

Data Validation Package

June 2010
Groundwater Sampling at the
Hallam, Nebraska,
Decommissioned Reactor

August 2010



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

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Sampling Event Summary

Site: Hallam, Nebraska, Decommissioned Reactor

Sampling Period: June 7-8, 2010

The 2008 *Long-Term Surveillance Plan [LTSP] for the Hallam Nuclear Power Facility, Hallam, Nebraska* requires biennial groundwater monitoring. This event involved sampling 17 monitoring wells at the Hallam, Nebraska, site. Water levels were measured at all sampled wells and two additional wells (6A and 6B) on June 7, 2010, before the sampling event was started. Water levels also were measured at the start of each sample event. Sampling and analysis was conducted as specified in *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated) and the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated).

Gross alpha and gross beta are the only parameters that were detected at statistically significant concentrations. Time/concentration graphs of the gross alpha and gross beta data are presented in this report. The gross alpha and gross beta activity concentrations observed are consistent with values previously observed and are attributed to naturally occurring radionuclides (e.g., uranium and uranium decay chain products) in the groundwater.

Michele Miller
Site Lead, S.M. Stoller

Date



Legend ● Sampled Monitoring Well		U.S. DEPARTMENT OF ENERGY <small>GRAND JUNCTION, COLORADO</small>	<small>Work Performed by</small> S.M. Stoller Corporation <small>Under DOE Contract No. DE-AM01-07LM00060</small>
		Sampled Locations June 2010 Hallam, NE, Decommissioned Reactor Site	
0 150 300 Feet	<small>DATE PREPARED:</small> August 13, 2010	<small>FILENAME:</small> S0601700	

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Hallam Decommissioned Reactor Sample Location Map

Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	<u>Hallam, Nebraska</u>	Date(s) of Water Sampling	<u>June 7-8, 2010</u>
Date(s) of Verification	<u>August 2, 2010</u>	Name of Verifier	<u>Steve Donovan</u>

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order Letter dated May 11, 2010.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>Yes</u>	
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibration was performed on May 27, 2010.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u>	<u>Operational checks were performed on June 7 and June 8, 2010.</u>
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>No</u>	<u>Alkalinity measurements were not performed.</u>
6. Was the category of the well documented?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	<u>Yes</u>	
Did the water level stabilize prior to sampling?	<u>Yes</u>	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	<u>Yes</u>	
Was the flow rate less than 500 mL/min?	<u>Yes</u>	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>NA</u>	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	A duplicate sample was collected from well 1A.
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	Dedicated tubing was used to sample all wells.
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 2628 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 (hardcopies) or are dates present for the "Date Signed" 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?	NA	Sample cooling was not required.
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN): 10053095
Sample Event: June 7-8, 2010
Site(s): Hallam, Nebraska
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Work Order No.: 1006146
Analysis: Radiochemistry
Validator: Steve Donovan
Review Date: August 2, 2010

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), “Standard Practice for Validation of Laboratory Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Preparation Method	Analytical Method
Gamma Spectrometry	GAM-A-001	SOP713R11	SOP713R11
Gross Alpha/Beta	GPC-A-001	SOP702R19	SOP724R10
Tritium	LSC-A-001	SOP700R10	SOP704R9
Nickel-63	LSC-A-009	SOP774R1	SOP704R9

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1006146-1	1A	Gross Beta	J	Result less than the determination limit
1006146-2	1B	Cesium-134	U	Identification criteria not met
1006146-2	1B	Yttrium-88	U	Identification criteria not met
1006146-2	1B	Gross Beta	J	Result less than the determination limit
1006146-4	2A	Gross Beta	J	Result less than the determination limit
1006146-6	2B2	Gross Alpha	J	Result less than the determination limit
1006146-6	2B2	Gross Beta	J	Result less than the determination limit
1006146-7	2C2	Gross Beta	J	Result less than the determination limit
1006146-8	3A	Thorium-234	U	Identification criteria not met
1006146-8	3A	Gross Beta	J	Result less than the determination limit

Table 2 (continued). Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1006146-9	3B	Gross Alpha	J	Result less than the determination limit
1006146-9	3B	Gross Beta	J	Result less than the determination limit
1006146-10	4A	Gross Alpha	J	Result less than the determination limit
1006146-10	4A	Gross Beta	J	Result less than the determination limit
1006146-11	4B	Gross Beta	J	Result less than the determination limit
1006146-13	5A	Uranium-235	U	Identification criteria not met
1006146-16	7C	Cesium-134	U	Identification criteria not met
1006146-17	8B	Gross Beta	J	Result less than the determination limit

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 20 samples on June 15, 2010, accompanied by Chain of Custody (COC) form. The COC form was checked to confirm that all of the samples were listed on the form with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents including the COC form and the sample tickets had no errors or omissions.

Holding Times and Preservation

The sample shipments were received intact at ambient temperature. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

Laboratory Instrument Calibration

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

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 Determination Limit (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 Decision Level Concentration estimated as the two sigma total propagated uncertainty.

Gamma Spectrometry

Activity concentrations above the MDC were reported in some instances where minimum nuclide identification criteria were not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the ‘diagnostic’ peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Sample results for gamma-emitting radionuclides that do not meet the identification criteria are qualified with a “U” flag as not detected.

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 blank results were below the MDC.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate samples (MS/MSD) were analyzed for gross alpha, gross beta, and tritium as a measure of method performance in the sample matrix. All spike results were within the acceptance range.

Laboratory Duplicate Analysis

The laboratory replicate sample results demonstrate acceptable laboratory precision with relative error ratios less than 3 for all duplicate sample results.

Laboratory Control Sample (LCS)

LCSs 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 analytes.

Detection Limits/Dilutions

Sample dilutions were not required. The required detection limits were met for all analytes with the following exception. The gross alpha and/or gross beta detection limits were not met because the dissolved solids in the samples limited the aliquot that could be analyzed.

Completeness

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

Electronic Data Deliverable (EDD) File

The EDD files arrived on July 13, 2010. The Sample Management System EDD validation module was used to verify that the EDD files were complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 10053095 Lab Code: PAR Validator: _____ Validation Date: 7/29/2010

Project: Hallam Analysis Type: Metals General Chem Rad Organics

of Samples: 18 Matrix: WATER Requested Analysis Completed: Yes

Chain of Custody

Present: OK Signed: OK Dated: OK

Sample

Integrity: OK Preservation: OK Temperature: OK

Select Quality Parameters

- Holding Times
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

There are 10 detection limit failures.

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

RIN: 10053095 Lab Code: PAR

Non-Compliance Report: Detection Limits

Project: Hallam

Validation Date: 7/29/2010

Ticket	Location	Lab Sample ID	Method Code	Lab Method	Analyte Name	Result	Qualifier	Reported Detection Limit	Required Detection Limit	Units
IGU 569	1A	1006146-1	GPC-A-001	724R10	GROSS ALPHA	1.72	U	2.6	2	pCi/L
IGU 586	2628	1006146-3	GPC-A-001	724R10	GROSS ALPHA	2.03	U	2.6	2	pCi/L
IGU 572	2B	1006146-5	GPC-A-001	724R10	GROSS ALPHA	22.1		2.5	2	pCi/L
IGU 575	3A	1006146-8	GPC-A-001	724R10	GROSS ALPHA	14.1		3.3	2	pCi/L
IGU 575	3A	1006146-8	GPC-A-001	724R10	GROSS BETA	12		5.2	4	pCi/L
IGU 576	3B	1006146-9	GPC-A-001	724R10	GROSS BETA	5.4		4.7	4	pCi/L
IGU 576	3B	1006146-9	GPC-A-001	724R10	GROSS ALPHA	6.31		2.6	2	pCi/L
IGU 577	4A	1006146-10	GPC-A-001	724R10	GROSS ALPHA	7.74		2.9	2	pCi/L
IGU 577	4A	1006146-10	GPC-A-001	724R10	GROSS BETA	6.7		4.5	4	pCi/L
IGU 579	4C	1006146-12	GPC-A-001	724R10	GROSS ALPHA	20.3		2.3	2	pCi/L

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 10053095 **Lab Code:** PAR **Date Due:** 7/13/2010
Matrix: Water **Site Code:** HAL **Date Completed:** 7/13/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
3A	Actinium-228	06/28/2010						0.60
2B	Actinium-228	06/29/2010						0.43
3A	Americium-241	06/28/2010						0.30
2B	Americium-241	06/29/2010						1.19
Blank_Spike	Americium-241	06/29/2010				96.20		
3A	Antimony-125	06/28/2010						0
2B	Antimony-125	06/29/2010						0
3A	Cerium-144	06/28/2010						0.03
2B	Cerium-144	06/29/2010						1.72
3A	Cesium-134	06/28/2010						0.71
2B	Cesium-134	06/29/2010						0.13
3A	Cesium-137	06/28/2010						2.31
2B	Cesium-137	06/29/2010						0.37
Blank_Spike	Cesium-137	06/29/2010				103.00		
3A	Cobalt-60	06/28/2010						0.77
2B	Cobalt-60	06/29/2010						0.72
Blank_Spike	Cobalt-60	06/29/2010				98.10		
3A	Europium-152	06/28/2010						1.35
2B	Europium-152	06/29/2010						0.96
3A	Europium-154	06/28/2010						0.38
2B	Europium-154	06/29/2010						0.93
3A	Europium-155	06/28/2010						0.42
2B	Europium-155	06/29/2010						0.48
1B	GROSS ALPHA	06/29/2010						0.04
4C	GROSS ALPHA	06/29/2010						0.02
2628	GROSS ALPHA	06/29/2010					106.0	
Blank_Spike	GROSS ALPHA	06/30/2010				81.70		
Blank	GROSS ALPHA	06/30/2010	0.2740	U				
1B	GROSS BETA	06/29/2010						1.10
4C	GROSS BETA	06/29/2010						1.73
2628	GROSS BETA	06/29/2010					108.0	
Blank_Spike	GROSS BETA	06/30/2010				93.50		

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 10053095 Lab Code: PAR Date Due: 7/13/2010
 Matrix: Water Site Code: HAL Date Completed: 7/13/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
Blank	GROSS BETA	06/30/2010	-0.7740	U				
2A	H-3	07/02/2010						0.32
4A	H-3	07/02/2010						0.83
Blank_Spike	H-3	07/03/2010				102.00		
2B2	H-3	07/03/2010					106.0	
Blank	H-3	07/03/2010	48.2000	U				
3A	Lead-212	06/28/2010						0.64
2B	Lead-212	06/29/2010						0.93
1A	Ni-63	06/29/2010			93.9			
1B	Ni-63	06/29/2010			93.8			
2A	Ni-63	06/29/2010			94.2			
2B	Ni-63	06/29/2010			92.8			
2B2	Ni-63	06/29/2010			91.8			
2C2	Ni-63	06/29/2010			93.2			
3A	Ni-63	06/29/2010			93.5			
3B	Ni-63	06/29/2010			92.9			
4A	Ni-63	06/29/2010			95.0			
4B	Ni-63	06/29/2010			89.9			
4C	Ni-63	06/29/2010			94.1			
5A	Ni-63	06/29/2010			93.8			
5B	Ni-63	06/29/2010			96.3			
7B	Ni-63	06/29/2010			93.9			
7C	Ni-63	06/29/2010			95.5			
8B	Ni-63	06/29/2010			102.0			
8C	Ni-63	06/29/2010			95.0			
2628	Ni-63	06/29/2010			90.9			
1A	Ni-63	06/29/2010			92.5			0.03
4B	Ni-63	06/29/2010			91.5			0.09
Blank_Spike	Ni-63	06/29/2010			93.3	110.00		
Blank	Ni-63	06/29/2010	-1.4500	U	93.8			
3A	Potassium-40	06/28/2010						0.24
2B	Potassium-40	06/29/2010						1.43

SAMPLE MANAGEMENT SYSTEM
Radiochemistry Data Validation Worksheet

RIN: 10053095 **Lab Code:** PAR **Date Due:** 7/13/2010
Matrix: Water **Site Code:** HAL **Date Completed:** 7/13/2010

Sample	Analyte	Date Analyzed	Result	Flag	Tracer %R	LCS %R	MS %R	Duplicate
3A	Promethium-144	06/28/2010						0.32
2B	Promethium-144	06/29/2010						0.85
3A	Promethium-146	06/28/2010						0.11
2B	Promethium-146	06/29/2010						0.12
3A	Ruthenium-106	06/28/2010						0.80
2B	Ruthenium-106	06/29/2010						0.42
3A	Thorium-234	06/28/2010						0.84
2B	Thorium-234	06/29/2010						0.23
3A	Uranium-235	06/28/2010						0.08
2B	Uranium-235	06/29/2010						0.98
3A	Yttrium-88	06/28/2010						0.43
2B	Yttrium-88	06/29/2010						0.64

Sampling Quality Control Assessment

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

Sampling Protocol

All monitoring 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. With the exception of well 1A, the data were further qualified with a “Q” flag as estimated values because these are Category II wells.

Equipment Blank Assessment

An equipment blank was not collected because dedicated tubing was used to sample all wells.

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 location 1A. The duplicate results have a relative error ratio value less than three, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 10053095 Lab Code: PAR Project: Hallam Validation Date: 7/29/2010

Duplicate: 2628

Sample: 1A

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Actinium-228	-5.18	U	12.5	1	21.3	U	19.1	1		2.3	pCi/L
Americium-241	-19.2	U	26.6	1	3.37	U	19.4	1		1.3	pCi/L
Antimony-125	0.305	U	4.45	1	-5.43	U	10.1	1		1.0	pCi/L
Cerium-144	-3.67	U	12.4	1	-5.31	U	17.7	1		0.1	pCi/L
Cesium-134	1.13	U	3.36	1	1.2	U	4.39	1		0	pCi/L
Cesium-137	-1.13	U	1.99	1	-1.91	U	4.76	1		0.3	pCi/L
Cobalt-60	-0.477	U	2.15	1	0.422	U	5.53	1		0.3	pCi/L
Europium-152	-0.391	U	10.9	1	5.04	U	23.3	1		0.4	pCi/L
Europium-154	-0.696	U	10.7	1	-8.38	U	24.3	1		0.6	pCi/L
Europium-155	-3.25	U	6.83	1	3.89	U	10	1		1.2	pCi/L
GROSS ALPHA	1.72	U	1.64	1	2.03	U	1.68	1		0.3	pCi/L
GROSS BETA	3.86		2.16	1	3.65	U	2.43	1		0.1	pCi/L
H-3	47.9	U	192	1	107	U	194	1		0.4	pCi/L
Lead-212	-0.506	U	7.66	1	-1.48	U	8.92	1		0.2	pCi/L
Ni-63	1.45	U	3.87	1	-1.35	U	3.96	1		1.0	pCi/L
Potassium-40	-106	U	51	1	-3.66	U	91	1		1.9	pCi/L
Promethium-144	0.729	U	2.02	1	2.6	U	5.06	1		0.7	pCi/L
Promethium-146	-0.134	U	2.3	1	-4.04	U	4.53	1		1.5	pCi/L
Ruthenium-106	-28.6	U	19.5	1	13.6	U	41.3	1		1.8	pCi/L
Thorium-234	16.9	U	62.2	1	-3.23	U	102	1		0.3	pCi/L
Uranium-235	6.55	U	11.9	1	-7.28	U	49.5	1		0.5	pCi/L
Yttrium-88	3.45	U	2.26	1	1.51	U	5.33	1		0.7	pCi/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 Donovan

Date

Data Validation Lead:

Steve Donovan

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.

The specific conductance result in well 3A was identified as a potential outlier. The specific conductance in this well has been trending upward since 1998. The data for this event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All Historical Data

Laboratory: ALS Laboratory Group

RIN: 10053095

Report Date: 8/3/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Current Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
HAL01	2A	0001	06/08/2010	Potassium-40	84	U	FQ	1438	U	L	98.1		FQJ	12	11	No
HAL01	2B2	0001	06/07/2010	Gross Alpha	4.54		FQJ	16.7		FQ	6.88		FQ	12	8	No
HAL01	2C2	N001	06/07/2010	Gross Beta	4.66		FQJ	15.68	U	Q	5.8	U	FQ	12	8	No
HAL01	3B	N001	06/08/2010	Gross Alpha	6.31		FQJ	27.7	U	FQ	8.73		FQ	12	5	No
HAL01	3B	N001	06/08/2010	Gross Beta	5.4		FQJ	20.36		L	8.87		FQJ	12	4	No
HAL01	8B	N001	06/08/2010	Gross Alpha	6.47		FQ	16.23			6.6		FQ	12	4	No
HAL01	8C	N001	06/08/2010	Gross Alpha	7.43		FQ	16.4		FQ	7.67			13	2	No

Data Validation Outliers Report - Field Parameters Only

Comparison: All Historical Data

Laboratory: Field Measurements

RIN: 10053095

Report Date: 8/3/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Current Qualifiers		Historical Maximum Qualifiers		Historical Minimum Qualifiers		Number of Data Points		Statistical Outlier
						Lab	Data	Result	Lab	Data	Result	Lab	Data	
HAL01	2A	N001	06/08/2010	Temperature	15.61		FQ	22.6	L	17.1	FQ	11	0	No
HAL01	2B	N001	06/08/2010	Temperature	14.87		FQ	23.2	L	16.7	FQ	11	0	No
HAL01	2B2	N001	06/07/2010	Oxidation Reduction Potential	-44.3		FQ	166	FQ	-24.5	FQ	10	0	No
HAL01	2B2	N001	06/07/2010	Temperature	16.89		FQ	24	FQ	17.11	FQ	11	0	No
HAL01	2C2	N001	06/07/2010	Temperature	17.44		FQ	25.85	FQ	18.6	FQ	11	0	No
HAL01	2C2	N001	06/07/2010	Turbidity	0.64		FQ	31.7		1.94	L	11	0	No
HAL01	3A	N001	06/08/2010	Specific Conductance	3114		FQ	2290	FQ	906	L	11	0	Yes
HAL01	3A	N001	06/08/2010	Temperature	17.31		FQ	26.8	FQ	17.59	FQ	11	0	No
HAL01	3B	N001	06/08/2010	Temperature	16.21		FQ	22.86	Q	17.17	FQ	11	0	No
HAL01	4A	N001	06/08/2010	Temperature	15.03		FQ	26.13	Q	15.51	FQ	11	0	No
HAL01	4A	N001	06/08/2010	Turbidity	0.98		FQ	14.4	L	1.36	FQ	11	0	No
HAL01	4B	N001	06/08/2010	Temperature	14.83		FQ	21.2	L	15.17	FQ	11	0	No
HAL01	4B	N001	06/08/2010	Turbidity	1.19		FQ	16.6	L	1.63	L	11	0	No
HAL01	4C	N001	06/08/2010	Turbidity	0.81		FQ	7.57	Q	0.98	FQ	10	0	No
HAL01	5A	N001	06/07/2010	Temperature	15.49		FQ	24.96	Q	16.54	FQ	11	0	No
HAL01	5B	N001	06/07/2010	Temperature	15.72		FQ	24.22	Q	16.95	FQ	11	0	No
HAL01	5B	N001	06/07/2010	Turbidity	0.34		FQ	5.1	FQ	0.91	FQ	11	0	No

Data Validation Outliers Report - Field Parameters Only

Comparison: All Historical Data

Laboratory: Field Measurements

RIN: 10053095

Report Date: 8/3/2010

Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Current Qualifiers		Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
HAL01	7B	N001	06/07/2010	Temperature	13.84		FQ	23.3		Q	15.18		FQ	11	0	No
HAL01	7B	N001	06/07/2010	Turbidity	0.58		FQ	21.6		FQ	1.13		FQ	11	0	No
HAL01	7C	N001	06/07/2010	Temperature	14.45		FQ	25.1		FQ	16.07		FQ	11	0	No
HAL01	8B	N001	06/08/2010	Temperature	14.71		FQ	22.1		FQ	16		L	11	0	No
HAL01	8C	N001	06/08/2010	Temperature	14.71		FQ	23.7		Q	16.2		L	11	0	No

STATISTICAL TESTS:

The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test

Outliers are identified using Dixon's Test when there are 25 or fewer data points.

Outliers are identified using Rosner's Test when there are 26 or more data points.

See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

Attachment 2

Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 1A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	16	- 23.5	21	U	F	0	21	12.5
Actinium-228	pCi/L	06/08/2010	N002	16	- 23.5	30	U	F	0	30	19.1
Americium-241	pCi/L	06/08/2010	N001	16	- 23.5	45	U	F	0	45	26.6
Americium-241	pCi/L	06/08/2010	N002	16	- 23.5	33	U	F	0	33	19.4
Antimony-125	pCi/L	06/08/2010	N001	16	- 23.5	7.7	U	F	0	7.7	4.45
Antimony-125	pCi/L	06/08/2010	N002	16	- 23.5	18	U	F	0	18	10.1
Cerium-144	pCi/L	06/08/2010	N001	16	- 23.5	21	U	F	0	21	12.4
Cerium-144	pCi/L	06/08/2010	N002	16	- 23.5	31	U	F	0	31	17.7
Cesium-134	pCi/L	06/08/2010	N001	16	- 23.5	5.5	U	F	0	5.5	3.36
Cesium-134	pCi/L	06/08/2010	N002	16	- 23.5	7.5	U	F	0	7.5	4.39
Cesium-137	pCi/L	06/08/2010	N001	16	- 23.5	3.4	U	F	0	3.4	1.99
Cesium-137	pCi/L	06/08/2010	N002	16	- 23.5	8.5	U	F	0	8.5	4.76
Cobalt-60	pCi/L	06/08/2010	N001	16	- 23.5	3.7	U	F	0	3.7	2.15
Cobalt-60	pCi/L	06/08/2010	N002	16	- 23.5	9.7	U	F	0	9.7	5.53
Dissolved Oxygen	mg/L	06/08/2010	N001	16	- 23.5	0.53		F	0		
Europium-152	pCi/L	06/08/2010	N001	16	- 23.5	19	U	F	0	19	10.9
Europium-152	pCi/L	06/08/2010	N002	16	- 23.5	41	U	F	0	41	23.3

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 1A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Europium-154	pCi/L	06/08/2010	N001	16	- 23.5	18	U	F	0	18	10.7
Europium-154	pCi/L	06/08/2010	N002	16	- 23.5	44	U	F	0	44	24.3
Europium-155	pCi/L	06/08/2010	N001	16	- 23.5	12	U	F	0	12	6.83
Europium-155	pCi/L	06/08/2010	N002	16	- 23.5	17	U	F	0	17	10
Gross Alpha	pCi/L	06/08/2010	N001	16	- 23.5	2.6	U	F	0	2.6	1.64
Gross Alpha	pCi/L	06/08/2010	N002	16	- 23.5	2.6	U	F	0	2.6	1.68
Gross Beta	pCi/L	06/08/2010	N001	16	- 23.5	3.86		FJ	0	3.3	2.16
Gross Beta	pCi/L	06/08/2010	N002	16	- 23.5	3.8	U	F	0	3.8	2.43
Lead-212	pCi/L	06/08/2010	N001	16	- 23.5	13	U	F	0	13	7.66
Lead-212	pCi/L	06/08/2010	N002	16	- 23.5	15	U	F	0	15	8.92
Nickel-63	pCi/L	06/08/2010	N001	16	- 23.5	13	U	F	0	13	3.87
Nickel-63	pCi/L	06/08/2010	N002	16	- 23.5	14	U	F	0	14	3.96
Oxidation Reduction Potential	mV	06/08/2010	N001	16	- 23.5	96		F	0		
pH	s.u.	06/08/2010	N001	16	- 23.5	6.77		F	0		
Potassium-40	pCi/L	06/08/2010	N001	16	- 23.5	86	U	F	0	86	51
Potassium-40	pCi/L	06/08/2010	N002	16	- 23.5	160	U	F	0	160	91
Promethium-144	pCi/L	06/08/2010	N001	16	- 23.5	3.4	U	F	0	3.4	2.02

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 1A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Promethium-144	pCi/L	06/08/2010	N002	16	- 23.5	8.5	U	F	0	8.5	5.06
Promethium-146	pCi/L	06/08/2010	N001	16	- 23.5	3.9	U	F	0	3.9	2.3
Promethium-146	pCi/L	06/08/2010	N002	16	- 23.5	8.3	U	F	0	8.3	4.53
Ruthenium-106	pCi/L	06/08/2010	N001	16	- 23.5	34	U	F	0	34	19.5
Ruthenium-106	pCi/L	06/08/2010	N002	16	- 23.5	70	U	F	0	70	41.3
Specific Conductance	umhos/cm	06/08/2010	N001	16	- 23.5	1655		F	0		
Temperature	C	06/08/2010	N001	16	- 23.5	19.36		F	0		
Thorium-234	pCi/L	06/08/2010	N001	16	- 23.5	100	U	F	0	100	62.2
Thorium-234	pCi/L	06/08/2010	N002	16	- 23.5	170	U	F	0	170	102
Tritium	pCi/L	06/08/2010	N001	16	- 23.5	320	U	F	0	320	192
Tritium	pCi/L	06/08/2010	N002	16	- 23.5	320	U	F	0	320	194
Turbidity	NTU	06/08/2010	N001	16	- 23.5	3.15		F	0		
Uranium-235	pCi/L	06/08/2010	N001	16	- 23.5	20	U	F	0	20	11.9
Uranium-235	pCi/L	06/08/2010	N002	16	- 23.5	83	U	F	0	83	49.5
Yttrium-88	pCi/L	06/08/2010	N001	16	- 23.5	3.6	U	F	0	3.6	2.26
Yttrium-88	pCi/L	06/08/2010	N002	16	- 23.5	9.1	U	F	0	9.1	5.33

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 1B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	39	- 49	19	U	FQ	0	19	11.2
Americium-241	pCi/L	06/08/2010	N001	39	- 49	28	U	FQ	0	28	16.7
Antimony-125	pCi/L	06/08/2010	N001	39	- 49	7.6	U	FQ	0	7.6	4.59
Cerium-144	pCi/L	06/08/2010	N001	39	- 49	20	U	FQ	0	20	12.4
Cesium-134	pCi/L	06/08/2010	N001	39	- 49	3.34		UFQ	0	2.2	1.18
Cesium-137	pCi/L	06/08/2010	N001	39	- 49	3.3	U	FQ	0	3.3	1.99
Cobalt-60	pCi/L	06/08/2010	N001	39	- 49	3.8	U	FQ	0	3.8	2.15
Dissolved Oxygen	mg/L	06/08/2010	N001	39	- 49	1.36		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	39	- 49	19	U	FQ	0	19	11.1
Europium-154	pCi/L	06/08/2010	N001	39	- 49	27	U	FQ	0	27	16
Europium-155	pCi/L	06/08/2010	N001	39	- 49	12	U	FQ	0	12	6.92
Gross Alpha	pCi/L	06/08/2010	N001	39	- 49	6.33		FQ	0	2	1.85
Gross Beta	pCi/L	06/08/2010	N001	39	- 49	8.64		FQJ	0	2.9	2.32
Lead-212	pCi/L	06/08/2010	N001	39	- 49	12	U	FQ	0	12	7.26
Nickel-63	pCi/L	06/08/2010	N001	39	- 49	13	U	FQ	0	13	3.87
Oxidation Reduction Potential	mV	06/08/2010	N001	39	- 49	109.1		FQ	0		
pH	s.u.	06/08/2010	N001	39	- 49	6.92		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 1B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	39	- 49	84	U	FQ	0	84	49.6
Promethium-144	pCi/L	06/08/2010	N001	39	- 49	3.4	U	FQ	0	3.4	2.05
Promethium-146	pCi/L	06/08/2010	N001	39	- 49	3.7	U	FQ	0	3.7	2.3
Ruthenium-106	pCi/L	06/08/2010	N001	39	- 49	33	U	FQ	0	33	19.5
Specific Conductance	umhos /cm	06/08/2010	N001	39	- 49	1035		FQ	0		
Temperature	C	06/08/2010	N001	39	- 49	17.97		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	39	- 49	98	U	FQ	0	98	58.9
Tritium	pCi/L	06/08/2010	N001	39	- 49	320	U	FQ	0	320	190
Turbidity	NTU	06/08/2010	N001	39	- 49	9.54		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	39	- 49	20	U	FQ	0	20	12.2
Yttrium-88	pCi/L	06/08/2010	N001	39	- 49	5.13		UFQ	0	3.5	2.32

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	0001	20	- 25	20	U	FQ	0	20	11.6
Americium-241	pCi/L	06/08/2010	0001	20	- 25	44	U	FQ	0	44	26.5
Antimony-125	pCi/L	06/08/2010	0001	20	- 25	7.9	U	FQ	0	7.9	4.5
Cerium-144	pCi/L	06/08/2010	0001	20	- 25	21	U	FQ	0	21	12.6
Cesium-134	pCi/L	06/08/2010	0001	20	- 25	5.6	U	FQ	0	5.6	3.37
Cesium-137	pCi/L	06/08/2010	0001	20	- 25	3.5	U	FQ	0	3.5	2.04
Cobalt-60	pCi/L	06/08/2010	0001	20	- 25	3.8	U	FQ	0	3.8	2.21
Dissolved Oxygen	mg/L	06/08/2010	N001	20	- 25	2.32		FQ	0		
Europium-152	pCi/L	06/08/2010	0001	20	- 25	18	U	FQ	0	18	10.5
Europium-154	pCi/L	06/08/2010	0001	20	- 25	27	U	FQ	0	27	16
Europium-155	pCi/L	06/08/2010	0001	20	- 25	12	U	FQ	0	12	6.91
Gross Alpha	pCi/L	06/08/2010	0001	20	- 25	12		FQ	0	1.4	2.5
Gross Beta	pCi/L	06/08/2010	0001	20	- 25	6.74		FQJ	0	3.2	2.27
Lead-212	pCi/L	06/08/2010	0001	20	- 25	13	U	FQ	0	13	7.68
Nickel-63	pCi/L	06/08/2010	0001	20	- 25	13	U	FQ	0	13	3.95
Oxidation Reduction Potential	mV	06/08/2010	N001	20	- 25	182		FQ	0		
pH	s.u.	06/08/2010	N001	20	- 25	7.08		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	0001	20	- 25	84	U	FQ	0	84	49.8
Promethium-144	pCi/L	06/08/2010	0001	20	- 25	3.4	U	FQ	0	3.4	2.09
Promethium-146	pCi/L	06/08/2010	0001	20	- 25	3.9	U	FQ	0	3.9	2.35
Ruthenium-106	pCi/L	06/08/2010	0001	20	- 25	33	U	FQ	0	33	19.8
Specific Conductance	umhos /cm	06/08/2010	N001	20	- 25	1120		FQ	0		
Temperature	C	06/08/2010	N001	20	- 25	15.61		FQ	0		
Thorium-234	pCi/L	06/08/2010	0001	20	- 25	100	U	FQ	0	100	60.4
Tritium	pCi/L	06/08/2010	N001	20	- 25	320	U	FQ	0	320	186
Turbidity	NTU	06/08/2010	N001	20	- 25	29.9		FQ	0		
Uranium-235	pCi/L	06/08/2010	0001	20	- 25	20	U	FQ	0	20	12.4
Yttrium-88	pCi/L	06/08/2010	0001	20	- 25	5.8	U	FQ	0	5.8	3.48

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	43	- 53	34	U	FQ	0	34	20.6
Americium-241	pCi/L	06/08/2010	N001	43	- 53	59	U	FQ	0	59	33.9
Antimony-125	pCi/L	06/08/2010	N001	43	- 53	19	U	FQ	0	19	11.1
Cerium-144	pCi/L	06/08/2010	N001	43	- 53	36	U	FQ	0	36	20.9
Cesium-134	pCi/L	06/08/2010	N001	43	- 53	7	U	FQ	0	7	4.1
Cesium-137	pCi/L	06/08/2010	N001	43	- 53	7.7	U	FQ	0	7.7	4.38
Cobalt-60	pCi/L	06/08/2010	N001	43	- 53	8.5	U	FQ	0	8.5	4.64
Dissolved Oxygen	mg/L	06/08/2010	N001	43	- 53	0.47		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	43	- 53	38	U	FQ	0	38	22.6
Europium-154	pCi/L	06/08/2010	N001	43	- 53	36	U	FQ	0	36	22
Europium-155	pCi/L	06/08/2010	N001	43	- 53	20	U	FQ	0	20	12.3
Gross Alpha	pCi/L	06/08/2010	N001	43	- 53	22.1		FQ	0	2.5	4.32
Gross Beta	pCi/L	06/08/2010	N001	43	- 53	13.8		FQ	0	3.5	3.22
Lead-212	pCi/L	06/08/2010	N001	43	- 53	13	U	FQ	0	13	7.83
Nickel-63	pCi/L	06/08/2010	N001	43	- 53	13	U	FQ	0	13	3.87
Oxidation Reduction Potential	mV	06/08/2010	N001	43	- 53	-40.6		FQ	0		
pH	s.u.	06/08/2010	N001	43	- 53	6.91		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	43	- 53	140	U	FQ	0	140	79.2
Promethium-144	pCi/L	06/08/2010	N001	43	- 53	7.9	U	FQ	0	7.9	4.66
Promethium-146	pCi/L	06/08/2010	N001	43	- 53	8.6	U	FQ	0	8.6	4.99
Ruthenium-106	pCi/L	06/08/2010	N001	43	- 53	70	U	FQ	0	70	38.8
Specific Conductance	umhos /cm	06/08/2010	N001	43	- 53	1280		FQ	0		
Temperature	C	06/08/2010	N001	43	- 53	14.87		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	43	- 53	180	U	FQ	0	180	108
Tritium	pCi/L	06/08/2010	N001	43	- 53	320	U	FQ	0	320	189
Turbidity	NTU	06/08/2010	N001	43	- 53	1.82		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	43	- 53	55	U	FQ	0	55	32.5
Yttrium-88	pCi/L	06/08/2010	N001	43	- 53	12	U	FQ	0	12	6.81

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2B2 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/07/2010	0001	-	29	U	FQ	0	29	17.9
Americium-241	pCi/L	06/07/2010	0001	-	35	U	FQ	0	35	19.9
Antimony-125	pCi/L	06/07/2010	0001	-	16	U	FQ	0	16	9.73
Cerium-144	pCi/L	06/07/2010	0001	-	31	U	FQ	0	31	18
Cesium-134	pCi/L	06/07/2010	0001	-	8.1	U	FQ	0	8.1	4.67
Cesium-137	pCi/L	06/07/2010	0001	-	8.3	U	FQ	0	8.3	4.74
Cobalt-60	pCi/L	06/07/2010	0001	-	8.8	U	FQ	0	8.8	5.06
Dissolved Oxygen	mg/L	06/07/2010	N001	-	3.39		FQ	0		
Europium-152	pCi/L	06/07/2010	0001	-	47	U	FQ	0	47	26
Europium-154	pCi/L	06/07/2010	0001	-	51	U	FQ	0	51	27.3
Europium-155	pCi/L	06/07/2010	0001	-	17	U	FQ	0	17	10
Gross Alpha	pCi/L	06/07/2010	0001	-	4.54		FQJ	0	2	1.61
Gross Beta	pCi/L	06/07/2010	0001	-	7.9		FQJ	0	2.8	2.21
Lead-212	pCi/L	06/07/2010	0001	-	17	U	FQ	0	17	9.8
Nickel-63	pCi/L	06/07/2010	0001	-	13	U	FQ	0	13	4.04
Oxidation Reduction Potential	mV	06/07/2010	N001	-	-44.3		FQ	0		
pH	s.u.	06/07/2010	N001	-	6.89		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2B2 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/07/2010	0001	-	160	U	FQ	0	160	95
Promethium-144	pCi/L	06/07/2010	0001	-	9.6	U	FQ	0	9.6	5.48
Promethium-146	pCi/L	06/07/2010	0001	-	8.5	U	FQ	0	8.5	4.7
Ruthenium-106	pCi/L	06/07/2010	0001	-	77	U	FQ	0	77	44.2
Specific Conductance	umhos /cm	06/07/2010	N001	-	1092		FQ	0		
Temperature	C	06/07/2010	N001	-	16.89		FQ	0		
Thorium-234	pCi/L	06/07/2010	0001	-	160	U	FQ	0	160	97.6
Tritium	pCi/L	06/07/2010	N001	-	320	U	FQ	0	320	188
Turbidity	NTU	06/07/2010	N001	-	27.3		FQ	0		
Uranium-235	pCi/L	06/07/2010	0001	-	29	U	FQ	0	29	17.9
Yttrium-88	pCi/L	06/07/2010	0001	-	8.8	U	FQ	0	8.8	5.14

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2C2 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/07/2010	N001	-	55	U	FQ	0	55	31.1
Americium-241	pCi/L	06/07/2010	N001	-	9.2	U	FQ	0	9.2	5.35
Antimony-125	pCi/L	06/07/2010	N001	-	21	U	FQ	0	21	12.6
Cerium-144	pCi/L	06/07/2010	N001	-	33	U	FQ	0	33	20
Cesium-134	pCi/L	06/07/2010	N001	-	9.3	U	FQ	0	9.3	5.5
Cesium-137	pCi/L	06/07/2010	N001	-	9.1	U	FQ	0	9.1	5.04
Cobalt-60	pCi/L	06/07/2010	N001	-	11	U	FQ	0	11	6.46
Dissolved Oxygen	mg/L	06/07/2010	N001	-	8.11		FQ	0		
Europium-152	pCi/L	06/07/2010	N001	-	54	U	FQ	0	54	29.6
Europium-154	pCi/L	06/07/2010	N001	-	50	U	FQ	0	50	31.4
Europium-155	pCi/L	06/07/2010	N001	-	15	U	FQ	0	15	8.66
Gross Alpha	pCi/L	06/07/2010	N001	-	5.05		FQ	0	1.5	1.46
Gross Beta	pCi/L	06/07/2010	N001	-	4.66		FQJ	0	2.9	1.98
Lead-212	pCi/L	06/07/2010	N001	-	16	U	FQ	0	16	9.18
Nickel-63	pCi/L	06/07/2010	N001	-	13	U	FQ	0	13	3.88
Oxidation Reduction Potential	mV	06/07/2010	N001	-	111		FQ	0		
pH	s.u.	06/07/2010	N001	-	7.41		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 2C2 WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/07/2010	N001	-	180	U	FQ	0	180	98.8
Promethium-144	pCi/L	06/07/2010	N001	-	10	U	FQ	0	10	5.79
Promethium-146	pCi/L	06/07/2010	N001	-	11	U	FQ	0	11	6.15
Ruthenium-106	pCi/L	06/07/2010	N001	-	91	U	FQ	0	91	50.6
Specific Conductance	umhos /cm	06/07/2010	N001	-	1020		FQ	0		
Temperature	C	06/07/2010	N001	-	17.44		FQ	0		
Thorium-234	pCi/L	06/07/2010	N001	-	110	U	FQ	0	110	65.3
Tritium	pCi/L	06/07/2010	N001	-	320	U	FQ	0	320	190
Turbidity	NTU	06/07/2010	N001	-	0.64		FQ	0		
Uranium-235	pCi/L	06/07/2010	N001	-	49	U	FQ	0	49	28.5
Yttrium-88	pCi/L	06/07/2010	N001	-	19	U	FQ	0	19	10.8

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 3A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	19	- 24	28	U	FQ	0	28	17.8
Americium-241	pCi/L	06/08/2010	N001	19	- 24	69	U	FQ	0	69	41.4
Antimony-125	pCi/L	06/08/2010	N001	19	- 24	20	U	FQ	0	20	11.4
Cerium-144	pCi/L	06/08/2010	N001	19	- 24	38	U	FQ	0	38	22.5
Cesium-134	pCi/L	06/08/2010	N001	19	- 24	8.7	U	FQ	0	8.7	4.89
Cesium-137	pCi/L	06/08/2010	N001	19	- 24	8.7	U	FQ	0	8.7	4.85
Cobalt-60	pCi/L	06/08/2010	N001	19	- 24	8.3	U	FQ	0	8.3	4.45
Dissolved Oxygen	mg/L	06/08/2010	N001	19	- 24	2.64		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	19	- 24	45	U	FQ	0	45	24.6
Europium-154	pCi/L	06/08/2010	N001	19	- 24	46	U	FQ	0	46	26.1
Europium-155	pCi/L	06/08/2010	N001	19	- 24	24	U	FQ	0	24	13.9
Gross Alpha	pCi/L	06/08/2010	N001	19	- 24	14.1		FQ	0	3.3	3.5
Gross Beta	pCi/L	06/08/2010	N001	19	- 24	12		FQJ	0	5.2	3.85
Lead-212	pCi/L	06/08/2010	N001	19	- 24	13	U	FQ	0	13	7.46
Nickel-63	pCi/L	06/08/2010	N001	19	- 24	13	U	FQ	0	13	4.01
Oxidation Reduction Potential	mV	06/08/2010	N001	19	- 24	87.3		FQ	0		
pH	s.u.	06/08/2010	N001	19	- 24	7.41		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 3A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	19	- 24	180	U	FQ	0	180	106
Promethium-144	pCi/L	06/08/2010	N001	19	- 24	9	U	FQ	0	9	5.31
Promethium-146	pCi/L	06/08/2010	N001	19	- 24	9.3	U	FQ	0	9.3	5.4
Ruthenium-106	pCi/L	06/08/2010	N001	19	- 24	77	U	FQ	0	77	43.4
Specific Conductance	umhos /cm	06/08/2010	N001	19	- 24	3114		FQ	0		
Temperature	C	06/08/2010	N001	19	- 24	17.31		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	19	- 24	120		UFQ	0	120	74.7
Tritium	pCi/L	06/08/2010	N001	19	- 24	320	U	FQ	0	320	189
Turbidity	NTU	06/08/2010	N001	19	- 24	1.68		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	19	- 24	38	U	FQ	0	38	22.6
Yttrium-88	pCi/L	06/08/2010	N001	19	- 24	8.8	U	FQ	0	8.8	5.3

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 3B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	43	- 53	31	U	FQ	0	31	17.8
Americium-241	pCi/L	06/08/2010	N001	43	- 53	40	U	FQ	0	40	22.6
Antimony-125	pCi/L	06/08/2010	N001	43	- 53	21	U	FQ	0	21	11
Cerium-144	pCi/L	06/08/2010	N001	43	- 53	35	U	FQ	0	35	20.8
Cesium-134	pCi/L	06/08/2010	N001	43	- 53	9.7	U	FQ	0	9.7	5.41
Cesium-137	pCi/L	06/08/2010	N001	43	- 53	9.8	U	FQ	0	9.8	5.64
Cobalt-60	pCi/L	06/08/2010	N001	43	- 53	10	U	FQ	0	10	6.16
Dissolved Oxygen	mg/L	06/08/2010	N001	43	- 53	1.9		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	43	- 53	54	U	FQ	0	54	27
Europium-154	pCi/L	06/08/2010	N001	43	- 53	56	U	FQ	0	56	33
Europium-155	pCi/L	06/08/2010	N001	43	- 53	19	U	FQ	0	19	11.9
Gross Alpha	pCi/L	06/08/2010	N001	43	- 53	6.31		FQJ	0	2.6	2.19
Gross Beta	pCi/L	06/08/2010	N001	43	- 53	5.4		FQJ	0	4.7	3.03
Lead-212	pCi/L	06/08/2010	N001	43	- 53	18	U	FQ	0	18	10.5
Nickel-63	pCi/L	06/08/2010	N001	43	- 53	13	U	FQ	0	13	4.03
Oxidation Reduction Potential	mV	06/08/2010	N001	43	- 53	92		FQ	0		
pH	s.u.	06/08/2010	N001	43	- 53	7.22		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 3B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	43	- 53	170	U	FQ	0	170	95.7
Promethium-144	pCi/L	06/08/2010	N001	43	- 53	11	U	FQ	0	11	6.27
Promethium-146	pCi/L	06/08/2010	N001	43	- 53	9.7	U	FQ	0	9.7	5.44
Ruthenium-106	pCi/L	06/08/2010	N001	43	- 53	98	U	FQ	0	98	55.2
Specific Conductance	umhos /cm	06/08/2010	N001	43	- 53	1728		FQ	0		
Temperature	C	06/08/2010	N001	43	- 53	16.21		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	43	- 53	170	U	FQ	0	170	98.8
Tritium	pCi/L	06/08/2010	N001	43	- 53	320	U	FQ	0	320	191
Turbidity	NTU	06/08/2010	N001	43	- 53	0.82		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	43	- 53	36	U	FQ	0	36	21.6
Yttrium-88	pCi/L	06/08/2010	N001	43	- 53	11	U	FQ	0	11	6.57

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 4A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	19	- 24	28	U	FQ	0	28	16.6
Americium-241	pCi/L	06/08/2010	N001	19	- 24	48	U	FQ	0	48	28
Antimony-125	pCi/L	06/08/2010	N001	19	- 24	13	U	FQ	0	13	7.91
Cerium-144	pCi/L	06/08/2010	N001	19	- 24	34	U	FQ	0	34	20
Cesium-134	pCi/L	06/08/2010	N001	19	- 24	6.2	U	FQ	0	6.2	3.62
Cesium-137	pCi/L	06/08/2010	N001	19	- 24	5.2	U	FQ	0	5.2	2.93
Cobalt-60	pCi/L	06/08/2010	N001	19	- 24	5.9	U	FQ	0	5.9	3.63
Dissolved Oxygen	mg/L	06/08/2010	N001	19	- 24	2.91		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	19	- 24	32	U	FQ	0	32	18.3
Europium-154	pCi/L	06/08/2010	N001	19	- 24	30	U	FQ	0	30	17.5
Europium-155	pCi/L	06/08/2010	N001	19	- 24	19	U	FQ	0	19	11.3
Gross Alpha	pCi/L	06/08/2010	N001	19	- 24	7.74		FQJ	0	2.9	2.48
Gross Beta	pCi/L	06/08/2010	N001	19	- 24	6.7		FQJ	0	4.5	3.01
Lead-212	pCi/L	06/08/2010	N001	19	- 24	16	U	FQ	0	16	9.47
Nickel-63	pCi/L	06/08/2010	N001	19	- 24	13	U	FQ	0	13	3.87
Oxidation Reduction Potential	mV	06/08/2010	N001	19	- 24	71		FQ	0		
pH	s.u.	06/08/2010	N001	19	- 24	7.2		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 4A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)			Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	19	-	24	110	U	FQ	0	110	63.6
Promethium-144	pCi/L	06/08/2010	N001	19	-	24	5.4	U	FQ	0	5.4	3.17
Promethium-146	pCi/L	06/08/2010	N001	19	-	24	6.2	U	FQ	0	6.2	3.66
Ruthenium-106	pCi/L	06/08/2010	N001	19	-	24	53	U	FQ	0	53	31.3
Specific Conductance	umhos /cm	06/08/2010	N001	19	-	24	2095		FQ	0		
Temperature	C	06/08/2010	N001	19	-	24	15.03		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	19	-	24	140	U	FQ	0	140	80.6
Tritium	pCi/L	06/08/2010	N001	19	-	24	320	U	FQ	0	320	191
Turbidity	NTU	06/08/2010	N001	19	-	24	0.98		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	19	-	24	33	U	FQ	0	33	19.5
Yttrium-88	pCi/L	06/08/2010	N001	19	-	24	8	U	FQ	0	8	4.83

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 4B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	44	- 54	27	U	FQ	0	27	15.9
Americium-241	pCi/L	06/08/2010	N001	44	- 54	43	U	FQ	0	43	26
Antimony-125	pCi/L	06/08/2010	N001	44	- 54	11	U	FQ	0	11	6.83
Cerium-144	pCi/L	06/08/2010	N001	44	- 54	32	U	FQ	0	32	19.1
Cesium-134	pCi/L	06/08/2010	N001	44	- 54	5.6	U	FQ	0	5.6	3.25
Cesium-137	pCi/L	06/08/2010	N001	44	- 54	5.3	U	FQ	0	5.3	3.01
Cobalt-60	pCi/L	06/08/2010	N001	44	- 54	5.8	U	FQ	0	5.8	3.29
Dissolved Oxygen	mg/L	06/08/2010	N001	44	- 54	1.07		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	44	- 54	27	U	FQ	0	27	15.2
Europium-154	pCi/L	06/08/2010	N001	44	- 54	31	U	FQ	0	31	17.3
Europium-155	pCi/L	06/08/2010	N001	44	- 54	17	U	FQ	0	17	10
Gross Alpha	pCi/L	06/08/2010	N001	44	- 54	13.4		FQ	0	1.7	2.78
Gross Beta	pCi/L	06/08/2010	N001	44	- 54	10.8		FQJ	0	3.9	3.02
Lead-212	pCi/L	06/08/2010	N001	44	- 54	16	U	FQ	0	16	9.21
Nickel-63	pCi/L	06/08/2010	N001	44	- 54	14	U	FQ	0	14	4.03
Oxidation Reduction Potential	mV	06/08/2010	N001	44	- 54	18		FQ	0		
pH	s.u.	06/08/2010	N001	44	- 54	7.07		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 4B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	44	- 54	100	U	FQ	0	100	58.2
Promethium-144	pCi/L	06/08/2010	N001	44	- 54	5	U	FQ	0	5	3.06
Promethium-146	pCi/L	06/08/2010	N001	44	- 54	5.7	U	FQ	0	5.7	3.41
Ruthenium-106	pCi/L	06/08/2010	N001	44	- 54	51	U	FQ	0	51	29.9
Specific Conductance	umhos /cm	06/08/2010	N001	44	- 54	1393		FQ	0		
Temperature	C	06/08/2010	N001	44	- 54	14.83		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	44	- 54	120	U	FQ	0	120	72.1
Tritium	pCi/L	06/08/2010	N001	44	- 54	320	U	FQ	0	320	190
Turbidity	NTU	06/08/2010	N001	44	- 54	1.19		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	44	- 54	30	U	FQ	0	30	18.2
Yttrium-88	pCi/L	06/08/2010	N001	44	- 54	5.8	U	FQ	0	5.8	3.44

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 4C WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	64	- 74	39	U	FQ	0	39	22.5
Americium-241	pCi/L	06/08/2010	N001	64	- 74	55	U	FQ	0	55	32.6
Antimony-125	pCi/L	06/08/2010	N001	64	- 74	18	U	FQ	0	18	10.5
Cerium-144	pCi/L	06/08/2010	N001	64	- 74	35	U	FQ	0	35	20.5
Cesium-134	pCi/L	06/08/2010	N001	64	- 74	10	U	FQ	0	10	5.95
Cesium-137	pCi/L	06/08/2010	N001	64	- 74	7.4	U	FQ	0	7.4	4.22
Cobalt-60	pCi/L	06/08/2010	N001	64	- 74	7.4	U	FQ	0	7.4	4.17
Dissolved Oxygen	mg/L	06/08/2010	N001	64	- 74	1.08		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	64	- 74	37	U	FQ	0	37	20.4
Europium-154	pCi/L	06/08/2010	N001	64	- 74	42	U	FQ	0	42	23.2
Europium-155	pCi/L	06/08/2010	N001	64	- 74	19	U	FQ	0	19	11.4
Gross Alpha	pCi/L	06/08/2010	N001	64	- 74	20.3		FQ	0	2.3	4.03
Gross Beta	pCi/L	06/08/2010	N001	64	- 74	16.1		FQ	0	4	3.69
Lead-212	pCi/L	06/08/2010	N001	64	- 74	14	U	FQ	0	14	8.22
Nickel-63	pCi/L	06/08/2010	N001	64	- 74	13	U	FQ	0	13	3.88
Oxidation Reduction Potential	mV	06/08/2010	N001	64	- 74	1.8		FQ	0		
pH	s.u.	06/08/2010	N001	64	- 74	7.05		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 4C WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	64	- 74	140	U	FQ	0	140	83.5
Promethium-144	pCi/L	06/08/2010	N001	64	- 74	8	U	FQ	0	8	4.7
Promethium-146	pCi/L	06/08/2010	N001	64	- 74	8.8	U	FQ	0	8.8	5.11
Ruthenium-106	pCi/L	06/08/2010	N001	64	- 74	60	U	FQ	0	60	36
Specific Conductance	umhos /cm	06/08/2010	N001	64	- 74	1285		FQ	0		
Temperature	C	06/08/2010	N001	64	- 74	14.96		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	64	- 74	160	U	FQ	0	160	98.2
Tritium	pCi/L	06/08/2010	N001	64	- 74	320	U	FQ	0	320	190
Turbidity	NTU	06/08/2010	N001	64	- 74	0.81		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	64	- 74	54	U	FQ	0	54	32.1
Yttrium-88	pCi/L	06/08/2010	N001	64	- 74	12	U	FQ	0	12	6.7

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 5A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/07/2010	N001	19	- 24	53	U	FQ	0	53	30.2
Americium-241	pCi/L	06/07/2010	N001	19	- 24	66	U	FQ	0	66	39.3
Antimony-125	pCi/L	06/07/2010	N001	19	- 24	20	U	FQ	0	20	10.5
Cerium-144	pCi/L	06/07/2010	N001	19	- 24	35	U	FQ	0	35	20
Cesium-134	pCi/L	06/07/2010	N001	19	- 24	9	U	FQ	0	9	5.2
Cesium-137	pCi/L	06/07/2010	N001	19	- 24	8.4	U	FQ	0	8.4	4.82
Cobalt-60	pCi/L	06/07/2010	N001	19	- 24	9.8	U	FQ	0	9.8	5.61
Dissolved Oxygen	mg/L	06/07/2010	N001	19	- 24	7.51		FQ	0		
Europium-152	pCi/L	06/07/2010	N001	19	- 24	51	U	FQ	0	51	27.7
Europium-154	pCi/L	06/07/2010	N001	19	- 24	47	U	FQ	0	47	27.2
Europium-155	pCi/L	06/07/2010	N001	19	- 24	20	U	FQ	0	20	11.6
Gross Alpha	pCi/L	06/07/2010	N001	19	- 24	4.99		FQ	0	1.4	1.37
Gross Beta	pCi/L	06/07/2010	N001	19	- 24	6.79		FQ	0	2.2	1.8
Lead-212	pCi/L	06/07/2010	N001	19	- 24	16	U	FQ	0	16	9.17
Nickel-63	pCi/L	06/07/2010	N001	19	- 24	13	U	FQ	0	13	4.02
Oxidation Reduction Potential	mV	06/07/2010	N001	19	- 24	160.4		FQ	0		
pH	s.u.	06/07/2010	N001	19	- 24	7.25		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 5A WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/07/2010	N001	19	- 24	180	U	FQ	0	180	107
Promethium-144	pCi/L	06/07/2010	N001	19	- 24	8.5	U	FQ	0	8.5	4.97
Promethium-146	pCi/L	06/07/2010	N001	19	- 24	8.8	U	FQ	0	8.8	4.94
Ruthenium-106	pCi/L	06/07/2010	N001	19	- 24	78	U	FQ	0	78	45.1
Specific Conductance	umhos /cm	06/07/2010	N001	19	- 24	1033		FQ	0		
Temperature	C	06/07/2010	N001	19	- 24	15.49		FQ	0		
Thorium-234	pCi/L	06/07/2010	N001	19	- 24	180	U	FQ	0	180	106
Tritium	pCi/L	06/07/2010	N001	19	- 24	320	U	FQ	0	320	191
Turbidity	NTU	06/07/2010	N001	19	- 24	2.25		FQ	0		
Uranium-235	pCi/L	06/07/2010	N001	19	- 24	44		UFQ	0	33	21.8
Yttrium-88	pCi/L	06/07/2010	N001	19	- 24	14	U	FQ	0	14	8.03

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 5B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/07/2010	N001	39	- 49	40	U	FQ	0	40	23.2
Americium-241	pCi/L	06/07/2010	N001	39	- 49	66	U	FQ	0	66	39.1
Antimony-125	pCi/L	06/07/2010	N001	39	- 49	22	U	FQ	0	22	12.3
Cerium-144	pCi/L	06/07/2010	N001	39	- 49	41	U	FQ	0	41	23.8
Cesium-134	pCi/L	06/07/2010	N001	39	- 49	8.8	U	FQ	0	8.8	4.97
Cesium-137	pCi/L	06/07/2010	N001	39	- 49	8.1	U	FQ	0	8.1	4.71
Cobalt-60	pCi/L	06/07/2010	N001	39	- 49	10	U	FQ	0	10	5.38
Dissolved Oxygen	mg/L	06/07/2010	N001	39	- 49	5.37		FQ	0		
Europium-152	pCi/L	06/07/2010	N001	39	- 49	49	U	FQ	0	49	26.8
Europium-154	pCi/L	06/07/2010	N001	39	- 49	45	U	FQ	0	45	25.2
Europium-155	pCi/L	06/07/2010	N001	39	- 49	24	U	FQ	0	24	14.2
Gross Alpha	pCi/L	06/07/2010	N001	39	- 49	19.8		FQ	0	0.87	3.41
Gross Beta	pCi/L	06/07/2010	N001	39	- 49	10.9		FQ	0	1.4	2.02
Lead-212	pCi/L	06/07/2010	N001	39	- 49	17	U	FQ	0	17	10.1
Nickel-63	pCi/L	06/07/2010	N001	39	- 49	13	U	FQ	0	13	3.9
Oxidation Reduction Potential	mV	06/07/2010	N001	39	- 49	194.2		FQ	0		
pH	s.u.	06/07/2010	N001	39	- 49	7.02		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 5B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/07/2010	N001	39	- 49	150	U	FQ	0	150	83.3
Promethium-144	pCi/L	06/07/2010	N001	39	- 49	9.4	U	FQ	0	9.4	5.44
Promethium-146	pCi/L	06/07/2010	N001	39	- 49	10	U	FQ	0	10	5.94
Ruthenium-106	pCi/L	06/07/2010	N001	39	- 49	75	U	FQ	0	75	45.2
Specific Conductance	umhos /cm	06/07/2010	N001	39	- 49	713		FQ	0		
Temperature	C	06/07/2010	N001	39	- 49	15.72		FQ	0		
Thorium-234	pCi/L	06/07/2010	N001	39	- 49	170	U	FQ	0	170	101
Tritium	pCi/L	06/07/2010	N001	39	- 49	320	U	FQ	0	320	191
Turbidity	NTU	06/07/2010	N001	39	- 49	0.34		FQ	0		
Uranium-235	pCi/L	06/07/2010	N001	39	- 49	58	U	FQ	0	58	34.3
Yttrium-88	pCi/L	06/07/2010	N001	39	- 49	13	U	FQ	0	13	7.4

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 7B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/07/2010	N001	-	24	U	FQ	0	24	13.8
Americium-241	pCi/L	06/07/2010	N001	-	50	U	FQ	0	50	30.1
Antimony-125	pCi/L	06/07/2010	N001	-	13	U	FQ	0	13	7.85
Cerium-144	pCi/L	06/07/2010	N001	-	39	U	FQ	0	39	22.6
Cesium-134	pCi/L	06/07/2010	N001	-	9.9	U	FQ	0	9.9	5.97
Cesium-137	pCi/L	06/07/2010	N001	-	5.3	U	FQ	0	5.3	3.13
Cobalt-60	pCi/L	06/07/2010	N001	-	6.3	U	FQ	0	6.3	3.72
Dissolved Oxygen	mg/L	06/07/2010	N001	-	1.53		FQ	0		
Europium-152	pCi/L	06/07/2010	N001	-	35	U	FQ	0	35	19.8
Europium-154	pCi/L	06/07/2010	N001	-	33	U	FQ	0	33	19.6
Europium-155	pCi/L	06/07/2010	N001	-	21	U	FQ	0	21	12.1
Gross Alpha	pCi/L	06/07/2010	N001	-	5.41		FQ	0	1.1	1.28
Gross Beta	pCi/L	06/07/2010	N001	-	7.57		FQ	0	1.5	1.59
Lead-212	pCi/L	06/07/2010	N001	-	16	U	FQ	0	16	9.18
Nickel-63	pCi/L	06/07/2010	N001	-	13	U	FQ	0	13	3.81
Oxidation Reduction Potential	mV	06/07/2010	N001	-	73.4		FQ	0		
pH	s.u.	06/07/2010	N001	-	7.14		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 7B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/07/2010	N001	-	110	U	FQ	0	110	64.8
Promethium-144	pCi/L	06/07/2010	N001	-	6.2	U	FQ	0	6.2	3.63
Promethium-146	pCi/L	06/07/2010	N001	-	6.6	U	FQ	0	6.6	3.96
Ruthenium-106	pCi/L	06/07/2010	N001	-	58	U	FQ	0	58	33.9
Specific Conductance	umhos /cm	06/07/2010	N001	-	643		FQ	0		
Temperature	C	06/07/2010	N001	-	13.84		FQ	0		
Thorium-234	pCi/L	06/07/2010	N001	-	160	U	FQ	0	160	96.3
Tritium	pCi/L	06/07/2010	N001	-	310	U	FQ	0	310	184
Turbidity	NTU	06/07/2010	N001	-	0.58		FQ	0		
Uranium-235	pCi/L	06/07/2010	N001	-	35	U	FQ	0	35	21.5
Yttrium-88	pCi/L	06/07/2010	N001	-	8.3	U	FQ	0	8.3	4.85

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 7C WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/07/2010	N001	-	31	U	FQ	0	31	17.8
Americium-241	pCi/L	06/07/2010	N001	-	54	U	FQ	0	54	31.2
Antimony-125	pCi/L	06/07/2010	N001	-	14	U	FQ	0	14	8.2
Cerium-144	pCi/L	06/07/2010	N001	-	39	U	FQ	0	39	23.1
Cesium-134	pCi/L	06/07/2010	N001	-	6.38		UFQ	0	5.4	3.55
Cesium-137	pCi/L	06/07/2010	N001	-	5.6	U	FQ	0	5.6	3.43
Cobalt-60	pCi/L	06/07/2010	N001	-	7	U	FQ	0	7	3.91
Dissolved Oxygen	mg/L	06/07/2010	N001	-	3.7		FQ	0		
Europium-152	pCi/L	06/07/2010	N001	-	33	U	FQ	0	33	19.6
Europium-154	pCi/L	06/07/2010	N001	-	34	U	FQ	0	34	18.5
Europium-155	pCi/L	06/07/2010	N001	-	21	U	FQ	0	21	12.2
Gross Alpha	pCi/L	06/07/2010	N001	-	8.34		FQ	0	1.2	1.79
Gross Beta	pCi/L	06/07/2010	N001	-	6.5		FQ	0	1.8	1.57
Lead-212	pCi/L	06/07/2010	N001	-	16	U	FQ	0	16	9.62
Nickel-63	pCi/L	06/07/2010	N001	-	13	U	FQ	0	13	3.82
Oxidation Reduction Potential	mV	06/07/2010	N001	-	122.6		FQ	0		
pH	s.u.	06/07/2010	N001	-	7.05		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 7C WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/07/2010	N001	-	120	U	FQ	0	120	65
Promethium-144	pCi/L	06/07/2010	N001	-	5.9	U	FQ	0	5.9	3.54
Promethium-146	pCi/L	06/07/2010	N001	-	6.7	U	FQ	0	6.7	3.97
Ruthenium-106	pCi/L	06/07/2010	N001	-	57	U	FQ	0	57	34.1
Specific Conductance	umhos /cm	06/07/2010	N001	-	707		FQ	0		
Temperature	C	06/07/2010	N001	-	14.45		FQ	0		
Thorium-234	pCi/L	06/07/2010	N001	-	120	U	FQ	0	120	70.7
Tritium	pCi/L	06/07/2010	N001	-	320	U	FQ	0	320	188
Turbidity	NTU	06/07/2010	N001	-	3.96		FQ	0		
Uranium-235	pCi/L	06/07/2010	N001	-	34	U	FQ	0	34	20.6
Yttrium-88	pCi/L	06/07/2010	N001	-	8.3	U	FQ	0	8.3	4.98

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 8B WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Actinium-228	pCi/L	06/08/2010	N001	-	30	U	FQ	0	30	18.5
Americium-241	pCi/L	06/08/2010	N001	-	66	U	FQ	0	66	39.2
Antimony-125	pCi/L	06/08/2010	N001	-	20	U	FQ	0	20	11.5
Cerium-144	pCi/L	06/08/2010	N001	-	34	U	FQ	0	34	20
Cesium-134	pCi/L	06/08/2010	N001	-	9.4	U	FQ	0	9.4	5.38
Cesium-137	pCi/L	06/08/2010	N001	-	8.8	U	FQ	0	8.8	4.75
Cobalt-60	pCi/L	06/08/2010	N001	-	8.5	U	FQ	0	8.5	4.93
Dissolved Oxygen	mg/L	06/08/2010	N001	-	2.07		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	-	43	U	FQ	0	43	24.2
Europium-154	pCi/L	06/08/2010	N001	-	49	U	FQ	0	49	29
Europium-155	pCi/L	06/08/2010	N001	-	20	U	FQ	0	20	11.8
Gross Alpha	pCi/L	06/08/2010	N001	-	6.47		FQ	0	1.5	1.6
Gross Beta	pCi/L	06/08/2010	N001	-	5.22		FQJ	0	1.9	1.5
Lead-212	pCi/L	06/08/2010	N001	-	16	U	FQ	0	16	9.18
Nickel-63	pCi/L	06/08/2010	N001	-	12	U	FQ	0	12	3.7
Oxidation Reduction Potential	mV	06/08/2010	N001	-	28.7		FQ	0		
pH	s.u.	06/08/2010	N001	-	6.9		FQ	0		

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 8B WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium-40	pCi/L	06/08/2010	N001	-	160	U	FQ	0	160	93.5
Promethium-144	pCi/L	06/08/2010	N001	-	7.7	U	FQ	0	7.7	4.66
Promethium-146	pCi/L	06/08/2010	N001	-	8.6	U	FQ	0	8.6	4.83
Ruthenium-106	pCi/L	06/08/2010	N001	-	78	U	FQ	0	78	43.6
Specific Conductance	umhos /cm	06/08/2010	N001	-	795		FQ	0		
Temperature	C	06/08/2010	N001	-	14.71		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	-	180	U	FQ	0	180	105
Tritium	pCi/L	06/08/2010	N001	-	320	U	FQ	0	320	187
Turbidity	NTU	06/08/2010	N001	-	2.92		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	-	23	U	FQ	0	23	14.8
Yttrium-88	pCi/L	06/08/2010	N001	-	14	U	FQ	0	14	8.1

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 8C WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA		
Actinium-228	pCi/L	06/08/2010	N001	-	20	U	FQ	0	20	13.1
Americium-241	pCi/L	06/08/2010	N001	-	75	U	FQ	0	75	43.8
Antimony-125	pCi/L	06/08/2010	N001	-	13	U	FQ	0	13	7.49
Cerium-144	pCi/L	06/08/2010	N001	-	34	U	FQ	0	34	20.3
Cesium-134	pCi/L	06/08/2010	N001	-	9.7	U	FQ	0	9.7	5.79
Cesium-137	pCi/L	06/08/2010	N001	-	5.8	U	FQ	0	5.8	3.32
Cobalt-60	pCi/L	06/08/2010	N001	-	6.3	U	FQ	0	6.3	3.76
Dissolved Oxygen	mg/L	06/08/2010	N001	-	1.61		FQ	0		
Europium-152	pCi/L	06/08/2010	N001	-	33	U	FQ	0	33	18.3
Europium-154	pCi/L	06/08/2010	N001	-	30	U	FQ	0	30	17.6
Europium-155	pCi/L	06/08/2010	N001	-	19	U	FQ	0	19	11
Gross Alpha	pCi/L	06/08/2010	N001	-	7.43		FQ	0	1.5	1.74
Gross Beta	pCi/L	06/08/2010	N001	-	5.91		FQ	0	1.8	1.52
Lead-212	pCi/L	06/08/2010	N001	-	14	U	FQ	0	14	8.39
Nickel-63	pCi/L	06/08/2010	N001	-	13	U	FQ	0	13	3.82
Oxidation Reduction Potential	mV	06/08/2010	N001	-	-68.3		FQ	0		
pH	s.u.	06/08/2010	N001	-	6.91		FQ	0		
Potassium-40	pCi/L	06/08/2010	N001	-	110	U	FQ	0	110	61.4
Promethium-144	pCi/L	06/08/2010	N001	-	5.6	U	FQ	0	5.6	3.32
Promethium-146	pCi/L	06/08/2010	N001	-	6.5	U	FQ	0	6.5	3.76

Groundwater Quality Data by Location (USEE100) FOR SITE HAL01, Hallam Decommissioned Reactor Site

REPORT DATE: 8/3/2010

Location: 8C WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Ruthenium-106	pCi/L	06/08/2010	N001	-	55	U	FQ	0	55	31.9
Specific Conductance	umhos/cm	06/08/2010	N001	-	734		FQ	0		
Temperature	C	06/08/2010	N001	-	14.71		FQ	0		
Thorium-234	pCi/L	06/08/2010	N001	-	120	U	FQ	0	120	72.9
Tritium	pCi/L	06/08/2010	N001	-	320	U	FQ	0	320	189
Turbidity	NTU	06/08/2010	N001	-	3.4		FQ	0		
Uranium-235	pCi/L	06/08/2010	N001	-	34	U	FQ	0	34	20.3
Yttrium-88	pCi/L	06/08/2010	N001	-	8.1	U	FQ	0	8.1	4.67

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.

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

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Static Water Level Data

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Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
1A	N	1440.35	06/07/2010	10:11:00	4.19	1436.16
1A	N	1440.35	06/08/2010	16:45:30	4.09	1436.26
1B	N	1440.5	06/07/2010	10:26:00	4.44	1436.06
1B	N	1440.5	06/08/2010	17:21:48	4.43	1436.07
2A	N	1441.02	06/07/2010	09:57:00	6.3	1434.72
2A	N	1441.02	06/08/2010	09:34:27	6.41	1434.61
2B	N	1441.29	06/07/2010	09:50:00	6.51	1434.78
2B	N	1441.29	06/08/2010	10:04:53	6.49	1434.8
2B2	N	1442.62	06/07/2010	10:08:00	6.77	1435.85
2B2	N	1442.62	06/07/2010	16:34:14	6.77	1435.85
2C2	N	1442.61	06/07/2010	10:09:00	10.32	1432.29
2C2	N	1442.61	06/07/2010	16:09:03	10.32	1432.29
3A	N	1439.03	06/07/2010	09:20:00	6.82	1432.21
3A	N	1439.03	06/08/2010	14:48:46	7.13	1431.9
3B	N	1439.39	06/07/2010	09:30:00	5.31	1434.08
3B	N	1439.39	06/08/2010	15:10:01	5.69	1433.7
4A	N	1438.5	06/07/2010	09:02:00	5.41	1433.09
4A	N	1438.5	06/08/2010	13:07:16	5.18	1433.32
4B	N	1438.61	06/07/2010	09:06:00	5.18	1433.43
4B	N	1438.61	06/08/2010	13:33:38	5.2	1433.41
4C	N	1439.77	06/07/2010	09:08:00	21.51	1418.26
4C	N	1439.77	06/08/2010	14:13:20	21.31	1418.46
5A	N	1437.63	06/07/2010	10:47:00	7.94	1429.69
5A	N	1437.63	06/07/2010	13:35:27	7.94	1429.69
5B	N	1437.95	06/07/2010	10:59:00	8.44	1429.51
5B	N	1437.95	06/07/2010	12:55:23	8.44	1429.51
6A	N	1438.13	06/07/2010	10:27:00	5.5	1432.63
6B	N	1438.15	06/07/2010	10:43:00	6.3	1431.85
7B	N	1443.11	06/07/2010	09:47:00	8.26	1434.85
7B	N	1443.11	06/07/2010	14:58:54	8.26	1434.85

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)
7C	N	1443.23	06/07/2010	09:40:00	8.59	1434.64
7C	N	1443.23	06/07/2010	14:33:44	8.59	1434.64
8B	N	1440.97	06/07/2010	09:11:00	6.74	1434.23
8B	N	1440.97	06/08/2010	11:49:57	8.2	1432.77
8C	N	1441.03	06/07/2010	09:16:00	7.21	1433.82
8C	N	1441.03	06/08/2010	11:02:33	6.67	1434.36

FLOW CODES: B BACKGROUND
N UNKNOWN

C CROSS GRADIENT
O ON SITE

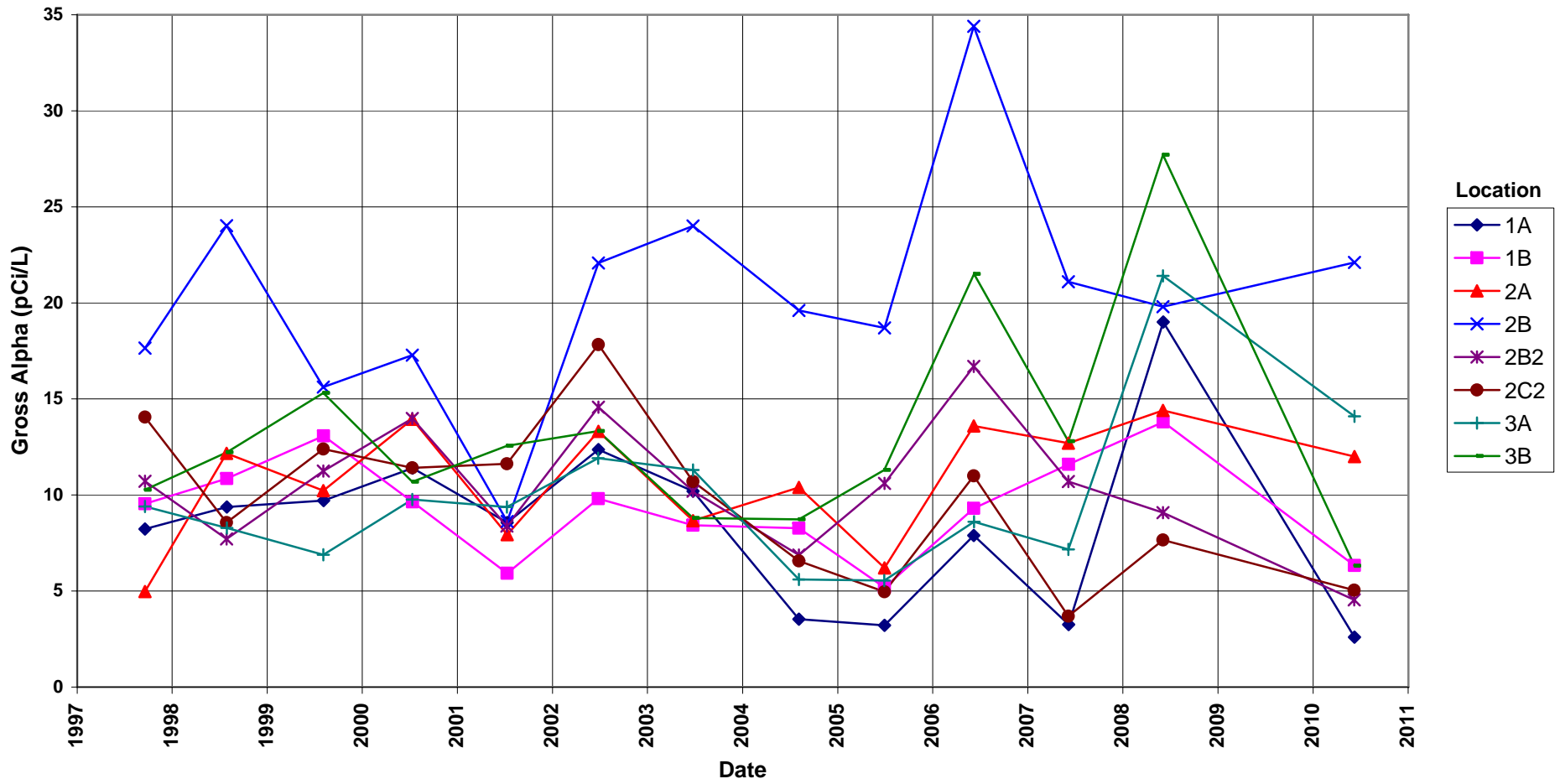
D DOWN GRADIENT
U UPGRADIENT

F OFF SITE

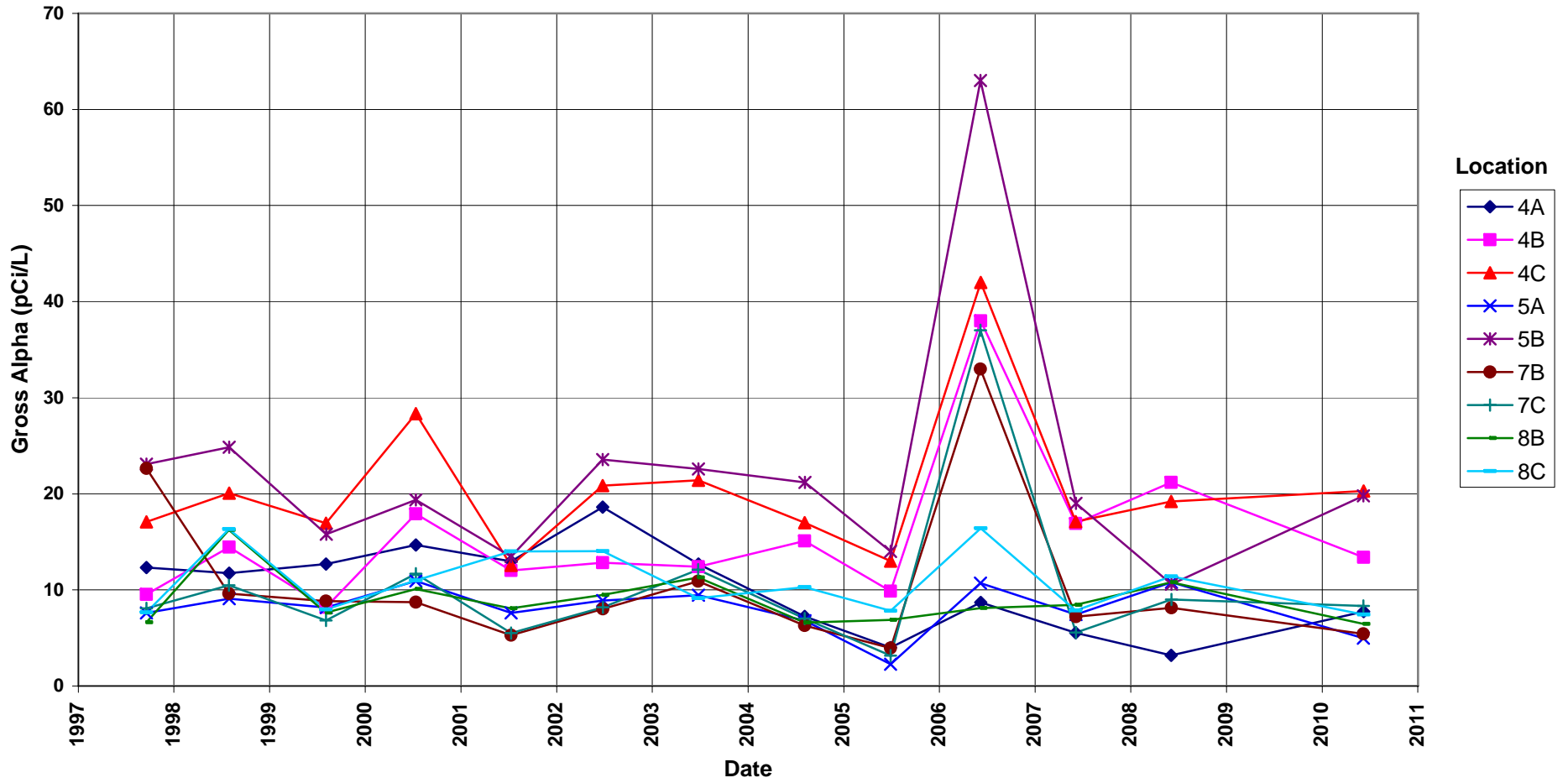
Time-Concentration Graphs

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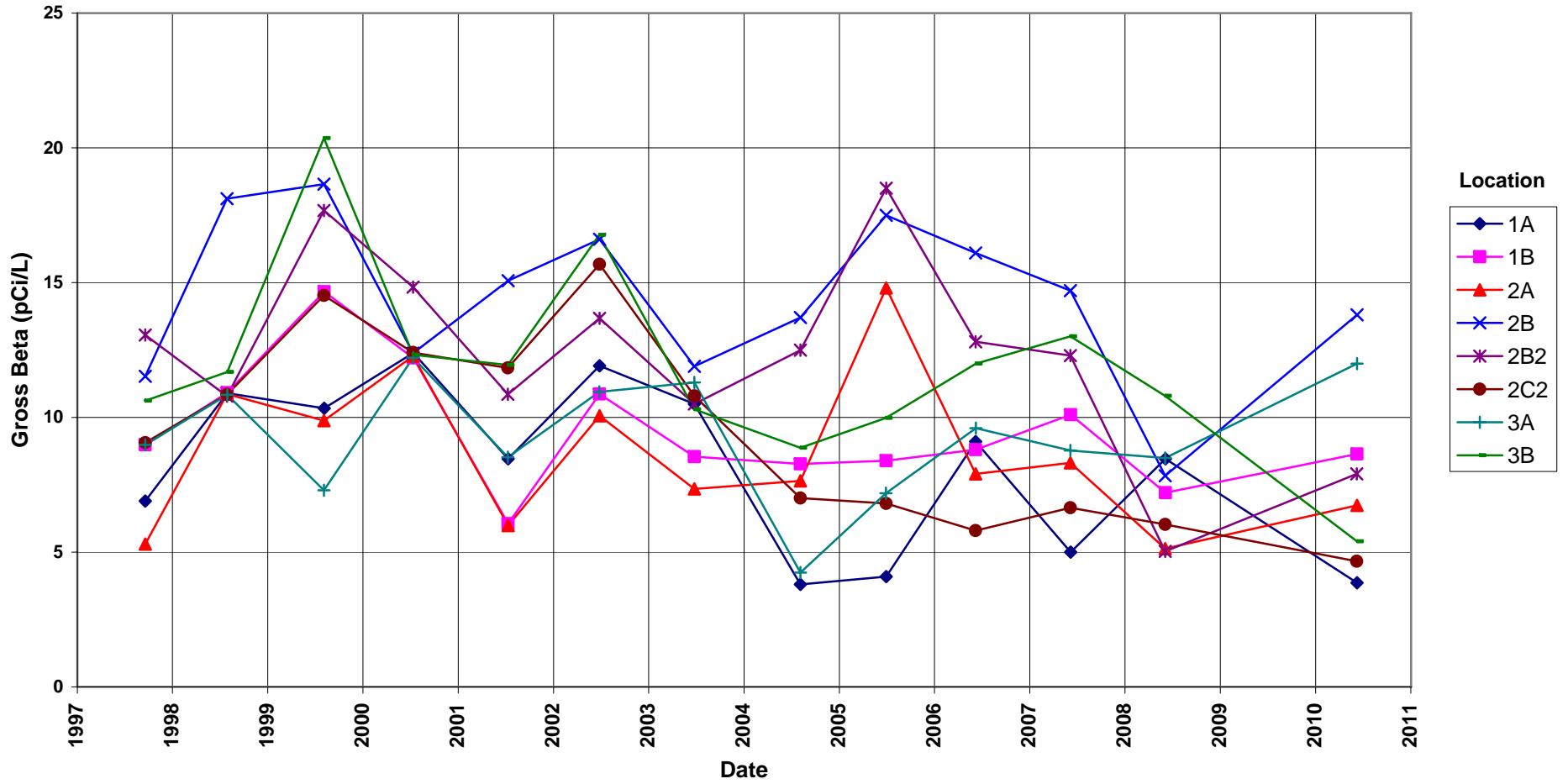
Hallam Decommissioned Reactor Site Gross Alpha Concentration



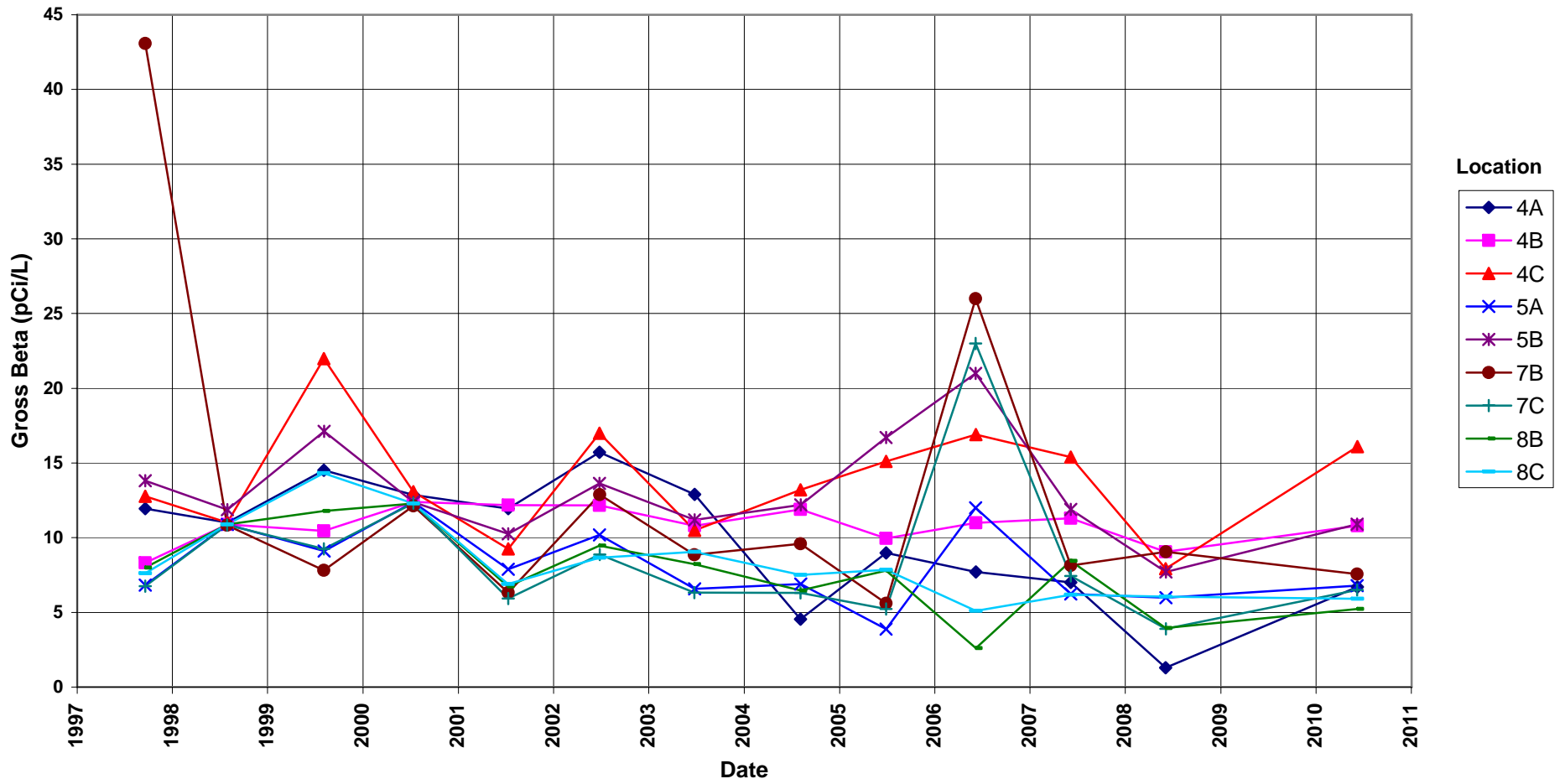
Hallam Decommissioned Reactor Site Gross Alpha Concentration



Hallam Decommissioned Reactor Site Gross Beta Concentration



Hallam Decommissioned Reactor Site Gross Beta Concentration



Attachment 3
Sampling and Analysis Work Order

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established 1959

Task Order LM00-501
Control Number 10-0580

May 11, 2010

U.S. Department of Energy
Office of Legacy Management
ATTN: Art Kleinrath
Site Manager
955 Mound Road
Miamisburg, OH 45342

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
June 2010 Environmental Sampling at Hallam, Nebraska

REFERENCE: Task Order LM-501-04-303-402, Hallam, NE, Site

Dear Mr. Kleinrath:

The purpose of this letter is to inform you of the upcoming sampling event at Hallam, Nebraska. Enclosed are the map and tables specifying sample locations and analytes for groundwater monitoring at the Hallam site. Water quality data will be collected at the site as part of the routine environmental sampling currently scheduled to begin the week of June 7, 2010.

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

Monitor Wells (filtered)*

OBS1A Gt	OBS2B Gt	OBS3A Gt	OBS4B Gt	OBS5A Gt	OBS7B	OBS8B
OBS1B Gt	OBS2B2 Unk	OBS3B Gt	OBS4C Gt	OBS5B Gt	OBS7C	OBS8C
OBS2A Gt	OBS2C2 Unk	OBS4A Gt				

*NOTE: Gt = Glacial till; Unk = unknown

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.

Please contact me at (412) 818-7015 if you have any questions or concerns.

Sincerely,

2010.05.10
16:43:15 -04'00'

Michele Miller
Project Manager

Art Kleinrath
Control Number 10-0580
Page 2

MM/lcg/lb

Enclosures (3)

cc: (electronic)

Cheri Bahrke, Stoller
Steve Donovan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Michelle Miller, Stoller
EDD Delivery
rc-grand.junction

Sampling Frequencies for Locations at Hallam, Nebraska

Location ID	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Monitoring Wells						
1A				X		Next in 6/2010
1B				X		Next in 6/2010
2A				X		Next in 6/2010
2B				X		Next in 6/2010
2B2				X		Next in 6/2010
2C2				X		Next in 6/2010
3A				X		Next in 6/2010
3B				X		Next in 6/2010
4A				X		Next in 6/2010
4B				X		Next in 6/2010
4C				X		Next in 6/2010
5A				X		Next in 6/2010
5B				X		Next in 6/2010
6A					X	Water level; micropurge if possible
6B					X	Water level; micropurge if possible
7B				X		Next in 6/2010
7C				X		Next in 6/2010
8B				X		Next in 6/2010
8C				X		Next in 6/2010

Sampling conducted in June
Based on LTSP dated June 2008

Constituent Sampling Breakdown

Site	Hallam		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
Approx. No. Samples/yr	17	0			
<i>Field Measurements</i>					
Alkalinity	X				
Dissolved Oxygen					
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride					
Chromium					
Gamma Spec	X		10 pCi/L	Gamma Spectrometry	GAM-A-001
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					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Nickel-63	X		700 pCi/L	Liquid Scintillation	LSC-A-009
Nitrate + Nitrite as N (NO3+NO2)-N					
Potassium					
Radium-226					
Radium-228					
Selenium					
Silica					
Sodium					
Strontium					
Sulfate					
Sulfide					
Total Dissolved Solids					
Total Organic Carbon					
Tritium	X		400 pCi/L	Liquid Scintillation	GPC-A-001
Uranium					
Vanadium					
Zinc					
Total No. of Analytes	5	0			

Note: All analyte samples are considered unfiltered unless stated otherwise. Tritium is always unfiltered. 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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Memorandum

Control Number N/A

DATE: June 28, 2010

TO: Michele Miller

FROM: Tom Welton

SUBJECT: Trip Report

Site: Hallam, Nebraska

Dates of Sampling Event: June 7 - 10, 2010.

Team Members: Tom Welton and Tim Zirbes.

Number of Locations Sampled: 17 groundwater monitoring wells. A summary table of samples collected is attached at the end of this report.

Locations Not Sampled/Reason: None.

Location Specific Information: All monitoring wells were purged and sampled using Category II criteria with the exception of monitoring well 1A, which was purged and sampled using Category I criteria.

Field Variance: Wells 2B2, 2C2, 7B, and 7C ran out of water during initial sampling due to limitations of using a peristaltic pump. These wells were allowed to recharge and subsequently sampled until sufficient volume was collected for all analytes. The subsequent samples were not micropurged and the recorded sample time and date is the time and date of the first sample collection. See field sheet comments for further information.

Filtered Samples: Locations 2A and 2B2 had turbidity of 29.9 and 27.3 NTUs respectively and, in accordance with the Sample and Analysis Plan, were filtered with a 0.45µ filter. The tritium samples were not filtered, as required by the plan. No other samples were filtered.

Quality Control Samples: Following are the false identifications assigned to the quality control sample:

False ID	True ID	Sample Type	Ticket Number
2628	1A	Field Duplicate	IGU 586

Requisition Numbers Assigned: Samples were assigned to requisition identification number (RIN) 10053095.

Water Level Measurements: Water levels were measured at all monitoring wells on June 7, 2010, before the sampling event was started. Water levels also were measured at the start of each sample event. In addition, the total depths of some wells were measured. The results of these measurements are shown in the table below.

LOCATION	SWL 6/7/2010	SWL at Sample Time	Measured Total Depth
1A	4.19	4.09	--
1B	4.44	4.43	--
2A	6.30	6.41	--
2B	6.51	6.49	--
2B2	6.77	6.77	--
2C2	10.32	10.32	80.13
3A	6.82	7.13	--
3B	5.31	5.69	--
4A	5.41	5.18	25.16
4B	5.18	5.20	55.36
4C	21.51	21.31	77.33
5A	7.94	7.94	25.09
5B	8.44	8.44	50.5
6A	5.50	5.31	15.63
6B	6.30	6.33	50.14
7B	8.26	8.26	48.30
7C	8.59	8.59	--
8B	6.74	8.20	--
8C	7.21	6.67	70.66

Well Inspection Summary: An inspection was conducted by others just prior to the sampling event. The findings were transmitted by e-mail to the sampling team and are reflected in the “Corrective Actions Required/Taken” section. In addition, it was noted in the 2008 trip report that the bollards at wells 7B and 7C were all broken out of the concrete and very loose. It appears that since the time of the 2008 report that the bollards were removed and replaced on one side by Jersey barriers. An ash bin made of very large concrete blocks is located on the other side of the wells and offer protection.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory: The sample at location 8C was split with Mr. Howard Shuman, Health Physicist, with the Nebraska Division of Public Health [(402) 471-0304]. Mr. Shuman requested only a split for nickel-63. Purge water from sampling was disposed of in accordance with the State of Nebraska, Department of Environmental Quality requirements.

Institutional Controls

Fences, Gates, Locks: No issues identified.

Signs: Not applicable.

Trespassing/Site Disturbances: None noted. Hallam is a fenced occupied site that is staffed 24 hours a day.

Site Issues: None.

Disposal Cell/Drainage Structure Integrity: Not applicable.

Vegetation/Noxious Weed Concerns: Not applicable.

Maintenance Requirements: None.

Safety Issues: None.

Access Issues: None.

Corrective Actions Required/Taken:

LOCATION	CORRECTIVE ACTION
1A	Wire brushed concrete pad around flush mount, painted pad with florescent paint, cleaned mating surfaces of lid, installed rubber washers on hold down bolts, glued brass identity medallion to concrete, installed vinyl well identifier to lid. Installed new Teflon lined tubing.
1B	Same as 1A, and purged well dry to remove solids at bottom.
2A	Installed new hinge on protective casing lids, painted protective casing, and applied vinyl well identifiers. This well was mistakenly labeled as 2-C; relabeled as 2-A.
2B	Installed new hinge on protective casing lid, painted protective casing.
2B2	Painted protective casing (touch up only).
2C2	Removed broken concrete at corners of pad closest to well, reinstalled bollards in corners (about 6 inches deeper), replaced broken concrete with fresh and filled all four bollards with sand and capped with concrete. The bollards could not be moved outside the concrete pad because of the adjacent Jersey barrier. Touch up painted protective casing.
3A	Installed new hinge, painted protective casing.
3B	Painted protective casing (touch up only). The protective casing lid is functional but will need to be replaced during next sampling/maintenance event.
4A	Painted protective casing (touch up only).
4B	Installed new hinge and touch up painted protective casing.
4C	Painted protective casing (touch up only).
5A	Wells in good shape, painted protective casing (touch up only).
5B	Same as 5A.
6A	Wire brushed concrete pad around flush mount, painted pad with florescent paint, cleaned mating surfaces of lid, installed rubber washers on hold-down bolts, glued brass identity medallion to concrete, installed vinyl well identifier to lid, installed new PVC cap on well casing. Purged well dry.
6B	Same as 6A. Purged well to 30 ft SWL.
7B	Shoveled ash from base of well, scraped and wire brushed approximately bottom 2 feet of protective casing which was heavily corroded, primed with rust inhibiting primer and top coated entire casing with orange paint.
7C	Same as 7B.
8B	Painted protective casing (touch up only), removed one bollard from concrete pad and reinstalled it outside the pad at a deeper depth, concreted bollard in and filled bollards with sand and capped with concrete.
8C	Same as 8B. Coupling about 4 ft down on tubing prevents SWL probe from reaching water level. During next sampling event either replace tubing or use different coupling.
All	Installed dedicated peristaltic pump masterflex tubing. All locks were lubricated. All hinges on the protective casing caps were oiled. During next sampling event, consideration should be given to replacing the locks, they are difficult to open.

SUMMARY OF SAMPLING AT HALLAM
June 7 – 10, 2010

Location	Date Sampled	Parameters	QC Taken	COMMENTS
5B	6/7/2010	Ni-63, H-3, G Spec, GAB		1255
5A	6/7/2010	Ni-63, H-3, G Spec, GAB		1335
7C	6/7/2010	Ni-63, H-3, G Spec, GAB		1433
7B	6/7/2010	Ni-63, H-3, G Spec, GAB		1458
2C2	6/7/2010	Ni-63, H-3, G Spec, GAB		1609
2B2	6/7/2010	Ni-63, H-3, G Spec, GAB		1634 (Filtered)*
2A	6/8/2010	Ni-63, H-3, G Spec, GAB		0934 (Filtered)*
2B	6/8/2010	Ni-63, H-3, G Spec, GAB		1004
8C**	6/8/2010	Ni-63, H-3, G Spec, GAB		1102
8B	6/8/2010	Ni-63, H-3, G Spec, GAB		1149
4A	6/8/2010	Ni-63, H-3, G Spec, GAB		1307
4B	6/8/2010	Ni-63, H-3, G Spec, GAB		1333
4C	6/8/2010	Ni-63, H-3, G Spec, GAB		1413
3A	6/8/2010	Ni-63, H-3, G Spec, GAB		1448
3B	6/8/2010	Ni-63, H-3, G Spec, GAB		1510
1A	6/8/2010	Ni-63, H-3, G Spec, GAB	QC/FD	1645; 2628 (FD) 1640
1B	6/8/2010	Ni-63, H-3, G Spec, GAB		1721

* Samples filtered with 0.45µ filter, H-3 was not filtered.

** Split aliquot with State for Ni-63 only.

(TW/lcg)

cc: (electronic)
 Art Kleinrath, DOE
 Ken Broberg, Stoller
 Steve Donovan, Stoller
 EDD Delivery