Data Validation Package

October 2008
Groundwater Sampling at the Parkersburg, West Virginia, Disposal Site

March 2009

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Parkersburg, West Virginia, Disposal Site

Sampling Period: October 15, 2008

Two groundwater samples were collected at the Parkersburg, West Virginia, Disposal Site to demonstrate compliance with standards as set forth in the *Long-Term Surveillance Plan for the Parkersburg, West Virginia, Disposal Site*. Water levels were measured at each sampled well and four additional wells. Sampling and analysis was conducted as specified in *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. One duplicate sample was collected from location MW-6.

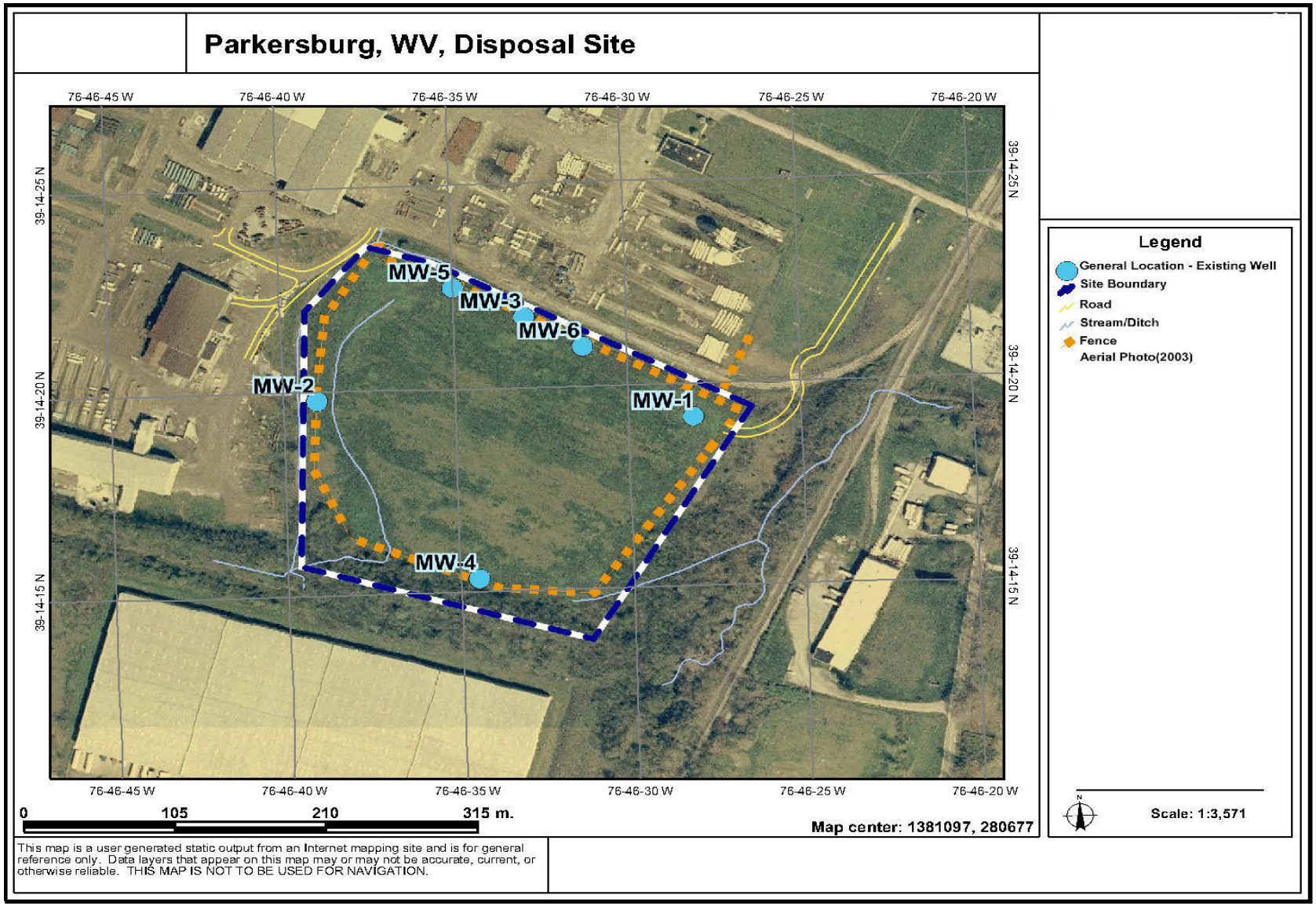
Groundwater samples are collected from monitor wells MW-5 and MW-6 once every five years and analyzed for major cations and anions, metals, radionuclides, and thiocyanate. The analytical results obtained are compared to the data collected in 1994 and 1995 to determine if any changes in groundwater quality have occurred that would indicate the formation and migration of a contaminant plume.

Time-concentration graphs are included in this report for those parameters measured that were detected at concentrations above the method detection limit (MDL). Review of those data indicate no evidence of a contaminant plume and that no large changes in groundwater quality have occurred.

Digitally signed by Michele L. Miller
DN: cn=Michele L. Miller, c=us, o=u.s. government, ou=department of energy, public cas, people
Date: 2009.04.09 14:19:36 -04'00'

Michele Miller
Site Lead, S.M. Stoller

Date



Parkersburg, West Virginia, Disposal Site Well Location Map

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Parkersburg Disposal Site	**Date(s) of Water Sampling**	October 13, 2009
Date(s) of Verification	March 5, 2009	**Name of Verifier**	Steve Donivan

	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 September 11, 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?	No	Monthly YSI calibration was performed or September 24, 2008. Quarterly turbidity meter calibration was performed on July 18, 2008.
4. Was an operational check of the field equipment conducted daily?	No	
Did the operational checks meet criteria?	NA	Operational check data not available.
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	No	DO was measured, but not required.
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?	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?	NA	
Was one pump/tubing volume removed prior to sampling?	NA	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from well MW-6.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	Dedicated equipment was used.
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 2678 was used for the duplicate sample.
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members (hard copies) or are dates present for the “Date Completed” fields (FDCS)?	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): 08091856
Sample Event: October 15, 2008
Site(s): Parkersburg, West Virginia
Laboratory: Paragon Analytics, Fort Collins, Colorado
Work Order No.: 0810135
Analysis: Metals, Inorganics, and Radiochemistry
Validator: Steve Donivan
Review Date: December 16, 2008

This validation was performed according to the *Environmental Procedures Catalog*, "Standard Practice for Validation of Laboratory Data," GT-9(P) Rev 1. The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. The analysis was successfully completed. The sample was prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Alkalinity	WCH-A-002	EPA 310.1	EPA 310.1
Chloride	MIS-A-039	SW-846 9056	SW-846 9056
Gross Alpha/Beta	GPC-A-001	EPA 900.0	EPA 900.0
Metals	LMM-01	SW-846 3005A	SW-846 6010B
Metals	LMM-02	SW-846 3005A	SW-846 6020
Nitrate	WCH-A-021	EPA 353.2	EPA 3536.2
Nitrite	WCH-A-022	SW-846 9056	SW-846 9056
Radium-226	GPC-A-001	SOP 712R14	SOP 724R10
Radium-228	GPC-A-001	SOP 746R8	SOP 724R10
Sulfate	MIS-A-044	SW-846 9056	SW-846 9056
Thiocyanate	MIA-A-045	EPA 314.0	EPA 314.0

Sample Shipping/Receiving

Paragon Analytics, Fort Collins, Colorado, received three water samples on October 16, 2008 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 and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal had no errors or omissions. Copies of the air waybill labels were included with the sample receiving documentation.

Preliminary review of the data indicated that the samples may have been misidentified during login. The laboratory was contacted on December 16, 2008, with a request to review the sample login and identification documentation. It was determined that the samples had been mislabeled during login. The laboratory corrected the error and provided corrected deliverables on December 23, 2008.

Preservation and Holding Times

The sample shipments were received cool and intact with the temperature inside the iced coolers at 9.6 °C and 15.5 °C, which does not comply with requirements. The alkalinity, nitrate, nitrite, sulfate, and thiocyanate results are qualified with a "J" flag as estimated values because of this noncompliance. 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.

Data Qualifier Summary

The analytical results were qualified as listed in Table 2.

Table 2. Data Qualifier Summary

Sample Number	Location	Analyte	Flag	Reason
All	All	Alkalinity	J	Temperature out of compliance
All	All	Beryllium	U	Less than 5 times the method blank
All	All	Nitrate	J	Temperature out of compliance
All	All	Nitrite	J	Temperature out of compliance
All	All	Sulfate	J	Temperature out of compliance
All	All	Thiocyanate	J	Temperature out of compliance
All	All	Zinc	U	Less than 5 times the method blank
0810135-1	MW-5	Cadmium	U	Less than 5 times the method blank
0810135-1	MW-5	Gross Beta	J	Less than 3 times the MDC
0810135-1	MW-5	Thallium	U	Less than 5 times the calibration blank
0810135-2	MW-6	Lead	U	Less than 5 times the method blank
0810135-2	MW-6	Thallium	U	Less than 5 times the calibration blank
0810135-3	MW-6 Duplicate	Lead	U	Less than 5 times the method blank

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 353.2, Nitrate + Nitrite as N

Calibrations were performed using six calibration standards on October 20, 2008. The calibration curve correlation coefficient (r^2) 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 four verification checks. All calibration check results were within the acceptance criteria.

Method MCAWW 314.0, Thiocyanate

Calibrations were performed using six calibration standards on September 18, 2008. The calibration curve r^2 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 two verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6010B

Calibrations for method 6010B metals were performed on October 22, 2008, using one calibration standard and a blank calibration; laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in 11 continuing calibration verifications (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 check results were within the acceptance range.

Method SW-846 6020

Calibrations for method 6020 metals were performed October 24, 2008. 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 continuing calibration verification checks were made at the required frequency resulting in four CCVs. All initial and continuing calibration verification results were within the acceptance range. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curves near the practical quantitation limit. The check results were within the acceptance range. The mass calibration and resolution was checked at the beginning of each analytical run in accordance with the procedure. Internal standard recoveries were stable and within acceptance ranges.

Method SW-846 9056

Initial calibrations were performed for chloride, nitrite, and sulfate using five calibration standards on October 17, 2008. The resulting calibration curves had r^2 values greater than 0.995 and intercepts less than 3 times the MDL. Initial calibration and calibration check standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in two CCVs. All initial and continuing calibration verification results were within the acceptance range.

Radiochemical Analysis

Radiochemical results are qualified with a "J" flag (estimated) when the result is greater than the minimum detectable concentration (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 total propagated uncertainty.

Gross Alpha/Beta

Plateau calibrations were performed on November 6, 2007. Alpha and beta attenuation calibrations were performed on November 8, 2007, covering a range of 0 to 204 milligrams (mg). All standards were counted to a minimum of 10,000 counts. All calibration and background checks met acceptance criteria. The residual mass was less than 100 mg for all samples.

Radium-226

Plateau voltage determinations and detector efficiency calibrations were performed in November and December 2007. Daily instrument checks performed on November 13 and 14, 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 July and September 2008. All calibration and background checks performed on November 3, 2008, met acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

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. In cases where blank concentration exceeds the instrument detection limit, 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. The gross alpha, gross beta, radium-226, and radium-228 method blank results were 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) pairs were analyzed for all analytes as a measure of method performance in the sample matrix. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The MS/MSD recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

The relative percent difference values for the laboratory replicate sample and matrix spike duplicate sample results for all non-radiochemical analytes were less than twenty percent and the relative error ratio for gross alpha and gross beta was less than 3.0, indicating acceptable laboratory precision.

Laboratory Control Samples (LCS)

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 performed during the metals analysis to monitor physical or chemical interferences that may exist in the sample matrix. Serial dilutions were prepared and analyzed for all metals. The acceptance criteria were met for all analytes.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The required detection limits were met for all analytes with the following exception. The total alkalinity reported detection limits were greater than the required detection limit. All total alkalinity results were greater than the detection limit.

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 chloride, nitrite, and sulfate data. There were no manual integrations performed and all peak integrations were satisfactory.

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with the total cations when expressed in

milliequivalents per liter (meq/L). Table 3 shows the total anion and cation results from this event and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference of 10 percent is considered acceptable.

Table 3. Cation/Anion Balance

Site Code	Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
PKB01	MW-5	7.4186	7.4028	0.11
PKB01	MW-6	6.7752	7.0258	1.82

The charge balance value for all locations was less than 10 percent indicating acceptable data quality.

Electronic Data Deliverable (EDD) File

The revised EDD file arrived on December 23, 2008. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 08091856 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 12/17/2008

Project: Parkersburg Disposal Site **Analysis Type:** ☑ Metals ☑ General Chem ☑ Rad ☐ Organics

# of Samples: 3 **Matrix:** WATER **Requested Analysis Completed:** Yes

Chain of Custody

Present: OK **Signed:** OK **Dated:** OK

Sample

Integrity: OK **Preservation:** OK **Temperature:** NO

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	There are 0 detection limit failures.
☐ Field/Trip Blanks	
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 08091856 **Lab Code:** PAR **Date Due:** 11/13/2008

Matrix: Water **Site Code:** PKB01 **Date Completed:** 11/18/2008

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								
ANTIMONY	10/24/2008	0.0000	1.0000	OK	OK	OK	OK	OK	102.0	98.0	104.0	5.0			
BARIUM	10/22/2008			OK	OK	OK	OK	OK	99.0	99.0	99.0	1.0	100.0	3.0	98.0
BARIUM	10/22/2008												99.0		99.0
BERYLLIUM	10/22/2008			OK	OK	OK	OK	OK	99.0	98.0	97.0	1.0	93.0		99.0
BERYLLIUM	10/22/2008												91.0		102.0
CADMIUM	10/24/2008	0.0000	1.0000	OK	OK	OK	OK	OK	102.0	94.0	100.0	6.0			
CALCIUM	10/22/2008			OK	OK	OK	OK	OK	102.0	108.0	104.0	1.0	105.0	5.0	106.0
CALCIUM	10/22/2008												102.0		107.0
CHROMIUM	10/22/2008			OK	OK	OK	OK	OK	100.0	100.0	99.0	1.0	91.0		99.0
CHROMIUM	10/22/2008												90.0		102.0
LEAD	10/24/2008	0.0000	1.0000	OK	OK	OK	OK	OK	105.0	100.0	106.0	6.0			
MAGNESIUM	10/22/2008			OK	OK	OK	OK	OK	103.0	104.0	104.0	0.0	105.0	3.0	101.0
MAGNESIUM	10/22/2008												104.0		102.0
MERCURY	10/20/2008	0.0000	1.0000	OK	OK	OK	OK	OK	100.0	103.0	94.0	9.0			104.0
NICKEL	10/22/2008			OK	OK	OK	OK	OK	99.0	99.0	98.0	2.0	92.0		99.0
NICKEL	10/22/2008												90.0		100.0
POTASSIUM	10/22/2008			OK	OK	OK	OK	OK	95.0	102.0	102.0	0.0		0.0	83.0
POTASSIUM	10/22/2008														83.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 08091856 **Lab Code:** PAR **Date Due:** 11/13/2008

Matrix: Water **Site Code:** PKB01 **Date Completed:** 11/18/2008

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								
SELENIUM	11/03/2008	0.0000	1.0000	OK	OK	OK	OK	OK	88.0	89.0	90.0	1.0			
SODIUM	10/22/2008			OK	OK	OK	OK	OK	97.0	103.0	103.0	0.0		8.0	86.0
SODIUM	10/22/2008														87.0
THALLIUM	10/24/2008	0.0000	1.0000	OK	OK	OK	OK	OK	92.0	91.0	101.0	10.0			
URANIUM	10/24/2008	0.0000	1.0000	OK	OK	OK	OK	OK	106.0	104.0	111.0	6.0			
ZINC	10/22/2008			OK	OK	OK	OK	OK	101.0	100.0	98.0	1.0	92.0		103.0
ZINC	10/22/2008												91.0		108.0
ZIRCONIUM	10/22/2008			OK	OK	OK	OK	OK	100.0	99.0	98.0	1.0	92.0		103.0
ZIRCONIUM	10/22/2008												92.0		103.0

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 08091856 **Lab Code:** PAR **Date Due:** 11/13/2008

Matrix: Water **Site Code:** PKB01 **Date Completed:** 11/18/2008

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
Blank_Spike	GROSS ALPHA	10/31/2008				97.6		
2678	GROSS ALPHA	11/03/2008						0.44
Blank_Spike	GROSS BETA	10/31/2008				93.7		
2678	GROSS BETA	11/03/2008						1.35
MW-6	Radium-226	11/13/2008			99.6			
2678	Radium-226	11/13/2008			105.0			
Blank_Spike	Radium-226	11/13/2008			99.4	107.0		
Blank_Spike_Du	Radium-226	11/13/2008			97.0	92.4		0.83
Blank	Radium-226	11/13/2008	0.0167	U	97.7			
MW-5	Radium-226	11/14/2008			97.1			
Blank_Spike	Radium-226	11/14/2008			100.0	90.2		
Blank_Spike_Du	Radium-226	11/14/2008			108.0	95.3		0.31
Blank	Radium-226	11/14/2008	0.0251	U	101.0			
MW-6	Radium-228	11/03/2008			63.2			
2678	Radium-228	11/03/2008			64.2			
MW-5	Radium-228	11/03/2008			65.6			
Blank_Spike	Radium-228	11/03/2008			59.6	93.1		
Blank_Spike_Du	Radium-228	11/03/2008			61.9	108.0		0.67
Blank	Radium-228	11/03/2008	-0.0767	U	66.1			

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 08091856 **Lab Code:** PAR **Date Due:** 11/13/2008

Matrix: Water **Site Code:** PKB01 **Date Completed:** 11/18/2008

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
CHLORIDE	10/17/2008	0.000	1.0000	OK	OK	OK	OK	OK	99.0				
NITRATE/NITRITE AS N	10/20/2008	0.000	1.0000	OK	OK	OK	OK	OK	104.0				
Nitrite	10/17/2008	0.000	1.0000	OK	OK	OK	OK	OK	96.0	95.0	96.0	1.00	
SULFATE	10/17/2008	0.000	1.0000	OK	OK	OK	OK	OK	100.0	103.0	99.0	1.00	
THIOCYANATE	10/22/2008	0.000	1.0000	OK	OK	OK	OK	OK	108.0	109.0	111.0	2.00	
TOTAL ALKALINITY As CaC(	10/23/2008			OK	OK	OK	OK	OK	99.0			1.00	

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.

Equipment Blank Assessment

An equipment blank was not necessary because dedicated equipment was used at each location.

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 MW-6. The non-radiochemical duplicate results met the U.S. Environmental Protection Agency recommended laboratory duplicate criteria of having a relative percent difference of less than 20 percent for results that are greater than 5 times the practical quantitation limit, and the radiochemical duplicate results had relative error ratios less than three demonstrating acceptable precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 08091856 **Lab Code:** PAR **Project:** Parkersburg Disposal Site **Validation Date:** 12/17/2008

Duplicate: 2678 **Sample:** MW-6

Analyte	Sample Result	Sample Flag	Sample Error	Duplicate Result	Duplicate Flag	Duplicate Error	RPD	RER	Units
ANTIMONY	0.037	U		0.037	U				UG/L
BARIUM	81			82			1.23		UG/L
BERYLLIUM	0.33	B		0.23	B				UG/L
CADMIUM	0.038	U		0.038	U				UG/L
CALCIUM	100000			100000			0		UG/L
CHLORIDE	38			37			2.67		MG/L
CHROMIUM	0.54	U		0.57	B				UG/L
GROSS ALPHA	0.217	U	0.566	-0.108	U	0.778		0.7	pCi/L
GROSS BETA	1.95	U	1.29	2.4	U	1.33		0.5	pCi/L
LEAD	0.11	B		0.14	B		24.00		UG/L
MAGNESIUM	11000			11000			0		UG/L
MERCURY	0.02	U		0.02	U				UG/L
NICKEL	1	B		1	U				UG/L
NITRATE/NITRITE AS N	1.7			1.7			0		MG/L
Nitrite	0.1	U		0.1	U				MG/L
POTASSIUM	2100			2100			0		UG/L
Radium-226	0.0268	U	0.058	0.0577	U	0.0816		0.6	pCi/L
Radium-228	0.184	U	0.316	-0.00174	U	0.311		0.8	pCi/L
SELENIUM	0.046	B		0.045	B				UG/L
SODIUM	19000			19000			0		UG/L
SULFATE	69			70			1.44		MG/L
THALLIUM	0.029	B		0.012	U				UG/L
THIOCYANATE	0.1	U		0.1	U				MG/L
TOTAL ALKALINITY As CaCO3	220			230			4.44		MG/L
URANIUM	0.44			0.44			0		UG/L
ZINC	2.9	B		2.8	B				UG/L
ZIRCONIUM	0.48	U		0.48	U				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 — 3-31-2009 (Date)

Data Validation Lead: Steve Donivan — 3-31-2009 (Date)

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

There were no potential outliers identified, and the data for this event are acceptable as qualified.

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Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009
Location: MW-5 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	10/15/2008	N001	-	220		FJ	#	20	
Antimony	mg/L	10/15/2008	N001	-	0.000037	U	F	#	0.000037	
Barium	mg/L	10/15/2008	N001	-	0.063		F	#	0.00038	
Beryllium	mg/L	10/15/2008	N001	-	0.0005	B	UF	#	0.00012	
Cadmium	mg/L	10/15/2008	N001	-	0.000076	B	UF	#	0.000038	
Calcium	mg/L	10/15/2008	N001	-	110		F	#	0.014	
Chloride	mg/L	10/15/2008	N001	-	54		F	#	1	
Chromium	mg/L	10/15/2008	N001	-	0.00054	U	F	#	0.00054	
Dissolved Oxygen	mg/L	10/15/2008	N001	-	0.56		F	#		
Gross Alpha	pCi/L	10/15/2008	N001	-	1.6	U	F	#	1.6	0.735
Gross Beta	pCi/L	10/15/2008	N001	-	3.45		FJ	#	2.4	1.39
Lead	mg/L	10/15/2008	N001	-	0.00055		F	#	0.000019	
Magnesium	mg/L	10/15/2008	N001	-	14		F	#	0.0089	
Mercury	mg/L	10/15/2008	N001	-	0.00002	U	F	#	0.00002	
Nickel	mg/L	10/15/2008	N001	-	0.0018	B	F	#	0.001	
Nitrate + Nitrite as Nitrogen	mg/L	10/15/2008	N001	-	2.7		FJ	#	0.02	
Nitrite	mg/L	10/15/2008	N001	-	0.1	U	FJ	#	0.1	
Oxidation Reduction Potential	mV	10/15/2008	N001	-	132.7		F	#		
pH	s.u.	10/15/2008	N001	-	8.26		F	#		
Potassium	mg/L	10/15/2008	N001	-	3.2		F	#	0.026	
Radium-226	pCi/L	10/15/2008	N001	-	0.14	U	F	#	0.14	0.0597

Groundwater Quality Data by Location (USEE100) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009
Location: MW-5 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Radium-228	pCi/L	10/15/2008	N001	-	0.71	U	F	#	0.71	0.356
Selenium	mg/L	10/15/2008	N001	-	0.000015	B	F	#	0.000011	
Sodium	mg/L	10/15/2008	N001	-	16		F	#	0.0018	
Specific Conductance	umhos /cm	10/15/2008	N001	-	687		F	#		
Sulfate	mg/L	10/15/2008	N001	-	62		FJ	#	0.5	
Temperature	C	10/15/2008	N001	-	14.27		F	#		
Thallium	mg/L	10/15/2008	N001	-	0.000028	B	UF	#	0.000012	
Thiocyanate	mg/L	10/15/2008	N001	-	0.1	U	FJ	#	0.1	
Turbidity	NTU	10/15/2008	N001	-	1		F	#		
Uranium	mg/L	10/15/2008	N001	-	0.0003	E	F	#	0.0000045	
Zinc	mg/L	10/15/2008	N001	-	0.012	B	UF	#	0.0014	
Zirconium	mg/L	10/15/2008	N001	-	0.00048	U	F	#	0.00048	

Groundwater Quality Data by Location (USEE100) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009
Location: MW-6 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	10/15/2008	N001	-	220		FJ	#	20	
Alkalinity, Total (As CaCO3)	mg/L	10/15/2008	N002	-	230		FJ	#	20	
Antimony	mg/L	10/15/2008	N001	-	0.000037	U	F	#	0.000037	
Antimony	mg/L	10/15/2008	N002	-	0.000037	U	F	#	0.000037	
Barium	mg/L	10/15/2008	N001	-	0.081		F	#	0.00038	
Barium	mg/L	10/15/2008	N002	-	0.082		F	#	0.00038	
Beryllium	mg/L	10/15/2008	N001	-	0.00033	B	UF	#	0.00012	
Beryllium	mg/L	10/15/2008	N002	-	0.00023	B	UF	#	0.00012	
Cadmium	mg/L	10/15/2008	N001	-	0.000038	U	F	#	0.000038	
Cadmium	mg/L	10/15/2008	N002	-	0.000038	U	F	#	0.000038	
Calcium	mg/L	10/15/2008	N001	-	100		F	#	0.014	
Calcium	mg/L	10/15/2008	N002	-	100		F	#	0.014	
Chloride	mg/L	10/15/2008	N001	-	38		F	#	1	
Chloride	mg/L	10/15/2008	N002	-	37		F	#	1	
Chromium	mg/L	10/15/2008	N001	-	0.00054	U	F	#	0.00054	
Chromium	mg/L	10/15/2008	N002	-	0.00057	B	F	#	0.00054	
Dissolved Oxygen	mg/L	10/15/2008	N001	-	0.47		F	#		
Gross Alpha	pCi/L	10/15/2008	N001	-	1.2	U	F	#	1.2	0.566
Gross Alpha	pCi/L	10/15/2008	N002	-	1.8	U	F	#	1.8	0.778

Groundwater Quality Data by Location (USEE100) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009
Location: MW-6 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Gross Beta	pCi/L	10/15/2008	N001	-	2.4	U	F	#	2.4	1.29
Gross Beta	pCi/L	10/15/2008	N002	-	2.4	U	F	#	2.4	1.33
Lead	mg/L	10/15/2008	N001	-	0.00011	B	UF	#	0.000019	
Lead	mg/L	10/15/2008	N002	-	0.00014	B	UF	#	0.000019	
Magnesium	mg/L	10/15/2008	N001	-	11		F	#	0.0089	
Magnesium	mg/L	10/15/2008	N002	-	11		F	#	0.0089	
Mercury	mg/L	10/15/2008	N001	-	0.00002	U	F	#	0.00002	
Mercury	mg/L	10/15/2008	N002	-	0.00002	U	F	#	0.00002	
Nickel	mg/L	10/15/2008	N001	-	0.001	B	F	#	0.001	
Nickel	mg/L	10/15/2008	N002	-	0.001	U	F	#	0.001	
Nitrate + Nitrite as Nitrogen	mg/L	10/15/2008	N001	-	1.7		FJ	#	0.01	
Nitrate + Nitrite as Nitrogen	mg/L	10/15/2008	N002	-	1.7		FJ	#	0.01	
Nitrite	mg/L	10/15/2008	N001	-	0.1	U	FJ	#	0.1	
Nitrite	mg/L	10/15/2008	N002	-	0.1	U	FJ	#	0.1	
Oxidation Reduction Potential	mV	10/15/2008	N001	-	147.1		F	#		
pH	s.u.	10/15/2008	N001	-	8.28		F	#		
Potassium	mg/L	10/15/2008	N001	-	2.1		F	#	0.026	
Potassium	mg/L	10/15/2008	N002	-	2.1		F	#	0.026	
Radium-226	pCi/L	10/15/2008	N001	-	0.14	U	F	#	0.14	0.058

Groundwater Quality Data by Location (USEE100) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009
Location: MW-6 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Radium-226	pCi/L	10/15/2008	N002	-	0.16	U	F	#	0.16	0.0816
Radium-228	pCi/L	10/15/2008	N001	-	0.65	U	F	#	0.65	0.316
Radium-228	pCi/L	10/15/2008	N002	-	0.67	U	F	#	0.67	0.311
Selenium	mg/L	10/15/2008	N001	-	0.000046	B	F	#	0.000011	
Selenium	mg/L	10/15/2008	N002	-	0.000045	B	F	#	0.000011	
Sodium	mg/L	10/15/2008	N001	-	19		F	#	0.0018	
Sodium	mg/L	10/15/2008	N002	-	19		F	#	0.0018	
Specific Conductance	umhos /cm	10/15/2008	N001	-	646		F	#		
Sulfate	mg/L	10/15/2008	N001	-	69		FJ	#	0.5	
Sulfate	mg/L	10/15/2008	N002	-	70		FJ	#	0.5	
Temperature	C	10/15/2008	N001	-	14.05		F	#		
Thallium	mg/L	10/15/2008	N001	-	0.000029	B	UF	#	0.000012	
Thallium	mg/L	10/15/2008	N002	-	0.000012	U	F	#	0.000012	
Thiocyanate	mg/L	10/15/2008	N001	-	0.1	U	FJ	#	0.1	
Thiocyanate	mg/L	10/15/2008	N002	-	0.1	U	FJ	#	0.1	
Turbidity	NTU	10/15/2008	N001	-	4		F	#		
Uranium	mg/L	10/15/2008	N001	-	0.00044		F	#	0.0000045	
Uranium	mg/L	10/15/2008	N002	-	0.00044		F	#	0.0000045	
Zinc	mg/L	10/15/2008	N001	-	0.0029	B	UF	#	0.0014	

Groundwater Quality Data by Location (USEE100) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009
Location: MW-6 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Zinc	mg/L	10/15/2008	N002	-	0.0028	B	UF	#	0.0014	
Zirconium	mg/L	10/15/2008	N001	-	0.00048	U	F	#	0.00048	
Zirconium	mg/L	10/15/2008	N002	-	0.00048	U	F	#	0.00048	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE PKB01, Parkersburg Disposal Site
REPORT DATE: 3/11/2009

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
MW-5	N	638.65	10/15/2008		63.25	575.4	
MW-6	N	638.05	10/15/2008		62.62	575.43	

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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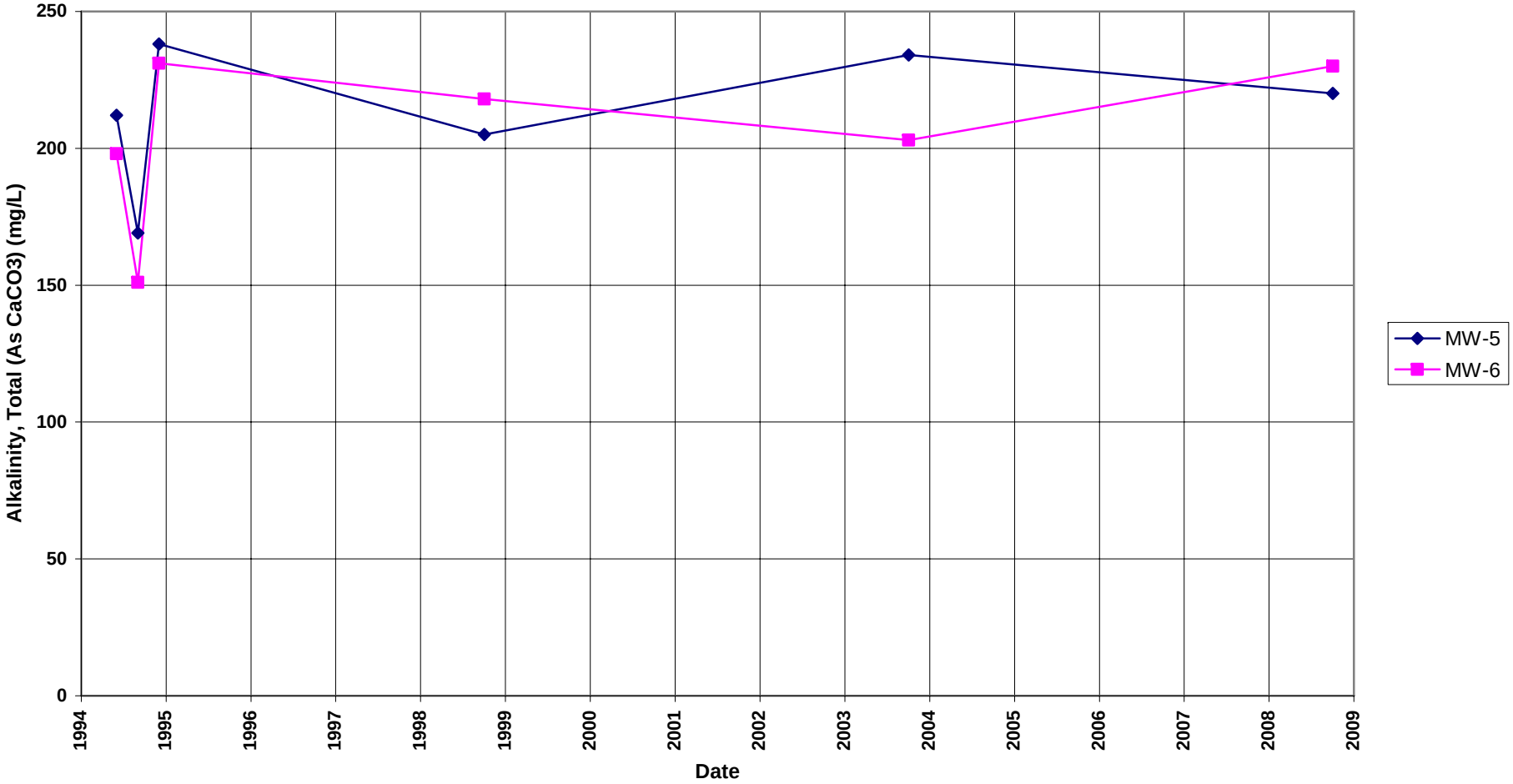
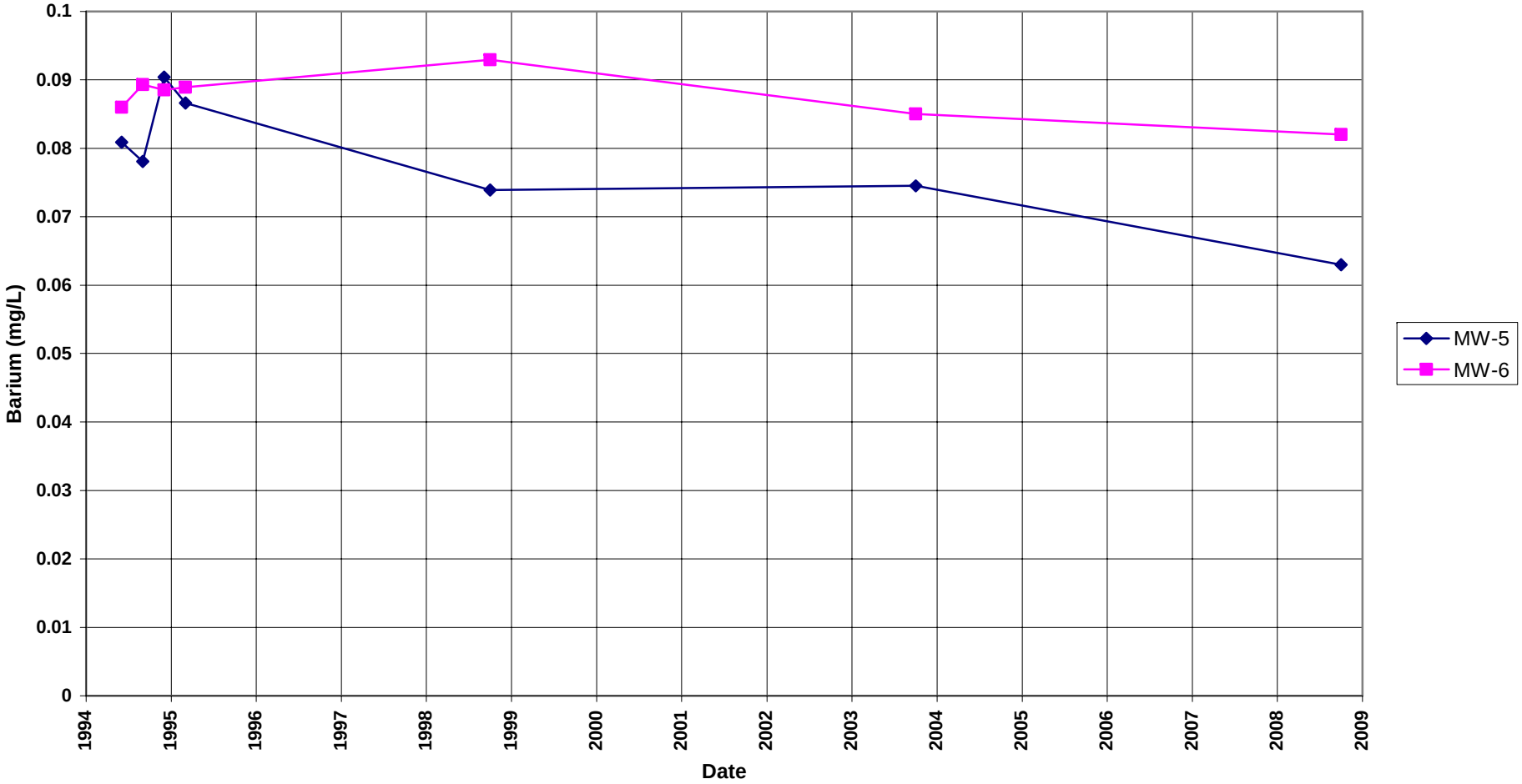
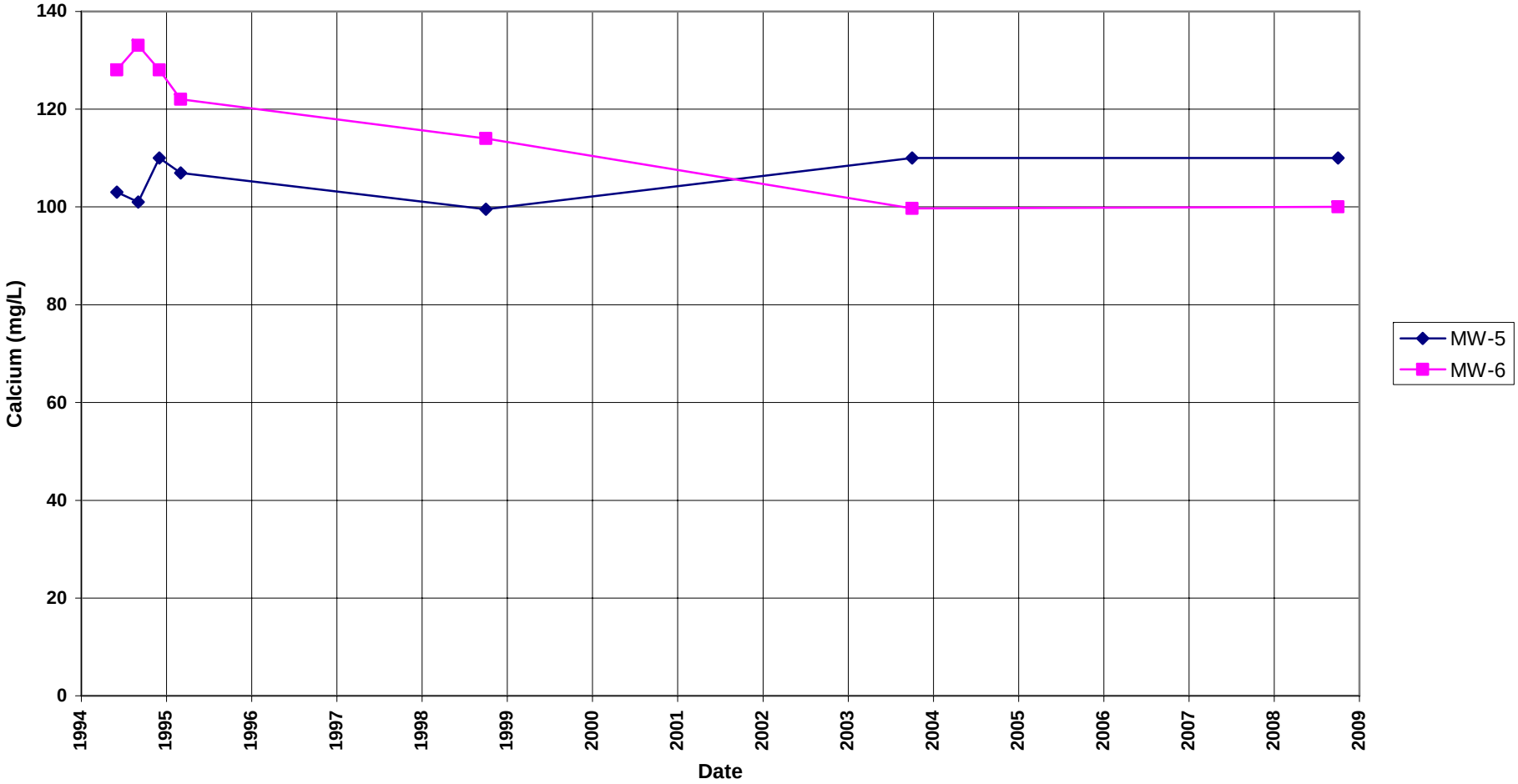
Parkersburg Disposal Site
Alkalinity, Total (As CaCO3) Concentration

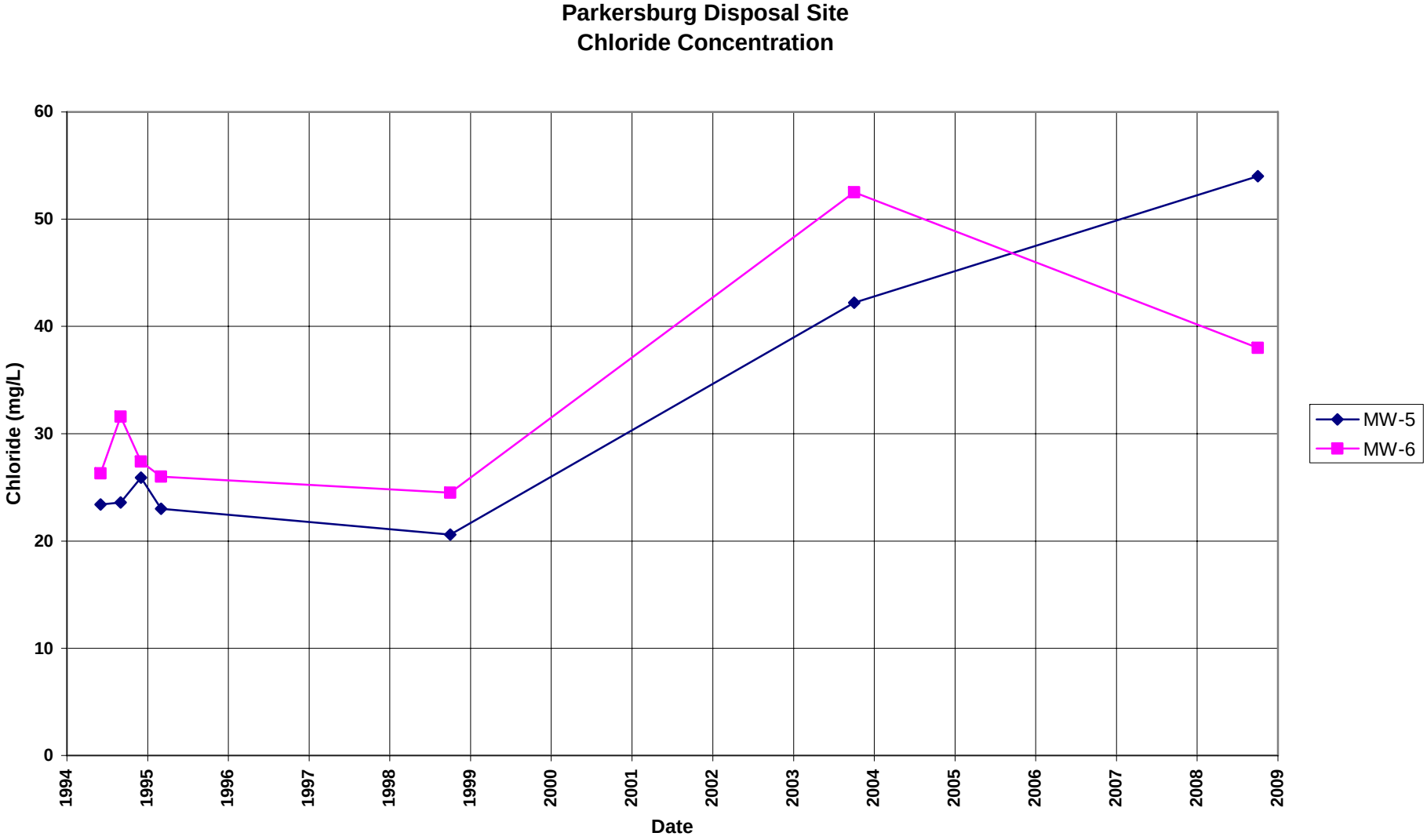


Parkersburg Disposal Site
Barium Concentration

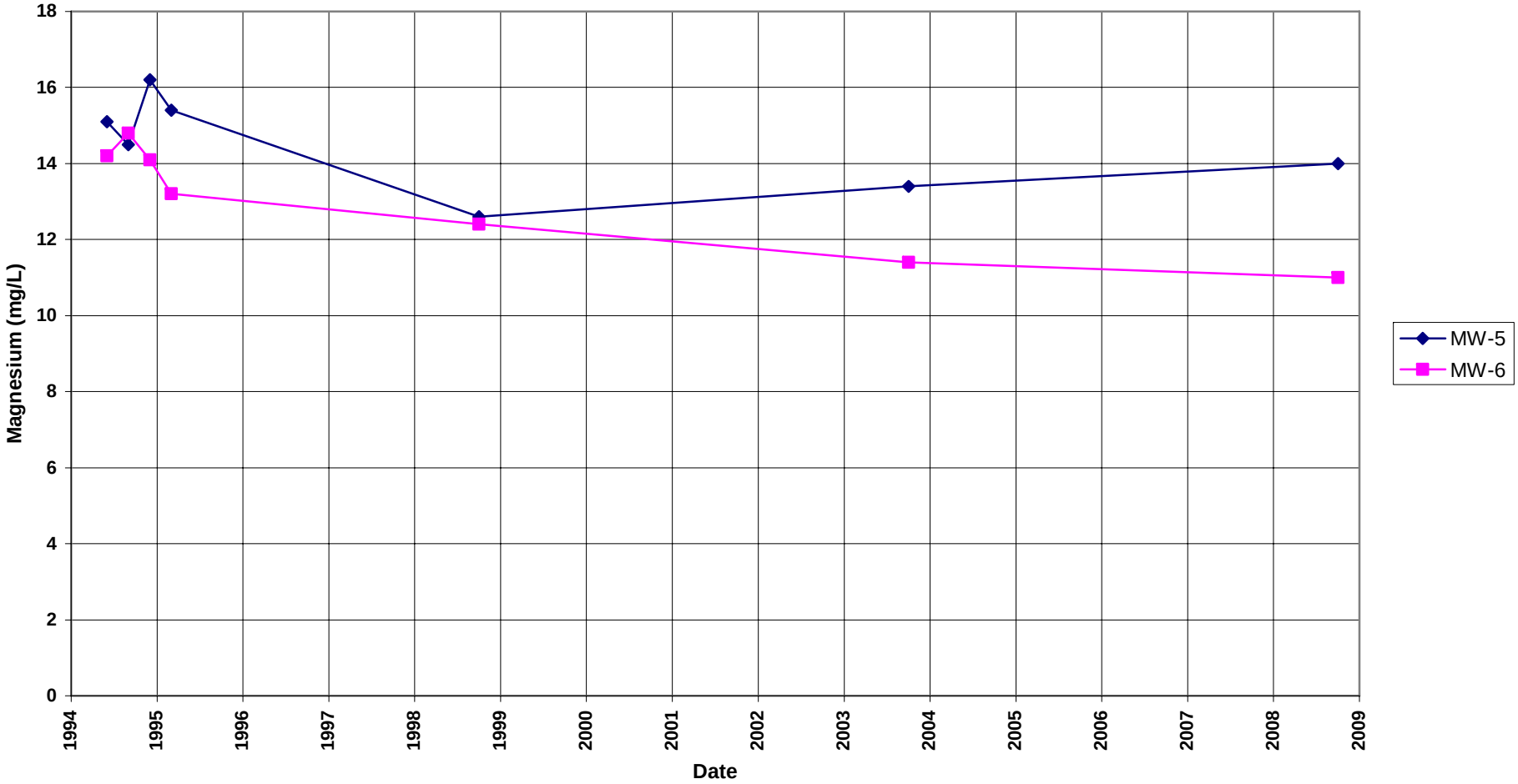


Parkersburg Disposal Site
Calcium Concentration

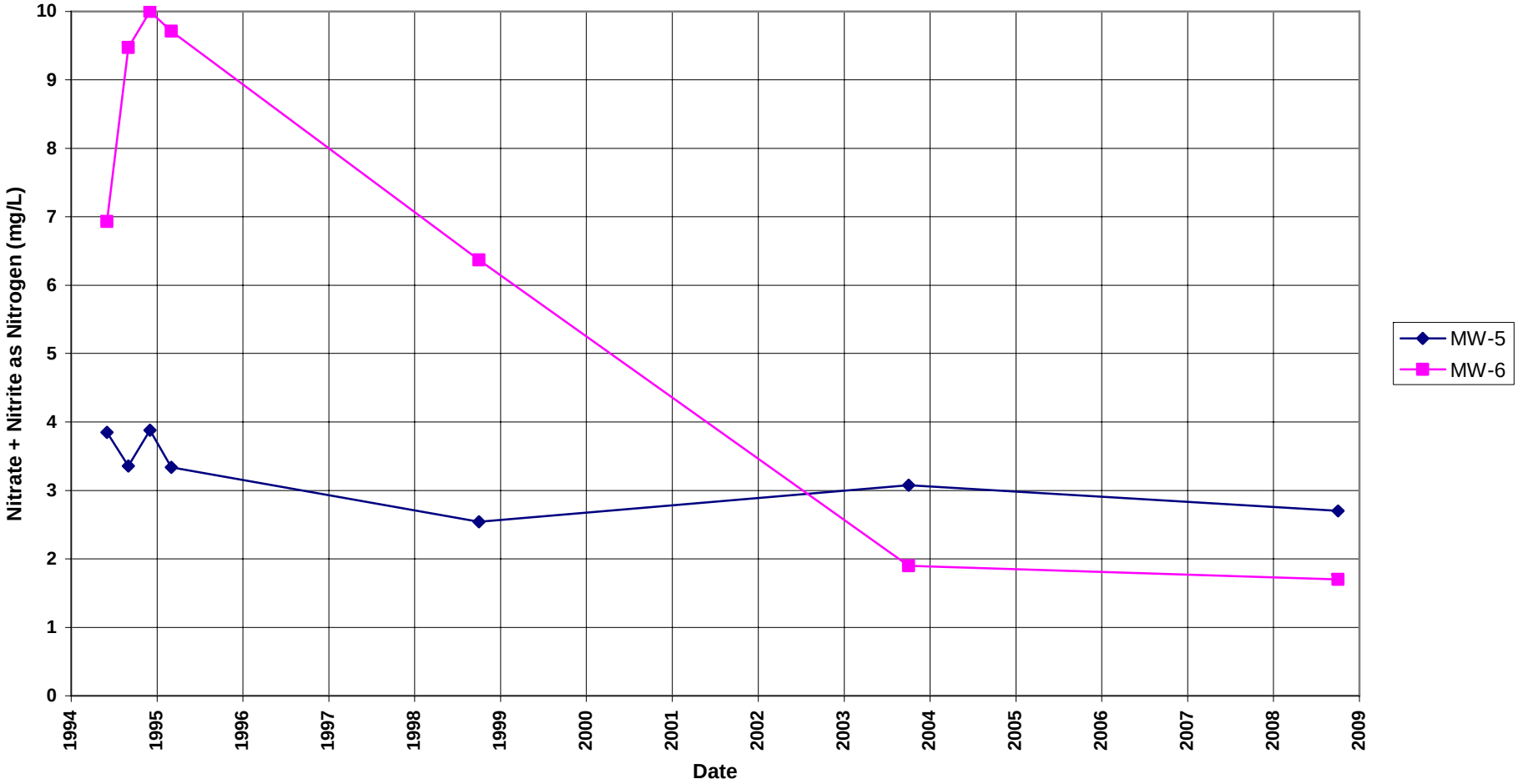



Parkersburg Disposal Site
Chloride Concentration
Chloride (mg/L)
60
50
40
30
20
10
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
MW-5
MW-6

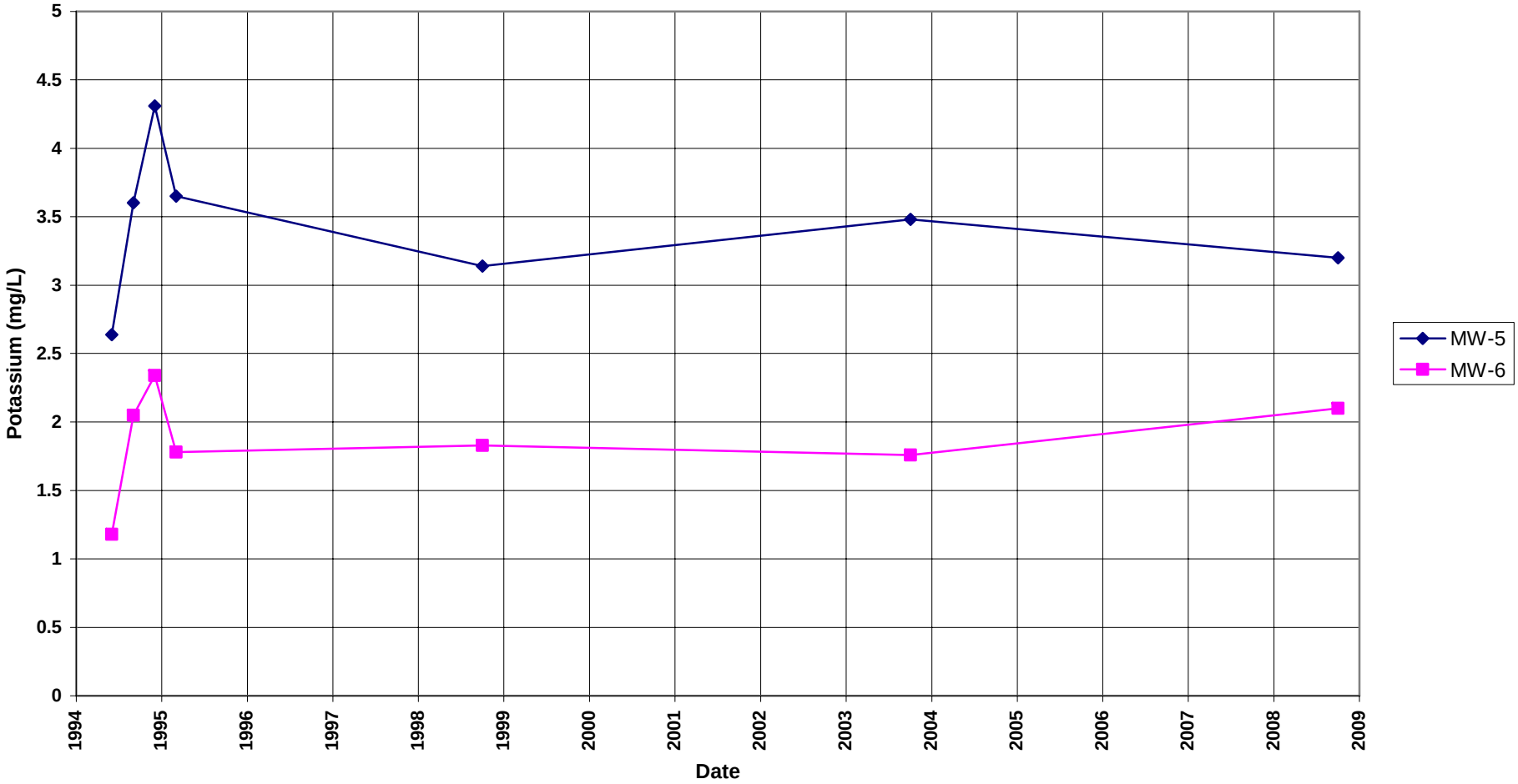
Parkersburg Disposal Site
Magnesium Concentration



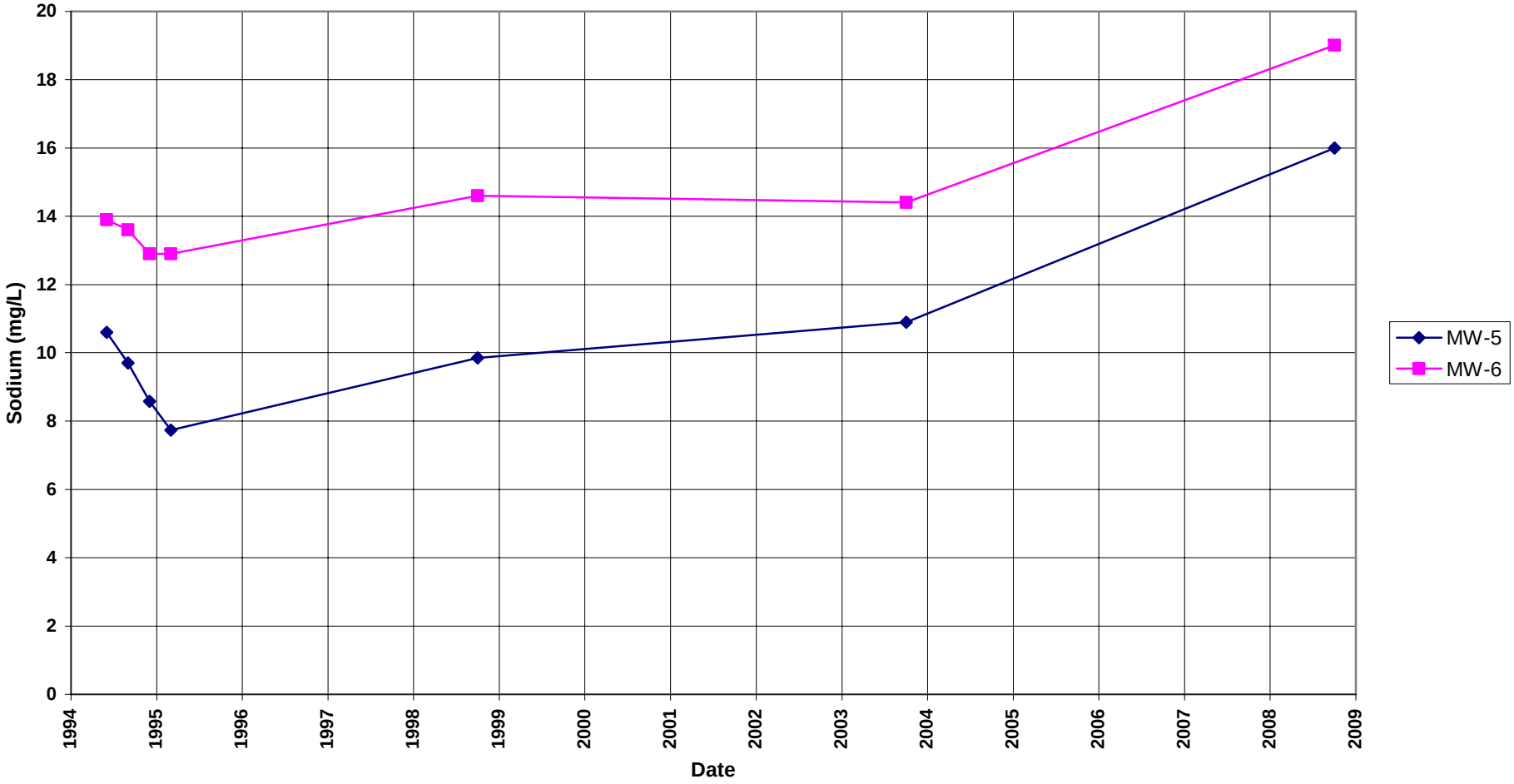
Parkersburg Disposal Site
Nitrate + Nitrite as Nitrogen Concentration



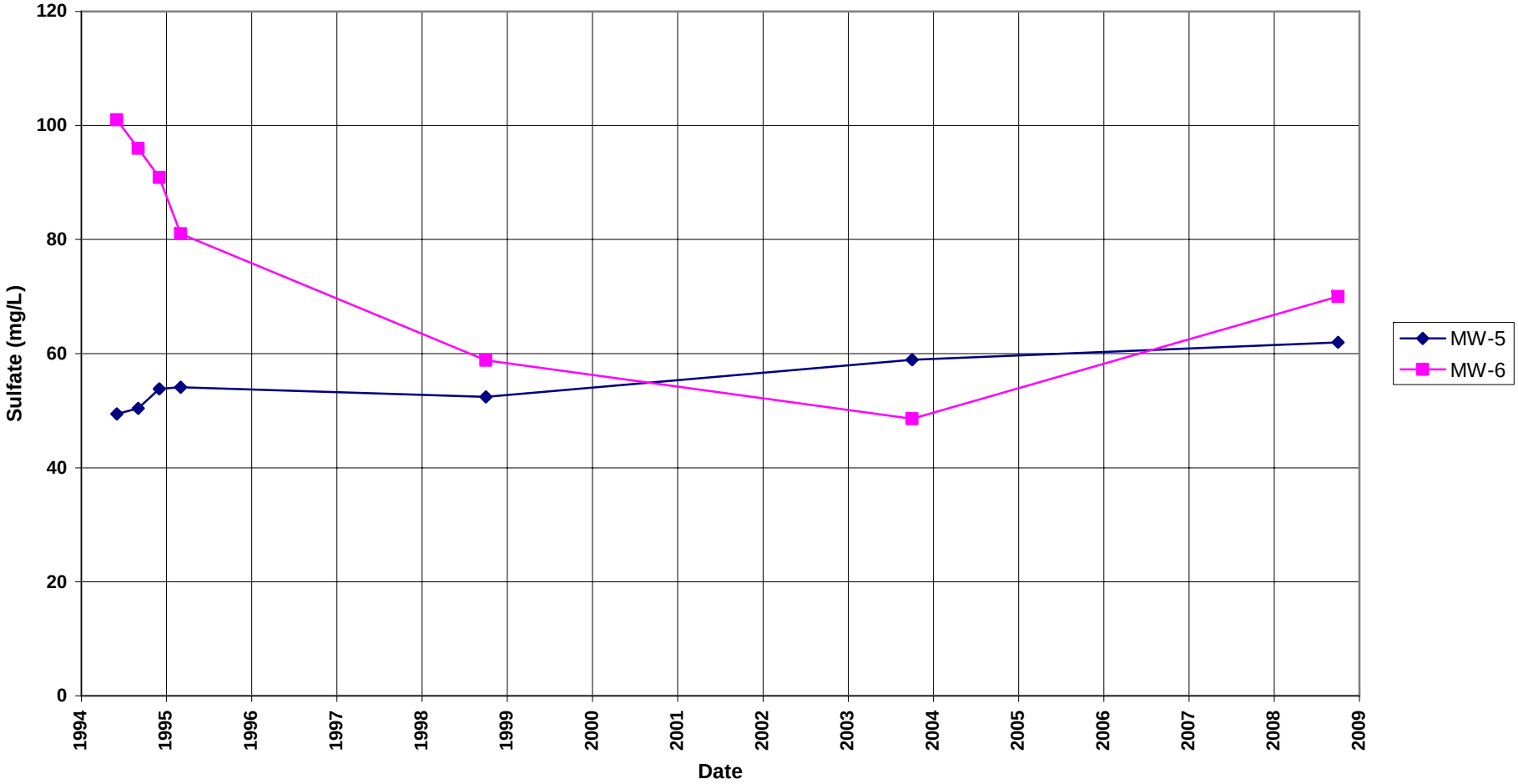
Parkersburg Disposal Site
Potassium Concentration

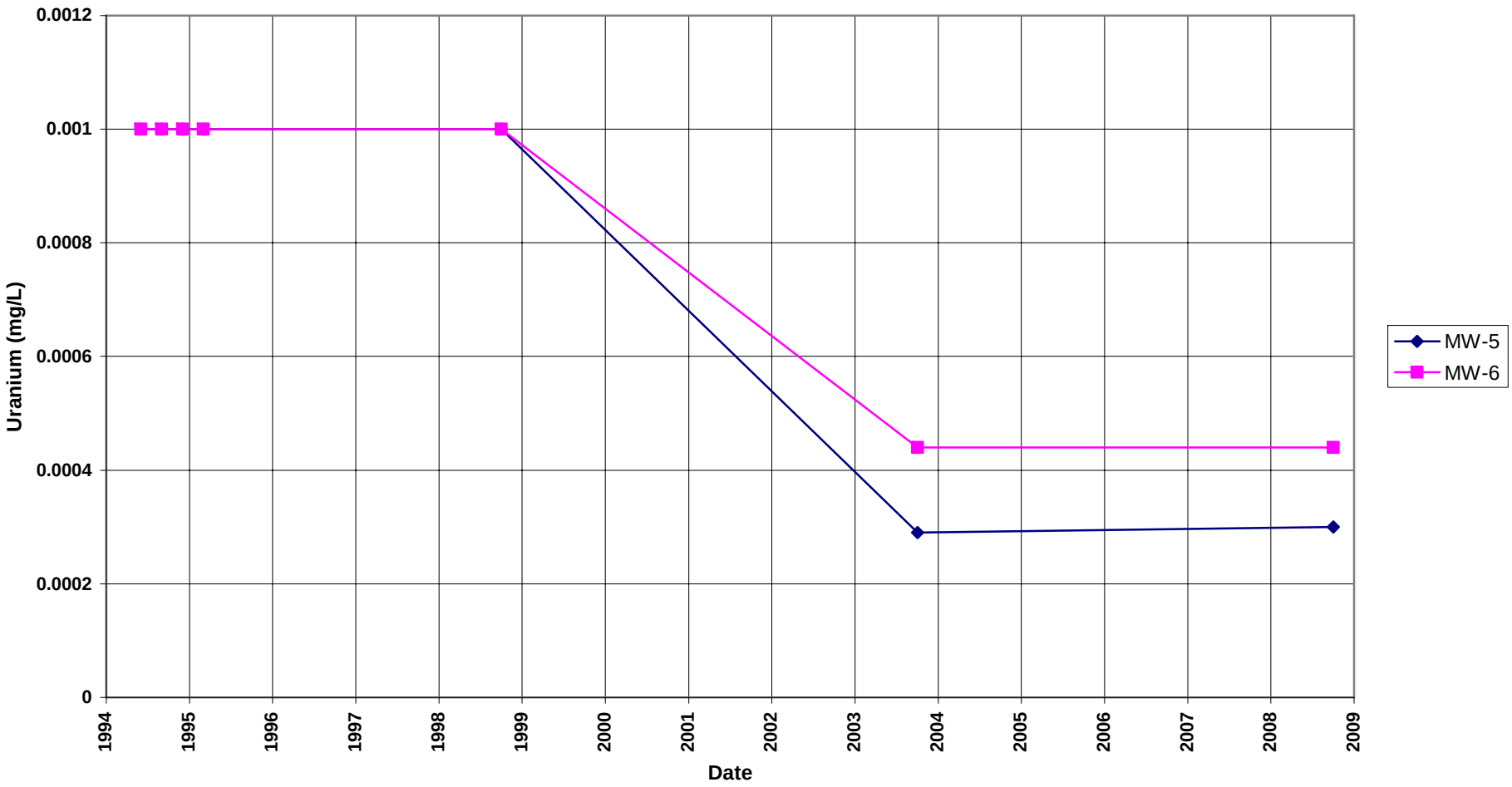


Parkersburg Disposal Site
Sodium Concentration



Parkersburg Disposal Site
Sulfate Concentration




Parkersburg Disposal Site
Uranium Concentration
Uranium (mg/L)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Date
MW-5
MW-6

Attachment 3
Sampling and Analysis Work Order

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Stoller established 1959

Task Order No.: LM00-501
Control No: 08-0748

September 11, 2008

U.S. Department of Energy
Office of Legacy Management
ATTN: Jack R. Craig
Site Manager
626 Cochrans Mill Road
Pittsburgh, PA 15236-0940

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
October 2008 Environmental Sampling at Parkersburg, West Virginia

Reference: Task Order LM00-501-07-609-402, Parkersburg Disposal Site

Dear Mr. Craig:

The purpose of this letter is to inform you of the upcoming sampling event at Parkersburg, West Virginia. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring. Water quality data will be collected from this site as part of the environmental sampling currently scheduled to begin the week of October 13, 2008.

The following list shows the wells (with zone of completion) scheduled to be sampled during this event.

Monitor Wells*
MW-5 Al MW-6 Al

*NOTE: Al – alluvium

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 being reviewed and are expected to be complete by the beginning of fieldwork.

If you have any questions, please call me at 513-738-3281.

Sincerely,

Michele Miller
Project Manager

The S.M. Stoller Corporation 10995 Hamilton Cleves Highway Harrison, OH 45030 (513) 648-5294 Fax: (513) 648-3252

Constituent Sampling Breakdown

Site	Parkersburg				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	2	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)					
Antimony	X		0.003	SW-846 6020	LMM-02
Barium	X				
Beryllium	X		0.0008	SW-846 6010	LMM-01
Cadmium	X		0.001	SW-846 6020	LMM-02
Calcium	X		5	SW-846 6010	LMM-01
Chloride	X		0.5	SW-846 9056	MIS-A-039
Chromium	X		0.002	SW-846 6010	LMM-01
Gross Alpha	X		2 pCi/L	EPA 900.0	GPC-A-001
Gross Beta	X		4 pCi/L	EPA 900.0	GPC-A-001
Iron					
Lead	X		0.002	SW-846 6020	LMM-02
Magnesium	X		5	SW-846 6010	LMM-01
Manganese					
Mercury	X		0.0001	SW-846 7470	LMM-01
Molybdenum					
Nickel	X		0.02	SW-846 6010	LMM-01
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	X		0.05	EPA 353.1	WCH-A-022
Nitrite	X		0.5	EPA 354.1	WCH-A-021
Potassium	X		1	SW-846 6010	LMM-01
Radium-226	X		1 pCi/L	Gas Proportional Counter	GPC-A-018
Radium-228	X		1 pCi/L	Gas Proportional Counter	GPC-A-020
Selenium	X		0.0001	SW-846 6020	LMM-02
Silica					
Sodium	X		1	SW-846 6010	LMM-01
Strontium					
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Thallium	X		0.004	SW-846 6020	LMM-02
Thiocyanate	X		0.1	SM 4500-CN-M	
Total Dissolved Solids					
Total Organic Carbon					
Uranium	X		0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc	X		0.02	SW-846 6010	LMM-01
Zirconium	X		0.2	SW-846 6010	LMM-02
Total No. of Analytes	25	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.

Attachment 4
Trip Report

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Stoller

established 1959

Memorandum

DATE: November 11, 2008

TO: Michele Miller
Ken Broberg
Steve Donivan
Wanda Sumner
EDD Delivery

FROM: Karen Voisard

SUBJECT: Trip Report for Parkersburg, West Virginia, Five Year Sampling, 2008

Date of Sampling Event: October 14 and 15th, 2008

Team Members: Jim Gore and Karen Voisard

Number of Locations Sampled: Two monitor wells were sampled; a duplicate sample was collected from well MW-6. Sample turbidity measurements were less than 10 Nephelometric Units and, therefore, samples did not require filtering.

Equipment: Samples were collected from monitor wells MW-5 and MW-6 using the dedicated bladder pumps installed in the two wells.

Location Specific Information: The following table includes the established well type and ticket numbers identified for each sampled well location.

Ticket Number	Location	Sample Date	Well Type
GKS 746	MW-5	10/15/2008	CAT I
GKS 747	MW-6	10/15/2008	CAT I

Water Level Measurements: Water levels were measured in all six monitor wells onsite. Water level data are provided in the table above and represent depth to water measurements measured from top of well.

Well Number	Water Level	Date
MW-1	63.35	10/14/2008
MW-2	57.70	10/14/2008
MW-3	62.94	10/14/2008
MW-4	62.43	10/14/2008
MW-5	63.25	10/14/2008
MW-6	62.62	10/14/2008

Sample Shipment: Samples were shipped overnight by FedEx to Paragon Analytics, Inc., on October 15, 2008.

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
2678	MW-6	Duplicate	GKS 748

Requisition Numbers Assigned: Samples were assigned to requisition identification number (RIN) 08091856.

Well Maintenance: Recommendations for monitor well MW-1, MW-2, MW-3, and MW-4 include replacing the large, rusty protective casings with conventional, painted protective casings; removing and disposing of the electrical pumps, fuse boxes, and cables within the wells; and raising the annular seals above the ground surface with bentonite topped with sand. Concrete well pads and proper labeling of the wells are also recommended to be completed at the time of these identified well repairs.

Institutional Controls: The gate was appropriately closed and locked following completion of the sampling event.