Data Validation Package

June 2008
Groundwater Sampling
at the Monument Valley, Arizona, Processing Site

November 2008

U.S. DEPARTMENT OF ENERGY | Office of Legacy Management

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Sampling Event Summary

Site: Monument Valley, Arizona, Processing Site

Sampling Period: June 24-25, 2008

Nineteen groundwater samples were collected at the Monument Valley, Arizona, Processing Site to monitor groundwater contaminants as specified in the *Final Site Observational Work Plan for the UMTRA Project Site at Monument Valley, Arizona*. Sampling and analysis was conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Water levels were measured at each sampled well. Duplicate samples were collected from location 0619.

Time-concentration plots for ammonia as nitrogen, chloride, nitrate + nitrite as nitrogen, sulfate, uranium, and vanadium are included with the results data. The data from this sampling event are consistent with values previously obtained. Widely fluctuating uranium concentrations in well 0662 have been previously noted and continue with the data from this sampling event. The uranium concentrations measured in well 0657 are also beginning to show wide fluctuations. Ongoing erosion of a former uranium mine located upgradient from the site may be affecting the uranium concentrations at these locations. The increasing nitrate + nitrite as nitrogen concentrations in wells 0761, 0762, 0771, and 0764, as indicated on the time-concentration graphs, are consistent with downgradient movement of the contaminant plume.

Wells with analyte concentrations that exceeded U.S. Environmental Protection Agency (EPA) 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	210
			0655	130
			0656	21
			0662	20
			0761	28
			0762	100
			0764	47
			0765	130
			0770	19
			0771	190
Uranium	0.044	MON01	0657	0.15
			0662	0.080
			0774	0.044

[a]Standards are listed in 40 CFR 192.02 Table 1 to Subpart A.

The Navajo Nation's proposed cleanup standard for sulfate is 250 milligrams per liter (mg/L). The ratios of sulfate:chloride concentrations vary depending on if the source is related to past millsite activities or if it occurs naturally. Tailings fluids were enriched in nitrate and sulfate but had relatively low chloride concentrations. A sulfate:chloride ratio greater than 10 is a good

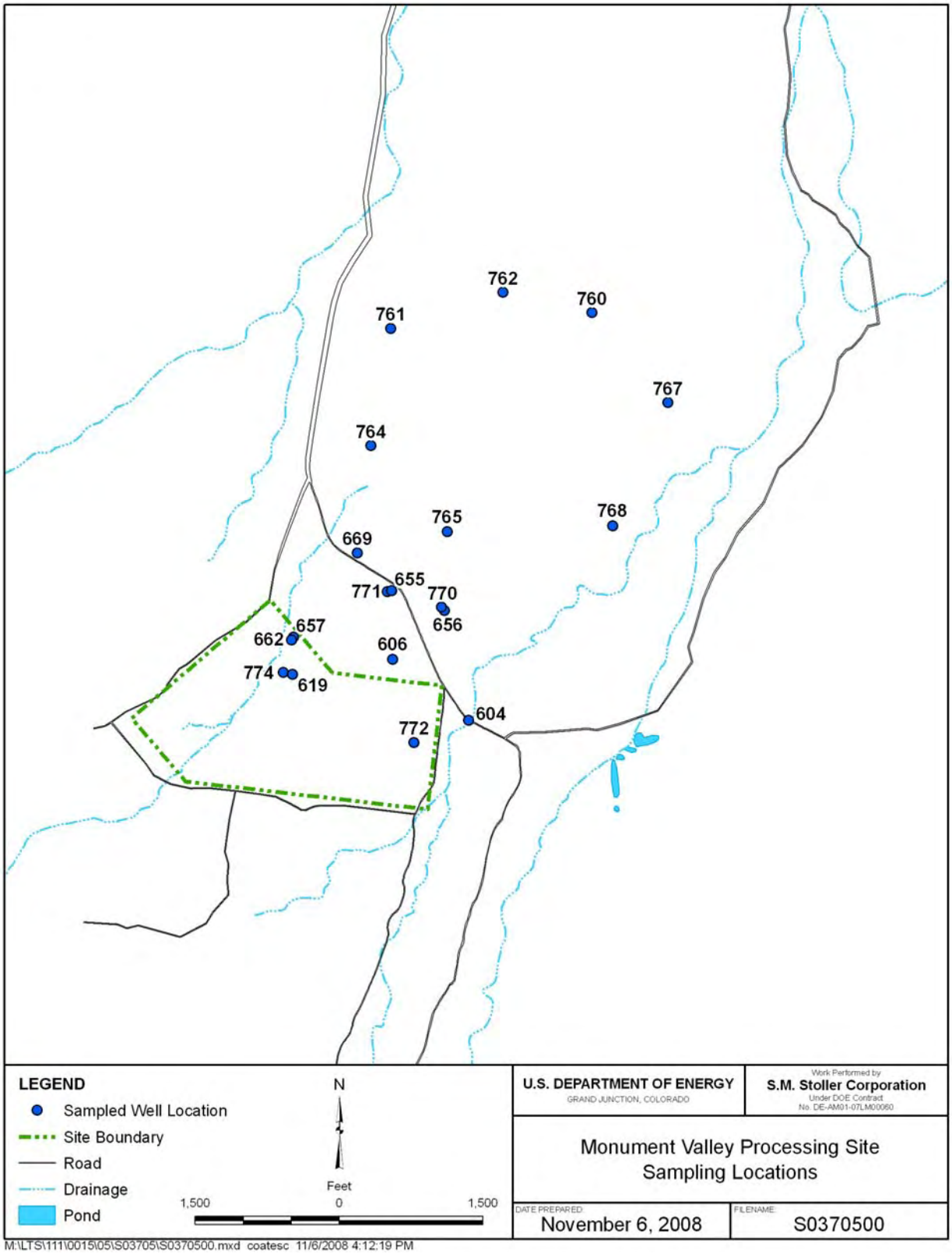
indication of groundwater contamination resulting from milling activities. The proposed sulfate treatment goal for Monument Valley will incorporate both criteria. The treatment goal will be achieved when the sulfate concentration is less than 250 mg/L *or* the sulfate:chloride ratio is less than 10. Table 2 lists sulfate concentrations and sulfate:chloride ratios.

Table 2. Sulfate Results

Location	Sulfate Concentration (mg/L)	Sulfate : Chloride	Treatment Goal Achieved ?
0619	27	5	Yes
0767	31	6	Yes
0774	36	7	Yes
0760	86	9	Yes
0669	96	12	Yes
0604	110	10	Yes
0772	120	8	Yes
0657	140	21	Yes
0656	170	11	Yes
0770	210	14	Yes
0768	220	6	Yes
0764	290	24	No
0606	360	26	No
0662	460	42	No
0761	490	35	No
0765	610	32	No
0762	1400	21	No
0655	1500	60	No
0771	1500	71	No

David Miller
Site Lead, S.M. Stoller

11/13/08
Date



Monument Valley, Arizona, Processing Site Sample Locations

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Monument Valley, Arizona	**Date(s) of Water Sampling**	June 24-25, 2008
Date(s) of Verification	October 15, 2008	**Name of Verifier**	Gretchen Baer

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOPs, instructions.		Work order letter dated May 21, 2008.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on June 23, 2008.
4. Was an operational check of the field equipment conducted twice daily?	Yes	
Did the operational checks meet criteria?	Yes	One ORP reading was not recorded but the checks immediately preceding and following were acceptable.
5. Were the number and types (alkalinity, temperature, specific conductance, 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	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	No	Turbidity was >10 NTU at 0760 & 0762. These samples were filtered and data are qualified as "Q."
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from well 0619.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	No equipment blank was needed because all wells are equipped with either dedicated downhole and pumphead tubing or a bladder pump.
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	Location ID 2417 was assigned to the duplicate sample from location 0619.
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	Samples were filtered as specified in the Sampling and Analysis Plan.
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):	08061655
Sample Event:	June 24-25, 2008
Site(s):	Monument Valley, Arizona
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Work Order No.:	0807006
Analysis:	Metals, Wet Chemistry, and Radiochemistry
Validator:	Gretchen Baer
Review Date:	August 22, 2008

This validation was performed according to the *Environmental Procedures Catalog*, "Standard Practice for Validation of Laboratory Data," GT-9(P). The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Ammonia as N	WCH-A-005	MCAWW 350.1	MCAWW 350.1
Chloride	MIS-A-039	SW-856 9056	SW-856 9056
Gross Alpha/Beta	GPC-A-001	SOP702R19	SOP724R10
Nitrite + Nitrate as N	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Radium-226	ASP-A-016	SOP783R8	SOP783R8
Radium-228	GPC-A-020	SOP746R8	SOP724R10
Sulfate	MIS-A-044	SW-856 9056	SW-856 9056
Uranium Isotopes	LMR-02	SOP776R11	SOP714R11
Uranium, Vanadium	LMM-02	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

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

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
0807006-3	0619	Chloride	J	Matrix spike failure
0807006-3	0619	Gross Beta	J	Less than 3 times the MDC
0807006-3	0619	Radium-228	J	Yields adjusted by laboratory
0807006-3	0619	Sulfate	J	Matrix spike failure
0807006-3	0619	U-235	J	Less than 3 times the MDC

Sample Number	Location	Analyte	Flag	Reason
0807006-7	0662	Radium-228	J	Yields adjusted by laboratory
0807006-19	0774	Radium-228	J	Yields adjusted by laboratory
0807006-20	0619 Duplicate	Chloride	J	Matrix spike failure
0807006-20	0619 Duplicate	Gross Beta	J	Less than 3 times the MDC
0807006-20	0619 Duplicate	Radium-228	J	Yields adjusted by laboratory Instrument check failure
0807006-20	0619 Duplicate	Sulfate	J	Matrix spike failure
0807006-20	0619 Duplicate	U-235	J	Less than 3 times the MDC

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 20 water samples on July 1, 2008, accompanied by a Chain of Custody (COC) form. Copies of the three air bills were included in the receiving documentation. The COC form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents, including the COC forms and the sample tickets, had no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperature inside the iced cooler at 4.8 °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.

Laboratory Instrument Calibration

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

Method MCAWW 350.1, Ammonia as N

Calibrations were performed using six calibration standards on July 7, 2008. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the method detection limit (MDL). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in eight verification checks. All calibration checks met the acceptance criteria.

Method MCAWW 353.2, Nitrite + Nitrate as N

Calibrations were performed using seven calibration standards on July 8, 2008. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in three verification checks. All calibration checks met the acceptance criteria.

Method SW-846 6020A, Uranium and Vanadium

Calibrations were performed for uranium on July 14, 2008, using eight standards and for vanadium on July 22, 2008, using six standards. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 22 verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 9056, Chloride and Sulfate

Calibrations were performed using five calibration standards on June 17, 2008. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in five verification checks for sulfate and seven checks for chloride. All calibration checks met the acceptance criteria.

Radiochemical Analysis

All radiochemical results reported included the calculated two-sigma total propagated uncertainty (TPU) and minimum detectable concentration (MDC). Radiochemical results are qualified with a "J" flag (estimated) when the result is greater than the MDC, but less than 3 times the MDC. Radiochemical results are qualified with a "U" flag (not detected) when the result is greater than the MDC but less than the two-sigma TPU.

Alpha Spectrometry

Alpha spectrometry calibrations and instrument backgrounds were performed on July 8, 2008. Daily instrument checks performed on July 8, 2008, met the acceptance criteria. The tracer recoveries met the acceptance criteria of 30 to 110 percent for all samples. The full width at half maximum (FWHM) was reviewed to evaluate the spectral resolution. All internal standard FWHM values were below 100 kiloelectron volts (keV), demonstrating acceptable resolution.

All internal standard peaks were within 50 keV of the expected position. The regions of interest (ROIs) for analyte peaks were reviewed. No manual integrations were performed and all ROIs were satisfactory.

Gross Alpha/Beta

Plateau calibrations were performed in November 2007. Alpha and beta attenuation calibrations were performed in November 2007 covering a range of 0 to 161 milligrams (mg). All standards were counted to a minimum of 10,000 counts. All calibration and background checks performed on July 15 and 16, 2008, met acceptance criteria. The residual mass was less than 100 mg for all samples.

Radium-226

Emanation cell plateau voltage determinations were performed in January 2008 and cell efficiency calibrations were performed in January 2008. Daily instrument checks performed on July 21, 2008, met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Radium-228

Plateau voltage determinations and detector efficiency calibrations were performed in September and November 2008. All calibration and background checks performed on July 9 and 10, 2008, met acceptance criteria, with the exception of an efficiency check of one detector on July 10, 2008, which was slightly below the lower limit. The associated sample result (the field duplicate) is flagged with a "J" flag (estimated). The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples. Chemical recoveries for several of the samples were adjusted by the laboratory to minimize possible low biases. The results for these samples are qualified with a "J" flag.

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.

Metals and Inorganics

All method blank and initial and continuing calibration blank results associated with the samples were below the practical quantitation limits with the exception of the method blank for sulfate, which was slightly above the reporting limit. The samples associated with this blank had sulfate concentrations greater than 5 times the blank, so no further qualification is necessary. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

Radiochemical Analysis

The gross alpha, gross beta, radium-226, radium-228, and uranium isotope method blank results were less than 1.65 times the respective TPU or below the MDC.

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 (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The spike recoveries met the recovery and precision criteria for all analytes evaluated with the following exceptions. The sulfate and chloride spike recoveries for the field duplicate were above the acceptance range. The affected results that were above the detection limit are qualified with a "J" flag (estimated).

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the non-radiochemical sample replicates and MS replicates were less than 20 percent for results that are greater than 5 times the practical quantitation limit, indicating acceptable precision. The radiochemical relative error ratio (calculated using the one-sigma TPU) for the sample replicates and laboratory control sample replicates was less than three for all duplicates, indicating acceptable precision.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were acceptable with the exception of a radium-228 control sample, which was recovered at 137 percent. All associated radium-228 results were below the MDL, so no qualification was necessary.

Metals Serial Dilution

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

Detection Limits/Dilutions

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

All radiochemical MDCs were calculated using the following equation as specified in *Quality Systems for Analytical Services* revision 2.3. All MDCs were less than the required MDCs.

$$MDC = \frac{3.29 \times \sqrt{\frac{b}{T_S} + \frac{b}{T_B}}}{K} + \frac{3}{K \times T_S}$$

Where:
b = background count rate counts per minute
T_S = Sample count time in minutes
T_B = Background count time in minutes
K = Efficiency factor

The calculation of the MDCs using the equation above was verified. All reported MDCs were less than the required MDCs.

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

A revised EDD file arrived on July 30, 2008. This EDD included corrections to two ticket IDs. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure that all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

EDD Non-Conformance Report

Report Date: 8/21/2008

EDD File: 08061655Rev1.xml

EDD Errors: No errors detected

Record	Table	Error Type	Field	Error Description

SAMPLE MANAGEMENT SYSTEM
General Data Validation Report

RIN: 08061655 **Lab Code:** PAR **Validator:** Gretchen Baer **Validation Date:** 8/21/2008

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

# 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

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	The reported detection limits are equal to or below contract requirements.
☐ Field/Trip Blanks	
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 08061655 **Lab Code:** PAR **Date Due:** 7/29/2008

Matrix: Water **Site Code:** MON **Date Completed:** 7/31/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
URANIUM	07/14/2008	-0.0020	1.0000	OK	OK	OK	OK	OK	100.0	108.0	104.0	4.0	105.0	2.0	103.0
URANIUM	07/14/2008											1.0			
VANADIUM	07/22/2008	-0.0090	1.0000	OK	OK	OK	OK	OK	98.0	99.0	96.0	1.0	100.0		98.0
VANADIUM	07/22/2008											0.0			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 08061655 **Lab Code:** PAR **Date Due:** 7/29/2008

Matrix: Water **Site Code:** MON **Date Completed:** 7/31/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
AMMONIA AS N	07/07/2008	-0.025	1.0000	OK	OK	OK	OK	OK	98.0	90.0	91.0	1.00	
CHLORIDE	07/02/2008	0.025	1.0000	OK	OK	OK	OK	OK	95.0	99.0	98.0	1.00	
CHLORIDE	07/02/2008									124.0			
NITRATE/NITRITE AS N	07/08/2008	0.009	0.9992	OK	OK	OK	OK	OK	100.0	102.0	104.0	1.00	
SULFATE	07/02/2008	0.234	1.0000	OK	OK	OK	OK	OK	95.0	105.0	101.0	2.00	
SULFATE	07/02/2008									128.0			

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 08061655 **Lab Code:** PAR **Date Due:** 7/29/2008

Matrix: Water **Site Code:** MON **Date Completed:** 7/31/2008

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
Blank	Gross Alpha	07/15/2008	0.2390	U				
0619_Duplicate	GROSS ALPHA	07/15/2008						0.65
LCS	GROSS ALPHA	07/16/2008				87.0		
Blank	Gross Beta	07/15/2008	0.0338	U				
0619_Duplicate	GROSS BETA	07/15/2008						0.13
LCS	GROSS BETA	07/16/2008				108.0		
0774	Radium-226	07/21/2008			96.7			
0619	Radium-226	07/21/2008			98.8			
0619 dup,2417	Radium-226	07/21/2008			97.2			
0662	Radium-226	07/21/2008			99.4			
0657	Radium-226	07/21/2008			99.1			
0657_Duplicate	Radium-226	07/21/2008			96.5			2.15
LCS	Radium-226	07/21/2008			98.7	107.0		
Blank	Radium-226	07/21/2008	0.0235	U	98.3			
0774	Radium-228	07/09/2008			52.9			
0619	Radium-228	07/09/2008			57.8			
0619 dup,2417	Radium-228	07/09/2008			54.5			
0662	Radium-228	07/09/2008			52.6			
0657	Radium-228	07/09/2008			54.3			
LCS	Radium-228	07/09/2008			54.0	118.0		
LCS_Duplicate	Radium-228	07/09/2008			52.7	137.0		0.70
Blank	Radium-228	07/09/2008	0.1160	U	56.8			
0774	U-234	07/09/2008			86.0			
0619	U-234	07/09/2008			81.3			
0619 dup,2417	U-234	07/09/2008			85.1			
0662	U-234	07/09/2008			84.4			
0657	U-234	07/09/2008			87.3			
0662_Duplicate	U-234	07/09/2008			86.7			0.30
LCS	U-234	07/09/2008			86.5	93.7		
Blank	U-234	07/09/2008	0.0324	U	84.4			
0662_Duplicate	Uranium-235	07/09/2008						0.36
Blank	Uranium-235	07/09/2008	0.0140	U				

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 08061655 **Lab Code:** PAR **Date Due:** 7/29/2008

Matrix: Water **Site Code:** MON **Date Completed:** 7/31/2008

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
0662_Duplicate	Uranium-238	07/09/2008						0.27
LCS	Uranium-238	07/09/2008				104.0		
Blank	Uranium-238	07/09/2008	0.0026	U				

Sampling Quality Control Assessment

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

Sampling Protocol

Monitor wells were sampled using either a peristaltic pump and dedicated tubing or a dedicated bladder pump. Sample results for monitor wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Additionally, wells 0764 and 0771 were qualified with a "Q" flag, indicating the data are qualitative because these wells were classified as Category II. Wells 0760 and 0762 were qualified with a "Q" flag because the turbidity criterion was not met during purging.

Equipment Blank Assessment

No equipment blanks were collected 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. Duplicate samples were collected from location 0619. The non-radiochemical duplicate results were acceptable, meeting the EPA recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the practical quantitation limit. The radiochemical duplicate results were acceptable with relative error ratios (calculated using the one-sigma TPU) of less than three.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 08061655 **Lab Code:** PAR **Project:** Monument Valley **Validation Date:** 8/21/2008

Duplicate: 2417 **Sample:** 0619

Analyte	Sample Result	Flag	Error	Duplicate Result	Flag	Error	RPD	RER	Units
AMMONIA AS N	0.1	U		0.1	U				MG/L
CHLORIDE	5.3			5.2	N		1.90		MG/L
GROSS ALPHA	3.5		0.959	5.96		1.53		2.7	pCi/L
GROSS BETA	4.36		1.38	4.64		1.61		0.3	pCi/L
NITRATE/NITRITE AS N	0.9			0.89			1.12		MG/L
Radium-226	0.0989	U	0.273	0.104	U	0.456		0	pCi/L
Radium-228	0.295	U	0.363	0.116	U	0.39		0.7	pCi/L
SULFATE	27			28	N		3.64		MG/L
U-234	3.38		0.6	3.36		0.584	0.59	0	pCi/L
URANIUM	8			7.9			1.26		UG/L
Uranium-235	0.109		0.056	0.112		0.0553		0.1	pCi/L
Uranium-238	2.86		0.515	2.77		0.489	3.20	0.2	pCi/L
VANADIUM	20	E		19			5.13		UG/L

Certification

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

Laboratory Coordinator: Steve Donivan — Date: 11-6-2008

Data Validation Lead: Gretchen Baer — Date: 11-6-08

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Attachment 1
Assessment of Anomalous Data

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Outliers Report

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Outliers Report

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

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

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

1. Identify extreme values that may be potential outliers by generating the Outliers Report using the Sample Management System from data in the SEEPro database. The application compares the new data set with historical data and lists all new data that fall outside the historical data range. Data listed in the report are highlighted if the concentration detected is not within 50 percent of historical minimum or maximum values. A determination is also made if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. Scientifically review statistical outliers and decide on their disposition.

The nitrate + nitrite as N result for well 0768 was identified as a potential outlier because of the low variability of the historical data. There were no errors identified with the nitrate + nitrite as N data, and the results from this sampling event are acceptable as qualified.

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Data Validation Outliers Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 08061655

Comparison: All Historical Data

Report Date: 10/14/2008

				Current			Historical Maximum			Historical Minimum			Number of		Normally	Statistical
					Qualifiers			Qualifiers			Qualifiers		Data Points		Distributed	Outlier
Site Code	Location Code	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect		
MON01	0606	06/25/2008	Sulfate	360		F	1650			390		F	47	0	No	No
MON01	0606	06/25/2008	Vanadium	0.00033		F	0.5		J	0.00034		F	43	29	No	No
MON01	0619	06/25/2008	Gross Alpha	5.96		F	91			12		F	10	0	Yes (log)	No
MON01	0619	06/25/2008	Gross Alpha	3.5		F	91			12		F	10	0	Yes (log)	No
MON01	0619	06/25/2008	Gross Beta	4.36		JF	45			6.69		FJ	10	0	Yes (log)	No
MON01	0619	06/25/2008	Gross Beta	4.64		JF	45			6.69		FJ	10	0	Yes (log)	No
MON01	0619	06/25/2008	Nitrate + Nitrite as Nitrogen	0.89		F	4.1			0.94		FQ	7	0	Yes	No
MON01	0619	06/25/2008	Nitrate + Nitrite as Nitrogen	0.9		F	4.1			0.94		FQ	7	0	Yes	No
MON01	0619	06/25/2008	Sulfate	27		JF	129			29		FQ	21	0	No	No
MON01	0619	06/25/2008	Sulfate	28	N	JF	129			29		FQ	21	0	No	No
MON01	0619	06/25/2008	Uranium	0.008		F	0.135			0.01		FQ	22	0	Yes	No
MON01	0619	06/25/2008	Uranium	0.0079		F	0.135			0.01		FQ	22	0	Yes	No
MON01	0656	06/25/2008	Sulfate	170		F	845			180		F	22	0	Yes (log)	No
MON01	0657	06/25/2008	Gross Alpha	62.8		F	54		F	2.19	U	JF	16	1	Yes	No
MON01	0657	06/25/2008	Uranium	0.15		F	0.084			0.0036		F	28	0	No	Yes
MON01	0669	06/24/2008	Sulfate	96		F	460			100		F	27	0	No	No
MON01	0669	06/24/2008	Uranium	0.0058		F	0.0155			0.0059		F	25	0	Yes	No
MON01	0761	06/24/2008	Uranium	0.031		F	0.029		F	0.0243			12	0	No	No
MON01	0762	06/24/2008	Nitrate + Nitrite as Nitrogen	100		FQ	83		F	56		F	6	0	Yes	No
MON01	0764	06/24/2008	Sulfate	290		FQ	430		L	320		FQ	15	0	Yes	No
MON01	0765	06/24/2008	Sulfate	610		F	986			620		F	16	0	Yes	No
MON01	0767	06/24/2008	Nitrate + Nitrite as Nitrogen	0.015		F	0.012		F	0.01	U	F	6	5	No	Yes
MON01	0768	06/24/2008	Nitrate + Nitrite as Nitrogen	0.014		F	0.01	U	F	0.01	U	F	7	7	Yes	Yes
MON01	0770	06/25/2008	Sulfate	210		F	389			220		F	15	0	Yes	No
MON01	0771	06/24/2008	Nitrate + Nitrite as Nitrogen	190		FQ	180		FQ	150		F	6	0	Yes	No
MON01	0774	06/25/2008	Chloride	5.4		F	8.77			5.5		F	11	0	No	No

Data Validation Outliers Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 08061655

Comparison: All Historical Data

Report Date: 10/14/2008

				Current			Historical Maximum			Historical Minimum			Number of		Normally	Statistical
					Qualifiers			Qualifiers			Qualifiers		Data Points		Distributed	Outlier
Site Code	Location Code	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect		
MON01	0774	06/25/2008	Gross Alpha	18.5		F	34.98		L	21.3		F	5	0	Yes	No
MON01	0774	06/25/2008	Gross Beta	7.47		F	23.94		L	9.39		F	5	0	Yes	No
MON01	0774	06/25/2008	Nitrate + Nitrite as Nitrogen	1.2		F	4		F	1.8		F	6	0	Yes	No
MON01	0774	06/25/2008	Sulfate	36		F	86		F	43		F	15	0	Yes	No

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

STATISTICAL TESTS:

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

Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	13	-	28	183		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	13	-	28	0.1	U	F	#	0.1	
Chloride	mg/L	06/25/2008	N001	13	-	28	11		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	13	-	28	0.053		F	#	0.01	
Oxidation Reduction Potential	mV	06/25/2008	N001	13	-	28	37		F	#		
pH	s.u.	06/25/2008	N001	13	-	28	8.12		F	#		
Specific Conductance	umhos /cm	06/25/2008	N001	13	-	28	661		F	#		
Sulfate	mg/L	06/25/2008	N001	13	-	28	110		F	#	2.5	
Temperature	C	06/25/2008	N001	13	-	28	16.7		F	#		
Turbidity	NTU	06/25/2008	N001	13	-	28	8.71		F	#		
Uranium	mg/L	06/25/2008	N001	13	-	28	0.0022		F	#	0.0001	
Vanadium	mg/L	06/25/2008	N001	13	-	28	0.0027		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	32	-	42	209		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	32	-	42	120		F	#	20	
Chloride	mg/L	06/25/2008	N001	32	-	42	14		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	32	-	42	210		F	#	2	
Oxidation Reduction Potential	mV	06/25/2008	N001	32	-	42	92		F	#		
pH	s.u.	06/25/2008	N001	32	-	42	7.14		F	#		
Specific Conductance	umhos /cm	06/25/2008	N001	32	-	42	2714		F	#		
Sulfate	mg/L	06/25/2008	N001	32	-	42	360		F	#	10	
Temperature	C	06/25/2008	N001	32	-	42	19.2		F	#		
Turbidity	NTU	06/25/2008	N001	32	-	42	0.61		F	#		
Uranium	mg/L	06/25/2008	N001	32	-	42	0.0088		F	#	0.0001	
Vanadium	mg/L	06/25/2008	N001	32	-	42	0.00033		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	103.9 - 153.9	161		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	103.9 - 153.9	0.1	U	F	#	0.1	
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N002	103.9 - 153.9	0.1	U	F	#	0.1	
Chloride	mg/L	06/25/2008	N001	103.9 - 153.9	5.3		JF	#	0.4	
Chloride	mg/L	06/25/2008	N002	103.9 - 153.9	5.2	N	JF	#	0.4	
Gross Alpha	pCi/L	06/25/2008	N001	103.9 - 153.9	3.5		F	#	0.91	0.959
Gross Alpha	pCi/L	06/25/2008	N002	103.9 - 153.9	5.96		F	#	1.2	1.53
Gross Beta	pCi/L	06/25/2008	N001	103.9 - 153.9	4.36		JF	#	2	1.38
Gross Beta	pCi/L	06/25/2008	N002	103.9 - 153.9	4.64		JF	#	2.6	1.61
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	103.9 - 153.9	0.9		F	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N002	103.9 - 153.9	0.89		F	#	0.01	
Oxidation Reduction Potential	mV	06/25/2008	N001	103.9 - 153.9	62		F	#		
pH	s.u.	06/25/2008	N001	103.9 - 153.9	7.87		F	#		
Radium-226	pCi/L	06/25/2008	N001	103.9 - 153.9	0.5	U	F	#	0.5	0.273
Radium-226	pCi/L	06/25/2008	N002	103.9 - 153.9	0.8	U	F	#	0.8	0.456
Radium-228	pCi/L	06/25/2008	N001	103.9 - 153.9	0.73	U	JF	#	0.73	0.363
Radium-228	pCi/L	06/25/2008	N002	103.9 - 153.9	0.82	U	JF	#	0.82	0.39
Specific Conductance	umhos /cm	06/25/2008	N001	103.9 - 153.9	397		F	#		
Sulfate	mg/L	06/25/2008	N001	103.9 - 153.9	27		JF	#	1	
Sulfate	mg/L	06/25/2008	N002	103.9 - 153.9	28	N	JF	#	1	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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
Temperature	C	06/25/2008	N001	103.9 - 153.9	17.9		F	#		
Turbidity	NTU	06/25/2008	N001	103.9 - 153.9	0.73		F	#		
Uranium	mg/L	06/25/2008	N001	103.9 - 153.9	0.008		F	#	0.0001	
Uranium	mg/L	06/25/2008	N002	103.9 - 153.9	0.0079		F	#	0.0001	
Uranium-234	pCi/L	06/25/2008	N001	103.9 - 153.9	3.38		F	#	0.013	0.6
Uranium-234	pCi/L	06/25/2008	N002	103.9 - 153.9	3.36		F	#	0.057	0.584
Uranium-235	pCi/L	06/25/2008	N001	103.9 - 153.9	0.109		JF	#	0.048	0.056
Uranium-235	pCi/L	06/25/2008	N002	103.9 - 153.9	0.112		JF	#	0.054	0.0553
Uranium-238	pCi/L	06/25/2008	N001	103.9 - 153.9	2.86		F	#	0.013	0.515
Uranium-238	pCi/L	06/25/2008	N002	103.9 - 153.9	2.77		F	#	0.054	0.489
Vanadium	mg/L	06/25/2008	N001	103.9 - 153.9	0.02	E	F	#	0.0003	
Vanadium	mg/L	06/25/2008	N002	103.9 - 153.9	0.019		F	#	0.0003	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	38	-	58	235		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	38	-	58	120		F	#	20	
Chloride	mg/L	06/24/2008	N001	38	-	58	25		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	38	-	58	130		F	#	1	
Oxidation Reduction Potential	mV	06/24/2008	N001	38	-	58	112		F	#		
pH	s.u.	06/24/2008	N001	38	-	58	7.17		F	#		
Specific Conductance	umhos /cm	06/24/2008	N001	38	-	58	3800		F	#		
Sulfate	mg/L	06/24/2008	N001	38	-	58	1500		F	#	25	
Temperature	C	06/24/2008	N001	38	-	58	18.5		F	#		
Turbidity	NTU	06/24/2008	N001	38	-	58	2.48		F	#		
Uranium	mg/L	06/24/2008	N001	38	-	58	0.011		F	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	38	-	58	0.0074		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	38	-	58	253		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	38	-	58	48		F	#	2	
Chloride	mg/L	06/25/2008	N001	38	-	58	15		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	38	-	58	21		F	#	0.2	
Oxidation Reduction Potential	mV	06/25/2008	N001	38	-	58	96		F	#		
pH	s.u.	06/25/2008	N001	38	-	58	7.74		F	#		
Specific Conductance	umhos /cm	06/25/2008	N001	38	-	58	1067		F	#		
Sulfate	mg/L	06/25/2008	N001	38	-	58	170		F	#	5	
Temperature	C	06/25/2008	N001	38	-	58	18		F	#		
Turbidity	NTU	06/25/2008	N001	38	-	58	0.64		F	#		
Uranium	mg/L	06/25/2008	N001	38	-	58	0.0054		F	#	0.0001	
Vanadium	mg/L	06/25/2008	N001	38	-	58	0.00043		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
Location: 0657 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	06/25/2008	N001	121	-	136	287		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	121	-	136	0.1	U	F	#	0.1	
Chloride	mg/L	06/25/2008	N001	121	-	136	6.8		F	#	1	
Gross Alpha	pCi/L	06/25/2008	N001	121	-	136	62.8		F	#	1.4	10.5
Gross Beta	pCi/L	06/25/2008	N001	121	-	136	20.8		F	#	3.1	3.93
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	121	-	136	4.4		F	#	0.05	
Oxidation Reduction Potential	mV	06/25/2008	N001	121	-	136	126		F	#		
pH	s.u.	06/25/2008	N001	121	-	136	7.56		F	#		
Radium-226	pCi/L	06/25/2008	N001	121	-	136	0.24	U	F	#	0.24	0.0994
Radium-228	pCi/L	06/25/2008	N001	121	-	136	0.76	U	F	#	0.76	0.369
Specific Conductance	umhos /cm	06/25/2008	N001	121	-	136	667		F	#		
Sulfate	mg/L	06/25/2008	N001	121	-	136	140		F	#	2.5	
Temperature	C	06/25/2008	N001	121	-	136	17.7		F	#		
Turbidity	NTU	06/25/2008	N001	121	-	136	1.59		F	#		
Uranium	mg/L	06/25/2008	N001	121	-	136	0.15		F	#	0.0005	
Uranium-234	pCi/L	06/25/2008	N001	121	-	136	47.1		F	#	0.055	7.58
Uranium-235	pCi/L	06/25/2008	N001	121	-	136	2.36		F	#	0.014	0.439
Uranium-238	pCi/L	06/25/2008	N001	121	-	136	45.8		F	#	0.031	7.37
Vanadium	mg/L	06/25/2008	N001	121	-	136	0.056		F	#	0.0006	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	37.5 - 67.5	205		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	37.5 - 67.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/25/2008	N001	37.5 - 67.5	11		F	#	2	
Gross Alpha	pCi/L	06/25/2008	N001	37.5 - 67.5	56.9		F	#	1.3	9.51
Gross Beta	pCi/L	06/25/2008	N001	37.5 - 67.5	14.9		F	#	2.4	2.9
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	37.5 - 67.5	20		F	#	0.2	
Oxidation Reduction Potential	mV	06/25/2008	N001	37.5 - 67.5	140		F	#		
pH	s.u.	06/25/2008	N001	37.5 - 67.5	7.3		F	#		
Radium-226	pCi/L	06/25/2008	N001	37.5 - 67.5	0.6	U	F	#	0.6	0.325
Radium-228	pCi/L	06/25/2008	N001	37.5 - 67.5	0.81	U	JF	#	0.81	0.415
Specific Conductance	umhos /cm	06/25/2008	N001	37.5 - 67.5	1258		F	#		
Sulfate	mg/L	06/25/2008	N001	37.5 - 67.5	460		F	#	5	
Temperature	C	06/25/2008	N001	37.5 - 67.5	19.6		F	#		
Turbidity	NTU	06/25/2008	N001	37.5 - 67.5	1.29		F	#		
Uranium	mg/L	06/25/2008	N001	37.5 - 67.5	0.08		F	#	0.0001	
Uranium-234	pCi/L	06/25/2008	N001	37.5 - 67.5	27		F	#	0.068	4.37
Uranium-235	pCi/L	06/25/2008	N001	37.5 - 67.5	1.17		F	#	0.036	0.245
Uranium-238	pCi/L	06/25/2008	N001	37.5 - 67.5	26		F	#	0.039	4.2
Vanadium	mg/L	06/25/2008	N001	37.5 - 67.5	0.024		F	#	0.0003	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	34	-	54	190		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	34	-	54	2.8		F	#	0.1	
Chloride	mg/L	06/24/2008	N001	34	-	54	8.3		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	34	-	54	7.1		F	#	0.05	
Oxidation Reduction Potential	mV	06/24/2008	N001	34	-	54	154		F	#		
pH	s.u.	06/24/2008	N001	34	-	54	7.58		F	#		
Specific Conductance	umhos /cm	06/24/2008	N001	34	-	54	672		F	#		
Sulfate	mg/L	06/24/2008	N001	34	-	54	96		F	#	2.5	
Temperature	C	06/24/2008	N001	34	-	54	18.5		F	#		
Turbidity	NTU	06/24/2008	N001	34	-	54	1.63		F	#		
Uranium	mg/L	06/24/2008	N001	34	-	54	0.0058		F	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	34	-	54	0.053		F	#	0.0006	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	0001	55	-	75	162		FQ	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	0001	55	-	75	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/24/2008	0001	55	-	75	9.5		FQ	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	0001	55	-	75	0.029		FQ	#	0.01	
Oxidation Reduction Potential	mV	06/24/2008	N001	55	-	75	99		FQ	#		
pH	s.u.	06/24/2008	N001	55	-	75	8.13		FQ	#		
Specific Conductance	umhos /cm	06/24/2008	N001	55	-	75	536		FQ	#		
Sulfate	mg/L	06/24/2008	0001	55	-	75	86		FQ	#	2.5	
Temperature	C	06/24/2008	N001	55	-	75	18.3		FQ	#		
Turbidity	NTU	06/24/2008	N001	55	-	75	15.6		FQ	#		
Uranium	mg/L	06/24/2008	0001	55	-	75	0.00026		FQ	#	0.0001	
Vanadium	mg/L	06/24/2008	0001	55	-	75	0.00018	U	FQ	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	39	-	49	182		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	39	-	49	0.1	U	F	#	0.1	
Chloride	mg/L	06/24/2008	N001	39	-	49	14		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	39	-	49	28		F	#	0.2	
Oxidation Reduction Potential	mV	06/24/2008	N001	39	-	49	180		F	#		
pH	s.u.	06/24/2008	N001	39	-	49	7.27		F	#		
Specific Conductance	umhos /cm	06/24/2008	N001	39	-	49	1455		F	#		
Sulfate	mg/L	06/24/2008	N001	39	-	49	490		F	#	5	
Temperature	C	06/24/2008	N001	39	-	49	18.8		F	#		
Turbidity	NTU	06/24/2008	N001	39	-	49	2.45		F	#		
Uranium	mg/L	06/24/2008	N001	39	-	49	0.031		F	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	39	-	49	0.0018		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	0001	29	-	49	225		FQ	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	0001	29	-	49	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/24/2008	0001	29	-	49	67		FQ	#	10	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	0001	29	-	49	100		FQ	#	1	
Oxidation Reduction Potential	mV	06/24/2008	N001	29	-	49	156		FQ	#		
pH	s.u.	06/24/2008	N001	29	-	49	7.49		FQ	#		
Specific Conductance	umhos /cm	06/24/2008	N001	29	-	49	3575		FQ	#		
Sulfate	mg/L	06/24/2008	0001	29	-	49	1400		FQ	#	25	
Temperature	C	06/24/2008	N001	29	-	49	17.5		FQ	#		
Turbidity	NTU	06/24/2008	N001	29	-	49	16.4		FQ	#		
Uranium	mg/L	06/24/2008	0001	29	-	49	0.011		FQ	#	0.0001	
Vanadium	mg/L	06/24/2008	0001	29	-	49	0.0071		FQ	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	47	-	52	188		FQ	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	47	-	52	0.1	U	FQ	#	0.1	
Chloride	mg/L	06/24/2008	N001	47	-	52	12		FQ	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	47	-	52	47		FQ	#	0.5	
Oxidation Reduction Potential	mV	06/24/2008	N001	47	-	52	117		FQ	#		
pH	s.u.	06/24/2008	N001	47	-	52	7.62		FQ	#		
Specific Conductance	umhos /cm	06/24/2008	N001	47	-	52	1266		FQ	#		
Sulfate	mg/L	06/24/2008	N001	47	-	52	290		FQ	#	5	
Temperature	C	06/24/2008	N001	47	-	52	20.1		FQ	#		
Turbidity	NTU	06/24/2008	N001	47	-	52	2.96		FQ	#		
Uranium	mg/L	06/24/2008	N001	47	-	52	0.013		FQ	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	47	-	52	0.016		FQ	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	58.6	-	88.7	253		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	58.6	-	88.7	120		F	#	20	
Chloride	mg/L	06/24/2008	N001	58.6	-	88.7	19		F	#	4	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	58.6	-	88.7	130		F	#	1	
Oxidation Reduction Potential	mV	06/24/2008	N001	58.6	-	88.7	120		F	#		
pH	s.u.	06/24/2008	N001	58.6	-	88.7	7.31		F	#		
Specific Conductance	umhos /cm	06/24/2008	N001	58.6	-	88.7	2600		F	#		
Sulfate	mg/L	06/24/2008	N001	58.6	-	88.7	610		F	#	10	
Temperature	C	06/24/2008	N001	58.6	-	88.7	18		F	#		
Turbidity	NTU	06/24/2008	N001	58.6	-	88.7	0.97		F	#		
Uranium	mg/L	06/24/2008	N001	58.6	-	88.7	0.011		F	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	58.6	-	88.7	0.0066		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	43.5 - 63.5	160		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	43.5 - 63.5	0.1	U	F	#	0.1	
Chloride	mg/L	06/24/2008	N001	43.5 - 63.5	5		F	#	0.4	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	43.5 - 63.5	0.015		F	#	0.01	
Oxidation Reduction Potential	mV	06/24/2008	N001	43.5 - 63.5	-92		F	#		
pH	s.u.	06/24/2008	N001	43.5 - 63.5	7.95		F	#		
Specific Conductance	umhos /cm	06/24/2008	N001	43.5 - 63.5	414		F	#		
Sulfate	mg/L	06/24/2008	N001	43.5 - 63.5	31		F	#	1	
Temperature	C	06/24/2008	N001	43.5 - 63.5	19.6		F	#		
Turbidity	NTU	06/24/2008	N001	43.5 - 63.5	9.3		F	#		
Uranium	mg/L	06/24/2008	N001	43.5 - 63.5	0.00069		F	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	43.5 - 63.5	0.00022	B	F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	24.4 - 44.4	169		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	24.4 - 44.4	0.5		F	#	0.1	
Chloride	mg/L	06/24/2008	N001	24.4 - 44.4	34		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	24.4 - 44.4	0.014		F	#	0.01	
Oxidation Reduction Potential	mV	06/24/2008	N001	24.4 - 44.4	-210		F	#		
pH	s.u.	06/24/2008	N001	24.4 - 44.4	8.07		F	#		
Specific Conductance	umhos /cm	06/24/2008	N001	24.4 - 44.4	795		F	#		
Sulfate	mg/L	06/24/2008	N001	24.4 - 44.4	220		F	#	2.5	
Temperature	C	06/24/2008	N001	24.4 - 44.4	19.6		F	#		
Turbidity	NTU	06/24/2008	N001	24.4 - 44.4	7.1		F	#		
Uranium	mg/L	06/24/2008	N001	24.4 - 44.4	0.00061		F	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	24.4 - 44.4	0.00028	B	F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	54.9	-	64.9	215		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	54.9	-	64.9	34		F	#	2	
Chloride	mg/L	06/25/2008	N001	54.9	-	64.9	15		F	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	54.9	-	64.9	19		F	#	0.2	
Oxidation Reduction Potential	mV	06/25/2008	N001	54.9	-	64.9	132		F	#		
pH	s.u.	06/25/2008	N001	54.9	-	64.9	7.56		F	#		
Specific Conductance	umhos /cm	06/25/2008	N001	54.9	-	64.9	1079		F	#		
Sulfate	mg/L	06/25/2008	N001	54.9	-	64.9	210		F	#	5	
Temperature	C	06/25/2008	N001	54.9	-	64.9	17.8		F	#		
Turbidity	NTU	06/25/2008	N001	54.9	-	64.9	2.32		F	#		
Uranium	mg/L	06/25/2008	N001	54.9	-	64.9	0.0056		F	#	0.0001	
Vanadium	mg/L	06/25/2008	N001	54.9	-	64.9	0.00055		F	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/24/2008	N001	57.4	-	77.4	287		FQ	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/24/2008	N001	57.4	-	77.4	210		FQ	#	20	
Chloride	mg/L	06/24/2008	N001	57.4	-	77.4	21		FQ	#	2	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2008	N001	57.4	-	77.4	190		FQ	#	2	
Oxidation Reduction Potential	mV	06/24/2008	N001	57.4	-	77.4	76		FQ	#		
pH	s.u.	06/24/2008	N001	57.4	-	77.4	7.2		FQ	#		
Specific Conductance	umhos /cm	06/24/2008	N001	57.4	-	77.4	4418		FQ	#		
Sulfate	mg/L	06/24/2008	N001	57.4	-	77.4	1500		FQ	#	25	
Temperature	C	06/24/2008	N001	57.4	-	77.4	18.7		FQ	#		
Turbidity	NTU	06/24/2008	N001	57.4	-	77.4	1.36		FQ	#		
Uranium	mg/L	06/24/2008	N001	57.4	-	77.4	0.014		FQ	#	0.0001	
Vanadium	mg/L	06/24/2008	N001	57.4	-	77.4	0.0077		FQ	#	0.00018	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	7.4	-	27.4	218		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	7.4	-	27.4	5.8		F	#	0.2	
Chloride	mg/L	06/25/2008	N001	7.4	-	27.4	16		F	#	1	
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	7.4	-	27.4	1.4		F	#	0.01	
Oxidation Reduction Potential	mV	06/25/2008	N001	7.4	-	27.4	12		F	#		
pH	s.u.	06/25/2008	N001	7.4	-	27.4	7.76		F	#		
Specific Conductance	umhos /cm	06/25/2008	N001	7.4	-	27.4	752		F	#		
Sulfate	mg/L	06/25/2008	N001	7.4	-	27.4	120		F	#	2.5	
Temperature	C	06/25/2008	N001	7.4	-	27.4	18		F	#		
Turbidity	NTU	06/25/2008	N001	7.4	-	27.4	2.15		F	#		
Uranium	mg/L	06/25/2008	N001	7.4	-	27.4	0.0077		F	#	0.0001	
Vanadium	mg/L	06/25/2008	N001	7.4	-	27.4	0.027		F	#	0.0003	

Groundwater Quality Data by Location (USEE100) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008
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	06/25/2008	N001	45	-	55	159		F	#		
Ammonia (NH3) Un-ionized as N	mg/L	06/25/2008	N001	45	-	55	0.1	U	F	#	0.1	
Chloride	mg/L	06/25/2008	N001	45	-	55	5.4		F	#	0.4	
Gross Alpha	pCi/L	06/25/2008	N001	45	-	55	18.5		F	#	1.2	3.49
Gross Beta	pCi/L	06/25/2008	N001	45	-	55	7.47		F	#	2	1.73
Nitrate + Nitrite as Nitrogen	mg/L	06/25/2008	N001	45	-	55	1.2		F	#	0.01	
Oxidation Reduction Potential	mV	06/25/2008	N001	45	-	55	163		F	#		
pH	s.u.	06/25/2008	N001	45	-	55	7.72		F	#		
Radium-226	pCi/L	06/25/2008	N001	45	-	55	0.27	U	F	#	0.27	0.135
Radium-228	pCi/L	06/25/2008	N001	45	-	55	0.81	U	JF	#	0.81	0.394
Specific Conductance	umhos /cm	06/25/2008	N001	45	-	55	407		F	#		
Sulfate	mg/L	06/25/2008	N001	45	-	55	36		F	#	1	
Temperature	C	06/25/2008	N001	45	-	55	19.3		F	#		
Turbidity	NTU	06/25/2008	N001	45	-	55	3.12		F	#		
Uranium	mg/L	06/25/2008	N001	45	-	55	0.044		F	#	0.0001	
Uranium-234	pCi/L	06/25/2008	N001	45	-	55	14.1		F	#	0.048	2.3
Uranium-235	pCi/L	06/25/2008	N001	45	-	55	0.71		F	#	0.051	0.167
Uranium-238	pCi/L	06/25/2008	N001	45	-	55	13.7		F	#	0.043	2.23
Vanadium	mg/L	06/25/2008	N001	45	-	55	0.018		F	#	0.0003	

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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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE MON01, Monument Valley Processing Site
REPORT DATE: 10/14/2008

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0604	C	4840.42	06/25/2008		9.74	4830.68	
0606	D	4864.73	06/25/2008		36.96	4827.77	
0619	O	4888.63	06/25/2008		79.89	4808.74	
0655	D	4862.06	06/24/2008		40.88	4821.18	
0656	D	4856.33	06/25/2008		38.4	4817.93	
0657	O	4878.99	06/25/2008		52.56	4826.43	
0662	D	4878.56	06/25/2008		51.9	4826.66	
0669	D	4867.19	06/24/2008		50.59	4816.6	
0760	D	4814.8	06/24/2008		25.65	4789.15	
0761	D	4835.02	06/24/2008		43.37	4791.65	
0762	D	4820.74	06/24/2008		32.6	4788.14	
0764	D	4851.53	06/24/2008		49.96	4801.57	
0765	D	4848.45	06/24/2008		36.53	4811.92	
0767	D	4808.25	06/24/2008		7.11	4801.14	
0768	D	4820.73	06/24/2008		14.37	4806.36	
0770	D	4857.26	06/25/2008		34.15	4823.11	
0771	D	4863.26	06/24/2008		42.75	4820.51	
0772	O	4847.6	06/25/2008		12	4835.6	
0774	O	4880.14	06/25/2008		51.59	4828.55	

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

WATER LEVEL FLAGS: D Dry F FLOWING

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Time-Concentration Graphs

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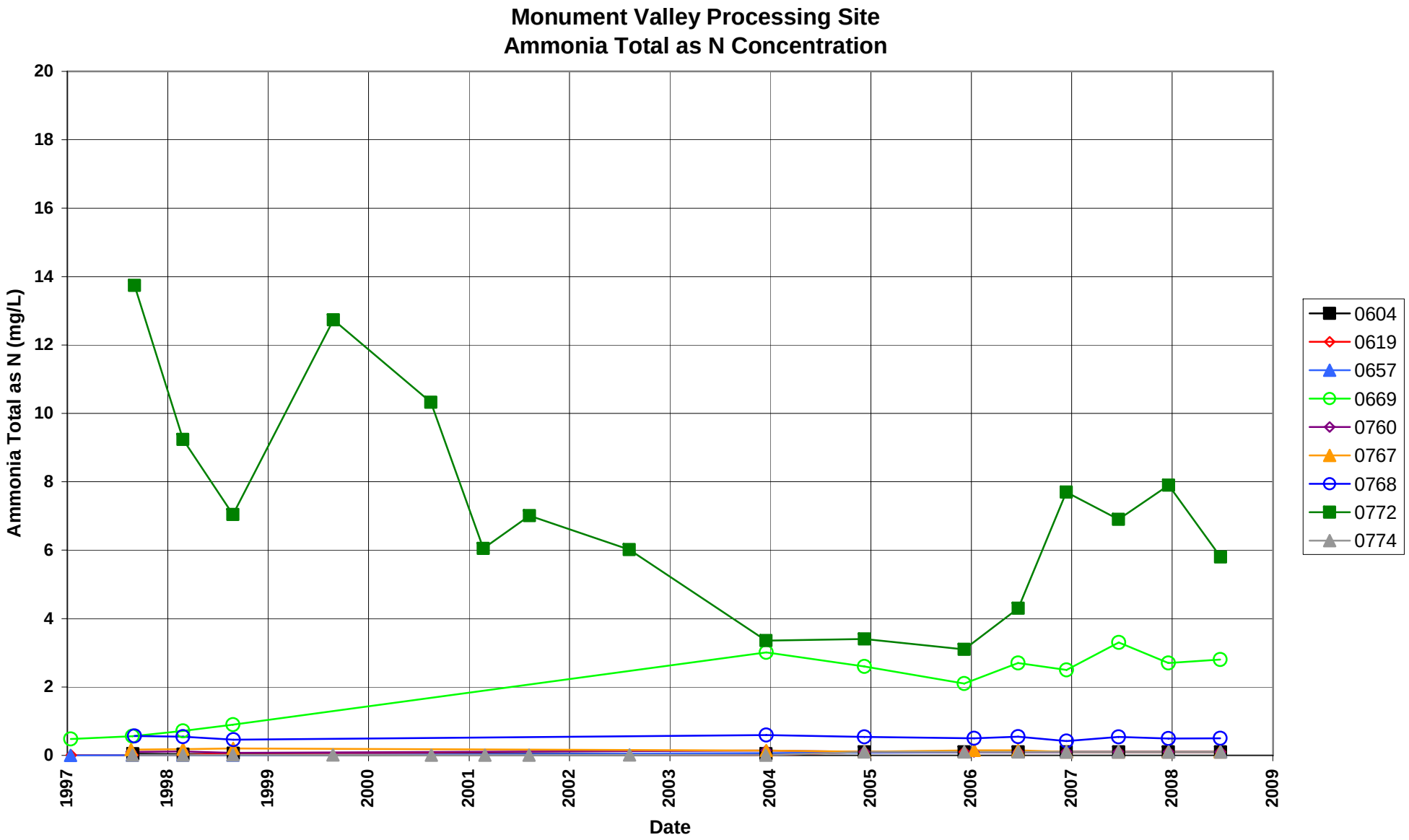
Monument Valley Processing Site
Ammonia Total as N Concentration
Ammonia Total as N (mg/L)
20
18
16
14
12
10
8
6
4
2
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0604
0619
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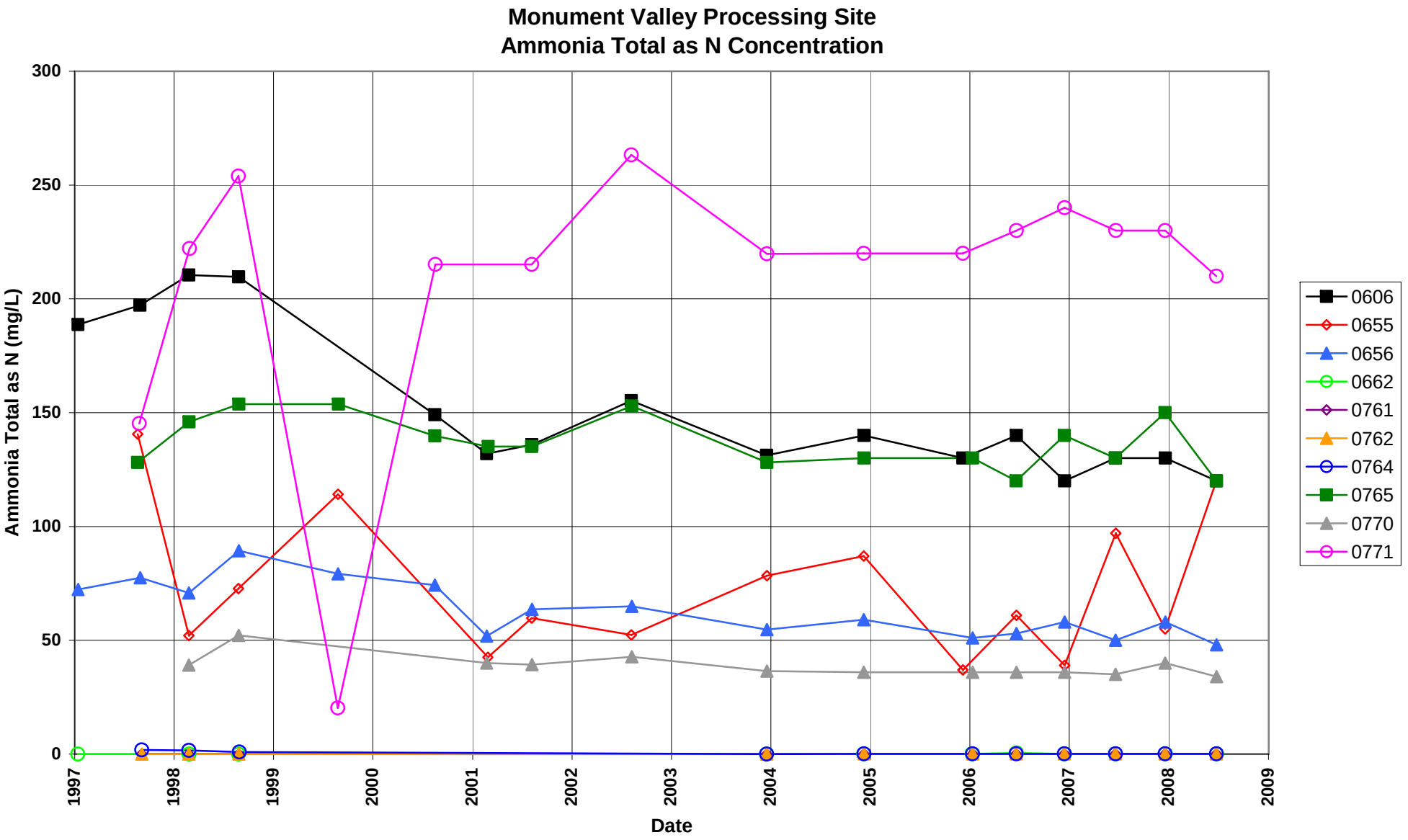
Monument Valley Processing Site
Ammonia Total as N Concentration
Ammonia Total as N (mg/L)
300
250
200
150
100
50
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0606
0655
0656
0662
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0771

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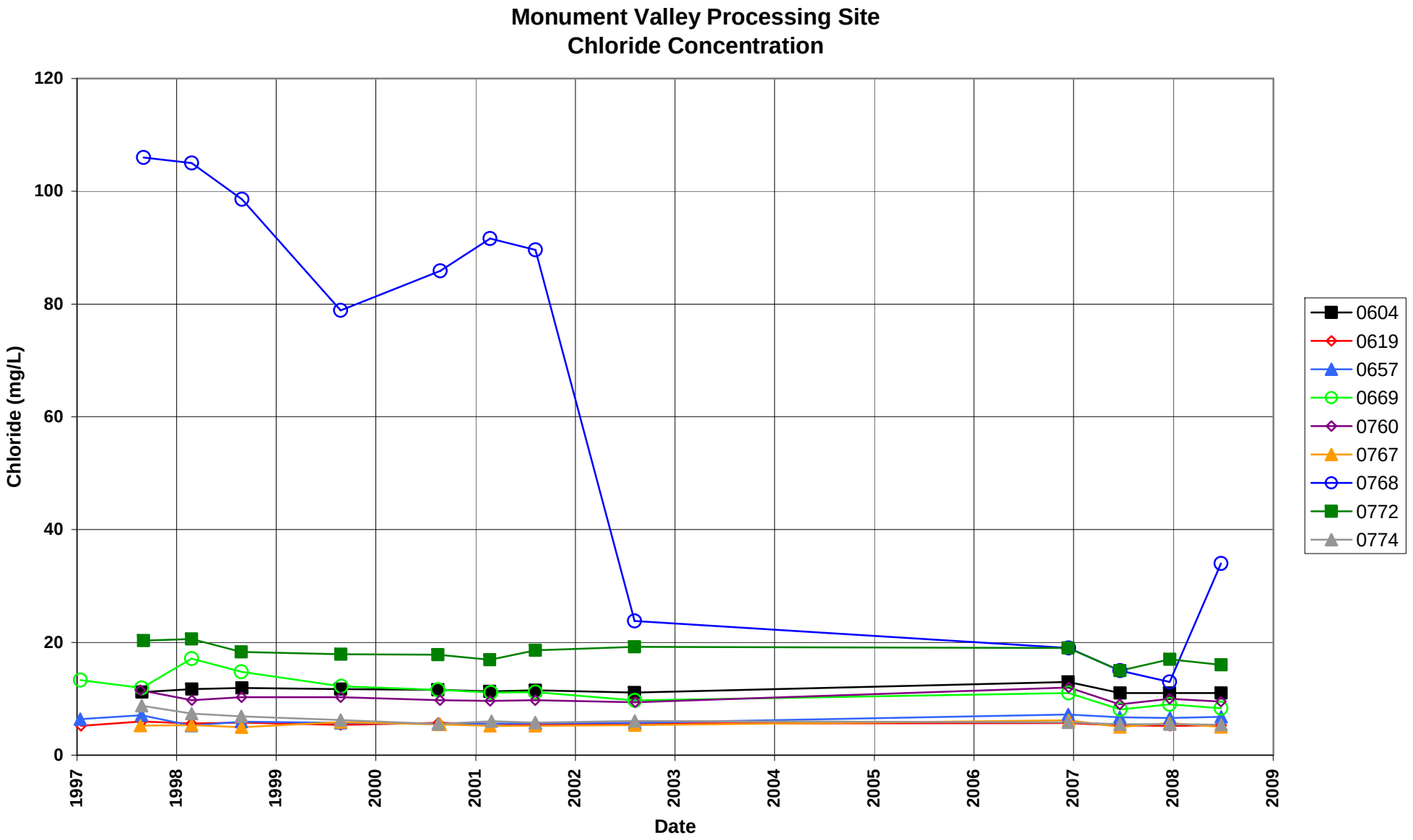
Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
120
100
80
60
40
20
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0604
0619
0657
0669
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0767
0768
0772
0774

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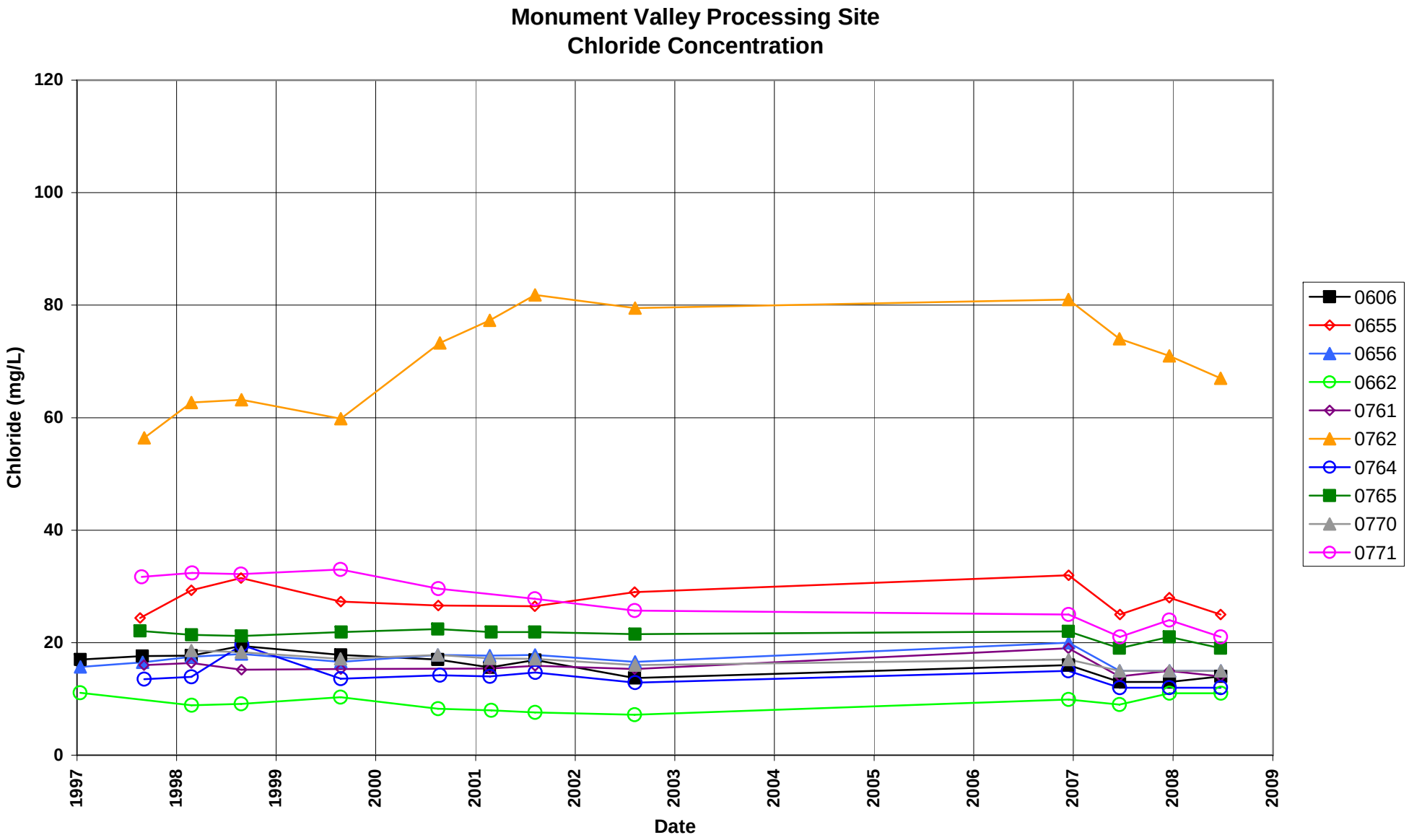
Monument Valley Processing Site
Chloride Concentration
Chloride (mg/L)
120
100
80
60
40
20
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0606
0655
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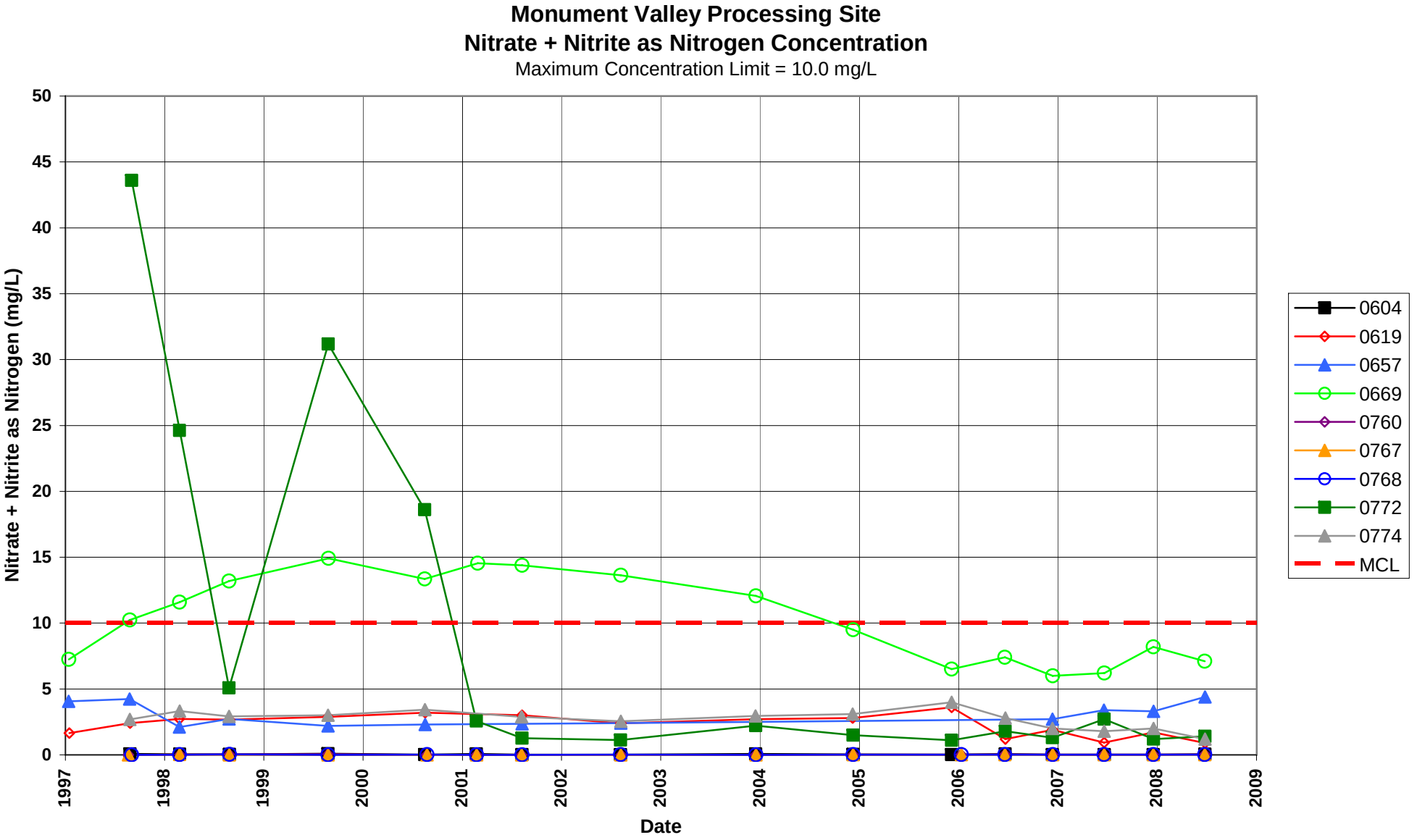
Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10.0 mg/L
Nitrate + Nitrite as Nitrogen (mg/L)
50
45
40
35
30
25
20
15
10
5
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0604
0619
0657
0669
0760
0767
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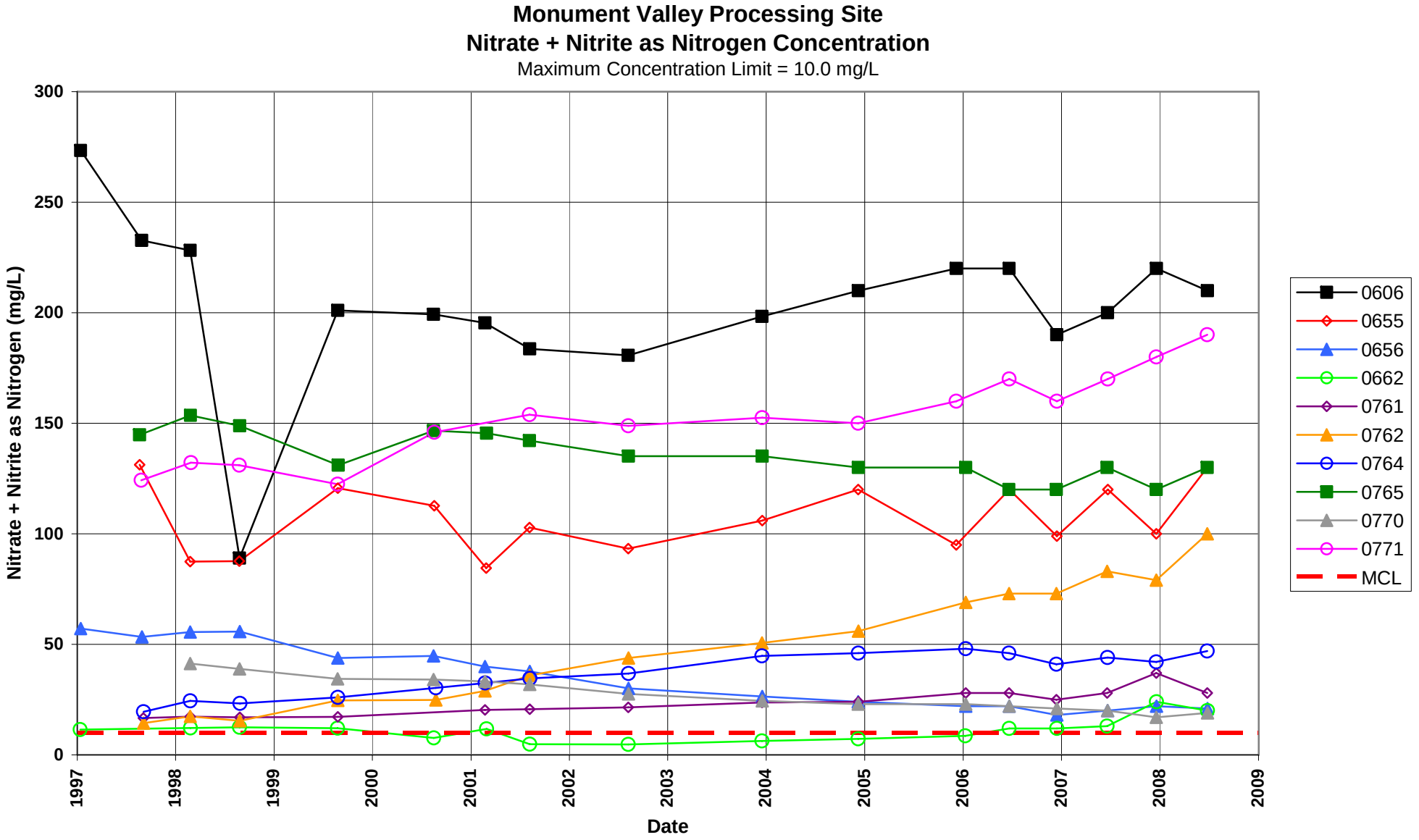
0774
MCL

-


Monument Valley Processing Site
Nitrate + Nitrite as Nitrogen Concentration
Maximum Concentration Limit = 10.0 mg/L
Nitrate + Nitrite as Nitrogen (mg/L)
300
250
200
150
100
50
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0606
0655
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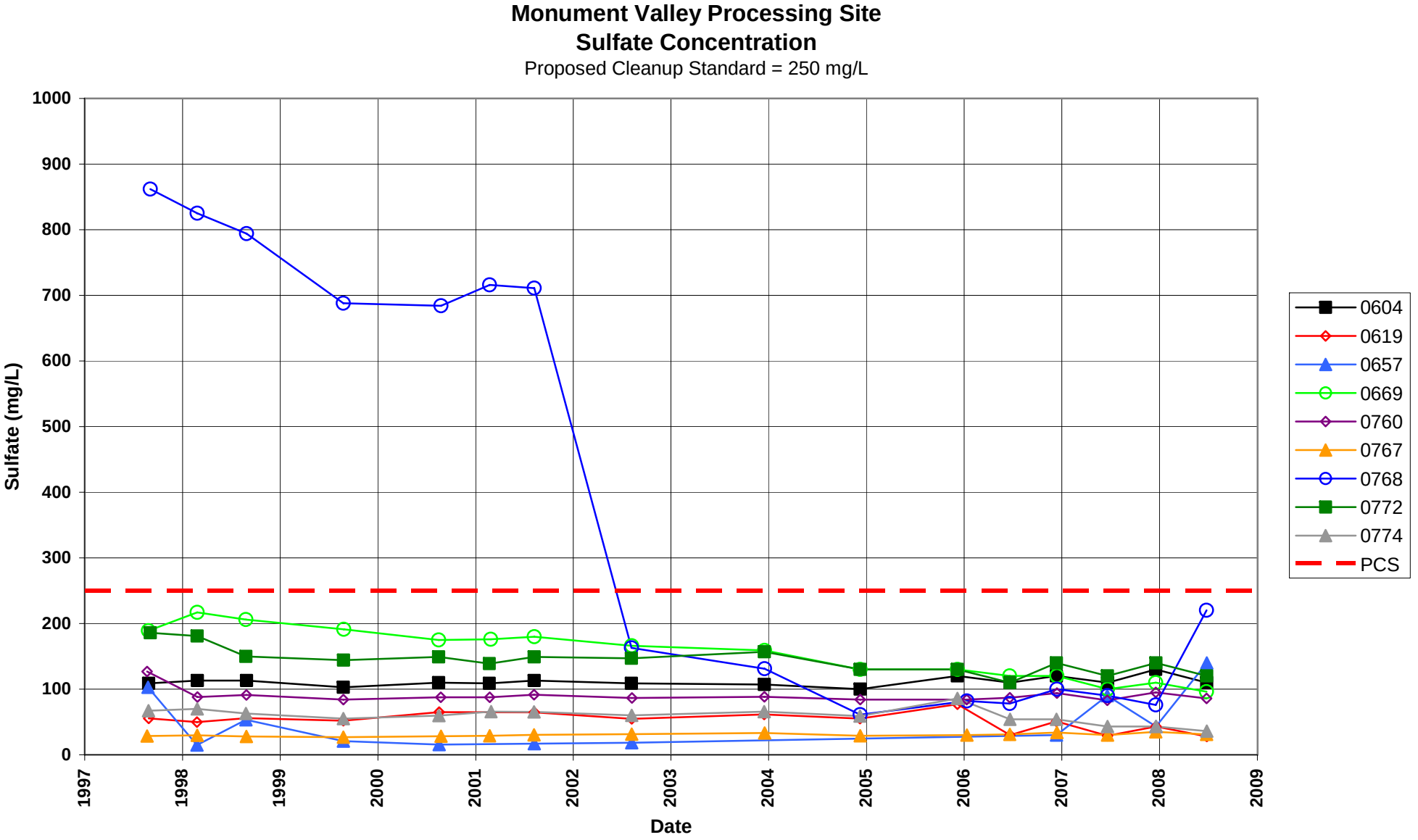
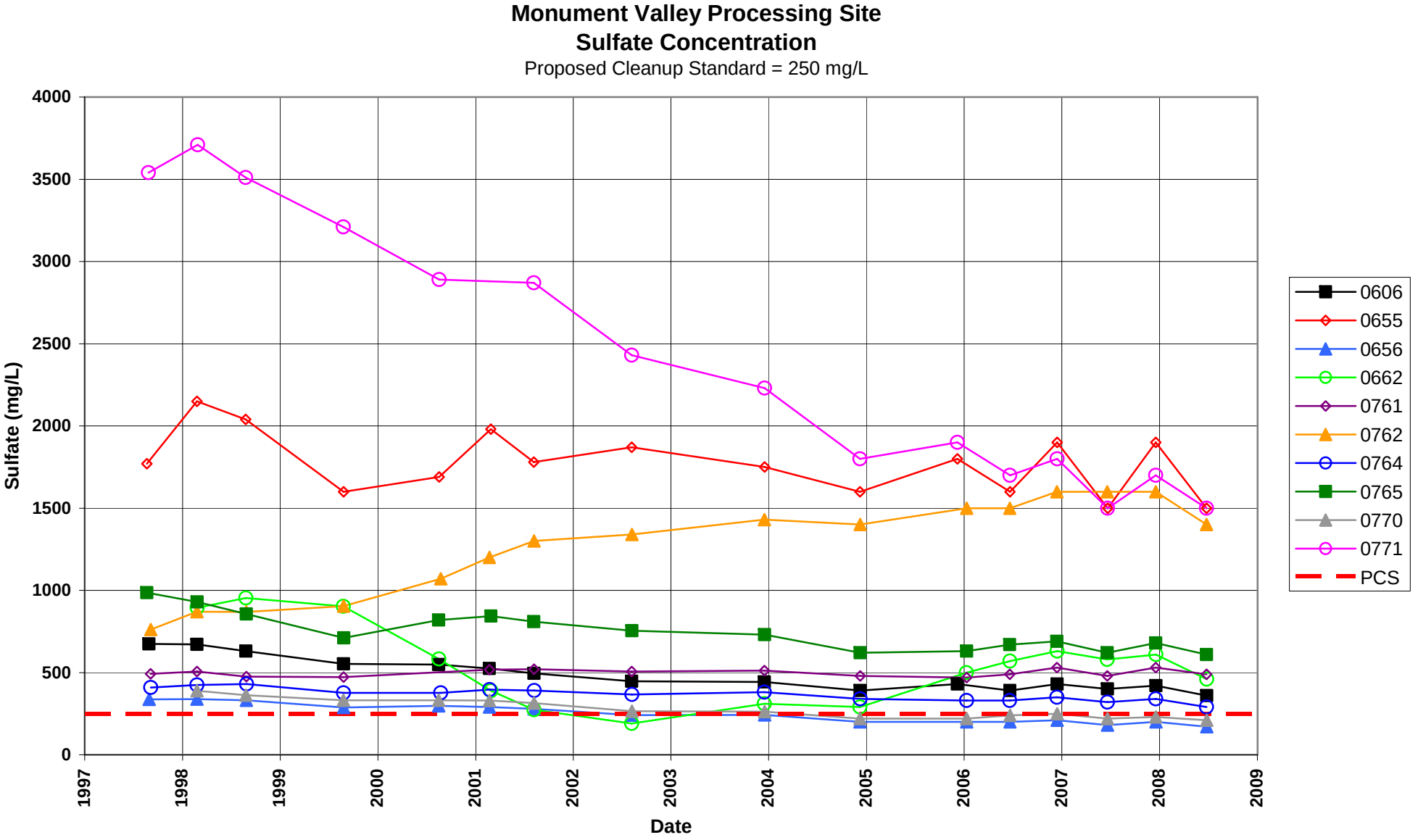
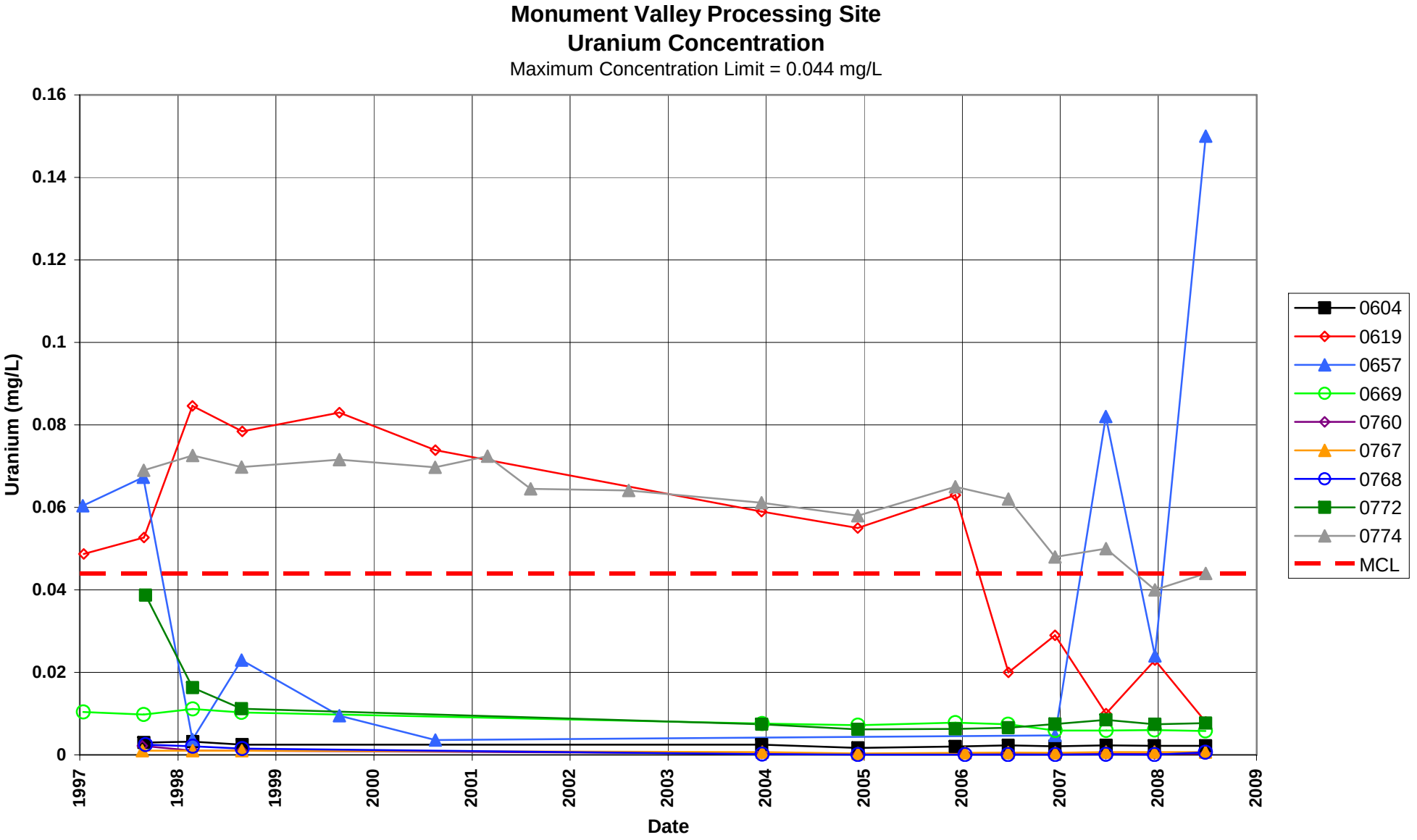

Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L
Sulfate (mg/L)
1000
900
800
700
600
500
400
300
200
100
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0604
0619
0657
0669
0760
0767
0768
0772
0774
PCS

-


Monument Valley Processing Site
Sulfate Concentration
Proposed Cleanup Standard = 250 mg/L
Sulfate (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0606
0655
0656
0662
0761
0762
0764
0765
0770
0771
PCS

-


Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L
Uranium (mg/L)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0604
0619
0657
0669
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0767
0768
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0774
MCL

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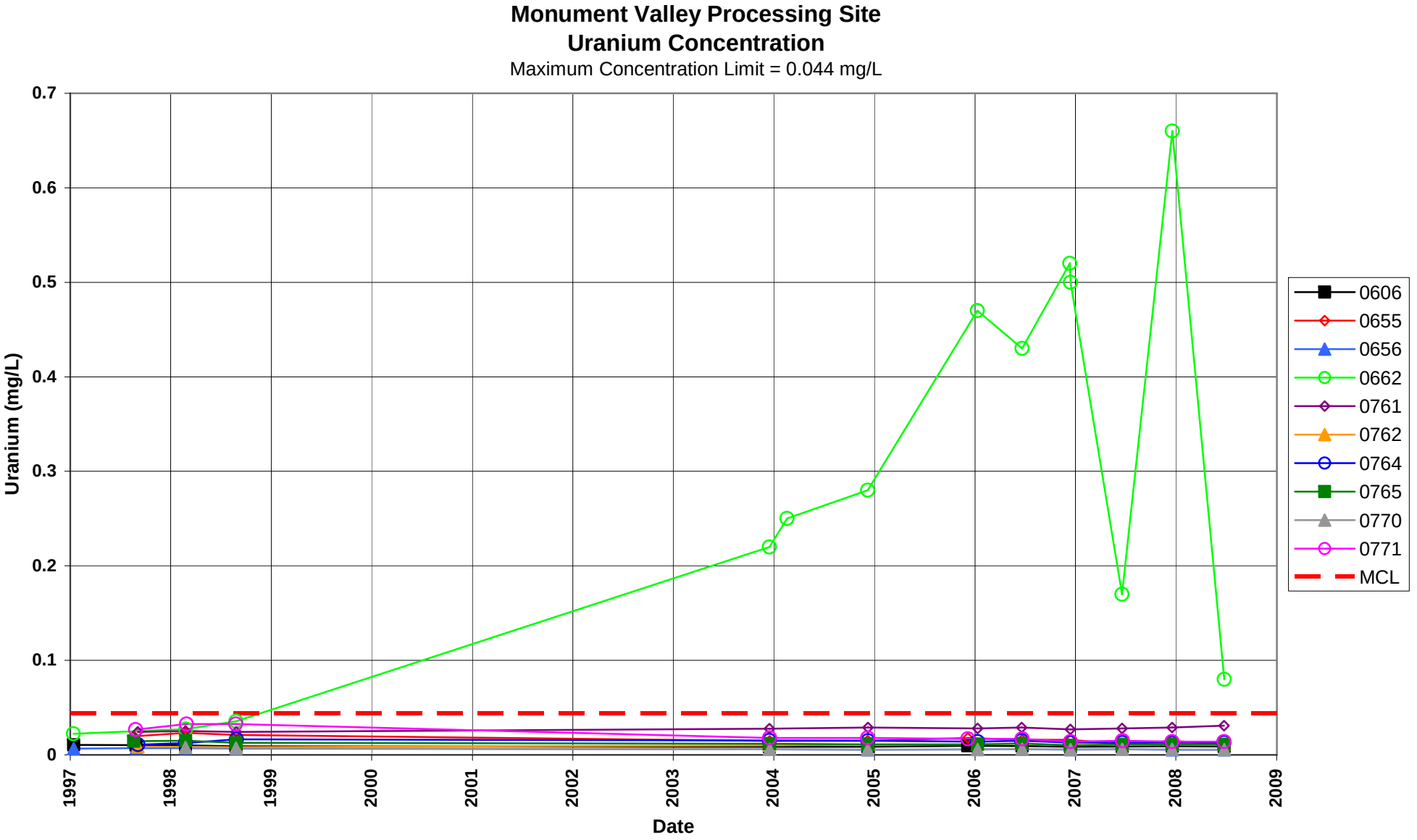
Monument Valley Processing Site
Uranium Concentration
Maximum Concentration Limit = 0.044 mg/L
Uranium (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
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Date
0606
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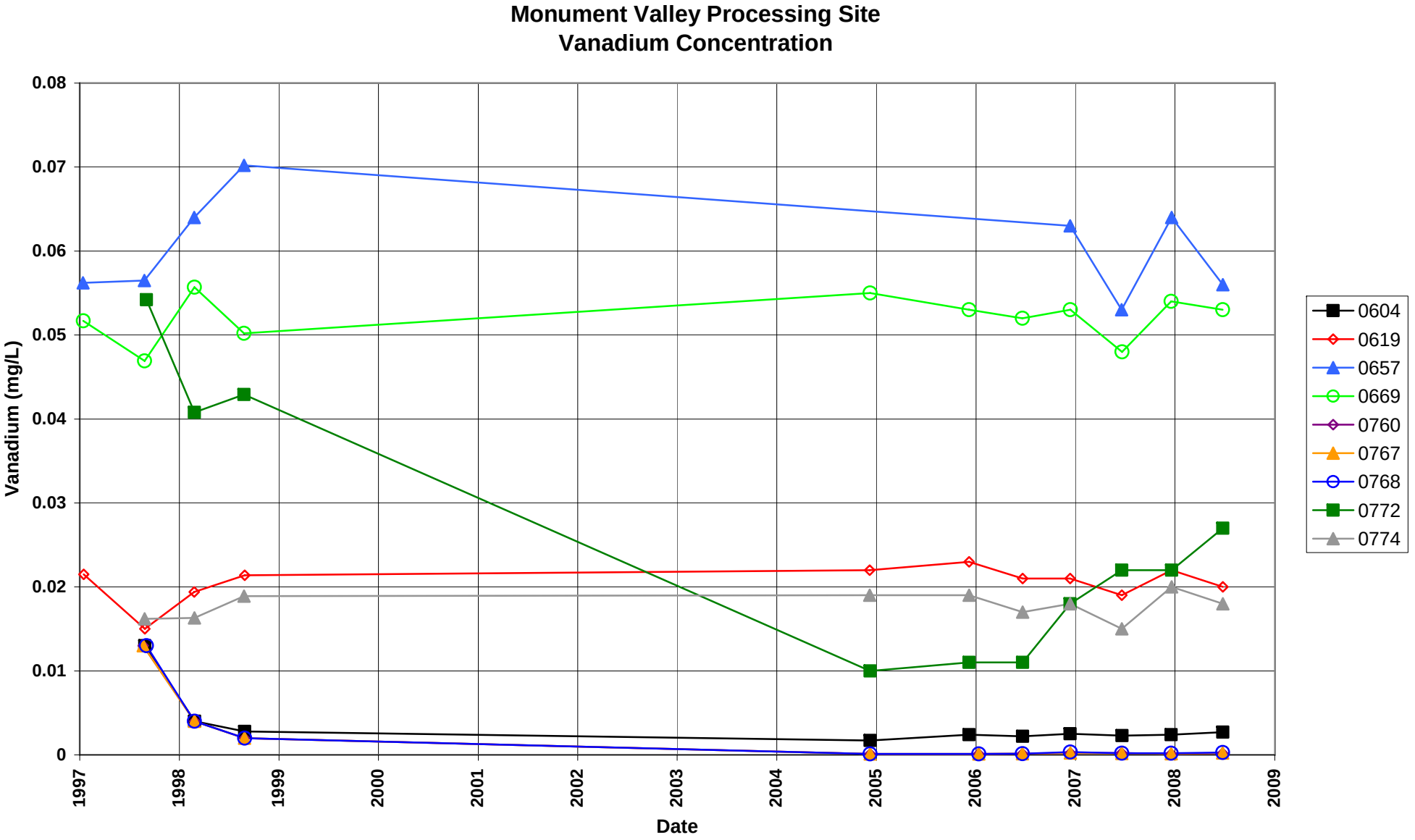
Monument Valley Processing Site
Vanadium Concentration
Vanadium (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
0604
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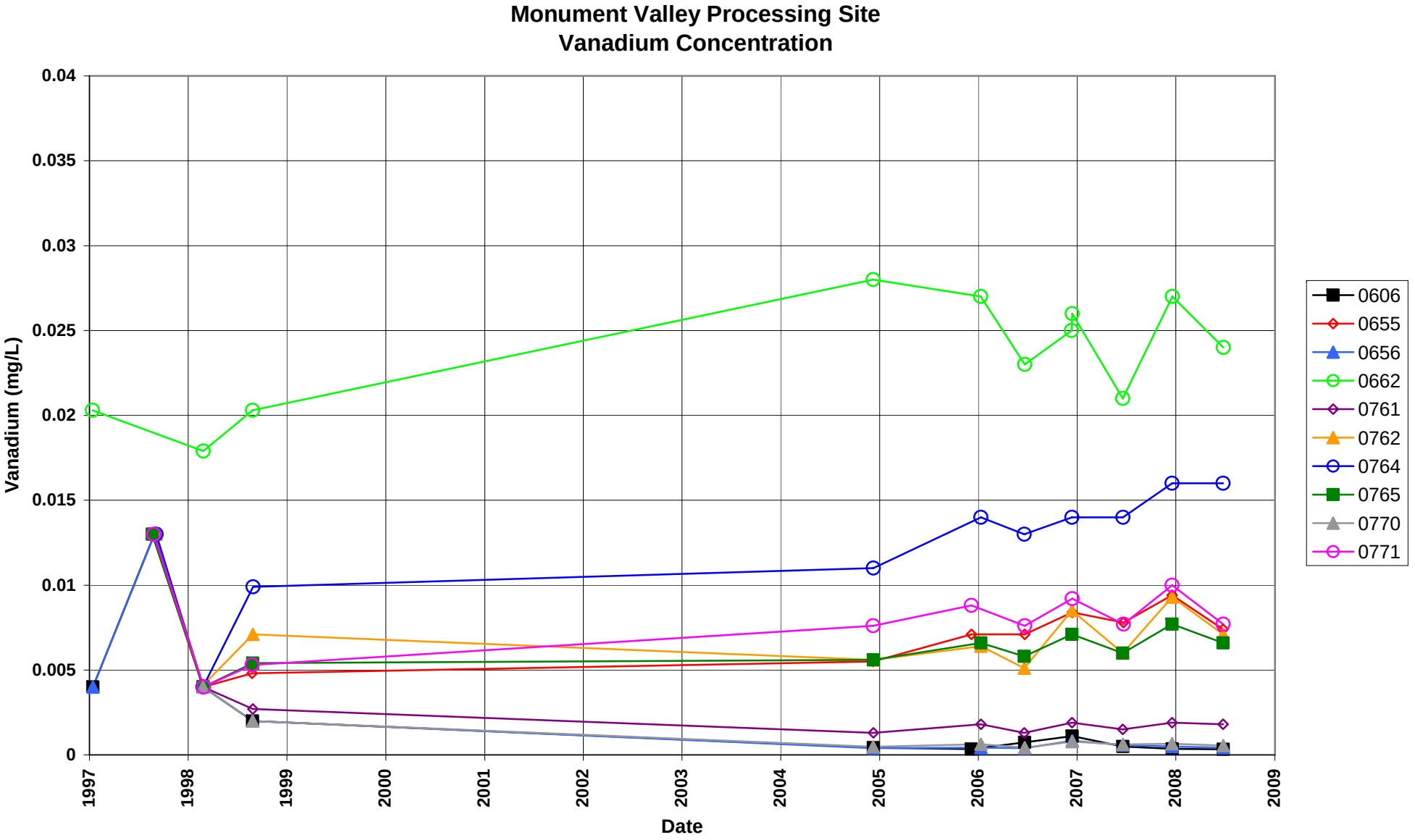
Monument Valley Processing Site
Vanadium Concentration
Vanadium (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
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Attachment 3
Sampling and Analysis Work Order

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Stoller established 1959

Task Order LM00-501
Control Number 08-0295

May 21, 2008

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

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
June 2008 Environmental Sampling at Monument Valley, Arizona

Reference: LM00-501-02-114-402, Monument Valley, AZ, Disposal Site

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Monument Valley, Arizona. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Monument Valley disposal site. Water quality data will be collected from monitor wells at this site as part of the routine environmental sampling currently scheduled to begin the week of June 23, 2008.

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

Monitor Wells*

604 Al	655 Al	662 Al	761 Al	765 Al	770 Al	772 Al
606 Al	656 Al	669 Al	762 Al	767 Al	771 Al	774 Al
619 Dc	657 Dc	760 Al	764 Al	768 Al		

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

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.

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

If you have any questions, please call me at extension 6652.

Sincerely,

Dave Miller
Site Lead

DM/lcg/hc
Enclosures (3)

cc: Steve Donivan, Stoller (e)
Lauren Goodknight, Stoller (e)
Dave Miller, Stoller (e)
EDD Delivery (e)

cc w/o enclosures:
Correspondence Control File (Thru Dee Dee Crawford/Christi Weston)
File MON 410.02 (rc-grand.junction)

\\Condor\home\L40048\My Documents\Ground Water\MON\0806MON-ltr.doc

Constituent Sampling Breakdown

Site	Monument Valley				
Analyte	**Groundwater**	**Surface Water**	**Required Detection Limit (mg/L)**	**Analytical Method**	**Line Item Code**
Approx. No. Samples/yr	19	0			
Field Measurements					
Alkalinity	X				
Dissolved Oxygen					
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)	X		0.1	EPA 350.1	WCH-A-005
Antimony					
Arsenic					
Cadmium					
Calcium					
Chloride	X		0.5	SW-846 9056	MIS-A_039
Chromium					
Cobalt					
Copper					
Fluoride					
Gross Alpha	0619, 0657, 0662, and 0774 only		2 pCi/L	EPA 900.0	GPC-A-001
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	X		0.05	EPA 353.1	WCH-A-022
PCBs					
Phosphate					
Potassium					
Radium-226	0619, 0657, 0662, and 0774 only		1 pCi/L	Gas Proportional Counter	GPC-A-018
Radium-228	0619, 0657, 0662, and 0774 only		1 pCi/L	Gas Proportional Counter	GPC-A-020
Selenium					
Silica					
Sodium					
Strontium					
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Thallium					
Total Dissolved Solids					
Uranium-234, -238	0619, 0657, 0662, and 0774 only		1 pCi/L	Alpha Spectrometry	ASP-A-024
Uranium	X		0.0001	SW-846 6020	LMM-02
Vanadium	X		0.0003	SW-846 6020	IMM-02
Zinc					
Total No. of Analytes	10	0			

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

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Attachment 4
Trip Report

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Stoller
Grand Junction Office
established 1959

Memorandum

Control Number N/A

DATE: July 16, 2008

TO: David Miller

FROM: Jeff Price

SUBJECT: Trip Report

Site: Monument Valley, Processing Site.

Dates of Sampling Event: June 23-25, 2008.

Team Members: David Atkinson and Jeff Price.

Number of Locations Sampled: 19 monitor wells.

Locations Not Sampled/Reason: None.

Location Specific Information: All monitor wells were purged and sampled using Category I criteria, except for wells 0764 and 0771, which were sampled as a Category II. Well 0619 needs a new small bladder pump.

Field Variance: None.

Quality Control Sample Cross Reference: Following is the false identification assigned to the quality control sample:

False ID	True ID	Sample Type	Ticket Number
2417	0619	Duplicate	NFK-873

Requisition Numbers Assigned: Samples were assigned to report identification number (RIN) 08061655.

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

Well Inspection Summary: Wind has removed sand from beneath the well pads at locations 0760 and 0764. This condition has caused the protective casing and concrete pad to become pedestalled and quite unstable.

Equipment: All equipment functioned properly.

Regulatory: None

Institutional Controls

Fences, Gates, Locks: The fence that surrounds the vegetation study area was down where it crosses the main wash near the southwest corner. Run-off from last seasons flash flooding was the cause of the fence being down. Future flooding will probably cause the same problem. The sampling crew righted the fence as best as possible, however, more work may need to be done.
Signs: Not applicable
Trespassing/Site Disturbances: None

Site Issues: None.

Disposal Cell/Drainage Structure Integrity: Not applicable.
Vegetation/Noxious Weed Concerns: Not applicable.
Maintenance Requirements: Well pads mentioned earlier.

Access Issues: None.

Corrective Action Required/Taken: None.

(JP/lcg)

cc: Rich Bush, DOE (e)
Steve Donivan, Stoller (e)
EDD Delivery (e)

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