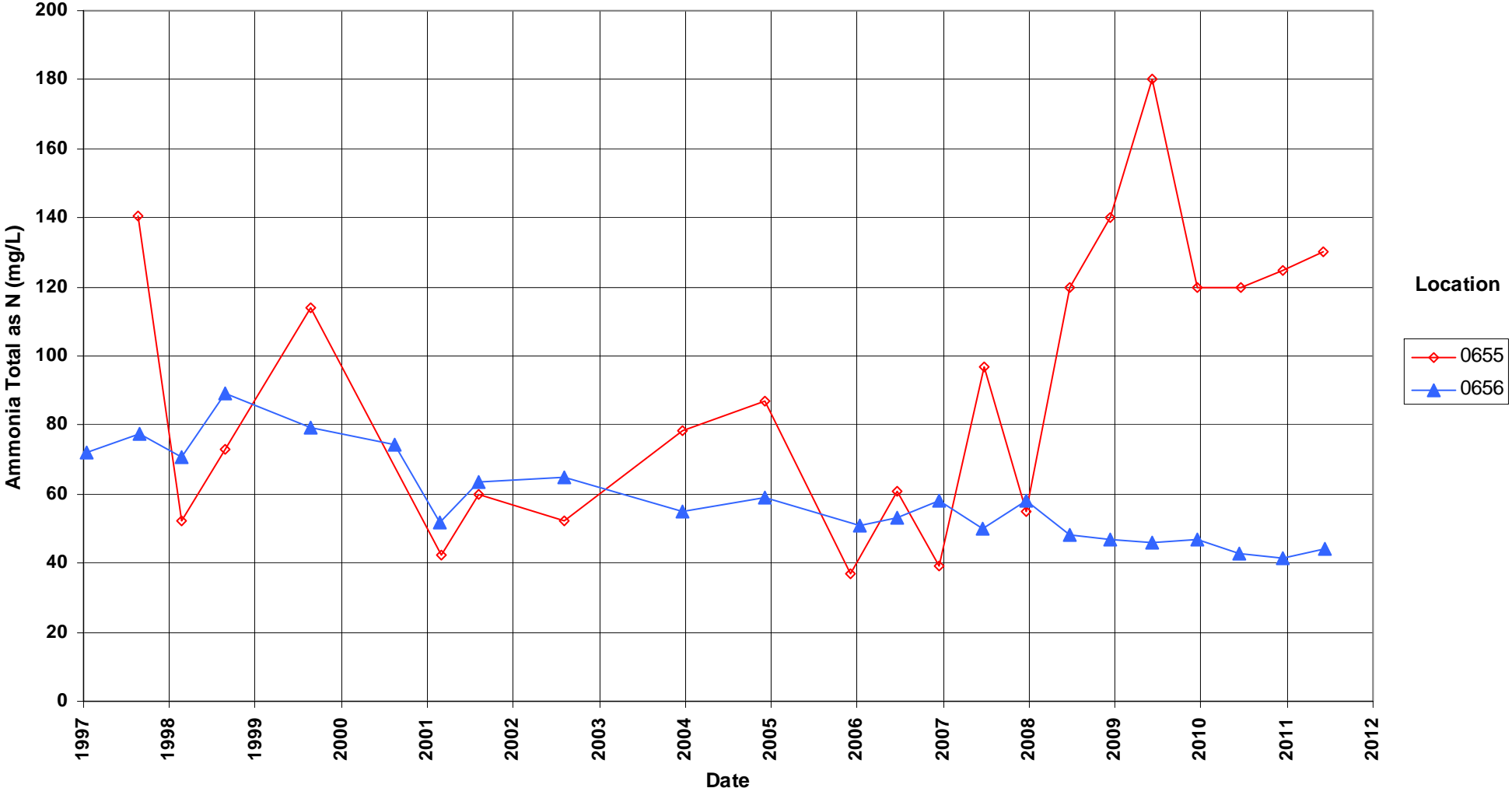
### Monument Valley Processing Site Ammonia Total as N Concentration



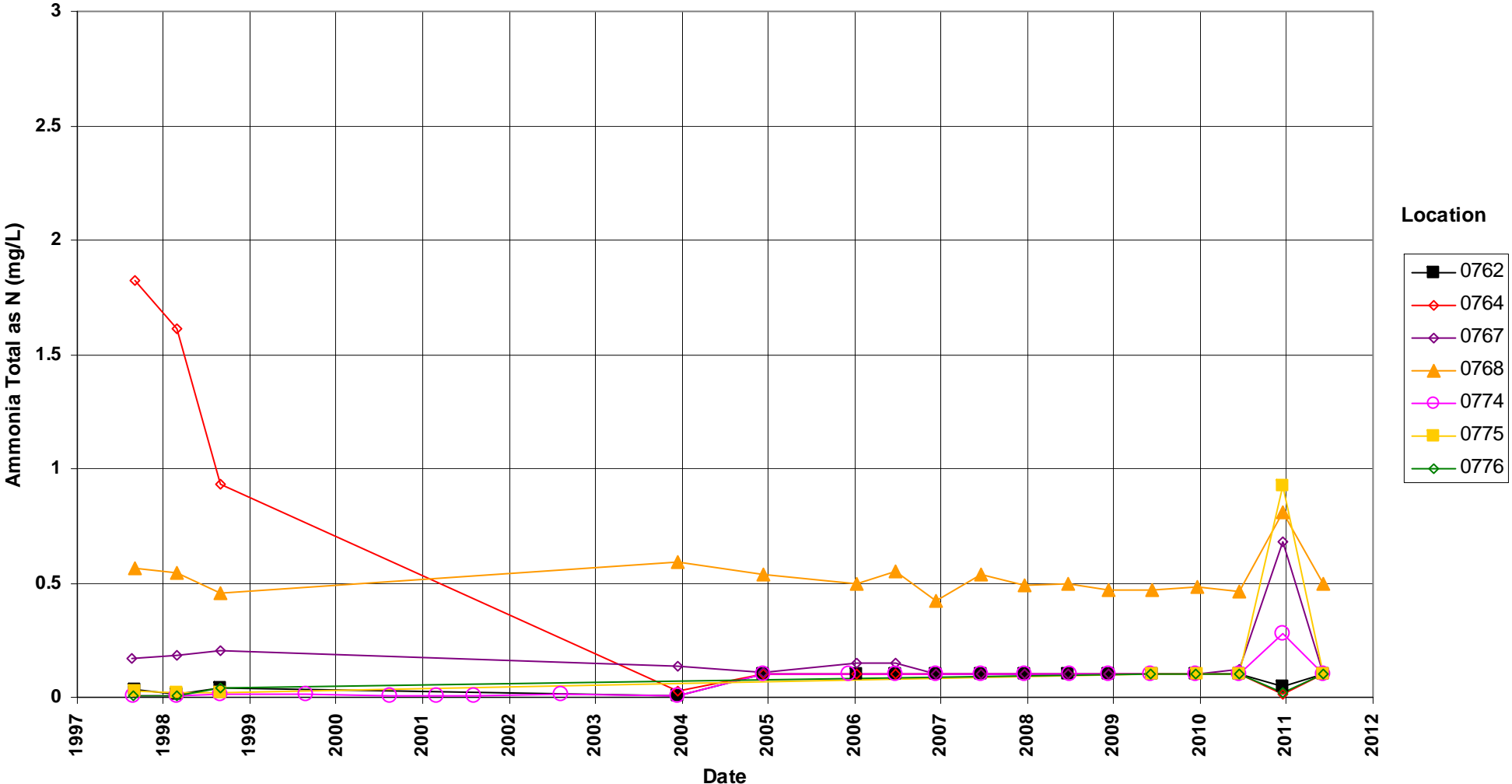
### Monument Valley Processing Site Ammonia Total as N Concentration



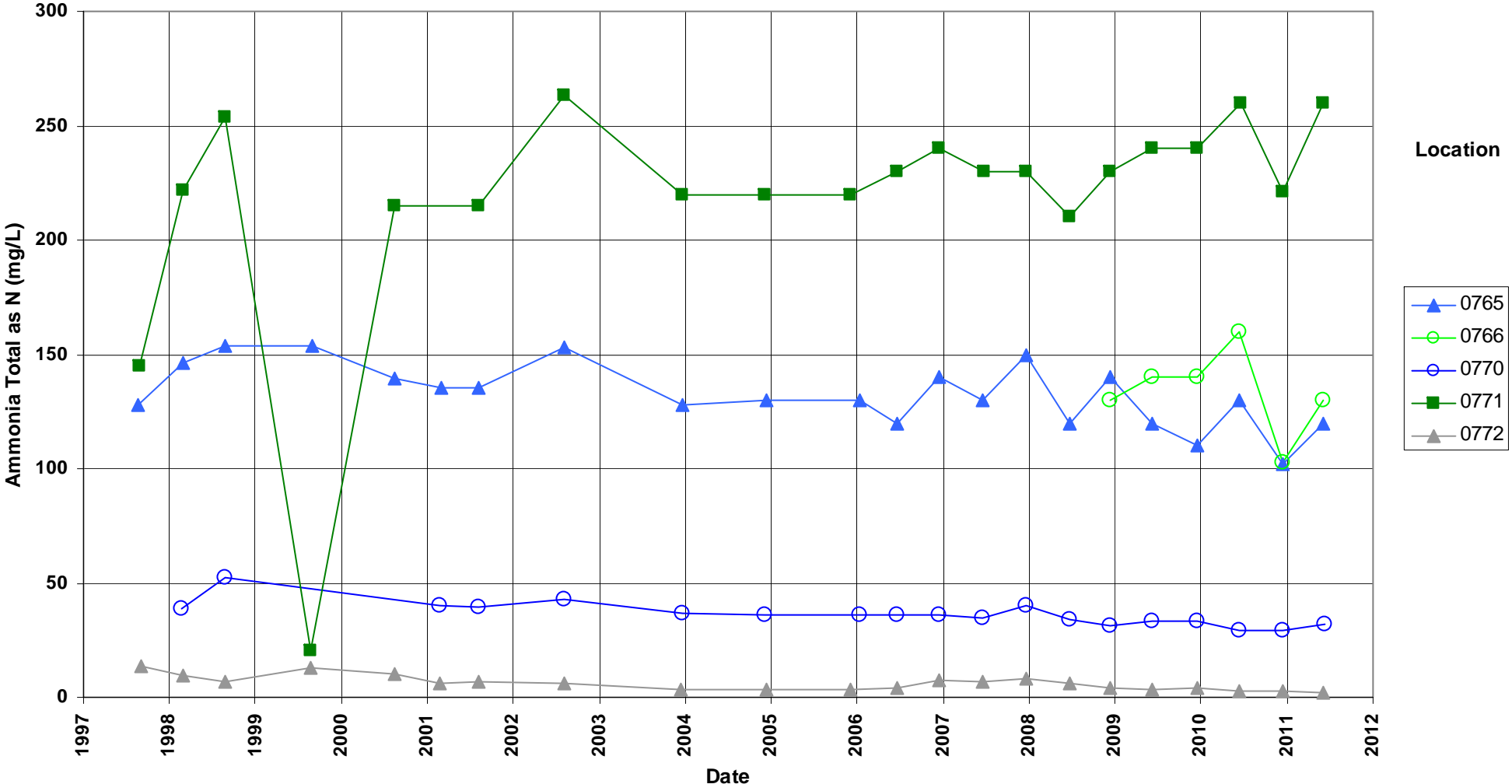
### Monument Valley Processing Site Ammonia Total as N Concentration



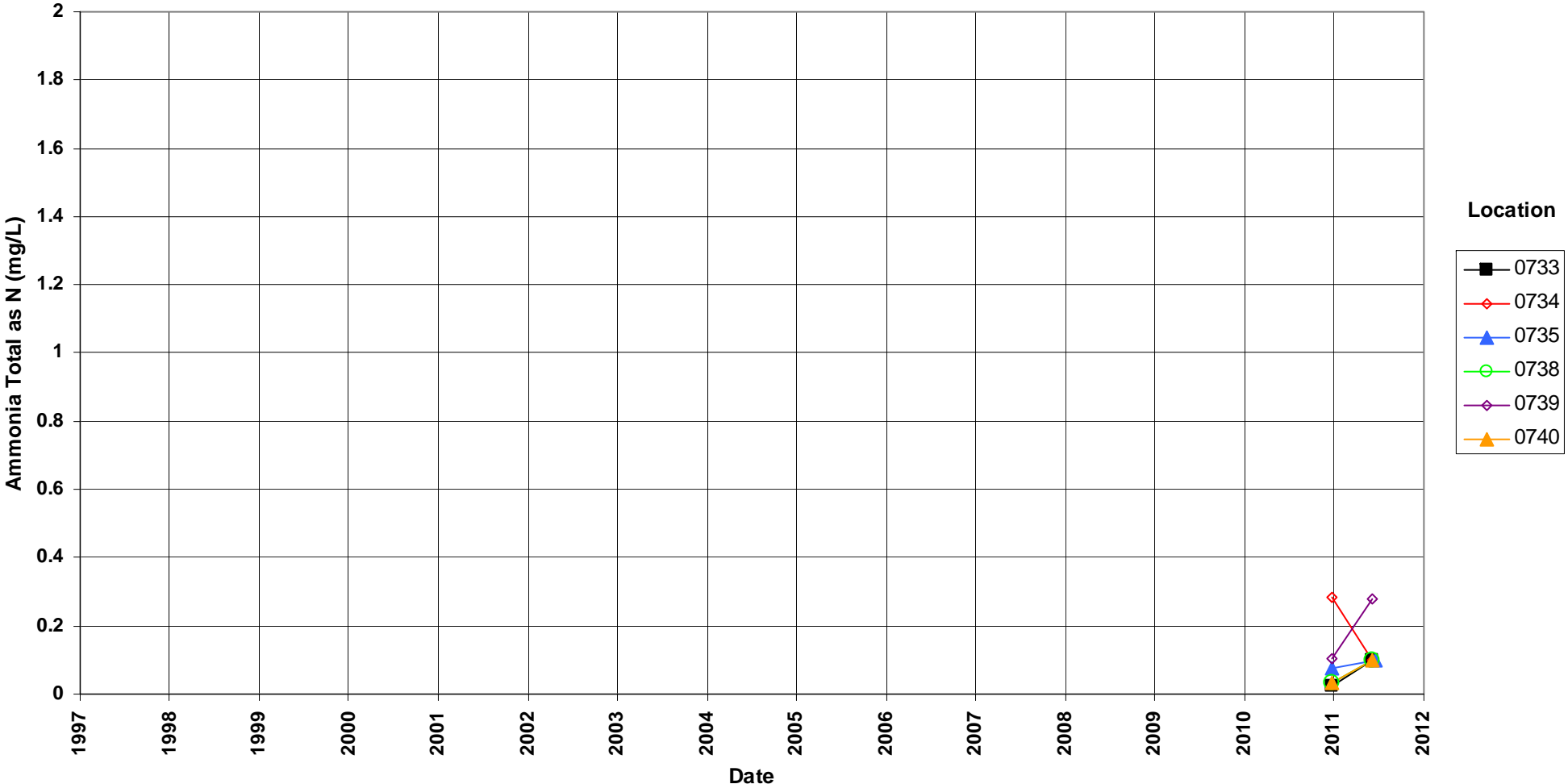
### Monument Valley Processing Site Ammonia Total as N Concentration



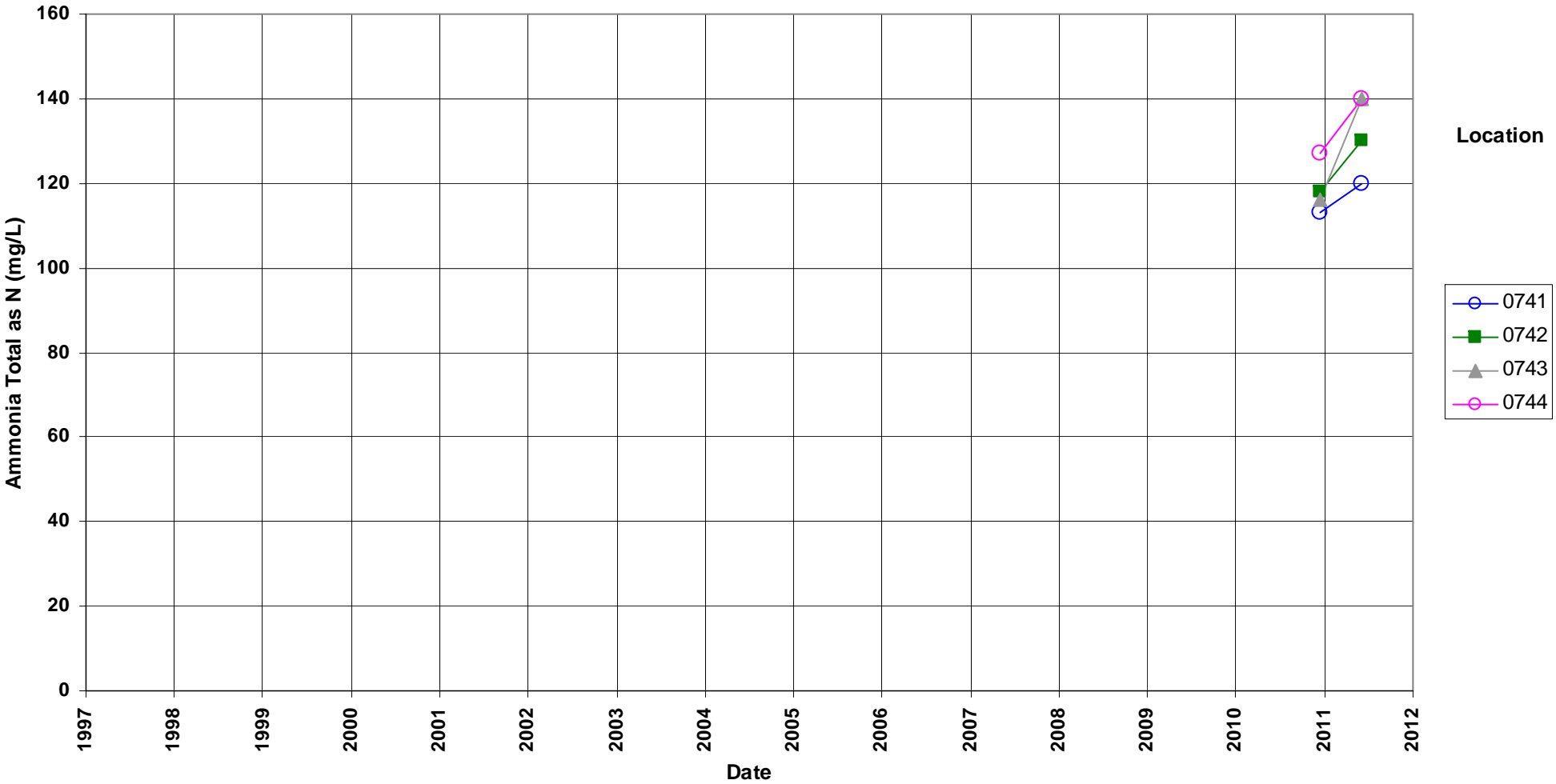
### Monument Valley Processing Site Ammonia Total as N Concentration



# Monument Valley Processing Site Ammonia Total as N Concentration

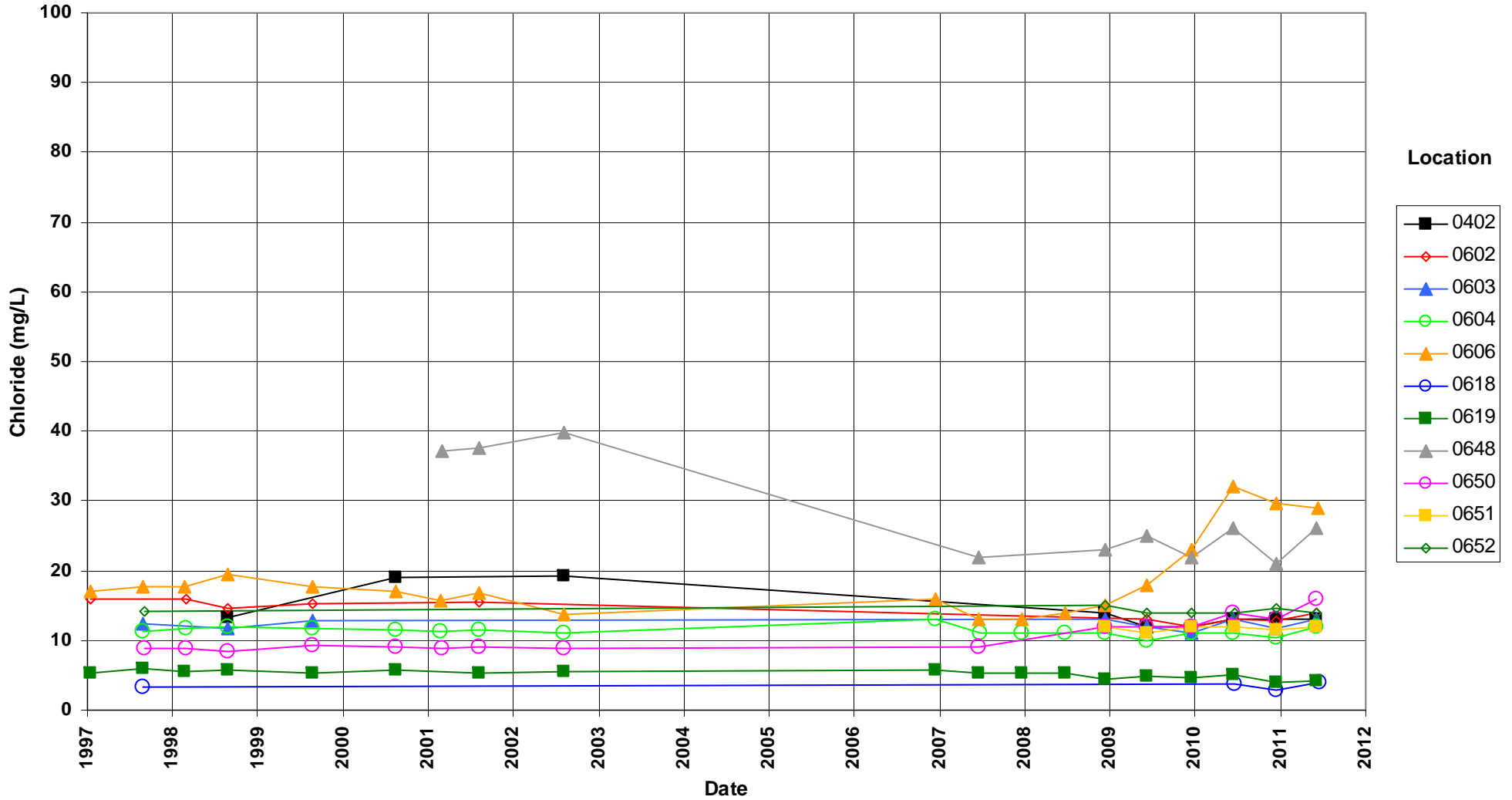


### Monument Valley Processing Site Ammonia Total as N Concentration

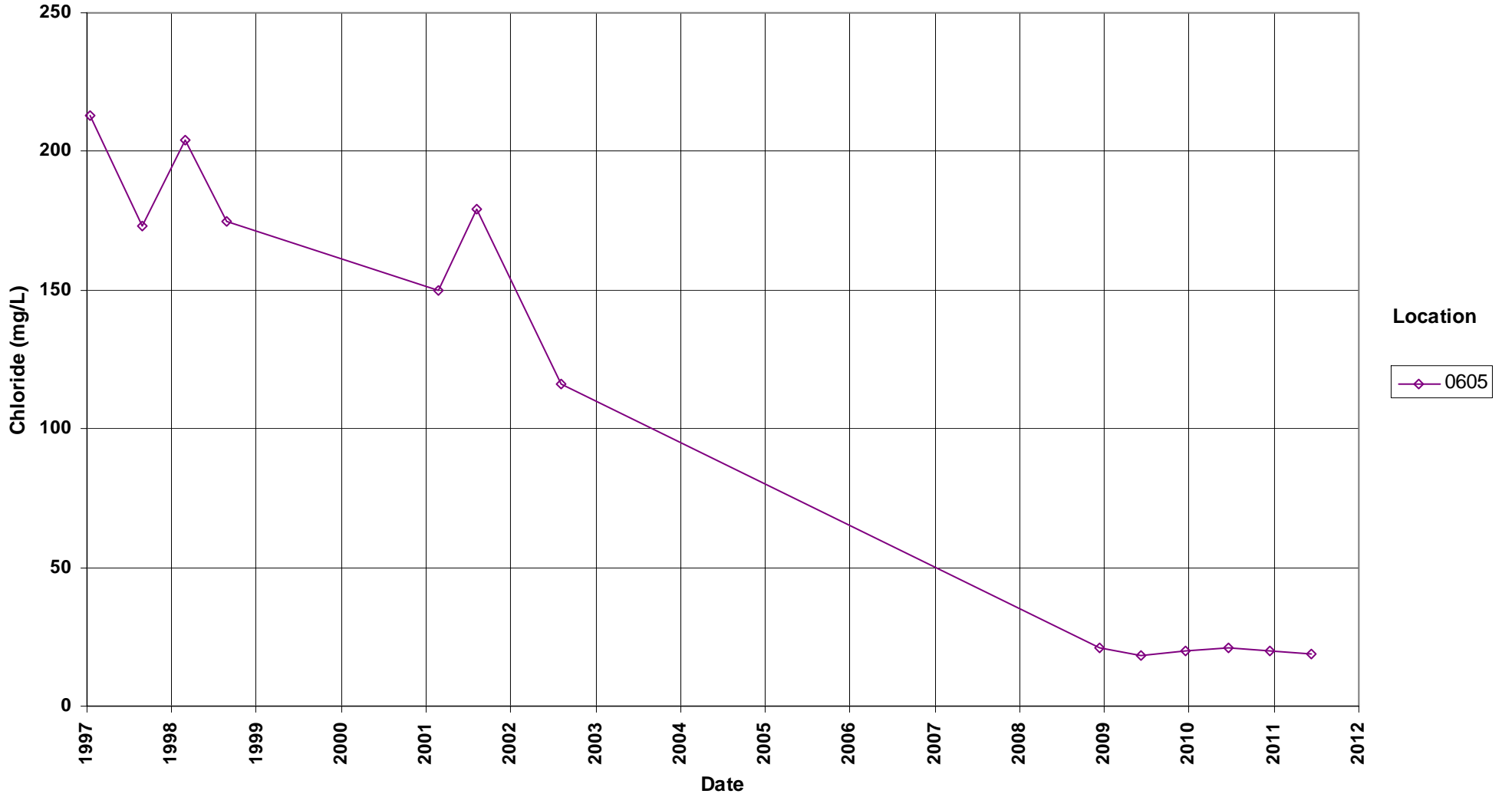




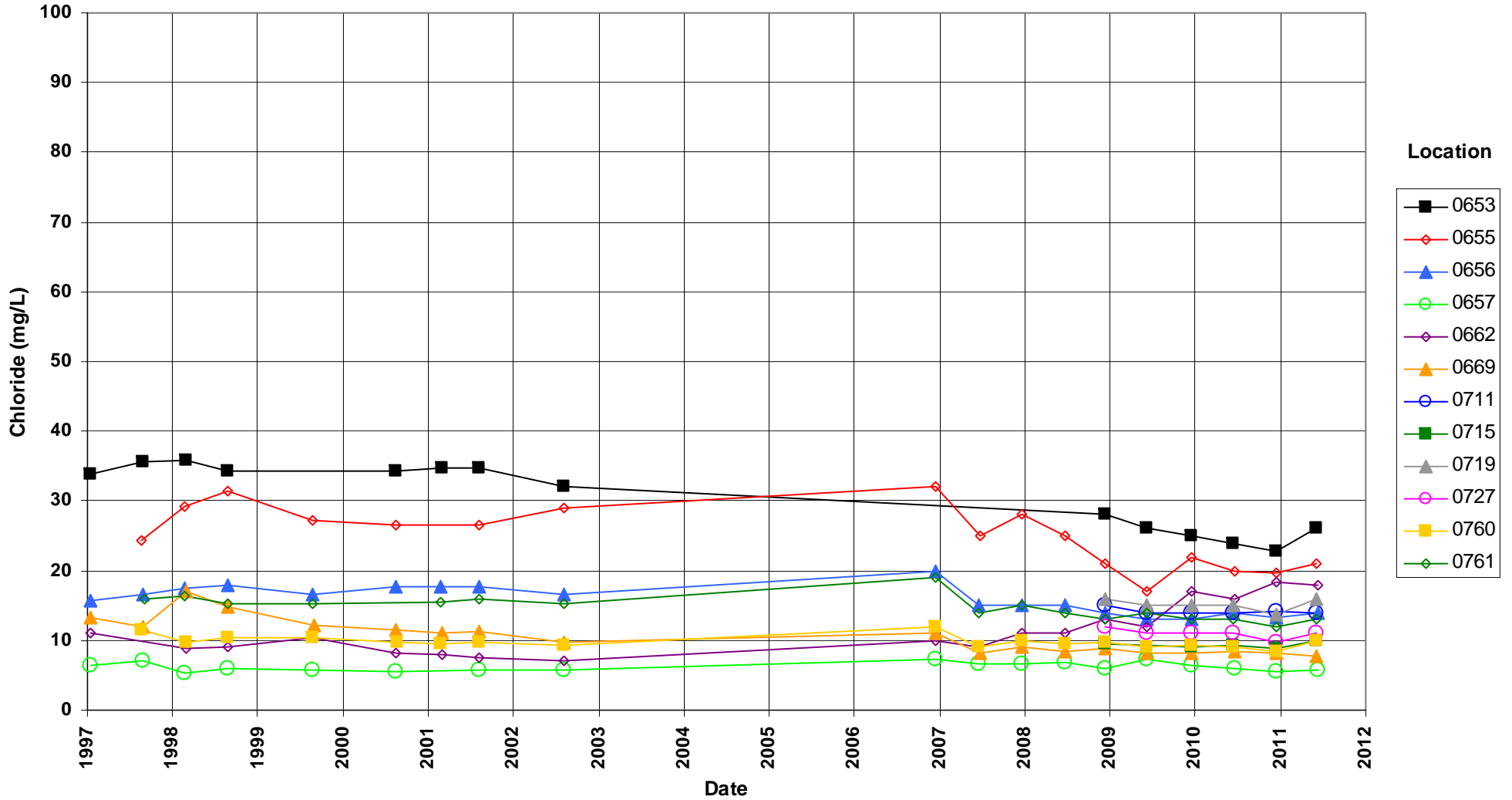
## Monument Valley Processing Site Chloride Concentration



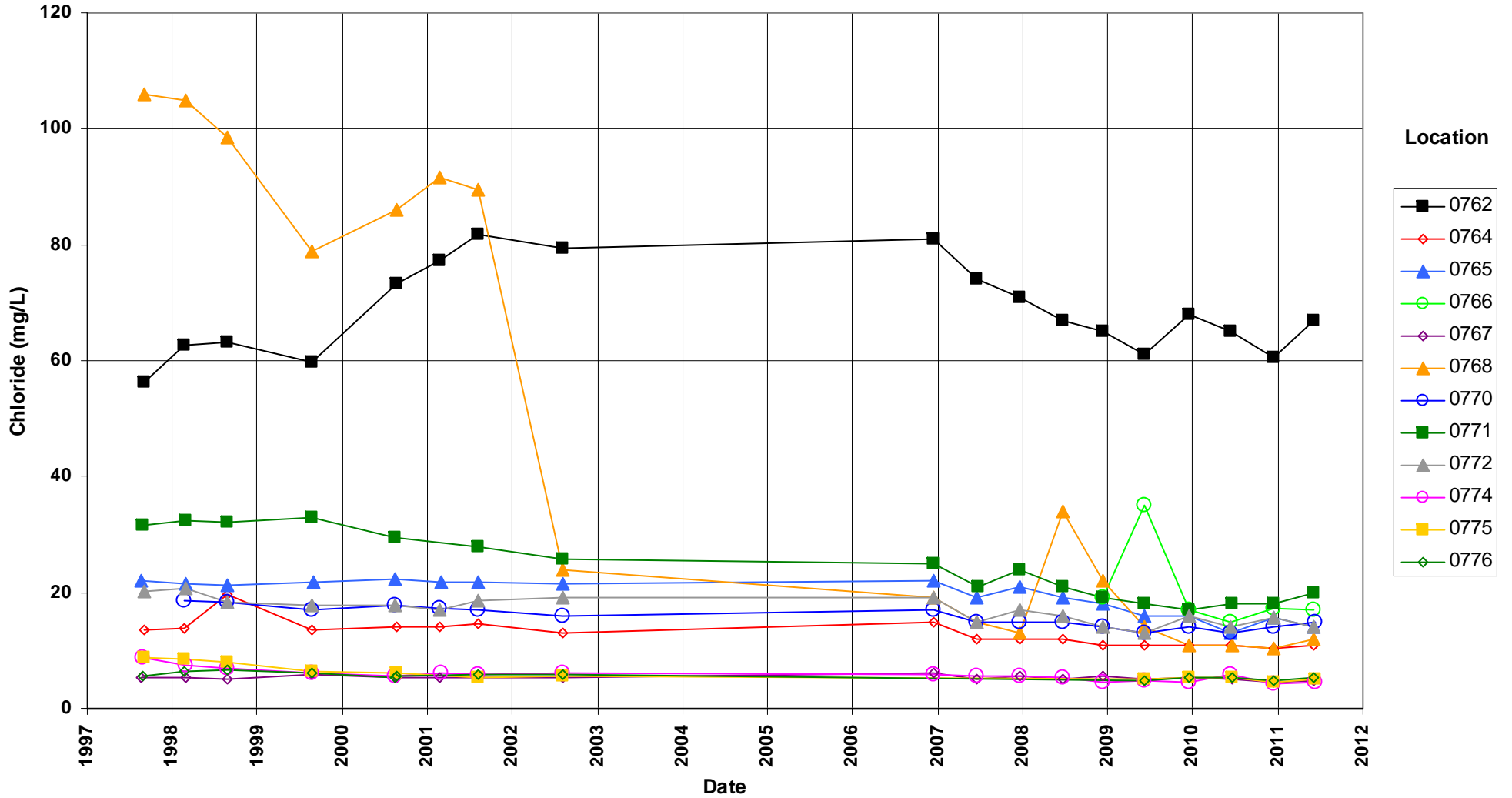
### Monument Valley Processing Site Chloride Concentration



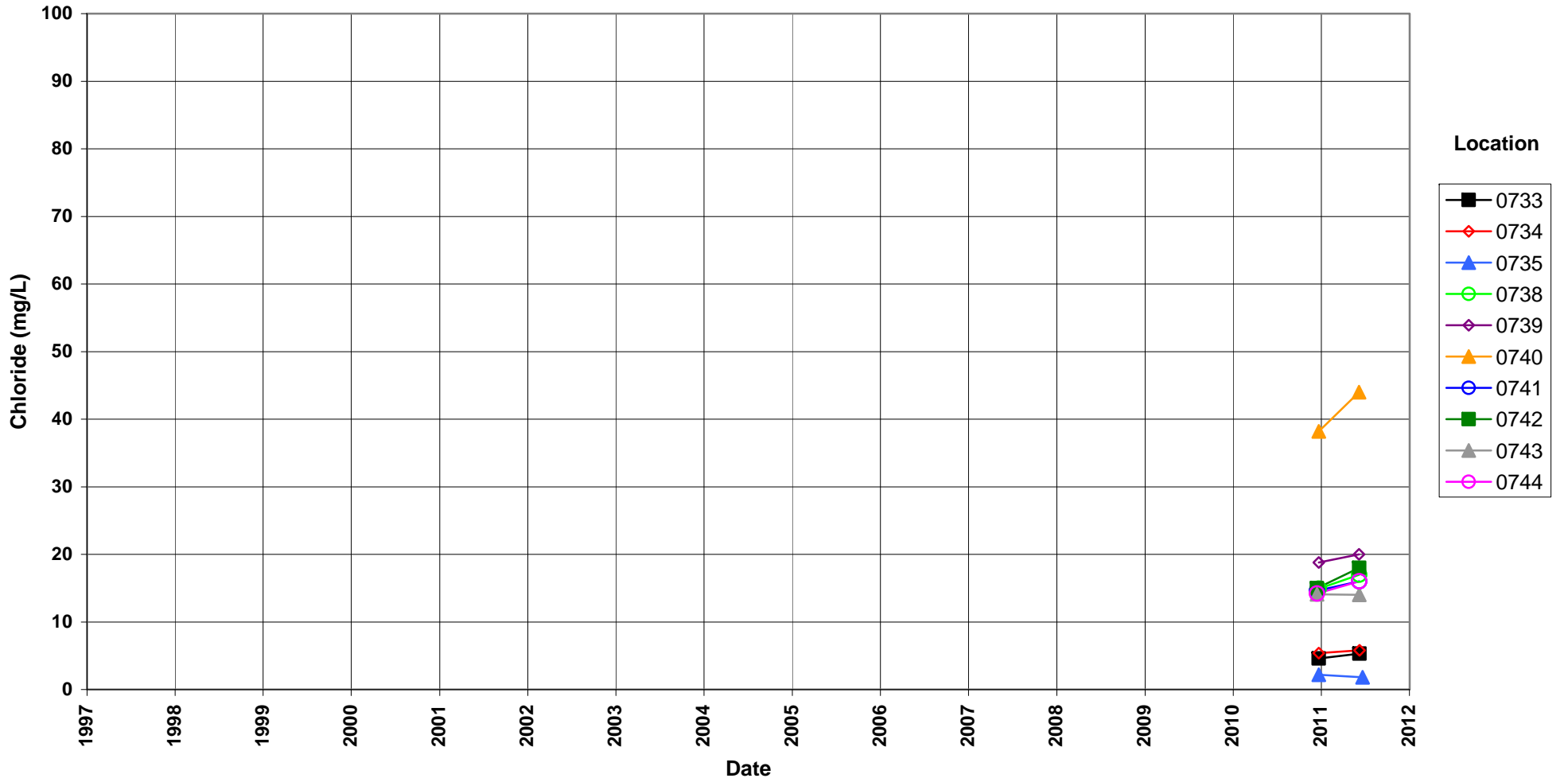
# Monument Valley Processing Site Chloride Concentration



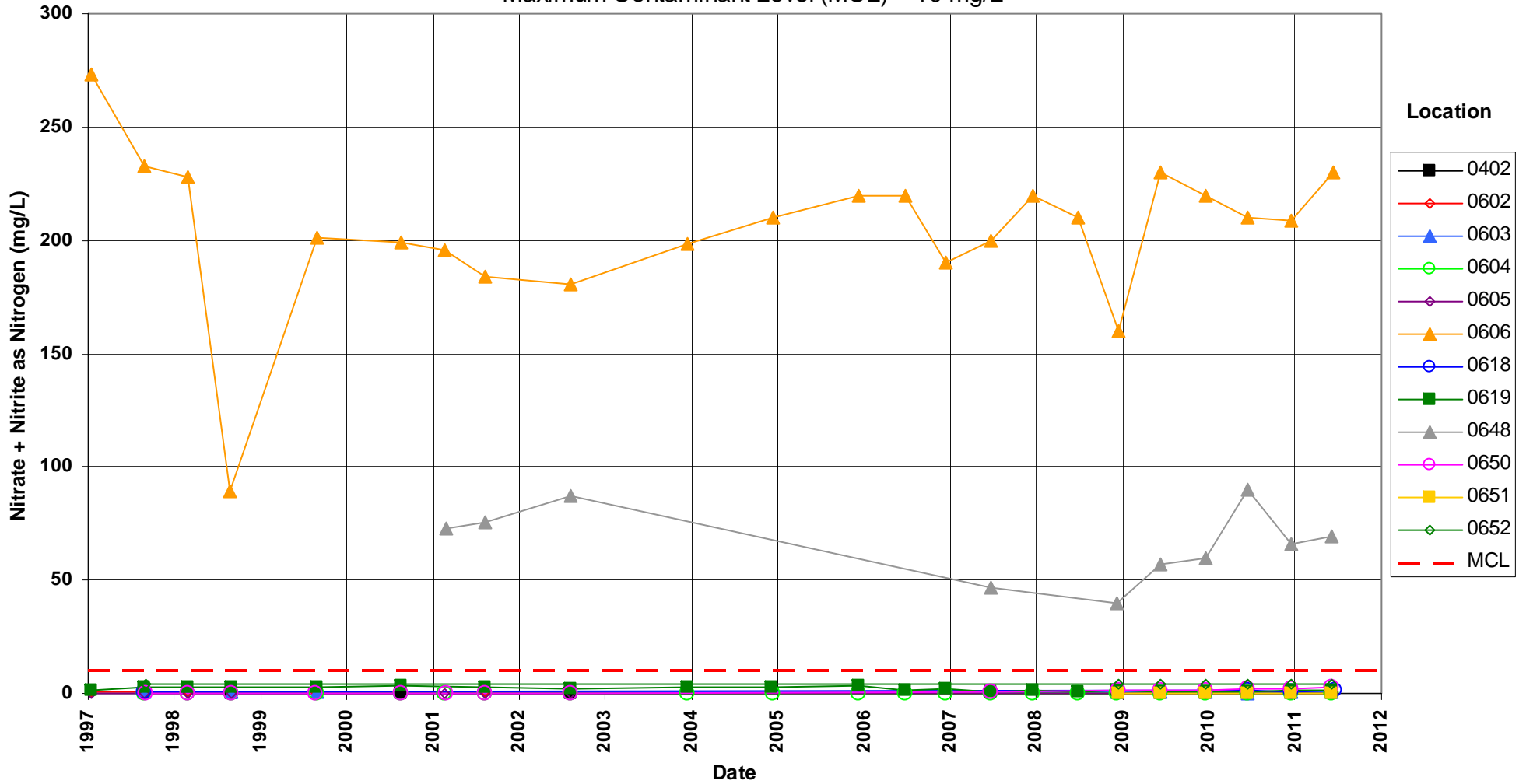
### Monument Valley Processing Site Chloride Concentration



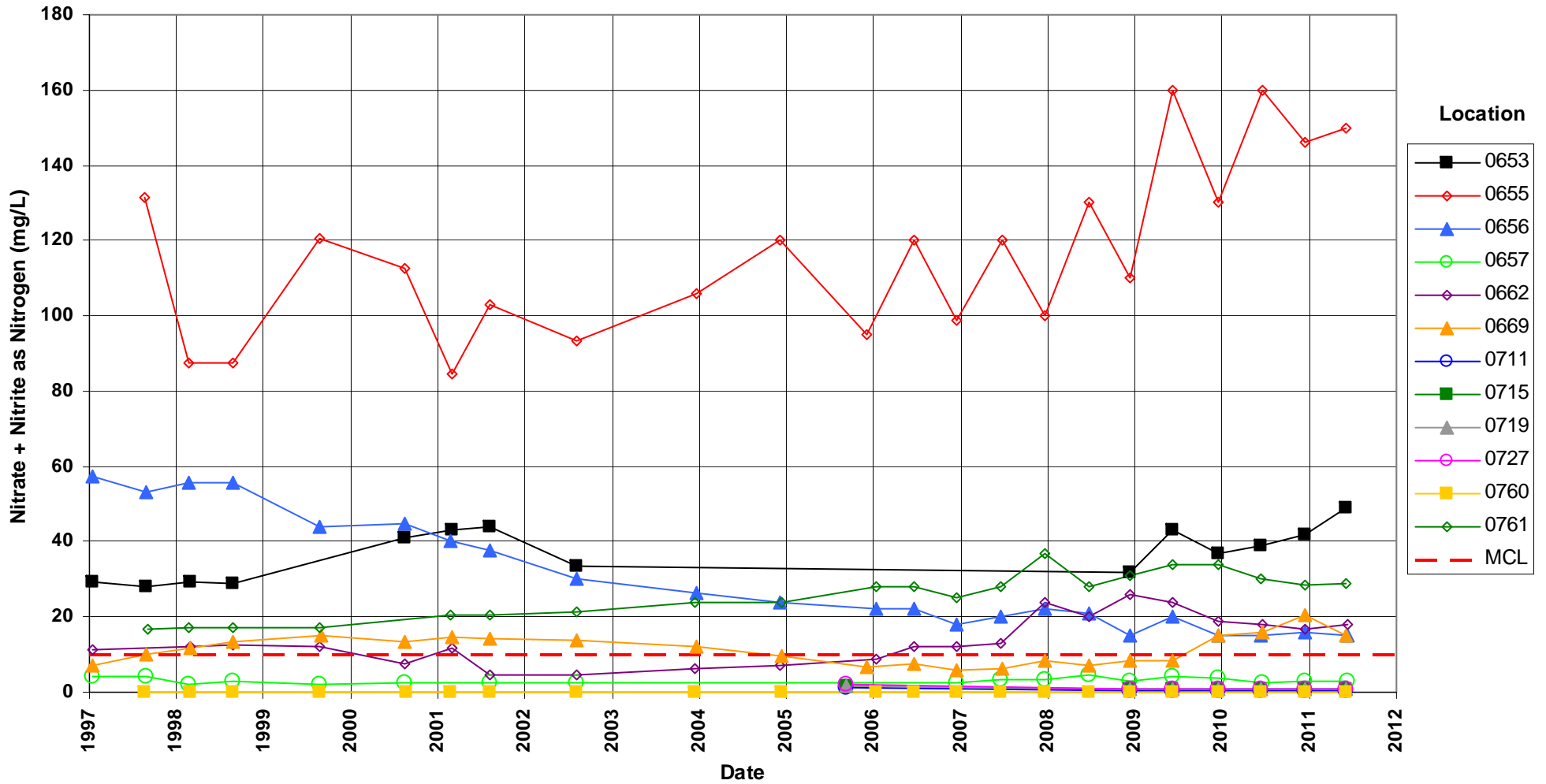
# Monument Valley Processing Site Chloride Concentration



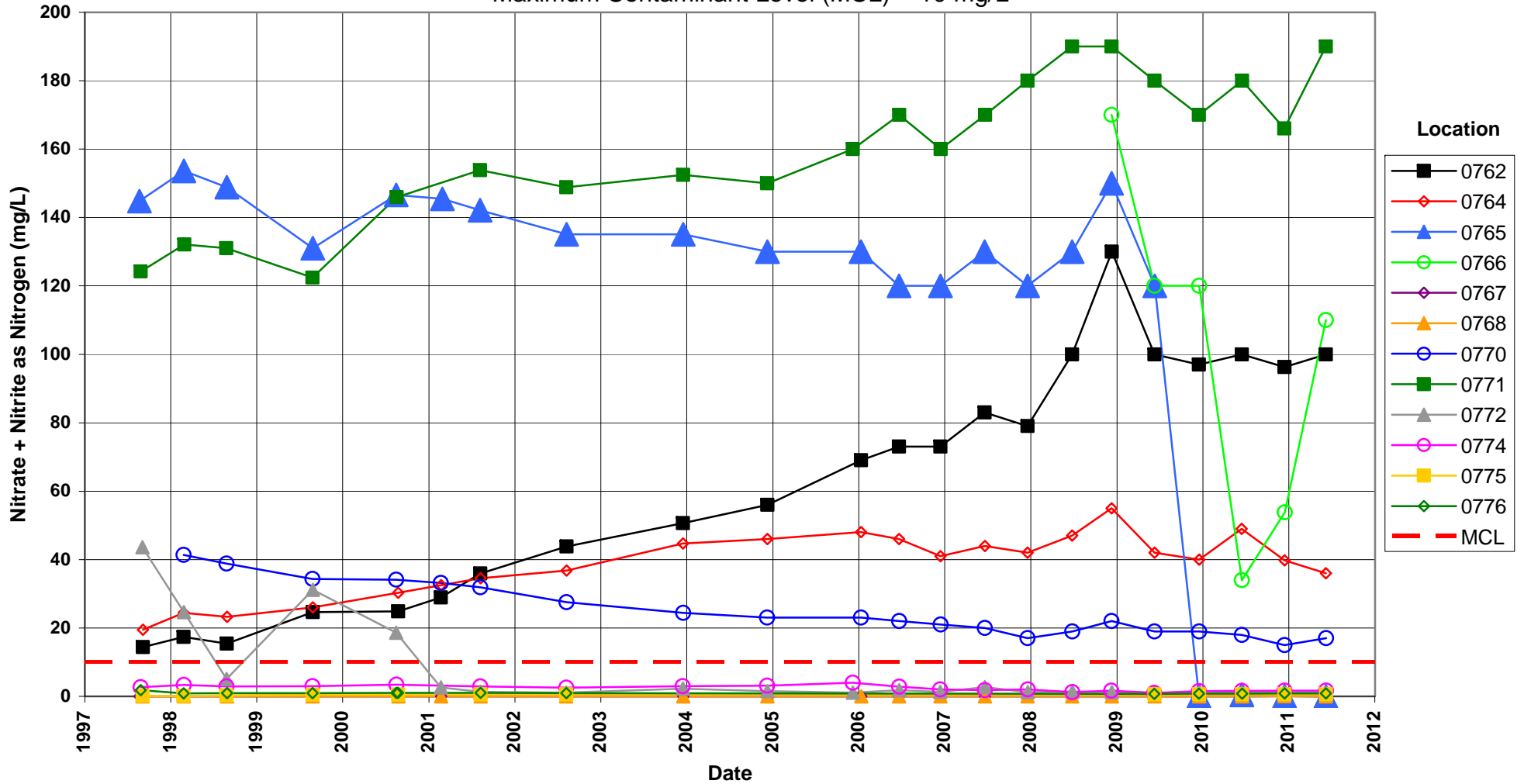
**Monument Valley Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
 Maximum Contaminant Level (MCL) = 10 mg/L



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

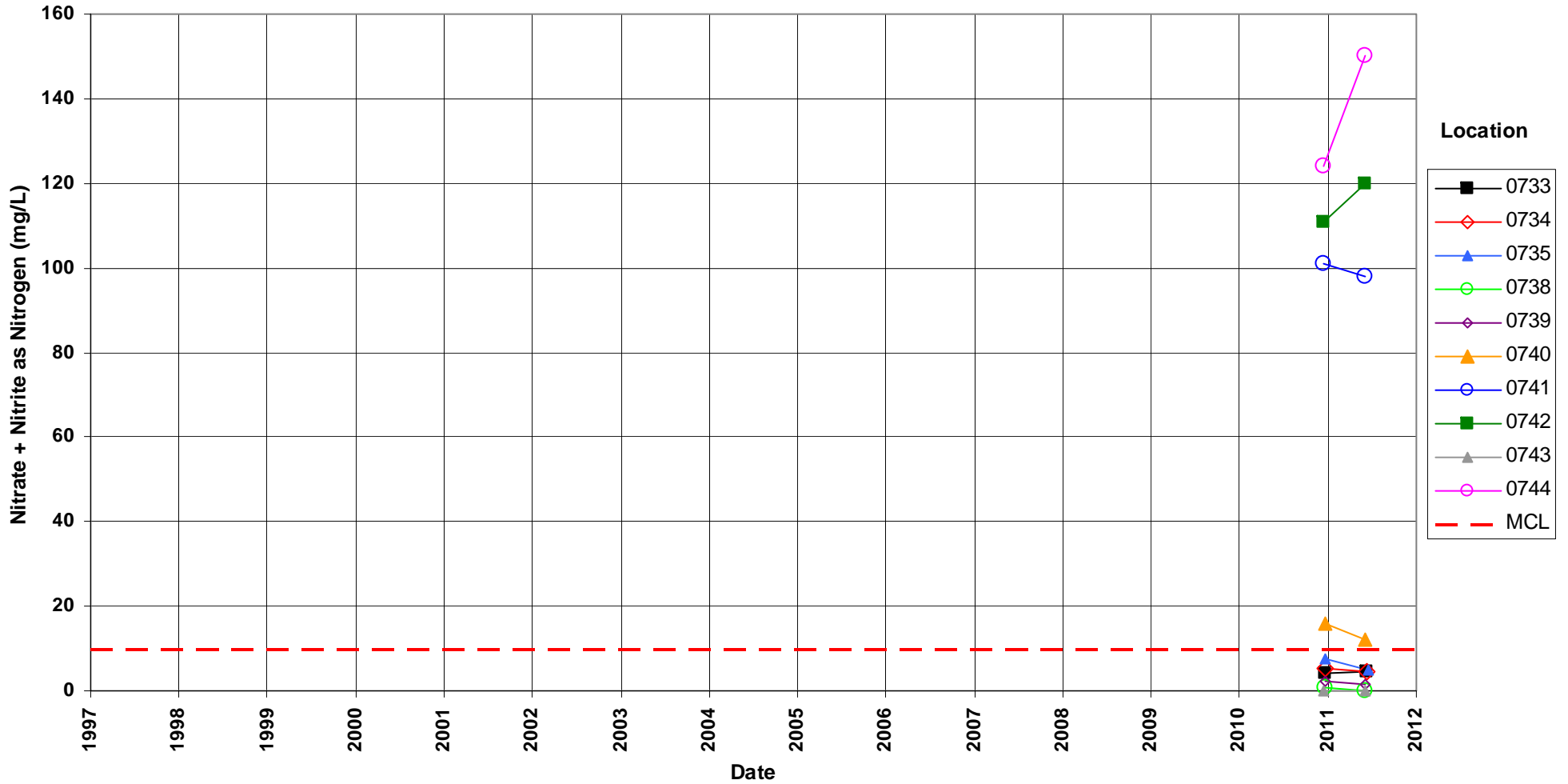


**Monument Valley Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
 Maximum Contaminant Level (MCL) = 10 mg/L

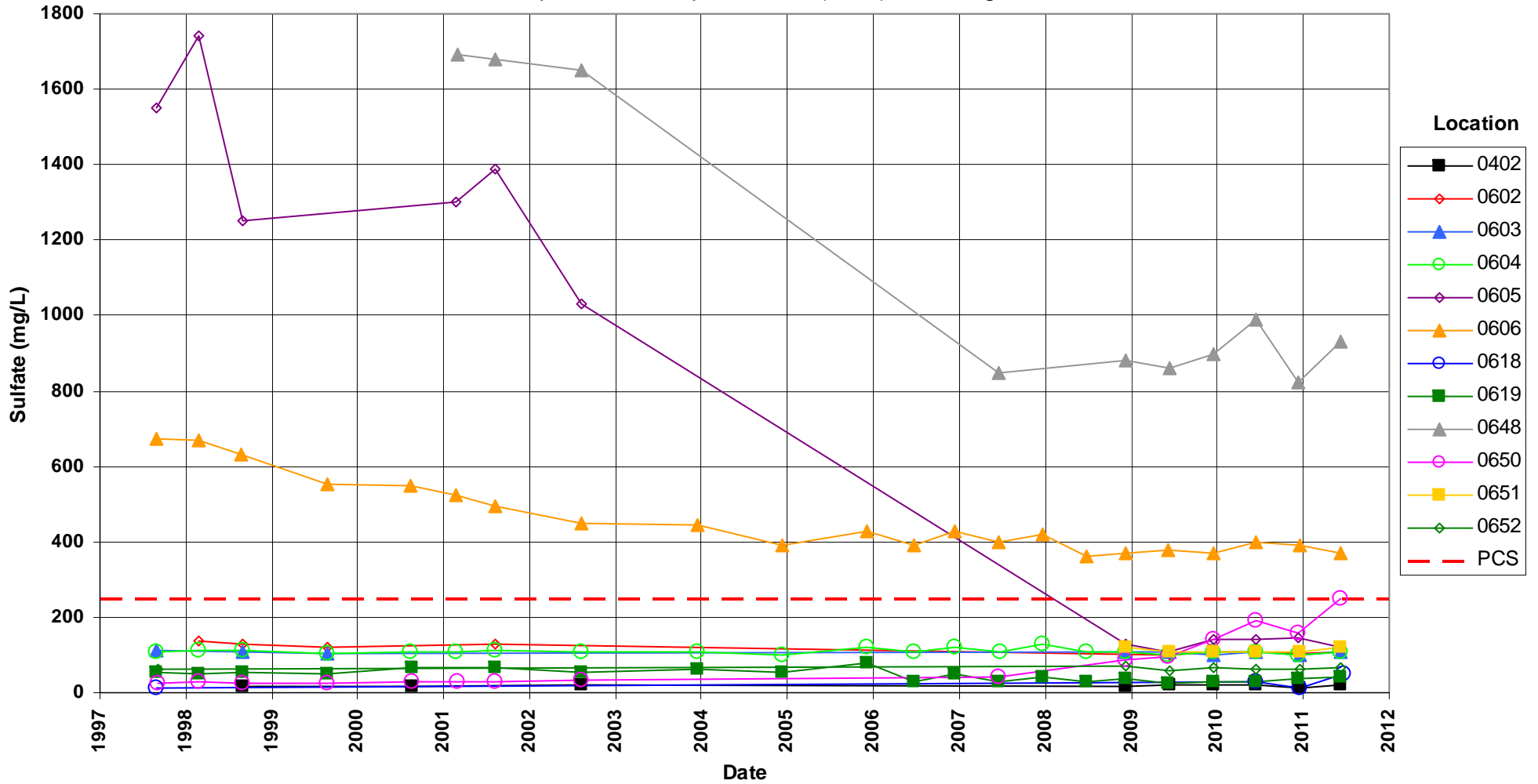




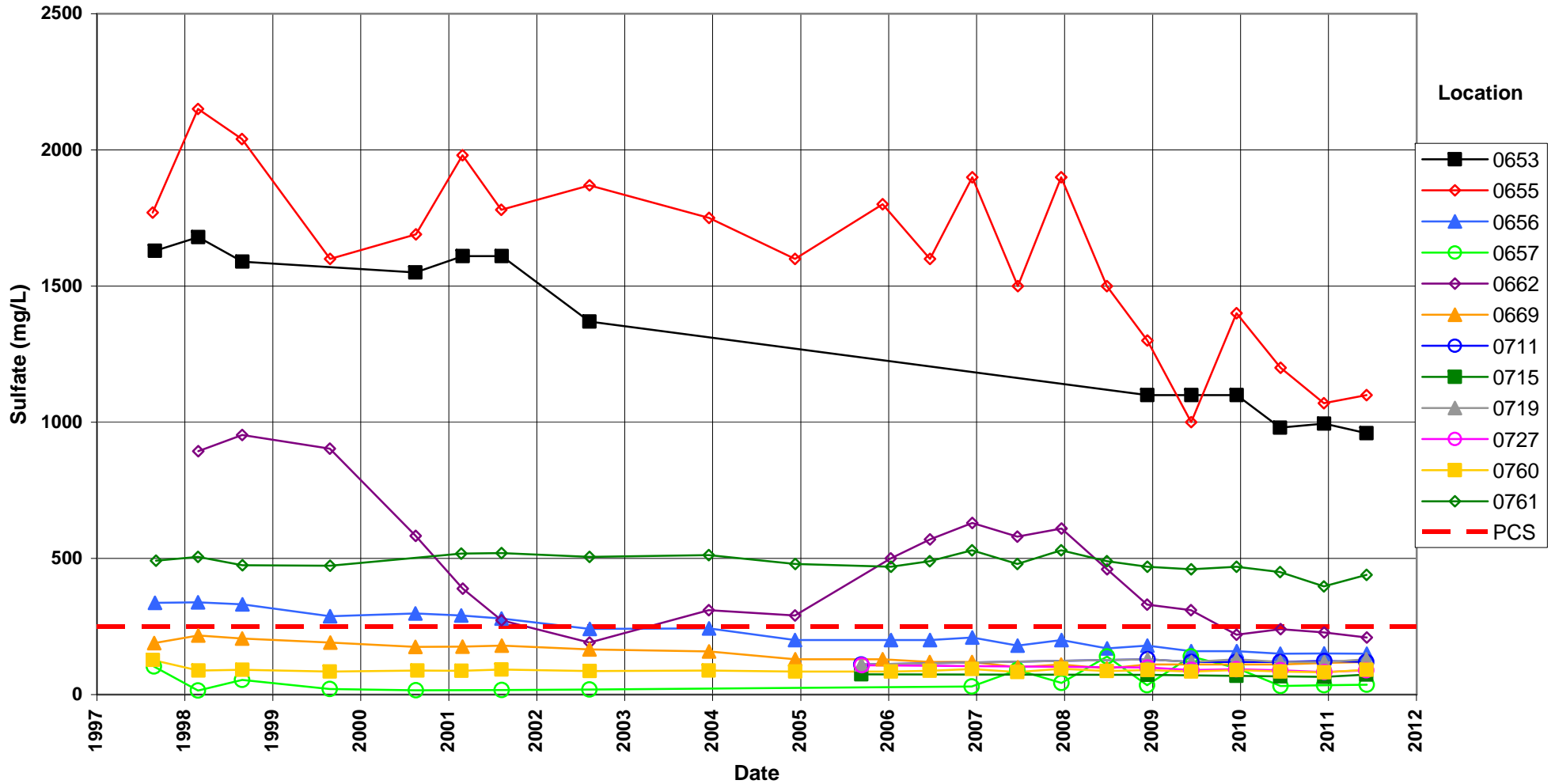
**Monument Valley Processing Site**  
**Nitrate + Nitrite as Nitrogen Concentration**  
Maximum Contaminant Level (MCL) = 10 mg/L



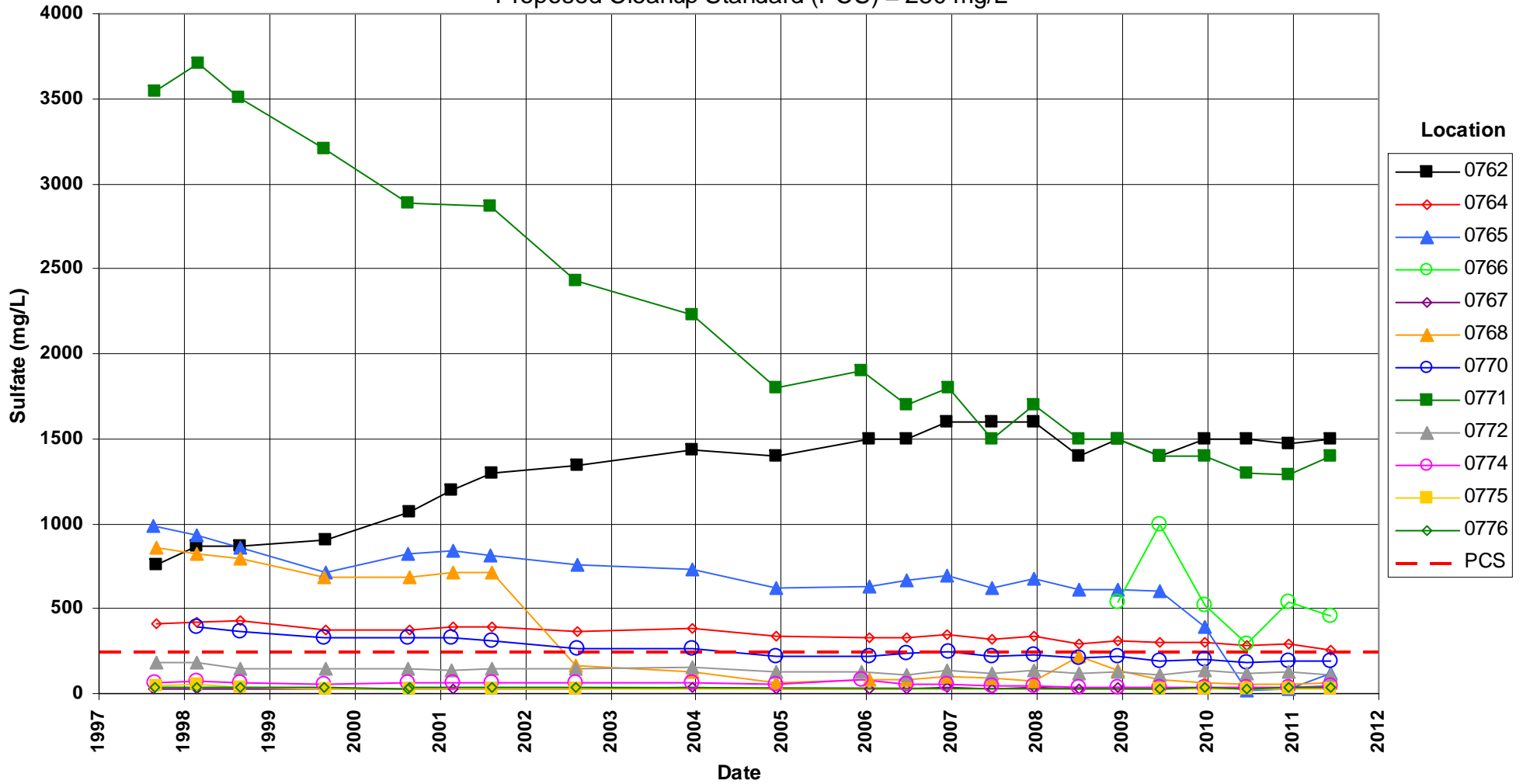
**Monument Valley Processing Site**  
**Sulfate Concentration**  
Proposed Cleanup Standard (PCS) = 250 mg/L



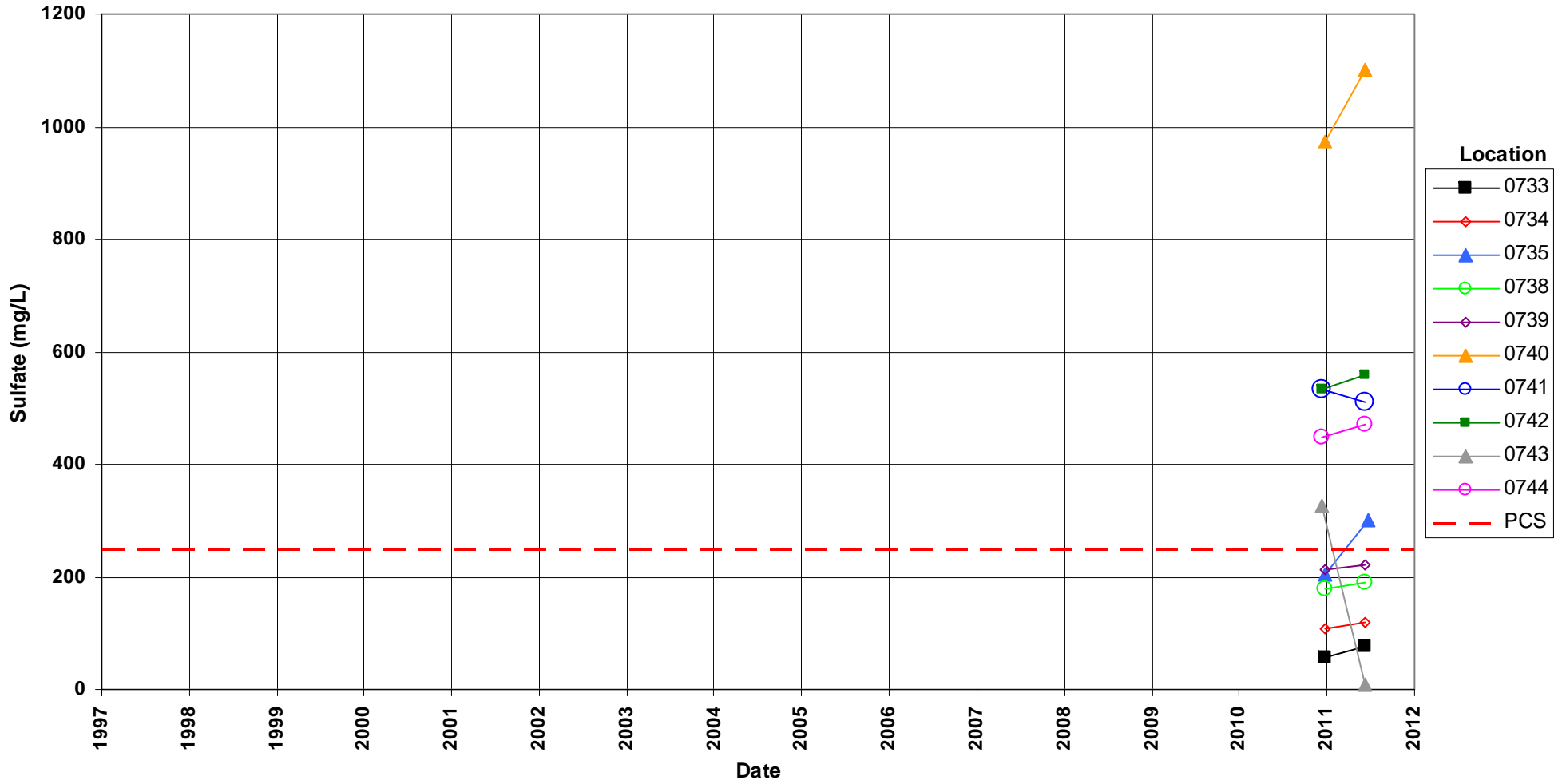
**Monument Valley Processing Site  
Sulfate Concentration**  
Proposed Cleanup Standard (PCS) = 250 mg/L



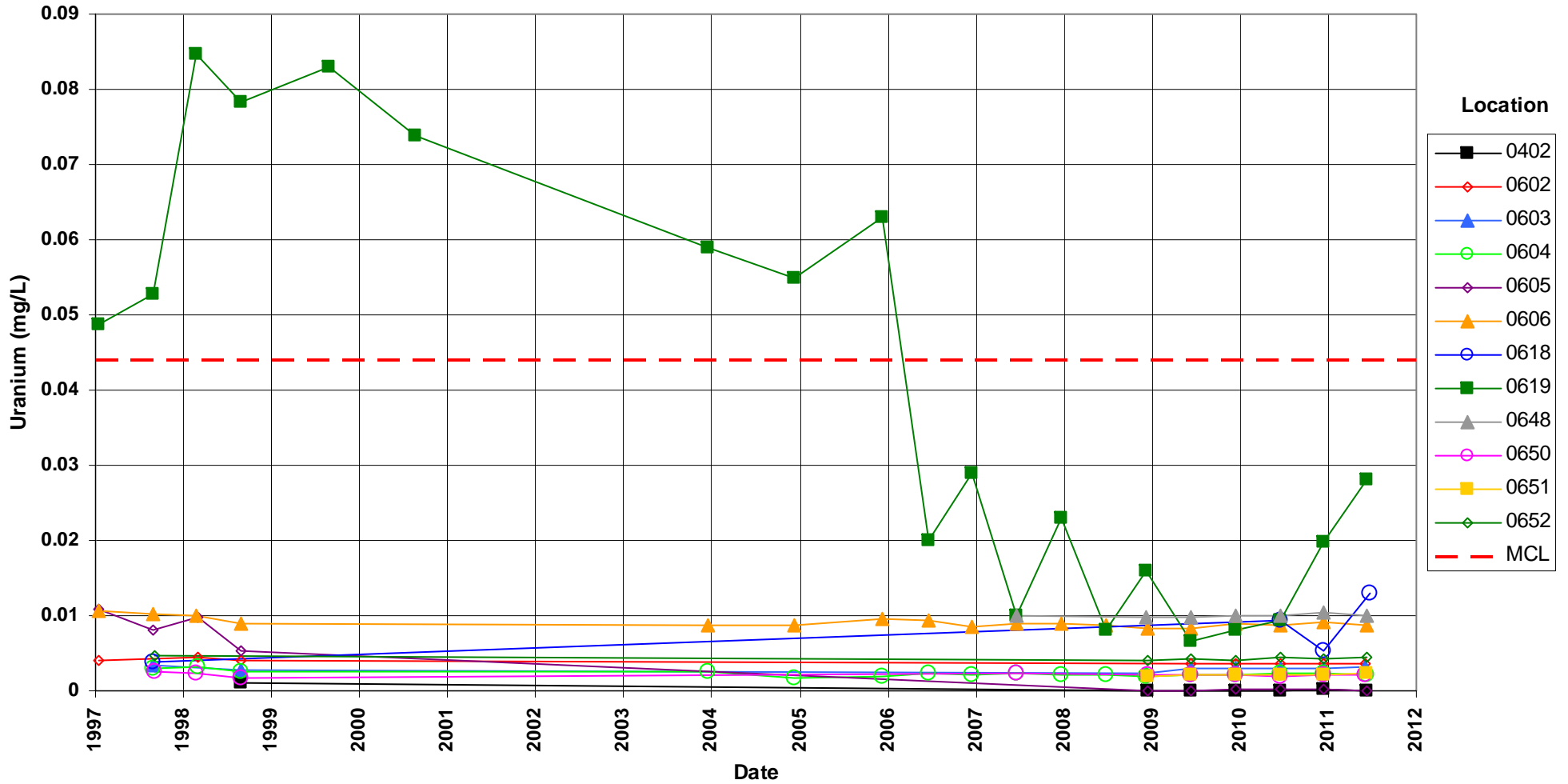
**Monument Valley Processing Site**  
**Sulfate Concentration**  
Proposed Cleanup Standard (PCS) = 250 mg/L



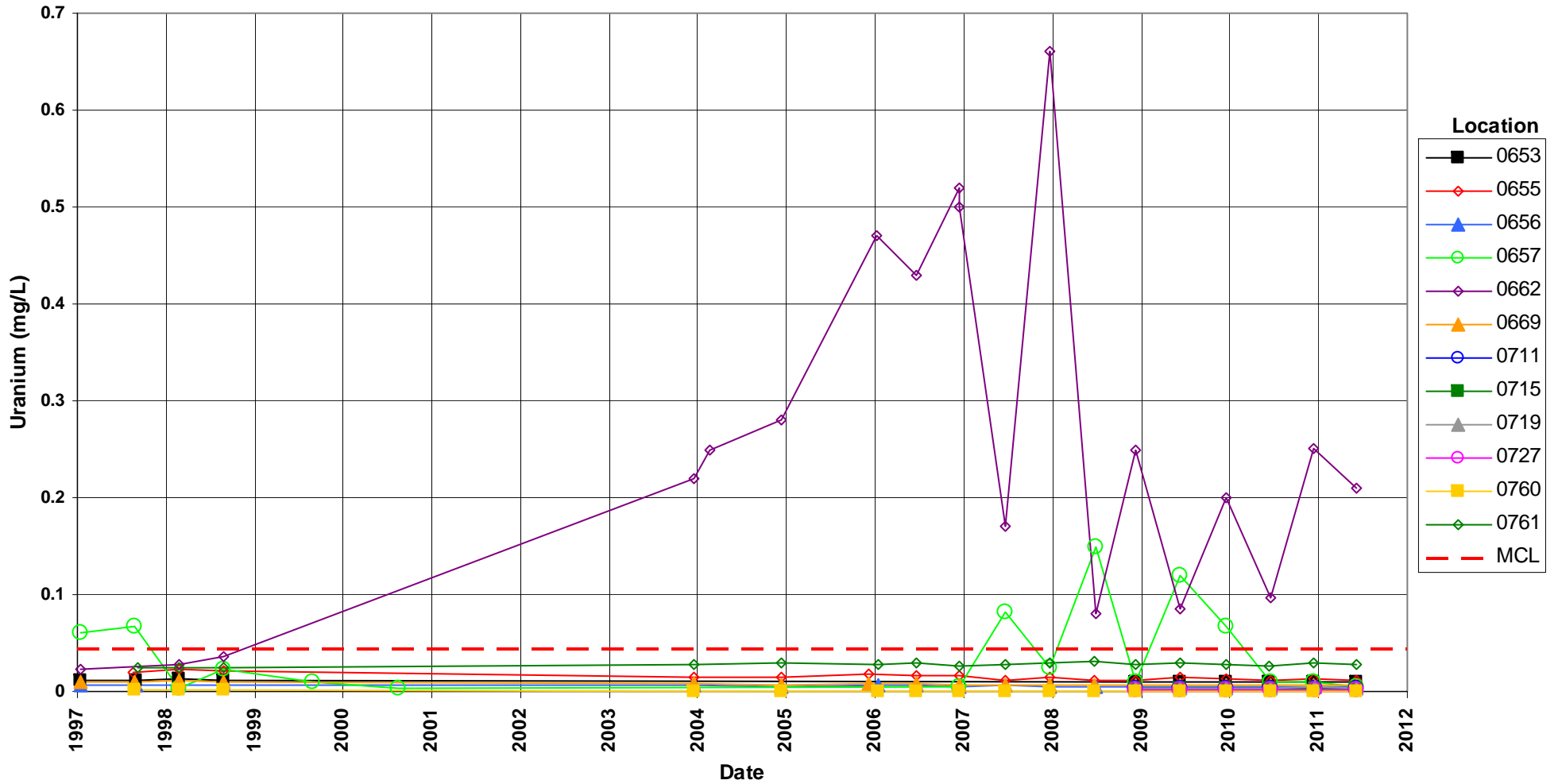
**Monument Valley Processing Site**  
**Sulfate Concentration**  
Proposed Cleanup Standard (PCS) = 250 mg/L



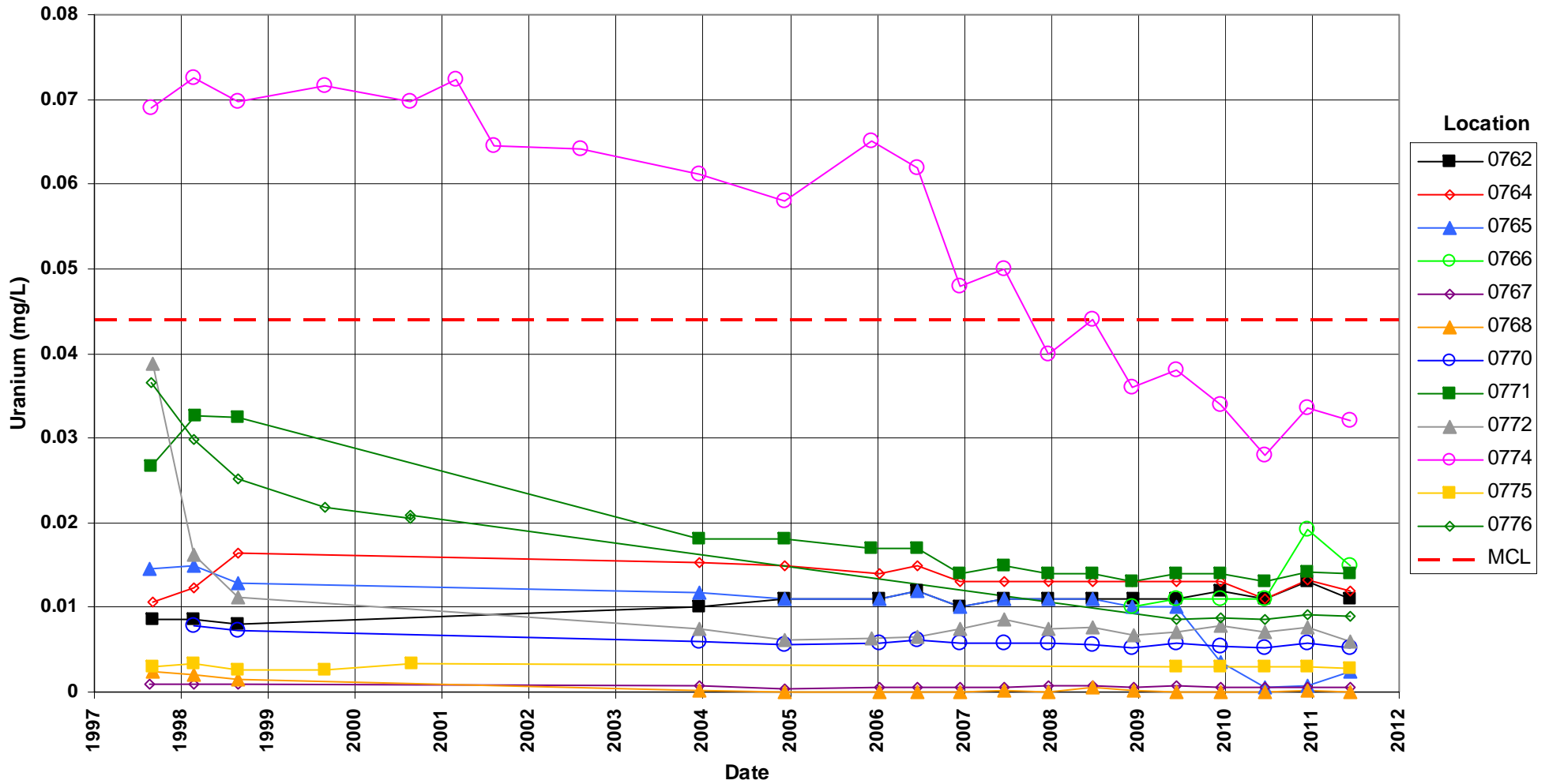
**Monument Valley Processing Site**  
**Uranium Concentration**  
 Maximum Contaminant Level (MCL) = 0.044 mg/L



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

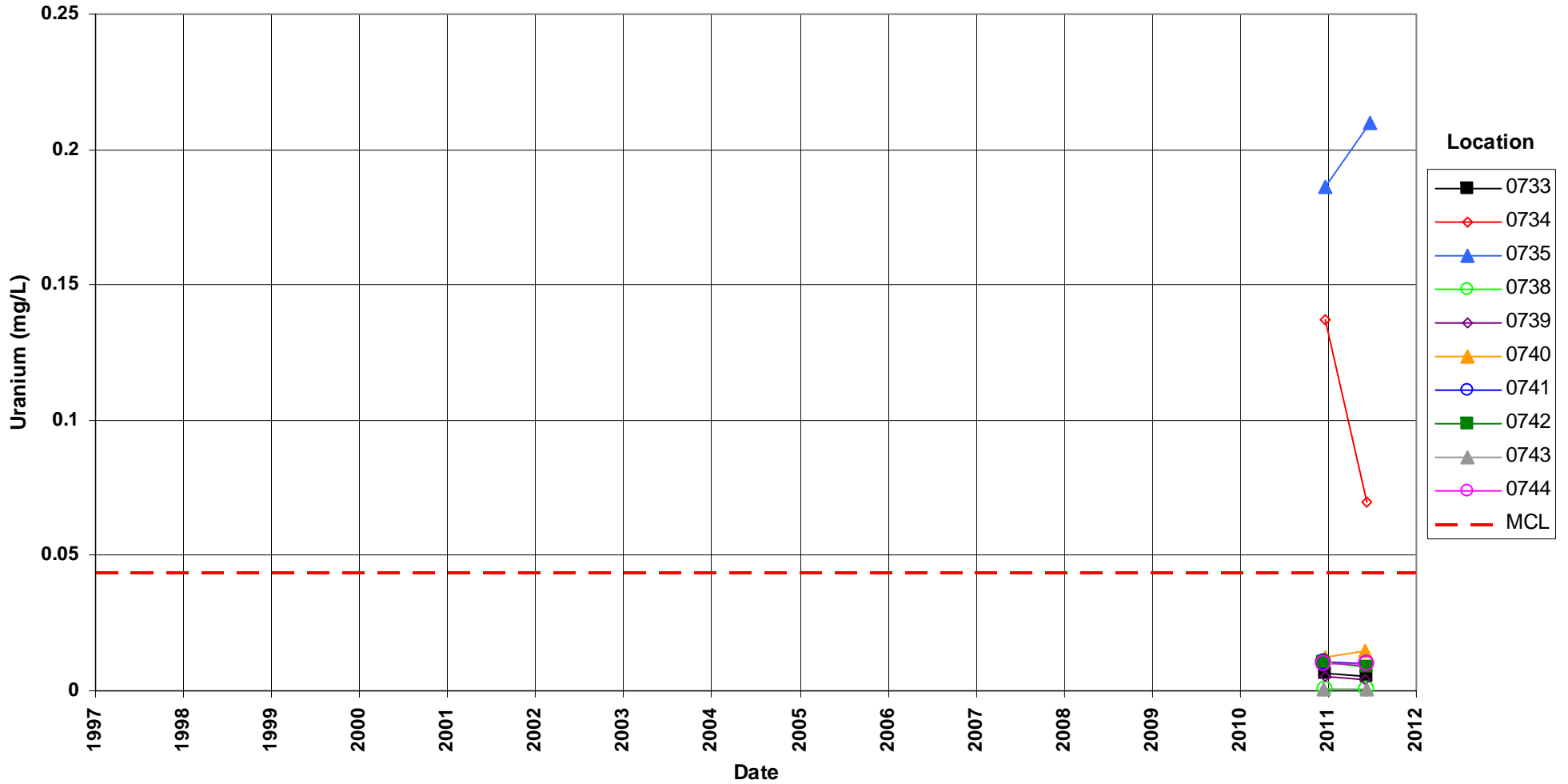


**Monument Valley Processing Site  
Uranium Concentration**  
Maximum Contaminant Level (MCL) = 0.044 mg/L

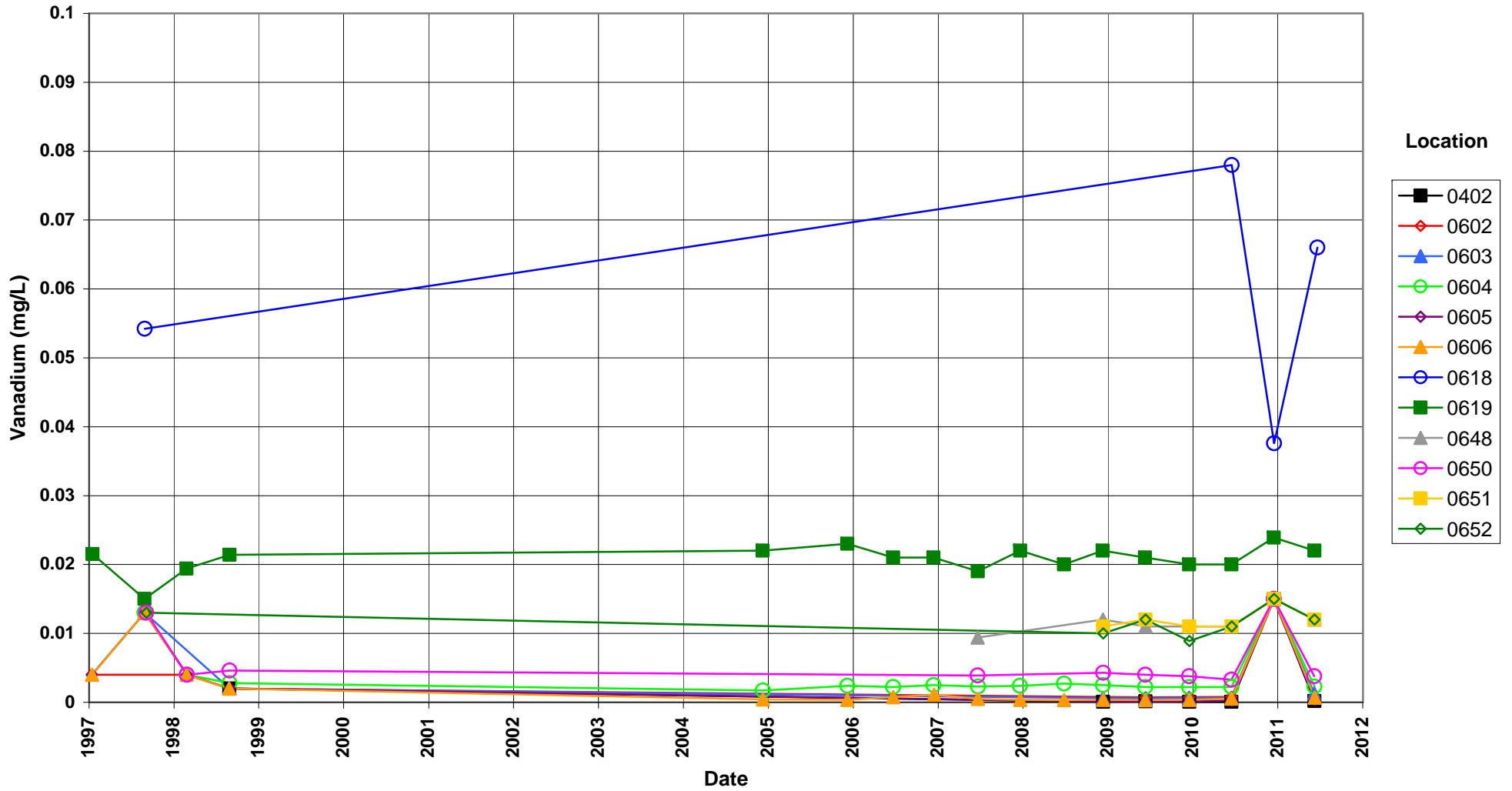




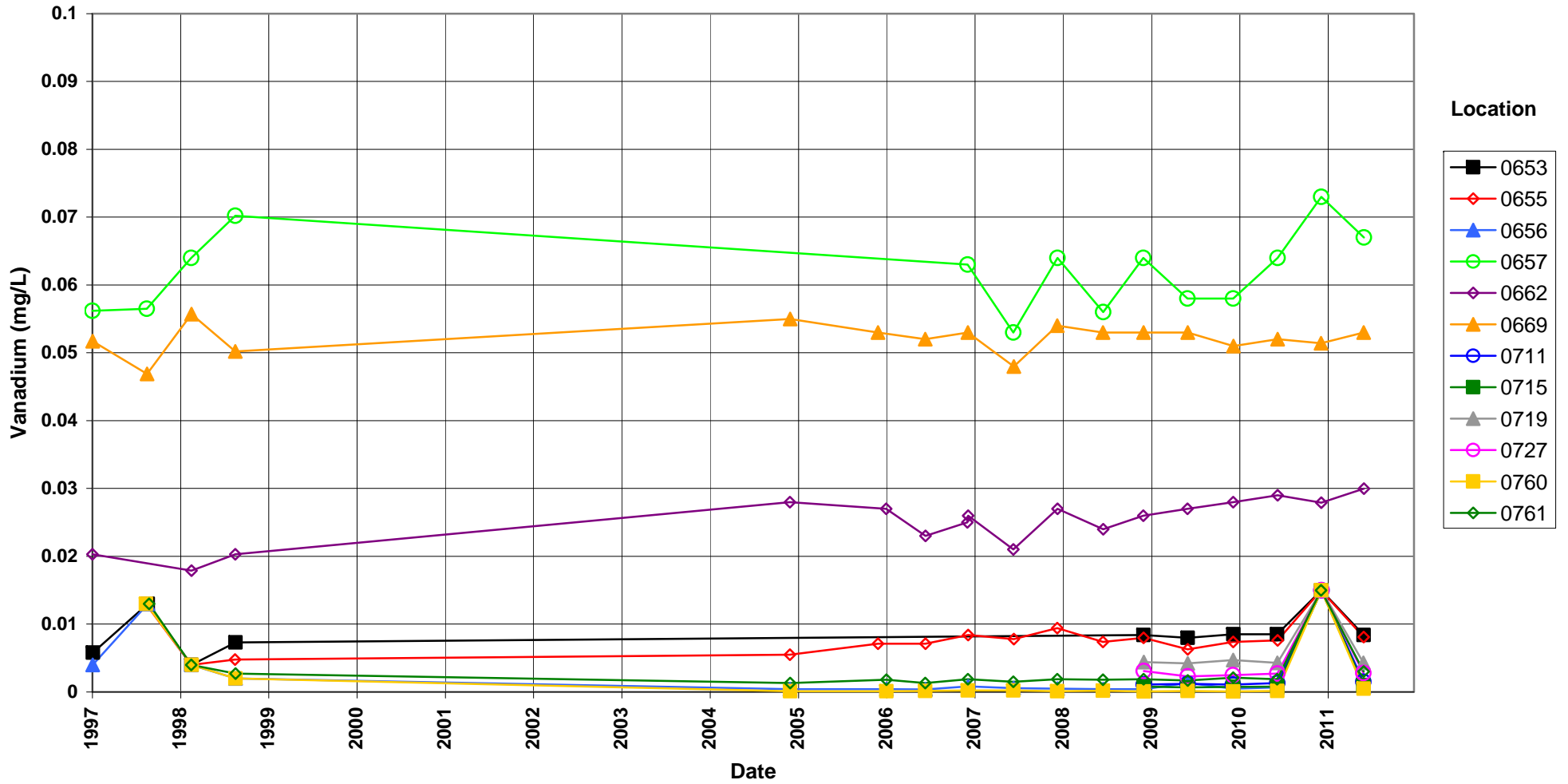
**Monument Valley Processing Site**  
**Uranium Concentration**  
Maximum Contaminant Level (MCL) = 0.044 mg/L



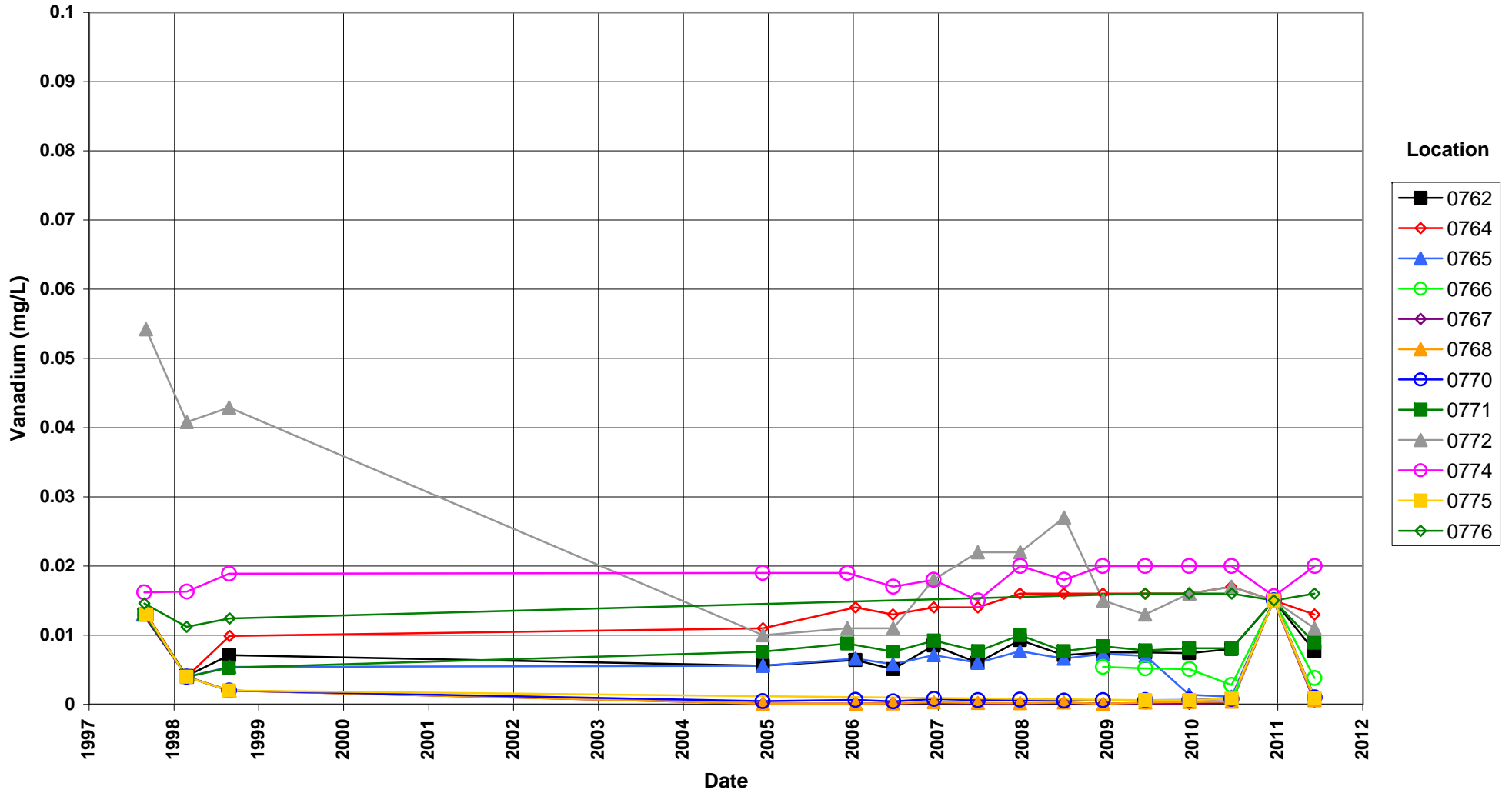
## Monument Valley Processing Site Vanadium Concentration



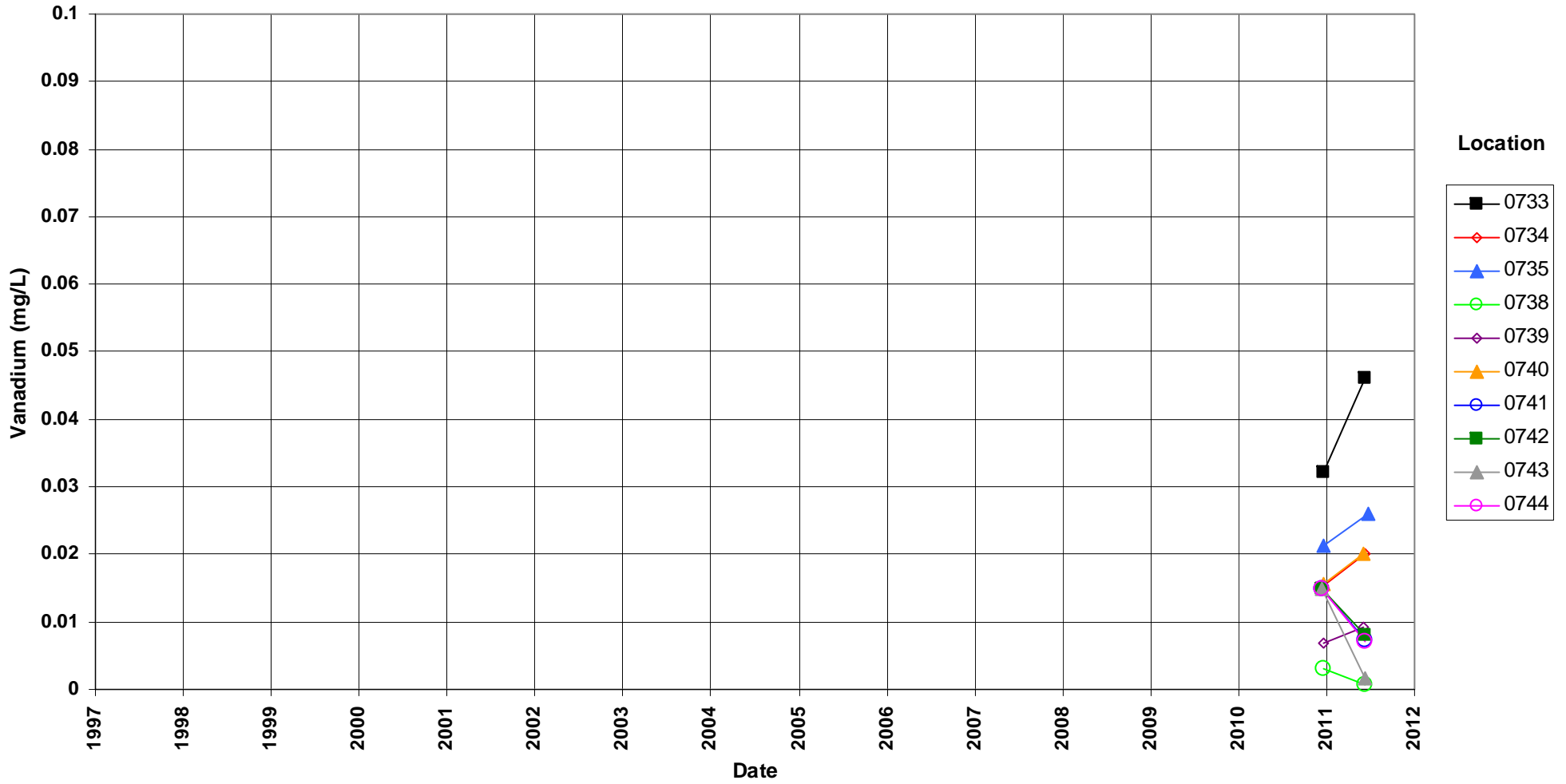
## Monument Valley Processing Site Vanadium Concentration



# Monument Valley Processing Site Vanadium Concentration



# Monument Valley Processing Site Vanadium Concentration



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

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established 1959

Task Order LM00-501  
Control Number 11-0616

May 6, 2011

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)  
June 2011 Environmental Sampling at Monument Valley, Arizona

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

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Monument Valley, AZ. 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 at this site as part of the routine environmental sampling currently scheduled to begin the week of June 6, 2011.

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

Richard Bush  
Control Number 11-0616  
Page 2

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.

Sincerely,



David Miller  
Site Lead

DM/lcg/lb

Enclosures (3)

cc: (electronic)  
Steve Donovan, Stoller  
Lauren Goodknight, Stoller  
David Miller, Stoller  
EDD Delivery  
rc-grand.junction  
File: MON 410.02(A)

**Sampling Frequencies for Locations at  
Monument Valley, Arizona**

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
<b>Monitoring Wells</b>						
402		X				
602		X				
603		X				
604		X				
605		X				
606		X				
618		X				Added by C. Gauthier 4/19/10
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				
770		X				
771		X				
772		X				
774		X				
775		X				
776		X				
<b>Surface Locations</b>						
623		X				

Sampling conducted in December and June

### Constituent Sampling Breakdown

Site	Monument Valley		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
	Groundwater	Surface Water			
Approx. No. Samples/yr	68	1			
<b>Field Measurements</b>					
Alkalinity	0603, 0611, 0615, 0618, and 0772 only				
Dissolved Oxygen					
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
<b>Laboratory Measurements</b>					
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
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					
<b>Total No. of Analytes</b>	14	6			

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

# **Attachment 4**

## **Trip Report**

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*Memorandum*

DATE: June 13, 2011  
 TO: David Miller  
 FROM: Gretchen Baer  
 SUBJECT: Sampling Trip Report

**Site:** Monument Valley, Arizona, Processing Site.

**Dates of Sampling Event:** June 6 – 8, 2011

**Team Members:** Gretchen Baer, Kent Moe, Dan Sellers, and Joe Treviño.  
 John McCord was present on June 6 & 7 to observe sampling. J. McCord will issue a Site Visit Report. A copy of the JSA signed by J. McCord is available in \\Condor\sms\11053841.

**Number of Locations Sampled:** Water samples for metals, anions, nitrate + nitrite as N, and ammonia as N, were collected from 44 monitoring wells and one surface location for a total of 45 locations.

**Locations Not Sampled/Reason:** There was no pump installed in well 0735. The dedicated submersible pump in well 0618 could not be turned on.

**Location Specific Information:**

Location IDs	Comments
0402, 0602, 0733, 0764, 0771	Cat II based on WL drop at slow purge rate.
0603, 0772	Alkalinity measurements were collected.
0605, 0768	Data loggers are installed in these wells. They need to be downloaded during the next sampling event.
0618	Could not get pump to turn on. Site lead was notified by phone call.
0619, 0776	Leaky check valves.
0648	The elevation was erroneously provided in FDGS as the 'Total Depth.'
0651, 0734, 0767	Significant erosion under well pads. Wells are solid. (See photos below at location 0734).
0734, 0738, 0739, 0741, 0760, 0765	Turbidity criteria could not be met at these Cat I wells; samples were filtered.
0735	No pump is installed. Too deep to sample by peristaltic. WL was measured at 51.36 feet. Total Depth was measured at 61.37 feet.
0741, 0742, 0743, 0744, 0765, 0766	All wells in this cluster had negative ORPs. Water had odor from bio-injection, most notably 0765. No further vandalism was observed. The tabs on the outer casing of 0765 were bent back to straight and a new lock was installed.
0768	Sulfur odor and negative ORP were noted.

David Miller  
June 13, 2011  
Page 2

**Field Variance:** None. Samples were collected according to the *Sampling and Analysis Plan for the U. S. Department of Energy Office of Legacy Management Sites*.

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

False ID	True ID	Ticket Number	Sample Type	Associated Matrix
2079	0662	JGS 605	Duplicate	Groundwater
2711	0768	JGS 588	Duplicate	Groundwater
2856	0619	JGS 593	Duplicate	Groundwater

**Requisition Identification Number (RIN) Assigned:** 11053841. Field data sheets can be found in \\Condor\sms\11053841 in the FieldData folder.

**Sample Shipment:** Samples were shipped from Grand Junction to ALS Laboratory Group on June 9, 2011.

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

**Well Inspection Summary:** Pump check valves are leaking in wells 0619 and 0776. Wind has undermined the pads at wells 0651, 0734, and 0767. Some rocks were placed under the pad at 0734 in an attempt to slow the erosion.



*Erosion at well 0734. Note the fence post in the background.*





*Erosion at well 0734 and nearby fencing.*

**Equipment:** Wells were sampled with a peristaltic pump/dedicated tubing or a dedicated bladder pump. The surface water location was sampled using a peristaltic pump and dedicated tubing. Because all equipment was dedicated, equipment blanks were not required. All equipment functioned properly, with the exception of the pump at 0618.

**Institutional Controls:**

**Fences, Gates, Locks:** All were in good condition.

**Signs:** Not applicable.

**Trespassing/Site Disturbances:** Damage from vandalism at and near well 0765 was observed in April 2011. No further disturbances were observed during this event.

**Site Issues:** Cell phone service (Verizon) 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 up and examined so that they can be cleaned or replaced.
- A pump should be installed at 0735.
- Routine well development should be completed, particularly at Category I wells where turbidity requirements could not be met, as listed in the table above.

**Access Issues:** None.

**Safety Issues:** None.

**Corrective Action Taken:** None.

GRB/lcg

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

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## Memorandum

DATE: July 8, 2011  
TO: David Miller  
FROM: Daniel Sellers  
SUBJECT: Sampling Trip Report

**Site:** Monument Valley, Arizona, Processing Site.

**Dates of Sampling Event:** June 20, 2011

**Team Members:** Dan Sellers and Joe Trevino.

**Number of Locations Sampled:** Water samples for metals, anions, nitrate + nitrite as N, and ammonia as N were collected from two monitoring wells (locations 0735 and 0618). A bladder pump was installed in well 0735 prior to collecting the sample. Well 0618 had an existing dedicated submersible pump, and water was collected from the valve.

**Locations Not Sampled/Reason:** None.

**Location Specific Information:** These two locations were sampled as a continuance of the June 6, 2011, sampling event. Samples could not be collected from these wells in early June due to pump problems.

**Field Variance:** None.

**Quality Control Sample Cross Reference:** Quality control samples are referenced under RIN # 11053841 from the sampling event in early June and can be found in \\Condor\sms\11053841 in the Field Data folder.

**Requisition Identification Number (RIN) Assigned:** Samples were assigned to RIN 1106391. Field data sheets can be found in \\Condor\sms\11063901 in the Field Data folder.

**Sample Shipment:** Samples were shipped from Grand Junction to ALS Laboratory Group on June 21, 2011.

**Water Level Measurements:** Water level was measured at well 0735.

**Data loggers:** Two data loggers were found in wells 0605 and 0648. They were downloaded and removed. Data has been uploaded to the database.

**Institutional Controls:**

**Fences, Gates, Locks:** All were in good condition.

**Signs:** Not applicable.

**Trespassing/Site Disturbances:** None.

**Site Issues:**

**Disposal Cell/Drainage Structure Integrity:** Not applicable.

**Vegetation/Noxious Weed Concerns:** None observed.

**Maintenance Requirements:** None.

**Access Issues:** None.

**Safety Issues:** None.

**Corrective Action Taken:** None.

DLS/lb

cc: (electronic)

Richard Bush, DOE

Steve Donovan, Stoller

EDD Delivery

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