DOE–LM/1314–2006

Data Validation Package

June 2006
Monument Valley, Arizona, Processing Site

September 2006

U.S. Department of Energy
Office of Legacy Management

Work Performed by the S.M. Stoller Corporation under DOE Contract No. DE–AC01–02GJ79491 for the U.S. Department of Energy Office of Legacy Management.
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Contents

Sampling Event Summary

Site: Monument Valley, Arizona, Processing Site

Sampling Period: June 20-21, 2006

Eighteen ground water samples were collected at the Monument Valley, Arizona, Processing Site to monitor ground water contaminants as specified in the *Final Site Observational Work Plan for the UMTRA Project Site at Monument Valley, Arizona*. Water levels were measured at each sampled well. Sampling and analysis was conducted as specified in *FY 2006 Sampling Frequencies and Analyses* (October 2005) and *Ground Water and Surface Water Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (DOE 2005). One duplicate sample was collected from location 0669.

Time concentration plots for ammonium, nitrate, sulfate, uranium, and vanadium are included with the results data. The data from this sampling event are consistent with values previously obtained. Increasing uranium concentrations in well 0662 have been previously noted with a slight decrease observed in the data from this sampling event. There are no corresponding increases in the nitrate or sulfate concentrations that would indicate contaminant movement. Ongoing erosion of a former uranium mine located upgradient from the site may be contributing to the increasing uranium concentrations at this location. The increasing nitrate concentration in wells 0761, 0762, and 0764 as indicated on the time versus concentration graphs, is consistent with downgradient movement of the contaminant plume. Wells with analyte concentrations that exceeded U.S. Environmental Protection Agency (EPA) ground water standards are listed in Table 1 on the following page.

Table 1. Monument Valley Locations That Exceed Standards

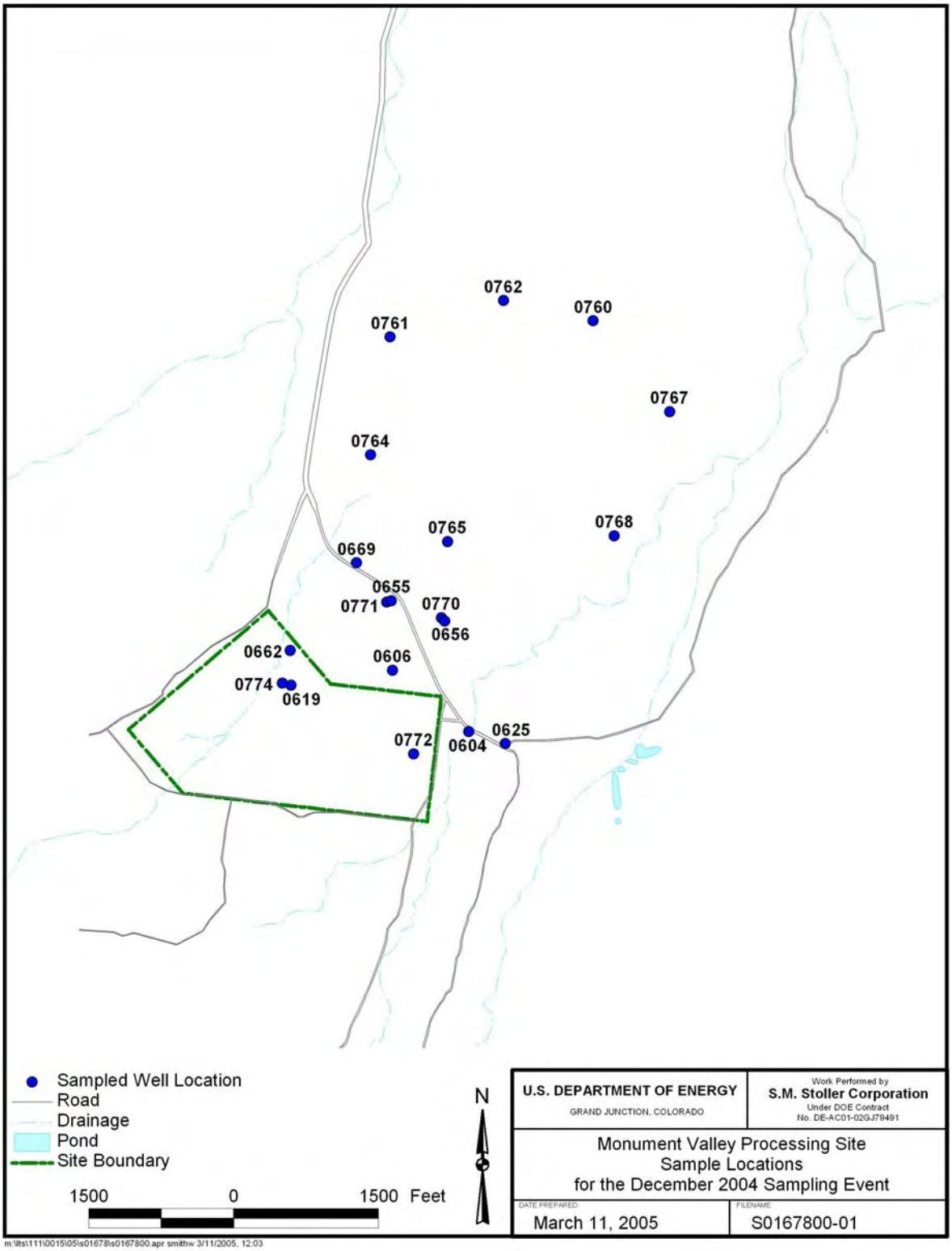
Comparison to UMTRCA Maximum Groundwater Concentration Standards
Laboratory: PARAGON (Fort Collins, CO)
Report Identification Number (RINs): 06060399
Report Date: 07/31/2006

Analyte	Standard[a]	Site Code	Location	Concentration
Nitrate as Nitrogen	10	MON01	0606	220
			0655	120
			0656	22
			0662	12
			0761	28
			0762	73
			0764	46
			0765	120
			0770	22
			0771	170
Uranium	0.044	MON01	0662	0.43
			0774	0.062

[a] Standards are listed in 40 CFR 192.02 Table 1 to Subpart A; units are in mg/L.

David Miller
Site Lead, S.M. Stoller

9/29/06
Date



Sample Locations at Monument Valley, Arizona, Processing Site

Data Assessment Summary

Water Sampling Field Activities Verification Checklist

Project	Monument Valley Processing Site	**Date(s) of Water Sampling**	June 20-21, 2006
Date(s) of Verification	September 8, 2006	**Name of Verifier**	Steve Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOP's, instructions.		Work Order letter dated May 19, 2006
2. Were the sampling locations specified in the planning documents sampled?	Yes	Private well 0201 not sampled per the Site Lead's verbal instructions.
3. Was a pre-trip calibration conducted as specified in the above named documents?	Yes	
4. Was an operational check of the field equipment conducted twice daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, Ec, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the Category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	Data from wells 0764 and 0771 qualified because of drawdown.
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

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

Laboratory Performance Assessment

General Information

Report Number (RIN):	06060399
Sample Event:	June 20-21, 2006
Site(s):	Monument Valley, Arizona
Laboratory:	Paragon Analytics
Work Order No.:	0606209
Analysis:	Metals and Inorganics
Validator:	Steve Donivan
Review Date:	July 31, 2006

This validation was performed according to the *Environmental Procedures Catalog* (STO 6), "Standard Practice for Validation of Laboratory Data," GT-9(P) (2004). See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 2.

Table 2. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as N, NH_3-N	WCH-A-005	MCAWW 350.1	MCAWW 350.1
Nitrate + Nitrite as N, NO_3+NO_2-N	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Sulfate, SO_4	MIS-A-044	SW-846 9056	SW-846 9056
Uranium, U	GJO-01	SW-846 3005A	SW-846 6020A
Vanadium, V	GJO-18	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

Analytical results were qualified as listed in Table 3. Refer to the attached validation worksheets and the sections following Table 3 for an explanation of the data qualifiers applied.

Table 3. Qualified Results

Sample Number	Location	Analyte	Flag	Reason
0606209-3	0606	V	U	Less than 5 times the calibration blank
0606209-6	0656	V	J	MDL verification failure
0606209-9	0760	U	U	Less than 5 times the calibration blank
0606209-10	0761	V	J	MDL verification failure
0606209-15	0768	U	U	Less than 5 times the calibration blank
0606209-16	0770	V	J	MDL verification failure
0606209-20	2278 (Equip Blank)	U	U	Less than 5 times the calibration blank

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 20 water samples on June 28, 2006, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed on the form with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents including the COC form and the sample tickets had no errors or omissions.

Preservation and Holding Times

The sample shipment was received cool and intact with a temperature within the chilled cooler of 1.0 °C, which complies with requirements. All samples were received in the correct container types, had been preserved correctly for the requested analyses, and were analyzed within the applicable holding times.

Laboratory Instrument Calibration

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

Method MCAWW 350.1
The initial calibration for ammonia as N was performed using six calibration standards on July 11, 2006, resulting in a calibration curve with a correlation coefficient (r^2) value greater than 0.995 and an intercept less than three times the method detection limit (MDL). Initial and continuing calibration verification (CCV) checks were made at the required frequency, resulting in nine CCVs. All calibration checks were within the acceptance range.

Method SW-846 6020A, Uranium and Vanadium
Calibrations for uranium and vanadium were performed on July 12, 2006. The initial calibrations were performed using six calibration standards resulting in calibration curves with r^2 values greater than 0.995. The absolute values of the curve intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and CCV checks were made at the required frequency resulting in four CCVs. All calibration check results met the acceptance criteria. A reporting limit verification check was made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit. The checks were within the acceptance criteria range with the exception of vanadium. Vanadium results that are greater than the method detection limit but less than five times the reporting limit are qualified with a "J" flag as estimated values. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries were stable and within acceptable ranges.

Method SW-846 9056
Initial calibrations were performed for sulfate using five calibration standards on June 15, 2006. The calibration curve r^2 values were greater than 0.995 and intercepts less than three times the MDL. Initial calibration and calibration check standards were prepared from independent sources. Initial and CCV checks were made at the required frequency resulting in four CCVs. All calibration checks met the acceptance criteria.

Method MCAWW 353.2
The initial calibration for NO_3+NO_2-N was performed using seven calibration standards on July 10, 2006, resulting in a calibration curve r^2 value greater than 0.995 and an intercept less than three times the MDL. Initial and continuing calibration checks were made at the required frequency resulting in three CCVs that 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 initial and continuing calibration blank results were below the practical quantitation limits for all analytes. The sulfate, NH_3-N, and NO_3+NO_2-N method blanks were below the method detection limits.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate samples (MS/MSD) were analyzed for NH_3-N, NO_3+NO_2-N, sulfate, uranium, and vanadium as a measure of method performance in the sample matrix. The MS/MSD analyses resulted in acceptable recovery and precision for all analytes.

Laboratory Replicate Analysis

The laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference (RPD) values for the laboratory replicate samples and matrix spike duplicate sample results were less than 20 percent.

Laboratory Control Sample

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 analysis categories.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for uranium and vanadium to monitor chemical or physical interferences in the sample matrix. The serial dilution data were not evaluated because the concentration of the undiluted sample was less than 100 times the practical quantitation limit.

Detection Limits/Dilutions

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

Completeness

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

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. There were no manual integrations performed and all peak integrations were satisfactory.

Electronic Data Deliverable (EDD) File

An EDD file arrived on July 20, 2006. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Worksheet

RIN: 6060399 Lab Code: PAR Validator: Steve Donivan Validation Date: 7/31/2006

Site: MONUMENT VALLEY Analysis Type: ☑ Metals ☑ General Chem ☐ Rad ☐ Oraganics

# of Samples: 20 Matrix: WATER Requested Analysis Completed: Yes

Chain of Custody

Present: OK Signed: OK Dated: OK

Sample

Integrity: OK Preservation: OK Temperature: OK

Exceptions

Method	Analyte	Location	Ticket	Collection Date	Preparation Date	Analysis Date	Dilution Factor	Holding Time Met	Detection Limit Met

Comments: The reported detection limits are equal to or below contract requirements.
All samples were analyzed within the applicable holding times.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 06060399 **Lab Code:** PAR **Date Due:** 7/26/2006

Matrix: Water **Site Code:** MON **Date Completed:** 7/21/2006

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Uranium	07/12/2006	0.0000	1.0000	OK	OK	OK	OK			108.0	109.0	1.0	104.0		126.0
Vanadium	07/12/2006	0.0000	1.0000	OK	OK	OK	OK			96.0	96.0	0.0	101.0		256.0

Comments: _____

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SAMPLE MANAGEMENT SYSTEM

Inorganics Data Validation Worksheet

RIN: 06060399 **Lab Code:** PAR **Date Due:** 7/26/2006

Matrix: Water **Site Code:** MON **Date Completed:** 7/21/2006

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Ammonia as N	07/11/2006	0	0.9999	OK	OK	OK	OK	OK	100.0	85.0	84.0	0	
Nitrate+Nitrite as N	07/10/2006	0	0.9999	OK	OK	OK	OK	OK	102.0	86.0	96.0	4.00	
Sulfate	06/29/2006	0	1.0000	OK	OK	OK	OK	OK	103.0	107.0	99.0	3.00	

Comments: _____

Sampling Quality Control Assessment

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

Sampling Protocol

All monitor well sample results were qualified with an "F" flag in the database indicating the wells were purged and sampled using the low-flow sampling method. Additionally, sample results from wells 0764 and 0771 were qualified with a "Q" flag because of water level draw down, and sample results from well 0760 were qualified with a "Q" flag because the turbidity criteria were not met.

Equipment Blank Assessment

The results for the equipment blank collected were below the method detection limit for all analytes meeting the acceptance criteria.

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of the overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates which measure only laboratory performance. Duplicate samples were collected from well 0669. The duplicate results met the EPA recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than five times the practical quantitation limit and are therefore acceptable.

Certification

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

Laboratory Coordinator: Steve Donivan — Date: 9-28-2006

Data Validation Lead: Steve Donivan — Date: 9-28-2006

Attachment 1
Assessment of Anomalous Data

Minimums and Maximums Report

Minimums and Maximums Report

The Minimums and Maximums Report is generated by a data validation application used to query the SEEPro database. The application compares the new data set with historical data and lists all new data that fall outside the historical data range. Data listed in the report require further review if:

(1) Identified low concentrations are not the result of improved detection limits.
(2) The concentration detected is not within 50 percent of historical minimum or maximum values.
(3) There were five or more historical sample results for comparison.

The uranium result from location 0619 is not within 50 percent of the historical maximum value for that location. This result will be compared to data from the next sampling event.

The uranium concentration at location 0662 that was identified as anomalously high in 2005 remained at an elevated concentration indicating that the data are not anomalous.

Data Validation Minimums and Maximums Report - No Field Parameters
Laboratory: PARAGON (Fort Collins, CO)
RIN: 06060399
Comparison: History Begin Date: 1/6/1996
Report Date: 9/8/2006

				Current			Historical Maximum			Historical Minimum			Count	
					Qualifiers			Qualifiers			Qualifiers			
Site Code	Location Code	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect
MON01	0619	06/21/2006	Sulfate	30		F	77		F	49.7		F	11	0
MON01	0619	06/21/2006	Uranium	0.02		F	0.0846		F	0.0487			10	0
MON01	0656	06/21/2006	Vanadium	0.00039		FJ	0.013	U		0.0004		FJ	6	4
MON01	0669	06/20/2006	Sulfate	120		F	217			130		F	12	0
MON01	0669	06/20/2006	Uranium	0.0067		F	0.0111			0.0072		F	8	0
MON01	0762	06/20/2006	Uranium	0.012		F	0.011		F	0.0081			6	0
MON01	0770	06/21/2006	Vanadium	0.00043		FJ	0.004	U		0.00048		FJ	5	3
MON01	0771	06/21/2006	Sulfate	1700		FQ	3710			1800		F	11	0
MON01	0772	06/21/2006	Sulfate	110		F	186			130		F	12	0
MON01	0774	06/21/2006	Sulfate	54		F	86		F	55			11	0

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.		

Anomalous Data Review Checksheet

Anomalous Data Review Checksheet

Site: Monument Valley Processing Site **Sampling Data:** Ground water

Reviewer: Steve Donivan (Name (print)) Steve Donivan (Signature) 9-28-2006 (Date)

Site Hydrologist: David Miller (Name (print)) D J Miller (Signature) 9/29/06 (Date)

Date of Review: September 8, 2006

Loc. No.	Analyte	Type of Anomaly	Disposition
0619	Uranium	Low	Compare to future results

Attachment 2
Data Presentation

Ground Water Quality Data

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0604 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	13	-	28	173		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	13	-	28	0.1	U	F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	13	-	28	0.076		F	#	.01	
Oxidation Reduction Potential	mV	06/21/2006	N001	13	-	28	-21.8		F	#		
pH	s.u.	06/21/2006	N001	13	-	28	8.45		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	13	-	28	604		F	#		
Sulfate	mg/L	06/21/2006	0001	13	-	28	110		F	#	2.5	
Temperature	C	06/21/2006	N001	13	-	28	19.15		F	#		
Turbidity	NTU	06/21/2006	N001	13	-	28	6.15		F	#		
Uranium	mg/L	06/21/2006	0001	13	-	28	0.0023		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	13	-	28	0.0022		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
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 CaCO3)	mg/L	06/21/2006	0001	32	-	42	222		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	32	-	42	140		F	#	20	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	32	-	42	220		F	#	2	
Oxidation Reduction Potential	mV	06/21/2006	N001	32	-	42	90.8		F	#		
pH	s.u.	06/21/2006	N001	32	-	42	7.26		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	32	-	42	2895		F	#		
Sulfate	mg/L	06/21/2006	0001	32	-	42	390		F	#	25	
Temperature	C	06/21/2006	N001	32	-	42	20.96		F	#		
Turbidity	NTU	06/21/2006	N001	32	-	42	0.58		F	#		
Uranium	mg/L	06/21/2006	0001	32	-	42	0.0093		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	32	-	42	0.00074		UF	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0619 WELL Water Use Permit No. 92-082.

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	103.9	-	153.9	168		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	103.9	-	153.9	0.1	U	F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	103.9	-	153.9	1.2		F	#	.01	
Oxidation Reduction Potential	mV	06/21/2006	N001	103.9	-	153.9	84.7		F	#		
pH	s.u.	06/21/2006	N001	103.9	-	153.9	7.98		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	103.9	-	153.9	388		F	#		
Sulfate	mg/L	06/21/2006	0001	103.9	-	153.9	30		F	#	2.5	
Temperature	C	06/21/2006	N001	103.9	-	153.9	19.24		F	#		
Turbidity	NTU	06/21/2006	N001	103.9	-	153.9	0.67		F	#		
Uranium	mg/L	06/21/2006	0001	103.9	-	153.9	0.02		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	103.9	-	153.9	0.021		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0655 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	38	-	58	263		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	38	-	58	61		F	#	5	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	38	-	58	120		F	#	1	
Oxidation Reduction Potential	mV	06/21/2006	N001	38	-	58	147		F	#		
pH	s.u.	06/21/2006	N001	38	-	58	7.36		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	38	-	58	3723		F	#		
Sulfate	mg/L	06/21/2006	0001	38	-	58	1600		F	#	25	
Temperature	C	06/21/2006	N001	38	-	58	19.62		F	#		
Turbidity	NTU	06/21/2006	N001	38	-	58	2.01		F	#		
Uranium	mg/L	06/21/2006	0001	38	-	58	0.016		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	38	-	58	0.0071		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0656 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	38	-	58	225		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	38	-	58	53		F	#	5	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	38	-	58	22		F	#	.2	
Oxidation Reduction Potential	mV	06/21/2006	N001	38	-	58	69.6		F	#		
pH	s.u.	06/21/2006	N001	38	-	58	7.92		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	38	-	58	1113		F	#		
Sulfate	mg/L	06/21/2006	0001	38	-	58	200		F	#	5	
Temperature	C	06/21/2006	N001	38	-	58	18.36		F	#		
Turbidity	NTU	06/21/2006	N001	38	-	58	0.44		F	#		
Uranium	mg/L	06/21/2006	0001	38	-	58	0.0059		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	38	-	58	0.00039		FJ	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0662 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	37.5	-	67.5	198		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	37.5	-	67.5	0.54		F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	37.5	-	67.5	12		F	#	.1	
Oxidation Reduction Potential	mV	06/21/2006	N001	37.5	-	67.5	104.6		F	#		
pH	s.u.	06/21/2006	N001	37.5	-	67.5	7.41		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	37.5	-	67.5	1305		F	#		
Sulfate	mg/L	06/21/2006	0001	37.5	-	67.5	570		F	#	5	
Temperature	C	06/21/2006	N001	37.5	-	67.5	17.95		F	#		
Turbidity	NTU	06/21/2006	N001	37.5	-	67.5	0.97		F	#		
Uranium	mg/L	06/21/2006	0001	37.5	-	67.5	0.43		F	#	.000017	
Vanadium	mg/L	06/21/2006	0001	37.5	-	67.5	0.023		F	#	.00069	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0669 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/20/2006	0001	34	-	54	193		F	#		
Ammonia Total as N	mg/L	06/20/2006	0001	34	-	54	2.6		F	#	.1	
Ammonia Total as N	mg/L	06/20/2006	0002	34	-	54	2.7		F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	34	-	54	7.4		F	#	.05	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0002	34	-	54	5.5		F	#	.05	
Oxidation Reduction Potential	mV	06/20/2006	N001	34	-	54	34.4		F	#		
pH	s.u.	06/20/2006	N001	34	-	54	7.76		F	#		
Specific Conductance	umhos /cm	06/20/2006	N001	34	-	54	670		F	#		
Sulfate	mg/L	06/20/2006	0001	34	-	54	120		F	#	5	
Sulfate	mg/L	06/20/2006	0002	34	-	54	120		F	#	2.5	
Temperature	C	06/20/2006	N001	34	-	54	18.79		F	#		
Turbidity	NTU	06/20/2006	N001	34	-	54	0.64		F	#		
Uranium	mg/L	06/20/2006	0001	34	-	54	0.0067		F	#	.0000034	
Uranium	mg/L	06/20/2006	0002	34	-	54	0.0074		F	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	34	-	54	0.05		F	#	.00014	
Vanadium	mg/L	06/20/2006	0002	34	-	54	0.052		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0760 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/20/2006	0001	55	-	75	168		FQ	#		
Ammonia Total as N	mg/L	06/20/2006	0001	55	-	75	0.1	U	FQ	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	55	-	75	0.037		FQ	#	.01	
Oxidation Reduction Potential	mV	06/20/2006	N001	55	-	75	-140.2		FQ	#		
pH	s.u.	06/20/2006	N001	55	-	75	8.3		FQ	#		
Specific Conductance	umhos /cm	06/20/2006	N001	55	-	75	527		FQ	#		
Sulfate	mg/L	06/20/2006	0001	55	-	75	87		FQ	#	2.5	
Temperature	C	06/20/2006	N001	55	-	75	21.86		FQ	#		
Turbidity	NTU	06/20/2006	N001	55	-	75	31.3		FQ	#		
Uranium	mg/L	06/20/2006	0001	55	-	75	0.00029		UFQ	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	55	-	75	0.00014	U	FQ	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0761 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/20/2006	0001	39	-	49	183		F	#		
Ammonia Total as N	mg/L	06/20/2006	0001	39	-	49	0.1	U	F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	39	-	49	28		F	#	.2	
Oxidation Reduction Potential	mV	06/20/2006	N001	39	-	49	25.1		F	#		
pH	s.u.	06/20/2006	N001	39	-	49	7.53		F	#		
Specific Conductance	umhos /cm	06/20/2006	N001	39	-	49	1397		F	#		
Sulfate	mg/L	06/20/2006	0001	39	-	49	490		F	#	10	
Temperature	C	06/20/2006	N001	39	-	49	19.62		F	#		
Turbidity	NTU	06/20/2006	N001	39	-	49	9.9		F	#		
Uranium	mg/L	06/20/2006	0001	39	-	49	0.029		F	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	39	-	49	0.0013		FJ	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
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 CaCO3)	mg/L	06/20/2006	0001	29	-	49	223		F	#		
Ammonia Total as N	mg/L	06/20/2006	0001	29	-	49	0.1	U	F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	29	-	49	73		F	#	.5	
Oxidation Reduction Potential	mV	06/20/2006	N001	29	-	49	-15.4		F	#		
pH	s.u.	06/20/2006	N001	29	-	49	7.58		F	#		
Specific Conductance	umhos /cm	06/20/2006	N001	29	-	49	3501		F	#		
Sulfate	mg/L	06/20/2006	0001	29	-	49	1500		F	#	25	
Temperature	C	06/20/2006	N001	29	-	49	19.12		F	#		
Turbidity	NTU	06/20/2006	N001	29	-	49	6.63		F	#		
Uranium	mg/L	06/20/2006	0001	29	-	49	0.012		F	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	29	-	49	0.0051		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0764 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/20/2006	0001	47	-	52	196		FQ	#		
Ammonia Total as N	mg/L	06/20/2006	0001	47	-	52	0.1	U	FQ	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	47	-	52	46		FQ	#	.5	
Oxidation Reduction Potential	mV	06/20/2006	N001	47	-	52	145.5		FQ	#		
pH	s.u.	06/20/2006	N001	47	-	52	7.36		FQ	#		
Specific Conductance	umhos /cm	06/20/2006	N001	47	-	52	1326		FQ	#		
Sulfate	mg/L	06/20/2006	0001	47	-	52	330		FQ	#	10	
Temperature	C	06/20/2006	N001	47	-	52	19.75		FQ	#		
Turbidity	NTU	06/20/2006	N001	47	-	52	3.88		FQ	#		
Uranium	mg/L	06/20/2006	0001	47	-	52	0.015		FQ	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	47	-	52	0.013		FQ	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
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 CaCO3)	mg/L	06/20/2006	0001	58.6	-	88.7	256		F	#		
Ammonia Total as N	mg/L	06/20/2006	0001	58.6	-	88.7	120		F	#	20	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	58.6	-	88.7	120		F	#	1	
Oxidation Reduction Potential	mV	06/20/2006	N001	58.6	-	88.7	59.9		F	#		
pH	s.u.	06/20/2006	N001	58.6	-	88.7	7.39		F	#		
Specific Conductance	umhos /cm	06/20/2006	N001	58.6	-	88.7	2743		F	#		
Sulfate	mg/L	06/20/2006	0001	58.6	-	88.7	670		F	#	10	
Temperature	C	06/20/2006	N001	58.6	-	88.7	21.28		F	#		
Turbidity	NTU	06/20/2006	N001	58.6	-	88.7	0.95		F	#		
Uranium	mg/L	06/20/2006	0001	58.6	-	88.7	0.012		F	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	58.6	-	88.7	0.0058		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0767 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/20/2006	0001	43.5	-	63.5	167		F	#		
Ammonia Total as N	mg/L	06/20/2006	0001	43.5	-	63.5	0.15		F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	43.5	-	63.5	0.01	U	F	#	.01	
Oxidation Reduction Potential	mV	06/20/2006	N001	43.5	-	63.5	-173.9		F	#		
pH	s.u.	06/20/2006	N001	43.5	-	63.5	8.02		F	#		
Specific Conductance	umhos /cm	06/20/2006	N001	43.5	-	63.5	403		F	#		
Sulfate	mg/L	06/20/2006	0001	43.5	-	63.5	31		F	#	2.5	
Temperature	C	06/20/2006	N001	43.5	-	63.5	19.63		F	#		
Turbidity	NTU	06/20/2006	N001	43.5	-	63.5	4.43		F	#		
Uranium	mg/L	06/20/2006	0001	43.5	-	63.5	0.00054		F	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	43.5	-	63.5	0.00014	U	F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0768 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/20/2006	0001	24.4	-	44.4	175		F	#		
Ammonia Total as N	mg/L	06/20/2006	0001	24.4	-	44.4	0.55		F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/20/2006	0001	24.4	-	44.4	0.01	U	F	#	.01	
Oxidation Reduction Potential	mV	06/20/2006	N001	24.4	-	44.4	-227.5		F	#		
pH	s.u.	06/20/2006	N001	24.4	-	44.4	8.3		F	#		
Specific Conductance	umhos /cm	06/20/2006	N001	24.4	-	44.4	498		F	#		
Sulfate	mg/L	06/20/2006	0001	24.4	-	44.4	78		F	#	2.5	
Temperature	C	06/20/2006	N001	24.4	-	44.4	18.37		F	#		
Turbidity	NTU	06/20/2006	N001	24.4	-	44.4	8.68		F	#		
Uranium	mg/L	06/20/2006	0001	24.4	-	44.4	0.000065	B	UF	#	.0000034	
Vanadium	mg/L	06/20/2006	0001	24.4	-	44.4	0.00014	U	F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
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 CaCO3)	mg/L	06/21/2006	0001	54.9	-	64.9	228		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	54.9	-	64.9	36		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	54.9	-	64.9	22		F	#	.2	
Oxidation Reduction Potential	mV	06/21/2006	N001	54.9	-	64.9	71.7		F	#		
pH	s.u.	06/21/2006	N001	54.9	-	64.9	7.7		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	54.9	-	64.9	1127		F	#		
Sulfate	mg/L	06/21/2006	0001	54.9	-	64.9	240		F	#	5	
Temperature	C	06/21/2006	N001	54.9	-	64.9	19.51		F	#		
Turbidity	NTU	06/21/2006	N001	54.9	-	64.9	1.35		F	#		
Uranium	mg/L	06/21/2006	0001	54.9	-	64.9	0.0061		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	54.9	-	64.9	0.00043		FJ	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0771 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	57.4	-	77.4	303		FQ	#		
Ammonia Total as N	mg/L	06/21/2006	0001	57.4	-	77.4	230		FQ	#	20	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	57.4	-	77.4	170		FQ	#	1	
Oxidation Reduction Potential	mV	06/21/2006	N001	57.4	-	77.4	190.4		FQ	#		
pH	s.u.	06/21/2006	N001	57.4	-	77.4	7.34		FQ	#		
Specific Conductance	umhos /cm	06/21/2006	N001	57.4	-	77.4	4584		FQ	#		
Sulfate	mg/L	06/21/2006	0001	57.4	-	77.4	1700		FQ	#	25	
Temperature	C	06/21/2006	N001	57.4	-	77.4	21.89		FQ	#		
Turbidity	NTU	06/21/2006	N001	57.4	-	77.4	0.63		FQ	#		
Uranium	mg/L	06/21/2006	0001	57.4	-	77.4	0.017		FQ	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	57.4	-	77.4	0.0076		FQ	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0772 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	7.4	-	27.4	220		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	7.4	-	27.4	4.3		F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	7.4	-	27.4	1.8		F	#	.01	
Oxidation Reduction Potential	mV	06/21/2006	N001	7.4	-	27.4	29.7		F	#		
pH	s.u.	06/21/2006	N001	7.4	-	27.4	7.97		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	7.4	-	27.4	714		F	#		
Sulfate	mg/L	06/21/2006	0001	7.4	-	27.4	110		F	#	5	
Temperature	C	06/21/2006	N001	7.4	-	27.4	18.16		F	#		
Turbidity	NTU	06/21/2006	N001	7.4	-	27.4	1.16		F	#		
Uranium	mg/L	06/21/2006	0001	7.4	-	27.4	0.0066		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	7.4	-	27.4	0.011		F	#	.00014	

Ground Water Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006
Location: 0774 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/21/2006	0001	45	-	55	167		F	#		
Ammonia Total as N	mg/L	06/21/2006	0001	45	-	55	0.1	U	F	#	.1	
Nitrate + Nitrite as Nitrogen	mg/L	06/21/2006	0001	45	-	55	2.8		F	#	.02	
Oxidation Reduction Potential	mV	06/21/2006	N001	45	-	55	97.2		F	#		
pH	s.u.	06/21/2006	N001	45	-	55	7.76		F	#		
Specific Conductance	umhos /cm	06/21/2006	N001	45	-	55	447		F	#		
Sulfate	mg/L	06/21/2006	0001	45	-	55	54		F	#	2.5	
Temperature	C	06/21/2006	N001	45	-	55	18.76		F	#		
Turbidity	NTU	06/21/2006	N001	45	-	55	3.64		F	#		
Uranium	mg/L	06/21/2006	0001	45	-	55	0.062		F	#	.0000034	
Vanadium	mg/L	06/21/2006	0001	45	-	55	0.017		F	#	.00014	

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.

Equipment Blank Data

BLANKS REPORT
LAB: PARAGON (Fort Collins, CO)
RIN: 06060399
Report Date: 9/8/2006

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab	Qualifiers Data	Detection Limit	Uncertainty	Sample Type
Ammonia Total as N	MON01	0999	06/20/2006	0001	mg/L	.1	U		.1		E
Nitrate + Nitrite as Nitrogen	MON01	0999	06/20/2006	0001	mg/L	.01	U		.01		E
Sulfate	MON01	0999	06/20/2006	0001	mg/L	.5	U		.5		E
Uranium	MON01	0999	06/20/2006	0001	mg/L	.000097	B	U	.0000034		E
Vanadium	MON01	0999	06/20/2006	0001	mg/L	.00014	U		.00014		E
Vanadium	MON01	0999	06/20/2006	0001	mg/L	.00014	U		.00014		E

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

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

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

SAMPLE TYPES:
E Equipment Blank.

Static Water Level Data

STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 9/8/2006

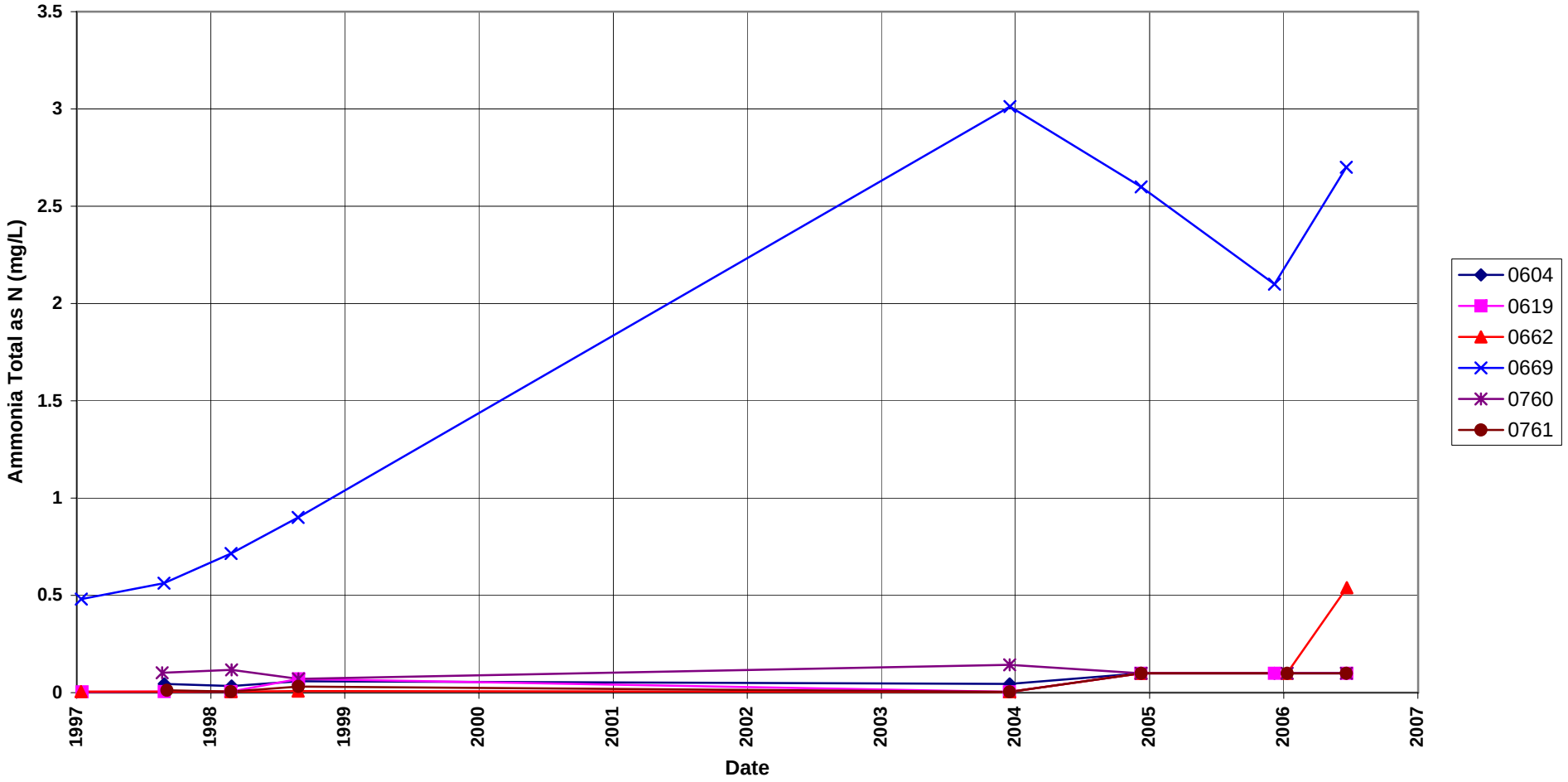
Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0604	C	4840.42	21-JUN-06	14:11:00	9.42	4831	
0606	D	4864.73	21-JUN-06	11:35:00	36.45	4828.28	
0619	O	4888.63	21-JUN-06	10:20:00	58.29	4830.34	
0655	D	4862.06	21-JUN-06	16:19:00	40.08	4821.98	
0656	D	4856.33	21-JUN-06	13:15:00	37.19	4819.14	
0662	D	4878.56	21-JUN-06	09:19:00	49.94	4828.62	
0669	D	4867.19	20-JUN-06	16:26:00	49.6	4817.59	
0760	D	4814.8	20-JUN-06	12:22:00	25.4	4789.4	
0761	D	4835.02	20-JUN-06	13:42:00	42.82	4792.2	
0762	D	4820.74	20-JUN-06	13:08:00	32.19	4788.55	
0764	D	4851.53	20-JUN-06	10:06:00	49.41	4802.12	
0765	D	4848.45	20-JUN-06	15:35:00	35.4	4813.05	
0767	D	4808.25	20-JUN-06	11:51:00	6.91	4801.34	
0768	D	4820.73	20-JUN-06	11:15:00	14.01	4806.72	
0770	D	4857.26	21-JUN-06	13:37:00	33.45	4823.81	
0771	D	4863.26	21-JUN-06	15:43:00	41.78	4821.48	
0772	O	4847.6	21-JUN-06	11:00:00	12.62	4834.98	
0774	O	4880.14	21-JUN-06	09:45:00	49.96	4830.18	
0774	O	4880.14	21-JUN-06	09:45:00	49.96	4830.18	

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT
O ON SITE U UPGRADIENT

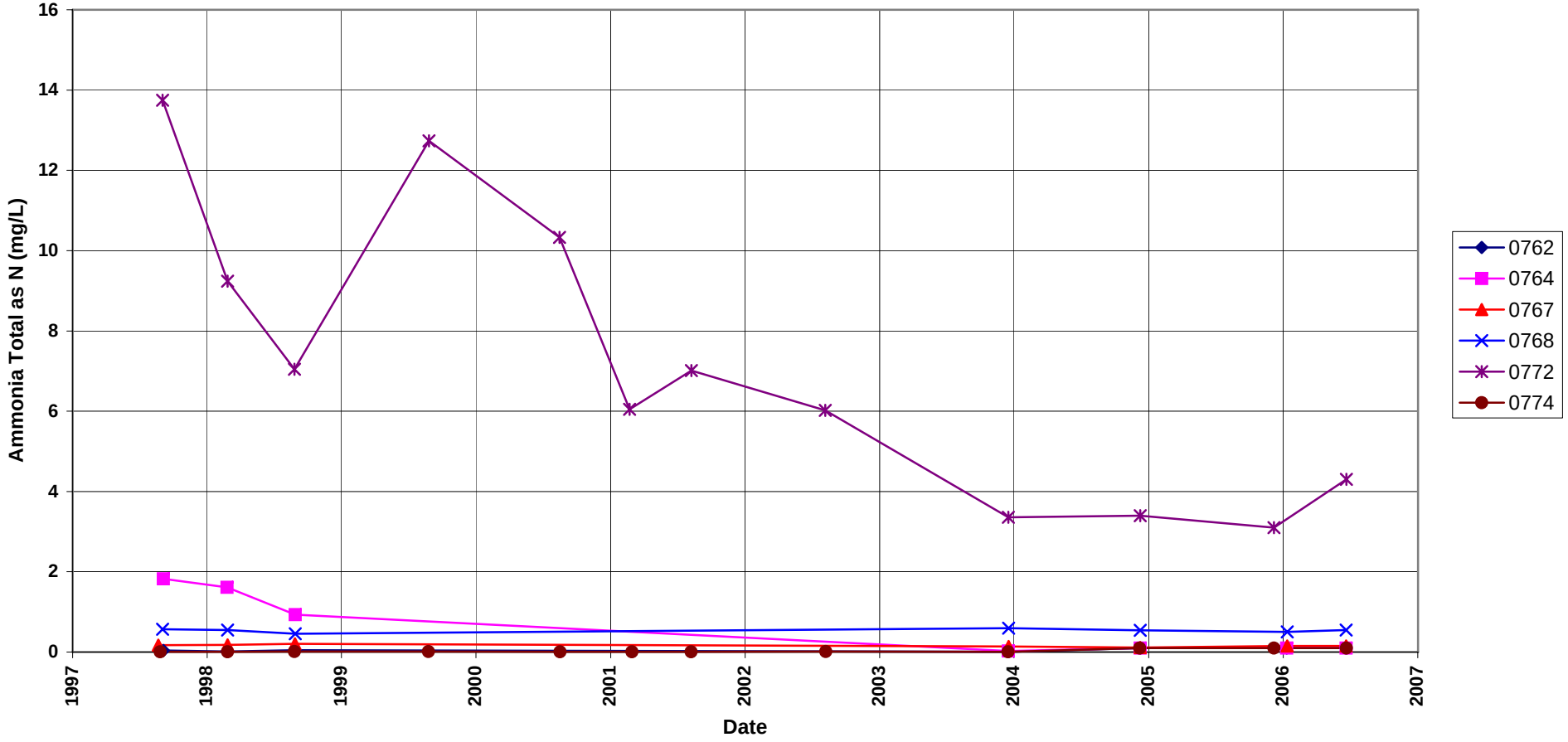
WATER LEVEL FLAGS: D Dry

Time Versus Concentration Graphs

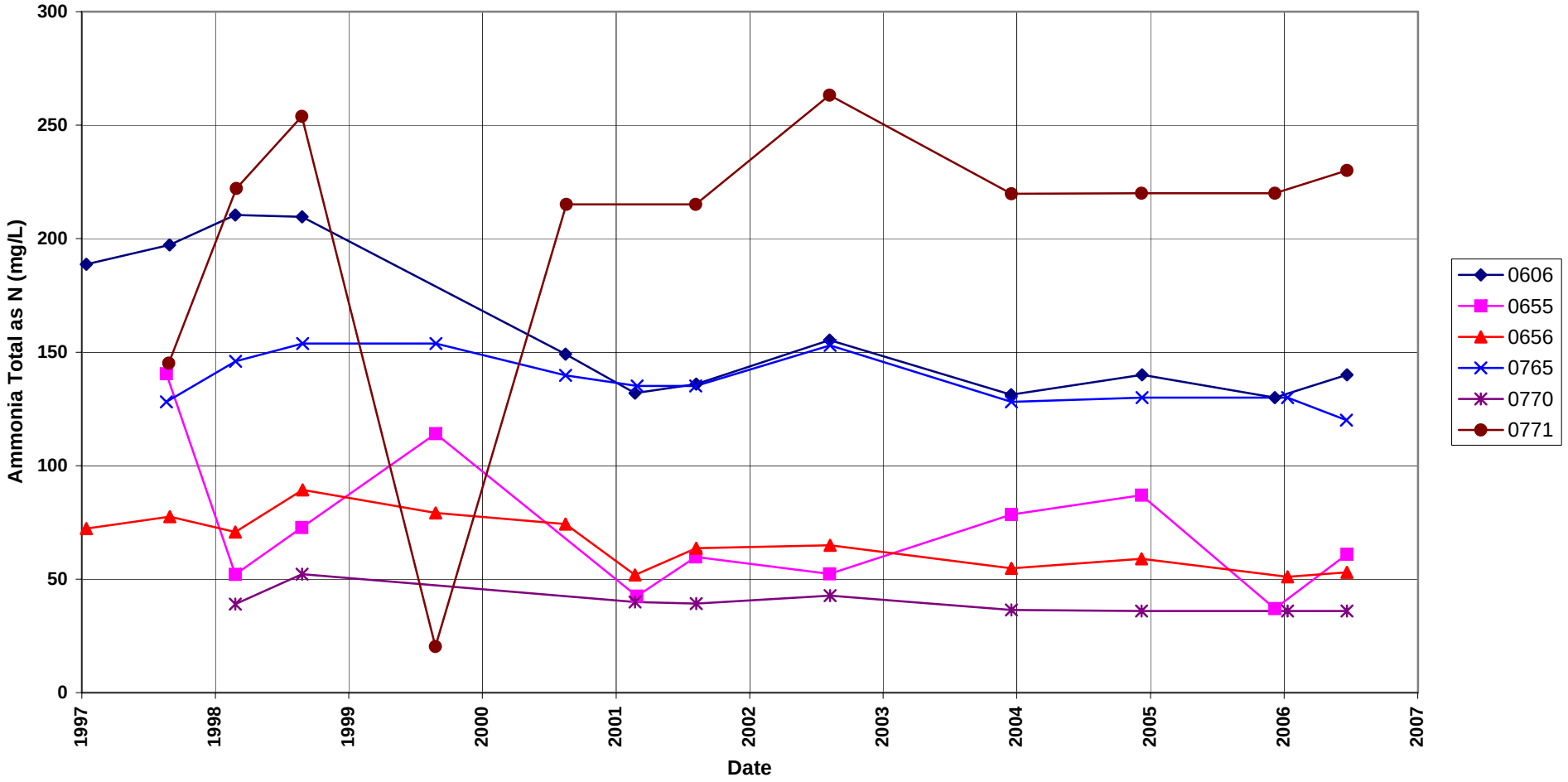
Monument Valley Processing Site
Ammonia Total as N Concentration



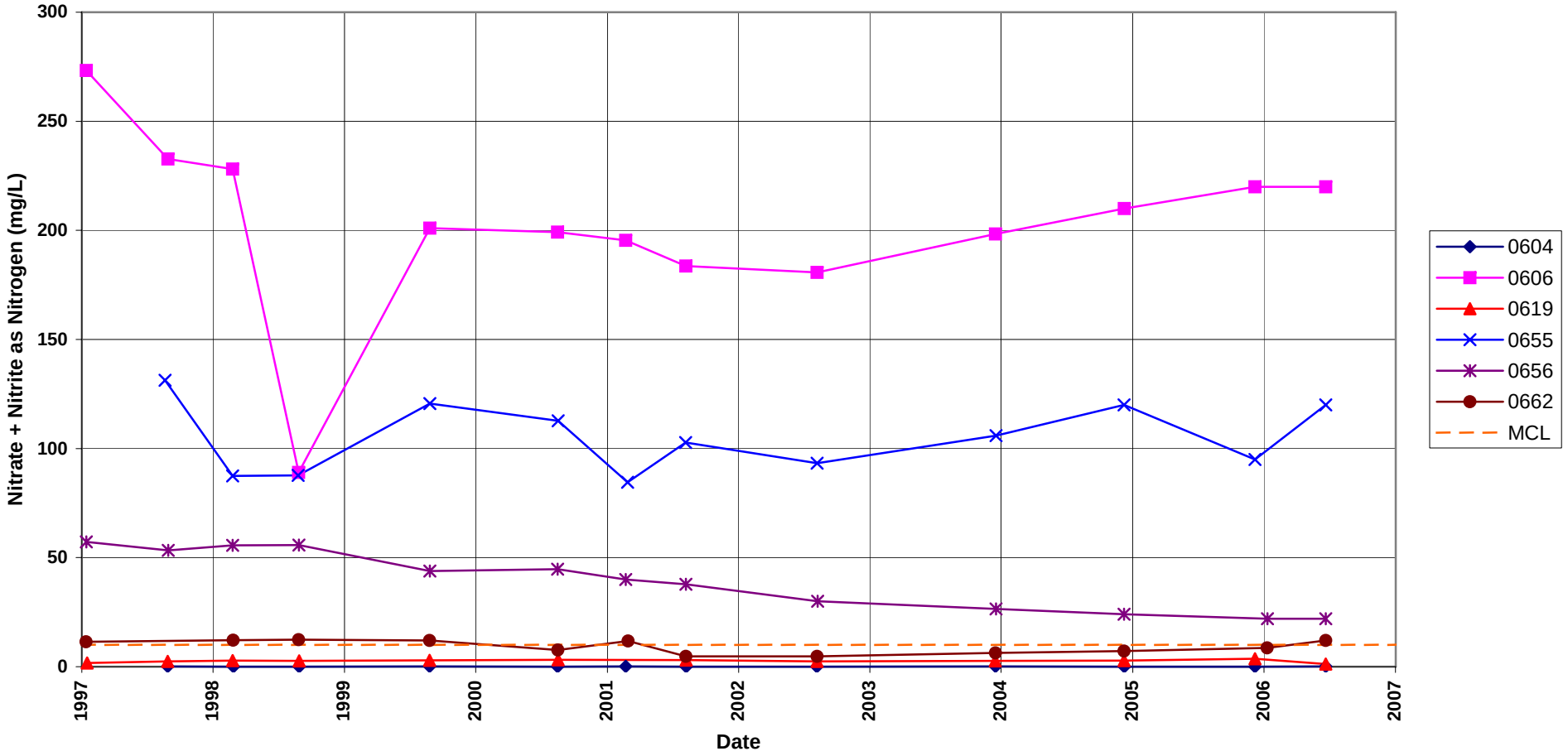
Monument Valley Processing Site
Ammonia Total as N Concentration



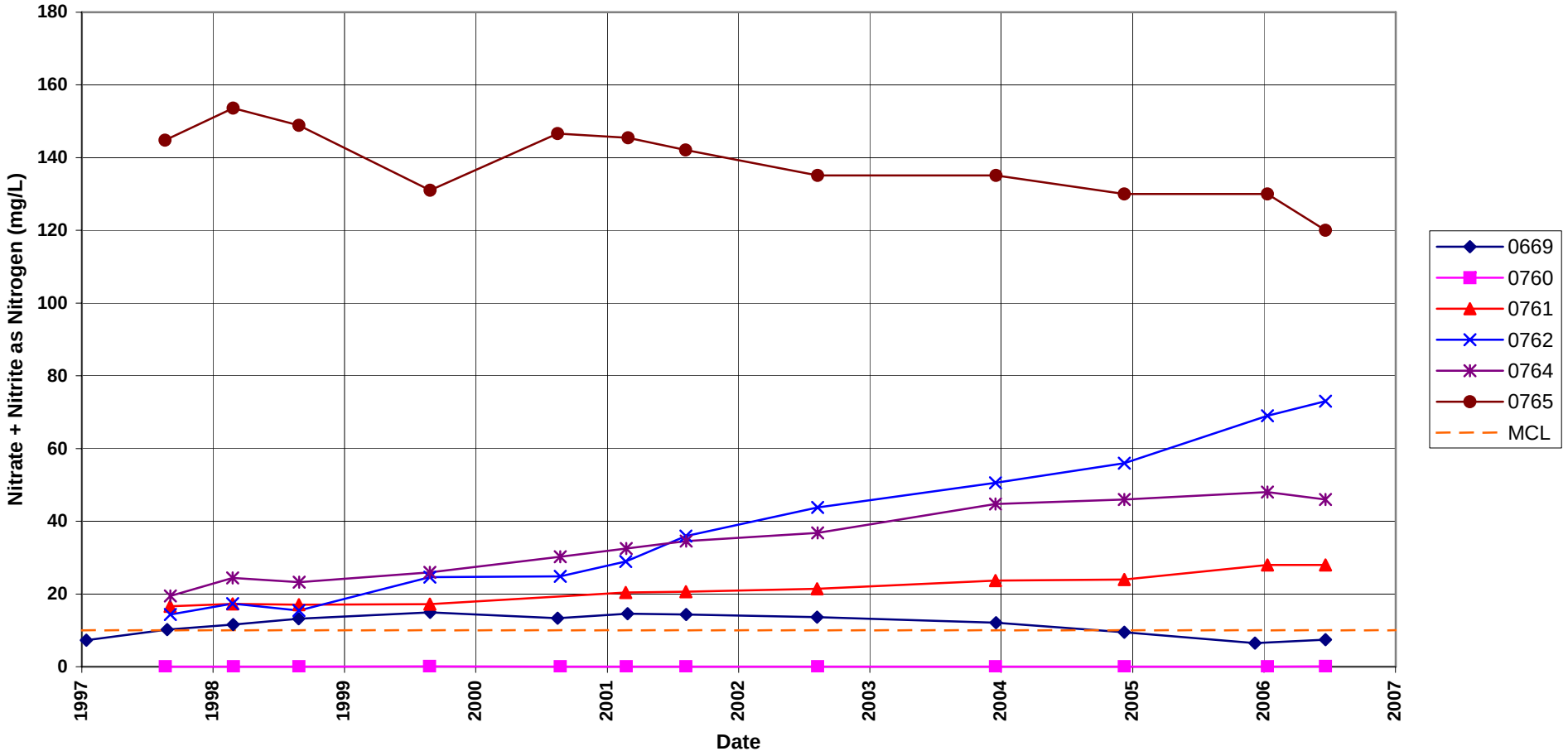
Monument Valley Processing Site
Ammonia Total as N Concentration



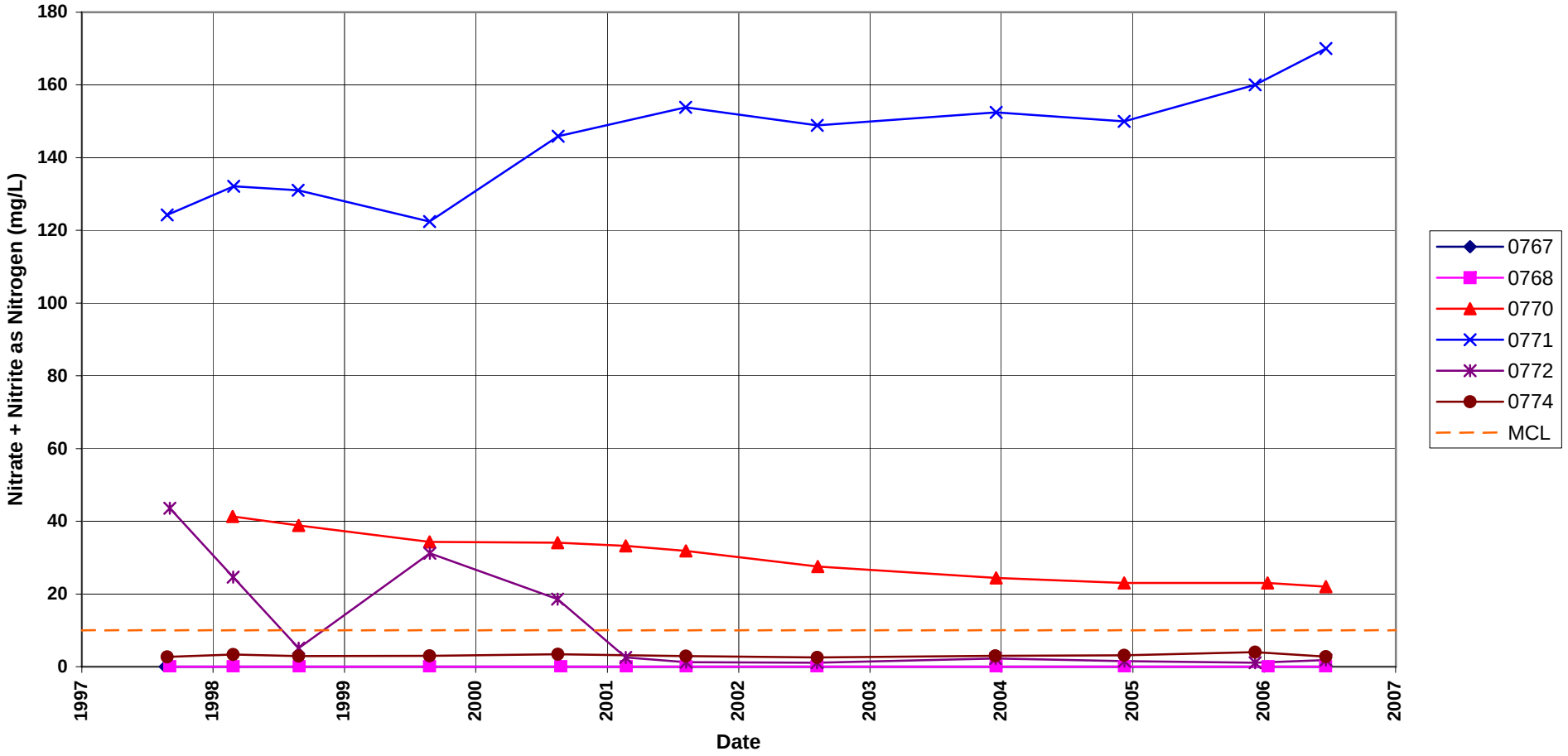
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Contaminant Level = 10.0 mg/L



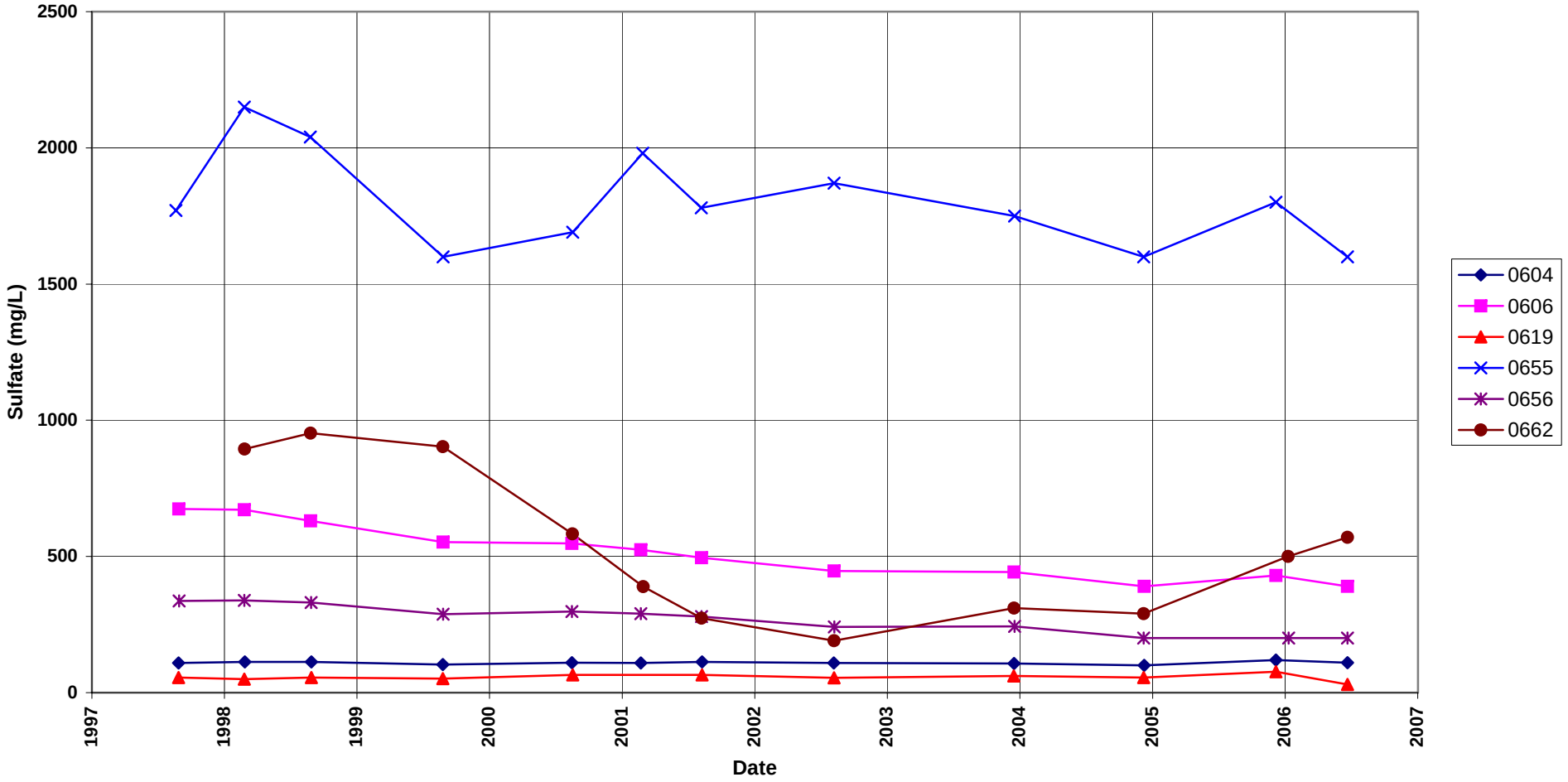
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Contaminant Level = 10.0 mg/L

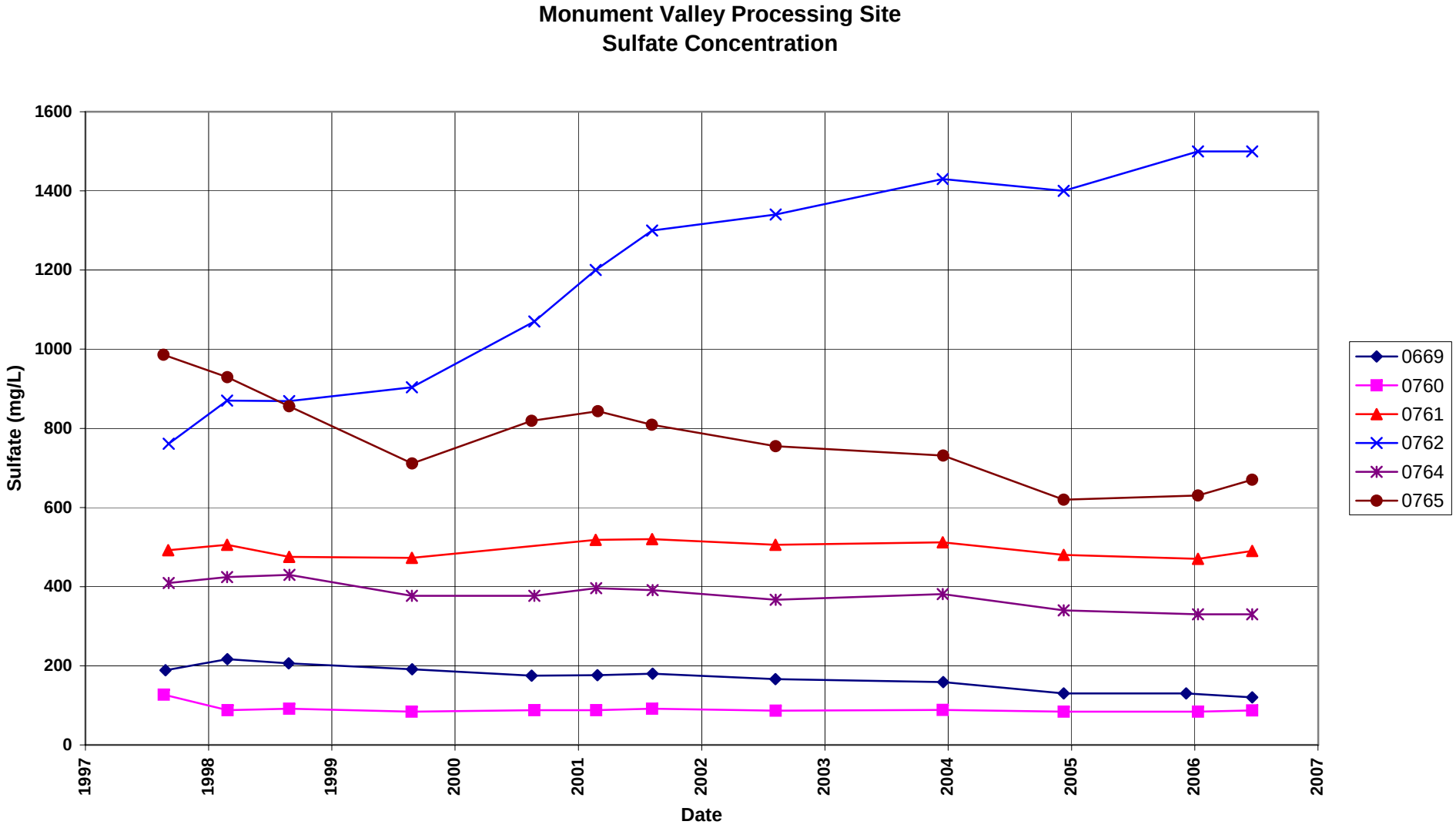


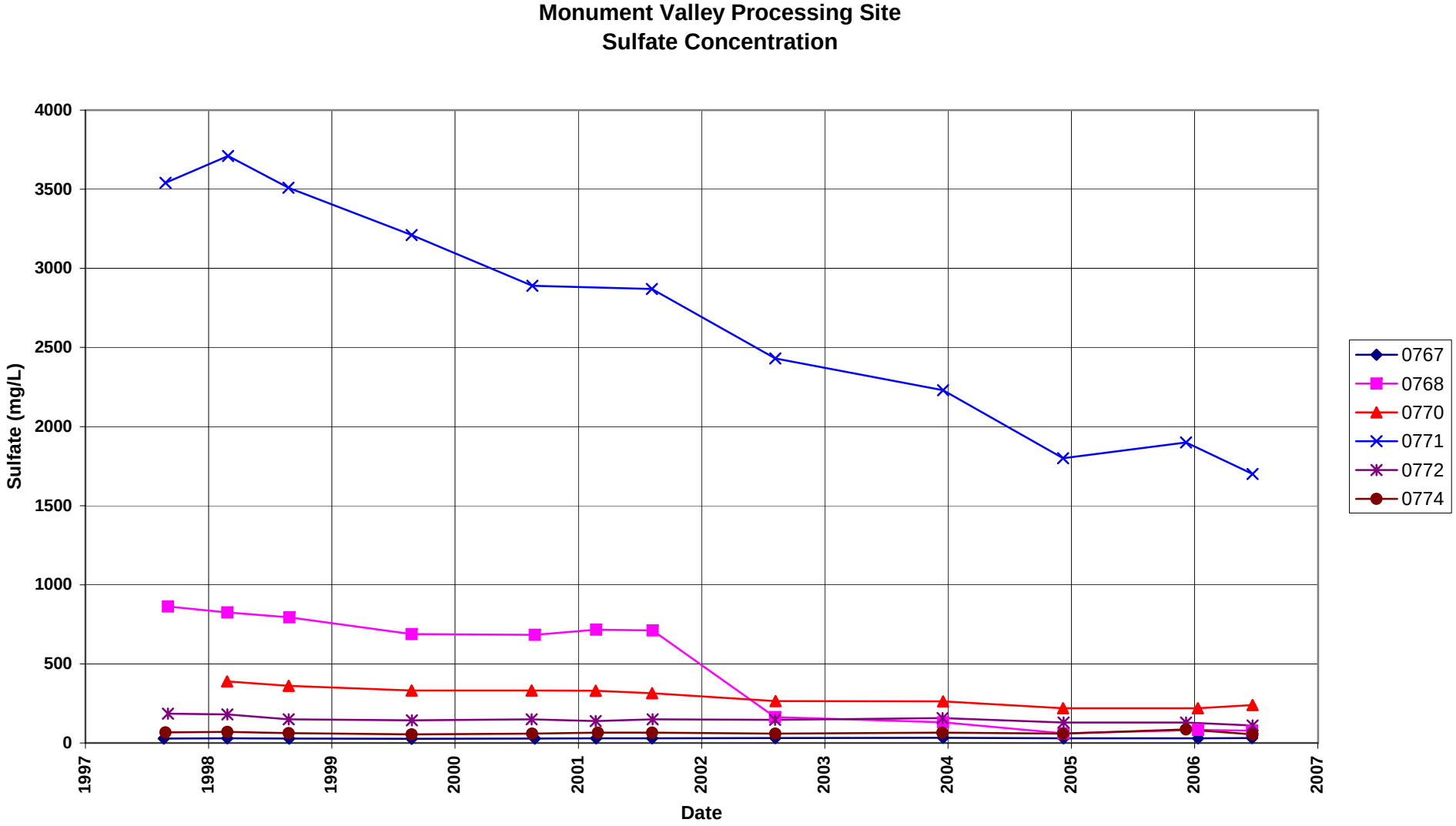
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Contaminant Level = 10.0 mg/L



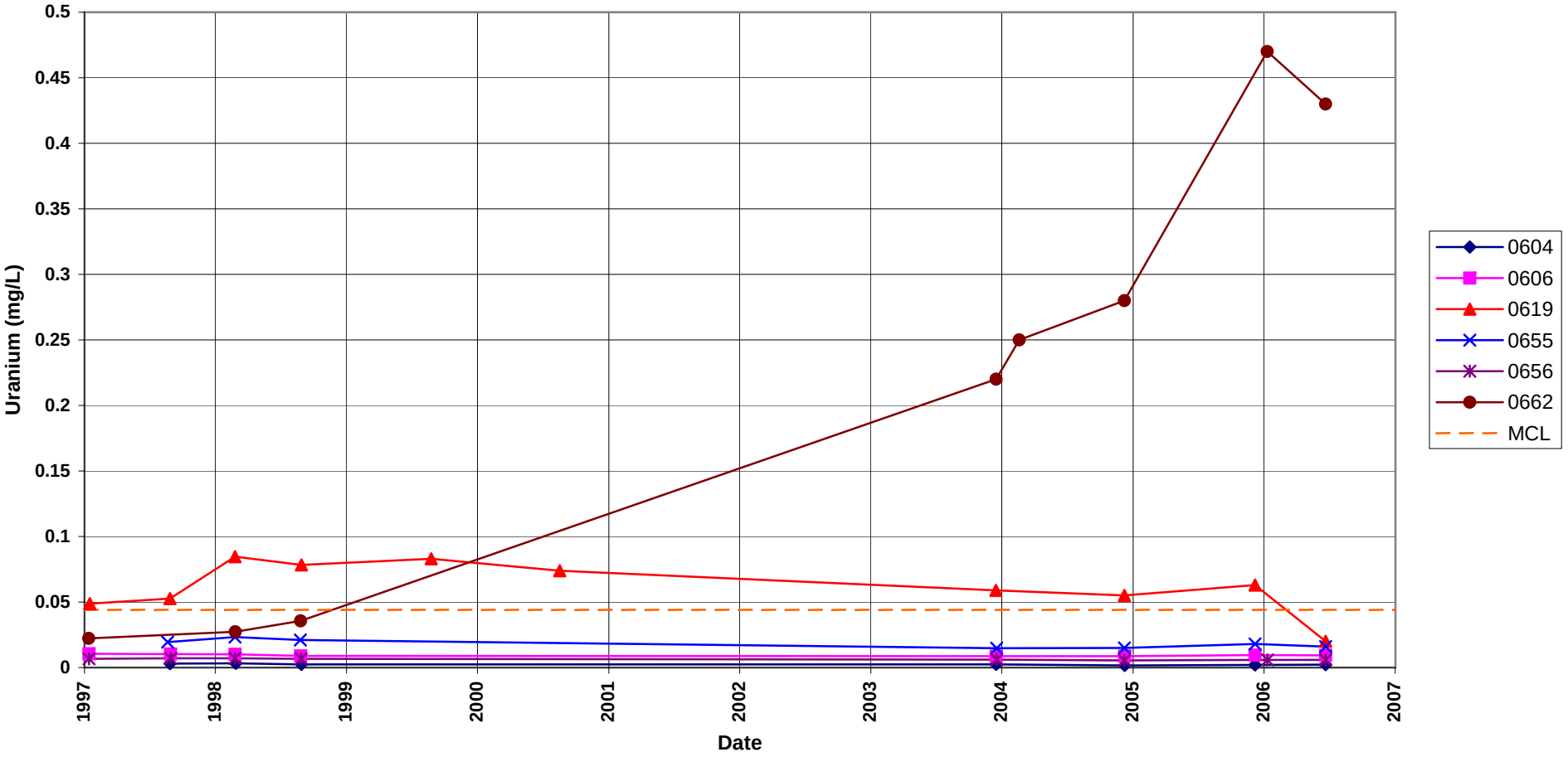
Monument Valley Processing Site
Sulfate Concentration



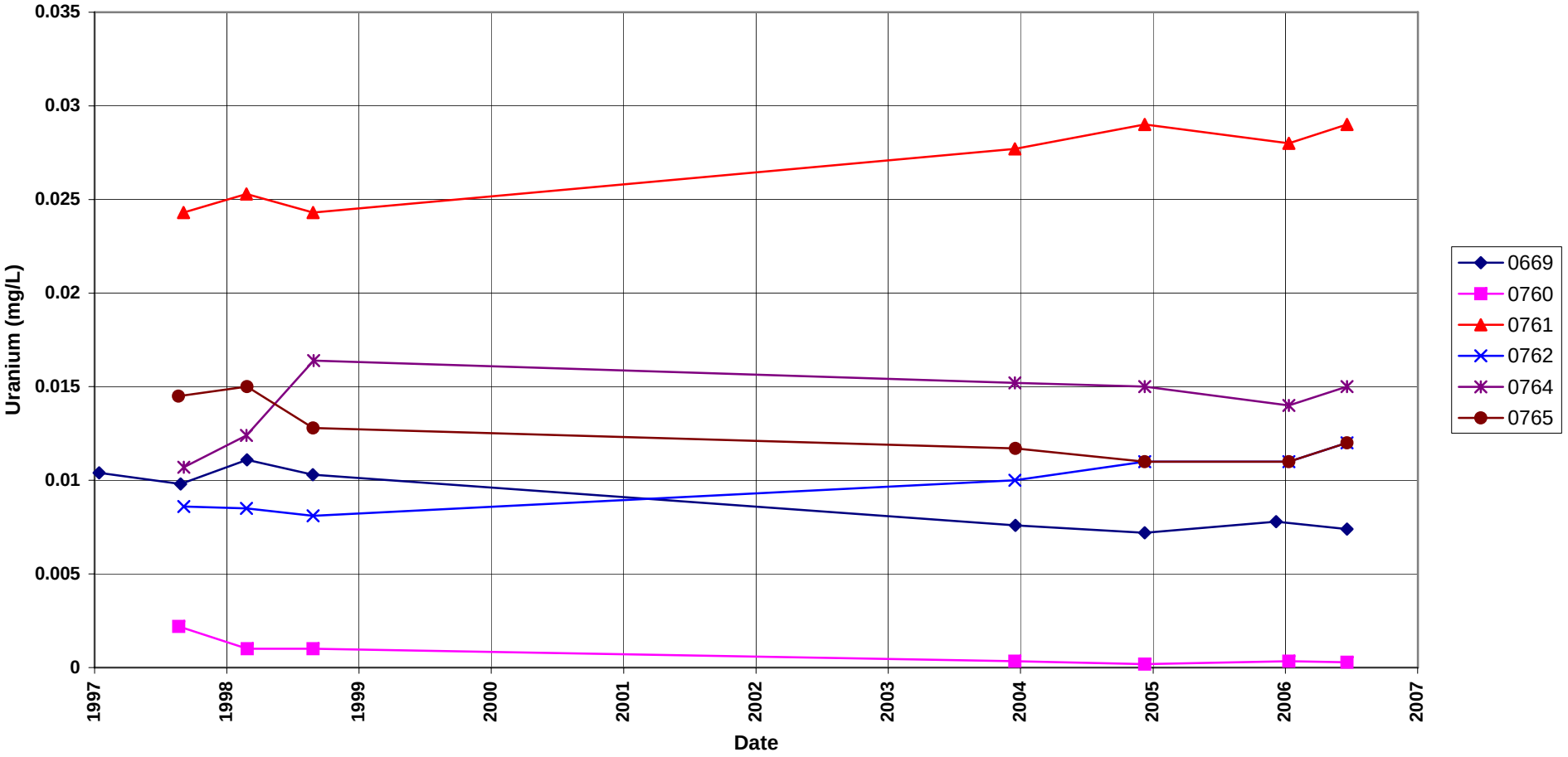

Monument Valley Processing Site
Sulfate Concentration
Sulfate (mg/L)
1600
1400
1200
1000
800
600
400
200
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Date
0669
0760
0761
0762
0764
0765


Monument Valley Processing Site
Sulfate Concentration
Sulfate (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Date
0767
0768
0770
0771
0772
0774

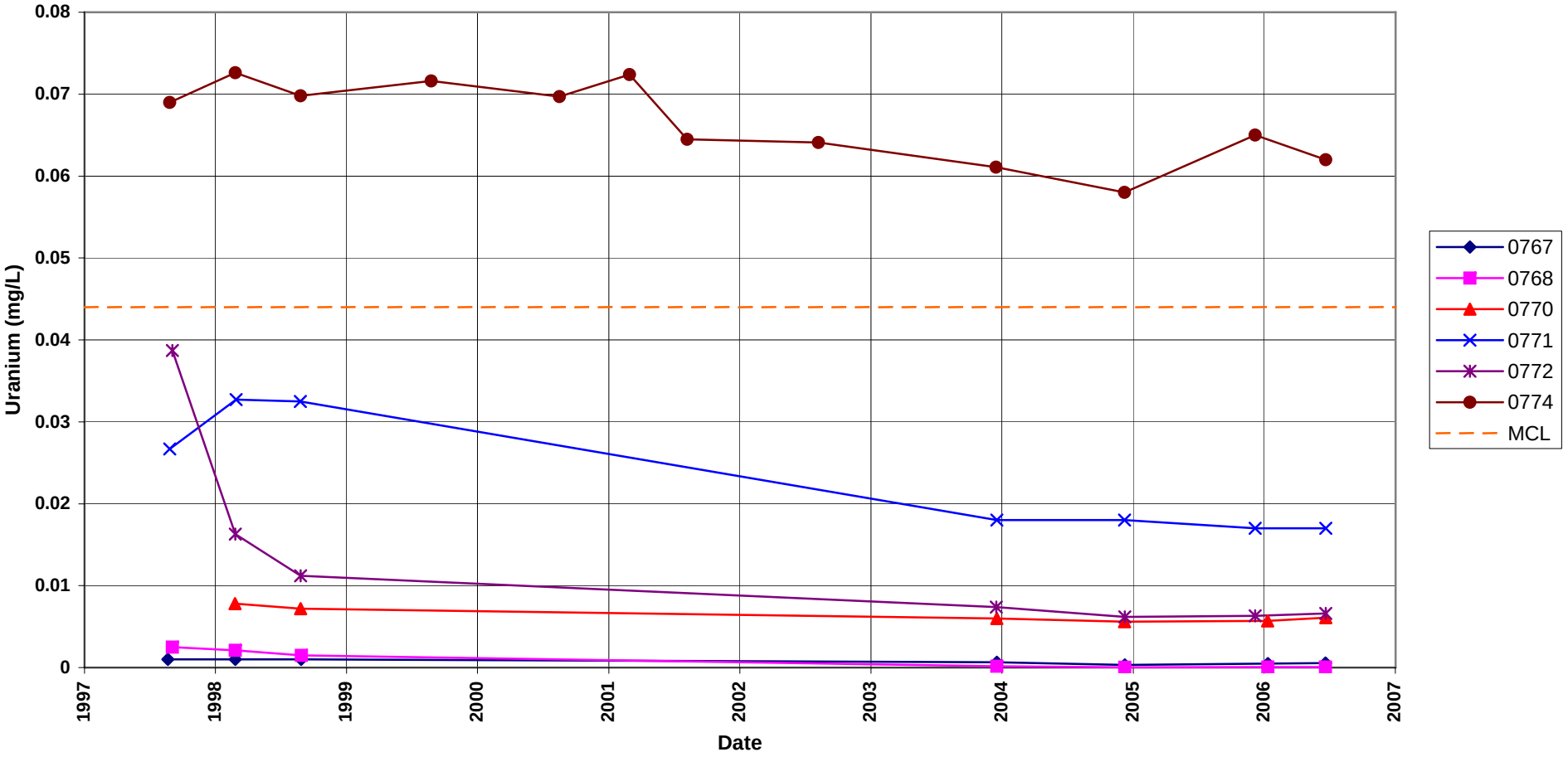
Monument Valley Processing Site
Uranium Concentration
Maximum Contaminant Level = 0.044 mg/L



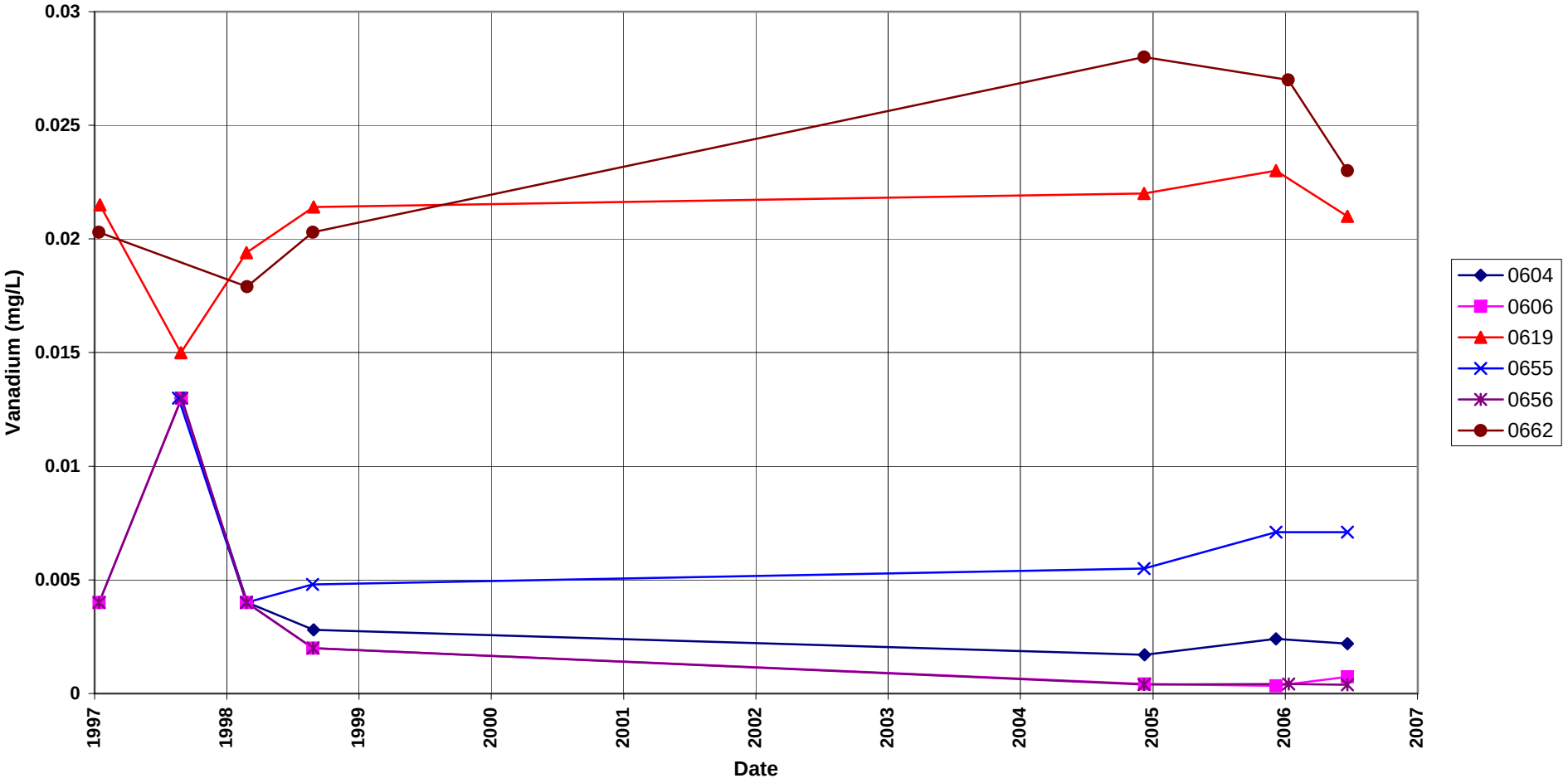
Monument Valley Processing Site
Uranium Concentration
Maximum Contaminant Level = 0.044 mg/L



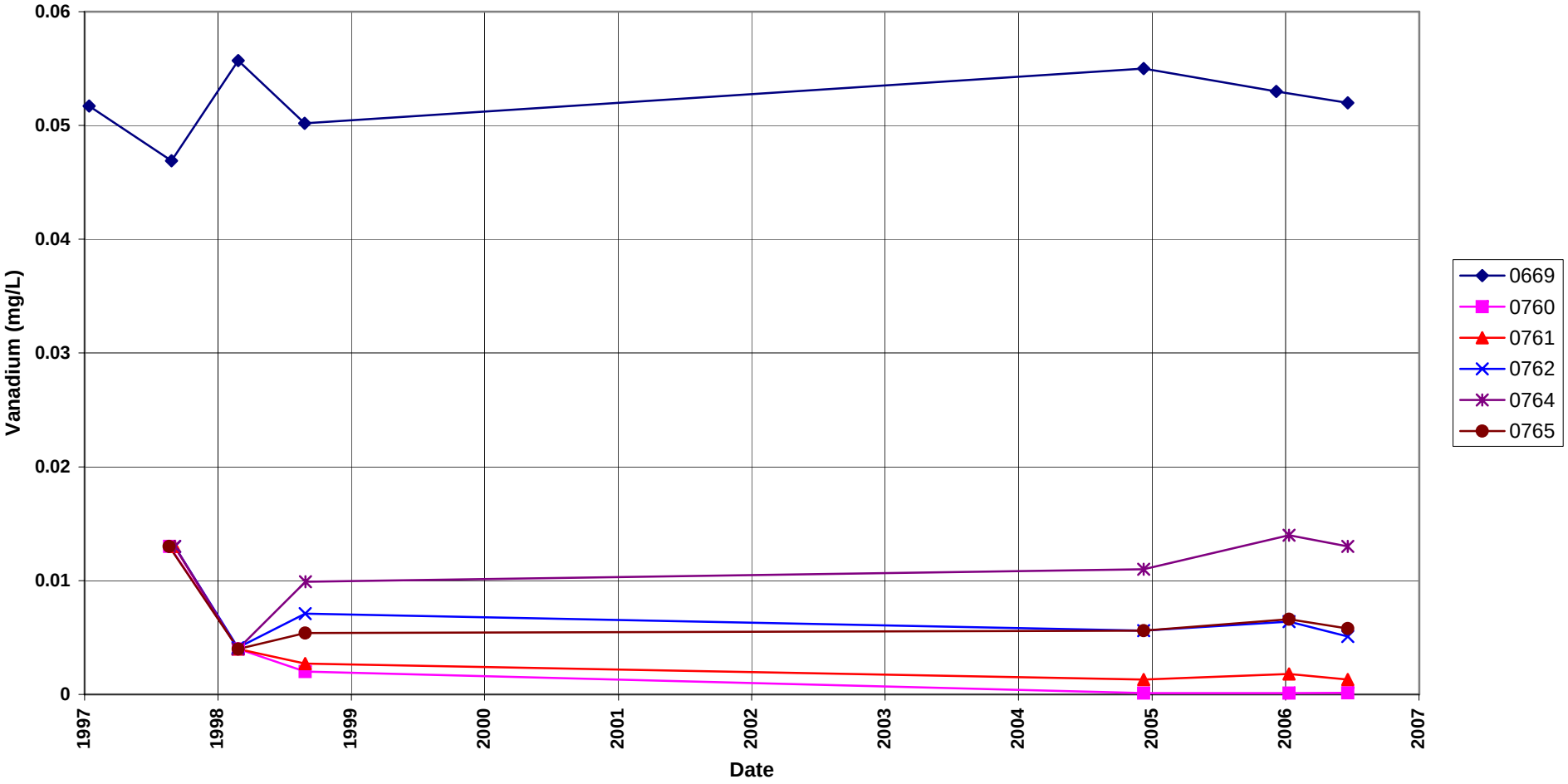
Monument Valley Processing Site
Uranium Concentration
Maximum Contaminant Level = 0.044 mg/L



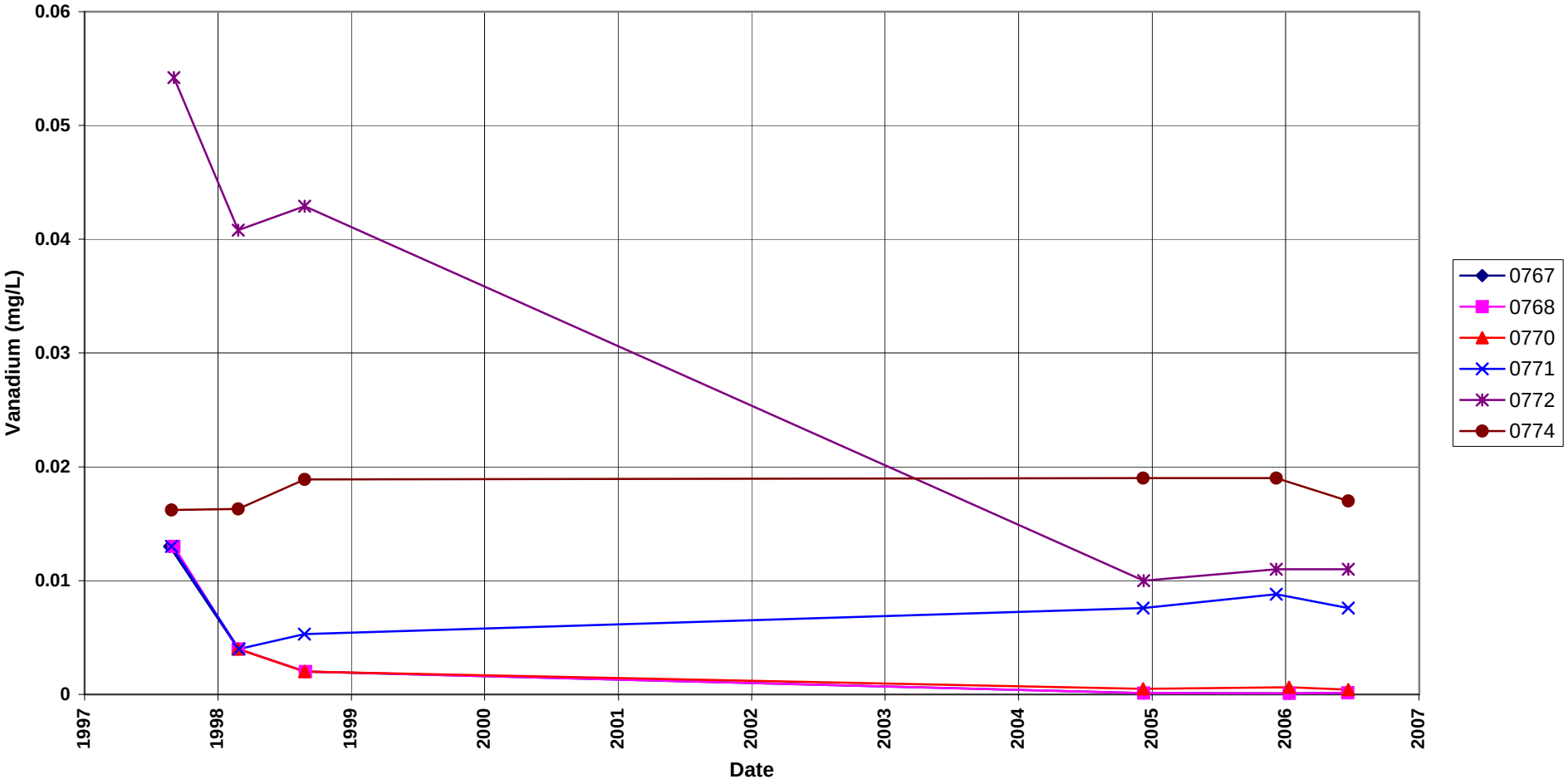
Monument Valley Processing Site
Vanadium Concentration



Monument Valley Processing Site
Vanadium Concentration



Monument Valley Processing Site
Vanadium Concentration



Attachment 3
Sampling and Analysis Work Order

Stoller
Grand Junction Office
established 1959

Task Order ST06-100-05
Control Number 1000-T06-1229

May 19, 2006

Richard P. Bush
Program Manager
U.S. Department of Energy
Grand Junction Office
2597 B ¾ Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AC13-02GJ79491, Stoller
June 2006 Environmental Sampling at Monument Valley, Arizona

Reference: FY 2006 LM Task Order No. ST06-100-05-103

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Monument Valley, Arizona. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring. Water quality data will be collected from monitor and domestic wells at this site as part of the routine environmental sampling scheduled to begin the week of June 19, 2006.

The following lists show the monitor and domestic well locations scheduled to be sampled during this event.

Well locations (filtered)

604	655	669	762	767	770	772
606	656	760	764	768	771	774
619	662	761	765			

Domestic locations (Unfiltered)

201

QA/QC samples will be collected as directed in the *Ground Water and Surface Water Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are covered under the cooperative agreement.

If you have any questions, please call me at extension 6588 or Dave Miller at extension 6652.

Sincerely,

Signature on original

Clay Carpenter
Project Manager

CC/lcg/mat
Enclosures (3)

cc: S. E. Donivan, Stoller (e)
L. C. Goodknight, Stoller (e)
D. E. Miller, Stoller (e)
K. E. Miller, Stoller
D. G. Traub, Stoller (e)

cc w/o enclosures:
Correspondence Control File (Thru B. Bonnet) (e)

Site	Monument Valley	
Analyte	**Ground Water**	**Surface Water**
Approx. No. Samples/yr	38	0
Field Measurements		
Alkalinity	X	
Dissolved Oxygen		
Redox Potential	X	
Residual Chlorine		
pH	X	
Specific Conductance	X	
Turbidity	X	
Temperature	X	
Laboratory Measurements		
Aluminum		
Ammonia as N (NH_3-N)	X	
Antimony		
Arsenic		
Barium		
Bromide		
Cadmium		
Calcium		
Chloride		
Chromium		
Cobalt		
Copper		
Fluoride		
Gamma Spec		
Gross Alpha		
Gross Beta		
Iron		
Lead		
Lead-210		
Magnesium		
Manganese		
Molybdenum		
Nickel		
Nickel-63		
Nitrate + Nitrite as N ((NO_3+NO_2)-N	X	
Nitrite		
PCBs		
Phosphate		
Polonium-210		
Potassium		
Radium-226		
Radium-228		
Selenium		

Analyte	Ground Water	Surface Water
Silica		
Sodium		
Strontium		
Sulfate	X	
Sulfide		
Thallium		
Thorium-230		
Tin		
Total Dissolved Solids		
Total Organic Carbon		
Total Suspended Solids		
Uranium	X	
Uranium-234, -238		
Vanadium	X	
Zinc		
Total Analytes	5	0

Attachment 4
Trip Report

Stoller established 1959
Grand Junction Office

Memorandum

Control Number N/A

DATE: July 7, 2006

TO: David E. Miller

FROM: Jeffrey W. Walters

SUBJECT: Trip Report

Site: Monument Valley, Arizona

Dates of Sampling Event: June 19 through June 22, 2006

Team Members: Jeff Walters and Emile Bettez

Number of Locations Sampled: 18 monitor wells, 1 duplicate and 1 equipment blank for a total of 20 samples.

Locations Not Sampled/Reason: Private well 0201 not sampled per the Site Lead's verbal instructions.

Location Specific Information:

Ticket Number	Location	Sample Date	Description
NDY 597	0764	6/20/06	Cat I
NDY 598	0768	6/20/06	Cat I; the tubing is a little short – bring needle-nose pliers next time to extract it.
NDY 599	0767	6/20/06	Cat I
NDY 600	0760	6/20/06	Cat I; turbidity would not go be low 28 NTUs
NFJ 901	0762	6/20/06	Cat I
NFJ 902	0761	6/20/06	Cat I
NFJ 903	0765	6/20/06	Cat I (barely)
NFJ 904	0699	6/20/06	Cat I
NFJ 905	2278	6/20/06	Equipment Blank
NFJ 906	0662	6/21/06	Cat I
NFJ 907	2277	6/21/06	Duplicate of 0699
NFJ 908	0774	6/21/06	Cat I; red "flaky" particles in water – may need to be redeveloped
NFJ 909	0619	6/21/06	Cat I; check valve in pump not sealing properly – needs cleaned or replaced.
NFJ 910	0772	6/21/06	Cat I
NFJ 911	0606	6/21/06	Cat I
NFJ 912	0656	6/21/06	Cat I
NFJ 913	0770	6/21/06	Cat I
NFJ 914	0604	6/21/06	Cat I
NFJ 915	0771	6/21/06	Cat I (barely; almost II)
NFJ 916	0655	6/21/06	Cat I

Field Variance: Monitor well 0760 turbidity would not drop below ~28 NTUs. (Same issue occurred during last sampling event.)

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

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2278	After 0699	Equipment blank	DI	NFJ 905
2277	0699	Duplicate	Ground water	NFJ 907

Requisition Numbers Assigned: All samples were assigned to RIN 06060399.

Sample Shipment: Samples with ticket numbers NDY 597 through NDY 600 and NFJ 901 through NFJ 916 were shipped overnight FedEx to Paragon Analytics, Inc., from Grand Junction, Colorado, on June 27, 2006.

Water Level Measurements: Water levels measurements were collected in all sampled wells. Water level data are provided in the table below. These data represent depth to water (ft btoc) measurements:

Well	Date	Depth to water (ft)
0604	6/21/06	9.42
0606	6/21/06	36.45
0619	6/21/06	58.29
0655	6/21/06	40.08
0656	6/21/06	37.19
0662	6/21/06	49.94
0669	6/20/06	49.60
0760	6/20/06	25.40
0761	6/20/06	42.82
0762	6/20/06	32.19
0764	6/20/06	49.41
0765	6/20/06	35.40
0767	6/20/06	6.91
0768	6/20/06	14.01
0770	6/21/06	33.45
0771	6/21/06	41.78
0772	6/21/06	12.62
0774	6/21/06	49.96

Well Inspection Summary: Well inspections were conducted at all sampled wells; Monitor wells 0604, 0760, 0767, and 0771 have erosion at base. The concrete pads for 0760 and 0767 are in the air. Monitor well 0662 has a crumbling concrete pad. All other wells were in good condition.

Equipment: 15 wells were equipped with dedicated submersible pumps. 3 wells were sampled using a peristaltic pump.

Institutional Controls: Did not examine: all gates were appropriately closed and locked during the sampling event.

Fences, Gates, Locks: OK
Signs: N/A
Trespassing/Site Disturbances: N/A

Site Issues

Disposal Cell/Drainage Structure Integrity: N/A
Vegetation/Noxious Weed Concerns: N/A
Maintenance Requirements: N/A

Corrective Action Taken None

(JWW/lcg)

cc: R. P. Bush, DOE (e)
S. E. Donivan, Stoller (e)
K. E. Miller, Stoller (e)