Department of Energy
Office of Legacy Management

APR 0 4 2007

Mr. Mark Thiesse
West District Supervisor
Groundwater Pollution Control Program
Wyoming Department of Environmental Quality
510 Meadowview Drive
Lander, WY 82520

Subject: Data Validation Package for Shirley Basin South, Wyoming, Disposal Site

Dear Mr. Thiesse:

Enclosed is a copy of the Data Validation Package for the Shirley Basin South, Wyoming, disposal site. This letter represents analyses of ground water samples that were collected on August 9-11, 2006.

The *Long-Term Surveillance Plan for the Shirley Basin South (UMTRCA Title II) Disposal Site, Carbon County, Wyoming* (December 2004) requires annual monitoring to verify continued compliance with the pertinent alternate concentration limits (ACLs) and Wyoming Class III (livestock use) ground water protection standards. Point-of-compliance (POC) wells 5-SC, 51-SC, 5-DC, and 19-DC, and monitor wells 40-SC, 54-SC, 10-DC, and K.G.S. #3 were sampled during this event.

Cadmium exceeded the ACL in POC well 5-SC in 2005 but dropped below the ACL in 2006. No trend is apparent on the time versus concentration graph. The radium-228 concentrations in POC well 5-DC and non-POC well 54-SC were above the ACL and continue to indicate an upward trend in both wells since 2003. The cadmium and radium-228 ACLs were exceeded on occasion prior to acquisition of the site by the U.S. Department of Energy. The cause for exceeding ACLs is not known at this time.

Please contact me at (720) 377-9682 if you have any questions.

Sincerely,

2007.04.02
08:38:17 -06'00'

Scott R. Surovchak
Site Manager

Enclosure

19901 Germantown Road, Germantown, MD 20874 | 2597 B 3/4 Road, Grand Junction, CO 81503
3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507 | 626 Cochrans Mill Road, P.O. Box 10940, Pittsburgh, PA 15236
1000 Independence Ave., S.W., Washington, DC 20585 | 11025 Dover Street, Suite 1000, Westminster, CO 80021
REPLY TO: Grand Junction Office

cc w/enclosure:
B. Von Till, NRC

cc w/o enclosure:
K. Frederick, WQD Cheyenne
D. Johnson, Stoller (e)
Project File: SBS 410.02 (D. Roberts)

Sampling Events-DVPs\DVP Shirley Basin South Aug 2006.doc

DOE–LM/1378–2006

Data Validation Package

August 2006
Shirley Basin South, Wyoming
Disposal Site

November 2006

U.S. Department of Energy
Office of Legacy Management

Work Performed by the S.M. Stoller Corporation Under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management.
Approved for public release; distribution is unlimited.

Contents

Sampling Event Summary

Site: Shirley Basin South, Wyoming, Disposal Site

Sampling Period: August 9-11, 2006

The *Long-Term Surveillance Plan* (LTSP) *for the Shirley Basin South (UMTRCA Title II) Disposal Site, Carbon County, Wyoming* (December 2004) requires annual monitoring to verify continued compliance with the pertinent alternate concentration limits (ACLs) and Wyoming Class III (livestock use) ground water protection standards. Point-of-compliance (POC) wells 5-SC, 51-SC, 5-DC, and 19-DC, and monitor wells 40-SC, 54-SC, 10-DC, and K.G.S.#3 were sampled as specified in the plan. Sampling and analysis was conducted in accordance with *FY 2006 Sampling Frequencies and Analyses* (October 2005) and the *Environmental Procedures Catalog* (STO 6). The water level was measured at each sampled well.

Monitor wells with an "SC" suffix are completed in the Upper Sand Aquifer of the Wind River Formation. Wells with a "DC" suffix are completed in the Main Sand Aquifer, and K.G.S.#3 well is completed in the uncontaminated Lower Sand Aquifer of the Wind River Formation.

Cadmium exceeded the ACL in POC well 5-SC in 2005, but dropped below the ACL in 2006. No trend is apparent on the time versus concentration graph. The radium-228 concentrations in POC well 5-DC and non-POC well 54-SC were above the ACL (Table 1) and continue to indicate an upward trend in both wells since 2003. As indicated in the time versus concentration graphs, the cadmium and radium-228 ACLs were exceeded on occasion prior to acquisition of the site by the U.S. Department of Energy. The cause for exceeding ACLs is not known at this time.

Table 1. Wells with Results Exceeding an ACL

Analyte	ACL[a]	5-DC	54-SC
Radium-228	25.7 pCi/L	47.1 pCi/L	101 pCi/L

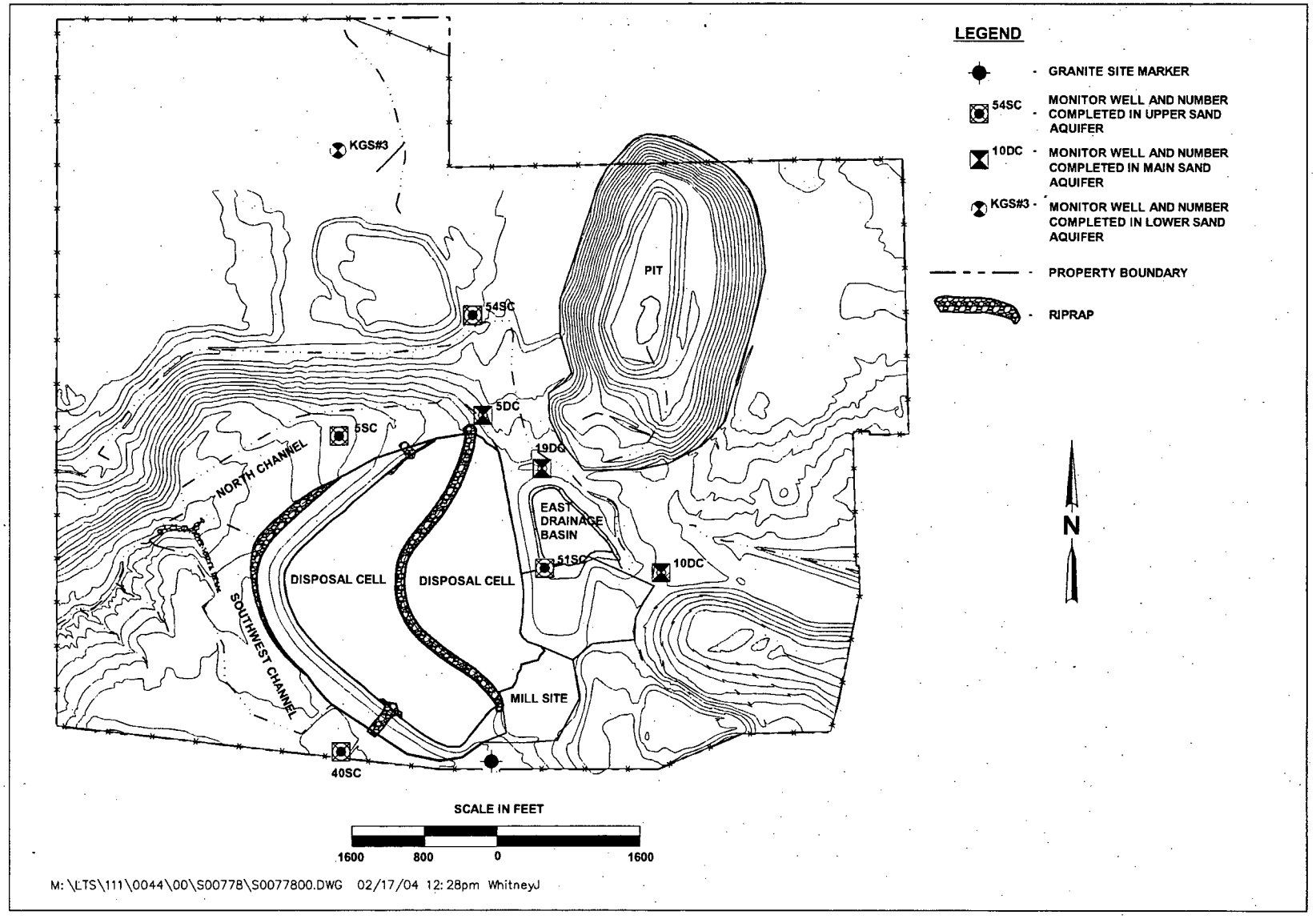
[a] Alternate concentration limits for Shirley Basin South Disposal Site.

No other constituents of concern exceeded ACLs. The uranium concentration in well 5-SC continues to indicate a downward trend since 1996; otherwise, no trends are apparent. Sulfate and total dissolved solids continue to exceed their respective Wyoming ground water protection standards in wells 5-DC, 5-SC, 51-SC, and 54-SC as they have done throughout the sampling history; however, there is no livestock use of the water at the site.

The water level and constituent concentrations in well K.G.S.#3 demonstrate hydraulic isolation of the Lower Sand Aquifer from the overlying contaminated aquifers.

Richard K. Johnson
Site Lead, S.M. Stoller

11/28/06
Date



Shirley Basin South, Wyoming, Disposal Site Sample Location Map

Data Assessment Summary

Water Sampling Field Activities Verification Checklist

Project	Shirley Basin South, Wyoming	**Date(s) of Water Sampling**	August 9-11-2006
Date(s) of Verification	November 9, 2006	**Name of Verifier**	Steve Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOP's, instructions.		Work Order letter dated July 5, 2006.
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 performed on August 2, 2006.
4. Was an operational check of the field equipment conducted twice daily?	No	Only one check was made per day.
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, Ec, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the Category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	
Was the true identity of the samples recorded on the Quality Assurance Sample Log?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members?	No	Only one signature at location 19-DC and 51-SC.
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):	06070434
Sample Event:	August 9-11, 2006
Site(s):	Shirley Basin South, Wyoming
Laboratory:	Paragon Analytics
Work Order No.:	0608104
Analysis:	Metals, Inorganic, and Radiochemistry
Validator:	Steve Donivan
Review Date:	October 4, 2006

This validation was performed according to the *Environmental Procedures Catalog* (STO 6), "Standard Practice for Validation of Laboratory Data," GT-9(P) Rev. 1 (2006). The procedure was applied at Level 3, Data Validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 2.

Table 2. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Cadmium (Cd), Lead (Pb)	MET-A-026	SW-846 3005A	SW-846 6020A
Chloride (Cl)	MIS-A-039	SW-846 9056	SW-846 9056
Chromium (Cr), Nickel (Ni)	MET-A-020	SW-846 3005A	SW-846 6010B
Nitrate/Nitrite-N (NO_3-N)	WCH-A-022	MCAWW 353.2	MCAWW 353.2
Radium–226 (Ra-226)	ASP-A-016	SOP783R6	SOP783R6
Radium–228 (Ra-228)	GPC-A-020	SW-846 9320	SW-846 9320
Selenium (Se)	GJO-014	SW-846 3005A	SW-846 6020A
Sulfate (SO_4)	MIS-A-044	SW-846 9056	SW-846 9056
Thorium-230 (Th-230)	ASP-A-008	SOP776R9	SOP714R9
Total Dissolved Solids (TDS)	WCH-A-033	MCAWW 160.1	MCAWW 160.1
Uranium (U)	GJO-01	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

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

Table 3. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
0608104-1	19-DC	Cd	U	Less than 5 times the calibration blank
0608104-1	19-DC	NO_3-N	J	Matrix spike failure
0608104-1	19-DC	Pb	U	Less than 5 times the calibration blank
0608104-1	19-DC	Th-232	J	Less than 3 times the MDC
0608104-2	2940 (40-SC Dup)	Cd	U	Less than 5 times the calibration blank
0608104-2	2940 (40-SC Dup)	NO_3-N	J	Matrix spike failure
0608104-2	2940 (40-SC Dup)	Pb	U	Less than 5 times the calibration blank
0608104-2	2940 (40-SC Dup)	Ra-228	J	Less than 3 times the MDC
0608104-2	2940 (40-SC Dup)	TDS	J	Missed holding time
0608104-3	40-SC	Cd	U	Less than 5 times the calibration blank
0608104-3	40-SC	NO_3-N	J	Matrix spike failure
0608104-3	40-SC	Pb	U	Less than 5 times the calibration blank
0608104-3	40-SC	Ra-228	J	Less than 3 times the MDC
0608104-3	40-SC	TDS	J	Missed holding time
0608104-4	54-SC	NO_3-N	J	Matrix spike failure
0608104-4	54-SC	Pb	U	Less than 5 times the calibration blank
0608104-4	54-SC	Se	U	Less than 5 times the method blank
0608104-4	54-SC	TDS	J	Missed holding time
0608104-5	5-DC	Cd	U	Less than 5 times the calibration blank
0608104-5	5-DC	NO_3-N	J	Matrix spike failure
0608104-5	5-DC	Pb	U	Less than 5 times the calibration blank
0608104-5	5-DC	Se	U	Less than 5 times the method blank
0608104-6	5-SC	NO_3-N	J	Matrix spike failure
0608104-6	5-SC	Pb	U	Less than 5 times the calibration blank
0608104-6	5-SC	Ra-228	J	Less than 3 times the MDC
0608104-7	K.G.S.#3	Cd	U	Less than 5 times the calibration blank
0608104-7	K.G.S.#3	NO_3-N	J	Matrix spike failure
0608104-7	K.G.S.#3	Pb	U	Less than 5 times the calibration blank
0608104-7	K.G.S.#3	TDS	J	Missed holding time
0608104-8	10-DC	Cd	U	Less than 5 times the calibration blank
0608104-8	10-DC	NO_3-N	J	Matrix spike failure
0608104-8	10-DC	Pb	U	Less than 5 times the calibration blank
0608104-9	51-SC	NO_3-N	J	Matrix spike failure
0608104-9	51-SC	Pb	U	Less than 5 times the calibration blank
0608104-9	51-SC	Se	U	Less than 5 times the method blank

Sample Shipping/Receiving

Paragon Analytics in Ft. Collins, Colorado, received nine water samples between August 12, 2006, and August 15, 2006, accompanied by Chain of Custody (COC) forms. The COC forms were checked to confirm that all of the samples were listed on the forms with sample

collection dates and times, and 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 cool and intact with temperatures within the chilled coolers of 1.6 °C and 4.0 °C, which is within the acceptance range. 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 with the following exception: samples 2940, 40-SC, 54-SC, and K.G.S. No. 3 were analyzed for TDS outside of the holding time. The TDS results for these samples are qualified with a "J" flag as estimated values.

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 SW-846 6020A, Cadmium, Lead, Selenium, Uranium
Calibrations for cadmium, lead, and uranium were performed on August 25, 2006, and for selenium on August 29, 2006. The initial calibrations were performed using six calibration standards resulting in calibration curves where the absolute value of the curve intercepts were less than three times the method detection limit (MDL) and the curve correlation coefficient (r^2) values were greater than 0.995. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks (CCVs) were made at the required frequency resulting in seven CCVs. All initial and CCV results were within the acceptance range with the exception of CCV7 for uranium. There were no samples associated with this CCV. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curves near the practical quantitation limit with the results 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, Chloride, Sulfate
Initial calibrations were performed for chloride and sulfate using five calibration standards on August 2, 2006. The calibration curve r^2 values were greater than 0.995 and intercepts less than three times the MDL. Initial calibration and calibration check standards were prepared from independent sources. Initial and CCV checks were made at the required frequency resulting in five CCVs. All calibration checks met the acceptance criteria.

Method SW-846 6010B, Chromium, Nickel
Calibration for cadmium was performed on August 22, 2006. The initial calibration was performed using four calibration standards resulting in a calibration curve where the absolute value of the curve intercept was less than three times the method detection limit (MDL) and the calibration curve r^2 value was greater than 0.995. Calibration and laboratory spike standards were prepared from independent sources. Initial and CCV checks were made at the required frequency resulting in nine 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 with the results within the acceptance range.

Method MCAWW 353.2, Nitrate-N
The initial calibration for NO_3+NO_2–N was performed using seven calibration standards on August 22, 2006, resulting in a calibration curve r^2 value greater than 0.995 and an intercept less than three times the MDL. Initial and continuing calibration checks were made at the required frequency resulting in seven CCVs that met the acceptance criteria.

Method MCAWW 160.1
There is no initial or continuing calibration requirement associated with the determination of total dissolved solids.

Radiochemical Analysis

Radiochemical results are qualified with a "J" flag (estimated) when the results are greater than the minimum detectable concentration (MDC), but less than three times the MDC. Radiochemical results are qualified with a "U" flag (not detected) when the results are greater than the MDC, but less than the two sigma total propagated uncertainty (TPU).

Radium-226
Emanation cell plateau voltage determinations were performed on May 25, 2006, and cell efficiency calibrations were performed on June 14, 2006. Daily efficiency calibration and background checks were performed on September 5, 2006. All calibration data met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Radium–228
Plateau voltage determinations were performed on October 31, 2005, and detector efficiency calibrations were performed on November 4, 2005. Daily efficiency calibration and background checks were performed on September 7, 2006. All calibration data met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples.

Thorium Isotopes
Alpha spectrometry calibrations were performed on August 18, 2006. Instrument background was determined on August 18, 2006. All daily instrument calibration and background checks met the acceptance criteria. The chemical recoveries met the acceptance criteria of 40 to 110 percent for all samples. The full width at half maximum (FWHM) was reviewed for all analyses to

evaluate the spectral resolution. All single peak FWHM values were below 100, demonstrating acceptable resolution. All internal standard peaks were within 50 KeV of the excepted position.

Method and Calibration Blanks

All initial and continuing calibration blank (CCB) results were below the practical quantitation limits for method 6010B and 6020A analytes with the exception of CCB7 for uranium. There were no samples associated with this CCB. In cases where blank concentration exceeded the instrument detection limit, the associated sample results are qualified with a "U" flag (not detected) when the sample results are greater than the MDL but less than five times the blank concentration.

The chloride, sulfate, NO_3+NO_2–N, and TDS method blanks and initial and continuing calibration blank results were below the method detection limits.

The thorium isotopes, radium-226, and radium-228 method blank results were below the minimum detectable concentration.

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

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

Matrix Spike Analysis

Matrix spike and matrix spike duplicate samples (MS/MSD) were analyzed for metals and nitrate-N as a measure of method performance in the sample matrix. The MS/MSD analyses resulted in acceptable recovery and precision for all analytes with the exception of nitrate-N. The nitrate-N results are qualified with a "J" flag as estimated values.

Laboratory Replicate Analysis

The laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference (RPD) values for the laboratory replicate samples and matrix spike duplicate sample results for non-radiochemical analytes were less than 20 percent. The radiochemical relative error ratio for the laboratory replicate sample was less than three.

Laboratory Control Sample

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

Metals Serial Dilution

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

Detection Limits/Dilutions

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

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The report received from the laboratory was complete.

Electronic Data Deliverable (EDD) File

The EDD file arrived on September 18, 2006, and the data was loaded into SEEPro on November 11, 2006. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Worksheet

RIN: 6070434 Lab Code: PAR Validator: Steve Donivan Validation Date: 10/4/2006

Site: SHIRLEY BASIN SOUTH Analysis Type: ☑ Metals ☑ General Chem ☑ Rad ☐ Oraganics

# of Samples: 9 Matrix: WATER Requested Analysis Completed: Yes

Chain of Custody
Present: OK Signed: OK Dated: OK

Sample
Integrity: OK Preservation: OK Temperature: OK

Exceptions

Method	Analyte	Location	Ticket	Collection Date	Preparation Date	Analysis Date	Dilution Factor	Holding Time Met	Detection Limit Met
EPA 160.1	TOTAL DISSOLVED SOLIDS	2940	NDV 895	8/9/2006	8/17/2006	8/18/2006	1	No	NA
EPA 160.1	TOTAL DISSOLVED SOLIDS	40-SC	NDV 894	8/9/2006	8/17/2006	8/18/2006	1	No	NA
EPA 160.1	TOTAL DISSOLVED SOLIDS	54-SC	NDV 893	8/9/2006	8/17/2006	8/18/2006	1	No	NA
EPA 160.1	TOTAL DISSOLVED SOLIDS	K.G.S.#3	NDV 892	8/9/2006	8/17/2006	8/18/2006	1	No	NA

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

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 06070434 **Lab Code:** PAR **Date Due:** 9/9/2006

Matrix: Water **Site Code:** SBS **Date Completed:** 9/21/2006

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
Cadmium	08/25/2006	0.0000	0.9999	OK	OK	OK	OK			95.0	95.0	0.0	103.0		101.0
Chromium	08/22/2006	0.0000	1.0000	OK	OK	OK	OK			94.0	95.0	1.0	91.0		100.0
Chromium	08/22/2006												89.0		100.0
Lead	08/25/2006	0.0020	0.9999	OK	OK	OK	OK			104.0	103.0	1.0	103.0		96.6
Nickel	08/22/2006	0.0000	1.0000	OK	OK	OK	OK			95.0	96.0	1.0	89.0	11.0	103.0
Nickel	08/22/2006												87.0		102.0
Selenium	08/29/2006	0.0000	0.9996	OK	OK	OK	OK	OK	106.0	98.0	95.0	3.0	104.0		124.0
Uranium	08/25/2006	0.0000	0.9999	OK	OK	OK	OK			116.0	117.0	1.0	113.0	53.0	91.5

Comments: _____

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 06070434 **Lab Code:** PAR **Date Due:** 9/9/2006

Matrix: Water **Site Code:** SBS **Date Completed:** 9/21/2006

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
10-DC	Thorium-230	08/22/2006			79.3			
10-DC	Radium-226	09/05/2006			100.0			
10-DC	Radium-228	09/07/2006			61.6			
19-DC	Thorium-230	08/22/2006			72.3			
19-DC	Radium-226	09/05/2006			102.0			
19-DC	Radium-228	09/07/2006			55.8			
2940	Thorium-230	08/22/2006			76.3			
2940	Radium-226	09/05/2006			105.0			
2940	Radium-228	09/07/2006			53.7			
2940 Dup	Thorium-228	08/22/2006			75.1			0.77
2940 Dup	Thorium-230	08/22/2006						0.86
2940 Dup	Thorium-232	08/22/2006						0.31
40-SC	Thorium-230	08/22/2006			82.1			
40-SC	Radium-226	09/05/2006			103.0			
40-SC	Radium-228	09/07/2006			64.4			
51-SC	Thorium-230	08/22/2006			78.4			
51-SC	Radium-226	09/05/2006			86.7			
51-SC	Radium-228	09/07/2006			66.2			
54-SC	Thorium-230	08/22/2006			78.3			
54-SC	Radium-226	09/05/2006			95.1			
54-SC	Radium-228	09/07/2006			65.7			
5-DC	Thorium-230	08/22/2006			74.8			
5-DC	Radium-226	09/05/2006			99.1			
5-DC	Radium-228	09/07/2006			61.8			
5-SC	Thorium-230	08/22/2006			82.3			
5-SC	Radium-226	09/05/2006			105.0			
5-SC	Radium-228	09/07/2006			58.7			
K.G.S.#3	Thorium-230	08/22/2006			77.0			
K.G.S.#3	Radium-226	09/05/2006			97.4			
K.G.S.#3	Radium-228	09/07/2006			63.2			
LCS	Thorium-230	08/22/2006			71.6	107.0		
LCS	Radium-226	09/05/2006			99.0	78.3		

Comments: _____

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 06070434 **Lab Code:** PAR **Date Due:** 9/9/2006

Matrix: Water **Site Code:** SBS **Date Completed:** 9/21/2006

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
LCS	Radium-228	09/07/2006			55.8	124.0		
LCSD	Radium-226	09/05/2006			101.0	79.9		0.10
LCSD	Radium-228	09/07/2006			59.5	114.0		0.43
Method Blank	Thorium-228	08/22/2006	0.4760	U	76.6			
Method Blank	Thorium-230	08/22/2006	0.3300	U				
Method Blank	Thorium-232	08/22/2006	0.1250	U				
Method Blank	Radium-226	09/05/2006	0.2400	U	98.1			
Method Blank	Radium-228	09/07/2006	0.6630	U	63.6			

Comments: _____

SAMPLE MANAGEMENT SYSTEM

Inorganics Data Validation Worksheet

RIN: 06070434 **Lab Code:** PAR **Date Due:** 9/9/2006

Matrix: Water **Site Code:** SBS **Date Completed:** 9/21/2006

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Chloride	08/17/2006	0	0.9999	OK	OK	OK	OK	OK	97.0	100.0	99.0	0	
Nitrate+Nitrite as N	08/22/2006	0	0.9999	OK	OK	OK	OK	OK	97.0	38.0	36.0	4.00	
Sulfate	08/17/2006	0	0.9999	OK	OK	OK	OK	OK	101.0	99.0	98.0	0	
Total Dissolved Solids	08/18/2006							OK	97.0				

Comments: _____

Sampling Quality Control Assessment

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

Sampling Protocol

All monitor well sample results were qualified with an "F" flag in the database indicating the wells were purged and sampled using the low-flow sampling method. Well 51-SC data were further qualified with a "Q" flag indicating that a constant water level could not be maintained. Turbidity requirements were not met during the purge and sampling process.

Equipment Blank Assessment

An equipment blank was not required because 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. A duplicate sample was collected from well 40-SC. With the exception of nitrate as N, the 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 are acceptable. The nitrate as N results are qualified with a "J" flag as estimated values because of matrix interference as evidenced by the matrix spike failure.

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 — 11-22-2006 (Date)

Data Validation Lead: Steve Donivan — 11-22-2006 (Date)

Attachment 1
Assessment of Anomalous Data

Minimums and Maximums Report

Minimums and Maximums Report

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

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

Four results were not within 50 percent of the historical minimum and are listed on the Anomalous Data Review Checksheet for further review. These results will be compared to results from the next sampling event to confirm the reduced concentrations observed.

Data Validation Minimums and Maximums Report - No Field Parameters
Laboratory: PARAGON (Fort Collins, CO)
RIN: 06070434
Comparison: All Historical Data
Report Date: 11/9/2006

Site Code	Location Code	Sample Date	Analyte	Current	Current Qualifiers		Historical Maximum	Historical Maximum Qualifiers		Historical Minimum	Historical Minimum Qualifiers		Count	
				Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect
SBS01	10-DC	08/11/2006	Nickel	0.00095	B	F	3.83			0.0023	B	UF	43	28
SBS01	19-DC	08/10/2006	Radium-226	6.23		F	11.2			6.5			16	0
SBS01	19-DC	08/10/2006	Radium-228	7.71		F	7.2			2	U		16	1
SBS01	19-DC	08/10/2006	Selenium	0.000016	U	F	0.004			0.00005	B	F	16	10
SBS01	40-SC	08/09/2006	Cadmium	0.00021	B	F	0.06			0.00023	B	UF	48	36
SBS01	51-SC	08/11/2006	Cadmium	0.00067		FQ	0.14			0.001			51	16
SBS01	51-SC	08/11/2006	Selenium	0.00019		UFQ	0.41			0.00033		FQ	61	40
SBS01	54-SC	08/09/2006	Cadmium	0.0012		F	0.1			0.003			51	15
SBS01	54-SC	08/09/2006	Nickel	3.5		F	3.2		F	0.34			51	0
SBS01	54-SC	08/09/2006	Selenium	0.00014		UF	0.066			0.00022		F	60	34
SBS01	5-DC	08/10/2006	Cadmium	0.00018	B	UF	0.1			0.004			54	20
SBS01	5-DC	08/10/2006	Selenium	0.0001		UF	1.3			0.00016		F	64	46

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

Anomalous Data Review Checksheet

Anomalous Data Review Checksheet

Site: Shirley Basin South **Sampling Data:** Ground Water

Reviewer: Steve Donivan (Name (print)) Steve Donivan (Signature) 11-22-2006 (Date)

Site Hydrologist: Dick Johnson (Name (print)) [signature] (Signature) 11/27/06 (Date)

Date of Review: November 9, 2006

Loc. No.	Analyte	Type of Anomaly	Disposition
10-DC	Nickel	Low	Compare to future results
19-DC	Selenium	Low	Compare to future results
54-SC	Cadmium	Low	Compare to future results
5-DC	Cadmium	Low	Compare to future results

Attachment 2
Data Presentation

Ground Water Quality Data

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 10-DC 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	08/11/2006	0001	180.8	-	220.8	191		F	#		
Cadmium	mg/L	08/11/2006	0001	180.8	-	220.8	0.00012	B	UF	#	.000016	
Chloride	mg/L	08/11/2006	0001	180.8	-	220.8	58		F	#	4	
Chromium	mg/L	08/11/2006	0001	180.8	-	220.8	0.0007	U	F	#	.0007	
Lead	mg/L	08/11/2006	0001	180.8	-	220.8	0.00016	B	UF	#	.000031	
Nickel	mg/L	08/11/2006	0001	180.8	-	220.8	0.00095	B	F	#	.00082	
Nitrate + Nitrite as Nitrogen	mg/L	08/11/2006	0001	180.8	-	220.8	0.016		FJ	#	.01	
Oxidation Reduction Potential	mV	08/11/2006	N001	180.8	-	220.8	-40.5		F	#		
pH	s.u.	08/11/2006	N001	180.8	-	220.8	6.59		F	#		
Radium-226	pCi/L	08/11/2006	0001	180.8	-	220.8	17.8		F	#	.363	4.49
Radium-228	pCi/L	08/11/2006	0001	180.8	-	220.8	5.17		F	#	.704	1.62
Selenium	mg/L	08/11/2006	0001	180.8	-	220.8	0.000016	U	F	#	.000016	
Specific Conductance	umhos /cm	08/11/2006	N001	180.8	-	220.8	2051		F	#		
Sulfate	mg/L	08/11/2006	0001	180.8	-	220.8	1000		F	#	10	
Temperature	C	08/11/2006	N001	180.8	-	220.8	10.84		F	#		
Thorium-228	pCi/L	08/11/2006	0001	180.8	-	220.8	-.0197	U	F	#	.434	.171
Thorium-230	pCi/L	08/11/2006	0001	180.8	-	220.8	0.426	U	F	#	.533	.3
Thorium-232	pCi/L	08/11/2006	0001	180.8	-	220.8	0.0494	U	F	#	.179	.0864
Total Dissolved Solids	mg/L	08/11/2006	0001	180.8	-	220.8	1800		F	#	40	
Turbidity	NTU	08/11/2006	N001	180.8	-	220.8	4.15		F	#		
Uranium	mg/L	08/11/2006	0001	180.8	-	220.8	0.011		F	#	.0000031	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 19-DC 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	08/10/2006	0001	177	-	237	242		F	#		
Cadmium	mg/L	08/10/2006	0001	177	-	237	0.0002	B	UF	#	.000016	
Chloride	mg/L	08/10/2006	0001	177	-	237	87		F	#	10	
Chromium	mg/L	08/10/2006	0001	177	-	237	0.0014	U	F	#	.0014	
Lead	mg/L	08/10/2006	0001	177	-	237	0.0002	B	UF	#	.000031	
Nickel	mg/L	08/10/2006	0001	177	-	237	0.14	E	F	#	.0016	
Nitrate + Nitrite as Nitrogen	mg/L	08/10/2006	0001	177	-	237	0.072	N	FJ	#	.01	
Oxidation Reduction Potential	mV	08/10/2006	N001	177	-	237	-60.9		F	#		
pH	s.u.	08/10/2006	N001	177	-	237	6.57		F	#		
Radium-226	pCi/L	08/10/2006	0001	177	-	237	6.23		F	#	.213	1.68
Radium-228	pCi/L	08/10/2006	0001	177	-	237	7.71		F	#	.756	2.37
Selenium	mg/L	08/10/2006	0001	177	-	237	0.000016	U	F	#	.000016	
Specific Conductance	umhos /cm	08/10/2006	N001	177	-	237	4004		F	#		
Sulfate	mg/L	08/10/2006	0001	177	-	237	2700		F	#	25	
Temperature	C	08/10/2006	N001	177	-	237	12.45		F	#		
Thorium-228	pCi/L	08/10/2006	0001	177	-	237	0.121	U	F	#	.35	.172
Thorium-230	pCi/L	08/10/2006	0001	177	-	237	-.199	U	F	#	.565	.194
Thorium-232	pCi/L	08/10/2006	0001	177	-	237	0.093		FJ	#	.063	.0943
Total Dissolved Solids	mg/L	08/10/2006	0001	177	-	237	4200		F	#	80	
Turbidity	NTU	08/10/2006	N001	177	-	237	2.4		F	#		
Uranium	mg/L	08/10/2006	0001	177	-	237	0.0002	E	F	#	.0000031	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 40-SC WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Alkalinity, Total (As CaCO3)	mg/L	08/09/2006	0001	-	112		F	#		
Cadmium	mg/L	08/09/2006	0001	-	0.00021	B	F	#	.000016	
Cadmium	mg/L	08/09/2006	0002	-	0.00021	B	UF	#	.000016	
Chloride	mg/L	08/09/2006	0001	-	120		F	#	10	
Chloride	mg/L	08/09/2006	0002	-	120		F	#	10	
Chromium	mg/L	08/09/2006	0001	-	0.0014	U	F	#	.0014	
Chromium	mg/L	08/09/2006	0002	-	0.0014	U	F	#	.0014	
Lead	mg/L	08/09/2006	0001	-	0.00016	B	UF	#	.000031	
Lead	mg/L	08/09/2006	0002	-	0.00017	B	UF	#	.000031	
Nickel	mg/L	08/09/2006	0001	-	0.018	B	F	#	.0016	
Nickel	mg/L	08/09/2006	0002	-	0.02	B	F	#	.0016	
Nitrate + Nitrite as Nitrogen	mg/L	08/09/2006	0001	-	0.28		FJ	#	.01	
Nitrate + Nitrite as Nitrogen	mg/L	08/09/2006	0002	-	0.44		FJ	#	.01	
Oxidation Reduction Potential	mV	08/09/2006	N001	-	154.1		F	#		
pH	s.u.	08/09/2006	N001	-	6.2		F	#		
Radium-226	pCi/L	08/09/2006	0001	-	0.198	U	F	#	.253	.176
Radium-226	pCi/L	08/09/2006	0002	-	0.0669	U	F	#	.236	.135
Radium-228	pCi/L	08/09/2006	0001	-	1.55		FJ	#	.64	.587
Radium-228	pCi/L	08/09/2006	0002	-	1.29		FJ	#	.751	.56
Selenium	mg/L	08/09/2006	0001	-	0.004		F	#	.000016	
Selenium	mg/L	08/09/2006	0002	-	0.0041		F	#	.000016	
Specific Conductance	umhos /cm	08/09/2006	N001	-	3777		F	#		

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 40-SC WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Sulfate	mg/L	08/09/2006	0001	-	2400		F	#	25	
Sulfate	mg/L	08/09/2006	0002	-	2400		F	#	25	
Temperature	C	08/09/2006	N001	-	10.27		F	#		
Thorium-228	pCi/L	08/09/2006	0001	-	0.0641	U	F	#	.358	.159
Thorium-228	pCi/L	08/09/2006	0002	-	-.00726	U	F	#	.446	.178
Thorium-230	pCi/L	08/09/2006	0001	-	-.000293	U	F	#	.53	.222
Thorium-230	pCi/L	08/09/2006	0002	-	-.226	U	F	#	.561	.189
Thorium-232	pCi/L	08/09/2006	0001	-	0.0204	U	F	#	.0554	.072
Thorium-232	pCi/L	08/09/2006	0002	-	0.0327	U	F	#	.137	.0791
Total Dissolved Solids	mg/L	08/09/2006	0001	-	4000		FJ	#	80	
Total Dissolved Solids	mg/L	08/09/2006	0002	-	4000		FJ	#	80	
Turbidity	NTU	08/09/2006	N001	-	0.73		F	#		
Uranium	mg/L	08/09/2006	0001	-	0.0004		F	#	.0000031	
Uranium	mg/L	08/09/2006	0002	-	0.0004		F	#	.0000031	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 5-DC WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cadmium	mg/L	08/10/2006	0001	-	0.00018	B	UF	#	.000016	
Chloride	mg/L	08/10/2006	0001	-	180		F	#	20	
Chromium	mg/L	08/10/2006	0001	-	0.034		F	#	.0021	
Lead	mg/L	08/10/2006	0001	-	0.00019	B	UF	#	.000031	
Nickel	mg/L	08/10/2006	0001	-	0.94		F	#	.0025	
Nitrate + Nitrite as Nitrogen	mg/L	08/10/2006	0001	-	0.35		FJ	#	.2	
Oxidation Reduction Potential	mV	08/10/2006	N001	-	271.6		F	#		
pH	s.u.	08/10/2006	N001	-	3.92		F	#		
Radium-226	pCi/L	08/10/2006	0001	-	10.3		F	#	.372	2.78
Radium-228	pCi/L	08/10/2006	0001	-	47.1		F	#	.69	14
Selenium	mg/L	08/10/2006	0001	-	0.0001		UF	#	.000016	
Specific Conductance	umhos /cm	08/10/2006	N001	-	6613		F	#		
Sulfate	mg/L	08/10/2006	0001	-	5500		F	#	50	
Temperature	C	08/10/2006	N001	-	12		F	#		
Thorium-228	pCi/L	08/10/2006	0001	-	2.66		F	#	.438	.675
Thorium-230	pCi/L	08/10/2006	0001	-	1.86		F	#	.555	.555
Thorium-232	pCi/L	08/10/2006	0001	-	1.52		F	#	.136	.443
Total Dissolved Solids	mg/L	08/10/2006	0001	-	8600		F	#	200	
Turbidity	NTU	08/10/2006	N001	-	0.64		F	#		
Uranium	mg/L	08/10/2006	0001	-	0.1		F	#	.000016	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 5-SC WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cadmium	mg/L	08/10/2006	0001	49.3	-	57.7	0.044		F	#	.000081	
Chloride	mg/L	08/10/2006	0001	49.3	-	57.7	310		F	#	20	
Chromium	mg/L	08/10/2006	0001	49.3	-	57.7	0.36		F	#	.0021	
Lead	mg/L	08/10/2006	0001	49.3	-	57.7	0.0012	B	UF	#	.00016	
Nickel	mg/L	08/10/2006	0001	49.3	-	57.7	3		F	#	.0025	
Nitrate + Nitrite as Nitrogen	mg/L	08/10/2006	0001	49.3	-	57.7	1.2		FJ	#	.5	
Oxidation Reduction Potential	mV	08/10/2006	N001	49.3	-	57.7	280.4		F	#		
pH	s.u.	08/10/2006	N001	49.3	-	57.7	3.26		F	#		
Radium-226	pCi/L	08/10/2006	0001	49.3	-	57.7	-.0589	U	F	#	.277	.132
Radium-228	pCi/L	08/10/2006	0001	49.3	-	57.7	1.85		FJ	#	.735	.691
Selenium	mg/L	08/10/2006	0001	49.3	-	57.7	0.022		F	#	.000078	
Specific Conductance	umhos /cm	08/10/2006	N001	49.3	-	57.7	1184		F	#		
Sulfate	mg/L	08/10/2006	0001	49.3	-	57.7	13000		F	#	100	
Temperature	C	08/10/2006	N001	49.3	-	57.7	9.52		F	#		
Thorium-228	pCi/L	08/10/2006	0001	49.3	-	57.7	49.6		F	#	.472	8.25
Thorium-230	pCi/L	08/10/2006	0001	49.3	-	57.7	489		F	#	.528	79
Thorium-232	pCi/L	08/10/2006	0001	49.3	-	57.7	13.3		F	#	.128	2.39
Total Dissolved Solids	mg/L	08/10/2006	0001	49.3	-	57.7	20000		F	#	200	
Turbidity	NTU	08/10/2006	N001	49.3	-	57.7	5.52		F	#		
Uranium	mg/L	08/10/2006	0001	49.3	-	57.7	3.8		F	#	.00031	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 51-SC WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Cadmium	mg/L	08/11/2006	0001	-	0.00067		FQ	#	.000016	
Chloride	mg/L	08/11/2006	0001	-	370		FQ	#	20	
Chromium	mg/L	08/11/2006	0001	-	0.37		FQ	#	.0021	
Lead	mg/L	08/11/2006	0001	-	0.00017	B	UFQ	#	.000031	
Nickel	mg/L	08/11/2006	0001	-	2.3		FQ	#	.0025	
Nitrate + Nitrite as Nitrogen	mg/L	08/11/2006	0001	-	0.45		FQJ	#	.2	
Oxidation Reduction Potential	mV	08/11/2006	N001	-	314.5		FQ	#		
pH	s.u.	08/11/2006	N001	-	3.46		FQ	#		
Radium-226	pCi/L	08/11/2006	0001	-	0.183	U	FQ	#	.219	.163
Radium-228	pCi/L	08/11/2006	0001	-	0.51	U	FQ	#	.65	.36
Selenium	mg/L	08/11/2006	0001	-	0.00019		UFQ	#	.000016	
Specific Conductance	umhos /cm	08/11/2006	N001	-	1018		FQ	#		
Sulfate	mg/L	08/11/2006	0001	-	11000		FQ	#	100	
Temperature	C	08/11/2006	N001	-	12.64		FQ	#		
Thorium-228	pCi/L	08/11/2006	0001	-	5.85		FQ	#	.463	1.19
Thorium-230	pCi/L	08/11/2006	0001	-	6.71		FQ	#	.535	1.33
Thorium-232	pCi/L	08/11/2006	0001	-	3.71		FQ	#	.0982	.818
Total Dissolved Solids	mg/L	08/11/2006	0001	-	16000		FQ	#	200	
Turbidity	NTU	08/11/2006	N001	-	16.1		FQ	#		
Uranium	mg/L	08/11/2006	0001	-	0.023		FQ	#	.0000031	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: 54-SC WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Data	QA	Detection Limit	Uncertainty
Cadmium	mg/L	08/09/2006	0001	-	0.0012		F	#	.000016	
Chloride	mg/L	08/09/2006	0001	-	340		F	#	20	
Chromium	mg/L	08/09/2006	0001	-	0.23		F	#	.0021	
Dissolved Oxygen	mg/L	08/09/2006	N001	-	3.05		F	#		
Lead	mg/L	08/09/2006	0001	-	0.00037	B	UF	#	.000031	
Nickel	mg/L	08/09/2006	0001	-	3.5		F	#	.0025	
Nitrate + Nitrite as Nitrogen	mg/L	08/09/2006	0001	-	0.31		FJ	#	.2	
Oxidation Reduction Potential	mV	08/09/2006	N001	-	271.6		F	#		
pH	s.u.	08/09/2006	N001	-	3.89		F	#		
Radium-226	pCi/L	08/09/2006	0001	-	14.5		F	#	.405	3.7
Radium-228	pCi/L	08/09/2006	0001	-	101		F	#	.644	30
Selenium	mg/L	08/09/2006	0001	-	0.00014		UF	#	.000016	
Specific Conductance	umhos /cm	08/09/2006	N001	-	8427		F	#		
Sulfate	mg/L	08/09/2006	0001	-	8100		F	#	50	
Temperature	C	08/09/2006	N001	-	14.98		F	#		
Thorium-228	pCi/L	08/09/2006	0001	-	9.39		F	#	.448	1.76
Thorium-230	pCi/L	08/09/2006	0001	-	6.07		F	#	.532	1.23
Thorium-232	pCi/L	08/09/2006	0001	-	8.72		F	#	.155	1.64
Total Dissolved Solids	mg/L	08/09/2006	0001	-	13000		FJ	#	200	
Turbidity	NTU	08/09/2006	N001	-	3.76		F	#		
Uranium	mg/L	08/09/2006	0001	-	0.066		F	#	.0000031	

Ground Water Quality Data by Location (USEE100) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006
Location: K.G.S.#3 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	08/09/2006	0001	420	-	450	75		F	#		
Cadmium	mg/L	08/09/2006	0001	420	-	450	0.00013	B	UF	#	.000016	
Chloride	mg/L	08/09/2006	0001	420	-	450	10		F	#	2	
Chromium	mg/L	08/09/2006	0001	420	-	450	0.0012	B	F	#	.0007	
Lead	mg/L	08/09/2006	0001	420	-	450	0.00017	B	UF	#	.000031	
Nickel	mg/L	08/09/2006	0001	420	-	450	0.0021	B	F	#	.00082	
Nitrate + Nitrite as Nitrogen	mg/L	08/09/2006	0001	420	-	450	0.01	U	FJ	#	.01	
Oxidation Reduction Potential	mV	08/09/2006	N001	420	-	450	-66.4		F	#		
pH	s.u.	08/09/2006	N001	420	-	450	9.37		F	#		
Radium-226	pCi/L	08/09/2006	0001	420	-	450	0.226	U	F	#	.276	.195
Radium-228	pCi/L	08/09/2006	0001	420	-	450	0.682	U	F	#	.688	.405
Selenium	mg/L	08/09/2006	0001	420	-	450	0.000016	U	F	#	.000016	
Specific Conductance	umhos /cm	08/09/2006	N001	420	-	450	689		F	#		
Sulfate	mg/L	08/09/2006	0001	420	-	450	220		F	#	5	
Temperature	C	08/09/2006	N001	420	-	450	17.43		F	#		
Thorium-228	pCi/L	08/09/2006	0001	420	-	450	-.0126	U	F	#	.298	.107
Thorium-230	pCi/L	08/09/2006	0001	420	-	450	-.22	U	F	#	.54	.182
Thorium-232	pCi/L	08/09/2006	0001	420	-	450	0.0138	U	F	#	.118	.0758
Total Dissolved Solids	mg/L	08/09/2006	0001	420	-	450	430		FJ	#	20	
Turbidity	NTU	08/09/2006	N001	420	-	450	2.19		F	#		
Uranium	mg/L	08/09/2006	0001	420	-	450	0.00012		F	#	.0000031	

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

STATIC WATER LEVELS (USEE700) FOR SITE SBS01, Shirley Basin South Disposal Site
REPORT DATE: 11/9/2006

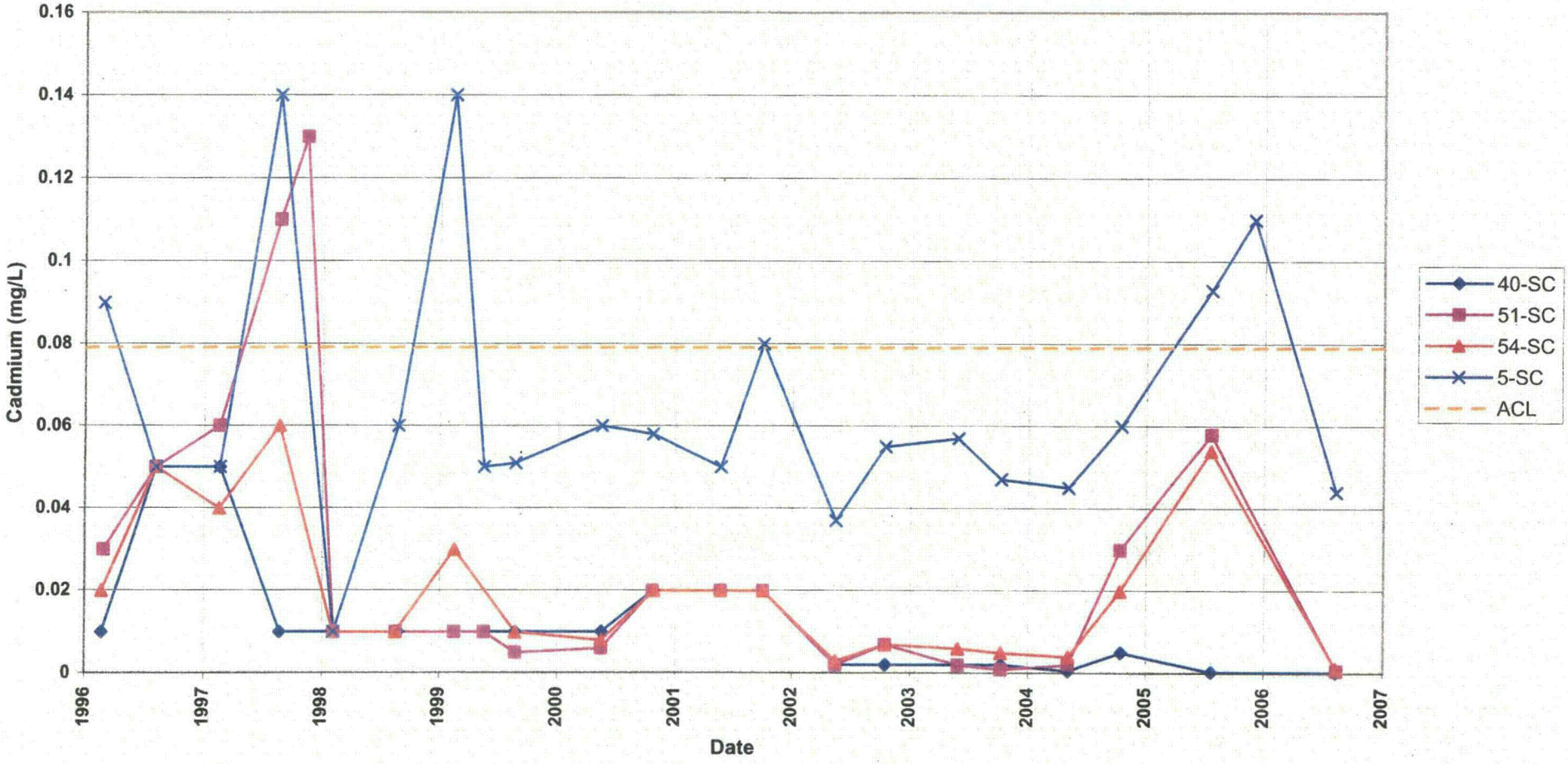
Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
10-DC		7113.02	10-AUG-06	14:50:00	172.97	6940.05	
19-DC		7112.04	10-AUG-06	12:45:00	172.76	6939.28	
40-SC		7058.48	09-AUG-06	18:29:00	9.16	7049.32	
5-DC		7119.84	10-AUG-06	10:46:00	181.4	6938.44	
5-SC		7056.45	10-AUG-06	09:20:00	56.38	7000.07	
51-SC		7091.68	11-AUG-06	10:50:00	97.93	6993.75	
54-SC		7158.78	09-AUG-06	15:11:00	208.11	6950.67	
K.G.S.#3		7171.03	09-AUG-06	10:28:00	226.69	6944.34	

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

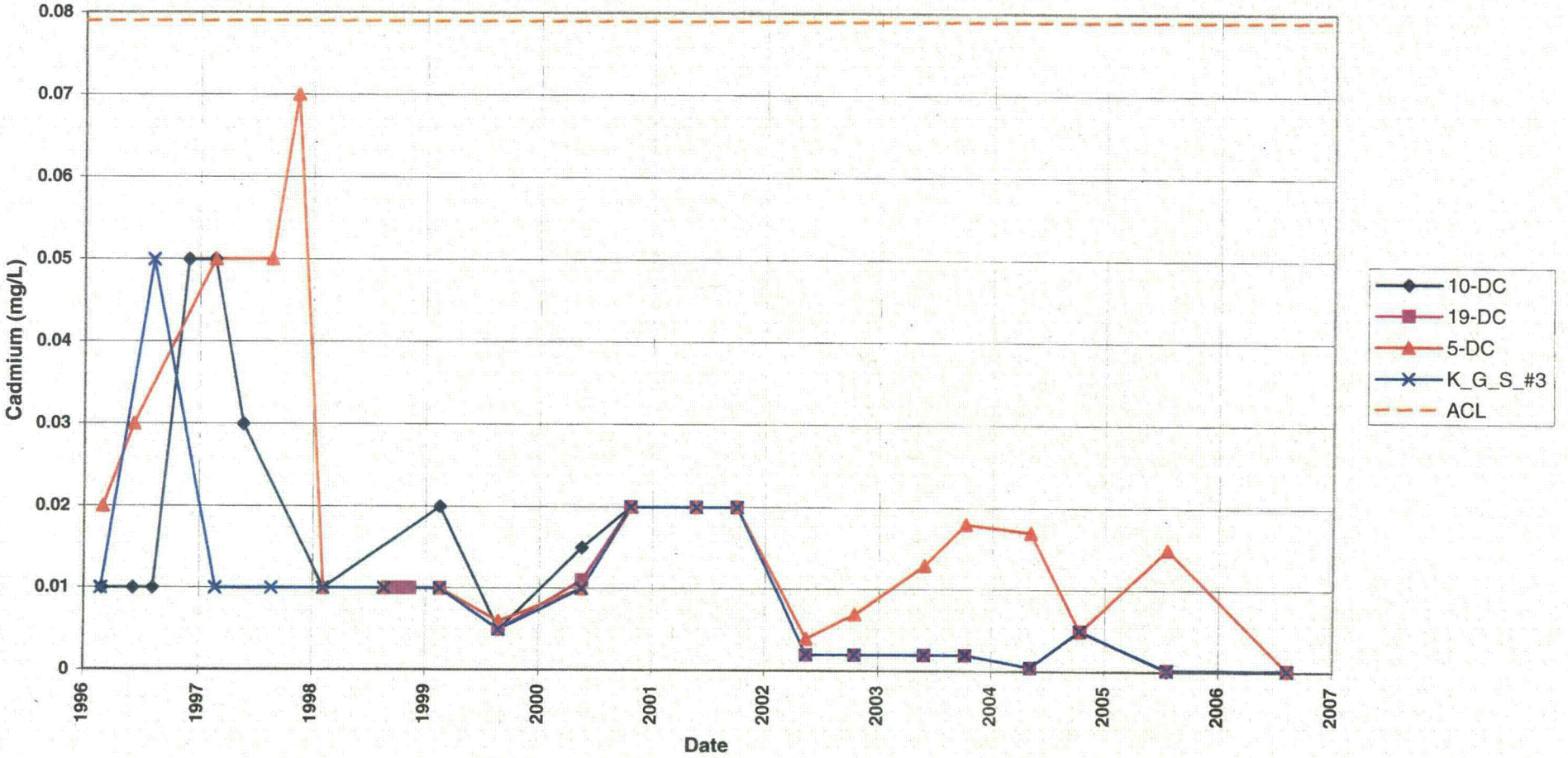
WATER LEVEL FLAGS: D Dry

Time Versus Concentration Graphs

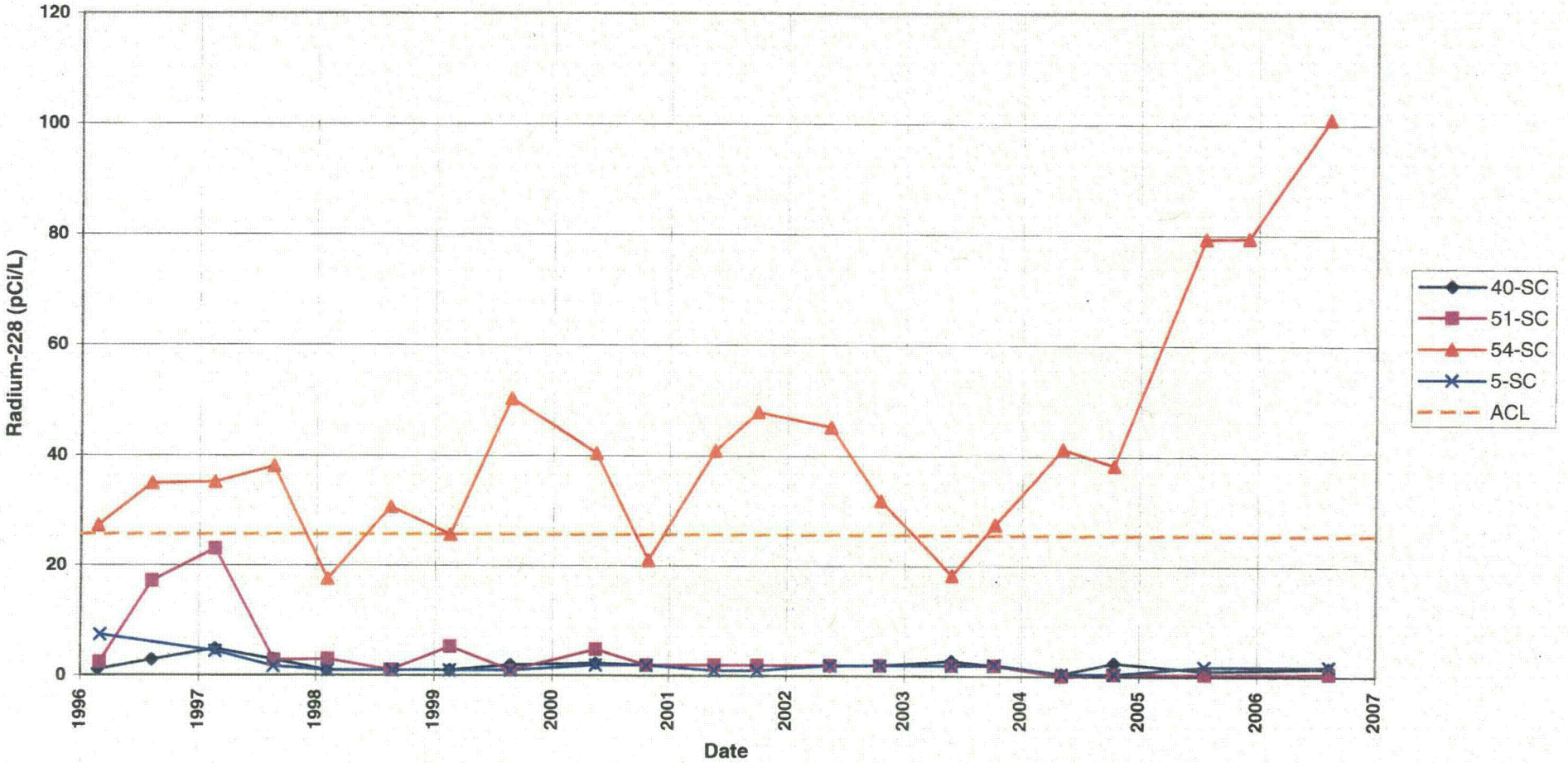
Shirley Basin South Disposal Site
Cadmium Concentration
Alternate Concentration Limit = 0.079 mg/L



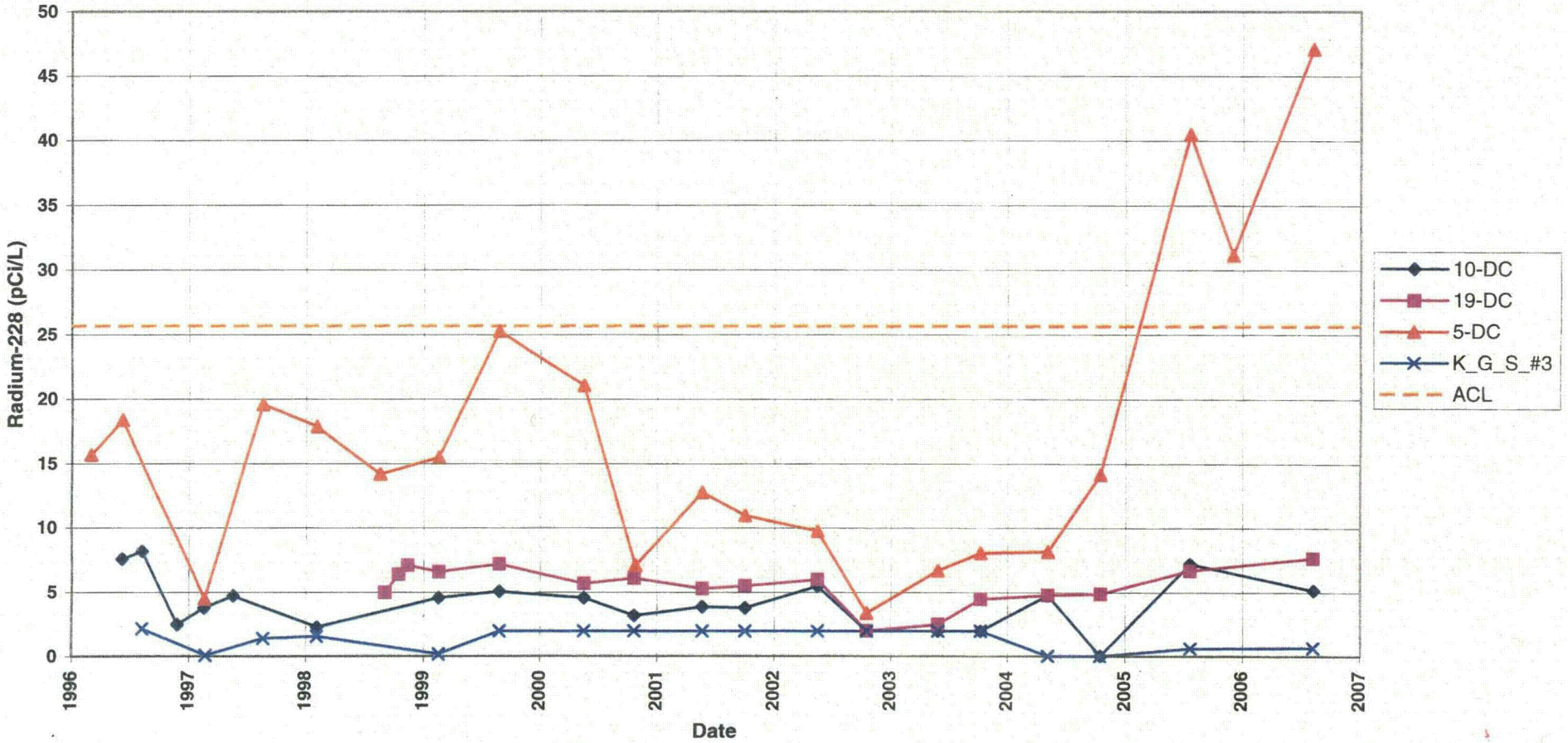
Shirley Basin South Disposal Site
Cadmium Concentration
Alternate Concentration Limit = 0.079 mg/L



Shirley Basin South Disposal Site
Radium-228 Concentration
Alternate Concentration Limit = 25.7 pCi/L



Shirley Basin South Disposal Site
Radium-228 Concentration
Alternate Concentration Limit = 25.7 pCi/L



Attachment 3
Sampling and Analysis Work Order

Stoller

established 1959

Task Order ST06-102
Control Number 1000-T06-1462

July 5, 2006

Scott R. Surovchak
Program Manager, LM–50
U.S. Department of Energy
Office of Legacy Management
12101 Airport Way, Unit C
Broomfield, CO 80021-2583

SUBJECT: Contract No. DE-AC01-02GJ79491, Stoller
August 2006 Environmental Sampling at Shirley Basin South, Wyoming, Disposal Site

Reference: FY 2006 LM Task Order No. ST06–102–26

Dear Mr. Surovchak:

The purpose of this letter is to inform you of the upcoming sampling event at the Shirley Basin South, Washington, Disposal Site. Enclosed are the map and tables specifying the sample locations and analyte lists for routine monitoring. Water quality data will be collected from monitor wells at this site as part of the environmental sampling currently scheduled to begin the week of August 7, 2006.

The following list shows the monitor wells scheduled to be sampled during this event.

Processing Site Monitor Wells (filtered)*

40-SC Nr	51-SC Nr	10-DC Rl	5-DC Nr	19-DC Rl	K.G.S. No.3 Nr
5-SC Nr	54-SC Nr				

*NOTE: Rl = Wind River - Lower Confined Sandstone; Nr = No Recovery of Data for Classifying

QA/QC 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 extension 6588 or Dick Johnson at extension 6022.

Sincerely,

Signature on original

Clay Carpenter
Project Manager

CC/lcg/mat
Enclosures (3)

cc: C. I. Bahrke, Stoller
S. E. Donivan, Stoller (e)
L. C. Goodknight, Stoller (e)
R. K. Johnson, Stoller (e)
K. E. Miller, Stoller (e)

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

Site	Shirley Basin South	
Analyte	Ground Water	Surface Water
Approx. No. Samples/yr	8	0
Field Measurements		
Alkalinity	X	
Dissolved Oxygen		
Redox Potential		
pH	X	
Specific Conductance	X	
Turbidity	X	
Temperature	X	
Laboratory Measurements		
Aluminum		
Ammonia as N (NH3-N)		
Antimony		
Arsenic		
Barium		
Beryllium		
Bromide		
BTEX		
Cadmium	X	
Calcium		
Chloride	X	
Chromium	X	
Cobalt		
Copper		
Fluoride		
Gamma Spec		
Gross Alpha		
Gross Beta		
Iron		
Lead	X	
Lead-210		
Magnesium		
Manganese		
Mercury		
Molybdenum		
Nickel	X	
Nickel-63		
Nitrate + Nitrite as N (NO3+NO2)-N	X	
Organics		
PCBs		
Phosphate		
Polonium-210		
Potassium		

Analyte	Ground Water	Surface Water
Radium-226	X	
Radium-228	X	
Radon-222		
Selenium	X	
Silica		
Sodium		
Strontium		
Sulfate	X	
Sulfide		
Thallium		
Thorium-230	X	
Thorium-232		
Tin		
Total Dissolved Solids	X	
Total Organic Carbon		
Tritium		
Uranium	X	
Uranium-234, -238		
Vanadium		
VOCs		
Zinc		
Total Analytes	13	0

Attachment 4
Trip Report

Stoller

established 1959

Grand Junction Office

Memorandum

Control Number N/A

DATE: September 14, 2006

TO: Richard K. Johnson

FROM: Emile A. Bettez

SUBJECT: Trip Report

Site: Shirley Basin Wyoming, Disposal Site

Dates of Sampling Event: August 9-11, 2006

Team Members: Jeff Walters and Emile Bettez

Number of Locations Sampled: 8 wells were sampled for metals (Cd, Cr, Pb, Ni, Se, U), Th-230, Ra-226/228, TDS, nitrites/nitrates, and anions (Cl, SO4). In addition, 1 duplicate sample was collected for QA/QC purposes. Because we disposed of the silicon tubing of the peristaltic pump after only one use, no equipment blank was required.

Locations Not Sampled/Reason: None.

Location Specific Information:

Ticket Number	Location	Sample Date	Description
NDV 892	KGS #3	8/9/2006	Cat. I. Well is very slow to purge due to eq. limitations
NDV 893	54-SC	8/9/2006	Cat. I
NDV 894	40-SC	8/9/2006	Cat. I
NDV 895	2940	8/9/2006	Duplicate sample of 40-SC
NDV 896	5-SC	8/10/2006	Cat. I
NDV 897	5-DC	8/10/2006	Cat. I
NDV 898	19-DC	8/10/2006	Cat. I
NDV 899	10-DC	8/10/2006	Cat. I
NDV 900	51-SC	8/11/2006	Cat. II

Field Variance: In this trip, we started to collect 3 bottles for Ra-226/228, instead of the 2 that were customary before.

Site Issues

Disposal Cell/Drainage Structure Integrity: OK

Vegetation/Noxious Weed Concerns: N/A

Maintenance Requirements: None observed

Corrective Action Taken: On August 10, 2006, while working at well 10-DC, our air compressor broke down right after the purge. We had to rent an air compressor at Rawlings, WY, and came back on August 11, 2006, to finish the well. We re-purged the well and collected an extra set of parameters before sampling.

EAB/lcg

cc: S. R. Surovchak, DOE (e)
C. I. Bahrke, Stoller (e)
S. E. Donivan, Stoller (e)
K. E. Miller, Stoller (e)

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

False Id	True Id	Sample Type	Associated Matrix	Ticket Number
2940	40-SC	Duplicate	Ground water	NDV 895

Requisition Numbers Assigned: All samples were assigned to RIN 06070434.

Sample Shipment: Samples that required cold conditions were shipped from Rawlins, WY, via UPS on August 11, 2006, for Saturday delivery to Paragon Analytics, due to the short holding times for these samples. (UPS Tracking No. J171 108 924 9) All the remaining samples were shipped overnight FedEx to Paragon Analytics, Inc., from Grand Junction, CO, on August 14, 2006. (FedEx Tracking No.8473 2967 6524)

Water Level Measurements: Water levels were collected at all sampled wells:

Location	Water Level (ft. BGS)
40-SC	9.16
5-SC	56.38
51-SC	97.93
54-SC	208.11
10-DC	172.97
5-DC	181.40
19-DC	172.76
KGS #3	226.69

Well Inspection Summary: All wells were in good condition.

Equipment: All wells were equipped with dedicated bladder pumps, except for well 40-SC which was sampled using a peristaltic pump.

Institutional Controls: All gates were appropriately closed and locked during the sampling event. On 8/10/2006, a couple of people who claimed to work for the mine nearby (they were wearing dosimeters), approached us in their truck to check who we were and what we were doing there.

Fences, Gates, Locks: OK

Signs: No missing or vandalized signs were observed.

Trespassing/Site Disturbances: N/A