Data Validation Package

December 2016 Groundwater and Surface Water Sampling at the Monument Valley, Arizona, Processing Site

June 2017

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Contents

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Sampling Event Summary

Site: Monument Valley, Arizona, Processing Site

Sampling Period: December 5–7, 2016

Fifty-two groundwater samples and one surface water sample were collected at the Monument Valley, Arizona, Processing Site to monitor groundwater contaminants for evaluating the effectiveness of the proposed compliance strategy as specified in the 1999 *Final Site Observational Work Plan for the UMTRA Project Site at Monument Valley, Arizona*. Planned monitoring locations are shown in Attachment 1, Sampling and Analysis Work Order. Sampling and analyses were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). Samples were collected for metals, anions, nitrate + nitrite as nitrogen, and ammonia as nitrogen analyses at all locations. Water levels were measured at all but one sampled well. See Attachment 2, Trip Report for additional details.

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

Table 1. Monument Valley Locations That Exceed Standards

Analyte	Standard[a] (mg/L)	Site Code	Location	Concentration (mg/L)
Nitrate + Nitrite as Nitrogen	10	MON01	0606	440
			0648	53
			0650	11
			0653	53
			0655	110
			0656	18
			0740	25
			0741	120
			0742	120
			0743	120
			0744	140
			0761	34
			0762	100
			0764	40
			0765	75
			0766	130
			0770	23
			0771	200
			0772	150

Table 1. Monument Valley Locations That Exceed Standards (continued)

Analyte	Standard[a] (mg/L)	Site Code	Location	Concentration (mg/L)
Uranium	0.044[b]	MON01	0662	0.41
			0699	0.38
			0700	0.57
			0701	0.48
			0702	0.52
			0703	0.56
			0704	0.56
			0734	0.13
			0735	0.18
			0740	0.06
			0772	0.054

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.
[b] The 30 picocures per liter (pCi/L) standard for uranium-234/238 converts to approximately 0.044 mg/L uranium.
mg/L = milligrams per liter.

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

Table 2. Sulfate Results

Location	Sulfate Concentration (mg/L)	Sulfate/Chloride Ratio	Treatment Goal Achieved?
0402	10	1	Yes
0602	100	8	Yes
0603	110	9	Yes
0604	110	10	Yes
0605	330	9	Yes
0606	680	31	No
0618	14	4	Yes
0619	100	23	Yes
0623	30	3	Yes
0648	760	40	No
0650	920	35	No
0651	110	10	Yes
0652	66	5	Yes

Table 2. Sulfate Results (continued)

Location	Sulfate Concentration (mg/L)	Sulfate/Chloride Ratio	Treatment Goal Achieved?
0653	1000	48	No
0655	1800	51	No
0656	140	12	Yes
0657	52	9	Yes
0662	82	17	Yes
0669	90	13	Yes
0699	58	14	Yes
0700	85	17	Yes
0701	68	15	Yes
0702	60	14	Yes
0703	74	16	Yes
0704	78	15	Yes
0711	120	9	Yes
0715	69	8	Yes
0719	110	9	Yes
0727	82	9	Yes
0733	74	17	Yes
0734	53	13	Yes
0735	160	57	Yes
0738	150	12	Yes
0739	160	11	Yes
0740	1500	42	No
0741	510	16	No
0742	400	17	No
0743	520	17	No
0744	380	12	No
0760	88	10	Yes
0761	400	36	No
0762	1400	24	No
0764	190	22	Yes
0765	510	19	No
0766	340	15	No
0767	32	6	Yes
0768	130	6	Yes
0770	170	14	Yes
0771	1600	80	No
0772	970	16	No
0774	110	23	Yes
0775	22	5	Yes
0776	50	10	Yes

Time-concentration plots for ammonia as nitrogen, chloride, nitrate + nitrite as nitrogen, sulfate, uranium, and vanadium are included in Attachment 3, Data Presentation. An assessment of anomalous data is included in Attachment 4.

Evan Tyrrell, Site Lead
Navarro Research and Engineering, Inc.

6/5/2017
Date

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Monument Valley, Arizona	**Date(s) of Water Sampling**	December 5–7, 2016
Date(s) of Verification	January 25, 2017	**Name of Verifier**	Samantha Tigar

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Work Order letter dated October 26, 2016.
2. Were the sampling locations specified in the planning documents sampled?	Yes	Additional field measurements and analytes were collected at select locations, at the direction of the site lead.
3. Were field equipment calibrations conducted as specified in the above-named documents?	Yes	
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	The records for sonde E on 12/6/16 and TURB01 on 12/7/16 contained typos, all instruments met the acceptance criteria.
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	No	Location 0700 was labeled a Category I well but sampled as a Category II well.
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	Turbidity at locations 0704, 0735, 0741, 0744, 0760, and 0762 was above 10 NTUs and samples were filtered as required in the SAP.
Was the flow rate less than 500 mL/min?	Yes	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	Duplicate samples were collected from locations 0619, 0766, and 0776.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	At the request of the site lead, sulfide samples were collected for laboratory analysis instead of being measured in the field.
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	No	At location 0703, the filter size (0.45 micron) was inadvertently not documented on the field data sheet. Water levels could not be measured during the purge at Category II wells 0606, 0700, 0701, and 0702.
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	No	The water level at location 0700 could not be measured. The well did not allow for a water level meter to be inserted.

Laboratory Performance Assessment

General Information

Report Numbers (RINs):	16118169
Sample Event:	December 5–7, 2016
Site(s):	Monument Valley, Arizona
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1612199
Analysis:	Metals and Wet Chemistry
Validator:	Samantha Tigar
Review Date:	January 25, 2017

This validation was performed according to the "Standard Practice for Validation of Environmental Data" found in Appendix A of *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated, http://energy.gov/lm/downloads/sampling-and-analysis-plan-us-department-energy-office-legacy-management-sites). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see Figures 1–4, Data Validation Worksheets). The DQIs comparability, completeness, and sensitivity are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as Nitrogen	WCH-A-005	EPA 350.1	EPA 350.1
Chloride, Sulfate	MIS-A-045	SW-856 9056	SW-856 9056
Nitrate + Nitrite as Nitrogen	WCH-A-022	EPA 353.2	EPA 353.2
Sulfide	WCH-A-038	EPA 376.1	EPA 376.1
Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020A
Calcium, Iron, Magnesium, Manganese, Potassium, Silicon, Sodium	LMM-01	SW-846 3005A	SW-846 6010B

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[a]	Reason
1612199-1	0402	Ammonia as Nitrogen	J	Matrix spike result less than 75%
1612199-11	0650	Iron	U	Less than 5 times the method blank
1612199-14	0653	Iron	U	Less than 5 times the method blank
1612199-18	0662	Iron	U	Less than 5 times the method blank
1612199-21	0700	Iron	J	Serial dilution greater than 10%
1612199-22	0701	Iron	U	Less than 5 times the method blank
1612199-23	0702	Iron	U	Less than 5 times the method blank
1612199-24	0703	Iron	U	Less than 5 times the method blank
1612199-42	0762	Iron	U	Less than 5 times the method blank
1612199-44	0765	Iron	U	Less than 5 times the method blank
1612199-48	0770	Iron	U	Less than 5 times the method blank
1612199-56	0776 duplicate	Iron	U	Less than 5 times the method blank
1612199-6	0606	Iron	U	Less than 5 times the method blank
1612199-48	0770	Manganese	U	Less than 5 times the method blank
1612199-56	0776 duplicate	Manganese	J	|Method blank| > method detection limit
1612199-8	0619	Nitrate + Nitrite as Nitrogen	J	Duplicate result difference greater than 20%
1612199-55	0619 duplicate	Nitrate + Nitrite as Nitrogen	J	Duplicate result difference greater than 20%

[a] "J" flag: estimated. "U" flag: not detected.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 56 water samples on December 12, 2016, 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 shipment was received intact with metals bottles in coolers at ambient temperature and with the temperature inside the iced coolers between 0 °C and 2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

A method detection limit (MDL) is defined in 40 CFR 136 as the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDLs reported by the laboratory were compared to the required MDLs to

assess the sensitivity of the analyses and found to be in compliance with contractual requirements.

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

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial Calibration Verification (ICV) demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing Calibration Verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method EPA 350.1, Ammonia as Nitrogen
Calibrations were performed using six calibration standards on December 14, 2016. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL as required by the cited method. The ICV and CCV checks were made at the required frequency. All calibration checks associated with the samples met the acceptance criteria.

Method EPA 353.2, Nitrate + Nitrite as Nitrogen
Calibrations were performed using seven calibration standards on December 15, 2016. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL as required by the cited method. The ICV and CCV checks were made at the required frequency. All calibration checks met the acceptance criteria.

Method EPA 376.1, Sulfide
There are no initial or continuing calibration requirements associated with this method.

Method SW-846 6010B, Calcium, Iron, Magnesium, Manganese, Potassium, Silicon, Sodium
Calibrations were performed on December 21 and 30, 2016, using three calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL as required by the cited method. The ICV and CCV checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 6020A, Uranium, Vanadium
Calibrations were performed on December 27, 2016, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of

the intercepts were less than 3 times the MDL as required by the cited method. The ICV and CCV checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL. 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 between December 20 and 30, 2016 using eight calibration standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL as required by the cited method. The ICV and CCV checks were made at the required frequency. All calibration checks met the acceptance criteria.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQLs for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a "U" flag as not detected. In cases where the absolute value of a negative blank concentration exceeds the MDL, associated sample results that are 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 are analyzed to verify the instrumental interelement and background correction factors and assess any bias due to interelement interferences. Interference check samples were analyzed at the required frequency with all results meeting the acceptance criteria.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of an analyte has been added before analysis. Matrix spike and matrix-spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question.
The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration or when the spike is performed on a diluted sample. The spikes met the recovery and precision criteria for all analytes evaluated, with the exception of ammonia as nitrogen. The associated result was qualified with a "J" flag as an estimated value.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should

be less than 20%. For results that are less than 5 times the PQL, the range should be no greater than the PQL. All replicate results met these criteria, demonstrating acceptable precision.

Laboratory Control Samples

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS results were acceptable for all analyses.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable with the exception of iron. The associated result was qualified with a "J" flag as an estimated value.

Completeness

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

Chromatography Peak Integration

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

Electronic Data Deliverable (EDD) File

The EDD file arrived on December 3, 2016. The Sample Management System EDD validation module was used to verify that the EDD files were complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 16118169 **Lab Code:** PAR **Validator:** Samantha Tigar **Validation Date:** 1/20/2017

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

# of Samples: 56 **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	There are 0 holding time failures.
☑ Detection Limits	There are 0 detection limit failures.
☐ Field/Trip Blanks	
☑ Field Duplicates	There were 3 duplicates evaluated.

Figure 1. General Validation Worksheet

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 16118169 **Lab Code:** PAR **Date Due:** 1/9/2017

Matrix: Water **Site Code:** MON01 **Date Completed:** 1/4/2017

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	12/21/2016					OK	99.0				100.0		106.0
Calcium	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	98.0				98.0		107.0
Calcium	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	96.0	94.0	92.0	2.0	97.0	3.0	92.0
Iron	ICP/ES	12/21/2016					OK	100.0				107.0		114.0
Iron	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	96.0				96.0		101.0
Iron	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	105.0	103.0	104.0	1.0	99.0		129.0
Iron	ICP/ES	12/30/2016					OK	104.0	100.0	110.0	11.0	101.0	13.0	130.0
Magnesium	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	99.0				100.0		101.0
Magnesium	ICP/ES	12/21/2016					OK	98.0				101.0		103.0
Magnesium	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	96.0	95.0	93.0	2.0	97.0	2.0	94.0
Manganese	ICP/ES	12/21/2016					OK	103.0				105.0		96.0
Manganese	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	102.0				103.0		96.0
Manganese	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	100.0	96.0	97.0	1.0	98.0		87.0
Potassium	ICP/ES	12/21/2016					OK	97.0						96.0
Potassium	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	98.0						93.0
Potassium	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	100.0	102.0	100.0	2.0			100.0
Silicon	ICP/ES	12/21/2016					OK	100.0				108.0		106.0

Figure 2. Metals Validation Worksheet

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 16118169 **Lab Code:** PAR **Date Due:** 1/9/2017

Matrix: Water **Site Code:** MON01 **Date Completed:** 1/4/2017

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Silicon	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	98.0				101.0		94.0
Silicon	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	103.0	118.0	107.0	3.0	106.0	3.0	78.0
Sodium	ICP/ES	12/21/2016					OK	99.0						97.0
Sodium	ICP/ES	12/21/2016	0.0000	1.0000	OK	OK	OK	98.0						97.0
Sodium	ICP/ES	12/30/2016	0.0000	1.0000	OK	OK	OK	101.0	105.0	101.0	0.0		2.0	99.0
Uranium	ICP/MS	12/28/2016					OK	96.0	99.0	96.0	4.0			
Uranium	ICP/MS	12/28/2016	0.0000	1.0000	OK	OK	OK	97.0			1.0	97.0	1.0	110.0
Uranium	ICP/MS	12/28/2016	0.0000	1.0000	OK	OK	OK	92.0	90.0	90.0	2.0	96.0	6.0	70.0
Vanadium	ICP/MS	12/28/2016	0.0000	1.0000	OK	OK	OK	93.0	94.0	94.0	2.0	99.0	2.0	106.0
Vanadium	ICP/MS	12/28/2016					OK	94.0	98.0	98.0	1.0			
Vanadium	ICP/MS	12/28/2016	0.0000	1.0000	OK	OK	OK	101.0	101.0	99.0	2.0	98.0		107.0

Figure 2. Metals Validation Worksheet (continued)

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 16118169 **Lab Code:** PAR **Date Due:** 1/9/2017

Matrix: Water **Site Code:** MON01 **Date Completed:** 1/4/2017

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
AMMONIA AS N	12/14/2016	0.000	1.0000	OK	OK	OK	108	59	56	3	
AMMONIA AS N	12/14/2016			OK	OK	OK	107	103	106	2	
AMMONIA AS N	12/14/2016			OK	OK	OK	110	85	89	5	
AMMONIA AS N	12/14/2016			OK	OK	OK	107				
CHLORIDE	12/21/2016	0.000	1.0000	OK	OK	OK	99	95	96	0	
CHLORIDE	12/21/2016					OK	97	93	90	1	
CHLORIDE	12/27/2016	0.000	1.0000	OK	OK	OK	97	89	92	3	
CHLORIDE	12/27/2016			OK	OK	OK	97	102	101	0	
CHLORIDE	12/29/2016	0.000	1.0000	OK	OK	OK	101	99	99	0	
CHLORIDE	12/30/2016	0.000	1.0000	OK	OK			100	101	1	
Nitrate+Nitrite as N	12/15/2016	0.000	1.0000	OK	OK	OK	91	98	102	3	
Nitrate+Nitrite as N	12/15/2016					OK	91	103	100	2	
Nitrate+Nitrite as N	12/15/2016					OK	91	99	100	1	
SULFATE	12/21/2016	0.000	1.0000	OK	OK	OK	98	98	99	1	
SULFATE	12/21/2016					OK	96			1	

Figure 3. Wet Chemistry Validation Worksheet

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 16118169 **Lab Code:** PAR **Date Due:** 1/9/2017

Matrix: Water **Site Code:** MON01 **Date Completed:** 1/4/2017

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
SULFATE	12/27/2016	0.000	1.0000	OK	OK	OK	97	78	80	1	
SULFATE	12/27/2016			OK	OK	OK	99	96	96	0	
SULFATE	12/29/2016	0.000	1.0000	OK	OK	OK	102	101	102	0	
SULFATE	12/30/2016	0.000	1.0000	OK	OK			103	106	1	
SULFIDE	12/13/2016					OK	82				

Figure 3. Wet Chemistry Validation Worksheet (continued)

Sampling Quality Control Assessment

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

Sampling Protocol

The surface water location, 0623, was collected using container immersion. All monitoring wells were sampled with a peristaltic pump and dedicated tubing, a hand crank and dedicated tubing, or a dedicated bladder pump. Sample results from these wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Wells 0402, 0602, 0606, 0700, 0701, 0702, 0703, 0764, and 0771 were further qualified with a "Q" flag, indicating the data are qualitative because these wells met Category II criteria.

Equipment Blank Assessment

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

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20%. For results that are less than 5 times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from locations 0619, 0766, and 0776. The duplicate results met the criteria, with the exception of nitrate + nitrite as nitrogen at location 0619. The associated results were qualified with a "J" flag as estimated values.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 16118169 **Lab Code:** PAR **Project:** Monument Valley **Validation Date:** 1/17/2017

Duplicate: 2251 **Sample:** 0766

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
AMMONIA AS N	120			25	120			25	0		MG/L
CHLORIDE	22			5	21			5			MG/L
Nitrate+Nitrite as N	130			100	130			100	0		MG/L
SULFATE	340			5	330			5	2.99		MG/L
Uranium	0.008			10	0.0078			10	2.53		MG/L
Vanadium	0.0047			10	0.0047			10			MG/L

Duplicate: 2711 **Sample:** 0619

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
AMMONIA AS N	0.15			1	0.1	U		1			MG/L
CHLORIDE	4.3			10	4.4			2			MG/L
Nitrate+Nitrite as N	6			10	4.1			10	37.62		MG/L
SULFATE	100			10	110			2			MG/L
Uranium	0.041			10	0.042			10	2.41		MG/L
Vanadium	0.021			10	0.021			10	0		MG/L

Duplicate: 2875 **Sample:** 0776

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
AMMONIA AS N	0.1	U		1	0.1	U		1			MG/L
CHLORIDE	5			2	5.9			2	16.51		MG/L
Nitrate+Nitrite as N	1.6			1	1.6			1	0		MG/L
SULFATE	50			2	54			2	7.69		MG/L
Uranium	0.014			10	0.014			10	0		MG/L
Vanadium	0.015			10	0.016			10	6.45		MG/L

Figure 4. Field Duplicates Validation Worksheet

Certification

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

Laboratory Coordinator: Stephen Donivan — Date: 6-5-2017

Data Validation Lead: Samantha Tigar — Date: 6-5-2017

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Attachment 1

Sampling and Analysis Work Order

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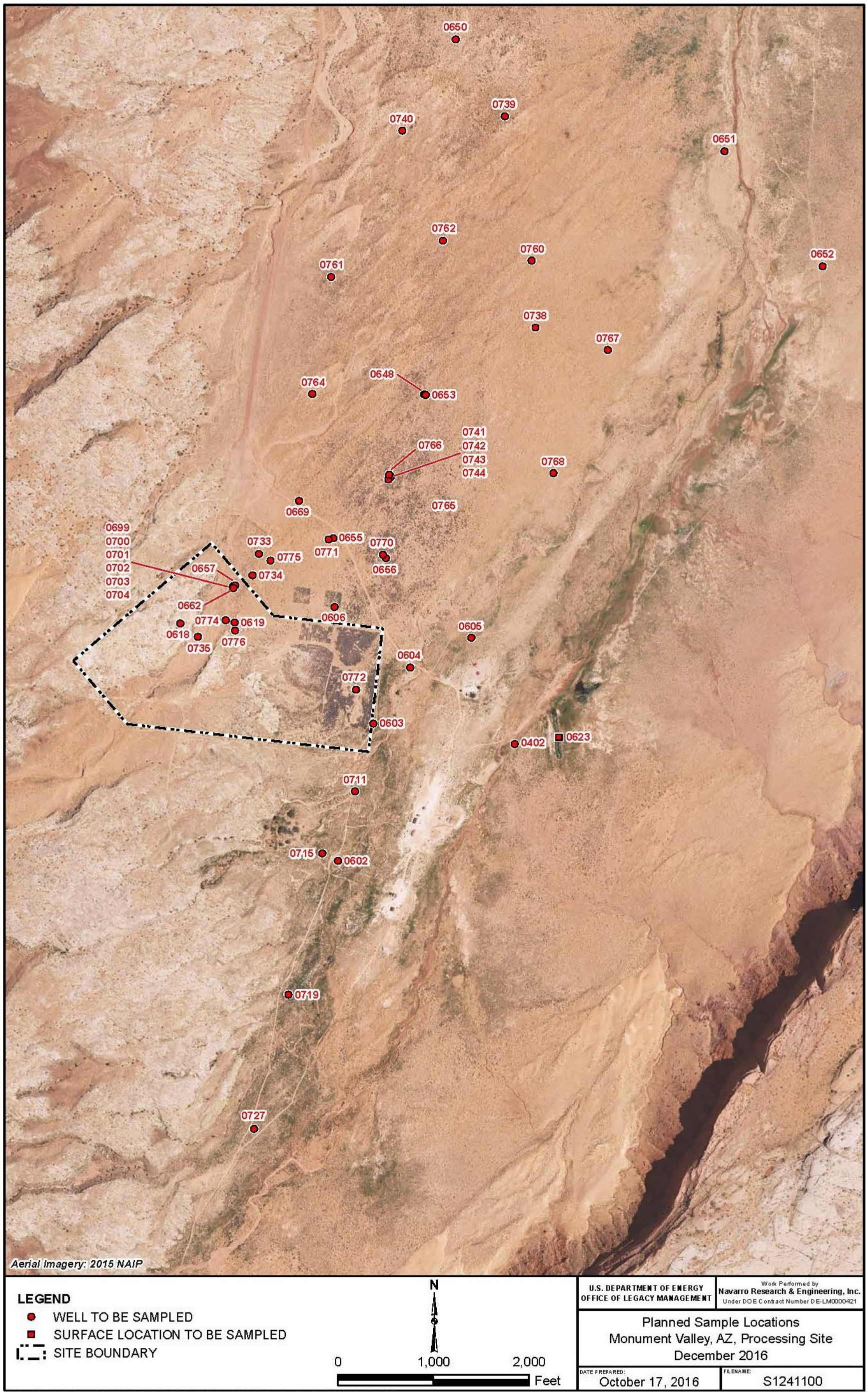

Monument Valley, Arizona, Processing Site, Planned Sample Locations Map

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October 26, 2016

Task Assignment 103
Control Number 17-0056

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

SUBJECT: Contract No. DE-LM0000421, Navarro Research & Engineering, Inc. (Navarro)
Task Assignment 103 LTS&M - UMTRCA Title I and II Sites, D&D Sites, Other Sites, and Other
December 2016 Environmental Sampling at the Monument Valley, Arizona, Processing Site

REFERENCE: Task Assignment 103, 1-103-1-02-114, Monument Valley, Arizona, Processing Site

Dear Ms. Denny:

The purpose of this letter is to inform you of the upcoming sampling event at the Monument Valley, Arizona, disposal site. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Monument Valley site. Water quality data will be collected from this site as part of the routine environmental sampling currently scheduled to begin the week of December 5, 2016.

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	650 Al	699 Al	727 Al	743 Al	767 Al
602 Al	651 Al	700 Al	733 Al	744 Al	768 Al
603 Al	652 Al	701 Al	734 Al	760 Al	770 Al
604 Al	653 Al	702 Al	735 Al	761 Al	771 Al
605 Al	655 Al	703 Al	738 Al	762 Al	772 Al
606 Al	656 Al	704 Al	739 Al	764 Al	774 Al
618 Al	657 Dc	711 Al	740 Al	765 Al	775 Dc
619 Dc	662 Al	715 Al	741 Al	766 Al	776 Dc
648 Al	669 Al	719 Al	742 Al		

*NOTE: Al = Alluvium; Dc = Dechelley Member of the Cutler Formation

Surface Location
623

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) 248-6626 if you have any questions.

Sincerely,

/FSC

Joseph E. Gillespie
LMS Site Lead

JEG/lcg/csa

Enclosures

cc: (electronic)
Christina Pennal, DOE
Jeff Carman, Navarro
Beverly Cook, Navarro
Steve Donivan, Navarro
Joey Gillespie, Navarro
Lauren Goodknight, Navarro
Sam Marutzky, Navarro
Diana Osborne, Navarro
EDD Delivery
Document Determination
rc-grand.junction
File: MON 0400.02

Sampling Frequencies for Locations at Monument Valley, Arizona

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
402			X			
602			X			
603			X			
604			X			
605			X			
606			X			
618			X			
619			X			
648			X			
650			X			
651			X			
652			X			
653			X			
655			X			
656			X			
657			X			
662			X			
669			X			
699			X			
700			X			
701			X			
702			X			
703			X			
704			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			

Sampling Frequencies for Locations at Monument Valley, Arizona

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
762			X			
764			X			
765			X			
766			X			
767			X			
768			X			
770			X			
771			X			
772			X			
774			X			
775			X			
776			X			
Surface Locations						
623			X			

Sampling conducted in December

Constituent Sampling Breakdown

Site	Monument Valley				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	68	1			
Field Measurements					
Alkalinity					
Dissolved Oxygen	X				
Iron $^{2+}$	0602, 0606, 0650, 0653 0662, 0699, 0700, 0701, 0702, 0703, 0704, 0762, 0765 and 0770 only				
Redox Potential	X				
pH	X				
Specific Conductance	X				
Sulfide	0602, 0606, 0650, 0653 0662, 0699, 0700, 0701, 0702, 0703, 0704, 0762, 0765 and 0770 only				
Turbidity	X				
Temperature	X				
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)	X	X	0.1	EPA 350.1	WCH-A-005
Arsenic					
Calcium					
Chloride	X	X	0.5	SW-846 9056	MIS-A_039
Chromium					
Gross Beta					
Iron	0602, 0606, 0650, 0653 0662, 0699, 0700, 0701, 0702, 0703, 0704, 0762, 0765 and 0770 only		0.05	SW-846 6020	LMM-02
Lead					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	X	X	0.05	EPA 353.1	WCH-A-022
Potassium					
Selenium					
Sulfate	X	X	0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids					
Uranium	X	X	0.0001	SW-846 6020	LMM-02
Vanadium	X	X	0.0003	SW-846 6020	LMM-02
Zinc					
Total No. of Analytes	7	6			

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

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Attachment 2

Trip Report

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memo

NAVARRO

To: David Miller, Navarro

From: Rob Rice, Navarro

Date: December 15, 2016

CC: Angelita Denny, DOE
David Dander, Navarro
Steve Donivan, Navarro
EDD Delivery

Re: Sampling Trip Report

Site: Monument Valley, Arizona, Processing Site

Dates of Event: December 5 – 7, 2016

Team Members: Gretchen Baer, Rob Rice, Dan Sellers, and Tony Franzone.

Number of Locations Sampled: Samples were collected from all 53 of the locations identified on the sampling notification letter, including 6 new locations (0699, 0700, 0701, 0702, 0703, and 0704).

Locations Not Sampled/Reason: None.

Location Specific Information:

Location IDs	Comments
0602, 0606, 0650, 0653, 0662, 0699, 0700, 0701, 0702, 0703, 0704, 0762, 0765, 0770	In addition to the regular bottle set, sulfide, iron, and field measurements for ferrous iron were collected at these locations.
0602, 0606, 0650, 0653, 0699, 0700, 0701, 0702, 0703, 0704, 0762, 0765, 0770	Field measurements for alkalinity were taken at these locations.
0602, 0606, 0650, 0653, 0762, 0765, 0770	In addition to the regular analytes, calcium, magnesium, manganese, potassium, silica, and sodium were collected at these locations.
0618	Formerly removed beehive is being rebuilt.
0402	Flush mount well difficult to locate, partially covered in sand. Cairn built on pad to help locate during next trip.
0606	Initial water level was above the pump, but water level dropped to below top of the pump during the purge. Well obstructed by plant roots, clinging to water level meter upon removal.
0700	Initial water levels could not be taken. Purged volume then sampled.
0606, 0700, 0701, 0702	Water levels could not be monitored during the purge.
0702	Well is set up with 1/4" ID dedicated tubing for use with a peristaltic pump. Tubing must be re-inserted several times during sample collection.

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

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2875	OMT 038	0776	Duplicate	Groundwater
2251	OMT 029	0766	Duplicate	Groundwater
2711	OMT 000	0619	Duplicate	Groundwater

Requisition Index Number (RIN) Assigned: Samples were assigned to RIN 16118169. Field data sheets can be found in \\crow\RAApps\SMS\16118169\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Grand Junction, CO, to ALS Laboratory Group in Fort Collins, CO, on December 8, 2016.

Water Level Measurements: Initial water levels were measured in all sampled wells except well 0700.

Data Loggers: N/A

Well Inspection Summary: See Future Actions Required or Suggested section below.

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

Field Variance: The following are deviations from the SAP.

Location IDs	Field Variance
0623	Surface water sample was taken slightly downstream from map-indicated sample point, due to water being frozen.
0735, 0741, 0744, 0760, 0762	Turbidity requirements could not be met at these locations, samples were filtered.
0606, 0700, 0701, 0702	Water levels could not be measured during purge to establish stability according to SAP.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory/DOE: Angelita Denny (DOE), Rob Evans (NRC), Joni Tallball and Cameron Corley (Navajo UMTRA/AML) observed sampling on December 6, 2016.

Institutional Controls:
Fences, Gates, and Locks: All gates were locked and in good condition.
Signs: No issues were observed.
Trespassing/Site Disturbances: None observed.
Disposal Cell/Drainage Structure Integrity: N/A

Safety Issues: None.

Access Issues: None.

General Information: Nothing to note.

Immediate Actions Taken: None.

Future Actions Required or Suggested: Numerous well maintenance issues were identified that require action. Wells 0606, 0735, 0744, 0760, and 0764 need to be redeveloped. Wells 0733 and 0762 need to be investigated with a down-hole camera, as the casing may be broken. Wells 0741, 0743, 0744 and 0766 are pedestalled significantly. Wells 0742 and 0776 have pumps which may need to be replaced; the screen at 0741 is likely broken based on excessive turbidity readings (>1000NTU). Well 0743 is rusting inside the outer casing at an accelerated rate and sloughing into the annulus. The bank around well 0404, a flush mount that is not on the regular sampling schedule, is eroding (see photo).

Well 0404

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Attachment 3

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: 1/27/2017
Location: 0402 WELL Tribal Well No. 08-0643.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	5.17	-	9.63	0.4	N	JQF	#	0.1	
Chloride	mg/L	12/06/2016	N001	5.17	-	9.63	12		QF	#	0.4	
Dissolved Oxygen	mg/L	12/06/2016	N001	5.17	-	9.63	4.98		QF	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	5.17	-	9.63	0.18		QF	#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	5.17	-	9.63	44		QF	#		
pH	s.u.	12/06/2016	N001	5.17	-	9.63	8.5		QF	#		
Specific Conductance	umhos /cm	12/06/2016	N001	5.17	-	9.63	561		QF	#		
Sulfate	mg/L	12/06/2016	N001	5.17	-	9.63	10		QF	#	1	
Temperature	C	12/06/2016	N001	5.17	-	9.63	13.05		QF	#		
Turbidity	NTU	12/06/2016	N001	5.17	-	9.63	9.52		QF	#		
Uranium	mg/L	12/06/2016	N001	5.17	-	9.63	0.000012	U	QF	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	5.17	-	9.63	0.00058	U	QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0602 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	19.5	-	29.5	175		QF	#		
Ammonia Total as N	mg/L	12/07/2016	N001	19.5	-	29.5	0.1	U	QF	#	0.1	
Calcium	mg/L	12/07/2016	N001	19.5	-	29.5	25		QF	#	0.024	
Chloride	mg/L	12/07/2016	N001	19.5	-	29.5	12		QF	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	19.5	-	29.5	4.42		QF	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	19.5	-	29.5	0.04		QF	#		
Iron	mg/L	12/07/2016	N001	19.5	-	29.5	0.22		QF	#	0.0067	
Magnesium	mg/L	12/07/2016	N001	19.5	-	29.5	17		QF	#	0.03	
Manganese	mg/L	12/07/2016	N001	19.5	-	29.5	0.002	J	QF	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	19.5	-	29.5	0.75		QF	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	19.5	-	29.5	69.6		QF	#		
pH	s.u.	12/07/2016	N001	19.5	-	29.5	8.11		QF	#		
Potassium	mg/L	12/07/2016	N001	19.5	-	29.5	1.9		QF	#	0.052	
Silica	mg/L	12/07/2016	N001	19.5	-	29.5	14		QF	#	0.021	
Silicon	mg/L	12/07/2016	N001	19.5	-	29.5	6.6		QF	#	0.0097	
Sodium	mg/L	12/07/2016	N001	19.5	-	29.5	92		QF	#	0.047	
Specific Conductance	umhos /cm	12/07/2016	N001	19.5	-	29.5	614		QF	#		
Sulfate	mg/L	12/07/2016	N001	19.5	-	29.5	100		QF	#	1	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0602 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/07/2016	N001	19.5	-	29.5	2	U	QF	#	2	
Temperature	C	12/07/2016	N001	19.5	-	29.5	15.08		QF	#		
Turbidity	NTU	12/07/2016	N001	19.5	-	29.5	3.11		QF	#		
Uranium	mg/L	12/07/2016	N001	19.5	-	29.5	0.0032		QF	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	19.5	-	29.5	0.00063	J	QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0603 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	43	-	53	0.33		F	#	0.1	
Chloride	mg/L	12/07/2016	N001	43	-	53	12		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	43	-	53	0.29		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	43	-	53	0.36		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	43	-	53	-20.2		F	#		
pH	s.u.	12/07/2016	N001	43	-	53	8.04		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	43	-	53	607		F	#		
Sulfate	mg/L	12/07/2016	N001	43	-	53	110		F	#	1	
Temperature	C	12/07/2016	N001	43	-	53	15.17		F	#		
Turbidity	NTU	12/07/2016	N001	43	-	53	5.62		F	#		
Uranium	mg/L	12/07/2016	N001	43	-	53	0.0027		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	43	-	53	0.00058	U	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0604 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	13	-	28	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	13	-	28	11		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	13	-	28	1.37		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	13	-	28	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	13	-	28	19		F	#		
pH	s.u.	12/07/2016	N001	13	-	28	8.34		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	13	-	28	588		F	#		
Sulfate	mg/L	12/07/2016	N001	13	-	28	110		F	#	1	
Temperature	C	12/07/2016	N001	13	-	28	13.91		F	#		
Turbidity	NTU	12/07/2016	N001	13	-	28	3.77		F	#		
Uranium	mg/L	12/07/2016	N001	13	-	28	0.0016		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	13	-	28	0.0018	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0605 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	14	-	29	0.47		F	#	0.1	
Chloride	mg/L	12/07/2016	N001	14	-	29	38		F	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	14	-	29	0.86		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	14	-	29	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	14	-	29	-114.4		F	#		
pH	s.u.	12/07/2016	N001	14	-	29	8.18		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	14	-	29	934		F	#		
Sulfate	mg/L	12/07/2016	N001	14	-	29	330	N	F	#	2.5	
Temperature	C	12/07/2016	N001	14	-	29	16.07		F	#		
Turbidity	NTU	12/07/2016	N001	14	-	29	9.09		F	#		
Uranium	mg/L	12/07/2016	N001	14	-	29	0.00086		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	14	-	29	0.00058	U	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0606 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	32	-	42	194		QF	#		
Ammonia Total as N	mg/L	12/07/2016	N001	32	-	42	71		QF	#	2.5	
Calcium	mg/L	12/07/2016	N001	32	-	42	420		QF	#	0.024	
Chloride	mg/L	12/07/2016	N001	32	-	42	22		QF	#	2	
Dissolved Oxygen	mg/L	12/07/2016	N001	32	-	42	2.56		QF	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	32	-	42	0		QF	#		
Iron	mg/L	12/07/2016	N001	32	-	42	0.061	J	UQF	#	0.0067	
Magnesium	mg/L	12/07/2016	N001	32	-	42	190		QF	#	0.03	
Manganese	mg/L	12/07/2016	N001	32	-	42	0.24		QF	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	32	-	42	440		QF	#	10	
Oxidation Reduction Potential	mV	12/07/2016	N001	32	-	42	98.8		QF	#		
pH	s.u.	12/07/2016	N001	32	-	42	7.11		QF	#		
Potassium	mg/L	12/07/2016	N001	32	-	42	5.3		QF	#	0.052	
Silica	mg/L	12/07/2016	N001	32	-	42	32		QF	#	0.021	
Silicon	mg/L	12/07/2016	N001	32	-	42	15		QF	#	0.0097	
Sodium	mg/L	12/07/2016	N001	32	-	42	140		QF	#	0.047	
Specific Conductance	umhos /cm	12/07/2016	N001	32	-	42	4615		QF	#		
Sulfate	mg/L	12/07/2016	N001	32	-	42	680		QF	#	5	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0606 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/07/2016	N001	32	-	42	2	U	QF	#	2	
Temperature	C	12/07/2016	N001	32	-	42	15.14		QF	#		
Turbidity	NTU	12/07/2016	N001	32	-	42	1.47		QF	#		
Uranium	mg/L	12/07/2016	N001	32	-	42	0.0086		QF	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	32	-	42	0.00058	U	QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0618 WELL 12" DIA Steel CSG. Old Mill Well??

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	-	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	-	3.8		F	#	2	
Dissolved Oxygen	mg/L	12/07/2016	N001	-	7.38		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	-	1.3		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	-	2.1		F	#		
pH	s.u.	12/07/2016	N001	-	7.78		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	-	320		F	#		
Sulfate	mg/L	12/07/2016	N001	-	14		F	#	5	
Temperature	C	12/07/2016	N001	-	15.53		F	#		
Turbidity	NTU	12/07/2016	N001	-	0.31		F	#		
Uranium	mg/L	12/07/2016	N001	-	0.003		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	-	0.06		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0619 WELL Water Use Permit No. 92-082.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/05/2016	N001	103.9 - 153.9	0.15		F	#	0.1	
Ammonia Total as N	mg/L	12/05/2016	N002	103.9 - 153.9	0.1	U	F	#	0.1	
Chloride	mg/L	12/05/2016	N001	103.9 - 153.9	4.3		F	#	2	
Chloride	mg/L	12/05/2016	N002	103.9 - 153.9	4.4		F	#	0.4	
Dissolved Oxygen	mg/L	12/05/2016	N001	103.9 - 153.9	8.31		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	N001	103.9 - 153.9	6		JF	#	0.1	
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	N002	103.9 - 153.9	4.1		JF	#	0.1	
Oxidation Reduction Potential	mV	12/05/2016	N001	103.9 - 153.9	155.4		F	#		
pH	s.u.	12/05/2016	N001	103.9 - 153.9	7.73		F	#		
Specific Conductance	umhos /cm	12/05/2016	N001	103.9 - 153.9	519		F	#		
Sulfate	mg/L	12/05/2016	N001	103.9 - 153.9	100		F	#	5	
Sulfate	mg/L	12/05/2016	N002	103.9 - 153.9	110		F	#	1	
Temperature	C	12/05/2016	N001	103.9 - 153.9	16.09		F	#		
Turbidity	NTU	12/05/2016	N001	103.9 - 153.9	1.07		F	#		
Uranium	mg/L	12/05/2016	N001	103.9 - 153.9	0.041		F	#	0.000012	
Uranium	mg/L	12/05/2016	N002	103.9 - 153.9	0.042		F	#	0.000012	
Vanadium	mg/L	12/05/2016	N001	103.9 - 153.9	0.021		F	#	0.00058	
Vanadium	mg/L	12/05/2016	N002	103.9 - 153.9	0.021		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0648 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	38.5	-	88.5	12		F	#	2.5	
Chloride	mg/L	12/07/2016	N001	38.5	-	88.5	19		F	#	2	
Dissolved Oxygen	mg/L	12/07/2016	N001	38.5	-	88.5	0.92		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	38.5	-	88.5	53		F	#	1	
Oxidation Reduction Potential	mV	12/07/2016	N001	38.5	-	88.5	131.9		F	#		
pH	s.u.	12/07/2016	N001	38.5	-	88.5	7.55		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	38.5	-	88.5	2034		F	#		
Sulfate	mg/L	12/07/2016	N001	38.5	-	88.5	760		F	#	5	
Temperature	C	12/07/2016	N001	38.5	-	88.5	15.21		F	#		
Turbidity	NTU	12/07/2016	N001	38.5	-	88.5	0.2		F	#		
Uranium	mg/L	12/07/2016	N001	38.5	-	88.5	0.008		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	38.5	-	88.5	0.01		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0650 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/06/2016	N001	77.5	-	97.5	166		F	#		
Ammonia Total as N	mg/L	12/06/2016	N001	77.5	-	97.5	0.1	U	F	#	0.1	
Calcium	mg/L	12/06/2016	N001	77.5	-	97.5	95		F	#	0.024	
Chloride	mg/L	12/06/2016	N001	77.5	-	97.5	26		F	#	4	
Dissolved Oxygen	mg/L	12/06/2016	N001	77.5	-	97.5	0.94		F	#		
Field Ferrous Iron	mg/L	12/06/2016	N001	77.5	-	97.5	0		F	#		
Iron	mg/L	12/06/2016	N001	77.5	-	97.5	0.042	J	UF	#	0.0067	
Magnesium	mg/L	12/06/2016	N001	77.5	-	97.5	67		F	#	0.03	
Manganese	mg/L	12/06/2016	N001	77.5	-	97.5	0.00053	J	F	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	77.5	-	97.5	11		F	#	0.1	
Oxidation Reduction Potential	mV	12/06/2016	N001	77.5	-	97.5	29		F	#		
pH	s.u.	12/06/2016	N001	77.5	-	97.5	7.89		F	#		
Potassium	mg/L	12/06/2016	N001	77.5	-	97.5	2.7		F	#	0.052	
Silica	mg/L	12/06/2016	N001	77.5	-	97.5	12		F	#	0.021	
Silicon	mg/L	12/06/2016	N001	77.5	-	97.5	5.8		F	#	0.0097	
Sodium	mg/L	12/06/2016	N001	77.5	-	97.5	270		F	#	0.047	
Specific Conductance	umhos /cm	12/06/2016	N001	77.5	-	97.5	2043		F	#		
Sulfate	mg/L	12/06/2016	N001	77.5	-	97.5	920		F	#	10	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0650 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/06/2016	0001	77.5	-	97.5	2	U	F	#	2	
Temperature	C	12/06/2016	N001	77.5	-	97.5	15.89		F	#		
Turbidity	NTU	12/06/2016	N001	77.5	-	97.5	0.38		F	#		
Uranium	mg/L	12/06/2016	N001	77.5	-	97.5	0.0026		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	77.5	-	97.5	0.0024	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0651 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	20	-	80	0.13		F	#	0.1	
Chloride	mg/L	12/07/2016	N001	20	-	80	11		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	20	-	80	3.61		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	20	-	80	0.2		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	20	-	80	-11.6		F	#		
pH	s.u.	12/07/2016	N001	20	-	80	8.27		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	20	-	80	633		F	#		
Sulfate	mg/L	12/07/2016	N001	20	-	80	110		F	#	1	
Temperature	C	12/07/2016	N001	20	-	80	15.34		F	#		
Turbidity	NTU	12/07/2016	N001	20	-	80	2.51		F	#		
Uranium	mg/L	12/07/2016	N001	20	-	80	0.002		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	20	-	80	0.011		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0652 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	34	-	54	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	34	-	54	14		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	34	-	54	0.68		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	34	-	54	5.1		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	34	-	54	18.3		F	#		
pH	s.u.	12/07/2016	N001	34	-	54	7.92		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	34	-	54	563		F	#		
Sulfate	mg/L	12/07/2016	N001	34	-	54	66		F	#	1	
Temperature	C	12/07/2016	N001	34	-	54	15.07		F	#		
Turbidity	NTU	12/07/2016	N001	34	-	54	0.96		F	#		
Uranium	mg/L	12/07/2016	N001	34	-	54	0.0037		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	34	-	54	0.0083		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0653 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	56	-	76	196		F	#		
Ammonia Total as N	mg/L	12/07/2016	N001	56	-	76	0.1	U	F	#	0.1	
Calcium	mg/L	12/07/2016	N001	56	-	76	180		F	#	0.024	
Chloride	mg/L	12/07/2016	N001	56	-	76	21		F	#	5	
Dissolved Oxygen	mg/L	12/07/2016	N001	56	-	76	1.49		F	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	56	-	76	0		F	#		
Iron	mg/L	12/07/2016	N001	56	-	76	0.015	J	UF	#	0.0067	
Magnesium	mg/L	12/07/2016	N001	56	-	76	150		F	#	0.03	
Manganese	mg/L	12/07/2016	N001	56	-	76	0.018		F	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	56	-	76	53		F	#	1	
Oxidation Reduction Potential	mV	12/07/2016	N001	56	-	76	135.7		F	#		
pH	s.u.	12/07/2016	N001	56	-	76	7.54		F	#		
Potassium	mg/L	12/07/2016	N001	56	-	76	4.1		F	#	0.052	
Silica	mg/L	12/07/2016	N001	56	-	76	16		F	#	0.021	
Silicon	mg/L	12/07/2016	N001	56	-	76	7.5		F	#	0.0097	
Sodium	mg/L	12/07/2016	N001	56	-	76	190		F	#	0.047	
Specific Conductance	umhos /cm	12/07/2016	N001	56	-	76	2386		F	#		
Sulfate	mg/L	12/07/2016	N001	56	-	76	1000		F	#	12	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0653 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/07/2016	0001	56	-	76	2	U	F	#	2	
Temperature	C	12/07/2016	N001	56	-	76	14.51		F	#		
Turbidity	NTU	12/07/2016	N001	56	-	76	1.15		F	#		
Uranium	mg/L	12/07/2016	N001	56	-	76	0.0096		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	56	-	76	0.0074		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0655 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	38	-	58	65		F	#	2.5	
Chloride	mg/L	12/06/2016	N001	38	-	58	35		F	#	10	
Dissolved Oxygen	mg/L	12/06/2016	N001	38	-	58	0.76		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	38	-	58	110		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	38	-	58	36.3		F	#		
pH	s.u.	12/06/2016	N001	38	-	58	7.41		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	38	-	58	3764		F	#		
Sulfate	mg/L	12/06/2016	N001	38	-	58	1800	N	F	#	25	
Temperature	C	12/06/2016	N001	38	-	58	13.87		F	#		
Turbidity	NTU	12/06/2016	N001	38	-	58	0.78		F	#		
Uranium	mg/L	12/06/2016	N001	38	-	58	0.013		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	38	-	58	0.0075		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0656 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	38	-	58	38		F	#	2.5	
Chloride	mg/L	12/07/2016	N001	38	-	58	12		F	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	38	-	58	0.74		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	38	-	58	18		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	38	-	58	203		F	#		
pH	s.u.	12/07/2016	N001	38	-	58	8.06		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	38	-	58	888		F	#		
Sulfate	mg/L	12/07/2016	N001	38	-	58	140		F	#	2.5	
Temperature	C	12/07/2016	N001	38	-	58	14.62		F	#		
Turbidity	NTU	12/07/2016	N001	38	-	58	0.98		F	#		
Uranium	mg/L	12/07/2016	N001	38	-	58	0.0047		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	38	-	58	0.00058	U	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0657 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	121	-	136	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	121	-	136	5.5		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	121	-	136	7.71		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	121	-	136	3.4		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	121	-	136	113.9		F	#		
pH	s.u.	12/07/2016	N001	121	-	136	7.92		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	121	-	136	432		F	#		
Sulfate	mg/L	12/07/2016	N001	121	-	136	52		F	#	1	
Temperature	C	12/07/2016	N001	121	-	136	15.18		F	#		
Turbidity	NTU	12/07/2016	N001	121	-	136	0.73		F	#		
Uranium	mg/L	12/07/2016	N001	121	-	136	0.012		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	121	-	136	0.065		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0662 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	37.5	-	67.5	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	37.5	-	67.5	4.8		F	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	37.5	-	67.5	6.97		F	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	37.5	-	67.5	0		F	#		
Iron	mg/L	12/07/2016	N001	37.5	-	67.5	0.044	J	UF	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	37.5	-	67.5	3		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	37.5	-	67.5	106.5		F	#		
pH	s.u.	12/07/2016	N001	37.5	-	67.5	7.73		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	37.5	-	67.5	553		F	#		
Sulfate	mg/L	12/07/2016	N001	37.5	-	67.5	82		F	#	2.5	
Sulfide	mg/L	12/07/2016	N001	37.5	-	67.5	2	U	F	#	2	
Temperature	C	12/07/2016	N001	37.5	-	67.5	15.03		F	#		
Turbidity	NTU	12/07/2016	N001	37.5	-	67.5	1.2		F	#		
Uranium	mg/L	12/07/2016	N001	37.5	-	67.5	0.41		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	37.5	-	67.5	0.031		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0669 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	34	-	54	1.7		F	#	0.1	
Chloride	mg/L	12/06/2016	N001	34	-	54	6.8		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	34	-	54	0.68		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	34	-	54	4.8		F	#	0.1	
Oxidation Reduction Potential	mV	12/06/2016	N001	34	-	54	171		F	#		
pH	s.u.	12/06/2016	N001	34	-	54	7.56		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	34	-	54	555		F	#		
Sulfate	mg/L	12/06/2016	N001	34	-	54	90		F	#	2.5	
Temperature	C	12/06/2016	N001	34	-	54	14.5		F	#		
Turbidity	NTU	12/06/2016	N001	34	-	54	0.73		F	#		
Uranium	mg/L	12/06/2016	N001	34	-	54	0.0054		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	34	-	54	0.056		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0699 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	50	-	70	154		F	#		
Ammonia Total as N	mg/L	12/07/2016	N001	50	-	70	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	50	-	70	4.2		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	50	-	70	7.18		F	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	50	-	70	0.01		F	#		
Iron	mg/L	12/07/2016	N001	50	-	70	0.29		F	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	50	-	70	1.6		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	50	-	70	116.8		F	#		
pH	s.u.	12/07/2016	N001	50	-	70	7.82		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	50	-	70	458		F	#		
Sulfate	mg/L	12/07/2016	N001	50	-	70	58		F	#	1	
Sulfide	mg/L	12/07/2016	N001	50	-	70	2	U	F	#	2	
Temperature	C	12/07/2016	N001	50	-	70	13.15		F	#		
Turbidity	NTU	12/07/2016	N001	50	-	70	7.63		F	#		
Uranium	mg/L	12/07/2016	N001	50	-	70	0.38		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	50	-	70	0.034		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0700 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	50	-	70	191		QF	#		
Ammonia Total as N	mg/L	12/07/2016	0001	50	-	70	0.1	U	QF	#	0.1	
Chloride	mg/L	12/07/2016	0001	50	-	70	5		QF	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	50	-	70	6.23		QF	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	50	-	70	0		QF	#		
Iron	mg/L	12/07/2016	0001	50	-	70	0.36	E	JQF	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	0001	50	-	70	5.3		QF	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	50	-	70	120.4		QF	#		
pH	s.u.	12/07/2016	N001	50	-	70	7.73		QF	#		
Specific Conductance	umhos /cm	12/07/2016	N001	50	-	70	598		QF	#		
Sulfate	mg/L	12/07/2016	0001	50	-	70	85		QF	#	2.5	
Sulfide	mg/L	12/07/2016	0001	50	-	70	2	U	QF	#	2	
Temperature	C	12/07/2016	N001	50	-	70	14.6		QF	#		
Turbidity	NTU	12/07/2016	N001	50	-	70	128		QF	#		
Uranium	mg/L	12/07/2016	0001	50	-	70	0.57		QF	#	0.000012	
Vanadium	mg/L	12/07/2016	0001	50	-	70	0.039		QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0701 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/05/2016	N001	50	-	70	173		QF	#		
Ammonia Total as N	mg/L	12/05/2016	0001	50	-	70	0.1		QF	#	0.1	
Chloride	mg/L	12/05/2016	0001	50	-	70	4.5		QF	#	0.4	
Dissolved Oxygen	mg/L	12/05/2016	N001	50	-	70	7.15		QF	#		
Field Ferrous Iron	mg/L	12/05/2016	N001	50	-	70	0		QF	#		
Iron	mg/L	12/05/2016	0001	50	-	70	0.029	J	UQF	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	0001	50	-	70	2		QF	#	0.1	
Oxidation Reduction Potential	mV	12/05/2016	N001	50	-	70	6.2		QF	#		
pH	s.u.	12/05/2016	N001	50	-	70	7.66		QF	#		
Specific Conductance	umhos /cm	12/05/2016	N001	50	-	70	482		QF	#		
Sulfate	mg/L	12/05/2016	0001	50	-	70	68		QF	#	1	
Sulfide	mg/L	12/05/2016	0001	50	-	70	2	U	QF	#	2	
Temperature	C	12/05/2016	N001	50	-	70	13.96		QF	#		
Turbidity	NTU	12/05/2016	N001	50	-	70	115		QF	#		
Uranium	mg/L	12/05/2016	0001	50	-	70	0.48		QF	#	0.000012	
Vanadium	mg/L	12/05/2016	0001	50	-	70	0.032		QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0702 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/05/2016	N001	50	-	70	280		QF	#		
Ammonia Total as N	mg/L	12/05/2016	0001	50	-	70	0.1	U	QF	#	0.1	
Chloride	mg/L	12/05/2016	0001	50	-	70	4.3		QF	#	0.4	
Dissolved Oxygen	mg/L	12/05/2016	N001	50	-	70	6.88		QF	#		
Field Ferrous Iron	mg/L	12/05/2016	N001	50	-	70	0		QF	#		
Iron	mg/L	12/05/2016	0001	50	-	70	0.029	J	UQF	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	0001	50	-	70	0.75		QF	#	0.01	
Oxidation Reduction Potential	mV	12/05/2016	N001	50	-	70	-49		QF	#		
pH	s.u.	12/05/2016	N001	50	-	70	7.82		QF	#		
Specific Conductance	umhos /cm	12/05/2016	N001	50	-	70	512		QF	#		
Sulfate	mg/L	12/05/2016	0001	50	-	70	60		QF	#	1	
Sulfide	mg/L	12/05/2016	0001	50	-	70	2	U	QF	#	2	
Temperature	C	12/05/2016	N001	50	-	70	14.29		QF	#		
Turbidity	NTU	12/05/2016	N001	50	-	70	182		QF	#		
Uranium	mg/L	12/05/2016	0001	50	-	70	0.52		QF	#	0.000012	
Vanadium	mg/L	12/05/2016	0001	50	-	70	0.013		QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0703 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	50	-	70	180		QF	#		
Ammonia Total as N	mg/L	12/07/2016	0001	50	-	70	0.1	U	QF	#	0.1	
Chloride	mg/L	12/07/2016	0001	50	-	70	4.6		QF	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	50	-	70	5.48		QF	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	50	-	70	0.04		QF	#		
Iron	mg/L	12/07/2016	0001	50	-	70	0.019	J	UQF	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	0001	50	-	70	3		QF	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	50	-	70	84.6		QF	#		
pH	s.u.	12/07/2016	N001	50	-	70	7.6		QF	#		
Specific Conductance	umhos /cm	12/07/2016	N001	50	-	70	529		QF	#		
Sulfate	mg/L	12/07/2016	0001	50	-	70	74		QF	#	2.5	
Sulfide	mg/L	12/07/2016	0001	50	-	70	2	U	QF	#	2	
Temperature	C	12/07/2016	N001	50	-	70	14.44		QF	#		
Turbidity	NTU	12/07/2016	N001	50	-	70	23.5		QF	#		
Uranium	mg/L	12/07/2016	0001	50	-	70	0.56		QF	#	0.000012	
Vanadium	mg/L	12/07/2016	0001	50	-	70	0.033		QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0704 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	50	-	70	179		F	#		
Ammonia Total as N	mg/L	12/07/2016	0001	50	-	70	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	0001	50	-	70	5.1		F	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	50	-	70	6.22		F	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	50	-	70	0		F	#		
Iron	mg/L	12/07/2016	0001	50	-	70	0.057	J	F	#	0.0067	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	0001	50	-	70	2.9		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	50	-	70	113.9		F	#		
pH	s.u.	12/07/2016	N001	50	-	70	7.62		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	50	-	70	519		F	#		
Sulfate	mg/L	12/07/2016	0001	50	-	70	78		F	#	2.5	
Sulfide	mg/L	12/07/2016	0001	50	-	70	2	U	F	#	2	
Temperature	C	12/07/2016	N001	50	-	70	9.78		F	#		
Turbidity	NTU	12/07/2016	N001	50	-	70	20.3		F	#		
Uranium	mg/L	12/07/2016	0001	50	-	70	0.56		F	#	0.000012	
Vanadium	mg/L	12/07/2016	0001	50	-	70	0.035		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0711 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	25.5	-	30.5	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	25.5	-	30.5	14		F	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	25.5	-	30.5	2.01		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	25.5	-	30.5	0.62		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	25.5	-	30.5	-53.4		F	#		
pH	s.u.	12/07/2016	N001	25.5	-	30.5	8		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	25.5	-	30.5	659		F	#		
Sulfate	mg/L	12/07/2016	N001	25.5	-	30.5	120		F	#	2.5	
Temperature	C	12/07/2016	N001	25.5	-	30.5	15.43		F	#		
Turbidity	NTU	12/07/2016	N001	25.5	-	30.5	3.1		F	#		
Uranium	mg/L	12/07/2016	N001	25.5	-	30.5	0.0036		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	25.5	-	30.5	0.0011	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0715 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	16	-	21	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	16	-	21	8.7		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	16	-	21	5.34		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	16	-	21	0.77		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	16	-	21	55.7		F	#		
pH	s.u.	12/07/2016	N001	16	-	21	8.04		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	16	-	21	514		F	#		
Sulfate	mg/L	12/07/2016	N001	16	-	21	69		F	#	1	
Temperature	C	12/07/2016	N001	16	-	21	14.97		F	#		
Turbidity	NTU	12/07/2016	N001	16	-	21	1.7		F	#		
Uranium	mg/L	12/07/2016	N001	16	-	21	0.0026		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	16	-	21	0.00091	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0719 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	19.35	-	24.35	0.1	U	F	#	0.1	
Chloride	mg/L	12/06/2016	N001	19.35	-	24.35	12		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	19.35	-	24.35	2.23		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	19.35	-	24.35	0.74		F	#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	19.35	-	24.35	17		F	#		
pH	s.u.	12/06/2016	N001	19.35	-	24.35	7.97		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	19.35	-	24.35	675		F	#		
Sulfate	mg/L	12/06/2016	N001	19.35	-	24.35	110		F	#	2.5	
Temperature	C	12/06/2016	N001	19.35	-	24.35	15.92		F	#		
Turbidity	NTU	12/06/2016	N001	19.35	-	24.35	2.02		F	#		
Uranium	mg/L	12/06/2016	N001	19.35	-	24.35	0.0036		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	19.35	-	24.35	0.0043		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0727 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	23.73	-	28.78	0.1	U	F	#	0.1	
Chloride	mg/L	12/06/2016	N001	23.73	-	28.78	8.9		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	23.73	-	28.78	2.95		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	23.73	-	28.78	0.82		F	#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	23.73	-	28.78	52		F	#		
pH	s.u.	12/06/2016	N001	23.73	-	28.78	8.01		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	23.73	-	28.78	536		F	#		
Sulfate	mg/L	12/06/2016	N001	23.73	-	28.78	82		F	#	2.5	
Temperature	C	12/06/2016	N001	23.73	-	28.78	15.9		F	#		
Turbidity	NTU	12/06/2016	N001	23.73	-	28.78	1.2		F	#		
Uranium	mg/L	12/06/2016	N001	23.73	-	28.78	0.0019		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	23.73	-	28.78	0.0023	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0733 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	49	-	54	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	49	-	54	4.3		F	#	0.8	
Dissolved Oxygen	mg/L	12/07/2016	N001	49	-	54	5.25		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	49	-	54	4		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	49	-	54	64.4		F	#		
pH	s.u.	12/07/2016	N001	49	-	54	7.69		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	49	-	54	511		F	#		
Sulfate	mg/L	12/07/2016	N001	49	-	54	74		F	#	2	
Temperature	C	12/07/2016	N001	49	-	54	15.96		F	#		
Turbidity	NTU	12/07/2016	N001	49	-	54	8.16		F	#		
Uranium	mg/L	12/07/2016	N001	49	-	54	0.0045		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	49	-	54	0.05		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0734 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	50	-	80	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	50	-	80	4.2		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	50	-	80	5.9		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	50	-	80	2.2		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	50	-	80	76.5		F	#		
pH	s.u.	12/07/2016	N001	50	-	80	7.76		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	50	-	80	461		F	#		
Sulfate	mg/L	12/07/2016	N001	50	-	80	53		F	#	1	
Temperature	C	12/07/2016	N001	50	-	80	14.79		F	#		
Turbidity	NTU	12/07/2016	N001	50	-	80	9.3		F	#		
Uranium	mg/L	12/07/2016	N001	50	-	80	0.13		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	50	-	80	0.024		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0735 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	0001	53.5	-	58.5	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	0001	53.5	-	58.5	2.8		F	#	0.8	
Dissolved Oxygen	mg/L	12/07/2016	N001	53.5	-	58.5	10.23		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	0001	53.5	-	58.5	4.8		F	#	0.1	
Oxidation Reduction Potential	mV	12/07/2016	N001	53.5	-	58.5	95.1		F	#		
pH	s.u.	12/07/2016	N001	53.5	-	58.5	7.81		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	53.5	-	58.5	598		F	#		
Sulfate	mg/L	12/07/2016	0001	53.5	-	58.5	160		F	#	2	
Temperature	C	12/07/2016	N001	53.5	-	58.5	15.36		F	#		
Turbidity	NTU	12/07/2016	N001	53.5	-	58.5	19.9		F	#		
Uranium	mg/L	12/07/2016	0001	53.5	-	58.5	0.18		F	#	0.000012	
Vanadium	mg/L	12/07/2016	0001	53.5	-	58.5	0.03		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0738 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	26	-	31	0.1	U	F	#	0.1	
Chloride	mg/L	12/06/2016	N001	26	-	31	13		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	26	-	31	1.75		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	26	-	31	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	26	-	31	-78.6		F	#		
pH	s.u.	12/06/2016	N001	26	-	31	8.2		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	26	-	31	695		F	#		
Sulfate	mg/L	12/06/2016	N001	26	-	31	150		F	#	2.5	
Temperature	C	12/06/2016	N001	26	-	31	16.2		F	#		
Turbidity	NTU	12/06/2016	N001	26	-	31	9.48		F	#		
Uranium	mg/L	12/06/2016	N001	26	-	31	0.00022		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	26	-	31	0.00074	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0739 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	33	-	38	0.96		F	#	0.1	
Chloride	mg/L	12/06/2016	N001	33	-	38	15		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	33	-	38	1.27		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	33	-	38	0.99		F	#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	33	-	38	-7.3		F	#		
pH	s.u.	12/06/2016	N001	33	-	38	8.11		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	33	-	38	747		F	#		
Sulfate	mg/L	12/06/2016	N001	33	-	38	160		F	#	2.5	
Temperature	C	12/06/2016	N001	33	-	38	15.26		F	#		
Turbidity	NTU	12/06/2016	N001	33	-	38	3.77		F	#		
Uranium	mg/L	12/06/2016	N001	33	-	38	0.0034		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	33	-	38	0.0092		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0740 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	30	-	35	0.1	U	F	#	0.1	
Chloride	mg/L	12/06/2016	N001	30	-	35	36		F	#	8	
Dissolved Oxygen	mg/L	12/06/2016	N001	30	-	35	5.7		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	30	-	35	25		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	30	-	35	119.9		F	#		
pH	s.u.	12/06/2016	N001	30	-	35	7.6		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	30	-	35	2817		F	#		
Sulfate	mg/L	12/06/2016	N001	30	-	35	1500		F	#	20	
Temperature	C	12/06/2016	N001	30	-	35	14.03		F	#		
Turbidity	NTU	12/06/2016	N001	30	-	35	2.88		F	#		
Uranium	mg/L	12/06/2016	N001	30	-	35	0.06		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	30	-	35	0.022		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0741 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	0001	50	-	80	110		F	#	2.5	
Chloride	mg/L	12/06/2016	0001	50	-	80	31		F	#	2	
Dissolved Oxygen	mg/L	12/06/2016	N001	50	-	80	0.69		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	0001	50	-	80	120		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	50	-	80	109.2		F	#		
pH	s.u.	12/06/2016	N001	50	-	80	7.66		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	50	-	80	2299		F	#		
Sulfate	mg/L	12/06/2016	0001	50	-	80	510		F	#	5	
Temperature	C	12/06/2016	N001	50	-	80	15.56		F	#		
Turbidity	NTU	12/06/2016	N001	50	-	80	1000	>	F	#		
Uranium	mg/L	12/06/2016	0001	50	-	80	0.0097		F	#	0.000012	
Vanadium	mg/L	12/06/2016	0001	50	-	80	0.0064		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0742 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	50	-	80	110		F	#	2.5	
Chloride	mg/L	12/06/2016	N001	50	-	80	24		F	#	2	
Dissolved Oxygen	mg/L	12/06/2016	N001	50	-	80	1.32		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	50	-	80	120		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	50	-	80	118		F	#		
pH	s.u.	12/06/2016	N001	50	-	80	7.64		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	50	-	80	2323		F	#		
Sulfate	mg/L	12/06/2016	N001	50	-	80	400		F	#	5	
Temperature	C	12/06/2016	N001	50	-	80	14.96		F	#		
Turbidity	NTU	12/06/2016	N001	50	-	80	9.13		F	#		
Uranium	mg/L	12/06/2016	N001	50	-	80	0.0081		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	50	-	80	0.0074		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0743 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	45	-	75	100		F	#	2.5	
Chloride	mg/L	12/06/2016	N001	45	-	75	31		F	#	2	
Dissolved Oxygen	mg/L	12/06/2016	N001	45	-	75	1.03		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	45	-	75	120		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	45	-	75	30		F	#		
pH	s.u.	12/06/2016	N001	45	-	75	7.67		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	45	-	75	2261		F	#		
Sulfate	mg/L	12/06/2016	N001	45	-	75	520		F	#	5	
Temperature	C	12/06/2016	N001	45	-	75	15.51		F	#		
Turbidity	NTU	12/06/2016	N001	45	-	75	4.66		F	#		
Uranium	mg/L	12/06/2016	N001	45	-	75	0.01		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	45	-	75	0.002	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0744 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	0001	31	-	61	110		F	#	2.5	
Chloride	mg/L	12/06/2016	0001	31	-	61	31		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	31	-	61	1.41		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	0001	31	-	61	140		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	31	-	61	49		F	#		
pH	s.u.	12/06/2016	N001	31	-	61	7.66		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	31	-	61	2246		F	#		
Sulfate	mg/L	12/06/2016	0001	31	-	61	380		F	#	2.5	
Temperature	C	12/06/2016	N001	31	-	61	15.86		F	#		
Turbidity	NTU	12/06/2016	N001	31	-	61	39.5		F	#		
Uranium	mg/L	12/06/2016	0001	31	-	61	0.0082		F	#	0.000012	
Vanadium	mg/L	12/06/2016	0001	31	-	61	0.007		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0760 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	0001	55	-	75	0.14		F	#	0.1	
Chloride	mg/L	12/06/2016	0001	55	-	75	9		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	55	-	75	0.51		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	0001	55	-	75	0.052		F	#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	55	-	75	-104.1		F	#		
pH	s.u.	12/06/2016	N001	55	-	75	8.19		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	55	-	75	523		F	#		
Sulfate	mg/L	12/06/2016	0001	55	-	75	88		F	#	2.5	
Temperature	C	12/06/2016	N001	55	-	75	16.38		F	#		
Turbidity	NTU	12/06/2016	N001	55	-	75	35.9		F	#		
Uranium	mg/L	12/06/2016	0001	55	-	75	0.00019		F	#	0.000012	
Vanadium	mg/L	12/06/2016	0001	55	-	75	0.00058	U	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0761 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	39	-	49	0.1	U	F	#	0.1	
Chloride	mg/L	12/06/2016	N001	39	-	49	11		F	#	2	
Dissolved Oxygen	mg/L	12/06/2016	N001	39	-	49	4.23		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	39	-	49	34		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	39	-	49	87.4		F	#		
pH	s.u.	12/06/2016	N001	39	-	49	7.31		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	39	-	49	1282		F	#		
Sulfate	mg/L	12/06/2016	N001	39	-	49	400		F	#	5	
Temperature	C	12/06/2016	N001	39	-	49	15.14		F	#		
Turbidity	NTU	12/06/2016	N001	39	-	49	7.31		F	#		
Uranium	mg/L	12/06/2016	N001	39	-	49	0.027		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	39	-	49	0.0019	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0762 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/06/2016	N001	29	-	49	266		F	#		
Ammonia Total as N	mg/L	12/06/2016	0001	29	-	49	0.1	U	F	#	0.1	
Calcium	mg/L	12/06/2016	0001	29	-	49	180		F	#	0.024	
Chloride	mg/L	12/06/2016	0001	29	-	49	58		F	#	8	
Dissolved Oxygen	mg/L	12/06/2016	N001	29	-	49	0.43		F	#		
Field Ferrous Iron	mg/L	12/06/2016	N001	29	-	49	0		F	#		
Iron	mg/L	12/06/2016	0001	29	-	49	0.037	J	UF	#	0.0067	
Magnesium	mg/L	12/06/2016	0001	29	-	49	150		F	#	0.03	
Manganese	mg/L	12/06/2016	0001	29	-	49	0.0079	J	F	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	0001	29	-	49	100		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	29	-	49	67.8		F	#		
pH	s.u.	12/06/2016	N001	29	-	49	7.51		F	#		
Potassium	mg/L	12/06/2016	0001	29	-	49	3.8		F	#	0.052	
Silica	mg/L	12/06/2016	0001	29	-	49	21		F	#	0.021	
Silicon	mg/L	12/06/2016	0001	29	-	49	9.7		F	#	0.0097	
Sodium	mg/L	12/06/2016	0001	29	-	49	450		F	#	0.047	
Specific Conductance	umhos /cm	12/06/2016	N001	29	-	49	3543		F	#		
Sulfate	mg/L	12/06/2016	0001	29	-	49	1400		F	#	20	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0762 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/06/2016	0001	29	-	49	2	U	F	#	2	
Temperature	C	12/06/2016	N001	29	-	49	15.78		F	#		
Turbidity	NTU	12/06/2016	N001	29	-	49	85.4		F	#		
Uranium	mg/L	12/06/2016	0001	29	-	49	0.012		F	#	0.000012	
Vanadium	mg/L	12/06/2016	0001	29	-	49	0.0082		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0764 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	47	-	52	0.1	U	QF	#	0.1	
Chloride	mg/L	12/06/2016	N001	47	-	52	8.5		QF	#	1.6	
Dissolved Oxygen	mg/L	12/06/2016	N001	47	-	52	5.3		QF	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	47	-	52	40		QF	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	47	-	52	32.1		QF	#		
pH	s.u.	12/06/2016	N001	47	-	52	7.82		QF	#		
Specific Conductance	umhos /cm	12/06/2016	N001	47	-	52	973		QF	#		
Sulfate	mg/L	12/06/2016	N001	47	-	52	190		QF	#	4	
Temperature	C	12/06/2016	N001	47	-	52	15.91		QF	#		
Turbidity	NTU	12/06/2016	N001	47	-	52	7.01		QF	#		
Uranium	mg/L	12/06/2016	N001	47	-	52	0.0082		QF	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	47	-	52	0.017		QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0765 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	58.6	-	88.7	280		F	#		
Ammonia Total as N	mg/L	12/07/2016	N001	58.6	-	88.7	82		F	#	2.5	
Calcium	mg/L	12/07/2016	N001	58.6	-	88.7	110		F	#	0.024	
Chloride	mg/L	12/07/2016	N001	58.6	-	88.7	27		F	#	4	
Dissolved Oxygen	mg/L	12/07/2016	N001	58.6	-	88.7	0.77		F	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	58.6	-	88.7	0.03		F	#		
Iron	mg/L	12/07/2016	N001	58.6	-	88.7	0.03	J	UF	#	0.0067	
Magnesium	mg/L	12/07/2016	N001	58.6	-	88.7	82		F	#	0.03	
Manganese	mg/L	12/07/2016	N001	58.6	-	88.7	0.092		F	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	58.6	-	88.7	75		F	#	1	
Oxidation Reduction Potential	mV	12/07/2016	N001	58.6	-	88.7	66.6		F	#		
pH	s.u.	12/07/2016	N001	58.6	-	88.7	7.55		F	#		
Potassium	mg/L	12/07/2016	N001	58.6	-	88.7	15		F	#	0.052	
Silica	mg/L	12/07/2016	N001	58.6	-	88.7	14		F	#	0.021	
Silicon	mg/L	12/07/2016	N001	58.6	-	88.7	6.5		F	#	0.0097	
Sodium	mg/L	12/07/2016	N001	58.6	-	88.7	97		F	#	0.047	
Specific Conductance	umhos /cm	12/07/2016	N001	58.6	-	88.7	2035		F	#		
Sulfate	mg/L	12/07/2016	N001	58.6	-	88.7	510		F	#	10	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0765 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/07/2016	N001	58.6	-	88.7	2	U	F	#	2	
Temperature	C	12/07/2016	N001	58.6	-	88.7	15.08		F	#		
Turbidity	NTU	12/07/2016	N001	58.6	-	88.7	2.98		F	#		
Uranium	mg/L	12/07/2016	N001	58.6	-	88.7	0.0081		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	58.6	-	88.7	0.0036		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0766 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	47.2	-	57.2	120		F	#	2.5	
Ammonia Total as N	mg/L	12/06/2016	N002	47.2	-	57.2	120		F	#	2.5	
Chloride	mg/L	12/06/2016	N001	47.2	-	57.2	22		F	#	1	
Chloride	mg/L	12/06/2016	N002	47.2	-	57.2	21		F	#	1	
Dissolved Oxygen	mg/L	12/06/2016	N001	47.2	-	57.2	1.04		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	47.2	-	57.2	130		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N002	47.2	-	57.2	130		F	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	47.2	-	57.2	80		F	#		
pH	s.u.	12/06/2016	N001	47.2	-	57.2	7.72		F	#		
Specific Conductance	umhos /cm	12/06/2016	N001	47.2	-	57.2	2137		F	#		
Sulfate	mg/L	12/06/2016	N001	47.2	-	57.2	340		F	#	2.5	
Sulfate	mg/L	12/06/2016	N002	47.2	-	57.2	330		F	#	2.5	
Temperature	C	12/06/2016	N001	47.2	-	57.2	16.18		F	#		
Turbidity	NTU	12/06/2016	N001	47.2	-	57.2	4.6		F	#		
Uranium	mg/L	12/06/2016	N001	47.2	-	57.2	0.008		F	#	0.000012	
Uranium	mg/L	12/06/2016	N002	47.2	-	57.2	0.0078		F	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	47.2	-	57.2	0.0047		F	#	0.00058	
Vanadium	mg/L	12/06/2016	N002	47.2	-	57.2	0.0047		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0767 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	43.5	-	63.5	0.13		F	#	0.1	
Chloride	mg/L	12/07/2016	N001	43.5	-	63.5	5		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	43.5	-	63.5	2.44		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	43.5	-	63.5	0.059		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	43.5	-	63.5	-116		F	#		
pH	s.u.	12/07/2016	N001	43.5	-	63.5	7.99		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	43.5	-	63.5	399		F	#		
Sulfate	mg/L	12/07/2016	N001	43.5	-	63.5	32		F	#	1	
Temperature	C	12/07/2016	N001	43.5	-	63.5	15.24		F	#		
Turbidity	NTU	12/07/2016	N001	43.5	-	63.5	1.13		F	#		
Uranium	mg/L	12/07/2016	N001	43.5	-	63.5	0.00059		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	43.5	-	63.5	0.00058	U	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0768 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	24.4	-	44.4	0.49		F	#	0.1	
Chloride	mg/L	12/07/2016	N001	24.4	-	44.4	22		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	24.4	-	44.4	0.5		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	24.4	-	44.4	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	24.4	-	44.4	-195.6		F	#		
pH	s.u.	12/07/2016	N001	24.4	-	44.4	8.2		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	24.4	-	44.4	481		F	#		
Sulfate	mg/L	12/07/2016	N001	24.4	-	44.4	130		F	#	1	
Temperature	C	12/07/2016	N001	24.4	-	44.4	15.82		F	#		
Turbidity	NTU	12/07/2016	N001	24.4	-	44.4	6		F	#		
Uranium	mg/L	12/07/2016	N001	24.4	-	44.4	0.00023		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	24.4	-	44.4	0.00058	U	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0770 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (as $CaCO_3$)	mg/L	12/07/2016	N001	54.9	-	64.9	195		F	#		
Ammonia Total as N	mg/L	12/07/2016	N001	54.9	-	64.9	34		F	#	2.5	
Calcium	mg/L	12/07/2016	N001	54.9	-	64.9	35		F	#	0.024	
Chloride	mg/L	12/07/2016	N001	54.9	-	64.9	12		F	#	1	
Dissolved Oxygen	mg/L	12/07/2016	N001	54.9	-	64.9	0.79		F	#		
Field Ferrous Iron	mg/L	12/07/2016	N001	54.9	-	64.9	0.11		F	#		
Iron	mg/L	12/07/2016	N001	54.9	-	64.9	0.072	J	UF	#	0.0067	
Magnesium	mg/L	12/07/2016	N001	54.9	-	64.9	29		F	#	0.03	
Manganese	mg/L	12/07/2016	N001	54.9	-	64.9	0.0014	J	UF	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	54.9	-	64.9	23		F	#	0.5	
Oxidation Reduction Potential	mV	12/07/2016	N001	54.9	-	64.9	193		F	#		
pH	s.u.	12/07/2016	N001	54.9	-	64.9	7.81		F	#		
Potassium	mg/L	12/07/2016	N001	54.9	-	64.9	4.5		F	#	0.052	
Silica	mg/L	12/07/2016	N001	54.9	-	64.9	15		F	#	0.021	
Silicon	mg/L	12/07/2016	N001	54.9	-	64.9	6.8		F	#	0.0097	
Sodium	mg/L	12/07/2016	N001	54.9	-	64.9	89		F	#	0.047	
Specific Conductance	umhos /cm	12/07/2016	N001	54.9	-	64.9	980		F	#		
Sulfate	mg/L	12/07/2016	N001	54.9	-	64.9	170		F	#	2.5	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0770 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfide	mg/L	12/07/2016	N001	54.9	-	64.9	2	U	F	#	2	
Temperature	C	12/07/2016	N001	54.9	-	64.9	15.15		F	#		
Turbidity	NTU	12/07/2016	N001	54.9	-	64.9	4.14		F	#		
Uranium	mg/L	12/07/2016	N001	54.9	-	64.9	0.0049		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	54.9	-	64.9	0.0009	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0771 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	N001	57.4	-	77.4	210		QF	#	2.5	
Chloride	mg/L	12/06/2016	N001	57.4	-	77.4	20		QF	#	10	
Dissolved Oxygen	mg/L	12/06/2016	N001	57.4	-	77.4	0.82		QF	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	N001	57.4	-	77.4	200		QF	#	1	
Oxidation Reduction Potential	mV	12/06/2016	N001	57.4	-	77.4	84.4		QF	#		
pH	s.u.	12/06/2016	N001	57.4	-	77.4	7.51		QF	#		
Specific Conductance	umhos /cm	12/06/2016	N001	57.4	-	77.4	3789		QF	#		
Sulfate	mg/L	12/06/2016	N001	57.4	-	77.4	1600		QF	#	25	
Temperature	C	12/06/2016	N001	57.4	-	77.4	14.32		QF	#		
Turbidity	NTU	12/06/2016	N001	57.4	-	77.4	1.12		QF	#		
Uranium	mg/L	12/06/2016	N001	57.4	-	77.4	0.012		QF	#	0.000012	
Vanadium	mg/L	12/06/2016	N001	57.4	-	77.4	0.0076		QF	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0772 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	7.4	-	27.4	2.6		F	#	0.1	
Chloride	mg/L	12/07/2016	N001	7.4	-	27.4	61		F	#	5	
Dissolved Oxygen	mg/L	12/07/2016	N001	7.4	-	27.4	1.99		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	7.4	-	27.4	150		F	#	1	
Oxidation Reduction Potential	mV	12/07/2016	N001	7.4	-	27.4	83.8		F	#		
pH	s.u.	12/07/2016	N001	7.4	-	27.4	7.6		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	7.4	-	27.4	3520		F	#		
Sulfate	mg/L	12/07/2016	N001	7.4	-	27.4	970		F	#	12	
Temperature	C	12/07/2016	N001	7.4	-	27.4	14.72		F	#		
Turbidity	NTU	12/07/2016	N001	7.4	-	27.4	3.42		F	#		
Uranium	mg/L	12/07/2016	N001	7.4	-	27.4	0.054		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	7.4	-	27.4	0.24		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0774 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/05/2016	N001	45	-	55	0.1	U	F	#	0.1	
Chloride	mg/L	12/05/2016	N001	45	-	55	4.7		F	#	1	
Dissolved Oxygen	mg/L	12/05/2016	N001	45	-	55	8.28		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	N001	45	-	55	4.6		F	#	0.1	
Oxidation Reduction Potential	mV	12/05/2016	N001	45	-	55	169.6		F	#		
pH	s.u.	12/05/2016	N001	45	-	55	7.73		F	#		
Specific Conductance	umhos /cm	12/05/2016	N001	45	-	55	528		F	#		
Sulfate	mg/L	12/05/2016	N001	45	-	55	110		F	#	2.5	
Temperature	C	12/05/2016	N001	45	-	55	16.05		F	#		
Turbidity	NTU	12/05/2016	N001	45	-	55	0.73		F	#		
Uranium	mg/L	12/05/2016	N001	45	-	55	0.043		F	#	0.000012	
Vanadium	mg/L	12/05/2016	N001	45	-	55	0.019		F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0775 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/07/2016	N001	142	-	167	0.1	U	F	#	0.1	
Chloride	mg/L	12/07/2016	N001	142	-	167	4.7		F	#	0.4	
Dissolved Oxygen	mg/L	12/07/2016	N001	142	-	167	4.33		F	#		
Nitrate + Nitrite as Nitrogen	mg/L	12/07/2016	N001	142	-	167	0.63		F	#	0.01	
Oxidation Reduction Potential	mV	12/07/2016	N001	142	-	167	51		F	#		
pH	s.u.	12/07/2016	N001	142	-	167	7.88		F	#		
Specific Conductance	umhos /cm	12/07/2016	N001	142	-	167	386		F	#		
Sulfate	mg/L	12/07/2016	N001	142	-	167	22		F	#	1	
Temperature	C	12/07/2016	N001	142	-	167	16.61		F	#		
Turbidity	NTU	12/07/2016	N001	142	-	167	0.69		F	#		
Uranium	mg/L	12/07/2016	N001	142	-	167	0.0027		F	#	0.000012	
Vanadium	mg/L	12/07/2016	N001	142	-	167	0.0008	J	F	#	0.00058	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0776 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/05/2016	N001	99.5	-	149.5	0.1	U	F	#	0.1	
Ammonia Total as N	mg/L	12/05/2016	N002	99.5	-	149.5	0.1	U	F	#	0.1	
Calcium	mg/L	12/05/2016	N002	99.5	-	149.5	31		F	#	0.024	
Chloride	mg/L	12/05/2016	N001	99.5	-	149.5	5		F	#	0.4	
Chloride	mg/L	12/05/2016	N002	99.5	-	149.5	5.9		F	#	0.4	
Dissolved Oxygen	mg/L	12/05/2016	N001	99.5	-	149.5	6.58		F	#		
Iron	mg/L	12/05/2016	N002	99.5	-	149.5	0.02	J	UF	#	0.0067	
Magnesium	mg/L	12/05/2016	N002	99.5	-	149.5	25		F	#	0.03	
Manganese	mg/L	12/05/2016	N002	99.5	-	149.5	0.00024	U	JF	#	0.00024	
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	N001	99.5	-	149.5	1.6		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	12/05/2016	N002	99.5	-	149.5	1.6		F	#	0.01	
Oxidation Reduction Potential	mV	12/05/2016	N001	99.5	-	149.5	151.4		F	#		
pH	s.u.	12/05/2016	N001	99.5	-	149.5	7.74		F	#		
Potassium	mg/L	12/05/2016	N002	99.5	-	149.5	2.2		F	#	0.052	
Silica	mg/L	12/05/2016	N002	99.5	-	149.5	11		F	#	0.021	
Silicon	mg/L	12/05/2016	N002	99.5	-	149.5	5.3		F	#	0.0097	
Sodium	mg/L	12/05/2016	N002	99.5	-	149.5	21		F	#	0.047	
Specific Conductance	umhos /cm	12/05/2016	N001	99.5	-	149.5	419		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/27/2017
Location: 0776 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	12/05/2016	N001	99.5	-	149.5	50		F	#	1	
Sulfate	mg/L	12/05/2016	N002	99.5	-	149.5	54		F	#	1	
Temperature	C	12/05/2016	N001	99.5	-	149.5	16.66		F	#		
Turbidity	NTU	12/05/2016	N001	99.5	-	149.5	0.64		F	#		
Uranium	mg/L	12/05/2016	N001	99.5	-	149.5	0.014		F	#	0.000012	
Uranium	mg/L	12/05/2016	N002	99.5	-	149.5	0.014		F	#	0.000012	
Vanadium	mg/L	12/05/2016	N001	99.5	-	149.5	0.015		F	#	0.00058	
Vanadium	mg/L	12/05/2016	N002	99.5	-	149.5	0.016		F	#	0.00058	

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: 1/27/2017
Location: 0623 SURFACE LOCATION

Parameter	Units	Sample Date	Sample ID	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Ammonia Total as N	mg/L	12/06/2016	0001	0.1	U		#	0.1	
Chloride	mg/L	12/06/2016	0001	11			#	0.2	
Dissolved Oxygen	mg/L	12/06/2016	N001	3			#		
Nitrate + Nitrite as Nitrogen	mg/L	12/06/2016	0001	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	12/06/2016	N001	-30			#		
pH	s.u.	12/06/2016	N001	7.54			#		
Specific Conductance	umhos/cm	12/06/2016	N001	604			#		
Sulfate	mg/L	12/06/2016	0001	30			#	0.5	
Temperature	C	12/06/2016	N001	1.57			#		
Turbidity	NTU	12/06/2016	N001	26.6			#		
Uranium	mg/L	12/06/2016	0001	0.00092			#	0.000012	
Vanadium	mg/L	12/06/2016	0001	0.00064	J		#	0.00058	

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: 1/24/2017

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0402	U	4840.3	12/06/2016	11:40:32	4.6	4835.7	
0602	U	4864.43	12/07/2016	11:50:54	9.41	4855.02	
0603	U	4849.41	12/07/2016	13:00:18	10.79	4838.62	
0604	C	4840.42	12/07/2016	10:00:07	8.8	4831.62	
0605	C	4835.07	12/07/2016	10:45:16	10.53	4824.54	
0606	D	4864.73	12/07/2016	13:35:28	35.99	4828.74	
0618	O	4924.81	12/07/2016	14:40:39	90.73	4834.08	
0619	O	4888.63	12/05/2016	15:35:32	55.85	4832.78	
0648	N	4835.14	12/07/2016	09:40:14	34.4	4800.74	
0650	D	4794.28	12/06/2016	11:25:19	19.97	4774.31	
0651	C	4787.88	12/07/2016	12:15:29	8.92	4778.96	
0652	C	4808.93	12/07/2016	12:30:40	19.25	4789.68	
0653	D	4837.08	12/07/2016	09:05:17	36.3	4800.78	
0655	D	4862.06	12/06/2016	10:25:15	39.69	4822.37	
0656	D	4856.33	12/07/2016	08:50:32	36.83	4819.5	
0657	O	4878.99	12/07/2016	17:00:07	48.79	4830.2	
0662	D	4878.56	12/07/2016	15:45:13	47.9	4830.66	
0669	D	4867.19	12/06/2016	08:50:02	49.21	4817.98	
0699	O	4876.09	12/07/2016	16:20:05	45.68	4830.41	
0701	O	4875.45	12/05/2016	16:50:03	45	4830.45	
0702	O	4875.95	12/05/2016	16:30:26	45.7	4830.25	
0703	O	4875.85	12/07/2016	16:10:32	45.5	4830.35	
0704	O	4875.93	12/07/2016	17:05:00	45.62	4830.31	
0733	D	4875.16	12/07/2016	15:20:27	47.63	4827.53	
0734	D	4877.97	12/07/2016	15:45:26	49.06	4828.91	
0735	O	4881.85	12/07/2016	15:10:43	48.75	4833.1	
0738	D	4810.86	12/06/2016	15:10:51	16.59	4794.27	
0739	D	4823.58	12/06/2016	11:00:11	22.67	4800.91	
0740	D	4810.28	12/06/2016	10:33:25	27	4783.28	

STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 1/24/2017

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	D	4846.98	12/06/2016	12:35:14	35.85	4811.13	
0742	D	4847.02	12/06/2016	13:10:28	36.06	4810.96	
0743	D	4846.92	12/06/2016	13:35:39	35.75	4811.17	
0744	D	4847.19	12/06/2016	14:10:41	36	4811.19	
0760	D	4814.8	12/06/2016	14:35:48	25.9	4788.9	
0761	D	4835.02	12/06/2016	09:47:42	43.43	4791.59	
0762	D	4820.74	12/06/2016	13:20:07	32.7	4788.04	
0764	D	4851.53	12/06/2016	16:20:32	49.91	4801.62	
0765	D	4848.45	12/07/2016	10:35:30	35.67	4812.78	
0766	D	4847.97	12/06/2016	14:35:11	36.21	4811.76	
0767	D	4808.25	12/07/2016	11:35:53	7.1	4801.15	
0768	D	4820.73	12/07/2016	11:10:30	14.44	4806.29	
0770	D	4857.26	12/07/2016	09:15:07	33.05	4824.21	
0771	D	4863.26	12/06/2016	10:45:28	41.39	4821.87	
0772	O	4847.6	12/07/2016	14:30:34	11.52	4836.08	
0774	O	4880.14	12/05/2016	16:20:50	47.56	4832.58	
0775	D	4879.68	12/07/2016	14:00:14	48.1	4831.58	
0776	O	4883.33	12/05/2016	15:00:46	51.44	4831.89	

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWNGRADIENT F OFFSITE
N UNKNOWN O ONSITE U UPGRADIENT

WATER LEVEL FLAGS: D Dry F Flowing B Below top of pump

Time-Concentration Graphs

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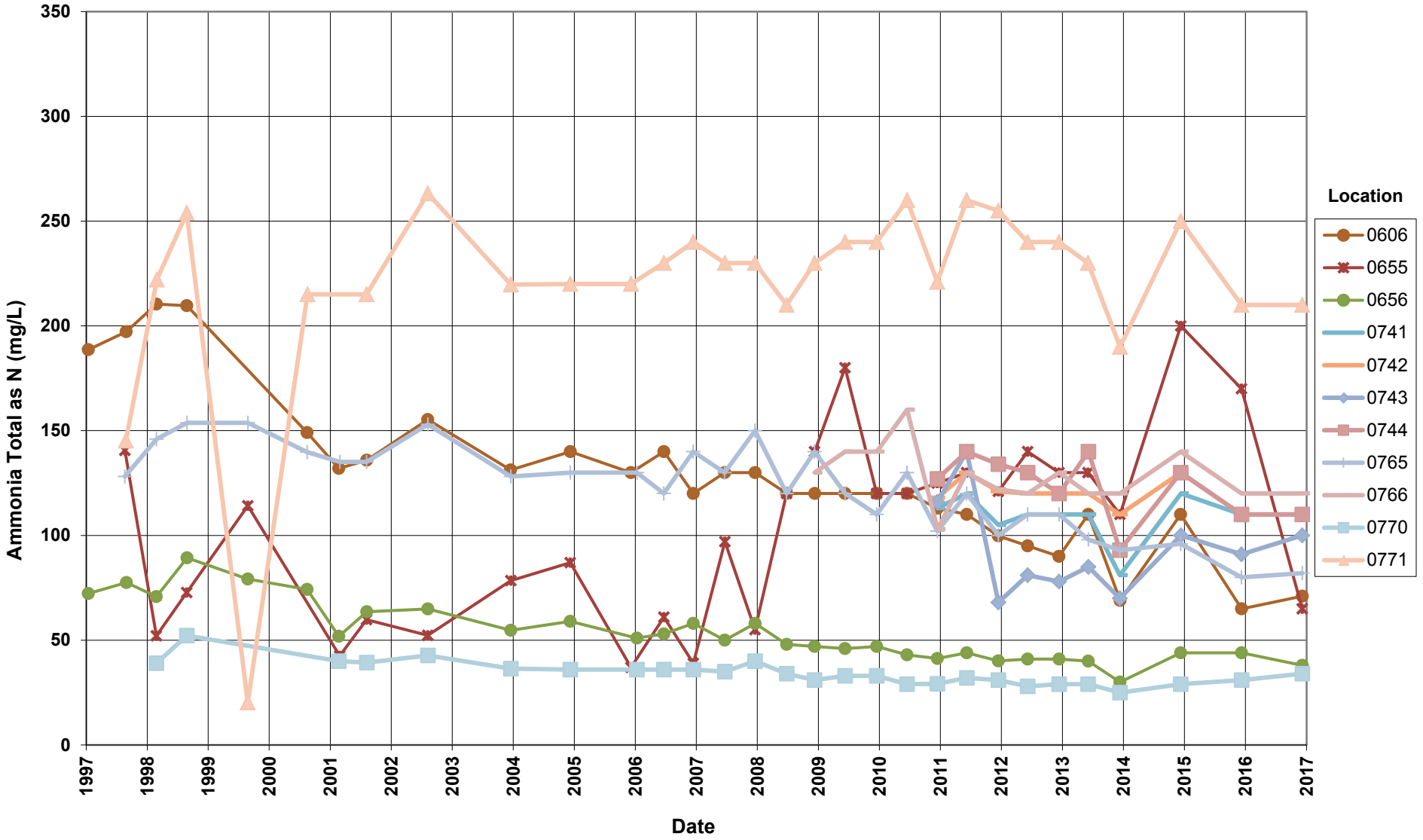
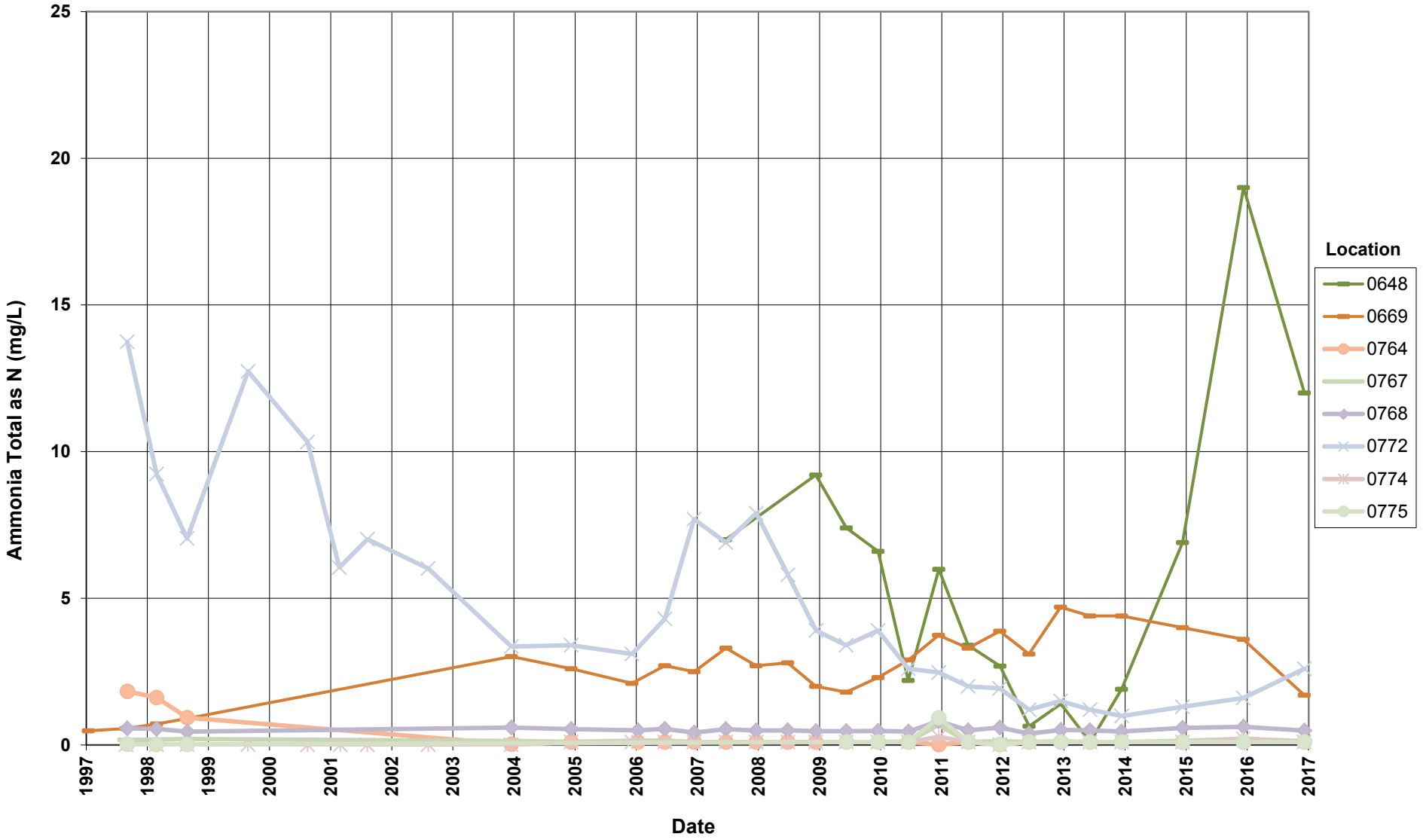
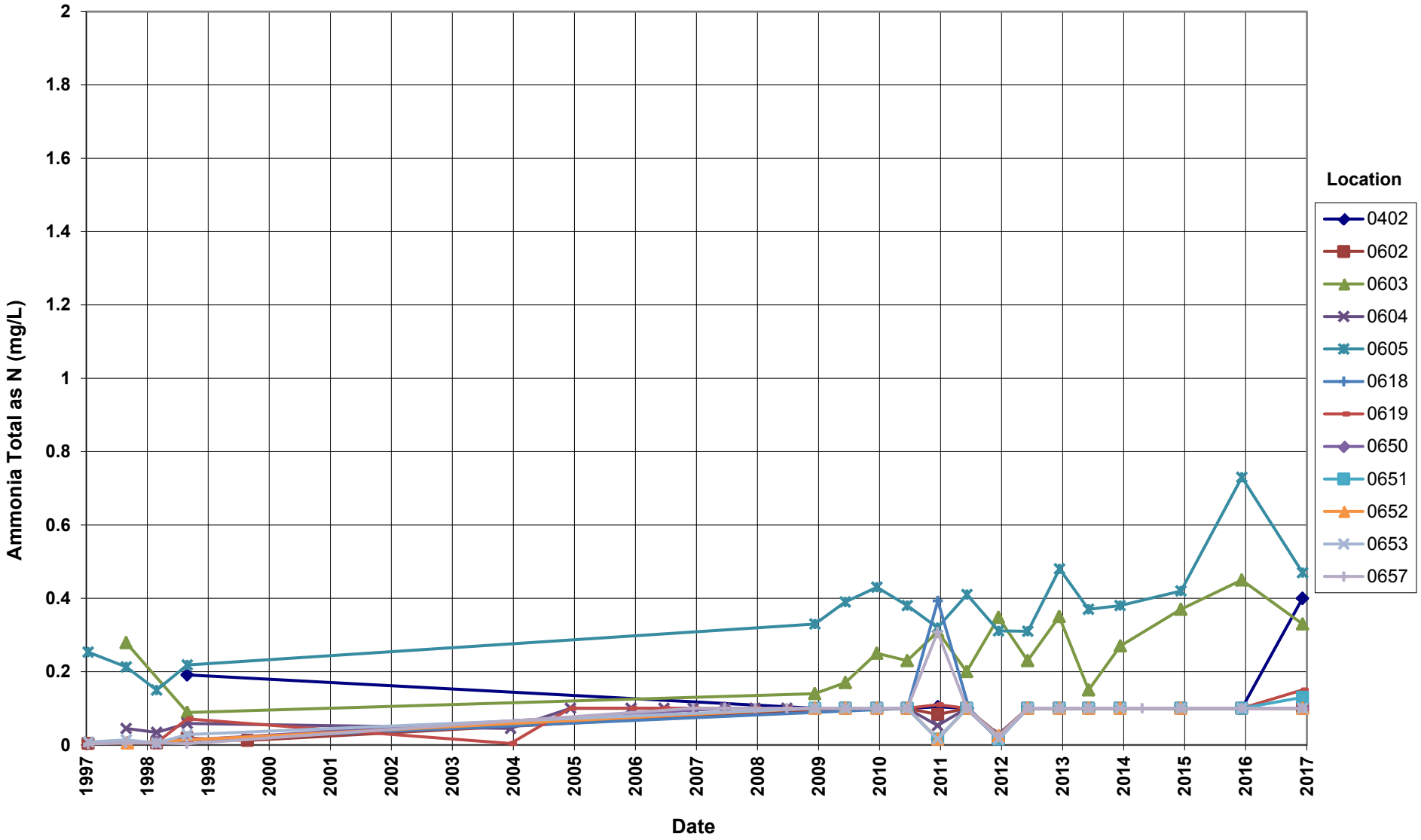
Monument Valley Processing Site
Ammonia Total as N Concentration



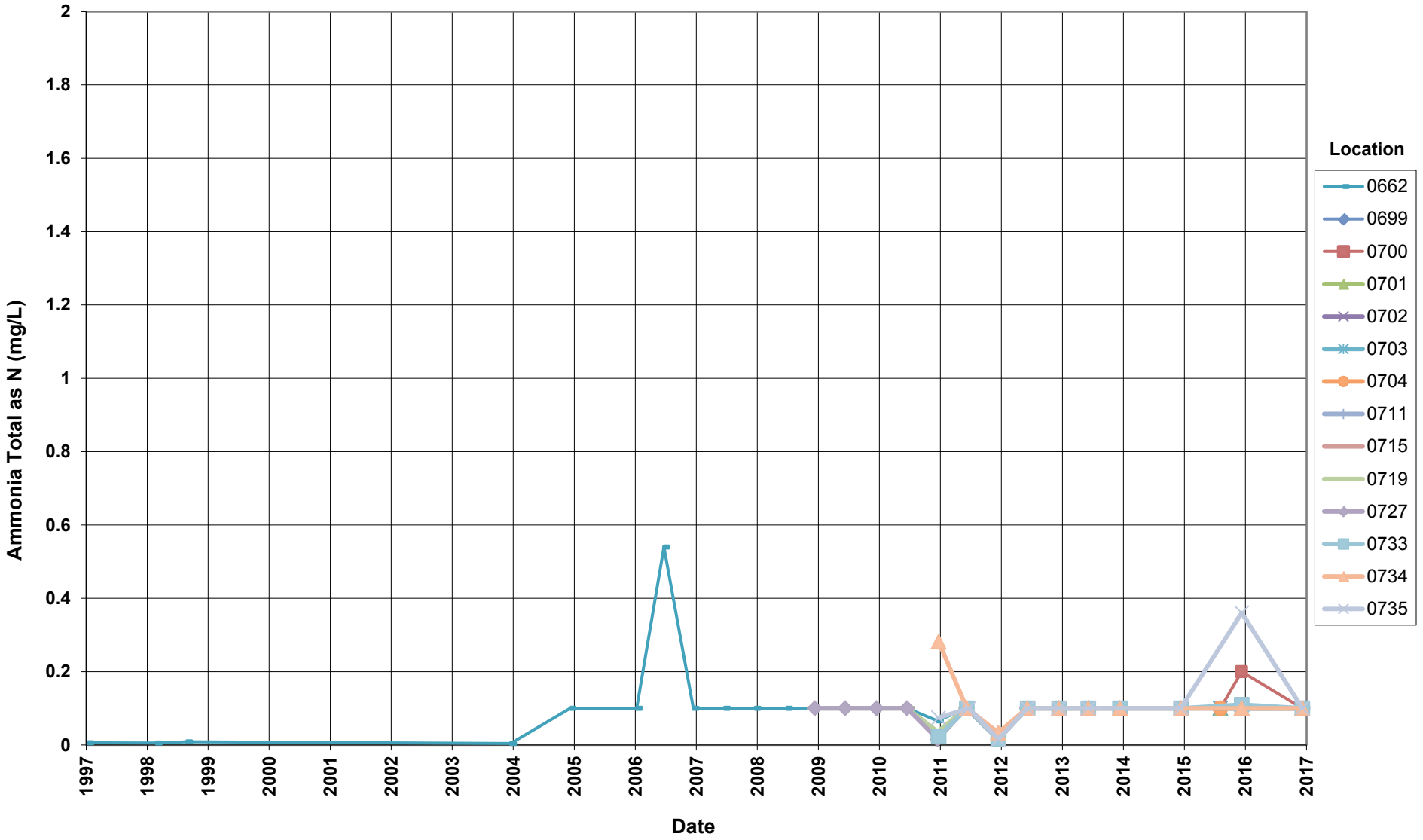
Monument Valley Processing Site
Ammonia Total as N Concentration



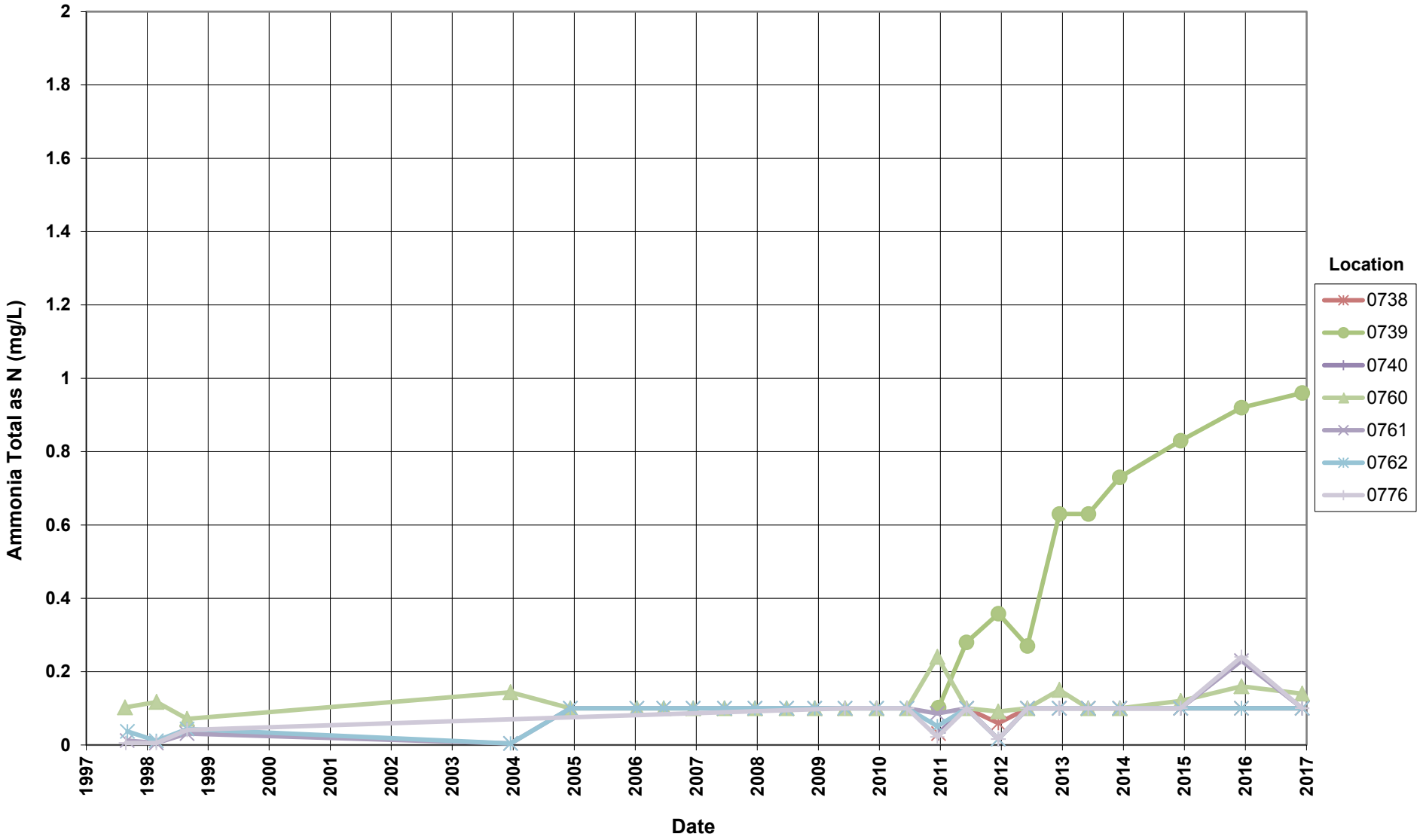
Monument Valley Processing Site
Ammonia Total as N Concentration

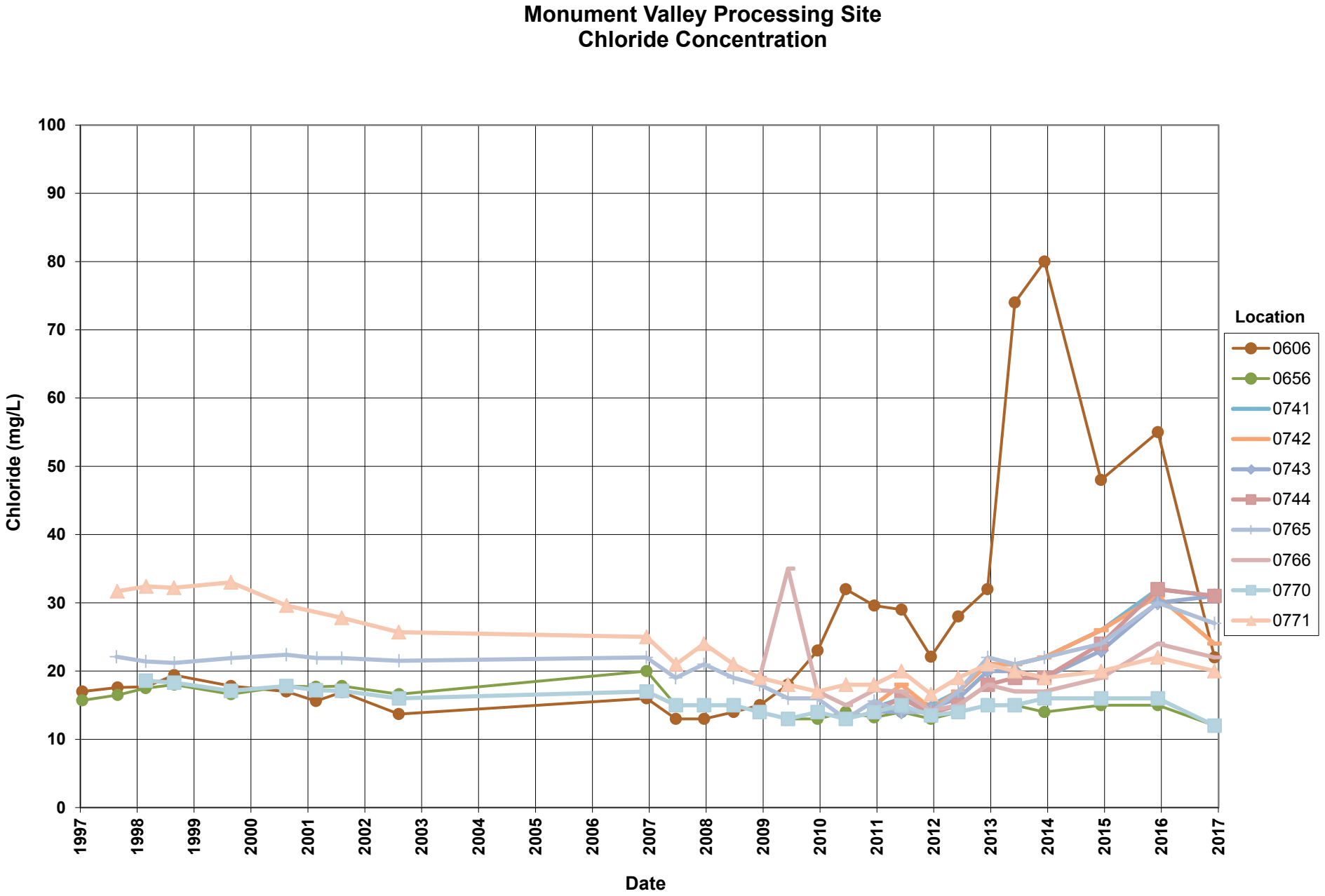


Monument Valley Processing Site
Ammonia Total as N Concentration

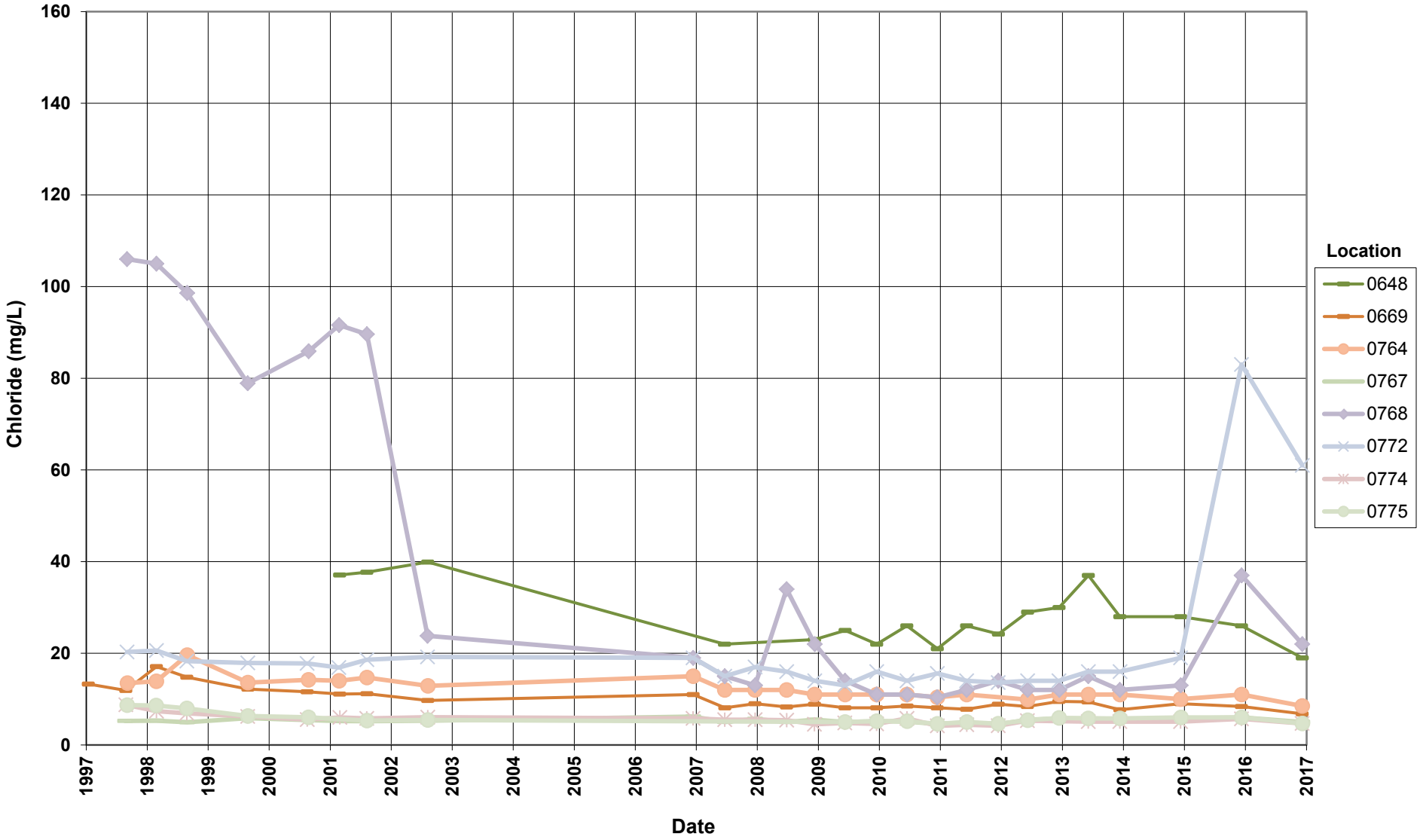


Monument Valley Processing Site
Ammonia Total as N Concentration

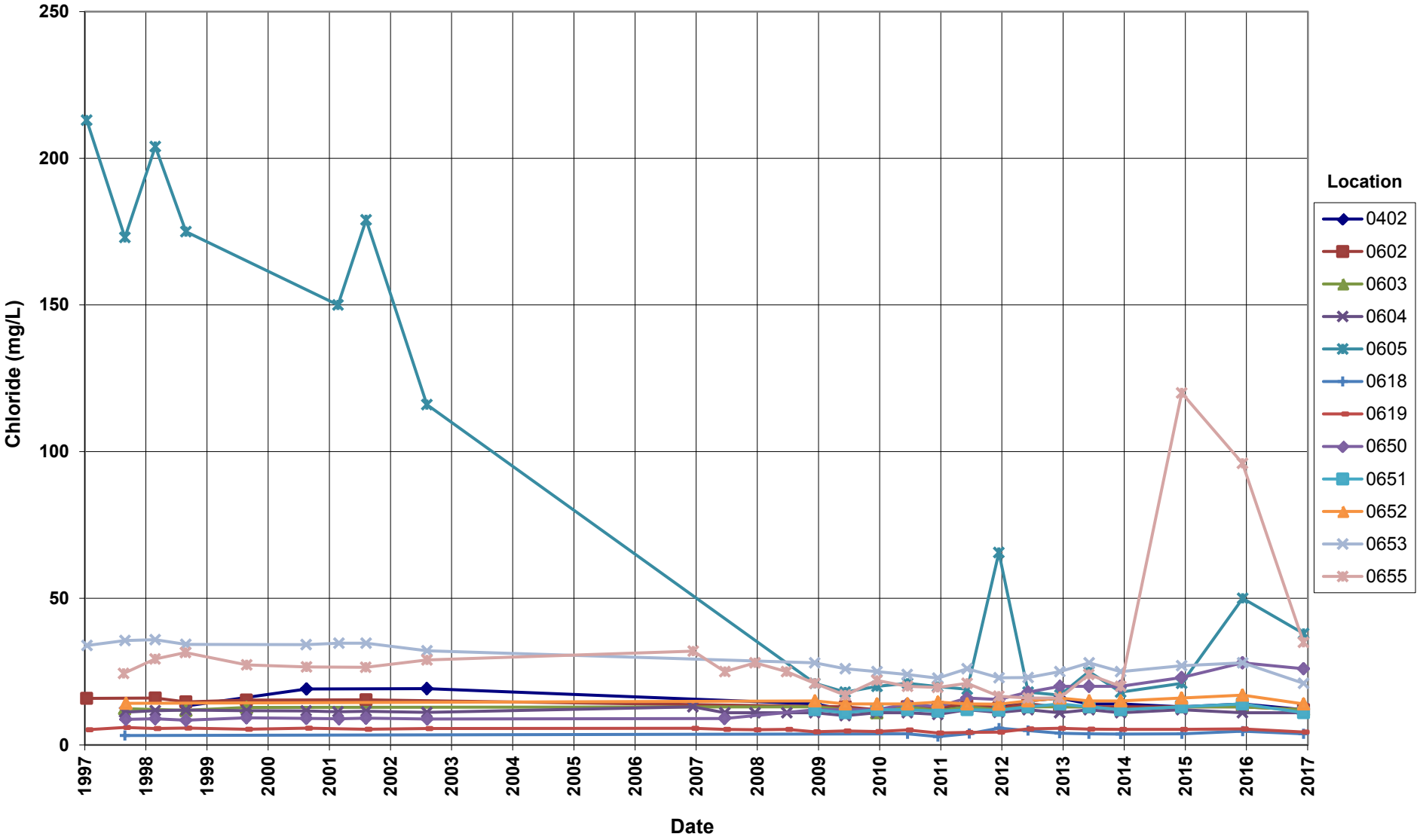



Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
100
90
80
70
60
50
40
30
20
10
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Date
Location
0606
0656
0741
0742
0743
0744
0765
0766
0770
0771

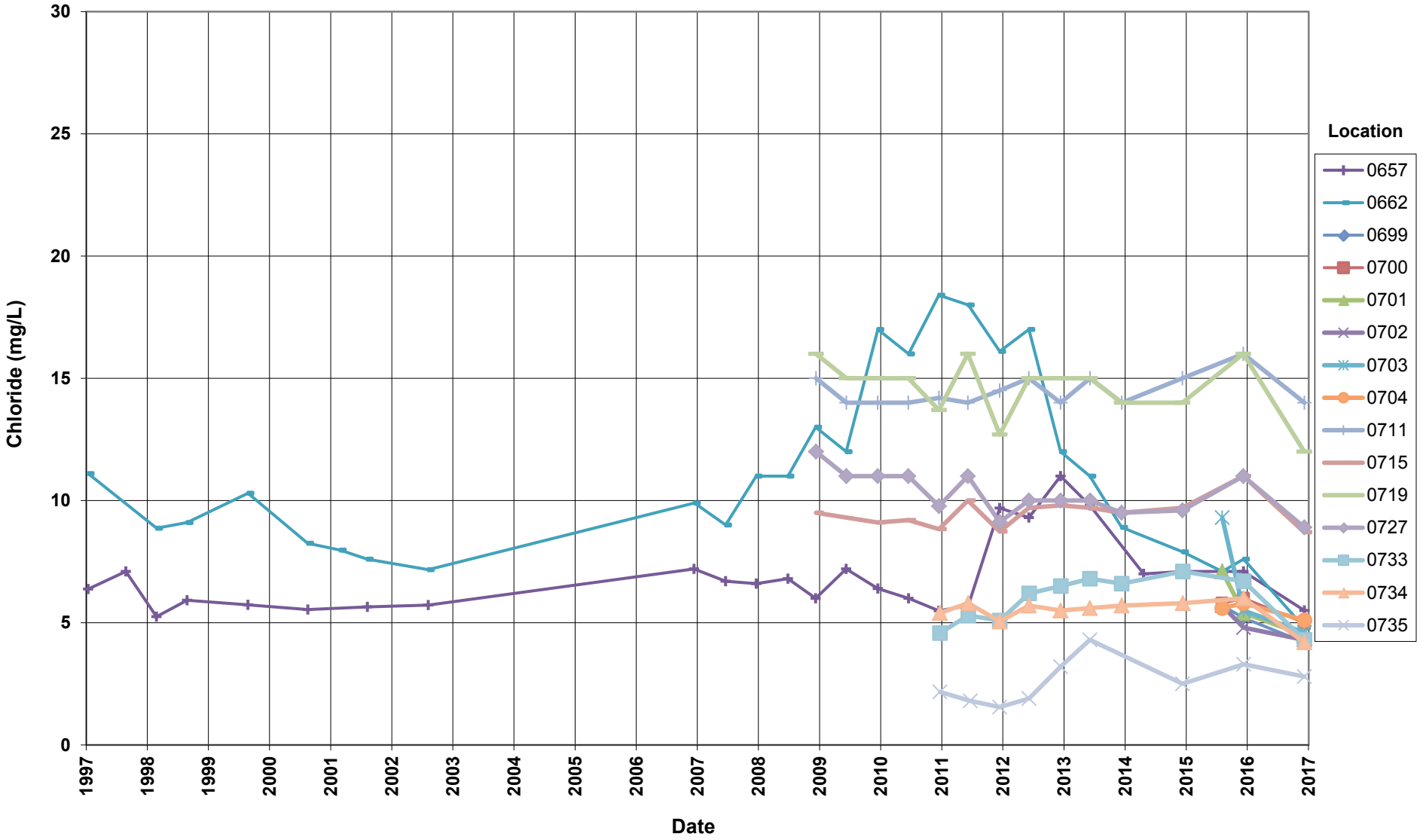
Monument Valley Processing Site
Chloride Concentration



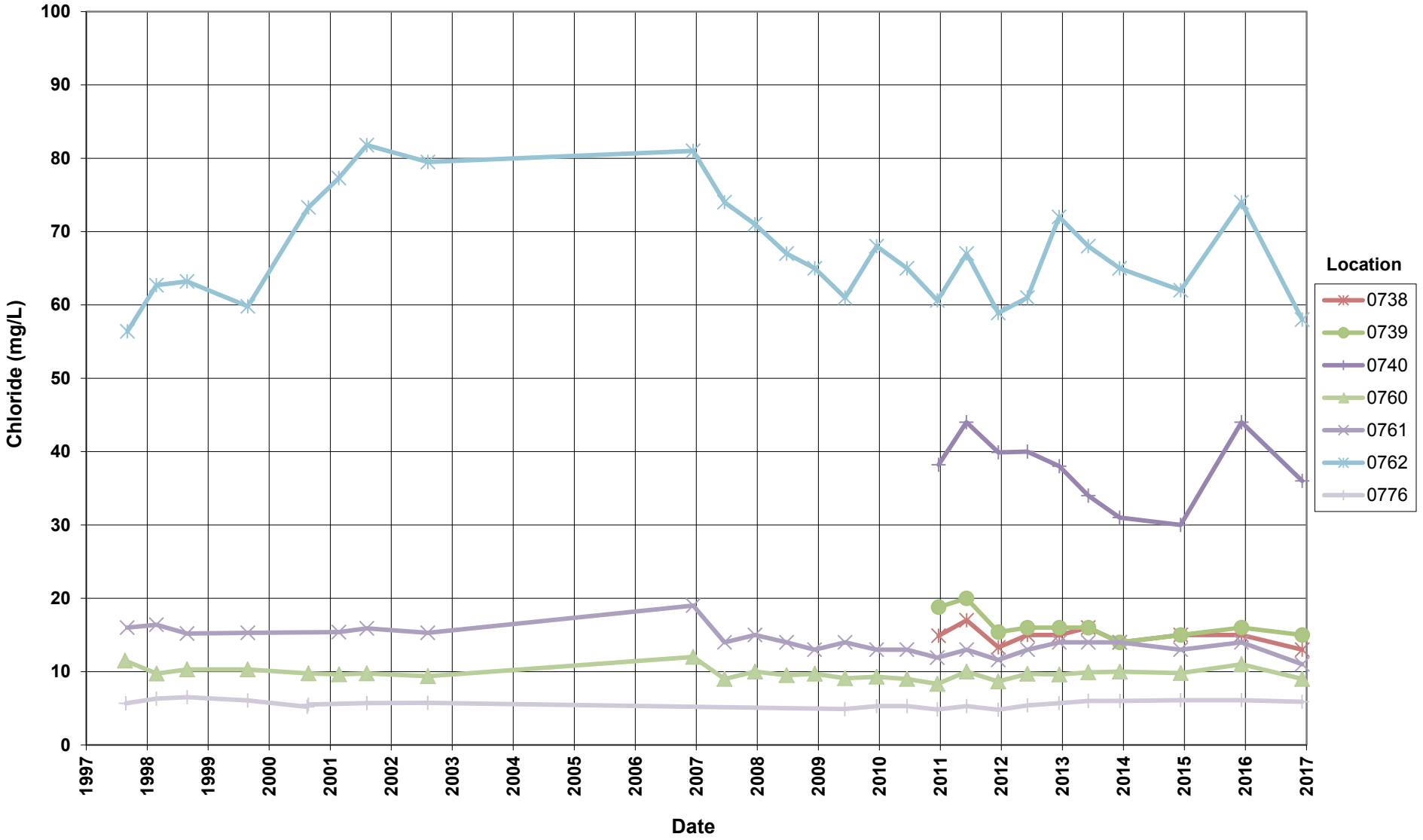
Monument Valley Processing Site
Chloride Concentration



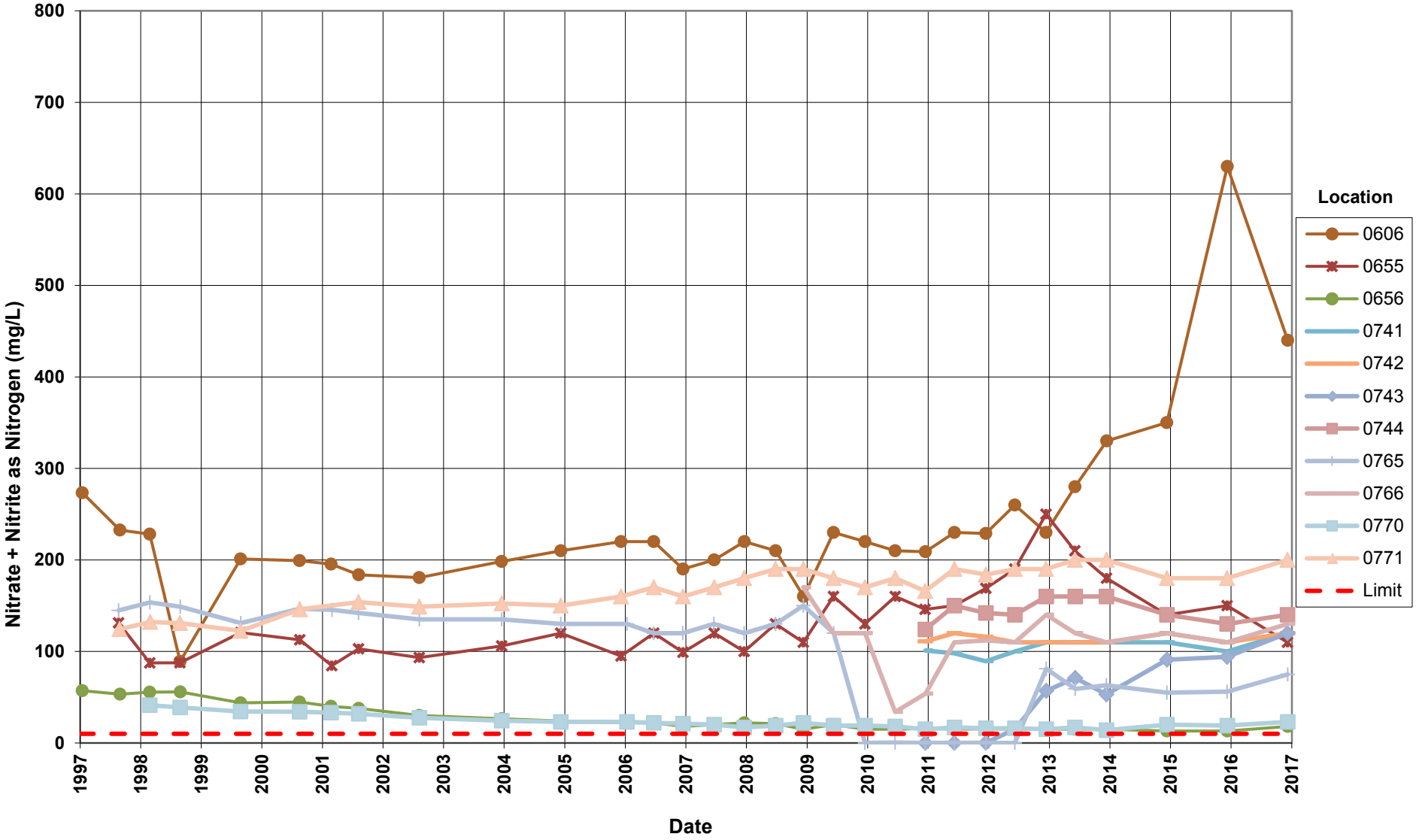
Monument Valley Processing Site
Chloride Concentration



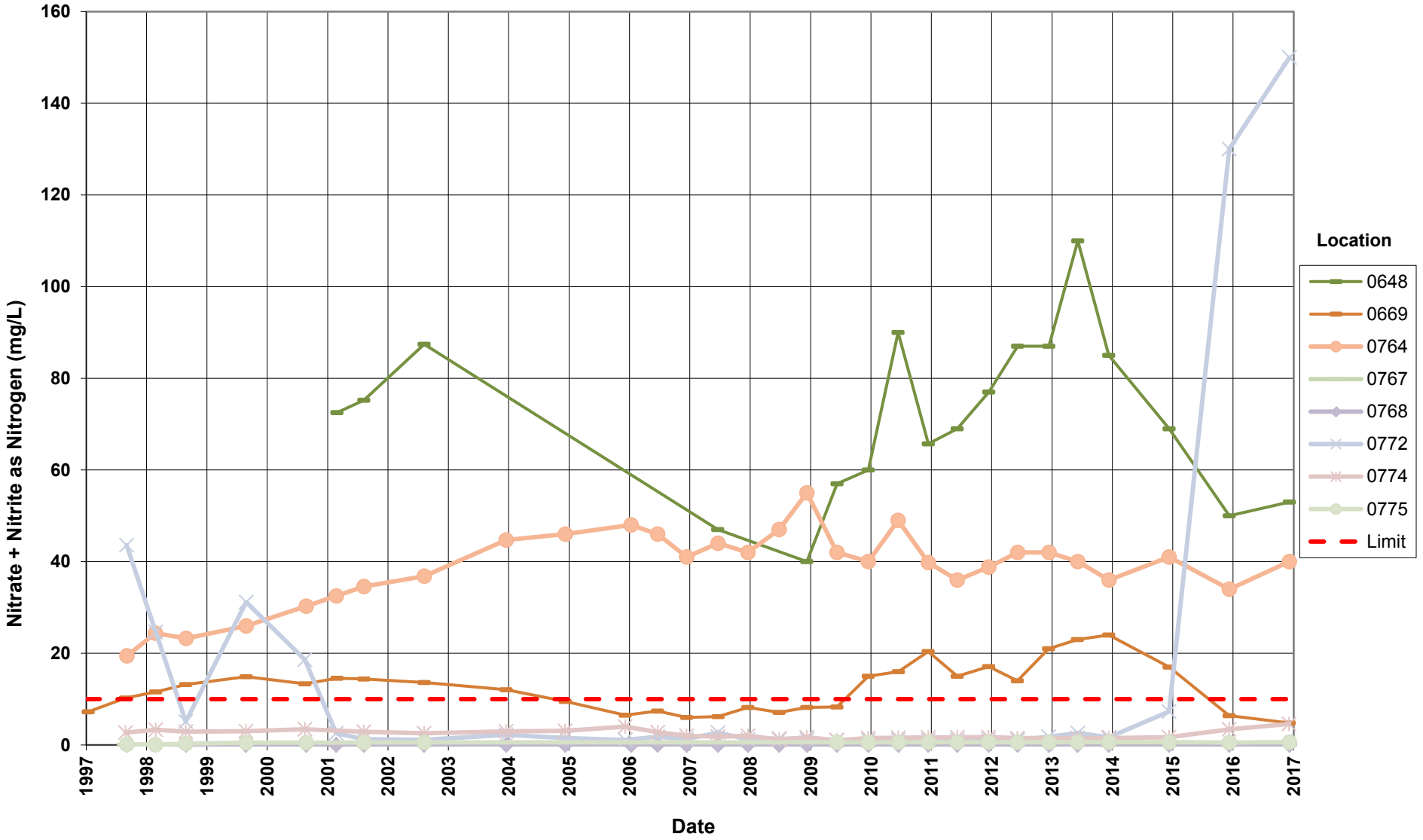
Monument Valley Processing Site
Chloride Concentration



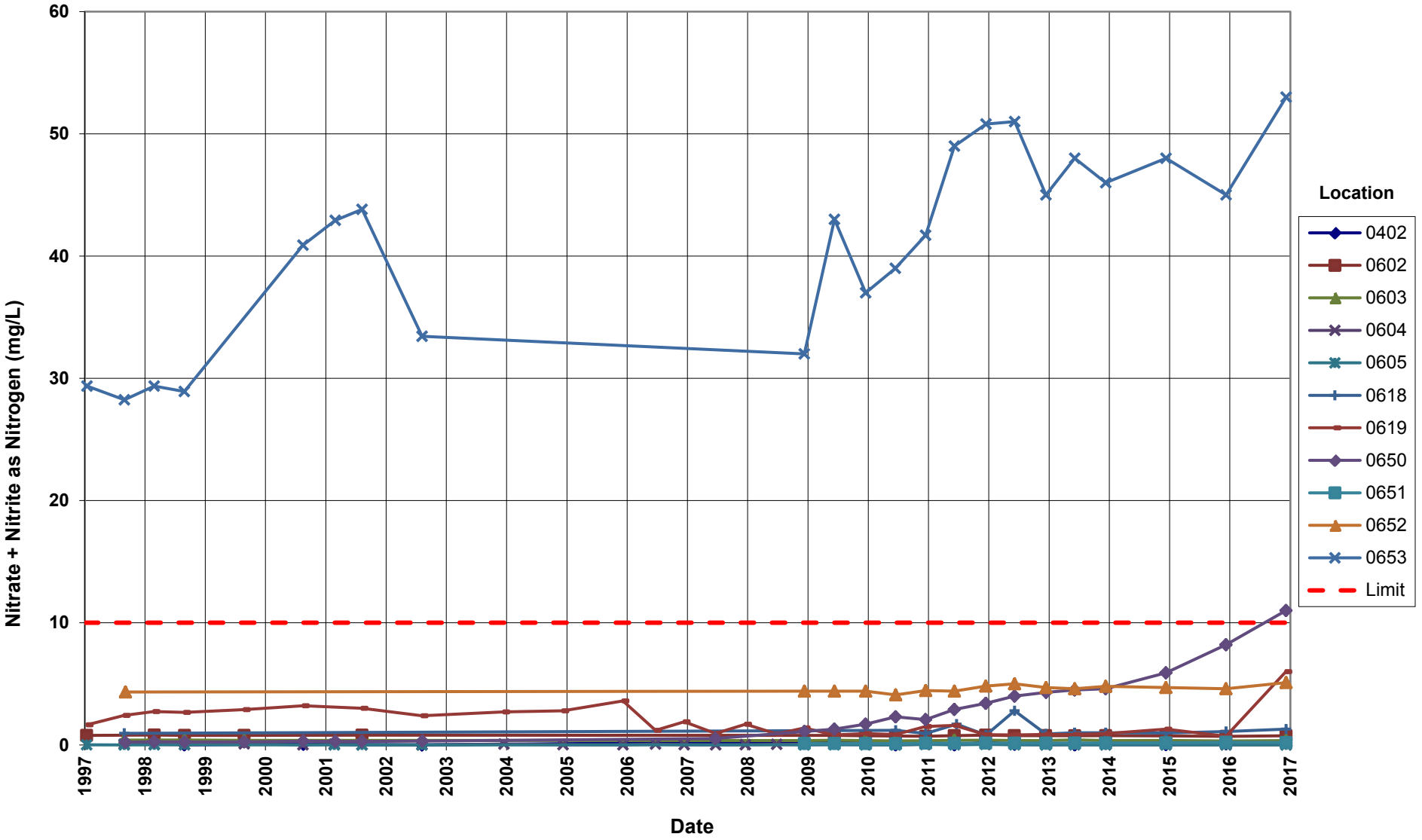
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10 mg/L



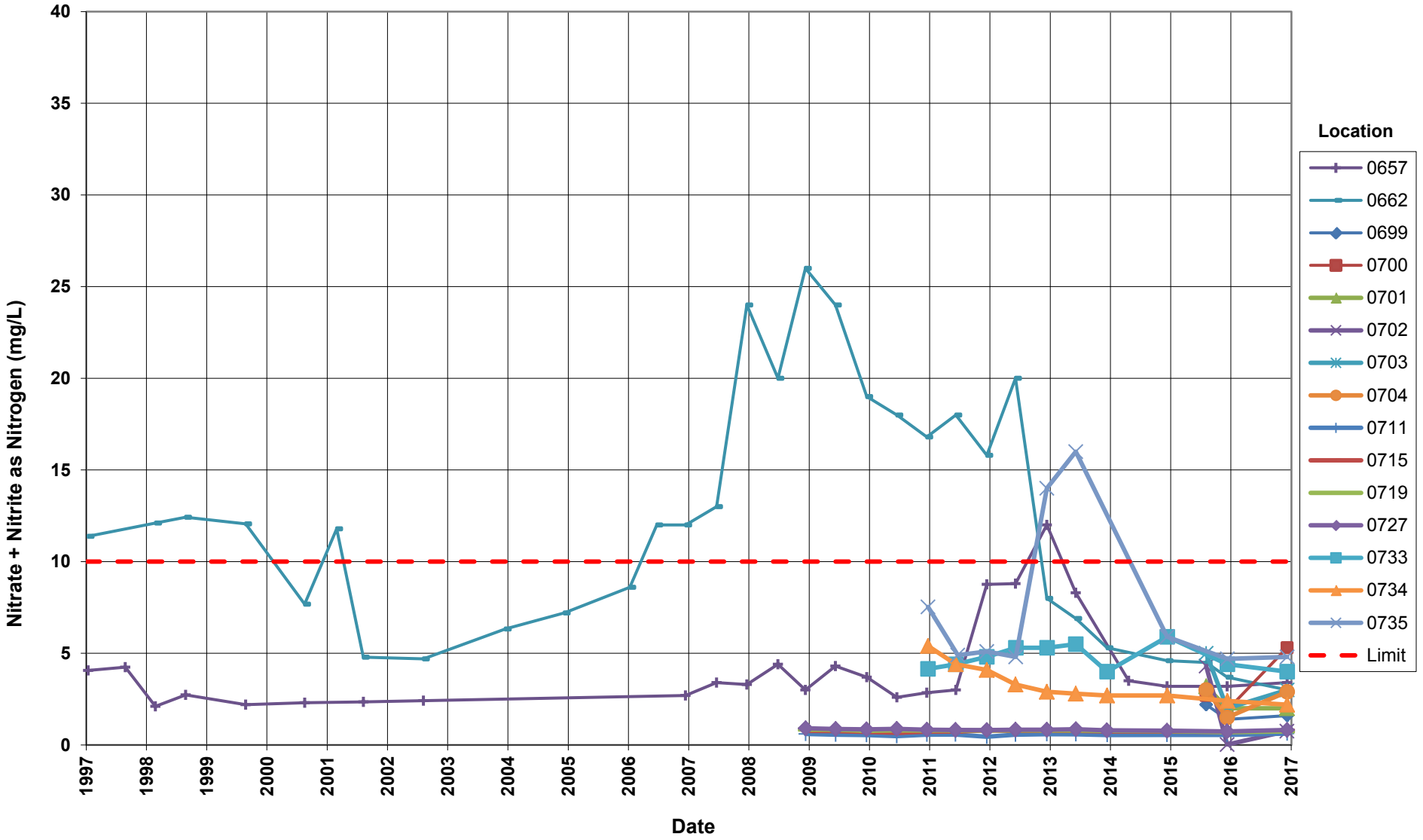
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10 mg/L



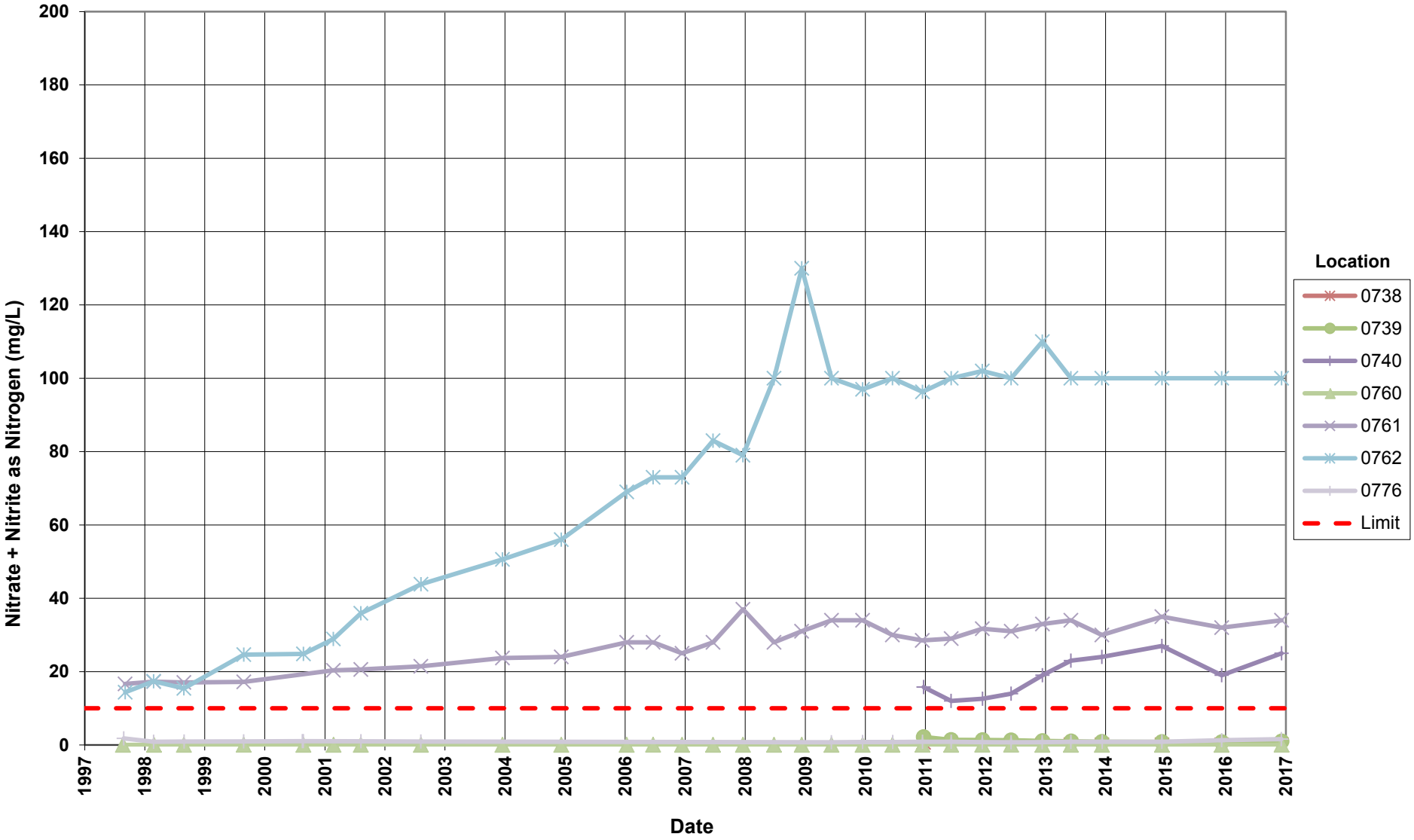
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10 mg/L



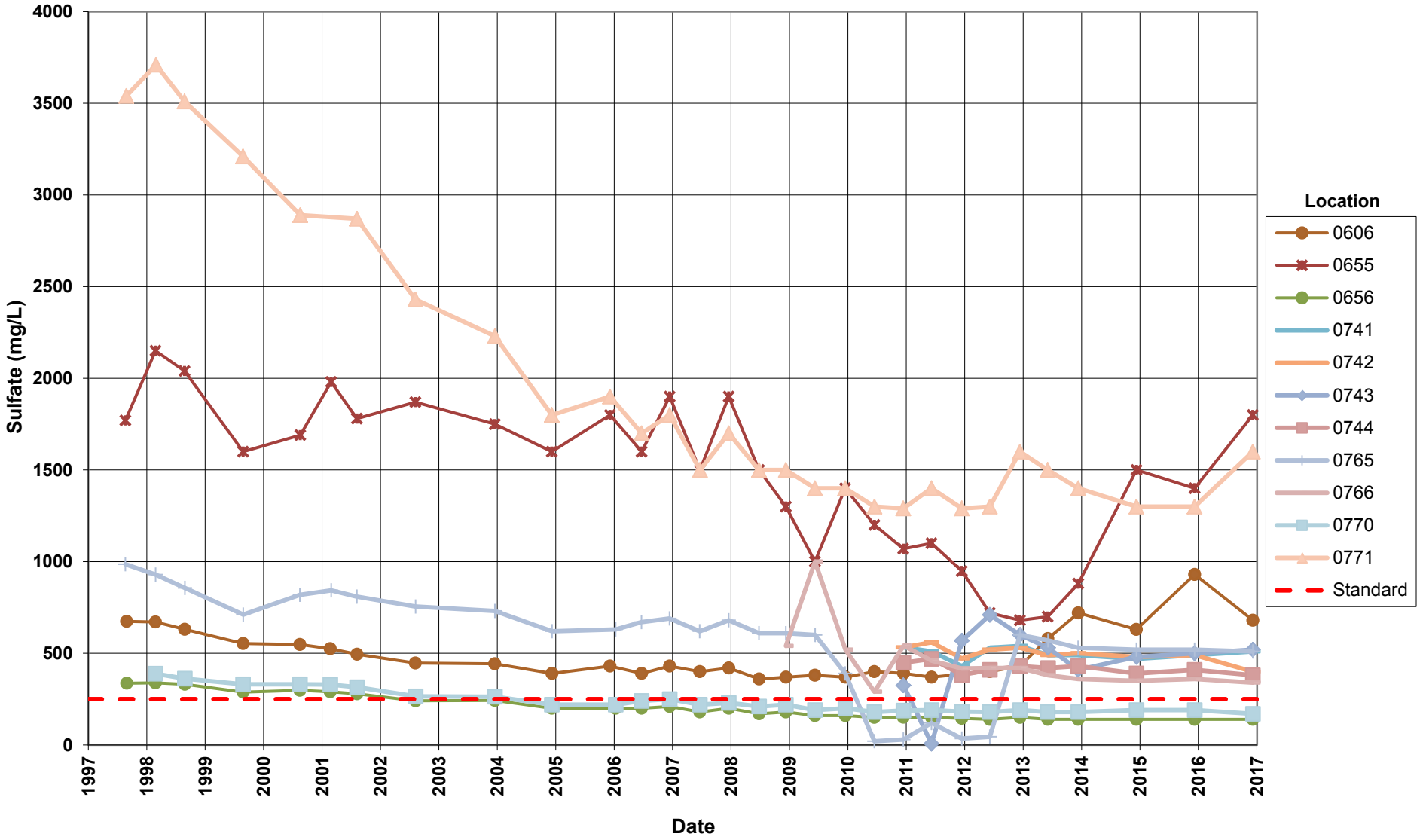
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10 mg/L



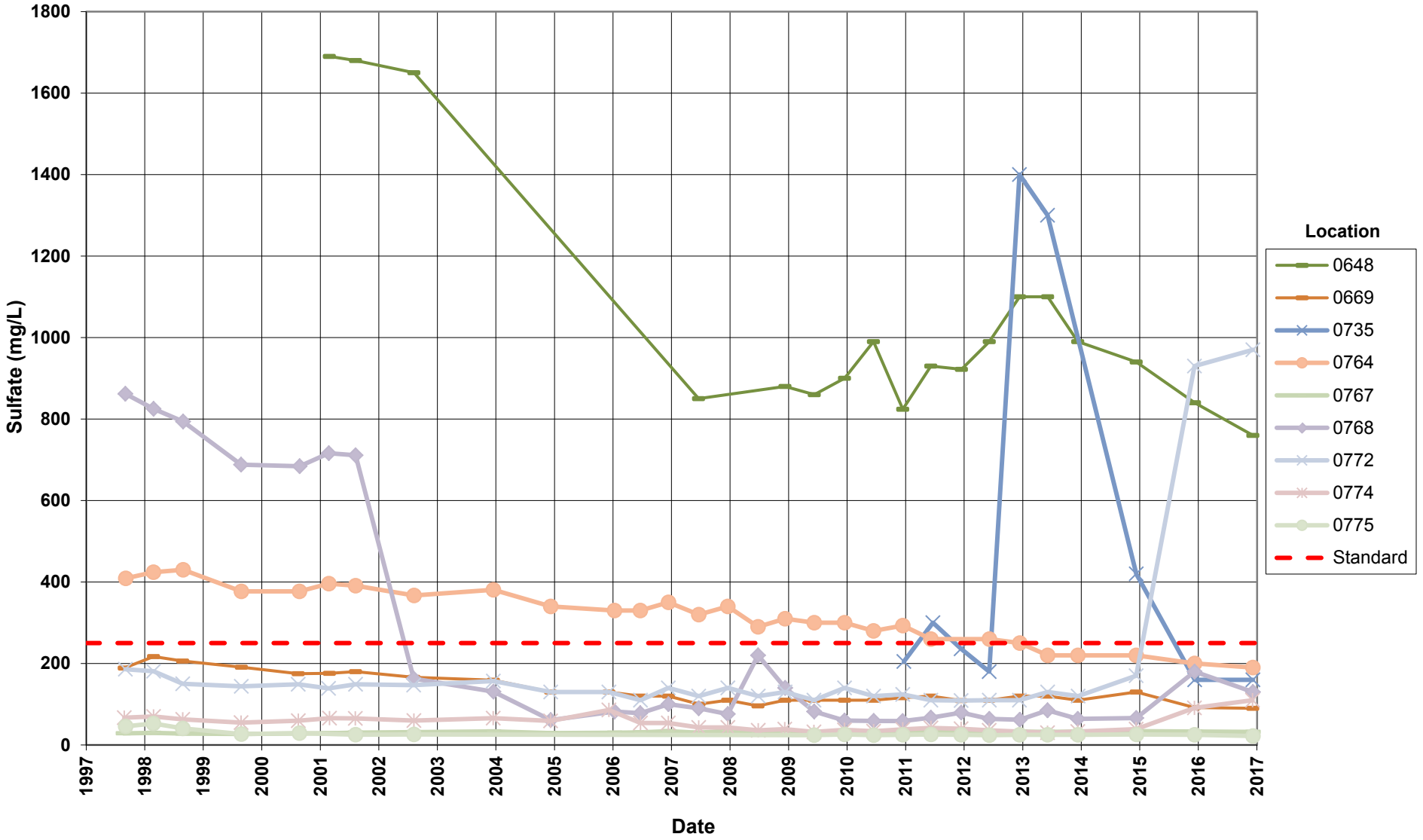
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10 mg/L



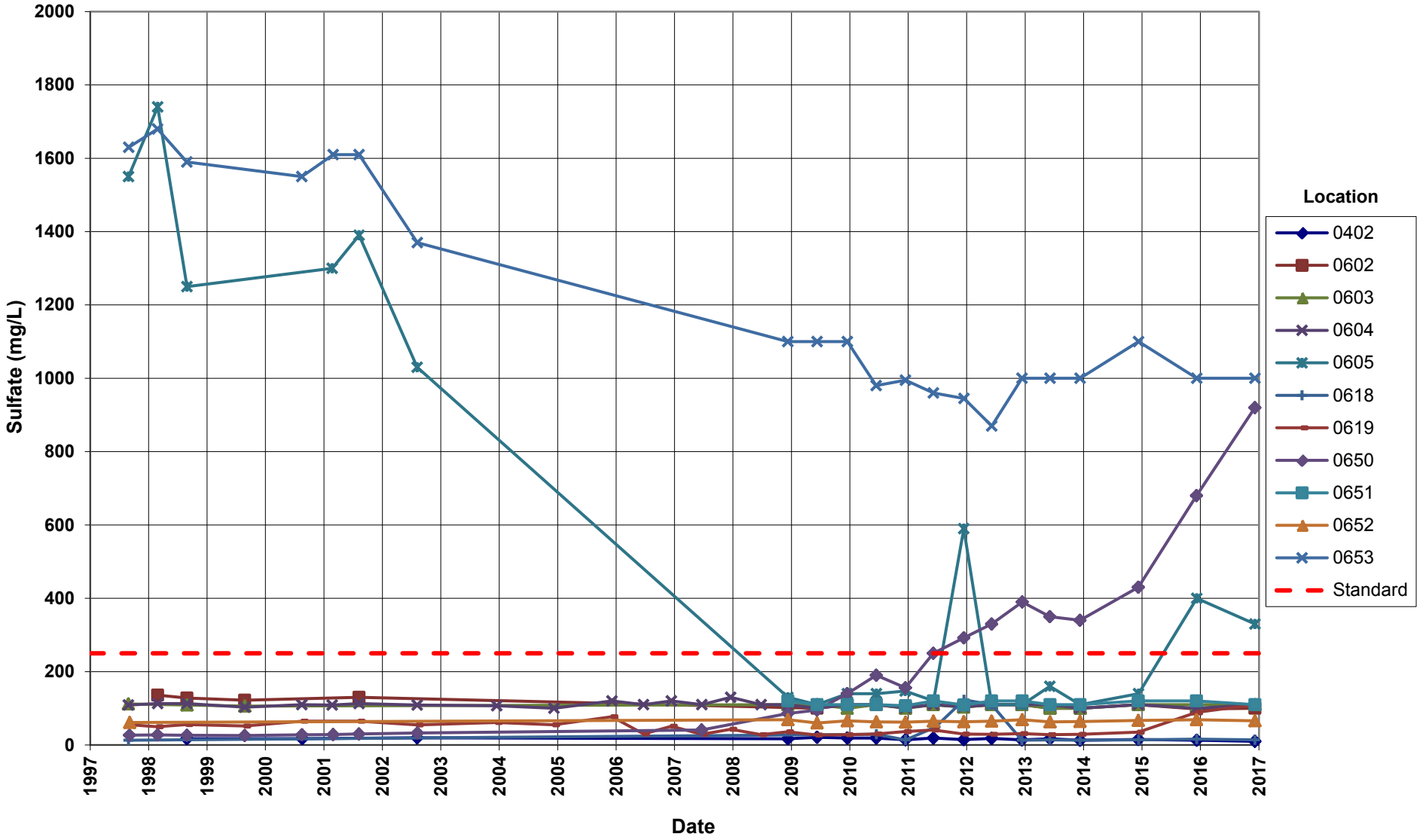
Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L



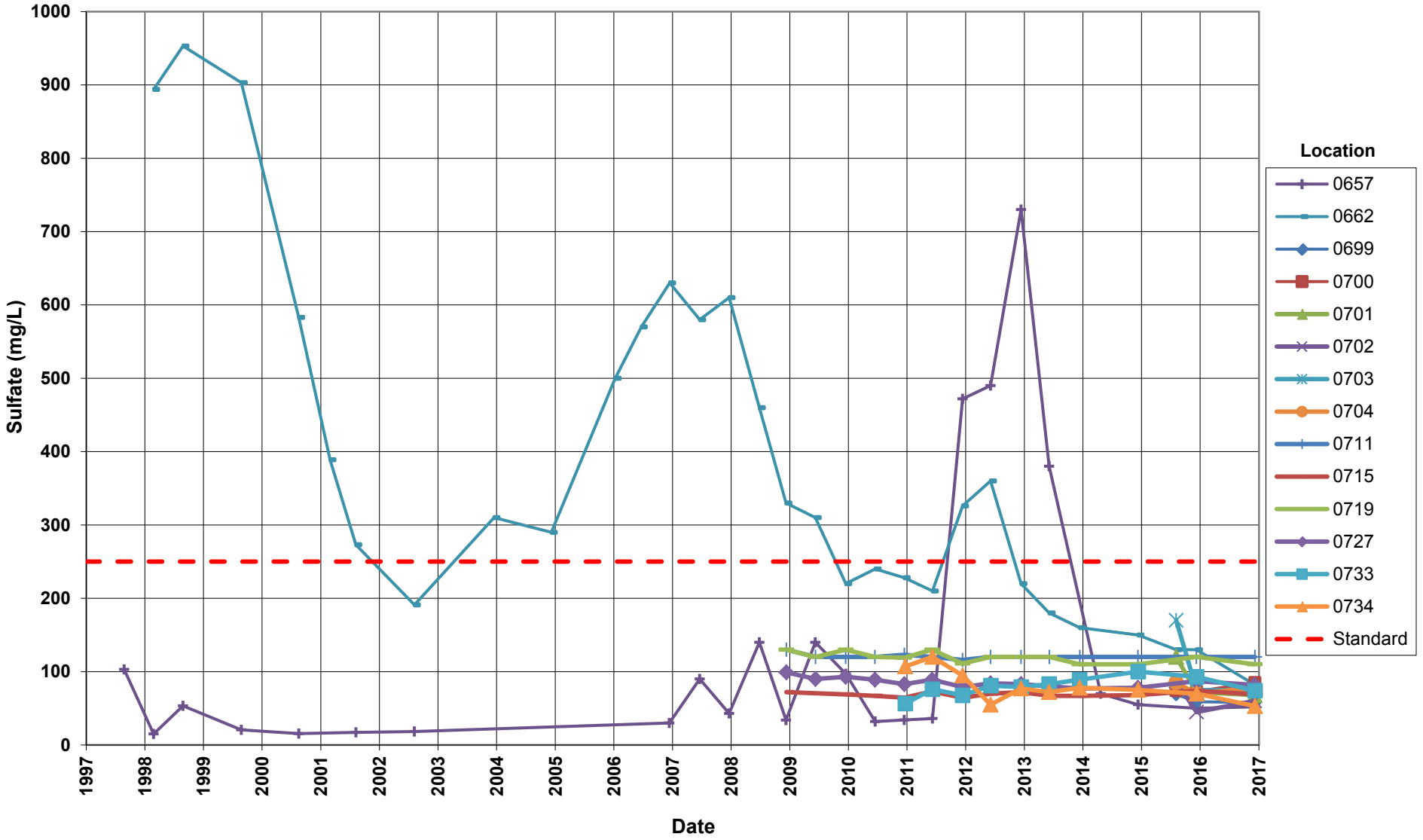
Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L



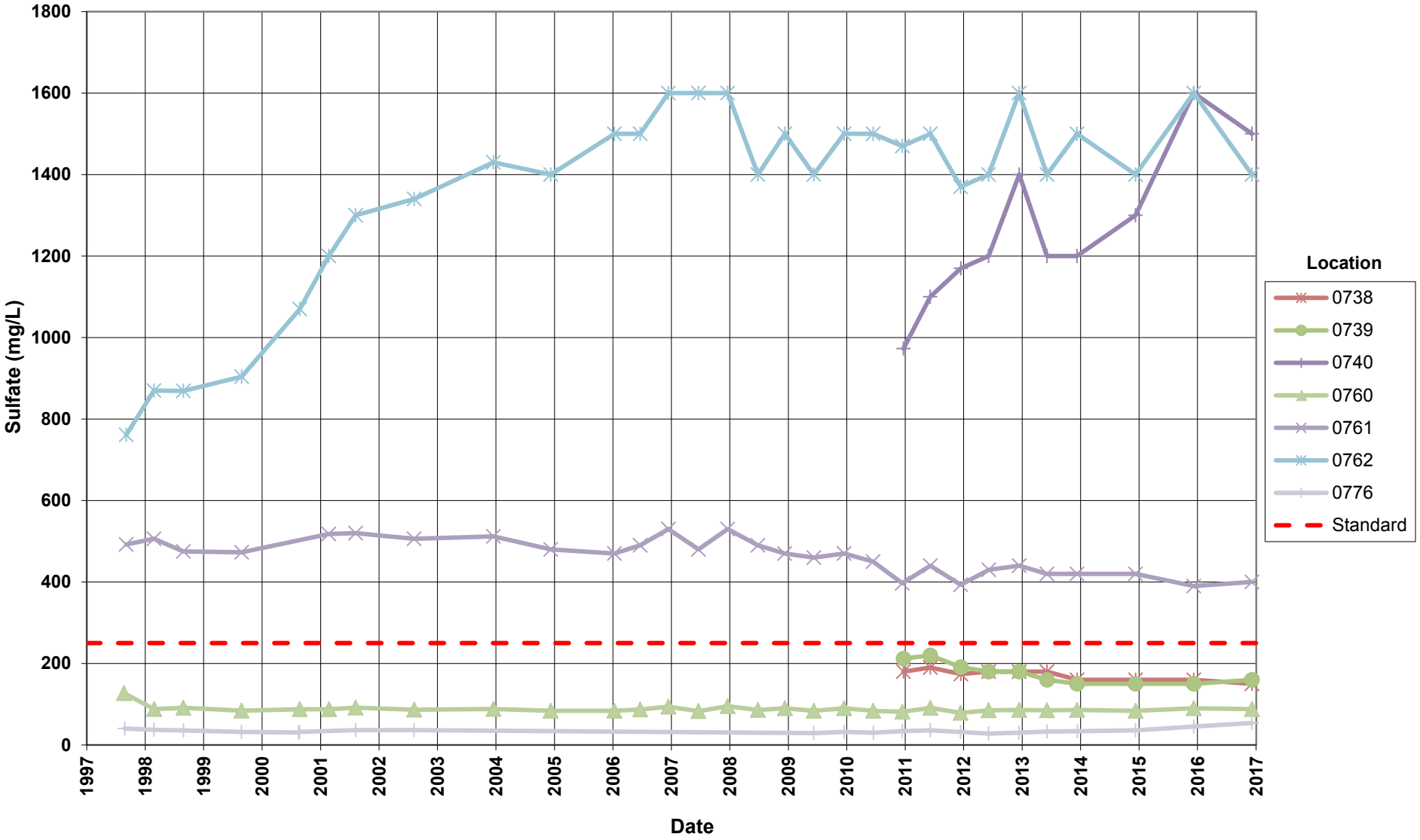
Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L



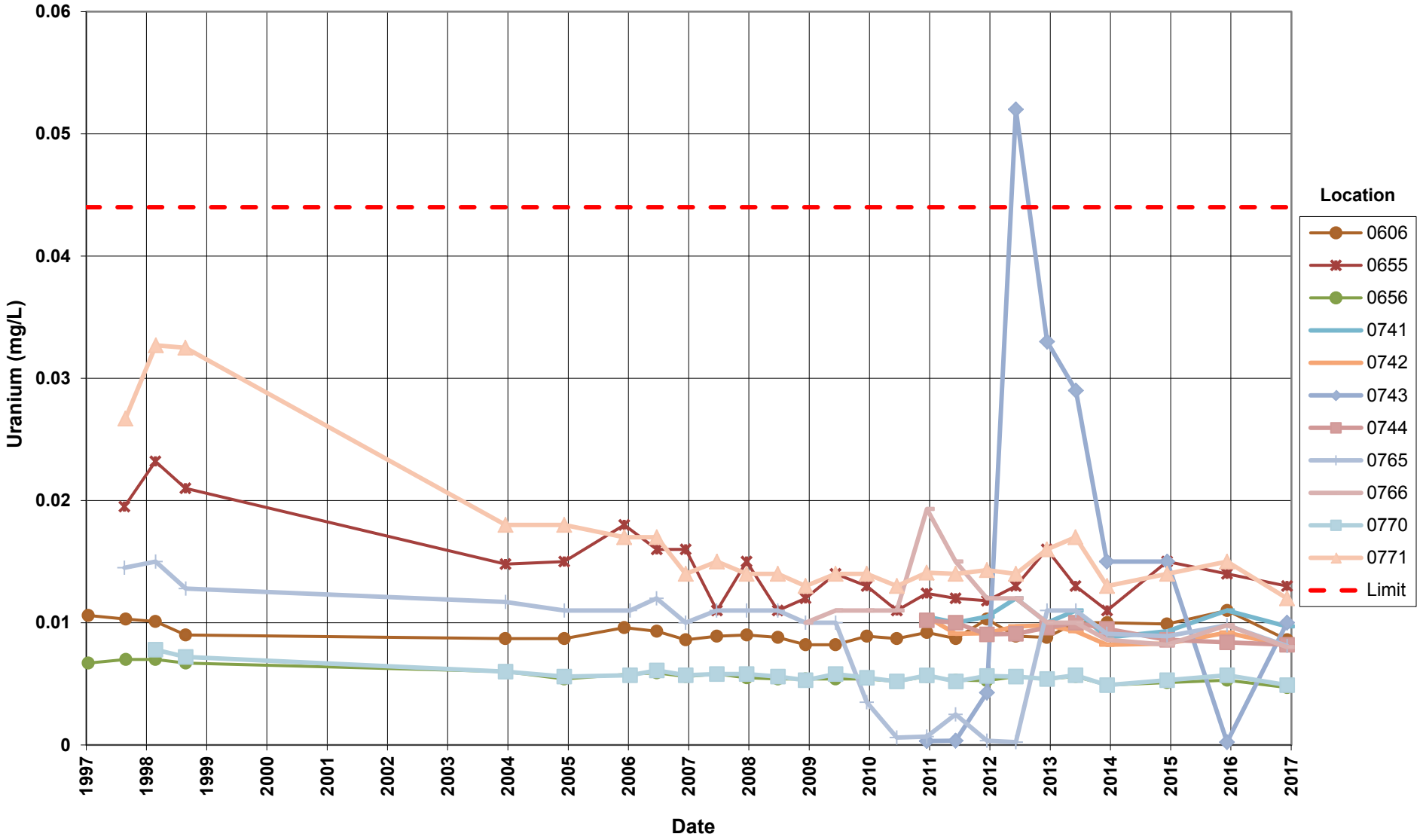
Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L



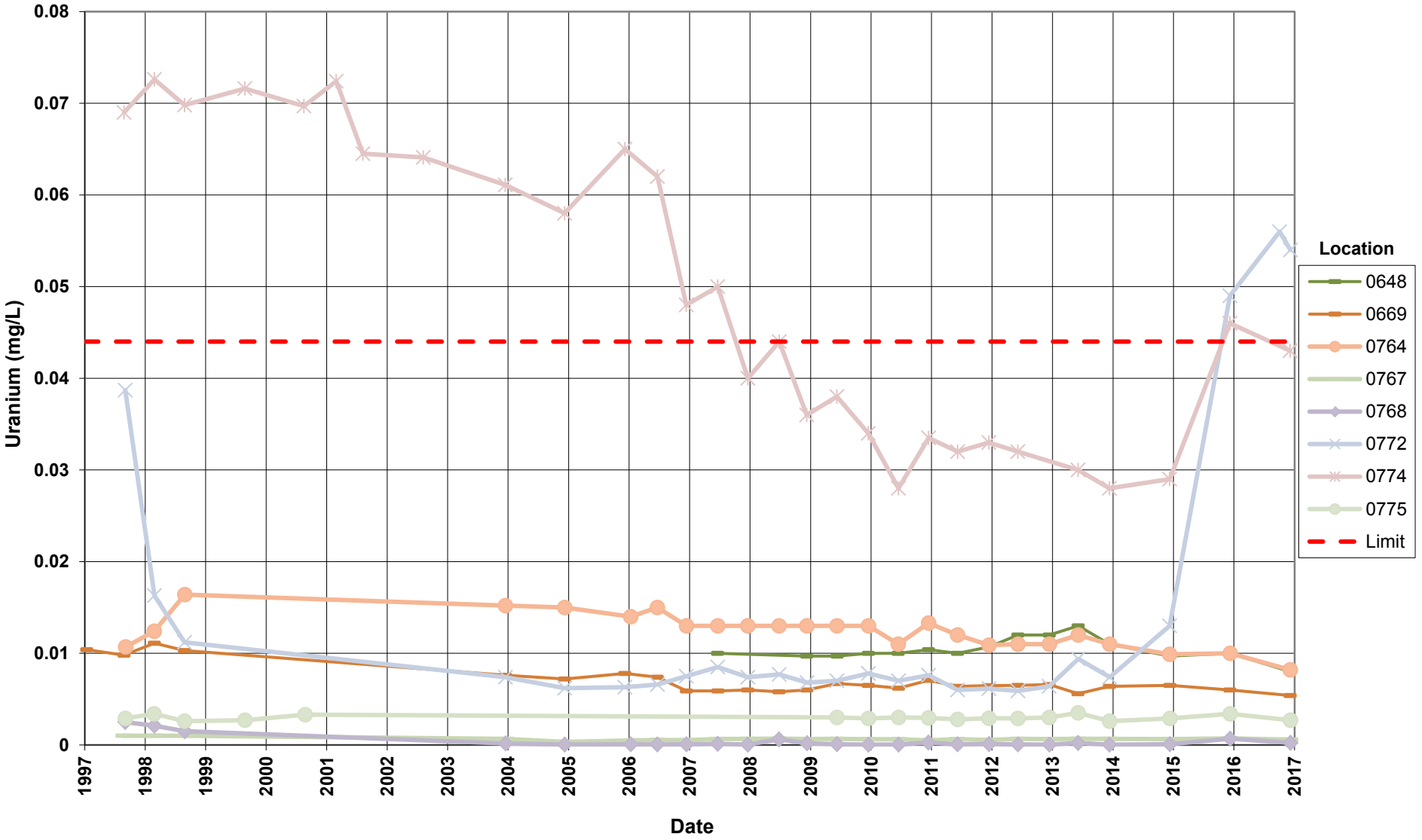
Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L



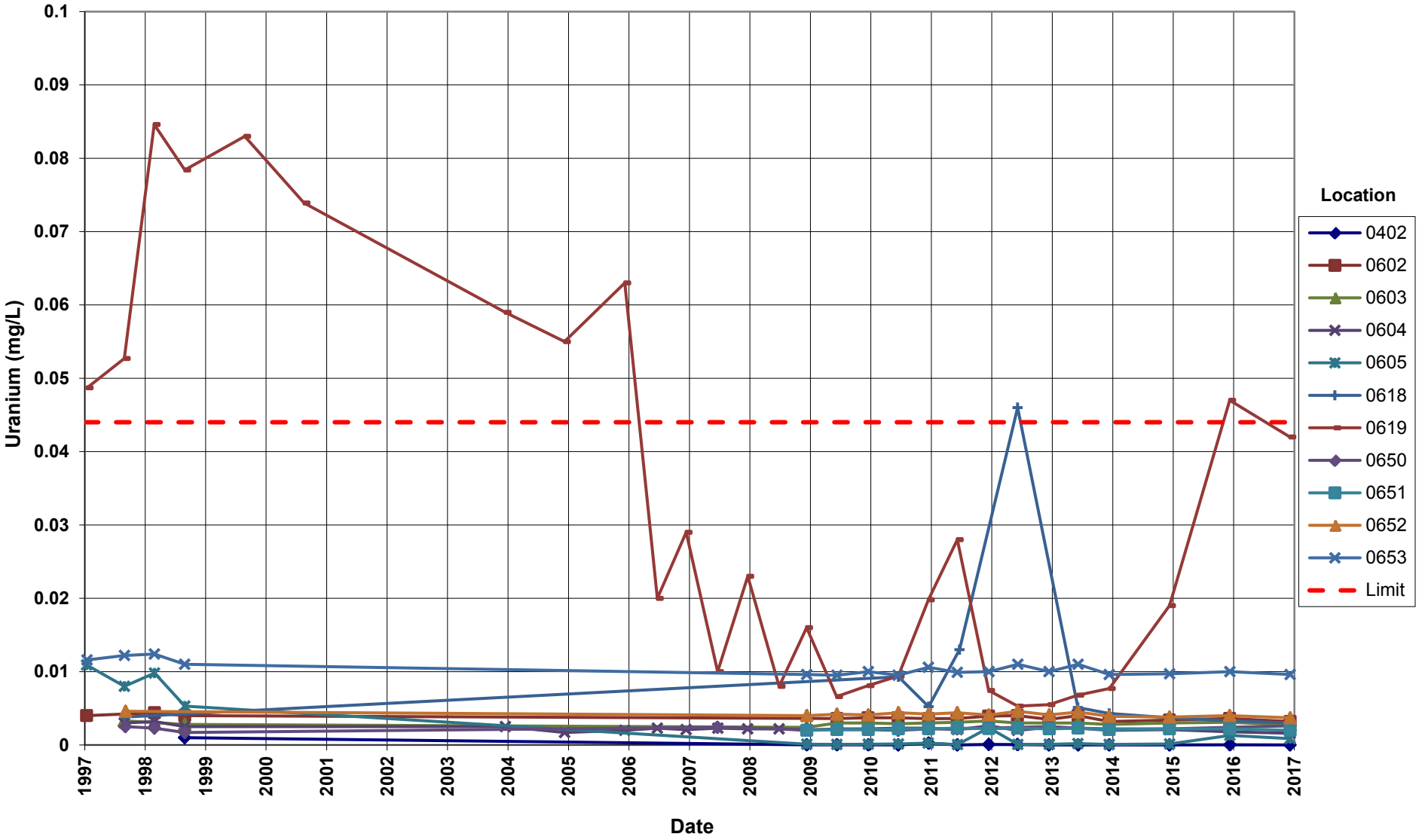
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



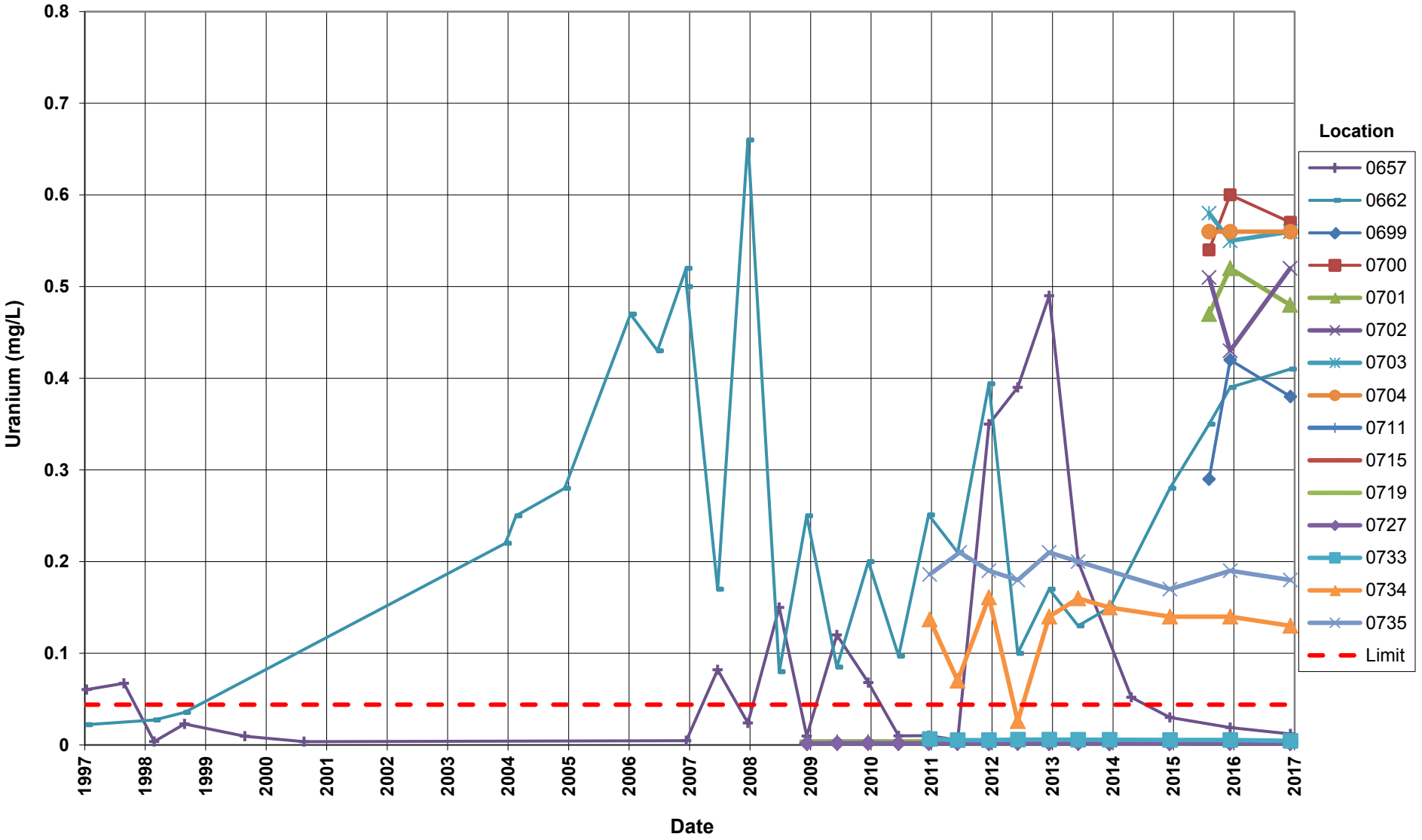
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



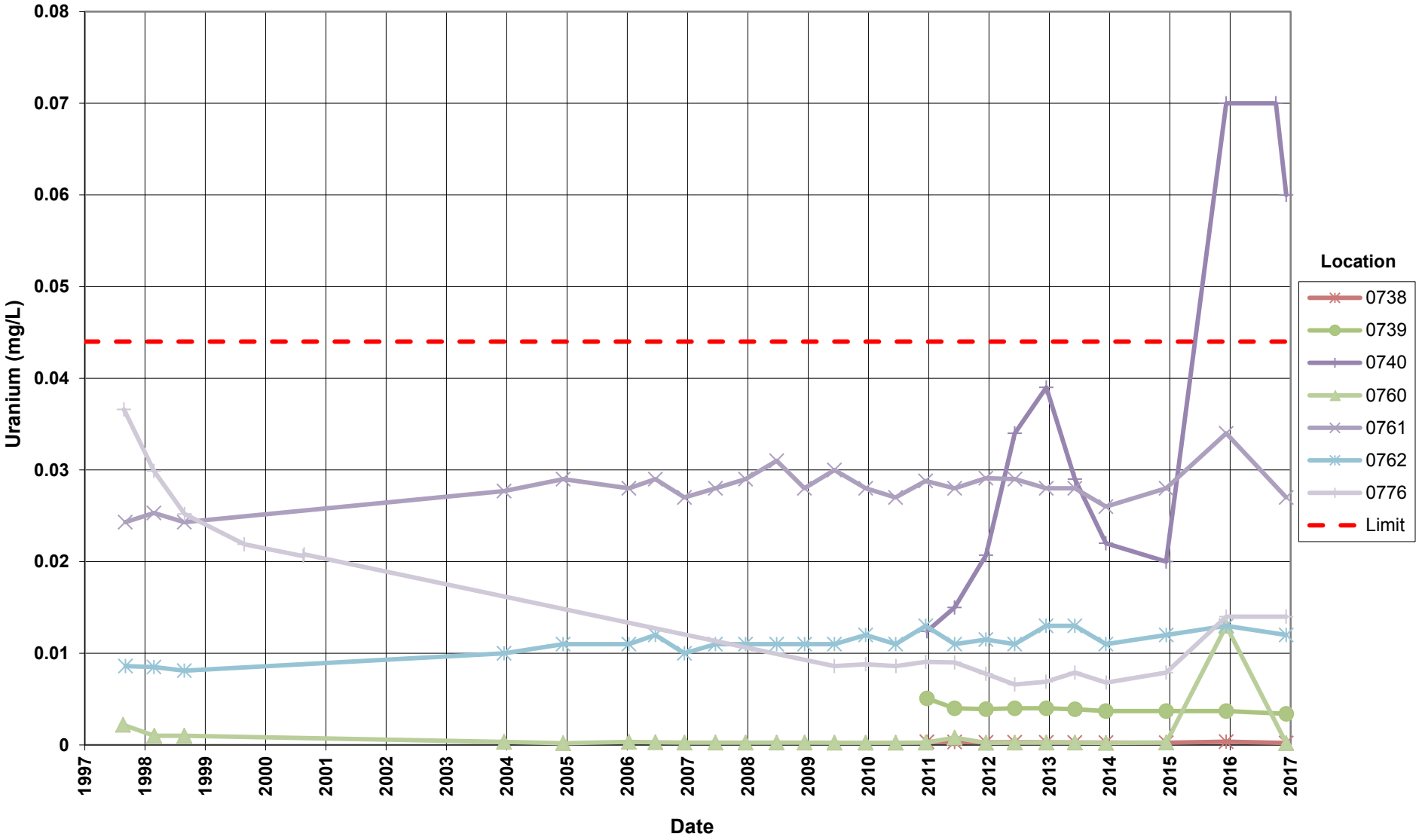
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



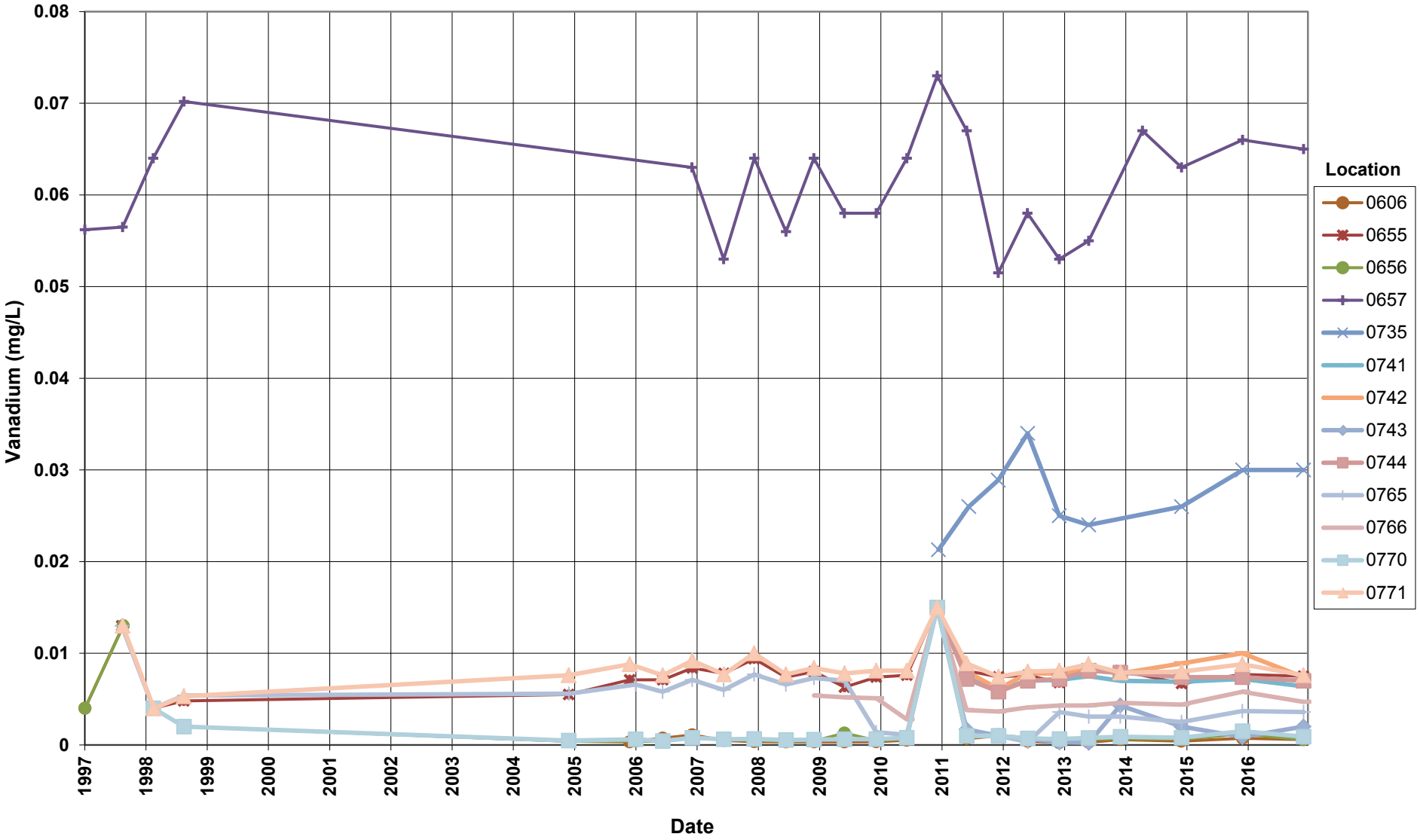
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



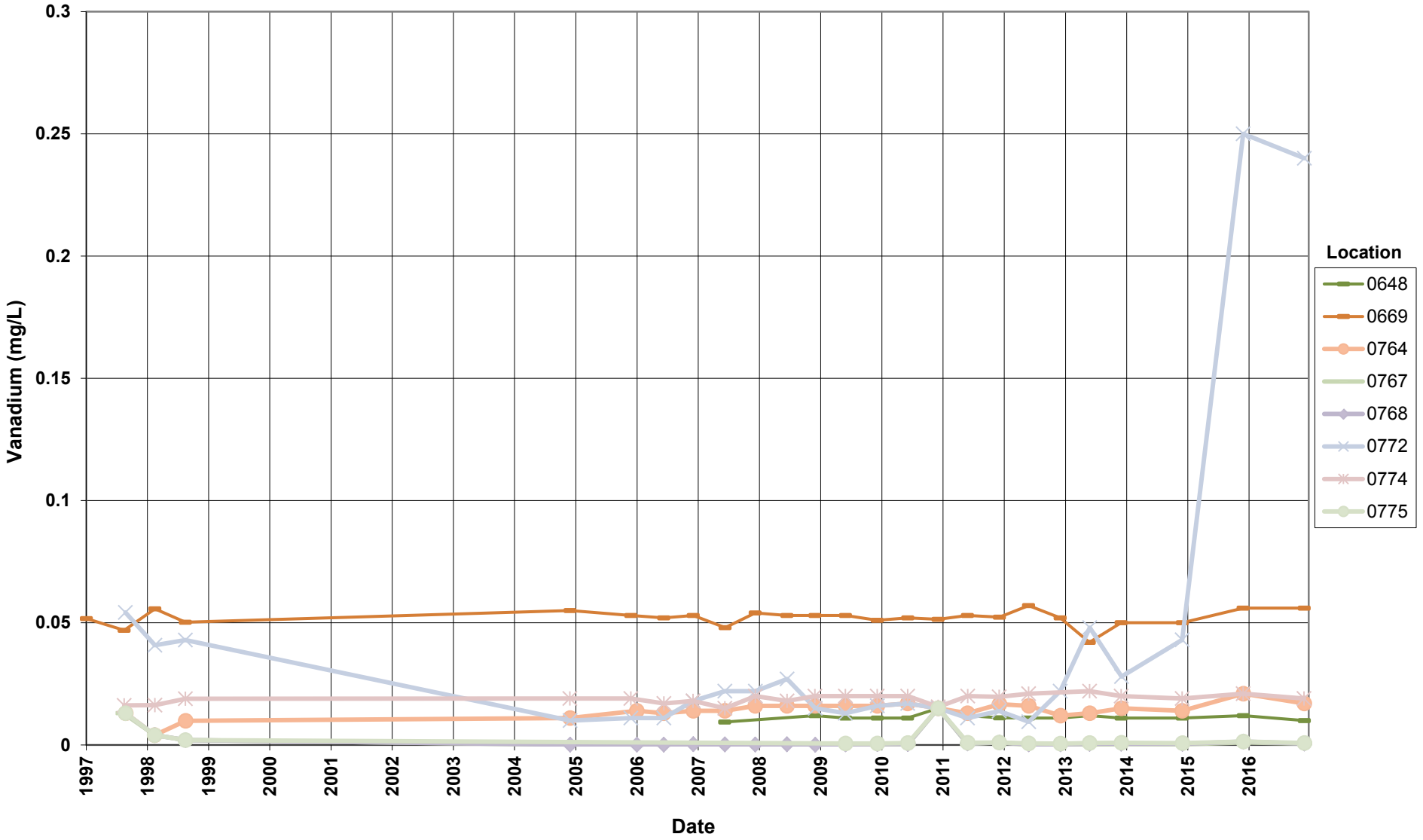
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L



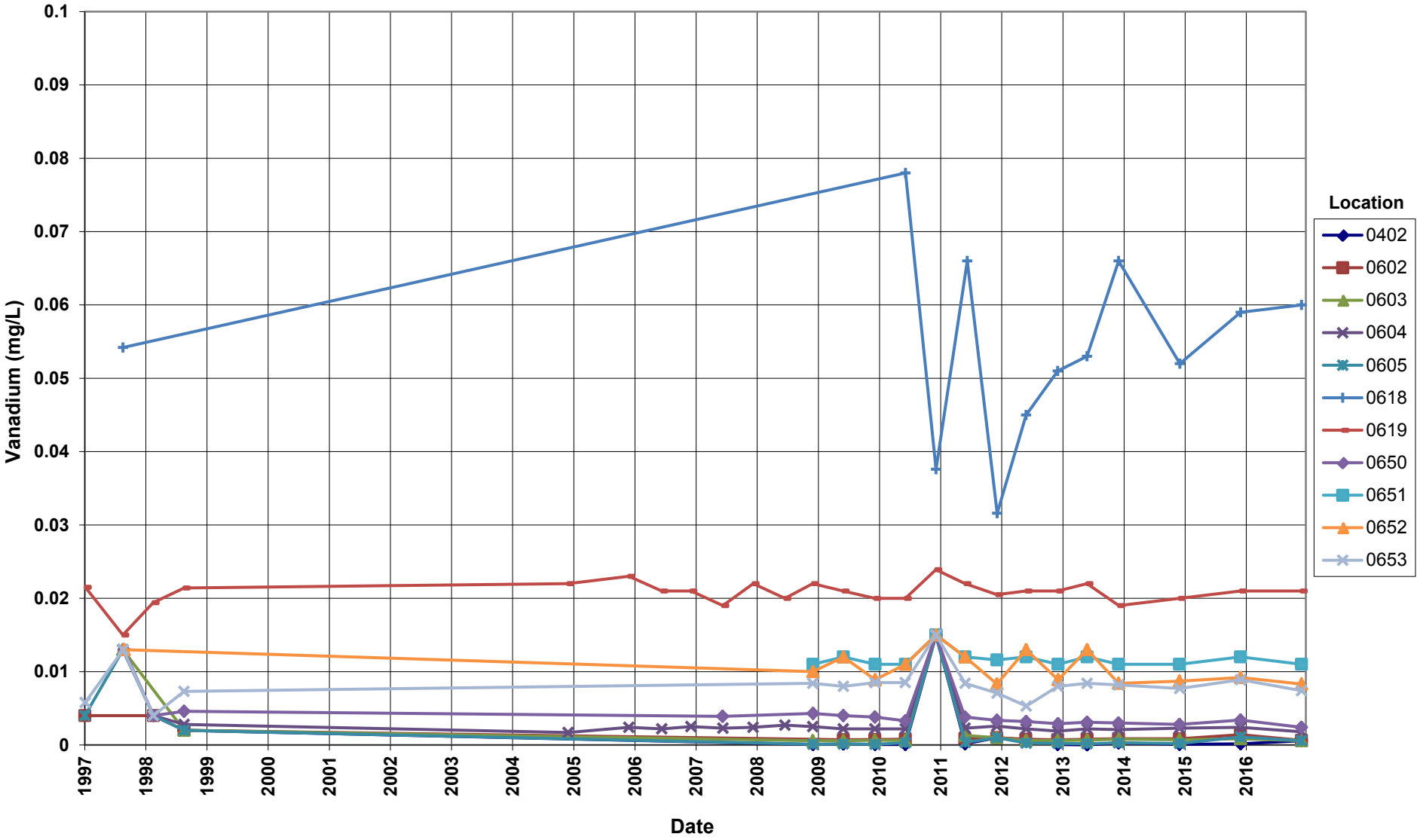
Monument Valley Processing Site
Vanadium Concentration



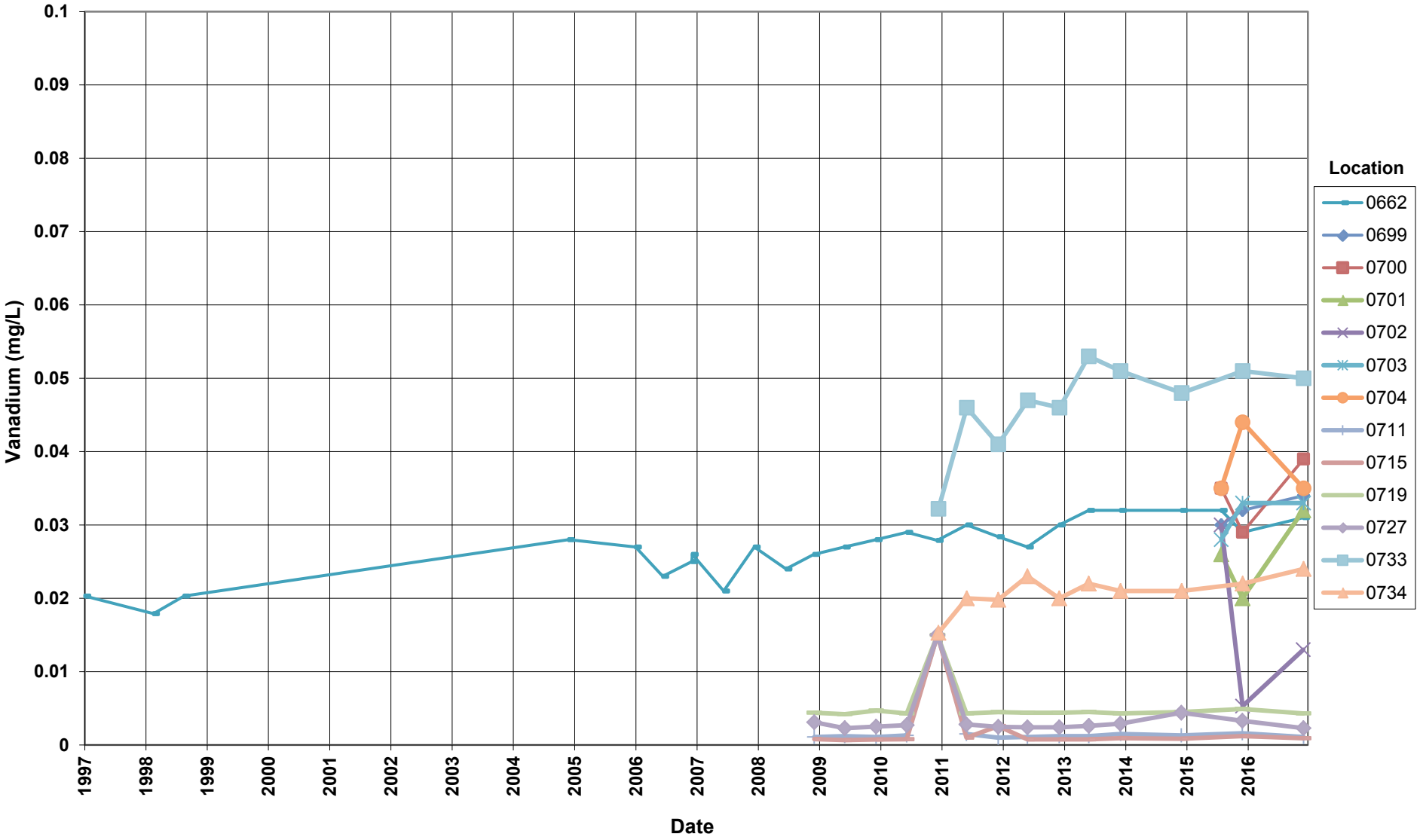
Monument Valley Processing Site
Vanadium Concentration



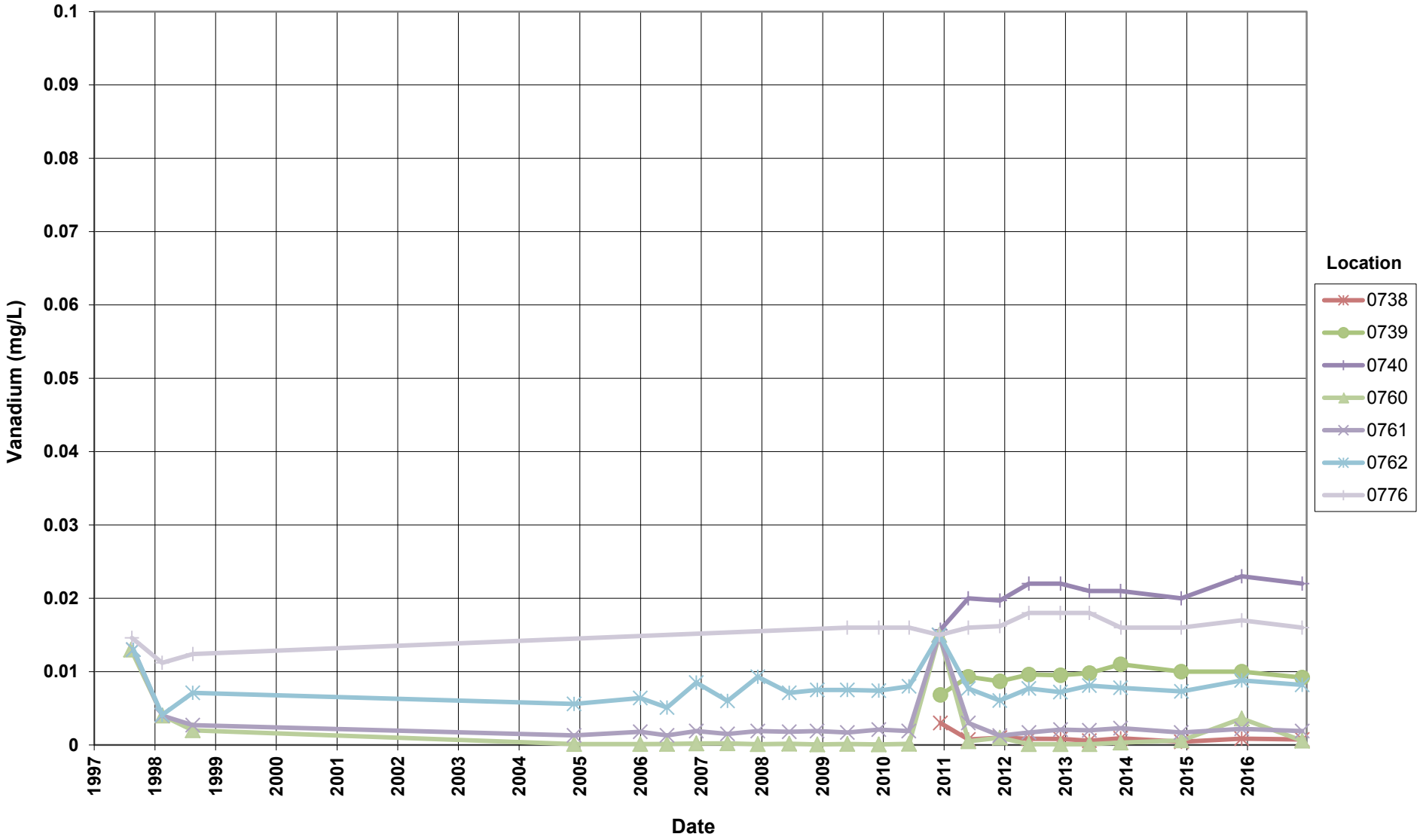
Monument Valley Processing Site
Vanadium Concentration



Monument Valley Processing Site
Vanadium Concentration



Monument Valley Processing Site
Vanadium Concentration



Attachment 4

Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

Ten laboratory results were identified as potentially anomalous. All data associated with these results were reviewed in detail. Outlying values are a result of analyte concentrations trending downward or upward and resulting in more variability in the population than was expected. Notable are the results for location 0772 where the concentrations for most analytes continue to be at significantly increased levels. The laboratory results for this RIN are acceptable as qualified.

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Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118169
Report Date: 1/27/2017

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
MON01	0402	N001	12/06/2016	Ammonia Total as N	0.400	N	JQF	0.104		UFQ	0.0160	U	FQ	13	13	NA
MON01	0402	N001	12/06/2016	Sulfate	10.00		QF	21.0		FQ	13.0		FQ	13	0	No
MON01	0602	N001	12/07/2016	Vanadium	0.00063	J	QF	0.0150	U	FQ	0.0007		FQ	12	2	NA
MON01	0604	N001	12/07/2016	Uranium	0.00160		F	0.00261		F	0.00180		F	17	0	Yes
MON01	0604	N001	12/07/2016	Vanadium	0.00180	J	F	0.0150	U	F	0.00190		F	17	1	NA
MON01	0618	N001	12/07/2016	Uranium	0.00300		F	0.0460			0.00330		F	10	0	NA
MON01	0619	N001	12/05/2016	Ammonia Total as N	0.150		F	0.110		F	0.0160	U	F	22	21	NA
MON01	0619	N002	12/05/2016	Nitrate + Nitrite as Nitrogen	4.10		JF	1.70		F	0.710		F	22	0	NA
MON01	0619	N001	12/05/2016	Nitrate + Nitrite as Nitrogen	6.00		JF	1.70		F	0.710		F	22	0	NA
MON01	0619	N001	12/05/2016	Sulfate	100.0		F	89.0		F	27.0		F	22	0	NA
MON01	0619	N002	12/05/2016	Sulfate	110		F	89.0		F	27.0		F	22	0	NA
MON01	0648	N001	12/07/2016	Chloride	19.0		F	37.0		F	21.0		F	15	0	No
MON01	0648	N001	12/07/2016	Sulfate	760		F	1100		F	810		F	15	0	No
MON01	0648	N001	12/07/2016	Uranium	0.00800		F	0.0130		F	0.00910		F	15	0	No
MON01	0650	N001	12/06/2016	Nitrate + Nitrite as Nitrogen	11.0		F	8.20		F	0.530		F	16	0	Yes
MON01	0650	N001	12/06/2016	Sulfate	920		F	680		F	41.0		F	16	0	Yes
MON01	0650	N001	12/06/2016	Uranium	0.00260		F	0.00250		F	0.00200		F	16	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118169
Report Date: 1/27/2017

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
MON01	0650	N001	12/06/2016	Vanadium	0.00240	J	F	0.0150	U	F	0.00264	B	F	16	1	NA
MON01	0651	N001	12/07/2016	Ammonia Total as N	0.130		F	0.1000	U	F	0.0160	U	F	13	13	NA
MON01	0652	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	5.10		F	5.00		F	4.10		F	13	0	No
MON01	0652	N001	12/07/2016	Uranium	0.00370		F	0.00460		F	0.00380		F	13	0	No
MON01	0653	N001	12/07/2016	Chloride	21.0		F	28.0		F	22.8		F	14	0	No
MON01	0653	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	53.0		F	51.0		F	32.0		F	13	0	No
MON01	0656	N001	12/07/2016	Chloride	12.0		F	15.0		F	13.0		F	16	0	NA
MON01	0656	N001	12/07/2016	Uranium	0.00470		F	0.00580		F	0.00490		F	16	0	Yes
MON01	0662	N001	12/07/2016	Chloride	4.80		F	18.4		F	7.10		FQ	20	0	No
MON01	0662	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	3.00		F	26.0		F	3.70		F	20	0	No
MON01	0662	N001	12/07/2016	Sulfate	82.0		F	610		F	130		F	20	0	No
MON01	0669	N001	12/06/2016	Chloride	6.80		F	9.50		F	7.70		F	18	0	No
MON01	0669	N001	12/06/2016	Nitrate + Nitrite as Nitrogen	4.80		F	24.0		F	6.20		F	18	0	No
MON01	0669	N001	12/06/2016	Sulfate	90.0		F	130		F	92.0		F	18	0	No
MON01	0669	N001	12/06/2016	Uranium	0.00540		F	0.00706		FQ	0.00560		F	18	0	No
MON01	0711	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	0.620		F	0.600		F	0.450		F	13	0	No
MON01	0715	N001	12/07/2016	Chloride	8.70		F	11.0		F	8.73		F	12	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118169
Report Date: 1/27/2017

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
MON01	0719	N001	12/06/2016	Chloride	12.0		F	16.0		F	12.7		F	14	0	No
MON01	0727	N001	12/06/2016	Chloride	8.90		F	12.0		F	9.12		F	13	0	No
MON01	0733	N001	12/07/2016	Chloride	4.30		F	7.10		F	4.58		F	9	0	No
MON01	0733	N001	12/07/2016	Uranium	0.00450		F	0.00649		F	0.00530		FQ	9	0	No
MON01	0734	N001	12/07/2016	Chloride	4.20		F	6.00		F	5.05		F	9	0	No
MON01	0734	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	2.20		F	5.40		F	2.40		F	9	0	No
MON01	0734	N001	12/07/2016	Sulfate	53.0		F	120		F	55.0		F	9	0	No
MON01	0734	N001	12/07/2016	Vanadium	0.0240		F	0.0230		F	0.0153		F	9	0	No
MON01	0738	N001	12/06/2016	Chloride	13.0		F	17.0		F	13.3		F	9	0	No
MON01	0738	N001	12/06/2016	Sulfate	150		F	190		F	160		F	9	0	No
MON01	0738	N001	12/06/2016	Uranium	0.00022		F	0.00036		F	0.00024		F	9	0	No
MON01	0739	N001	12/06/2016	Ammonia Total as N	0.960		F	0.920		F	0.102		UF	9	1	No
MON01	0739	N001	12/06/2016	Uranium	0.00340		F	0.00508		F	0.00370		F	9	0	NA
MON01	0741	0001	12/06/2016	Nitrate + Nitrite as Nitrogen	120		F	110		F	89.3		F	9	0	No
MON01	0742	N001	12/06/2016	Sulfate	400		F	560		F	472		F	10	0	Yes
MON01	0743	N001	12/06/2016	Chloride	31.0		F	30.0		F	14.0		F	9	0	No
MON01	0743	N001	12/06/2016	Nitrate + Nitrite as Nitrogen	120		F	94.0		F	0.0120		F	9	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118169
Report Date: 1/27/2017

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
MON01	0744	0001	12/06/2016	Sulfate	380		F	470		F	382		F	9	0	No
MON01	0744	0001	12/06/2016	Uranium	0.00820		F	0.0102		F	0.00840		F	9	0	No
MON01	0760	0001	12/06/2016	Nitrate + Nitrite as Nitrogen	0.0520		F	0.0500	U	F	0.01000	U	F	17	10	NA
MON01	0760	0001	12/06/2016	Uranium	0.00019		F	0.0130		F	0.00021		F	17	1	NA
MON01	0761	N001	12/06/2016	Chloride	11.0		F	15.0		F	11.6		F	16	0	Yes
MON01	0762	0001	12/06/2016	Chloride	58.0		F	74.0		F	58.9		F	17	0	No
MON01	0764	N001	12/06/2016	Chloride	8.50		QF	12.0		FQ	9.90		FQ	15	0	Yes
MON01	0764	N001	12/06/2016	Sulfate	190		QF	340		FQ	200		FQ	15	0	No
MON01	0764	N001	12/06/2016	Uranium	0.00820		QF	0.0133		FQ	0.00990		FQ	16	0	Yes
MON01	0766	N002	12/06/2016	Uranium	0.00780		F	0.0193		F	0.00800		F	14	0	No
MON01	0767	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	0.0590		F	0.0500	U	F	0.01000	U	F	17	16	NA
MON01	0770	N001	12/07/2016	Chloride	12.0		F	16.0		F	13.0		F	16	0	No
MON01	0770	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	23.0		F	22.0		F	14.0		F	16	0	No
MON01	0770	N001	12/07/2016	Sulfate	170		F	230		F	180		F	16	0	NA
MON01	0771	N001	12/06/2016	Uranium	0.0120		QF	0.0170		FQ	0.0130		F	16	0	No
MON01	0772	N001	12/07/2016	Nitrate + Nitrite as Nitrogen	150		F	130		F	0.990		F	20	0	NA
MON01	0772	N001	12/07/2016	Sulfate	970		F	930		F	109		F	20	0	NA

Data Validation Outliers Report - No Field Parameters
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Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
MON01	0774	N001	12/05/2016	Nitrate + Nitrite as Nitrogen	4.60		F	3.40		F	1.000		F	16	0	NA
MON01	0774	N001	12/05/2016	Sulfate	110		F	91.0		F	30.0		F	16	0	NA
MON01	0775	N001	12/07/2016	Sulfate	22.0		F	26.0		F	24.0		F	12	0	No
MON01	0776	N001	12/05/2016	Nitrate + Nitrite as Nitrogen	1.60		F	1.30		F	0.740		F	13	0	NA
MON01	0776	N002	12/05/2016	Nitrate + Nitrite as Nitrogen	1.60		F	1.30		F	0.740		F	13	0	NA
MON01	0776	N002	12/05/2016	Sulfate	54.0		F	45.0		F	28.0		F	13	0	Yes
MON01	0776	N001	12/05/2016	Sulfate	50.0		F	45.0		F	28.0		F	13	0	Yes

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test.
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

NA: Data are not normally or lognormally distributed.

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