



YANKEE ATOMIC ELECTRIC COMPANY

49 Yankee Road, Rowe, Massachusetts 01367

May 6, 2008
BYR 2008-014

Dave Howland
Department of Environmental Protection
Western Regional Office
436 Dwight Street
Springfield, MA 01103

Subject: Post-Closure Maintenance and Monitoring Report

This letter serves as the Post-Closure Maintenance and Monitoring Report that documents the results of the monitoring required by the Massachusetts Department of Environmental Protection (DEP), as documented in the "Filed" Deed Notices for the Southeast Construction Fill Area (SCFA) and the Beneficial Use Determination (BUD) Area. This report documents the results of the following post-closure monitoring:

- Groundwater Monitoring (Documented in Attachment 1)
- Surface Water Monitoring (Documented in Attachment 1)
- Soil Stability Monitoring – Settlement, Cracks and Erosion and Vegetative Cover (Documented in Attachment 2)

Should you require additional information please contact me at 413-424-5261 Extension 303.

Sincerely,

YANKEE ATOMIC ELECTRIC CO

Robert Mitchell
ISFSI Manager

cc w/encl.:

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**Post Closure Groundwater and Surface Water Monitoring
Report, Spring 2008
Yankee Nuclear Power Station**

Prepared for:

**Yankee Atomic Electric Company
Yankee Nuclear Power Station
49 Yankee Road
Rowe, Massachusetts**

Prepared by:

**MACTEC Engineering and Consulting, Inc.
511 Congress Street
Portland, Maine 04101**

May 2008

Project Number 3617087152

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1.0 INTRODUCTION

MACTEC Engineering and Consulting, Inc. (MACTEC) has been contracted by The Yankee Atomic Electric Company to conduct the Post Closure Groundwater and Surface Water Monitoring Program at the Yankee Nuclear Power Station, located at 49 Yankee Road in Rowe, Massachusetts (YNPS).

YNPS completed its decommissioning in 2007, under the regulatory oversight of the Nuclear Regulatory Commission (NRC). However, as part of the closure process, ongoing groundwater and surface water monitoring is still required under the Massachusetts Department of Environmental Protection (MassDEP) to demonstrate that the groundwater is in compliance under the Massachusetts Contingency Plan (MCP) and for post closure monitoring for the Beneficial Use Determination (BUD) Area and the Southeast Construction Fill Area (SCFA). This report presents the findings from samples collected in March 2008 in support of the Site closure requirements under the MCP and to support post closure monitoring.

2.0 BACKGROUND

Through the site closure process, a comprehensive investigation was conducted to characterize environmental conditions and to develop the conceptual site model, not only to identify source areas and impacted media, but to also describe the fate and transport of both chemicals and radionuclides in soils, groundwater, and surface water. These findings have been published in numerous reports and have achieved the appropriate regulatory approvals. The conceptual site model for groundwater at YNPS was published in the Final Groundwater Conditions Report, submitted to the NRC on February 15, 2007.

As part of the Decommissioning Project, 81 groundwater monitoring wells were installed to characterize the hydrogeology as well as groundwater quality. Currently there are 53 wells that remain on Site. Of these wells, 15 groundwater monitoring wells are to be sampled to demonstrate compliance with the MCP and to support post closure monitoring. As recommended below, the remaining 38 wells may now be abandoned as not to become a potential conduit for surface runoff to impact groundwater conditions.

3.0 SCOPE OF WORK

Groundwater monitoring for closure under the License Termination Plan (LTP) has been completed. However, groundwater monitoring is still required to reach closure under the MassDEP and to support post closure monitoring, and as such, this program was completed in accordance with the MassDEP-approved Groundwater Monitoring Plan to Support Closure under the MCP (ERM, 2007).

The sampling program included the sampling of 15 groundwater monitoring wells and six surface water sample locations. The sampling program is summarized in Table 1. The sampling locations are shown on Figure 1. All groundwater samples were collected in accordance with Low Stress (Low Flow) Purging and Sampling guidance (USEPA, 1996a). Field data records are presented in Appendix A and a summary of the field data parameters is presented in Table 2.

The radiochemistry data were validated in accordance with Site Procedure RP-05. Chemical analytical data were validated in accordance with USEPA Region 1, New England Validation Guidelines (USEPA, 1989 and 1996b). A summary of the data validation findings and tabulated validated data are provided in Appendix B-1 (radiological), B-2 (chemical), and B-3 (validation checklists).

4.0 FINDINGS

Groundwater samples were submitted for both radiological and chemical parameters.

4.1 RADIOLOGICAL PARAMETERS

Radionuclides in groundwater are compared to the U.S. Environmental Protection Agency's (USEPA's) Maximum Concentration Limit (MCL). In addition to these criteria, data are also evaluated over time to assess if trends are decreasing, stable, or increasing. A change of 15 percent from the Spring 2007 event has been used to evaluate trends.

Groundwater samples were collected from 10 monitoring wells and one surface water location (Sherman Spring) for analysis of radionuclides. Consistent with previous events, tritium was the only radionuclide positively identified in groundwater. The results from the March 2008 sampling

event are presented on Table 3 along with previous data to demonstrate that there continues to be a generally downward and/or stable trend in tritium concentrations. Radionuclides were not detected in the sample collected at the Sherman Spring monitoring location this event.

As anticipated, the highest concentration of tritium was detected at MW-107C at 25,700 picocuries per liter (pCi/L), with the next highest detection reported at monitoring well MW-107F (9,890 pCi/L). The MCL for tritium is 20,000 pCi/L. As shown on Table 3, these detections are consistent with the conceptual site model; tritium remains elevated at a few locations; however, the concentrations are generally trending downward. Additionally, because the source was removed as part of Site Closure, this trend is anticipated to continue over time.

4.2 CHEMICAL PARAMETERS

Groundwater chemical data are evaluated using the GW-1 groundwater standards (310 CMR 40.0974(2)) (MassDEP, 2008). For the analyses where GW-1 standards are not published, data are compared to Massachusetts MCLs or Massachusetts Secondary MCLs (SMCLs) (MassDEP, 2007). Surface water chemical data are evaluated using USEPA Ambient Water Quality Criteria (AWQC) (USEPA, 2002). For the analyses where AWQC are not published, data are compared to Massachusetts MCLs or SMCLs (MassDEP, 2007).

Former Industrial Area All but three of the monitoring wells (CFW-1, CFW-5 and CFW-6) that are sampled for chemical parameters are located in the Former Industrial Area. None of the surface water sampling locations are within the Former Industrial Area. Groundwater samples collected from wells in the Former Industrial Area were analyzed for arsenic and acetone. Monitoring well MW-101C was analyzed for acetone and monitoring wells MW-101A, MW-107A, and MW-111C were analyzed for arsenic.

- Acetone was detected at MW-101C at a concentration of 2.20 mg/L, below the MassDEP GW-1 standard of 6.3 mg/L.
- Arsenic was detected at MW-101A at a concentration of 0.01 milligrams per liter (mg/L), which equals the MassDEP GW-1 standard.
- Arsenic was not detected in samples collected from monitoring wells MW-107A and MW-111C.

A summary of the acetone data from monitoring well MW-101C is presented on Table 4. A summary of arsenic data from monitoring wells MW-101A, MW-107A, and MW-111C is presented on Table 5.

Former Southeast Construction Fill Area Samples were collected from three groundwater monitoring wells (CFW-1, CFW-5, and CFW-6) and five surface water locations (SW-1 through SW-5) to assess the potential environmental impacts from the Former SCFA. A summary of the sampling program is presented in Table 1.

No volatile organic compounds (VOCs) were detected in any of the groundwater or surface water samples at concentrations greater than the screening values. Several metals and other naturally occurring compounds were detected in both groundwater and surface water samples; however, the concentrations are consistent with background and historic data with the exception of a few parameters reported for CFW-6. Only iron and manganese were detected at concentrations that exceed the SMCLs. SMCLs are used to assess the aesthetic qualities of drinking water and are not health-based standards. Concentrations that exceed SMCLs are not necessarily indicative of potential health risks.

A summary of the groundwater data for wells downgradient of the SCFA is presented on Table 6. A summary of the surface water data for locations associated with the SCFA is presented in Table 7.

Sherman Spring Sampling was completed at the Sherman Spring surface water location (SP-1) and samples were analyzed for VOCs and total RCRA 8 metals plus thallium. All results were reported as not detected. Validated data is included in Appendix B.

5.0 CONCLUSIONS

Based on the data collected during the March 2008 sampling event, tritium continues to be the only site related radionuclide impacting groundwater and/or surface water at YNPS. Tritium concentrations continue to be stable or decreasing across the site, with the highest concentration reported at MW-107C at an activity of 25,700 pCi/L compared to the MCL of 20,000 pCi/L.

Acetone was detected at MW-101C below the GW-1 standard. In accordance with the Groundwater Monitoring Plan, samples must be collected from this well until there are two consecutive rounds of data that are below the GW-1 standard of 6.3 mg/L. Based on the data presented in Table 4, monitoring at well MW-101C may be discontinued.

Arsenic was detected at MW-101A at the GW-1 standard. In accordance with the Groundwater Monitoring Plan, samples must be collected from the three wells until there are two consecutive rounds of data that are below the GW-1 standard of 0.01 mg/L. Based on the data presented in Table 5, sampling will continue for wells MW-101A and MW-111C. Monitoring at well MW-107A may be discontinued.

Groundwater results reported for CFW-6 were not consistent with historical results for some (not all) parameters. Results obtained from this location during the next event (March 2009) will be reviewed and evaluated for potential trends.

6.0 RECOMMENDATIONS

The results from the March 2008 groundwater sampling event were consistent with the approved conceptual site model. No additional sampling is warranted at this time. In accordance with the Post Closure Groundwater Monitoring Plan, the next groundwater and surface water sampling event is scheduled for March 2009.

As the groundwater monitoring program is progressing, wells that are no longer part of the active network may also be abandoned at this time. This action is recommended to eliminate the conduit for storm water runoff to potentially reach the water table. Wells should be abandoned by a Massachusetts licensed driller in accordance with state regulations.

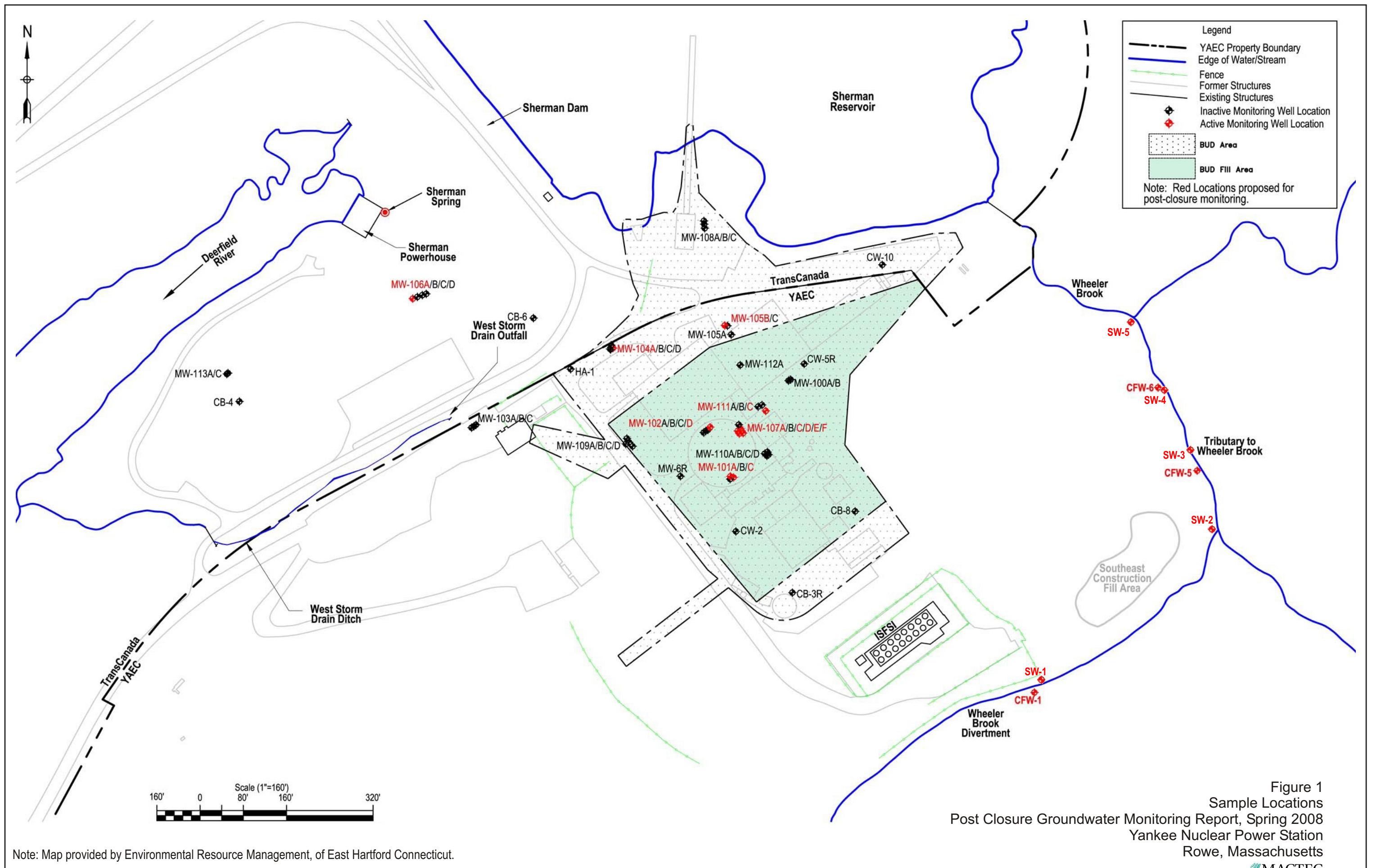
7.0 ACRONYMS

BUD	Beneficial Use Determination
MACTEC	MACTEC Engineering and Consulting Services, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MCL	Maximum Concentration Limit
MCP	Massachusetts Contingency Plan
mg/L	milligrams per liter
NRC	Nuclear Regulatory Commission
RC	Reporting Concentrations
SCFA	Southeast Construction Fill Area
SMCL	Secondary Maximum Contaminant Levels
USEPA	Environmental Protection Agency
VOC	volatile organic compound
YNPS	Yankee Nuclear Power Station

8.0 REFERENCES

- ERM 2007. Groundwater Monitoring Plan to Support Closure under the Massachusetts Contingency Plan, Yankee Nuclear Power Station, Site Closure Project, Rowe, Massachusetts, June 2007.
- ISFSI Procedure RP-05, “YNPS Groundwater Monitoring Program”.
- MACTEC, 2006. Health and Safety Plan, Yankee Nuclear Power Station, Rowe, Massachusetts, April 2006.
- MassDEP, 2007. Standards and Guidelines for Contaminants in Massachusetts Drinking Waters. Spring 2007. Department of Environmental Protection, Office of Research and Standards.
- MassDEP, 2008. Massachusetts Contingency Plan, 310 CMR 40.000. February 14, 2008.
- USEPA, 1989. “Region I, Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses;” Hazardous Site Evaluation Division; February, 1989.
- USEPA, 1996a. Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Ground Water Monitoring Wells, July 1996.
- USEPA, 1996b. “Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, Parts I and II,” Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December, 1996.
- USEPA, 2002. Nationally Recommended Water Quality Criteria: 2002. Office of Water, Science and Technology. Doc. No. EPA-822-R-02-047.
- YNPS, 2007. BYR 2007-016, Final Groundwater Conditions Report, Yankee Nuclear Power Station, Rowe, Massachusetts, February 15, 2007.

Figures



Note: Map provided by Environmental Resource Management, of East Hartford Connecticut.

Tables

Table 1
Groundwater and Surface Water Monitoring Program Summary
March 2008

Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
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Rowe, Massachusetts

				<i>Analysis Method</i>										
				VOC - (8260 with TICs)	Acetone - (8260)	Metals List 1 - (6010/7470)	Metals List 2 - (6010/7470)	Arsenic - (6010)	Cyanide - (9010)	Nitrate Chloride/Sulfite (9056), TDS (SM2540C), Alkalinity (3100)	COD (SM 520C)	Gamma isotopic ¹ (Gamma Spec)	Sr-90 (GPC, LSC)	Tritium (LSC)
Fraction				T	T	T	T	T	T	T	T	T	T	T
Bottle Size				40	40	500	500	500	1	500	250	2	2	500
Bottle Size Units				mL	mL	mL	mL	mL	Liter	mL	mL	Liter	Liter	mL
Bottle Material				Glass Vial	Glass Vial	Poly	Poly	Poly	Poly	Poly	Amber Glass	Poly	Poly	Poly
Preservative				HCl	HCl	HNO3	HNO3	HNO3	NaOH	4 Deg C	H2SO4	HNO3	HNO3	
Lab ID				NEL	NEL	NEL	NEL	NEL	NEL	NEL	NEL	GEL	GEL	GEL
Media	Loc Name	Field Sample ID	QC Code											
GW	CFW-1	CFW-1	FS	X		X			X	X	X			
GW	CFW-5	CFW-5	FS	X		X			X	X	X			X
GW	CFW-5	CFW-5DUP	FD	X		X			X	X	X			
GW	CFW-5	CFW-5MS	MS	X		X			X	X	X			
GW	CFW-5	CFW-5MSD	MSD	X		X			X	X	X			
GW	CFW-6	CFW-6	FS	X		X			X	X	X			X
GW	MW-101A	MW-101A	FS					X						
GW	MW-101C	MW-101C	FS		X									
GW	MW-102D	MW-102D	FS									X	X	X
GW	MW-104A	MW-104A	FS									X	X	X
GW	MW-105B	MW-105B	FS									X	X	X
GW	MW-106A	MW-106A	FS									X	X	X
GW	MW-107A	MW-107A	FS					X						
GW	MW-107C	MW-107C	FS									X	X	X
GW	MW-107D	MW-107D	FS									X	X	X
GW	MW-107E	MW-107E	FS									X	X	X
GW	MW-107E	MW-107EDUP	FD									X	X	X
GW	MW-107E	MW-107EMS	MS									X	X	X
GW	MW-107E	MW-107EMSD	MSD									X	X	X
GW	MW-107F	MW-107F	FS									X	X	X
GW	MW-111C	MW-111C	FS					X						
SW	SW-1	SW-1	FS	X		X			X	X	X			
SW	SW-2	SW-2	FS	X		X			X	X	X			
SW	SW-3	SW-3	FS	X		X			X	X	X			
SW	SW-4	SW-4	FS	X		X			X	X	X			
SW	SW-5	SW-5	FS	X		X			X	X	X			
SW	SP-1	SP-1	FS	X			X					X	X	X
QC	EB-001	EB-001	EB		X							X	X	X
QC	TB-001	TB-001	TB	X										
QC	TB-002	TB-002	TB	X										
TOTAL				14	2	11	1	3	11	11	11	13	13	15

Table 1
Groundwater and Surface Water Monitoring Program Summary
March 2008

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Notes:

Metals List 1 - RCRA 8 plus copper, iron, manganese, zinc, calcium, sodium

Metals List 2 - RCRA 8 plus thallium

¹ = Gamma isotopic includes: Co-60, Cs-134, Cs-137, Nb-94, Sb-125, Eu-152, Eu-154, Eu-155, Ag-108m

COD chemical oxygen demand
EB Equipment Blank
FD Field Duplicate
FS Field Sample
GEL General Engineering Laboratories
GW Groundwater Sample
HCl Hydrochloric Acid
HNO₃ Nitric Acid
MD Matrix Spike Duplicate
ml milliliter
MS Matrix Spike
NEL Northeast Laboratories
SW Surface Water Sample
T Total
TB Trip Blank
TDS Total Dissolved Solids
VOC volatile organic compound
X indicates parameter scheduled for analysis.

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**Table 2
Field Parameter Measurements**

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	Parameter Units	Conductivity μSiemens/cm	DO mg/L	Eh mv	pH S.U.	Temperature Deg C	Turbidity NTUs
Field Sample ID	Sample Date						
CFW-1	3/25/2008	22	1.25	178	6.32	2.7	149
CFW-5	3/26/2008	276	< 0.1	-87	6	4.42	22
CFW-6	3/25/2008	76	< 0.1	194	4.89	4.59	2.73
MW-101A	3/26/2008	734	2.94	-105	11.84	7.38	9.61
MW-101C	3/26/2008	254	2.41	-154	9.2	6.4	6.77
MW-102D	3/26/2008	369	< 0.1	96	7.7	6.77	9.89
MW-104A	3/25/2008	601	< 0.1	116	6.07	9.54	0.45
MW-105B	3/26/2008	503	< 0.1	-200	7.43	8.39	7.98
MW-106A	3/26/2008	529	< 0.1	165	6.02	5.9	Not collected
MW-107A	3/24/2008	883	< 0.1	-170	11.96	7.2	4.8
MW-107C	3/25/2008	382	< 0.1	-22	7.92	4.96	32.9
MW-107D	3/24/2008	401	< 0.1	-163	7	8.16	4.09
MW-107E	3/24/2008	161	< 0.1	-191	7.94	8.6	4.2
MW-107F	3/24/2008	318	< 0.1	-138	7.43	8.45	6.8
MW-111C	3/26/2008	3140	< 0.1	-219	12.5	9.12	6.7
SP-1	3/26/2008	283	10.88	144	6.45	4.83	6.34
SW-1	3/25/2008	26	18.6	195	6.2	0.8	3.1
SW-2	3/25/2008	22	17.2	109	6.23	1.6	7.4
SW-3	3/25/2008	26	15.16	158	5.41	3.01	1.17
SW-4	3/25/2008	40	12.93	104	5.39	1.19	4.49
SW-5	3/25/2008	27	12.51	113	5.31	0.66	0.58

Notes:

μSiemens/cm - microseimens per centimeter
 Deg C - Degrees Celsius
 DO - dissolved oxygen
 Eh - reduction/oxidation potential
 GW - Groundwater Sample
 mg/L - milligrams per liter
 mv - millivolts
 NTUs - Nephelometric Units
 SU - Standard Units
 SW - Surface Water Sample
 SP - Sherman Spring Sample

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**Table 3
Summary of Tritium Analytical Data and Trend Analysis**

**Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
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Rowe, Massachusetts**

Location	Aug-03	Sep-03	Nov-03	Mar-04	May-04	Dec-06	Mar-07	Mar-08	Trend Analysis*
CFW-5	-		-		-	-	392	-	Stable
CFW-6	-		-		-	581	4000/4210	-	Decrease
MW-102D						6530	8580	1590	Decrease
MW-104A						2850	3100/2930	1850	Decrease
MW-105B	4850		5220	4890	4530	2900	3440	4710	Stable**
MW-106A						3010	- /2850	846	Decrease
MW-107C		48000	45780	8880	39020	29100	30900	25700	Decrease
MW-107D		9150	9710	5940	10910	9310	9440	9380	Stable
MW-107E						5700	6420	5060 / 5160	Decrease
MW-107F						9210	9220	9890	Stable
Sherman Spring	-		-	210	890	1100	452	-	Decrease

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* Trend analysis is based on a concentration change of greater than 15% from the March 2007 Sample Event.

** Increase at MW-105B was greater than 15%, however, well conditions are considered stable when compared to historic values.

5060/5160 - shows sample and duplicate sample

"-" signifies concentration less than minimum detectable activity

Table 4
Summary of Acetone Data at Monitoring Well MW-101C

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Location	Sample Date	Sample ID	QC Code	Units	Acetone*
MW-101C	9/16/2003	MW-101C-091603	FS	MG/L	0.69 J
MW-101C	5/22/2004	FD-002-052204	FD	MG/L	11 J
MW-101C	5/22/2004	MW-101C-052204	FS	MG/L	14 J
MW-101C	8/22/2004	FD004-082204	FD	MG/L	5.5 J
MW-101C	8/22/2004	MW-101C-082204	FS	MG/L	3.8 J
MW-101C	11/14/2004	FD001-111404	FD	MG/L	3.4
MW-101C	11/14/2004	MW-101C-111404	FS	MG/L	2.9
MW-101C	9/14/2006	FD004-091406	FD	MG/L	1.39 J
MW-101C	9/14/2006	MW-101C-091406	FS	MG/L	1.67 J
MW-101C	12/7/2006	MW-101C-120706-RE	FS	MG/L	3.57
MW-101C	3/19/2007	FD003-031907-RE	FD	MG/L	3.64
MW-101C	3/19/2007	MW-101C-031907	FS	MG/L	2.89
MW-101C	3/26/2008	MW-101C	FS	MG/L	2.2

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Notes:

* = GW-1 Standard for Acetone is 6.3 mg/L (310 CMR 40.0974(2); effective 2/14/2008)

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

Table 5
Summary of Arsenic Data at Monitoring Wells MW-101A, MW-107A, and MW-111C

Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
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Location	Sample Date	Sample ID	QC Code	Units	Arsenic*
MW-101A	6/28/2006	208/MW101A-062806	FS	MG/L	0.0141
	9/14/2006	MW-101A-091406	FS	MG/L	0.0161
	12/14/2006	MW-101A-121406	FS	MG/L	0.012
	3/14/2007	MW-101A-031407	FS	MG/L	0.0092
	3/26/2008	MW-101A	FS	MG/L	0.01 J
MW-107A	4/25/2006	MW-107A-042506	FS	MG/L	0.0126
	7/5/2006	MW-107A-070506	FS	MG/L	0.0144
	9/12/2006	FD006-091206	FD	MG/L	0.0105
	9/12/2006	MW-107A-091206	FS	MG/L	0.0112
	12/11/2006	FD001-121106	FD	MG/L	0.0116
	12/11/2006	MW-107A-121106	FS	MG/L	0.0123
	3/12/2007	FD005-031207	FD	MG/L	0.009
	3/12/2007	MW-107A-031207	FS	MG/L	0.0094
	3/24/2008	MW-107A	FS	MG/L	-
	MW-111C	4/26/2006	MW-111C-042606	FS	MG/L
3/15/2007		MW-111C-031507	FS	MG/L	0.0101
3/26/2008		MW-111C	FS	MG/L	-

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Checked/Date: NSG 04/23/08

Notes:

* GW-1 Standard for Arsenic is 0.01 mg/L (310 CMR 40.0974(2); effective 2/14/2008)

"-" indicates analyte not detected.

Bold Italics indicates an exceedance of the GW-1 standard.

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

**Table 6
Summary of Chemical Data From SCFA Monitoring Wells**

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Analysis	Parameter	Location	CFW-1	CFW-1	CFW-1	CFW-1	CFW-1	CFW-1	CFW-1
		Sample Date	8/7/2003	8/18/2004	8/19/2005	8/25/2005	9/18/2006	9/19/2006	3/15/2007
		Sample ID	CFW-1-080703	CFW-1-081804	CFW-1-081905	CFW-1-082505	CFW-1-091806	CFW-1-091906	CFW-1-031507
		QC Code	FS	FS	FS	FS	FS	FS	FS
		MCP Criteria							
VOCs	4-Methyl-2-pentanone	350	-	-	0.0014 J	-	-	-	
	Acetone	6.3	R	-	-	R	-	-	
	Chloromethane	1000	-	0.00069 J	0.0007 J	-	-	-	
	Naphthalene	0.14	-	-	-	-	-	-	
	Toluene	1000	-	0.00043 J	-	-	-	-	
Metals	Arsenic	0.01	-	-	-	-	-	-	
	Barium	2	0.017	0.014	0.012	-	0.0451	-	
	Cadmium	0.005	-	-	-	-	-	-	
	Calcium	NA	-	-	-	-	-	-	
	Chromium	0.1	-	-	-	-	0.0036 J	-	
	Copper	1	-	-	-	-	0.0091	-	
	Cyanide, Total	0.2	-	-	-	-	-	-	
	Iron	0.3*	1.8	1.2 J	0.706 J	-	10.7	-	
	Lead	0.015	-	-	-	-	0.0056 J	-	
	Manganese	0.05*	0.047	0.11	0.0533	-	0.305	-	
	Mercury	0.002	-	-	-	-	-	-	
	Nickel	0.1	-	-	-	-	0.0073	-	
	Selenium	0.05	-	-	-	-	-	-	
	Silver	0.1	-	-	-	-	-	-	
	Sodium	20	-	-	-	-	-	-	
	Zinc	5	-	-	-	-	-	-	
Wet Chem	Alkalinity, Total	NA	6	5.1	7	-	5	7.14	
	Chemical Oxygen Demand	NA	-	-	-	-	14.4	-	
	Chloride	250*	-	-	-	-	-	0.67 J	
	Cyanide, Available	0.2	-	-	-	-	-	-	
	Cyanide, Total	0.2	-	-	-	-	-	-	
	Nitrate as N	10	-	-	-	-	0.08 J	-	
	Sulfate	250*	4.4 J	4.9	3.81 J	-	3.7	3.32	
	Total Dissolved Solids	500*	-	4	22	13	29	-	

Notes:

All results in milligrams per liter (mg/L)

Bold Italics indicates an exceedance of applicable criteria.

Applicable criteria is the MCP GW-1 standard (310 CMR 40.0974(2); effective 2/14/2008) and, if not available, the Maximum Contaminant Level or Secondary Maximum Contaminant Level (SMCL) (MADEP, 2007)

* indicates SMCL; not a health-based standard

NA - Not Available

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

R - data rejected during validation; unusable

"-" indicates analyte not detected

Table 6
Summary of Chemical Data From SCFA Monitoring Wells

Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
Yankee Nuclear Power Station
Rowe, Massachusetts

Analysis	Parameter	Location	CFW-1	CFW-1	CFW-5	CFW-5	CFW-5	CFW-5	CFW-5
		Sample Date	3/16/2007	3/25/2008	8/5/2003	8/18/2004	8/17/2005	9/13/2006	3/8/2007
		Sample ID	CFW-1-031607	CFW-1	CFW-5-080503	CFW-5-081804	CFW-5-081705	CFW-5-091306	CFW-5-030807
		QC Code	FS	FS	FS	FS	FS	FS	FS
		MCP Criteria							
VOCs	4-Methyl-2-pentanone	350	-	-	-	0.0006 J	-	-	
	Acetone	6.3	0.0027	-	-	-	R	-	
	Chloromethane	1000	-	-	0.00069 J	0.0009 J	-	-	
	Naphthalene	0.14	-	-	-	-	-	-	
	Toluene	1000	-	-	-	-	-	-	
Metals	Arsenic	0.01	-	-	-	-	-	0.0063	
	Barium	2	0.0138	-	0.043	0.061	0.0612	0.0638	
	Cadmium	0.005	0.0005 J	-	-	-	-	-	
	Calcium	NA	1.83	1.5	-	-	-	29.1	
	Chromium	0.1	-	-	-	-	-	-	
	Copper	1	0.0026 J	-	-	-	-	-	
	Cyanide, Total	0.2	-	-	-	-	-	-	
	Iron	0.3*	1.98	5.8 J	38	67	89.2	75.1	
	Lead	0.015	0.0041 J	-	R	-	-	0.0036 J	
	Manganese	0.05*	0.12	0.15	3.5	4.4	4.16 J	4.62	
	Mercury	0.002	-	-	-	-	-	-	
	Nickel	0.1	-	-	-	-	0.0129	-	
	Selenium	0.05	-	-	-	-	0.007 J	-	
	Silver	0.1	0.0013 J	-	-	-	-	-	
	Sodium	20	1.28	0.94	-	-	-	3.71	
	Zinc	5	0.0126	-	-	-	-	-	
Wet Chem	Alkalinity, Total	NA	-	3.4	87	93	101	130	
	Chemical Oxygen Demand	NA	17.8	-	26	32	27.3	36.9	
	Chloride	250*	-	-	-	2.7	1.91	15.5 J	
	Cyanide, Available	0.2	-	-	-	-	-	-	
	Cyanide, Total	0.2	-	-	-	-	-	-	
	Nitrate as N	10	-	-	-	-	-	0.04 J	
	Sulfate	250*	-	3.2	1.2	1.2	0.58 J	-	
	Total Dissolved Solids	500*	12	46	120	200	111	170	

Notes:

All results in milligrams per liter (mg/L)

Bold Italics indicates an exceedance of applicable criteria.

Applicable criteria is the MCP GW-1 standard (310 CMR 40.0974(2); effective 2/14/2008) and, if not available, the Maximum Contaminant Level or Secondary Maximum Contaminant Level (SMCL) (MADEP, 2007)

* indicates SMCL; not a health-based standard

NA - Not Available

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

R - data rejected during validation; unusable

"-" indicates analyte not detected

**Table 6
Summary of Chemical Data From SCFA Monitoring Wells**

**Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
Yankee Nuclear Power Station
Rowe, Massachusetts**

Analysis	Parameter	Location	CFW-5	CFW-5	CFW-6	CFW-6	CFW-6	CFW-6	CFW-6
		Sample Date	3/26/2008	3/26/2008	8/11/2003	8/18/2004	8/24/2005	8/24/2005	4/19/2006
		Sample ID	CFW-5	CFW-5 DUP	CFW-6-081103	CFW-6-081804	FD001-082405	CFW-6-082405	CFW-6-042006
		QC Code	FS	FD	FS	FS	FD	FS	FS
		MCP Criteria							
VOCs	4-Methyl-2-pentanone	350	-	-	-	-	0.0009 J	0.0008 J	-
	Acetone	6.3	-	-	-	-	-	0.008 J	0.0026 J
	Chloromethane	1000	-	-	-	-	-	-	-
	Naphthalene	0.14	-	-	-	-	-	-	-
	Toluene	1000	-	-	-	-	-	-	-
Metals	Arsenic	0.01	-	-	-	-	-	-	-
	Barium	2	-	-	0.069	0.077	0.0641	0.0629	-
	Cadmium	0.005	-	-	-	-	-	-	-
	Calcium	NA	16	15	-	-	-	-	-
	Chromium	0.1	-	-	-	-	-	-	-
	Copper	1	-	-	-	-	-	-	-
	Cyanide, Total	0.2	-	-	-	-	-	-	-
	Iron	0.3*	32 J	31 J	67	51 J	71.5	71	-
	Lead	0.015	-	-	-	-	-	-	-
	Manganese	0.05*	1.9	1.8	8.8	6.9	7.65	7.54	-
	Mercury	0.002	-	-	-	-	-	-	-
	Nickel	0.1	-	-	-	-	-	-	-
	Selenium	0.05	-	-	-	-	-	-	-
	Silver	0.1	-	-	-	-	-	-	-
	Sodium	20	1.8	1.6	-	-	-	-	-
	Zinc	5	-	-	-	-	-	-	-
Wet Chem	Alkalinity, Total	NA	69	63	100	110	136	116	-
	Chemical Oxygen Demand	NA	18	17	38	33	30.1	31.8	-
	Chloride	250*	2.3	2.2	-	2.3	9.12	7.79	-
	Cyanide, Available	0.2	-	-	-	-	-	-	-
	Cyanide, Total	0.2	-	-	-	-	-	0.0127	-
	Nitrate as N	10	-	-	-	-	-	-	-
	Sulfate	250*	2.3	2.3	-	-	-	-	-
	Total Dissolved Solids	500*	110	100	180	200	204	214	-

Notes:

All results in milligrams per liter (mg/L)

Bold Italics indicates an exceedance of applicable criteria.

Applicable criteria is the MCP GW-1 standard (310 CMR 40.0974(2); effective 2/14/2008) and, if not available, the Maximum Contaminant Level or Secondary Maximum Contaminant Level (SMCL) (MADEP, 2007)

* indicates SMCL; not a health-based standard

NA - Not Available

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

R - data rejected during validation; unusable

"-" indicates analyte not detected

**Table 6
Summary of Chemical Data From SCFA Monitoring Wells**

**Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
Yankee Nuclear Power Station
Rowe, Massachusetts**

Analysis	Parameter	Location	CFW-6	CFW-6	CFW-6	CFW-6	CFW-6
		Sample Date	9/13/2006	9/13/2006	3/8/2007	3/8/2007	3/25/2008
		Sample ID	CFW-6-091306	FD001-091306	CFW-6-030807	FD007-030807	CFW-6
		QC Code	FS	FD	FS	FD	FS
		MCP Criteria					
VOCs	4-Methyl-2-pentanone	350	-	-	-	-	-
	Acetone	6.3	R	R	-	-	-
	Chloromethane	1000	-	-	-	-	-
	Naphthalene	0.14	-	-	-	-	-
	Toluene	1000	-	-	-	-	-
Metals	Arsenic	0.01	-	-	0.0054 J	0.0049 J	-
	Barium	2	0.0544	0.0592	0.0612	0.0592	-
	Cadmium	0.005	-	-	0.0005 J	0.0002 J	-
	Calcium	NA	-	-	25.5	25.4	7.4
	Chromium	0.1	0.0024 J	0.0027 J	0.0022 J	0.0028 J	-
	Copper	1	-	-	-	-	-
	Cyanide, Total	0.2	-	-	-	-	-
	Iron	0.3*	64.6	68.1	56.8	58.8	0.57 J
	Lead	0.015	0.0031 J	0.003 J	0.0029 J	-	-
	Manganese	0.05*	6.69	7.2	6.74	6.8	0.2
	Mercury	0.002	0.00018 J	-	0.00006 J	-	-
	Nickel	0.1	0.0098	0.01	-	-	-
	Selenium	0.05	0.0091 J	0.0101 J	-	-	-
	Silver	0.1	-	-	-	-	-
	Sodium	20	-	-	1.56	1.52	1.3
Zinc	5	0.0134	-	-	0.0056	-	
Wet Chem	Alkalinity, Total	NA	108	131	100	128	17
	Chemical Oxygen Demand	NA	35.1	36.4	26.3	51.9	27
	Chloride	250*	14.7 J	16.1 J	12.5	11.8	-
	Cyanide, Available	0.2	-	-	-	-	-
	Cyanide, Total	0.2	-	-	-	-	-
	Nitrate as N	10	0.04 J	-	0.04 J	0.04 J	-
	Sulfate	250*	-	-	0.7 J	0.68 J	4.7
Total Dissolved Solids	500*	147	172	189	181	33	

Prepared/Date: BJS 04/22/08
Checked/Date: NSG 04/23/08

Notes:

All results in milligrams per liter (mg/L)

Bold Italics indicates an exceedance of applicable criteria.

Applicable criteria is the MCP GW-1 standard (310 CMR 40.0974(2); effective 2/14/2008) and, if not available, the Maximum Contaminant Level or Secondary Maximum Contaminant Level (SMCL) (MADEP, 2007)

* indicates SMCL; not a health-based standard

NA - Not Available

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

R - data rejected during validation; unusable

"-" indicates analyte not detected

Table 7
Summary of Chemical Data for SCFA Surface Water Locations

Post Closure Groundwater and Surface Water Monitoring Report Spring 2008
Yankee Nuclear Power Station
Rowe, Massachusetts

Analysis	Parameter	Loc Name	SW-1	SW-2	SW-3	SW-4	SW-5
		Field Sample Date	3/25/2008	3/25/2008	3/25/2008	3/25/2008	3/25/2008
		Field Sample ID	SW-1	SW-2	SW-3	SW-4	SW-5
		QC Code	FS	FS	FS	FS	FS
Screening Values							
VOCs	Target Compounds		-	-	-	-	-
Metals	Calcium	NA	2.5	2.3	2.2	2.6	2.3
Metals	Iron	1	0.016 J	0.021 J	0.029 J	1.1 J	0.26 J
Metals	Manganese	0.05*	-	-	-	0.14	0.04
Metals	Sodium	20*	1.1	1.1	1.1	1.1	1
Cyanide	Cyanide, Total	0.0052	-	-	-	-	-
Wet Chem	Alkalinity, Total	20	1.9	1.1	-	3.5	1.5
Wet Chem	Sulfate	250*	5	5	5.9	5.1	5
Wet Chem	Total Dissolved Solids	250*	21	54	8	19	31

Notes:

All results in milligrams per liter (mg/L)

Screening value is the USEPA Ambient Water Quality Criteria (AWQC) and, if not available, the Maximum Contaminant Level or Secondary Maximum Contaminant Level (MADEP, 2007)

* indicates criteria is from the Secondary Maximum Contaminant Level; not a health-based standard

FS - Field Sample

FD - Field Duplicate

MG/L - milligrams per liter

J - estimated value

"-" indicates analyte not detected.

NA - Not Available

Prepared/Date: BJS 04/22/08

Checked/Date: NSG 04/23/08

APPENDIX A

FIELD DATA RECORDS – MARCH 2008

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location CFW-1 Well Designation CFW-1
Sampling Team Lovejoy Sample Period March 08
Date March 25, 2008 Time 1640

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>9.10</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>3.02</u> (ft)	
Length of Water Column (LWC) <u>6.08</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>0.97</u> gal	Conversion Factor <u>0.16</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.04</u> (gal)	
Purge rate = 100 ml/min	

At Time of Measurements:	
Color <u>Light brown</u>	Odor <u>None</u>
Total volume purged <u>0.96 gal</u>	Duration of purging <u>40 min</u>
Purging method <u>Peristaltic pump</u>	Did well go dry? <u>Yes</u>
Weather conditions <u>Fair</u>	

Pump Serial Number <u>5008-24</u>
Water Quality Monitor Serial Number <u>M015-06</u>
Analyses Requested <u>Metals List 1, VOC, COD, CN, NO₂, Cl₂, SO₄, TDS, Alkalinity</u>

Previous Final Readings: pH 4.75 Cond 0.031 Turb 21.2 DO 11.21 Temp 4.19 ORP 145 DTW 3.20
Flow 100 ³H —

CFW-1
WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 09</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	8.20	0.021	73.6	0.9	2.31	289	3.35	100 ml/min
10	6.91	0.021	89.9	1.40	2.30	288	3.49	
15	6.68	0.028	74.0	1.47	2.41	149	5.22	
20	6.54	0.031	87.4	0.59	2.40	118	5.98	
25	6.31	0.029	198	0.26	2.50	128	7.00	
30	6.13	0.026	262	0.58	2.54	153	7.45	
35	6.23	0.022	424	2.10	2.79	160	7.70	
40	6.23	0.022	904	2.10	3.10	190	8.45	
45	<i>After Recharge</i>							
50	6.32	0.022	149	1.25	2.7	178	4.30	
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location CFW-5 Well Designation CFW-5
 Sampling Team Lovejoy Sample Period MARCH 08
 Date March 24, 2008 Time 1000

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>8.21</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>4.52</u> (ft)	
Length of Water Column (LWC) <u>3.69</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>0.59</u> gal	Conversion Factor <u>0.16</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.30</u> (gal)	
Purge Rate = 100 ml/min	

At Time of Measurements:	
Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>1.32 gal</u>	Duration of purging <u>50 minutes</u>
Purging method <u>Peristaltic pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Rain showers</u>	

Pump Serial Number <u>5008-24</u>
Water Quality Monitor Serial Number <u>Horiba U-22 m015-06</u>
Analyses Requested <u>NO₃, Cl₂, Alkalinity, SO₄, TDS, CN, COD, Metals List 1</u> <u>Pritom</u> <u>Sampled for DUP/ms/msd</u>

Previous Final Readings: pH 6.51 Cond 0.44 Turb 3 DO 0.49 Temp 3.3 ORP -41 DTW 5.27
 Flow 200 ³H —

CFW-5
WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	5.86	0.287	61.0	0.0	4.19	-50	4.92	
10	5.90	0.269	50.4	0.0	4.23	-65	4.91	
15	5.91	0.264	39.4	0.0	4.22	-72	4.92	
20	5.91	0.264	29.8	0.0	4.29	-77	4.90	
25	5.92	0.266	22.7	0.0	4.32	-80	4.88	
30	5.92	0.268	15.1	0.0	4.39	-81	4.88	
35	5.96	0.271	22.6	0.0	4.34	-85	4.88	
40	5.96	0.272	25.9	0.0	4.38	-86	4.88	
45	5.97	0.274	22.4	0.0	4.43	-86	4.88	
50	6.00	0.276	22.0	0.0	4.42	-87	4.88	
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOGForm 1

Sample Location CFW-6 Well Designation CFW-6
 Sampling Team M. VanNoordenne Sample Period March 2008
 Date 3-25-08 Time 1002

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>8.51</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>4.55</u> (ft)	
Length of Water Column (LWC) <u>3.96</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>0.63</u> gal	Conversion Factor <u>0.11</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.25</u> (gal)	

At Time of Measurements:

Color <u>clear</u>	Odor <u>None</u>
Total volume purged <u>1.25</u>	Duration of purging <u>32 minutes</u>
Purging method <u>B Peristaltic pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Sunny, 25°F</u>	

Pump Serial Number <u>5008-24</u>
Water Quality Monitor Serial Number <u>M015-07, M024-19</u>
Analyses Requested <u>VOC, COD, metals, cyanide, nitrate, chloride, sulfate, TDS, Alkalinity, H-3</u>

Previous Final Readings: pH 6.70 Cond 0.359 Turb 4 DO 0.41 Temp 3.6 ORP 2 DTW >33
 Flow 240 ³H —

CFW-6
WATER QUALITY PARAMETERS
Form 2

Sample Round *March 2008*

Current Readings

0930
0935
0940
0945
0950
0955
1000

Time (min)	pH +/- 0.1 std.unit	Cond mS/cm +/- 3%	Turb (NTU) +/- 10% NA <10NTU	D.O (mg/L) +/-10%	Temp (°C) +/- 1 E	ORP (mv) +/-10 mv	DTW (feet)	Comments
0								Pumped @ 150 mL/min
5	4.82	0.081	5.38	0.09	4.63	197	4.65	
10	4.84	0.077	4.81	0.00	4.46	201	4.71	
15	4.88	0.078	3.99	0.00	4.54	197	4.73	
20	4.87	0.076	3.54	0.00	4.66	190	4.76	
25	4.90	0.076	3.70	0.00	4.48	189	4.76	
30	4.89	0.076	2.73	0.00	4.59	194	4.77	
35		1002	collect samples					
40		1020	Sampling complete.					
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-101A Well Designation MW-101A
 Sampling Team M. VanNoordennen Sample Period March 2008
 Date 3-26-08 Time 1653

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>23.50</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>11.57</u> (ft)	
Length of Water Column (LWC) <u>11.93</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>1.91</u> gal	Conversion Factor <u>0.16</u>
Actual Volume of Purge (VTP) (VTP = VW x 3) <u>5.73</u> (gal)	

At Time of Measurements:

Color <u>Slightly yellowish</u>	Odor <u>None</u>
Total volume purged <u>1.59</u>	Duration of purging <u>40 minutes</u>
Purging method <u>Geopump</u>	Did well go dry? <u>Yes</u>
Weather conditions <u>Snowy/rainy, 35°F</u>	

Pump Serial Number 5008-24
 Water Quality Monitor Serial Number M015-07, M024.17
 Analyses Requested Arsenic

Previous Final Readings: pH 11.41 Cond 0.719 Turb 8.58 DO 8.00 Temp 6.96 ORP -92 DTW 18.6
 Flow 100 ³H —

mw-101A
WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
<i>0935</i>	<i>+/- 0.1 std.unit</i>	<i>+/- 3%</i>	<i>+/- 10% NA <10NTU</i>	<i>+/-10%</i>	<i>+/- 1 E</i>	<i>+/-10 mv</i>		<i>Pumping 130 m³/min (slowest rate)</i>
<i>0940</i>	<i>11.60</i>	<i>0.730</i>	<i>3.59</i>	<i>1.49</i>	<i>7.28</i>	<i>-82</i>	<i>13.92</i>	
<i>0945</i>	<i>11.67</i>	<i>0.740</i>	<i>4.13</i>	<i>3.34</i>	<i>7.33</i>	<i>-101</i>	<i>13.92</i>	
<i>0950</i>	<i>11.71</i>	<i>0.741</i>	<i>3.46</i>	<i>3.01</i>	<i>7.53</i>	<i>-114</i>	<i>14.80</i>	
<i>0955</i>	<i>11.75</i>	<i>0.742</i>	<i>2.98</i>	<i>0.00</i>	<i>7.44</i>	<i>-125</i>	<i>15.68</i>	
<i>1000</i>	<i>11.79</i>	<i>0.747</i>	<i>3.27</i>	<i>0.00</i>	<i>7.53</i>	<i>-134</i>	<i>16.59</i>	
<i>1005</i>	<i>11.81</i>	<i>0.745</i>	<i>3.37</i>	<i>0.00</i>	<i>7.56</i>	<i>-144</i>	<i>17.53</i>	
<i>1010</i>	<i>11.84</i>	<i>0.748</i>	<i>2.88</i>	<i>0.00</i>	<i>7.53</i>	<i>-152</i>	<i>18.41</i>	
<i>1015</i>	<i>11.87</i>	<i>0.746</i>	<i>3.10</i>	<i>0.00</i>	<i>7.58</i>	<i>-164</i>	<i>19.27</i>	
<i>1020</i>	<i>11.89</i>	<i>0.743</i>	<i>2.91</i>	<i>0.00</i>	<i>7.60</i>	<i>-160</i>	<i>19.91</i>	
<i>50</i>		<i>1022</i>	<i>Well purged below top of screen.</i>			<i>Samples will be</i>		
<i>55</i>			<i>collected upon recharge.</i>			<i>OTW = 20.31</i>		
<i>60</i>								
<i>1653</i>	<i>11.84</i>	<i>0.734</i>	<i>9.61</i>	<i>2.94</i>	<i>7.38</i>	<i>-105</i>	<i>11.98</i>	<i>Samples collected</i>
<i>70</i>								
<i>75</i>								
<i>80</i>								
<i>85</i>								
<i>90</i>								
<i>95</i>								
<i>100</i>								
<i>105</i>								
<i>110</i>								
<i>115</i>								
<i>120</i>								

GROUND WATER SAMPLING FIELD LOGForm 1

Sample Location MW-101C Well Designation MW101-C
 Sampling Team Lovejoy Sample Period MARCH 08
 Date March 25-26, 2008 Time 1030 3/26

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>112.7</u>	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>43.85</u>	
Length of Water Column (LWC) <u>68.85</u>	(ft) (LWC=D-DTW)
Volume of Water in Well (VW) <u>11.02</u>	gal Conversion
ml Actual	Factor <u>0.16</u>
Volume of Purge (VTP) (VTP = VW x 3) <u>33.06</u>	(gal)

At Time of Measurements:	
Color <u>Clear</u>	Odor <u>Musty, slight H₂S</u>
Total volume purged <u>3.74</u>	Duration of purging <u>3hrs</u>
Purging method <u>Bladder pump</u>	Did well go dry? <u>Yes</u>
Weather conditions <u>Fair</u>	

Pump Serial Number <u>S051-02</u>
Water Quality Monitor Serial Number <u>Honiba U-22 M015-04</u>
Analyses Requested <u>Acetone</u>

Previous Final Readings: pH 9.75 Cond 0.34 Turb 9.92 DO 1.84 Temp 8.0 ORP -250 DTW 62.52
 Flow 100 ³H —

MW 101C

WATER QUALITY PARAMETERS

Form 2

Sample Round <i>MARCH 08</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std. unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	10.18	0.296	30.3	8.1	7.8	-166	45.90	
10	9.98	0.290	46.3	6.1	7.8	-172	46.32	
15	9.86	0.289	34.2	3.3	7.75	-184	46.89	
20	9.77	0.289	35.5	1.5	7.89	-190	47.55	
25	9.72	0.289	25.8	1.2	7.70	-193	48.35	
30	9.65	0.289	21.6	0.6	7.82	-193	49.27	
35	9.64	0.289	18.8	0.0	7.91	-194	49.82	
40	9.59	0.289	20.7	0.0	7.70	-193	50.83	
45	9.54	0.292	21.4	0.0	7.8	-194	51.38	
50	9.51	0.292	20.1	0.0	7.7	-195	51.88	
55	9.45	0.295	19.1	0.0	7.9	-194	52.53	
60	9.45	0.296	14.5	0.0	7.6	-195	53.11	
65	9.47	0.298	12.4	0.0	7.8	-194	53.55	
70	9.49	0.299	13.8	0.0	7.67	-196	54.10	
75	9.53	0.300	12.1	0.0	7.51	-193	54.46	
80	9.56	0.301	-	0.0	7.30	-191	54.47	
85	9.59	0.302	13.9	0.0	7.2 7.2	-191	54.91	
90	9.57	0.300	13.6	0.0	7.1 7.1	-191	55.24	
95	> Purge rate to 300ml/min to deaerate well							
100	Sampled on 3/26 @ 1030 Final Readings							
105	9.20	0.254	6.77	2.41	6.40	-154	44.87	
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-102D Well Designation MW-102D
 Sampling Team M. van Noordemen Sample Period March 2008
 Date 3-25-08 - 3-26-08 Time 1303 (3-26-08)

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>22.51</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>16.72</u> (ft)	
Length of Water Column (LWC) <u>5.79</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>0.93</u> gal	Conversion Factor <u>0.14</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.79</u> (gal)	

At Time of Measurements:	
Color <u>Clear</u>	Odor <u>NONE</u>
Total volume purged <u>1.79 gal.</u>	Duration of purging <u>53 minutes</u>
Purging method <u>Peristaltic Pump</u>	Did well go dry? <u>Yes</u>
Weather conditions <u>Sunny, 40°F</u>	

Pump Serial Number <u>S008-24</u>
Water Quality Monitor Serial Number <u>M015-02, M024-19</u>
Analyses Requested <u>GAMMA, Sr-90, H-3</u>

Previous Final Readings: pH 7.57 Cond 0.60 Turb 100 DO 0.10 Temp 7.3 ORP 154 DTW 21.7
 Flow 100 ³H —

MW-102D

WATER QUALITY PARAMETERS

Form 2

Sample Round *March 2008*

Current Readings

Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		Pump @ 130 mL/min
1510								
1515	7.00	0.529	16.2	0.00	8.87	79	18.05	
1520	7.05	0.532	9.24	0.00	8.40	74	18.80	
1525	7.07	0.534	6.64	0.00	8.17	70	19.23	
1530	6.97	0.537	7.55	0.00	8.33	64	19.70	
1535	6.95	0.541	6.66	0.00	8.16	56	20.15	
1540	6.92	0.550	5.49	0.00	8.26	23	20.68	
1545	6.91	0.552	8.61	0.00	8.16	7	21.10	
1550	6.89	0.555	8.67	0.00	8.23	-12	21.33	
1555	6.88	0.553	8.21	0.00	8.27	-41	21.73	
1600	6.87	0.552	52.5	0.00	8.37	-53	22.17	
55		1603	Well went dry		Will sample upon recharge			
60								
32608 1313 650	7.70	0.369	9.89	0.00	6.77	96	16.80	Samples collected
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-104A Well Designation MW-104A
 Sampling Team M. Van Noordeman Sample Period March 2008
 Date 3-25-08 Time 1330

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>27.50</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>18.42</u> (ft)	
Length of Water Column (LWC) <u>9.08</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>1.45</u> gal	Conversion Factor <u>0.16</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.30</u> (gal)	

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>1.30 gal</u>	Duration of purging <u>42 minutes</u>
Purging method <u>Peristaltic Pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Sunny, 35° F</u>	

Pump Serial Number 5008-24
 Water Quality Monitor Serial Number M015-07, M024-19
 Analyses Requested Gamma, Sr-90, H-3

Previous Final Readings: pH 6.4 Cond 0.391 Turb 3.2 DO <0.1 Temp 7.2 ORP 82 DTW 21.95
 Flow 150 ³H —

MW-104A
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		<i>Pumped @ 125 mL/min</i>
1255								
1300	6.42	0.582	0.66	2.65	9.50	129	18.42	
1305	6.36	0.596	0.39	1.42	9.14	126	18.43	
1310	6.27	0.597	0.73	1.05	9.08	124	18.44	
1315	6.16	0.600	0.86	0.69	9.26	123	18.44	
1320	6.13	0.599	0.36	0.00	9.41	121	18.44	
1325	6.10	0.601	0.54	0.00	9.41	119	18.44	
1330	6.07	0.599	0.31	0.00	9.70	118	18.44	
1335	6.07	0.601	0.45	0.00	9.54	116	18.44	
45		1337	Collect	sampled				
50		1430	Sampling	complete				
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-105B Well Designation MW-105B
 Sampling Team M. Van Noorden Sample Period March 2008
 Date 3-26-08 Time 1547

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>75.67</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>21.30</u> (ft)	
Length of Water Column (LWC) <u>54.37</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>8.70</u> gal	Conversion Factor <u>0.16</u>
^m <u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>26.1</u> (gal)	

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>2.00</u>	Duration of purging <u>>> minutes</u>
Purging method <u>Bladder Pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>windy, 35°F</u>	

Pump Serial Number 5051-02
 Water Quality Monitor Serial Number M015-07, M024-17
 Analyses Requested Gamma Sr-90, H-3

Previous Final Readings: pH 8.44 Cond 118 Turb 736 DO 1.96 Temp 8.96 ORP -202 DTW 27.89
 Flow 100 ³H —

MW-105 B
WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
1430	0	+/- 0.1 std. unit	+/- 3%	+/- 10% NA <10NTU	+/- 10%	+/- 1 E	+/- 10 mv	Pumping 100 mL/min
1435	5	8.08	0.528	15.4	9.00	8.24	60	22.02
1440	10	7.62	0.465	9.93	1.29	8.62	-85	22.46
1445	15	8.18	0.506	60.4	0.00	8.51	-183	22.90
1450	20	8.19	0.540	88.7		8.42	-196	23.24
1455	25	8.14	0.550	81.5		8.53	-198	23.57
1500	30	7.93	0.547	78.8		8.61	-186	23.85
1505	35	7.73	0.534	50.1		8.32	-171	23.24.6
1510	40	7.61	0.507	31.2		8.78	-165	24.30
1515	45	7.56	0.492	21.7		8.87	-169	24.48
1520	50	7.53	0.488	20.4		8.74	-174	24.66
1525	55	7.49	0.484	12.6		8.75	-180	24.82
1530	60	7.47	0.488	9.73		8.62	-186	24.97
1535	65	7.45	0.498	8.91		8.59	-193	25.09
1540	70	7.43	0.501	7.81		8.47	-198	25.16
1545	75	7.43	0.503	7.98	↓	8.39	-200	25.10
	80		1547	collect	MW-105 B for Gamma Sr-90, H-3			
	85		1635	Sampling complete				
	90							
	95							
	100							
	105							
	110							
	115							
	120							

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-106A Well Designation MW 106A
 Sampling Team Lovejoy Sample Period MARCH 08
 Date MARCH 26, 2008 Time 1500

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>22.6</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>5.44</u> (ft)	
Length of Water Column (LWC) <u>17.16</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>2.25</u> gal	Conversion Factor <u>0.16</u>
Volume of Purge (VTP) (VTP = VW x 3) <u>8.25</u> (gal)	
Purge Rate = 100ml/min	

At Time of Measurements:	
Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>1.18 gal</u>	Duration of purging <u>45 minutes</u>
Purging method <u>Peristaltic pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Fair</u>	

Pump Serial Number <u>5008-24</u>
Water Quality Monitor Serial Number <u>Horiba U-22 M015-06</u>
Analyses Requested <u>Sr-90 (GPC-LSC), Gamma isotopic (Gamma Spec)</u> <u>Tritium (LSC)</u>

Previous Final Readings: pH 6.09 Cond 381 Turb 2.19 DO <0.1 Temp 5.30 ORP 147 DTW 9.02
 Flow 150 ³H —

MW 106 A

WATER QUALITY PARAMETERS

Form 2

Sample Round MARCH 08								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	6.07	0.548	Meter Inoperative	1.8	6.20	137	6.21	
10	6.04	0.542	-	0.8	5.90	150	6.39	
15	-	-	-	-	-	-	-	
20	6.03	0.532	-	0.06	5.91	159	6.49	
25	6.02	0.530	-	0.00	5.86	161	6.51	
30	6.02	0.529	-	0.00	5.90	163	6.52	
35	6.02	0.529	-	0.00	5.90	163	6.53	
40	6.02	0.527	-	0.00	5.92	164	6.54	
45	6.02	0.529	-	0.00	5.90	165	6.54	
50	Sample Complete @			1545	Final DTW =		6.46	
55	Sample Turbidity = 5.1 NTU							
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-107A Well Designation MW-107A
 Sampling Team Lovejoy Sample Period MARCH 09
 Date March 24, 2009 Time 1635

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>28.20</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>13.22</u> (ft)	
Length of Water Column (LWC) <u>14.98</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>2.40</u> gal	Conversion Factor <u>0.16</u>
Volume of Purge (VTP) (VTP = VW x 3) <u>7.20</u> (gal)	
Purge rate = 105 ml/min	

At Time of Measurements:	
Color <u>Yellow</u>	Odor <u>None</u>
Total volume purged <u>0.83 gal</u>	Duration of purging <u>30 minutes</u>
Purging method <u>Peristaltic pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Fair/cold</u>	

Pump Serial Number <u>S008-24</u>
Water Quality Monitor Serial Number <u>M015-06</u>
Analyses Requested <u>Arsenic</u>

Previous Final Readings: pH 11.66 Cond 8256 Turb 1.32 DO 2.77 Temp 60 ORP -81 DTW —
 Flow 150 ³H —

MW-107A
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 08</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	—	—	—	—	—	—	—	
10	11.86	0.787	6.0	0.0	7.3	-147	15.29	
15	11.93	0.900	4.2	0.0	7.2	-167	15.78	
20	11.95	0.883	3.1	0.0	7.1	-174	16.04	
25	11.96	0.883	4.3	0.0	7.2	-173	16.23	
30	11.96	0.883	4.8	0.0	7.2	-170	16.37	
35	Start purge @ 1605 (105ml/min)							
40	End purge @ 1635							
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-107C Well Designation MW-107C
Sampling Team D Lovejoy Sample Period March 08
Date 3/25/08 - 3/26/08 Time 1310

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>42.80</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>21.42</u> (ft)	
Length of Water Column (LWC) <u>21.38</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>3.42</u> gal	Conversion Factor <u>0.16</u>
Volume of Purge (VTP) (VTP = VW x 3) <u>10.26</u> (gal)	

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>2.34</u>	Duration of purging ^{per} <u>3 hrs 100 min</u>
Purging method <u>Bladder pump</u>	Did well go dry? ^{Doc} <u>Yes No</u>
Weather conditions <u>Fair</u>	
<u>Ave purge rate 90 ml/min</u>	

Pump Serial Number <u>S051-03</u>
Water Quality Monitor Serial Number <u>M015-07</u>
Analyses Requested <u>Tritium (LSC) Gamma isotopic (Gamma spec)</u> <u>5r-90</u>

Previous Final Readings: pH >12 Cond 0.36 Turb 3.02 DO 4.11 Temp 8.1 ORP -28 DTW 36.71
Flow 250 ³H —

MW-107C
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	8.13	0.359	114	5.0	5.7	64	23.28	
10	7.82	0.357	60.5	4.89	5.1	69	23.65	
15	7.79	0.357	57.0	4.37	5.1	70	23.74	
20	7.71	0.361	49.3	3.80	5.1	64	23.89	
25	7.67	0.367	49.8	2.89	5.0	51	23.94	
30	7.68	0.370	51.6	2.31	4.91	44	24.02	
35	7.74	0.374	53.6	1.59	4.8	37	24.03	
40	7.69	0.375	58.9	1.05	4.76	30	24.07	
45	7.81	0.378	61.1	0.63	4.66	22	24.09	
50	7.79	0.379	50.6	0.35	4.51	18	24.13	
55	7.74	0.380	52.5	0.0	4.41	12	24.16	
60	7.72	0.380	47.4	0.0	4.49	7	24.17	
65	7.74	0.381	45.0	0.0	4.61	2	24.19	
70	7.75	0.380	47.2	0.0	4.81	-1	24.21	
75	7.78	0.380	39.7	0.0	4.96	-8	24.23	
80	7.83	0.380	33.5	0.0	5.01	-14	24.24	
85	7.96	0.381	34.4	0.0	5.09	-18	24.25	
90	7.93	0.382	33.1	0.0	5.01	-20	24.26	
95	7.92	0.382	32.9	0.0	4.96	-22	24.27	
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-107D Well Designation MW-107D
Sampling Team M. van Noordenen Sample Period March 2008
Date 3-24-08 Time 1437

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>91.45</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>39.82</u> (ft)	
Length of Water Column (LWC) <u>51.63</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>8.26</u> gal	Conversion Factor <u>0.16</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.61</u> (gal)	

At Time of Measurements:

Color <u>clear</u>	Odor <u>None</u>
Total volume purged <u>1.61</u>	Duration of purging <u>62 minutes</u>
Purging method <u>Bladder pump</u>	Did well go dry? <u>NO</u>
Weather conditions <u>Sunny, windy, 35°F</u>	

Pump Serial Number 5051-03

Water Quality Monitor Serial Number M015-02, M024-19

Analyses Requested Gamma, Sr-90, H-3

Previous Final Readings: pH 7.44 Cond 0.321 Turb 1.01 DO 5.14 Temp 9.5 ORP -155 DTW 50.40
Flow 300 ³H —

M.V-107D
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
1335	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		Purge @ 100 mL/min
1340	5	6.79	0.378	20.9	0.25	6.80	100	40.72
1345	10	6.98	0.366	23.7	0.03	7.22	47	41.25
1350	15	7.08	0.359	20.3	0.00	7.33	8	41.98
1355	20	7.14	0.357	19.4	0.00	7.88	-21	43.14
1400	25	7.15	0.360	17.1	0.00	7.81	-39	43.19
1405	30	7.16	0.361	14.7	0.00	7.63	-70	43.21
1410	35	7.09	0.365	12.1	0.00	7.87	-139	43.21
1415	40	7.03	0.375	10.8	0.00	7.73	-159	43.21
1420	45	7.06	0.382	8.54	0.00	8.44	-166	43.21
1425	50	7.02	0.398	7.09	0.00	8.18	-166	43.21
1430	55	7.00	0.399	5.58	0.00	8.00	-163	43.21
1435	60	7.00	0.401	4.09	0.00	8.16	-163	43.21
65	1430 collect samples							
70	1510 Sampling complete. Well secure							
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-107E Well Designation MW-107E
 Sampling Team Lovejoy Sample Period March 08
 Date March 24 2008 Time 1425

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D)	Diameter of Well <u>2</u> (in)
Depth to water (DTW)	<u>25.24</u> (ft)
Length of Water Column (LWC)	<u>59.88</u> (ft)
Volume of Water in Well (VW)	<u>34.64</u> (ft) (LWC=D-DTW)
Volume of Purge (VTP) (VTP = VW x 3)	<u>5.54</u> gal Conversion Factor <u>0.16</u>
Purge rate = <u>90ml/min</u>	<u>16.62</u> (gal)

At Time of Measurements:

Color <u>clear</u>	Odor <u>none</u>
Total volume purged <u>1.429gal</u>	Duration of purging <u>60 minutes</u>
Purging method <u>Bladder pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Fair, cold</u>	

Pump Serial Number <u>S051-02</u>
Water Quality Monitor Serial Number <u>M01506</u>
Analyses Requested <u>Tritium - (LSC) Gamma isotopic (Gamma spec)</u> <u>Sr-90</u>

Previous Final Readings: pH 8.03 Cond 0.167 Turb 0.82 DO 0.007 Temp 9.3 ORP 157 DTW 80.51
 Flow 350 ³H —

MW-107E

WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 08</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	—	—	—	—	—	—	—	
10	7.27	0.175	28.1	1.11	7.4	67	24.72	
15	7.72	0.174	38.4	0.0	8.0	-137	24.72	
20	7.81	0.170	24.4	0.0	8.6	-163	25.90	
25	7.83	0.169	15.7	0.0	8.7	-171	26.00	
30	7.87	0.166	9.9	0.0	8.5	-183	26.08	
35	7.90	0.165	8.1	0.0	8.6	-186	26.28	
40	7.90	0.164	6.1	0.0	8.4	-187	26.21	
45	7.90	0.163	5.7	0.0	8.6	-190	26.24	
50	7.95	0.162	4.7	0.0	8.7	-191	26.29	
55	7.94	0.161	4.2	0.0	8.6	-191	26.33	
60	Start sample collection @ 1425							
65	End sample collection @ 1620 (includes DOP/ms/msD)							
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOGForm 1

Sample Location MW-107F Well Designation MW-107F
 Sampling Team M. van Noordennen Sample Period March 2008
 Date 3-24-08 Time 1627

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>56.60</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>26.27</u> (ft)	
Length of Water Column (LWC) <u>30.33</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>4.85</u> gal	Conversion Factor <u>0.16</u>
<u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>1.22</u> (gal)	

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>1.22</u>	Duration of purging <u>47 minutes</u>
Purging method <u>Bladder pump</u>	Did well go dry? <u>No</u>
Weather conditions <u>Sunny, windy, 30°F</u>	

Pump Serial Number <u>S051-03</u>
Water Quality Monitor Serial Number <u>M015-02, M024-19</u>
Analyses Requested <u>Gamma, Sr-90, H-3</u>

Previous Final Readings: pH 7.55 Cond 0.330 Turb 5.50 DO 1.28 Temp 2.67 ORP -131 DTW 24.17
 Flow 220 ³H —

MW-10) F
WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
<i>1540</i>	<i>0</i>	<i>+/- 0.1 std.unit</i>	<i>+/- 3%</i>	<i>+/- 10% NA <10NTU</i>	<i>+/-10%</i>	<i>+/- 1 E</i>	<i>+/-10 mv</i>	<i>Purge @ 100 mL/min</i>
<i>1445</i>	<i>5</i>	<i>7.40</i>	<i>0.284</i>	<i>5.83</i>	<i>0.18</i>	<i>8.03</i>	<i>10</i>	<i>26.50</i>
<i>1550</i>	<i>10</i>	<i>7.45</i>	<i>0.282</i>	<i>5.62</i>	<i>0.00</i>	<i>8.39</i>	<i>-36</i>	<i>26.65</i>
<i>1555</i>	<i>15</i>	<i>7.48</i>	<i>0.290</i>	<i>7.59</i>	<i>0.00</i>	<i>8.80</i>	<i>-89</i>	<i>26.80</i>
<i>1600</i>	<i>20</i>	<i>7.40</i>	<i>0.300</i>	<i>6.82</i>	<i>0.00</i>	<i>8.69</i>	<i>-113</i>	<i>26.95</i>
<i>1605</i>	<i>25</i>	<i>7.45</i>	<i>0.313</i>	<i>6.35</i>	<i>0.00</i>	<i>7.71</i>	<i>-121</i>	<i>26.65</i>
<i>1610</i>	<i>30</i>	<i>7.48</i>	<i>0.312</i>	<i>5.55</i>	<i>0.00</i>	<i>8.16</i>	<i>-120</i>	<i>26.68</i>
<i>1615</i>	<i>35</i>	<i>7.48</i>	<i>0.318</i>	<i>6.14</i>	<i>0.00</i>	<i>8.68</i>	<i>-132</i>	<i>26.66</i>
<i>1620</i>	<i>40</i>	<i>7.43</i>	<i>0.319</i>	<i>7.73</i>	<i>0.00</i>	<i>8.59</i>	<i>-136</i>	<i>26.63</i>
<i>1625</i>	<i>45</i>	<i>7.43</i>	<i>0.318</i>	<i>6.80</i>	<i>0.00</i>	<i>8.45</i>	<i>-138</i>	<i>26.65</i>
	<i>50</i>		<i>1620</i>	<i>collect samples</i>				
	<i>55</i>		<i>1710</i>	<i>Sampling complete. Well secure</i>				
	<i>60</i>							
	<i>65</i>							
	<i>70</i>							
	<i>75</i>							
	<i>80</i>							
	<i>85</i>							
	<i>90</i>							
	<i>95</i>							
	<i>100</i>							
	<i>105</i>							
	<i>110</i>							
	<i>115</i>							
	<i>120</i>							

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location MW-111C Well Designation MW-111C
 Sampling Team M. van Noordennen Sample Period March 2008
 Date 3-26-08 Time 1745

Measuring Point <u>TOR</u>	Depth to Mid Screen <u>—</u> (ft)
Well Depth (from measuring point) (D) <u>39.32</u> (ft)	Diameter of Well <u>2</u> (in)
Depth to water (DTW) <u>18.23</u> (ft)	
Length of Water Column (LWC) <u>21.09</u> (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) <u>3.37</u> gal	Conversion Factor <u>0.16</u>
^{or} <u>Actual</u> Volume of Purge (VTP) (VTP = VW x 3) <u>10.11</u> (gal)	

At Time of Measurements:

Color <u>clear</u>	Odor <u>None</u>
Total volume purged <u>3.07</u>	Duration of purging <u>118 minutes</u>
Purging method <u>Bladder Pump</u>	Did well go dry? <u>Yes</u>
Weather conditions <u>Rainy, 35°F</u>	

Pump Serial Number 5051-02
 Water Quality Monitor Serial Number M015-07, M034-17
 Analyses Requested Arsenic

Previous Final Readings: pH 11.41 Cond 0.639 Turb 19.6 DO 8.17 Temp 66 ORP -97 DTW 31.00
 Flow 200 ³H —

mw-111C
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>march 2008</i>									
Current Readings									
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments	
1215	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		Pump rate 100 ml/min	
1220	12.46	1.71	17.0	6.82	8.80	-186	19.31		
1225	12.58	2.71	16.5	2.62	8.13	-205	20.20		
1230	12.59	2.95	16.0	0.90	7.98	-204	21.03		
1235	12.56	2.83	16.5	1.69	7.98	-190	21.86		
1240	12.52	2.67	16.0	3.50	7.90	-178	22.64		
1245	—	—	—	—	—	—	23.43		
1250	↓	↓	↓	↓	↓	↓	24.18		
1255	↓	↓	↓	↓	↓	↓	24.90		
1300	↓	↓	↓	↓	↓	↓	25.23		
1305	↓	↓	↓	↓	↓	↓	26.40		
1310	↓	↓	↓	↓	↓	↓	26.90		
1315	↓	↓	↓	↓	↓	↓	27.60		
1320	↓	↓	↓	↓	↓	↓	28.21		
1325	↓	↓	↓	↓	↓	↓	28.78		
1330	↓	↓	↓	↓	↓	↓	29.29		
1335	↓	↓	↓	↓	↓	↓	29.89		
1340	↓	↓	↓	↓	↓	↓	30.28		
1345	↓	↓	↓	↓	↓	↓	30.73		
1350	↓	↓	↓	↓	↓	↓	31.13		
1355	↓	↓	↓	↓	↓	↓	31.93		
1400	↓	↓	↓	↓	↓	↓	32.68		
1405	↓	↓	↓	↓	↓	↓	33.38		
1410	↓	↓	↓	↓	↓	↓	—		
120	1413	well is dry. Samples will be collected upon recharge							

MW-111C

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
<i>125</i>	<i>12.5</i>	<i>3.14</i>	<i>6.7</i>	<i>0.0</i>	<i>9.12</i>	<i>-219</i>	<i>22.53</i>	<i>Samples collected</i>
130								
135								
140								
145								
150								
155								

1745
1630

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location SP-1 Well Designation SP-1
Sampling Team M. van Noorden Sample Period March 2008
Date 3-26-08 Time 0910

Measuring Point _____	Depth to Mid Screen _____ (ft)
Well Depth (from measuring point) (D) _____ (ft)	Diameter of Well _____ (in)
Depth to water (DTW) _____ (ft)	
Length of Water Column (LWC) _____ (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) _____ gal	Conversion Factor _____
Volume of Purge (VTP) (VTP = VW x 3) _____ (gal)	

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>N/A</u>	Duration of purging <u>N/A</u>
Purging method <u>N/A</u>	Did well go dry? <u>N/A</u>
Weather conditions <u>Snowy, 35°F</u>	

Pump Serial Number N/A

Water Quality Monitor Serial Number M015-07, M024-17

Analyses Requested VOC, metals, gamma, Sr-90, H-3

Previous Final Readings: pH 6.8 Cond 0.95 Turb 5.6 DO 11.6 Temp 32 ORP >1 DTW -
Flow - ³H -

5P-1
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10% <i>10.88</i>	+/- 1 E	+/-10 mv		
0910 <i>50</i>	<i>6.45</i>	<i>0.283</i>	<i>6.34</i>	<i>2.44(m)</i>	<i>4.83</i>	<i>144</i>	<i>N/A</i>	
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location SW-1 Well Designation SW-1
Sampling Team Lovejoy Sample Period March 08
Date March 25, 2008 Time 0920

Measuring Point _____	Depth to Mid Screen _____ (ft)
Well Depth (from measuring point) (D) _____ (ft)	Diameter of Well _____ (in)
Depth to water (DTW) _____ (ft)	
Length of Water Column (LWC) _____ (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) _____ gal	Conversion Factor _____
Volume of Purge (VTP) (VTP = VW x 3) _____ (gal)	

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>NA</u>	Duration of purging <u>NA</u>
Purging method <u>Grab</u>	Did well go dry? <u>NA</u>
Weather conditions <u>Fair</u>	
<u>water Depth 8"</u>	

Pump Serial Number NA

Water Quality Monitor Serial Number M015-07

Analyses Requested metals, VOC, COD, CN, NO₂, Cl₂, SO₄, TDS, Alkalinity

Previous Final Readings: pH 8.2 Cond⁽⁰³⁾ 1.2 Turb 1.2 DO 13.2 Temp 4.1 ORP 136 DTW —
Flow — ³H —

SW-1

WATER QUALITY PARAMETERS

Form 2

Sample Round <i>March 08</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	6.20	0.026	3.1	18.6	0.8	195	—	Depth = 8"
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location SW-2 Well Designation SW-2
Sampling Team Lovejoy Sample Period March 08
Date March 25, 2008 Time 1635

Measuring Point _____	Depth to Mid Screen _____ (ft)
Well Depth (from measuring point) (D) _____ (ft)	Diameter of Well _____ (in)
Depth to water (DTW) _____ (ft)	
Length of Water Column (LWC) _____ (ft) (LWC=D-DTW)	
Volume of Water in Well (VW) _____ gal	Conversion Factor _____
Volume of Purge (VTP) (VTP = VW x 3) _____ (gal)	

N
A


At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>NA</u>	Duration of purging <u>NA</u>
Purging method <u>NA</u>	Did well go dry? <u>NA</u>
Weather conditions <u>Fair</u>	
Water Depth <u>4"</u>	

Pump Serial Number <u>N/A</u>
Water Quality Monitor Serial Number <u>M015-07</u>
Analyses Requested <u>Metals List 1, VOC, COD, CN, NO₂, Cl₂, SO₄, TDS, Alkalinity</u>

Previous Final Readings: pH 5.8 Cond 0.026 Turb 25 DO 10 Temp 0.7 ORP 230 DTW -
Flow - ³H -

SW-2
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 08</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
5	6.23	0.022	7.4	17.2	1.6	109		Water Depth = 4"
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location SW-3 Well Designation SW-3
 Sampling Team M. Van Noordemmen Sample Period March 2008
 Date 3-25-08 Time 1100

Measuring Point <u>N/A</u>	Depth to Mid Screen <u>N/A</u> (ft)
Well Depth (from measuring point) (D)	Diameter of Well <u>N/A</u> (in)
Depth to water (DTW)	<u>N/A</u> (ft)
Length of Water Column (LWC)	<u>N/A</u> (ft) (LWC=D-DTW)
Volume of Water in Well (VW)	<u>N/A</u> gal Conversion Factor <u>N/A</u>
Volume of Purge (VTP) (VTP = VW x 3)	<u>N/A</u> (gal)

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>N/A</u>	Duration of purging <u>N/A</u>
Purging method <u>N/A</u>	Did well go dry? <u>N/A</u>
Weather conditions <u>Sunny, 75°F</u>	

Pump Serial Number N/A
 Water Quality Monitor Serial Number M015-07, M024-19
 Analyses Requested VOC, COD, metals, cyanide, nitrate, chloride, sulfate,
N ~~TD~~ TDS, alkalinity

Previous Final Readings: pH 5.5 Cond 002 Turb 1.4 DO 10.7 Temp 0.8 ORP 155 DTW —
 Flow — ³H —

5w-3
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
<i>1100</i> 50	<i>5.41</i>	<i>0.026</i>	<i>1.17</i>	<i>15.16</i>	<i>3.01</i>	<i>158</i>	<i>N/A</i>	
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location SW-4 Well Designation SW-4
 Sampling Team M. Van Noordenen Sample Period March 2008
 Date 3-25-08 Time 1025

Measuring Point <u>N/A</u>	Depth to Mid Screen <u>N/A</u> (ft)
Well Depth (from measuring point) (D)	Diameter of Well <u>N/A</u> (in)
Depth to water (DTW)	<u>N/A</u> (ft)
Length of Water Column (LWC)	<u>N/A</u> (ft) (LWC=D-DTW)
Volume of Water in Well (VW)	<u>N/A</u> gal Conversion Factor <u>N/A</u>
Volume of Purge (VTP) (VTP = VW x 3)	<u>N/A</u> (gal)

At Time of Measurements:

Color <u>clear</u>	Odor <u>None</u>
Total volume purged <u>N/A</u>	Duration of purging <u>N/A</u>
Purging method <u>N/A</u>	Did well go dry? <u>N/A</u>
Weather conditions <u>Sunny, 25°F</u>	

Pump Serial Number N/A
 Water Quality Monitor Serial Number M015-07, M024-19
 Analyses Requested VOC, COD, metals, cyanide, nitrate, chloride, sulfate, TDS, Alkalinity

Previous Final Readings: pH 5.5 Cond 0.034 Turb 0.49 DO 3.5 Temp 0.8 ORP 133 DTW —
 Flow — ³H —

SW-4
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
<i>1025</i> 5	<i>5.39</i>	<i>0.040</i>	<i>4.49</i>	<i>12.93</i>	<i>1.19</i>	<i>104</i>	<i>N/A</i>	
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

GROUND WATER SAMPLING FIELD LOG

Form 1

Sample Location SW-5 Well Designation SW-5
Sampling Team M. Van Noordemen Sample Period March 2008
Date 3-25-08 Time 1040

Measuring Point <u>N/A</u>	Depth to Mid Screen <u>N/A</u> (ft)
	Diameter of Well <u>N/A</u> (in)
Well Depth (from measuring point) (D)	<u>N/A</u> (ft)
Depth to water (DTW)	<u>N/A</u> (ft)
Length of Water Column (LWC)	<u>N/A</u> (ft) (LWC=D-DTW)
Volume of Water in Well (VW)	<u>N/A</u> gal Conversion Factor <u>N/A</u>
Volume of Purge (VTP) (VTP = VW x 3)	<u>N/A</u> (gal)

At Time of Measurements:

Color <u>Clear</u>	Odor <u>None</u>
Total volume purged <u>N/A</u>	Duration of purging <u>N/A</u>
Purging method <u>N/A</u>	Did well go dry? <u>N/A</u>
Weather conditions <u>Sunny, 25°F</u>	

Pump Serial Number <u>N/A</u>
Water Quality Monitor Serial Number <u>M015-07, M024-19</u>
Analyses Requested <u>VOC, COD, metals, cyanide, nitrate, chloride, sulfate, TDS, alkalinity</u>

Previous Final Readings: pH 6.5 Cond 0048 Turb - DO 8.3 Temp 0.8 ORP 22 DTW -
Flow - ³H -

SW-5
WATER QUALITY PARAMETERS
Form 2

Sample Round <i>March 2008</i>								
Current Readings								
Time (min)	pH	Cond mS/cm	Turb (NTU)	D.O (mg/L)	Temp (°C)	ORP (mv)	DTW (feet)	Comments
0	+/- 0.1 std.unit	+/- 3%	+/- 10% NA <10NTU	+/-10%	+/- 1 E	+/-10 mv		
<i>50</i>	<i>5.31</i>	<i>0.027</i>	<i>0.58</i>	<i>12.51</i>	<i>0.66</i>	<i>113</i>	<i>N/A</i>	
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								
90								
95								
100								
105								
110								
115								
120								

1040

APPENDIX B

ANALYICAL DATA – MARCH 2008

APPENDIX B-1

RADIOLOGICAL DATA

APPENDIX B - 1
Radiological Data - March 2008

Yankee Nuclear Power Station

		Location	CFW-5			CFW-6			MW-102D			MW-104A		
		Sample Date	3/26/2008			3/25/2008			3/26/2008			3/25/2008		
		Sample ID	CFW-5			CFW-6			MW-102D			MW-104A		
		QC Code	FS			FS			FS			FS		
		Media	GW			GW			GW			GW		
Analysis	Parameter	Units	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty
RAD	Antimony-125	PCI/L							1.4	U	5.71	-1.21	U	5.48
RAD	Cesium-134	PCI/L							-0.743	U	2.11	-0.022	U	2.3
RAD	Cesium-137	PCI/L							-0.294	U	2.14	2.11	U	4.65
RAD	Cobalt-60	PCI/L							-0.757	U	2.12	1.78	U	2.06
RAD	Europium-152	PCI/L							5.93	U	6.7	-1.94	U	5.59
RAD	Europium-154	PCI/L							-1.59	U	6.51	1.23	U	5.68
RAD	Europium-155	PCI/L							4.24	U	8.48	5.41	U	7.47
RAD	Niobium-94	PCI/L							0.198	U	1.8	-0.53	U	1.77
RAD	Silver-108	PCI/L							-0.564	U	2.12	1.63	U	3.18
RAD	Strontium-90	PCI/L							0.0236	U	0.595	-0.003	U	0.234
RAD	Tritium	PCI/L	-135	U	212	-23.5	U	218	1590		425	1850		468
PCI/L - picoCuries per Liter														
U - not detected														
R - data rejected during validation; unusable														
FS - Field Sample														
FD - Field Duplicate														
QC - Quality Control														
EB - equipment blank														
GW - groundwater														
BW - blank water														
SW - surface water														

APPENDIX B - 1
Radiological Data - March 2008

Yankee Nuclear Power Station

		Location	MW-105B			MW-106A			MW-107C			MW-107D		
		Sample Date	3/26/2008			3/26/2008			3/25/2008			3/24/2008		
		Sample ID	MW-105B			MW-106A			MW-107C			MW-107D		
		QC Code	FS			FS			FS			FS		
		Media	GW			GW			GW			GW		
Analysis	Parameter	Units	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty
RAD	Antimony-125	PCI/L	2.27	U	9.24	-3.03	U	6.32	-1.13	U	5.56	-4.27	U	7.64
RAD	Cesium-134	PCI/L	0.734	U	3.31	0.0978	U	2.46	0.281	U	2.04	-1.72	U	2.92
RAD	Cesium-137	PCI/L	3.85	U	3.59	-0.571	U	2.29	0.184	U	2.54	-0.215	U	2.7
RAD	Cobalt-60	PCI/L	-0.333	U	3.36	-0.77	U	2.51	0.695	U	1.75	0.602	U	2.6
RAD	Europium-152	PCI/L	5.11	U	9.18	-6.04	U	7.45	1.27	U	6.16	1.35	U	9.7
RAD	Europium-154	PCI/L	-4.92	U	10.8	-7.14	U	10.7	-1.13	U	5.39	-6.89	U	6.94
RAD	Europium-155	PCI/L	-4.6	U	9.85	4.54	U	8.89	-4.28	U	7.41	-8.75	U	11.3
RAD	Niobium-94	PCI/L		R	3.83	0.772	U	2.3	0.544	U	1.61	0.412	U	2.51
RAD	Silver-108	PCI/L	1.29	U	3.19	2.54	U	2.3	0.346	U	1.99	-1.46	U	2.72
RAD	Strontium-90	PCI/L	0.493	U	0.544	-0.094	U	0.291	-0.099	U	0.465	0.182	U	0.272
RAD	Tritium	PCI/L	4710		994	846		308	25700		5040	9380		1890
PCI/L - picoCuries per Liter														
U - not detected														
R - data rejected during validation; unusable														
FS - Field Sample														
FD - Field Duplicate														
QC - Quality Control														
EB - equipment blank														
GW - groundwater														
BW - blank water														
SW - surface water														

APPENDIX B - 1
Radiological Data - March 2008

Yankee Nuclear Power Station

		Location	MW-107E			MW-107E			MW-107F			Spring		
		Sample Date	3/24/2008			3/24/2008			3/24/2008			3/26/2008		
		Sample ID	MW-107E			MW-107E DUP			MW-107F			SP-1		
		QC Code	FS			FD			FS			FS		
		Media	GW			GW			GW			SW		
Analysis	Parameter	Units	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty	Result	Qualifier	Uncertainty
RAD	Antimony-125	PCI/L	-2.94	U	7.19	-4.03	U	8.9	-4.85	U	5.52	2.16	U	5.75
RAD	Cesium-134	PCI/L	-0.232	U	2.82	1.2	U	2.87	0.786	U	2.09	-0.7	U	2
RAD	Cesium-137	PCI/L	1.25	U	2.61	1.35	U	2.91	-1.18	U	2.18	0.227	U	1.97
RAD	Cobalt-60	PCI/L	-0.459	U	2.22	0.208	U	2.5	0.858	U	1.96	-0.078	U	1.78
RAD	Europium-152	PCI/L	-0.638	U	7.05	0.0765	U	8.9	0.284	U	6.02	-1.6	U	6.36
RAD	Europium-154	PCI/L	3.36	U	7.1	-4.74	U	7.22	0.387	U	5.63	0.894	U	5.32
RAD	Europium-155	PCI/L	-4.42	U	9.19	5.57	U	12	7.5	U	8.25	3.73	U	7.97
RAD	Niobium-94	PCI/L	1.63	U	2.23	-1.16	U	2.3	-0.804	U	1.99	0.482	U	1.88
RAD	Silver-108	PCI/L	-0.595	U	2.69	-0.319	U	3.4	0.0135	U	2.08	0.781	U	2.2
RAD	Strontium-90	PCI/L	0.267	U	0.306	-0.073	U	0.411	-0.204	U	0.26	-0.114	U	0.227
RAD	Tritium	PCI/L	5060		1060	5160		1080	9890		1990	165	U	230
PCI/L - picoCuries per Liter														
U - not detected														
R - data rejected during validation; unusable														
FS - Field Sample														
FD - Field Duplicate														
QC - Quality Control														
EB - equipment blank														
GW - groundwater														
BW - blank water														
SW - surface water														

APPENDIX B - 1
Radiological Data - March 2008

Yankee Nuclear Power Station

		Location	QC		
		Sample Date	3/24/2008		
		Sample ID	EB-001		
		QC Code	EB		
		Media	BW		
Analysis	Parameter	Units	Result	Qualifier	Uncertainty
RAD	Antimony-125	PCI/L	0.186	U	4.07
RAD	Cesium-134	PCI/L	1.03	U	1.97
RAD	Cesium-137	PCI/L	0.379	U	1.58
RAD	Cobalt-60	PCI/L	-0.069	U	1.87
RAD	Europium-152	PCI/L	1.13	U	4.58
RAD	Europium-154	PCI/L	-3.3	U	4.55
RAD	Europium-155	PCI/L	-1.01	U	4.86
RAD	Niobium-94	PCI/L	-0.222	U	1.92
RAD	Silver-108	PCI/L	-0.999	U	1.51
RAD	Strontium-90	PCI/L	-0.079	U	0.244
RAD	Tritium	PCI/L	-188	U	209
	PCI/L - picoCuries per Liter				
	U - not detected				
	R - data rejected during validation; unusable				
	FS - Field Sample				
	FD - Field Duplicate				
	QC - Quality Control				
	EB - equipment blank				
	GW - groundwater				
	BW - blank water				
	SW - surface water				

**Data Validation Summary
Yankee Nuclear Power Station
Rowe, Massachusetts
SDG: 3Y-YR-001**

Introduction:

Twelve groundwater samples and one equipment blank were collected March 24, 2008 through March 26, 2008, at the Yankee Nuclear Power Station, located in Rowe, Massachusetts. The samples were analyzed for one or more of the following parameters: Tritium by Liquid Scintillation, Strontium-90 by GFPC, and Gamma Isotopes (Co-60, Cs-134, Cs-137, Nb-94, Sb-125, Eu-152, Eu-154, Eu-155, and Ag-108m) by Gamma Spectroscopy. Sample analyses for all parameters were performed by GEL Laboratories, LLC, located in Charleston, South Carolina.

A chemist review was performed on all samples and analyses using information supplied by the laboratory. The data package was validated using SAIC guidance – “Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyses” (April 2002), DOE Guidance – “Evaluation of Radiochemical Data Usability” (April, 1997), and the Yankee Nuclear Power Station Groundwater Monitoring Program, Document RP-05 (September 13, 2007).

The following samples collected during March 2008 are included in the data evaluation:

Field Sample ID	GEL ID	Sample Date	Comment
CFW-5	205621013	3/26/08	Tritium
CFW-6	205621001	3/25/08	Tritium
MW-102D	205621002	3/26/08	Tritium, Sr-90, Gamma
MW-104A	205621003	3/25/08	Tritium, Sr-90, Gamma
MW-105B	205621004	3/26/08	Tritium, Sr-90, Gamma
MW-106A	205621005	3/26/08	Tritium, Sr-90, Gamma
MW-107C	205621006	3/25/08	Tritium, Sr-90, Gamma
MW-107D	205621007	3/24/08	Tritium, Sr-90, Gamma
MW-107E	205621008	3/24/08	Tritium, Sr-90, Gamma
MW-107EDUP	205621009	3/24/08	Tritium, Sr-90, Gamma
MW-107F	205621010	3/24/08	Tritium, Sr-90, Gamma
SP-1	205621011	3/26/08	Tritium, Sr-90, Gamma
EB-001	205621012	3/24/08	Tritium, Sr-90, Gamma

Data were evaluated for the following parameters:

- * Collection and Preservation
- * Holding Times
- * Data Completeness
- * Tracer Recoveries
- * Blank Contamination
- * Duplicates
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicates
- * Target Compound Quantitation
- * Miscellaneous

* - all criteria were met for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

Target Compound Quantitation

Gamma – The suspected Niobium-94 radionuclide peak was detected in sample MW-105B, but failed to meet the positive identification criteria. The Nb-94 result in sample MW-105B was rejected by the laboratory due to the low abundance that resulted in the uncertain identification. The lab qualified the result with “UI” which was changed to “R” (rejected) during validation.

References:

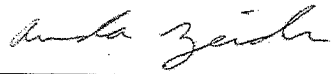
Science Applications International Corporation (SAIC), 2002. “Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyses.” Thomas L Rucker, Ph.D. and C. Martin Johnson, Jr.; Revision 07, April, 2002.

Department of Energy (DOE). “Evaluation of Radiochemical Data Usability.” April, 1997.

Yankee Nuclear Power Station, 2007. “YNPS Groundwater Monitoring Program.” ISFSI Radiation Protection, RP-05: September, 13, 2007.

Data Validator: Amanda Zeidler

Signature



Date: April 21, 2008

APPENDIX B-2

CHEMICAL DATA

APPENDIX B - 2
Chemical Data - March 2008

Yankee Nuclear Power Station

		Loc Name	CFW-1		CFW-5		CFW-5		CFW-6	
		Field Sample Date	3/25/2008		3/26/2008		3/26/2008		3/25/2008	
		Field Sample ID	CFW-1		CFW-5		CFW-5 DUP		CFW-6	
		QC Code	FS		FS		FD		FS	
		Media	GW		GW		GW		GW	
Analysis	Parameter	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
VOCs	1,1,1,2-Tetrachloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1,1-Trichloroethane	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
VOCs	1,1,2,2-Tetrachloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1,2-Trichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1-Dichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2,3-Trichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2,4-Trichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dibromoethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichloropropane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,3-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,3-Dichloropropene (total)	MG/L	0.00039	U	0.00039	U	0.00039	U	0.00039	U
VOCs	1,4-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	2-Butanone	MG/L	0.01	U	0.01	UJ	0.01	U	0.01	U
VOCs	4-Methyl-2-pentanone	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Acetone	MG/L	0.0027	U	0.001	U	0.001	U	0.001	U
VOCs	Benzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromodichloromethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromoform	MG/L	0.001	U	0.001	UJ	0.001	UJ	0.001	U
VOCs	Bromomethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Carbon tetrachloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chlorodibromomethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chloroform	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Cis-1,2-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Ethyl benzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Methyl Tertbutyl Ether	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Methylene chloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Naphthalene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Styrene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Tetrachloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Toluene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	trans-1,2-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Trichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Vinyl chloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Xylenes, Total	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
Metals	Arsenic	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Barium	MG/L	0.05	U	0.05	U	0.05	U	0.05	U
Metals	Cadmium	MG/L	0.004	U	0.004	U	0.004	U	0.004	U
Metals	Calcium	MG/L	1.5		16		15		7.4	
Metals	Chromium	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Copper	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Iron	MG/L	5.8	J	32	J	31	J	0.57	J
Metals	Lead	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Manganese	MG/L	0.15		1.9		1.8		0.2	
Metals	Mercury	MG/L	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Metals	Selenium	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Silver	MG/L	0.005	UJ	0.005	UJ	0.005	UJ	0.005	UJ
Metals	Sodium	MG/L	0.94		1.8		1.6		1.3	
Metals	Thallium	MG/L								
Metals	Zinc	MG/L	0.02	U	0.02	U	0.02	U	0.02	U
Cyanide	Cyanide, Total	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Wet Chem	Alkalinity, Total	MG/L	3.4		69		63		17	
Wet Chem	Chemical Oxygen Demand	MG/L	10	U	18		17		27	
Wet Chem	Chloride	MG/L	2	U	2.3		2.2		2	U
Wet Chem	Nitrate as N	MG/L	0.5	U	0.5	U	0.5	U	0.5	U
Wet Chem	Sulfate	MG/L	3.2		2.3		2.3		4.7	
Wet Chem	Total Dissolved Solids	MG/L	46		110		100		33	

APPENDIX B - 2
Chemical Data - March 2008

Yankee Nuclear Power Station

		Loc Name	MW-101A	MW-101C	MW-107A	MW-111C					
		Field Sample Date	3/26/2008	3/26/2008	3/24/2008	3/26/2008					
		Field Sample ID	MW-101A	MW-101C	MW-107A	MW-111C					
		QC Code	FS	FS	FS	FS					
		Media	GW	GW	GW	GW					
Analysis	Parameter	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	
VOCs	1,1,1,2-Tetrachloroethane	MG/L									
VOCs	1,1,1-Trichloroethane	MG/L									
VOCs	1,1,2,2-Tetrachloroethane	MG/L									
VOCs	1,1,2-Trichloroethane	MG/L									
VOCs	1,1-Dichloroethane	MG/L									
VOCs	1,1-Dichloroethene	MG/L									
VOCs	1,2,3-Trichlorobenzene	MG/L									
VOCs	1,2,4-Trichlorobenzene	MG/L									
VOCs	1,2-Dibromoethane	MG/L									
VOCs	1,2-Dichlorobenzene	MG/L									
VOCs	1,2-Dichloroethane	MG/L									
VOCs	1,2-Dichloropropane	MG/L									
VOCs	1,3-Dichlorobenzene	MG/L									
VOCs	1,3-Dichloropropene (total)	MG/L									
VOCs	1,4-Dichlorobenzene	MG/L									
VOCs	2-Butanone	MG/L									
VOCs	4-Methyl-2-pentanone	MG/L									
VOCs	Acetone	MG/L		2.2							
VOCs	Benzene	MG/L									
VOCs	Bromodichloromethane	MG/L									
VOCs	Bromoform	MG/L									
VOCs	Bromomethane	MG/L									
VOCs	Carbon tetrachloride	MG/L									
VOCs	Chlorobenzene	MG/L									
VOCs	Chlorodibromomethane	MG/L									
VOCs	Chloroform	MG/L									
VOCs	Cis-1,2-Dichloroethene	MG/L									
VOCs	Ethyl benzene	MG/L									
VOCs	Methyl Tertbutyl Ether	MG/L									
VOCs	Methylene chloride	MG/L									
VOCs	Naphthalene	MG/L									
VOCs	Styrene	MG/L									
VOCs	Tetrachloroethene	MG/L									
VOCs	Toluene	MG/L									
VOCs	trans-1,2-Dichloroethene	MG/L									
VOCs	Trichloroethene	MG/L									
VOCs	Vinyl chloride	MG/L									
VOCs	Xylenes, Total	MG/L									
Metals	Arsenic	MG/L	0.01	J			0.01	U		0.01	U
Metals	Barium	MG/L									
Metals	Cadmium	MG/L									
Metals	Calcium	MG/L									
Metals	Chromium	MG/L									
Metals	Copper	MG/L									
Metals	Iron	MG/L									
Metals	Lead	MG/L									
Metals	Manganese	MG/L									
Metals	Mercury	MG/L									
Metals	Selenium	MG/L									
Metals	Silver	MG/L									
Metals	Sodium	MG/L									
Metals	Thallium	MG/L									
Metals	Zinc	MG/L									
Cyanide	Cyanide, Total	MG/L									
Wet Chem	Alkalinity, Total	MG/L									
Wet Chem	Chemical Oxygen Demand	MG/L									
Wet Chem	Chloride	MG/L									
Wet Chem	Nitrate as N	MG/L									
Wet Chem	Sulfate	MG/L									
Wet Chem	Total Dissolved Solids	MG/L									

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Chemical Data - March 2008

Yankee Nuclear Power Station

		Loc Name	Spring		SW-1		SW-2		SW-3	
		Field Sample Date	3/26/2008		3/25/2008		3/25/2008		3/25/2008	
		Field Sample ID	SP-1		SW-1		SW-2		SW-3	
		QC Code	FS		FS		FS		FS	
		Media	SW		SW		SW		SW	
Analysis	Parameter	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
VOCs	1,1,1,2-Tetrachloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1,1-Trichloroethane	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
VOCs	1,1,2,2-Tetrachloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1,2-Trichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1-Dichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2,3-Trichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2,4-Trichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dibromoethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichloropropane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,3-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,3-Dichloropropene (total)	MG/L	0.00039	U	0.00039	U	0.00039	U	0.00039	U
VOCs	1,4-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	2-Butanone	MG/L	0.01	UJ	0.01	U	0.01	U	0.01	U
VOCs	4-Methyl-2-pentanone	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Acetone	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Benzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromodichloromethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromoform	MG/L	0.001	UJ	0.001	U	0.001	U	0.001	U
VOCs	Bromomethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Carbon tetrachloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chlorodibromomethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chloroform	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Cis-1,2-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Ethyl benzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Methyl Tertbutyl Ether	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Methylene chloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Naphthalene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Styrene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Tetrachloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Toluene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	trans-1,2-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Trichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Vinyl chloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Xylenes, Total	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
Metals	Arsenic	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Barium	MG/L	0.05	U	0.05	U	0.05	U	0.05	U
Metals	Cadmium	MG/L	0.004	U	0.004	U	0.004	U	0.004	U
Metals	Calcium	MG/L			2.5		2.3		2.2	
Metals	Chromium	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Copper	MG/L			0.01	U	0.01	U	0.01	U
Metals	Iron	MG/L			0.016	J	0.021	J	0.029	J
Metals	Lead	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Manganese	MG/L			0.01	U	0.01	U	0.01	U
Metals	Mercury	MG/L	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Metals	Selenium	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
Metals	Silver	MG/L	0.005	UJ	0.005	UJ	0.005	UJ	0.005	UJ
Metals	Sodium	MG/L			1.1		1.1		1.1	
Metals	Thallium	MG/L	0.0018	U						
Metals	Zinc	MG/L			0.02	U	0.02	U	0.02	U
Cyanide	Cyanide, Total	MG/L			0.01	U	0.01	U	0.01	U
Wet Chem	Alkalinity, Total	MG/L			1.9		1.1		1	U
Wet Chem	Chemical Oxygen Demand	MG/L			10	U	10	U	10	U
Wet Chem	Chloride	MG/L			2	U	2	U	2	U
Wet Chem	Nitrate as N	MG/L			0.5	U	0.5	U	0.5	U
Wet Chem	Sulfate	MG/L			5		5		5.9	
Wet Chem	Total Dissolved Solids	MG/L			21		54		8	

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Yankee Nuclear Power Station

		Loc Name	SW-4		SW-5		QC		QC	
		Field Sample Date	3/25/2008		3/25/2008		3/24/2008		3/25/2008	
		Field Sample ID	SW-4		SW-5		EB-001		TB-001	
		QC Code	FS		FS		EB		TB	
		Media	SW		SW		BW		BW	
Analysis	Parameter	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
VOCs	1,1,1,2-Tetrachloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1,1-Trichloroethane	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
VOCs	1,1,2,2-Tetrachloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1,2-Trichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1-Dichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,1-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2,3-Trichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2,4-Trichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dibromoethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichloroethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,2-Dichloropropane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,3-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	1,3-Dichloropropene (total)	MG/L	0.00039	U	0.00039	U	0.00039	U	0.00039	U
VOCs	1,4-Dichlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	2-Butanone	MG/L	0.01	U	0.01	U	0.01	U	0.01	U
VOCs	4-Methyl-2-pentanone	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Acetone	MG/L	0.001	U	0.001	U	0.0015	U	0.001	U
VOCs	Benzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromodichloromethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromoform	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Bromomethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Carbon tetrachloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chlorobenzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chlorodibromomethane	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Chloroform	MG/L	0.001	U	0.001	U	0.00087	J	0.001	U
VOCs	Cis-1,2-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Ethyl benzene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Methyl Tertbutyl Ether	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Methylene chloride	MG/L	0.001	U	0.001	U	0.001	U	0.00063	J
VOCs	Naphthalene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Styrene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Tetrachloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Toluene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	trans-1,2-Dichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Trichloroethene	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Vinyl chloride	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
VOCs	Xylenes, Total	MG/L	0.001	U	0.001	U	0.001	U	0.001	U
Metals	Arsenic	MG/L	0.01	U	0.01	U				
Metals	Barium	MG/L	0.05	U	0.05	U				
Metals	Cadmium	MG/L	0.004	U	0.004	U				
Metals	Calcium	MG/L	2.6		2.3					
Metals	Chromium	MG/L	0.01	U	0.01	U				
Metals	Copper	MG/L	0.01	U	0.01	U				
Metals	Iron	MG/L	1.1	J	0.26	J				
Metals	Lead	MG/L	0.01	U	0.01	U				
Metals	Manganese	MG/L	0.14		0.04					
Metals	Mercury	MG/L	0.0002	U	0.0002	U				
Metals	Selenium	MG/L	0.01	U	0.01	U				
Metals	Silver	MG/L	0.005	UJ	0.005	UJ				
Metals	Sodium	MG/L	1.1		1					
Metals	Thallium	MG/L								
Metals	Zinc	MG/L	0.02	U	0.02	U				
Cyanide	Cyanide, Total	MG/L	0.01	U	0.01	U				
Wet Chem	Alkalinity, Total	MG/L	3.5		1.5					
Wet Chem	Chemical Oxygen Demand	MG/L	10	U	10	U				
Wet Chem	Chloride	MG/L	2	U	2	U				
Wet Chem	Nitrate as N	MG/L	0.5	U	0.5	U				
Wet Chem	Sulfate	MG/L	5.1		5					
Wet Chem	Total Dissolved Solids	MG/L	19		31					

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Yankee Nuclear Power Station

		Loc Name	QC			
		Field Sample Date	3/26/2008			
		Field Sample ID	TB-002			
		QC Code	TB			
		Media	BW			
Analysis	Parameter	Units	Result	Qualifier		
VOCs	1,1,1,2-Tetrachloroethane	MG/L	0.001	U		
VOCs	1,1,1-Trichloroethane	MG/L	0.01	U		
VOCs	1,1,2,2-Tetrachloroethane	MG/L	0.001	U		
VOCs	1,1,2-Trichloroethane	MG/L	0.001	U		
VOCs	1,1-Dichloroethane	MG/L	0.001	U		
VOCs	1,1-Dichloroethene	MG/L	0.001	U		
VOCs	1,2,3-Trichlorobenzene	MG/L	0.001	U		
VOCs	1,2,4-Trichlorobenzene	MG/L	0.001	U		
VOCs	1,2-Dibromoethane	MG/L	0.001	U		
VOCs	1,2-Dichlorobenzene	MG/L	0.001	U		
VOCs	1,2-Dichloroethane	MG/L	0.001	U		
VOCs	1,2-Dichloropropane	MG/L	0.001	U		
VOCs	1,3-Dichlorobenzene	MG/L	0.001	U		
VOCs	1,3-Dichloropropene (total)	MG/L	0.00039	U		
VOCs	1,4-Dichlorobenzene	MG/L	0.001	U		
VOCs	2-Butanone	MG/L	0.01	U		
VOCs	4-Methyl-2-pentanone	MG/L	0.001	U		
VOCs	Acetone	MG/L	0.001	U		
VOCs	Benzene	MG/L	0.001	U		
VOCs	Bromodichloromethane	MG/L	0.001	U		
VOCs	Bromoform	MG/L	0.001	U		
VOCs	Bromomethane	MG/L	0.001	U		
VOCs	Carbon tetrachloride	MG/L	0.001	U		
VOCs	Chlorobenzene	MG/L	0.001	U		
VOCs	Chlorodibromomethane	MG/L	0.001	U		
VOCs	Chloroform	MG/L	0.001	U		
VOCs	Cis-1,2-Dichloroethene	MG/L	0.001	U		
VOCs	Ethyl benzene	MG/L	0.001	U		
VOCs	Methyl Tertbutyl Ether	MG/L	0.001	U		
VOCs	Methylene chloride	MG/L	0.001	U		
VOCs	Naphthalene	MG/L	0.001	U		
VOCs	Styrene	MG/L	0.001	U		
VOCs	Tetrachloroethene	MG/L	0.001	U		
VOCs	Toluene	MG/L	0.001	U		
VOCs	trans-1,2-Dichloroethene	MG/L	0.001	U		
VOCs	Trichloroethene	MG/L	0.001	U		
VOCs	Vinyl chloride	MG/L	0.001	U		
VOCs	Xylenes, Total	MG/L	0.001	U		
Metals	Arsenic	MG/L				
Metals	Barium	MG/L			Notes:	
Metals	Cadmium	MG/L			mg/L - milligrams per liter	
Metals	Calcium	MG/L			U - not detected	
Metals	Chromium	MG/L			J - estimated value	
Metals	Copper	MG/L			FS - field sample	
Metals	Iron	MG/L			FD - field duplicate	
Metals	Lead	MG/L			QC - quality control	
Metals	Manganese	MG/L			EB - equipment blank	
Metals	Mercury	MG/L			TB - trip blank	
Metals	Selenium	MG/L			GW - groundwater	
Metals	Silver	MG/L			BW - blank water	
Metals	Sodium	MG/L			SW - surface water	
Metals	Thallium	MG/L				
Metals	Zinc	MG/L				
Cyanide	Cyanide, Total	MG/L				
Wet Chem	Alkalinity, Total	MG/L				
Wet Chem	Chemical Oxygen Demand	MG/L				
Wet Chem	Chloride	MG/L				
Wet Chem	Nitrate as N	MG/L				
Wet Chem	Sulfate	MG/L				
Wet Chem	Total Dissolved Solids	MG/L				

**Data Validation Summary
Yankee Nuclear Power Station
Rowe, Massachusetts
SDG: 3Y-YR-001**

Introduction:

Nine groundwater samples, five surface water samples, one equipment blank, and two trip blanks were collected March 24, 2008 through March 26, 2008, at the Yankee Nuclear Power Station, located in Rowe, Massachusetts. The samples were analyzed for one or more of the following parameters: volatile organic compounds (VOC), total metals, and wet chemistry parameters (cyanide, COD, nitrate, chloride, sulfate, TDS, and alkalinity). Sample analyses for all parameters were performed by Northeast Laboratory Services (NEL), located in Waterville, ME.

A chemist review was performed on all samples and analyses using information supplied by the laboratory. The data package was validated using Region I EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses (USEPA, 1996), Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses (USEPA, 2004), and Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses (USEPA, 1989), and the Yankee Nuclear Power Station Groundwater Monitoring Program, Document RP-05 (September 13, 2007).

The following samples collected during March 2008 are included in the data evaluation:

Field Sample ID	NEL ID	Sample Date	Comment
CFW-6	AK03044	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
SW-1	AK03045	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
SW-3	AK03046	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
SW-4	AK03047	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
SW-5	AK03048	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
MW-107A	AK03049	3/24/08	Arsenic
EB-001	AK03050	3/24/08	Equipment Blank: VOC
TB-001	AK03051	3/25/08	Trip Blank: VOC
SW-2	AK03134	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
CFW-1	AK03135	3/25/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
CFW-5	AK03136	3/26/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
CFW-5DUP	AK03137	3/26/08	VOC, metals*, cyanide, COD, nitrate, chloride, sulfate, TDS, alkalinity
SP-1	AK03138	3/26/08	VOC, RCRA 8 metals + thallium
MW-101C	AK03139	3/26/08	Acetone
TB-002	AK03140	3/26/08	Trip Blank: VOC
MW-101A	AK03201	3/26/08	Arsenic
MW-111C	AK03202	3/26/08	Arsenic

* Metals include – RCRA 8 (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) + copper, iron, manganese, zinc, calcium, sodium

Data were evaluated for the following parameters:

- * Collection and Preservation
- * Holding Times
- * Data Completeness
- * Surrogate Recoveries
- * Blank Contamination
- * Duplicates
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicates
- * Serial Dilutions
- * Target Compound Quantitation
- * Miscellaneous

* - all criteria were met for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

Duplicates

Metals – The laboratory duplicate associated with sample CFW-5 reported a relative percent difference between iron (29) results that was greater than the control limit of 20. Iron results, in samples of a similar matrix, were qualified as estimated. The results for iron in samples CFW-6, CFW-5, CFW-5DUP, and CFW-1 were positive and were qualified as estimated (J). ✓

Laboratory Control Samples

VOC – The LCS/LCSD, associated with samples CFW-5 and SP-1, reported percent recoveries for 2-butanone (54, 55) and bromoform (29, 29) that were below the laboratory control limit of 60-140 indicating a potential low bias. The results for 2-butanone and bromoform were non-detect in samples CFW-5 and SP-1 and were qualified as estimated (UJ). ✓

Metals – The LCS/LCSD associated with all metals samples in the SDG reported percent recoveries for silver (78, 78) that were below the laboratory control limit of 85-115 indicating a potential low bias. In addition, the percent recoveries for arsenic (119, 118) and iron (119, 116) were greater than the laboratory control limit of 75-115 indicating a potential high bias. The results for silver were non-detect in samples CFW-6, SW-1, SW-2, SW-3, SW-4, SW-5, CFW-1, SP-1, CFW-5, and CFW-5DUP and were qualified as estimated (UJ). The results for iron in these samples were all positive and were qualified as estimated (J). The result for arsenic was positive in sample MW-101 and was also qualified as estimated (J). ✓

Matrix Spike/Matrix Spike Duplicate

VOC – The MS/MSD associated with sample CFW-5 reported percent recoveries for bromoform (32, 33) that were below the laboratory control limits of 60-140 indicating a potential low bias. The results for bromoform in samples CFW-5 and CFW-5DUP were non-detect and were qualified as estimated (UJ). ✓

Metals – The relative percent difference between the matrix spike and matrix spike duplicate associated with sample CFW-5 was greater than the control limit of 20 for silver (36). Silver results, in samples of a similar matrix, were qualified as estimated. The results for silver in samples CFW-6, CFW-5, CFW-5DUP, and CFW-1 were non-detect and were qualified as estimated (UJ). ✓



References:


U.S. Environmental Protection Agency (USEPA), 1996. "Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, Parts I and II," Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; December, 1996.

U.S. Environmental Protection Agency (USEPA), 2004. "Region I, Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses;" Hazardous Site Evaluation Division; February, 2004.

U.S. Environmental Protection Agency (USEPA), 1989. "Region I, Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses;" Hazardous Site Evaluation Division; February, 1989.

Yankee Nuclear Power Station, 2007. "YNPS Groundwater Monitoring Program." ISFSI Radiation Protection, RP-05: September, 13, 2007.

Data Validator: Amanda Zeidler

Signature 

Date: April 17, 2008

APPENDIX B-3

VALIDATION CHECKLISTS

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Gamma

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
MW-102D	4/3/08	FS	YES	O.K.	YES	See attached checklists
MW-104A	4/3/08	FS	YES	O.K.	YES	See attached checklists
MW-105B	4/3/08	FS	YES	Nb-94 uncertain identification	YES	See attached checklists
MW-106A	4/3/08	FS	YES	O.K.	YES	See attached checklists
MW-107C	4/3/08	FS	YES	O.K.	YES	See attached checklists
MW-107D	4/3/08	FS	YES	O.K.	YES	See attached checklists
MW-107E	4/3/08	FS	YES	O.K.	YES	See attached checklists
MW-107EDUP	4/3/08	DU (Field)	YES	O.K.	YES	See attached checklists
MW-107F	4/3/08	FS	YES	O.K.	YES	See attached checklists
SP-1	4/3/08	FS	YES	O.K.	YES	See attached checklists
EB-001	4/3/08	BL (equipment)	YES	O.K.	YES	See attached checklists
Laboratory QC						
QC1201548722 MB	4/3/08	BL	YES	O.K.	YES	See attached checklists
QC1201548723 DUP	4/4/08	DU	YES	O.K.	YES	See attached checklists
QC1201543725 LCS	4/3/08	QC	YES	O.K.	YES	See attached checklists

NOTE

1.0	FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
2.0	Reported MDC <= Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
3.0	Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

The suspected Niobium-94 radionuclide peak was detected in sample MW-105B, but failed to meet the positive identification criteria. The Nb-94 result was rejected by the laboratory due to the low abundance and uncertain identification. The lab qualified the result with "UF" which was changed to "R" (rejected) during validation.

III. Resolution of Sample Processing/Missing Analytes comments:

One or more compounds in samples MW-104A, MW-105B, Mw-106, MW-107D, MW-107E, and MW-107EDUP did not meet the required uncertainties identified in document RP-05. All MDC requirements were met. See attached checklists for additional information.

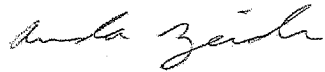
IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: _____



Date: April 21, 2008

RADIONUCLIDE ANALYSES
REGION I VALIDATION CHECKLIST for
Criteria and Qualifiers: SAIC Guidelines Revision 07, April 2002

Gamma
TIER I / II / III (circle one)

SITE: Yankee Rowe Project #: 3617087152/02.01 SDG #: 3Y-YR-001

LAB #: 205621

Sample IDs: See attached tracking sheet or samples listed: MW-102D, MW-104A, MW-105B,
MW-106A, MW-107C, MW-107D, MW-107E, MW-107ED4P, MW-107F,
SP-1, EB-001

During Level III validation, calculation and transcription checks are completed as specified in the SAIC validation guidelines (Revision 07, April 2002). These checks are documented on attached validation notes.

YES	NO	NA	
Data completeness			
<input checked="" type="checkbox"/>	<input type="checkbox"/>		All data summaries, QC forms and raw data available from hard copy or electronic data package
<input checked="" type="checkbox"/>	<input type="checkbox"/>		Data summaries match EDD
			Contact lab if missing data. Lab to respond with 24 hours.
Holding Times and Preservation			
<input checked="" type="checkbox"/>	<input type="checkbox"/>		Hold times met (6 months)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preserved
Calibration			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Efficiency Calibrated (NIST Traceable)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Daily Performance Check
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standard Counting Statistics Uncertainty <1%
			OK - Per case narrative
Blanks (Background Checks)			
<input checked="" type="checkbox"/>	<input type="checkbox"/>		Method blank was prepared with each batch of samples or with a maximum of 20 samples
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are result <MDA qualify not detected (U)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are results > 5 times blank concentration
			No blank contamination, Equipment Blank (EB-001) - non-detect
Tracer Recovery			
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Recovery > 50% and <100%
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Recovery >100%

RADIONUCLIDE ANALYSES
REGION I VALIDATION CHECKLIST for
Criteria and Qualifiers: SAIC Guidelines Revision 07, April 2002

TIER I / II / III (circle one)

<p>Matrix Spikes <i>MW-107E AZ 4-19-08</i></p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Percent recovery of 80-120% excluding results exceeding the spike concentration by $\geq 4x$</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Was a field blank used for spike analysis</p>	
<p>Laboratory Control Samples (LCS) <i>Lab</i></p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Percent recoveries are within limits (waters 80-120%, soils 75-125%) <i>AZ 4-19-08</i></p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> LCS was analyzed for each matrix, batch of samples, or every 20 samples.</p>	<p><i>Lab Limits 75-125</i></p>
<p>Laboratory Duplicate <i>MW-107E</i></p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Was a field blank used as the lab duplicate</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Is the DER > 1</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Duplicate analyzed for every matrix and every 20 samples or batch</p>	<p>If the DER for a particular radionuclide is > 1, qualify the results for that radionuclide in all associated samples of the same matrix as estimated (J).</p> <p><i>All results non-detect</i></p>
<p>Field Duplicate <i>MW-107E</i></p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Is the DER > 1</p>	<p><i>See attached sheet for calculations</i></p>
<p>Quantitation</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Results <DL qualified as non-detect (U)</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Results plus the uncertainty are not negative</p>	<p>Secret</p> <p><i>One or more compounds in samples MW-104A, MW-105B, MW-106, MW-107D, MW-107E, and MW-107EDup did not meet the required uncertainties required in RP-05. - See Back</i></p>
<p>System Performance</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Were performance problems noted in the case narrative</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Was poor spectroscopy performance identified e.g. High background levels or shifts in energy Extraneous peaks Loss of Resolution Peak-tailing or splitting</p>	<p><i>MW-105B</i></p> <p><i>Niobium-94 result rejected due to low abundance, - uncertain identification</i></p> <p style="text-align: center;">R</p>

Validator's Signature: *Anda Zwick*

Date: *4-21-08*

Reviewed By: *Bradley B Co*

Date: *4/22/08*

Uncertainties (reported versus required)

MW-104A
 CS-137 Reported # Req'd in RP-05
 4.65 2.7

MW-105B
 Sb-125 9.24 8.3
 CS-134 3.31 2.3
 CS-137 3.59 2.7
 Eu-152 9.18 8.3
 Eu-154 10.8 8.3
 Eu-155 9.85 8.3

MW-106
 CS-134 2.46 2.3
 Eu-154 10.7 8.3
 Eu-155 8.89 8.3

MW-107D
 CS-134 2.92 2.3
 Eu-152 9.7 8.3
 Eu-155 11.3 8.3

MW-107E
 CS-134 2.82 2.3
 Eu-155 9.19 8.3

MW-107EDUP
 Sb-125 8.9 8.3
 CS-134 2.87 2.3
 CS-137 2.91 2.7
 Eu-152 8.9 8.3
 Eu-155 12.0 8.3

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Strontium-90

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
MW-102D	4/15/08	FS	YES	O.K.	YES	See attached checklists
MW-104A	4/10/08	FS	YES	O.K.	YES	See attached checklists
MW-105B	4/15/08	FS	YES	O.K.	YES	See attached checklists
MW-106A	4/10/08	FS	YES	O.K.	YES	See attached checklists
MW-107C	4/10/08	FS	YES	O.K.	YES	See attached checklists
MW-107D	4/10/08	FS	YES	O.K.	YES	See attached checklists
MW-107E	4/10/08	FS	YES	O.K.	YES	See attached checklists
MW-107EDUP	4/15/08	DU (Field)	YES	O.K.	YES	See attached checklists
MW-107F	4/10/08	FS	YES	O.K.	YES	See attached checklists
SP-1	4/10/08	FS	YES	O.K.	YES	See attached checklists
EB-001	4/10/08	BL (equipment)	YES	O.K.	YES	See attached checklists
Laboratory QC						
QC1201548532 MB	4/10/08	BL	YES	O.K.	YES	See attached checklists
QC1201548533 DUP	4/10/08	DU	YES	O.K.	YES	See attached checklists
QC1201548535 LCS	4/10/08	QC	YES	O.K.	YES	See attached checklists
QC1201548534 MS	4/10/08	SK	YES	O.K.	YES	See attached checklists

NOTE

- | | |
|-----|--|
| 1.0 | FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike |
| 2.0 | Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported. |
| 3.0 | Requirements for SK, DU, and QC per section D. |

I. All Requested analyses performed on all samples? X Yes _____ No

II. Resolution of Sample Processing/Missing Analytes comments:

The MDC for Strontium-90 in sample MW-102D was 1.12 pCi/g, which is slightly above the required MDC of 1.0 pCi/g identified in document RP-05.

III. Resolution of Sample Processing/Missing Analytes comments:

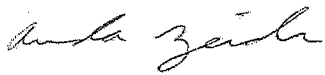
No additional processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: 

Date: April 21, 2008

RADIONUCLIDE ANALYSES
REGION I VALIDATION CHECKLIST for
Criteria and Qualifiers: SAIC Guidelines Revision 07, April 2002

Sr-90

TIER I / II / III (circle one)

SITE: Yankee Rowe Project #: 3617087152/02.01 SDG #: 3Y-YR-001

LAB #: 205621

Sample IDs: See attached tracking sheet or samples listed: MW-102D, MW-104A, MW-105B, MW-106A, MW-107C, MW-107D, MW-107E, MW-107EDuP, MW-107F, SP-1, EB-001

During Level III validation, calculation and transcription checks are completed as specified in the SAIC validation guidelines (Revision 07, April 2002). These checks are documented on attached validation notes.

YES NO NA	
<p>Data completeness</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> All data summaries, QC forms and raw data available from hard copy or electronic data package</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Data summaries match EDD</p>	<p>Contact lab if missing data. Lab to respond with 24 hours.</p>
<p>Holding Times and Preservation</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Hold times met (6 months)</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Preserved</p>	
<p>Calibration</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Efficiency Calibrated (NIST Traceable)</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Daily Performance Check</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Standard Counting Statistics Uncertainty <1%</p>	<p>OK - Per case narrative</p>
<p>Blanks (Background Checks)</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Method blank was prepared with each batch of samples or with a maximum of 20 samples</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are result <MDA qualify not detected (U)</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are results > 5 times blank concentration</p>	<p>No Blank Contamination Equipment Blank (EB-001) - non-detect</p>
<p>Tracer Recovery</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Recovery > 50% and <100%</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Recovery >100%</p>	

RADIONUCLIDE ANALYSES
REGION I VALIDATION CHECKLIST for
Criteria and Qualifiers: SAIC Guidelines Revision 07, April 2002

TIER I / II / III (circle one)

<p>Matrix Spikes MW-107E 75-125 (Lab Limit)</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Percent recovery of 80-120% excluding results exceeding the spike concentration by $\geq 4x$</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Was a field blank used for spike analysis</p>	
<p>Laboratory Control Samples (LCS) Lab</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Percent recoveries are within limits (waters 80-120%, soils 75-125%) ⁴⁻¹⁹⁻⁰⁸</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> LCS was analyzed for each matrix, batch of samples, or every 20 samples.</p>	<p>Lab limits 75-125</p>
<p>Laboratory Duplicate MW-107E</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Was a field blank used as the lab duplicate</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Is the DER > 1</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Duplicate analyzed for every matrix and every 20 samples or batch</p>	<p>If the DER for a particular radionuclide is > 1, qualify the results for that radionuclide in all associated samples of the same matrix as estimated (J).</p> <p>Results both non-detect</p>
<p>Field Duplicate MW-107E</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Is the DER > 1</p>	<p>See attached sheet for calculations</p>
<p>Quantitation</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Results < DL qualified as non-detect (U)</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Results plus the uncertainty are not negative</p>	<p>The MDC for Sr-90 in sample MW-102D was 1.12 pCi/g which is slightly above the required MDC of 1.0 pCi/g.</p>
<p>System Performance</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Were performance problems noted in the case narrative</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Was poor spectroscopy performance identified e.g. High background levels or shifts in energy Extraneous peaks Loss of Resolution Peak-tailing or splitting</p>	<p>Samples MW-102D, MW-105B, MW-107E DUP were verified by recounting at least 5-days from the separation date. The second count was reported.</p> <p>- No quals necessary</p>

Validator's Signature: *Anda Zwick*

Date: 4-19-08

Reviewed By: *Bradley Bland*

Date: 4/22/08

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Tritium

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-102D	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-104A	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-105B	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-106A	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-107C	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-107D	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-107E	4/7/08	FS	YES	O.K.	YES	See attached checklists
MW-107EDUP	4/7/08	DU (Field)	YES	O.K.	YES	See attached checklists
MW-107F	4/7/08	FS	YES	O.K.	YES	See attached checklists
SP-1	4/7/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	4/8/08	FS	YES	O.K.	YES	See attached checklists
EB-001	4/8/08	BL (equipment)	YES	O.K.	YES	See attached checklists
Laboratory QC						
QC1201548418 MB	4/8/08	BL	YES	O.K.	YES	See attached checklists
QC1201548419 DUP	4/8/08	DU	YES	O.K.	YES	See attached checklists
QC1201548421 LCS	4/8/08	QC	YES	O.K.	YES	See attached checklists
QC1201548420 MS	4/8/08	SK	YES	O.K.	YES	See attached checklists

NOTE

1.0	FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
2.0	Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
3.0	Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 21, 2008

RADIONUCLIDE ANALYSES
REGION I VALIDATION CHECKLIST for
Criteria and Qualifiers: SAIC Guidelines Revision 07, April 2002

Tritium

TIER (I) / II / III (circle one)

SITE: Yankee Rowe Project #: 3617087152/02.01 SDG #: 34-YR-001

LAB #: 205621

Sample IDs: See attached tracking sheet or samples listed: CFW-6, MW-102B, MW-104A,
MW-105B, MW-106A, MW-107C, MW-107D, MW-107E, MW-107E DUP,
MW-107F, SP-1, EB-001, CFW-5

During Level III validation, calculation and transcription checks are completed as specified in the SAIC validation guidelines (Revision 07, April 2002). These checks are documented on attached validation notes.

YES NO NA	
<p>Data completeness</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> All data summaries, QC forms and raw data available from hard copy or electronic data package</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Data summaries match EDD</p>	<p>Contact lab if missing data. Lab to respond with 24 hours.</p>
<p>Holding Times and Preservation</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Hold times met (6 months)</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Preserved</p>	
<p>Calibration</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Efficiency Calibrated (NIST Traceable)</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Daily Performance Check</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Standard Counting Statistics Uncertainty <1%</p>	<p><i>OK - Per case narrative</i></p>
<p>Blanks (Background Checks)</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Method blank was prepared with each batch of samples or with a maximum of 20 samples</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are result <MDA qualify not detected (U)</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Are results > 5 times blank concentration</p>	<p><i>No blank Contamination</i> <i>Equipment Blank (EB-001) - Non-detect</i></p>
<p>Tracer Recovery</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Recovery > 50% and <100%</p> <p><input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Recovery >100%</p>	

RADIONUCLIDE ANALYSES
REGION I VALIDATION CHECKLIST for
Criteria and Qualifiers: SAIC Guidelines Revision 07, April 2002

TIER I / II / III (circle one)

Matrix Spikes MW-107E 75-125 (lab limits) <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Percent recovery of 80-120% excluding results exceeding the spike concentration by $\geq 4x$ <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Was a field blank used for spike analysis	
Laboratory Control Samples (LCS) <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Percent recoveries are within ^{limits} limits (waters 80-120%, soils 75-125%) <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> LCS was analyzed for each matrix, batch of samples, or every 20 samples.	Lab limits 75-125%
Laboratory Duplicate MW-107E <input type="checkbox"/> <input checked="" type="checkbox"/> Was a field blank used as the lab duplicate <input type="checkbox"/> <input checked="" type="checkbox"/> Is the DER > 1 <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Duplicate analyzed for every matrix and every 20 samples or batch	If the DER for a particular radionuclide is > 1, qualify the results for that radionuclide in all associated samples of the same matrix as estimated (J).
Field Duplicate MW-107E <input type="checkbox"/> <input checked="" type="checkbox"/> Is the DER > 1	See attached sheet for calculations
Quantitation <input checked="" type="checkbox"/> <input type="checkbox"/> Results < DL qualified as non-detect (U) <input checked="" type="checkbox"/> <input type="checkbox"/> Results plus the uncertainty are not negative	Tritium result greater than 20,000 pCi/g in sample MW-107C (25,700 pCi/g) - previously identified, O.K.
System Performance <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Were performance problems noted in the case narrative <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Was poor spectroscopy performance identified e.g. High background levels or shifts in energy Extraneous peaks Loss of Resolution Peak-tailing or splitting	

Validator's Signature: *Anda Z...*

Date: 4-20-08

Reviewed By: *Dwight B. ...*

Date: 4/22/08

Duplicate Error Ratio (DER) Calculation Check

Sample	Result	TPU	Duplicate Result	TPU	RPD	DER	
MW-107E (Sb-125)	-2.94	7.19	-4.03	8.9	-31	0.07	Field Duplicate - Both results non-detect
MW-107E (Cs-134)	-0.232	2.82	1.2	2.87	296	0.25	Field Duplicate - Both results non-detect
MW-107E (Cs-137)	1.25	2.61	1.35	2.91	8	0.02	Field Duplicate - Both results non-detect
MW-107E (Co-60)	-0.459	2.22	0.208	2.5	-531	0.14	Field Duplicate - Both results non-detect
MW-107E (Eu-152)	-0.638	7.05	0.0765	8.9	-254	0.04	Field Duplicate - Both results non-detect
MW-107E (Eu-154)	3.36	7.1	-4.74	7.22	-1174	0.57	Field Duplicate - Both results non-detect
MW-107E (Eu-155)	-4.42	9.19	5.57	12	1737	0.47	Field Duplicate - Both results non-detect
MW-107E (Nb-94)	1.63	2.23	-1.16	2.3	1187	0.62	Field Duplicate - Both results non-detect
MW-107E (Ag-108m)	-0.595	2.69	-0.319	3.4	-60	0.05	Field Duplicate - Both results non-detect
MW-107E (Sr-90)	0.267	0.306	-0.0731	0.411	351	0.47	Field Duplicate - Both results non-detect
MW-107E (H-3)	5060	1060	5160	1080	2	0.05	Field Duplicate

RPD = relative percent difference
 DER = duplicate error ratio
 TPU = total propagated error

ATTACHMENT D

REVIEW OF CHAIN OF CUSTODY AND SAMPLE DOCUMENTATION

**SDG: 3Y-YR-001
(GEL Work Order: 205621)**

Sampling Event Date(s) 3/24/08 – 3/26/08 Shipment Date 3/27/08

Wells Sampled in this Batch:

- I. All samples identified on COC forms? Yes No
- II. Samples obtained match those required by sampling plan? Yes No
- III. Verification of unbroken chain of custody for samples? Yes No
- IV. Samples received intact by laboratory? Yes No
- V. Sample flush volumes and flow parameters consistent with historical data and acceptable?
 Yes No
- VI. Sample non-radiological parameters consistent with historical data and acceptable?
 Yes No *N/A - all radiochemistry parameters in this SDG.*
- VII. All preservative and container requirements met? Yes No
- VIII. Samples obtained match those required by sampling plan? Yes No
- IX. Evaluation for accepting sample for any questions I - VIII answered "NO" (indicate if resample will be done prior to shipment):

Sample CFW-5 was identified on the COC, but was not received in the shipment. The contractor was notified and it was determined that the sample was shipped to the wrong laboratory (NEL). The sample was shipped to GEL and received the following day. See the Attachment D (COC_2_RAD) for details.

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 21, 2008

OP by 4/23/08

ATTACHMENT D

REVIEW OF CHAIN OF CUSTODY AND SAMPLE DOCUMENTATION

**SDG: 3Y-YR-001
(GEL Work Order: 205621)**

Sampling Event Date(s) 3/26/08 Shipment Date 3/28/08

Wells Sampled in this Batch:

- I. All samples identified on COC forms? Yes No
- II. Samples obtained match those required by sampling plan? Yes No
- III. Verification of unbroken chain of custody for samples? Yes No
- IV. Samples received intact by laboratory? Yes No
- V. Sample flush volumes and flow parameters consistent with historical data and acceptable?
 Yes No
- VI. Sample non-radiological parameters consistent with historical data and acceptable?
 Yes No *N/A - all radiochemistry parameters in this SDG.*
- VII. All preservative and container requirements met? Yes No
- VIII. Samples obtained match those required by sampling plan? Yes No
- IX. Evaluation for accepting sample for any questions I - VIII answered "NO" (indicate if resample will be done prior to shipment):

Sample CFW-5 was initially shipped to the wrong laboratory (NEL), but was received intact and with proper documentation by GEL the following day.

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 21, 2008

APC 4/23/08

ATTACHMENT E

**YANKEE NUCLEAR POWER STATION
SITE CHARACTERIZATION QUALITY ASSURANCE PROGRAM PLAN FOR
SAMPLE DATA QUALITY**

Identify analytes individually

Sample	Analyte	Date	Reject, Resample or Reanalyze	Brief Description
MW-105B	Niobium-94	4/3/08	Reject	Uncertain Identification

I. Identify the specific reason for rejection of sample result, resample or reanalysis requirements (this should include a description of why the data point for that analyte may/may not be omitted):

The suspected Niobium-94 radionuclide peak was detected in sample MW-105B, but failed to meet the positive identification criteria. The Nb-94 result was rejected by the laboratory due to the low abundance which resulted in the uncertain identification. Due to this uncertainty, the result should be omitted and not used in any data analysis.

II. Are other analytes from this sample affected? Explain

No other analytes from this sample were affected.

III. Are changes to the procedures for sampling, preservation, transport, analysis or assessment required (review AP-9601 for any specific program requirements)? Explain specific changes.

No procedural changes are necessary. The issue noted above was random and was not the result of any procedural issues.

Reviewer: Amanda Zeidler

Signature: 

Date: April 21, 2008

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Volatile Organic Compounds (VOCs)

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	4/3/08	FS	YES	O.K.	YES	See attached checklists
SW-1	4/3/08	FS	YES	O.K.	YES	See attached checklists
SW-3	4/3/08	FS	YES	O.K.	YES	See attached checklists
SW-4	4/3/08	FS	YES	O.K.	YES	See attached checklists
SW-5	4/3/08	FS	YES	O.K.	YES	See attached checklists
SW-2	4/3/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	4/3/08	FS	YES	O.K.	YES	See attached checklists
SP-1	4/4/08	FS	YES	O.K.	YES	See attached checklists
MW-101C	4/4/08	FS	YES	1:20 dilution required	YES	See attached checklists
CFW-5	4/4/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	4/3/08	DU (Field)	YES	O.K.	YES	See attached checklists
EB-001	4/3/08	BL (equipment)	YES	O.K.	YES	See attached checklists
TB-001	4/3/08	BL (trip)	YES	O.K.	YES	See attached checklists
TB-002	4/3/08	BL (trip)	YES	O.K.	YES	See attached checklists
Laboratory QC						
VBLKF0403	4/3/08	BL	YES	O.K.	YES	See attached checklists
VLCSF0403	4/3/08	QC	YES	O.K.	YES	See attached checklists
VLCSDF0403	4/3/08	QC	YES	O.K.	YES	See attached checklists
VBLKF0404	4/4/08	BL	YES	O.K.	YES	See attached checklists
VLCSF0404	4/4/08	QC	YES	O.K.	YES	See attached checklists
VLCSDF0404	4/4/08	QC	YES	O.K.	YES	See attached checklists
AK03136 MS	4/4/08	SK	YES	O.K.	YES	See attached checklists
AK03136 MSD	4/4/08	SK	YES	O.K.	YES	See attached checklists

NOTE

- 1.0 FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
- 2.0 Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
- 3.0 Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

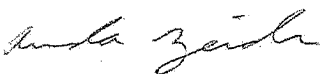
No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

See attached checklists for details on sample qualifications

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: 

Date: April 17, 2008

REGION I TIER II VALIDATION CHECKLIST
Criteria and Qualifications: REGION I Organics Guideline (Draft 12/96)
VOLATILE

Site: Yankee Rowe

Project #: 3617087152/02.01 Box #: AK030
AK031

Sample IDs: See attached tracking sheet or samples listed.

<u>CFW-6</u>	<u>SW-5</u>	<u>CFW-5</u>	_____
<u>SW-1</u>	<u>EB-001</u>	<u>CFW-SDUP</u>	_____
<u>SW-3</u>	<u>SW-2</u>	<u>SP-1</u>	_____
<u>SW-4</u>	<u>CFW-1</u>	<u>MW-101C</u>	_____

This checklist is used to document Tier II validation. It can also be used to document Level III validation. During Level III validation, calculation and transcription checks are completed for instrument tuning, surrogates, target compounds, spike recoveries, calibration data, and internal standards as specified in the guideline. These checks are documented on attached validation notes.

YES	NO		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hold Times	Attach list of samples which exceed hold times. Indicate <u>total</u> hold time and qualifiers.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Data completeness Cover page, Forms I-VIII, DC-1, DC-2, and raw data	Comments on missing information (if any) and action taken.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Original shipping and receiving documents Chain of Custody	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	All original lab records of sample preparation and analysis	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	GC/MS Instrument Performance Check <u>NA</u> Form V present and complete for all samples for each 12-hour period samples were analyzed	Attach copy of Form V if criteria was not met. Highlight criteria not met, list samples affected, and list qualifiers added. <u>OK - Per case narrative</u>
<input type="checkbox"/>	<input type="checkbox"/>	Appropriate number of significant figures reported (at least 2)	
<input type="checkbox"/>	<input type="checkbox"/>	Mass/Charge list (m/z) criteria met	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	GC/MS Initial Calibration <u>NA</u> Form VI present and complete for all samples	Attach copy of Form VI if criteria was not met. Highlight criteria not met, list samples affected, and list qualifiers added. <u>OK - Per case narrative</u>
<input type="checkbox"/>	<input type="checkbox"/>	%RSD less than or equal to 30%	
<input type="checkbox"/>	<input type="checkbox"/>	RRF greater than or equal to 0.05	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	GC/MS Continuing Calibration <u>NA</u> Form VII present and complete for all samples	Attach copy of Form VII if criteria was not met. Highlight criteria not met, list samples affected, and list qualifiers added. <u>OK - Per case narrative</u>
<input type="checkbox"/>	<input type="checkbox"/>	%D less than or equal to 25%	
<input type="checkbox"/>	<input type="checkbox"/>	RRF greater than or equal to 0.05.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Method Blanks Form I & IV present and complete for all blanks	Attach copy of Form IV for all samples. List all contaminants, concentrations and action level. Attach copy of Form I for contaminated field or trip blanks. Circle all contaminants. Field QC blanks will not be used to determine action levels for non-aqueous samples. Flag samples EB (equipment blank), TB (trip blank), or BB (bottle blank) as indicated in the guideline.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One analyzed per GC/MS system per tune	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One analyzed per matrix/concentration level	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Contaminants * <u>See Back</u> *	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A cleaning blank was analyzed after any high concentration sample (exceeding calibration range)	

Method Blank

VB112F0403 (4-3-08)

Results all ND

- No Action

Hexachlorobutadiene 1.89 ug/L

Applies to: AK03051, -50, -44, -45, -46, -47, -48
AK03140, -34, -35, -37

GC : cyclotrisiloxane, hexamethyl RT=15.9

REGION I TIER II VALIDATION CHECKLIST
Criteria and Qualifications: REGION I Organics Guideline (Draft 12/96)
VOLATILE

Site: Yankee Rowe

Project #: 3617087152/02.0 Box #: AK030
AK031

Trip/Equipment Blanks <input checked="" type="checkbox"/> <input type="checkbox"/> Contaminants * See Back *	Describe professional judgements and qualifiers if applied.
Surrogate/System Monitoring Compounds Recovery <input checked="" type="checkbox"/> <input type="checkbox"/> Form II present and complete for all samples <input checked="" type="checkbox"/> <input type="checkbox"/> Percent recovery criteria met	Attach copies of Form II (Part 2) for all non-compliant %R. Circle outliers & indicate qualifier.
Matrix Spike/Matrix Spike Duplicate <u>CFW-5</u> <input checked="" type="checkbox"/> <input type="checkbox"/> Form I and III present and complete <input type="checkbox"/> <input checked="" type="checkbox"/> Percent recovery criteria met (<u>Lab limits</u>) <input checked="" type="checkbox"/> <input type="checkbox"/> non-target compound RPD criteria met Field Duplicates <u>CFW-5</u> <input checked="" type="checkbox"/> <input type="checkbox"/> Form I's present and complete <input checked="" type="checkbox"/> <input type="checkbox"/> RPD criteria (water <30%, soils <50%) met <u>RESULTS all ND</u>	Attach copy of Form III for all non-compliant % and RPD. Circle all non-compliances and indicate qualifiers. <p align="center">* See Back *</p> Identify field duplicate pair and attach list of all compounds with non-compliant RfDs. Indicate qualifiers.
Internal Standard <input type="checkbox"/> <u>NA</u> <input type="checkbox"/> Form VIII present and complete for all samples <input type="checkbox"/> <input type="checkbox"/> Area counts within -50 to +100 percent of calib. std. <input type="checkbox"/> <input checked="" type="checkbox"/> Retention Time within 30 seconds of calib. std.	Attach copy of Form VIII if criteria was not met. Highlight criteria not met, list samples affected, and list qualifiers added. <p align="center"><u>OK - Per case narrative</u></p>
Target Compounds List (TCL) <input checked="" type="checkbox"/> <input type="checkbox"/> Form I present and complete for all samples <input checked="" type="checkbox"/> <input type="checkbox"/> Reviewed narrative for anomalies	Call (Fax) lab for re-submittals. Attach copy of facsimile transmission to this review.
Tentatively Identified Compounds (TICs) <input checked="" type="checkbox"/> <input type="checkbox"/> Form I Part B present and complete for all samples <input type="checkbox"/> <input checked="" type="checkbox"/> TCL compounds reported as TICs	Call lab for missing data. Fill out TIC Form and submit to data entry.
Table 1 Check <input checked="" type="checkbox"/> <input type="checkbox"/> Check Table 1 results against Form I's and ensure all data on Table 1 is correct.	

Reviewer's Signature:

Anda Zwick

Date:

4-17-08

Comments:

LCS (VLCS F0403)

	<u>LCS</u>	<u>LCSD</u>
1,1-Dichloroethane	152	147

- All results ND, no Action necessary

LCS (VLCS F0404)

	<u>LCS</u>	<u>LCSD</u>	
1,1-Dichloroethane	142	OK	- All results ND

2-Butanone	54	54.6	(60-140)
------------	----	------	----------

Bromoform	29.1	29.3	(60-140)
-----------	------	------	----------

Applies to: CFW-5, SP-1, MW-101C

↓
Acetone only

UJ-CFW-5
SP-1

MS/MSD (CFW-5)

1,1-dichloroethane	<u>MS</u> 157	<u>MSD</u> 160	(60-140) - Results ND, no action
Bromoform	32	32.8	(60-140) - <u>UJ CFW-5, CFW-5DUP</u>

Trip Blank (TB-001)

MeCl₂ 0.63 ug/L - Results all ND, no action

TIC: cyclotrisiloxane, hexamethyl RT=15.92

Trip Blank (TB-002)

TIC: cyclotrisiloxane, hexamethyl RT=15.91

Equipment Blank (EB-001)

Chloroform 0.87 ug/L - Results all ND, no action

Acetone 1.5 ug/L x 10 = 15 ug/L - Results all ND, or greater than AL, no action.

TIC: cyclotrisiloxane, hexamethyl RT=15.92

APPLIES TO: MW-101C, MW-105B, MW-107C, MW-107D, MW-107E, MW-107F, MW-111C

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Total Metals (excluding mercury)

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/31/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/31/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/31/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/31/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/31/08	FS	YES	O.K.	YES	See attached checklists
MW-107A	3/31/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/31/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/31/08	FS	YES	O.K.	YES	See attached checklists
SP-1	3/31/08	FS	YES	O.K.	YES	See attached checklists
MW-101A	3/31/08	FS	YES	O.K.	YES	See attached checklists
MW-111C	3/31/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/31/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	3/31/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
WLRB 032808E	3/31/08	BL	YES	O.K.	YES	See attached checklists
WLCS 032808E	3/31/08	QC	YES	O.K.	YES	See attached checklists
WLCS 032808E	3/31/08	QC	YES	O.K.	YES	See attached checklists
AK03136 LD	3/31/08	DU	YES	O.K.	YES	See attached checklists
AK03136 MS	3/31/08	SK	YES	O.K.	YES	See attached checklists
AK03136 MSD	3/31/08	SK	YES	O.K.	YES	See attached checklists

NOTE

- 1.0 FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
- 2.0 Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
- 3.0 Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

See attached checklists for details on sample qualifications

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Mercury

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
SP-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-5DUP	3/28/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
LRB-032708A	3/28/08	BL	YES	O.K.	YES	See attached checklists
LCS-032708A	3/28/08	QC	YES	O.K.	YES	See attached checklists
LCSD-032708A	3/28/08	QC	YES	O.K.	YES	See attached checklists
AK03136 LD	3/28/08	DU	YES	O.K.	YES	See attached checklists
AK03136 MS	3/28/08	SK	YES	O.K.	YES	See attached checklists
AK03136 MSD	3/28/08	SK	YES	O.K.	YES	See attached checklists

NOTE

- 1.0 FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
- 2.0 Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
- 3.0 Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

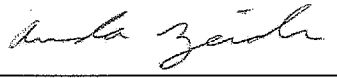
No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: 

Date: April 17, 2008

REGION I TIER II VALIDATION CHECKLIST
Criteria and Qualifiers: Region I Guidelines (6/13/88 Modified 2/89)
INORGANIC

SITE: Yankee Rowe Project #: 3617087152/02.01 Box #: AK 030, AK031, AK032

Sample IDs: See attached tracking sheet or samples listed:
CFW-6, SW-1, SW-3, SW-4, SW-5, MW-107A, SW-2, CFW-1, CFW-5,
CFW-SDuP, SP-1, MW-101A, MW-111C

YES	NO	VALIDATION CHECK	NONCOMPLIANCE NOTES
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hold Times Met	Attach list of samples which exceed hold times. Indicate <u>total</u> hold time and qualifiers.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Samples preserved	
		Data Completeness	Comments on missing information (if any) and action taken.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cover page, Forms I - XIV, DC-1, DC-2, and raw data.	Chain of Custody Internal laboratory chain of custody
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Original shipping and receiving documents	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lab records of sample transfer, preparation and analysis	
		Calibration	ICP: at least one blank and one standard AA and CN: at least one blank and three standards, with one standard at the CRDL for AA. Hg: at least one blank and four standards Correlation coefficient criteria applicable to all analyses except ICP If correlation coefficient is not acceptable, discuss deficiencies, affected samples and action taken. See method. No acceptance range dictated by CLP methods or National Functional Guidelines. See regional guidelines for guidance. 90-110% for ICP, 85-115% for CN, 80-120% for Hg Every 10 samples or every 2 hrs. Attach copy of Form II (2A) for all noncompliant ICVs and CCVs. Circle non-compliances and indicate qualifiers.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Appropriate number of standards used to establish calibration curve.	
<input type="checkbox"/>	<input type="checkbox"/>	Correlation coefficient > 0.995.	
<input type="checkbox"/>	<input type="checkbox"/>	Calibrated daily.	
<input type="checkbox"/>	<input type="checkbox"/>	CRI/CRA analyzed at the proper frequency in the analytical run sequence.	
<input type="checkbox"/>	<input type="checkbox"/>	CRI/CRA %R within acceptance range.	
<input type="checkbox"/>	<input type="checkbox"/>	ICV/CCV %R within acceptance range.	
<input type="checkbox"/>	<input type="checkbox"/>	CCVs analyzed at the proper frequency.	
<input type="checkbox"/>	<input type="checkbox"/>	Traceable ICV source.	

OK per case narrative

<p>Blanks</p> <p>Method:</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Method blank was prepared with each batch of samples or with a maximum of 20 samples</p> <p><input checked="" type="checkbox"/> <input type="checkbox"/> Results >IDL</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Absolute value negative method blank results > 2xIDL</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Reanalysis was conducted if necessary</p> <p>Calibration Blanks</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> ICB/CCB results > IDL</p> <p><input type="checkbox"/> <input type="checkbox"/> Absolute value of negative ICB/CCB results > 2xIDL</p> <p><input type="checkbox"/> <input type="checkbox"/> CCB analyzed every 10 samples or 2 hrs.</p> <p>Field Blanks</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Results >IDL</p>	<p>Attach copy of Form III (3). Circle all contaminants; indicate action to be taken, action level if applicable, and samples affected.</p> <p>Establish action level at 5Xcontamination level. Qualify data per Region I Guidelines.</p> <p>Establish action level at 5X abs value of result. J (+<AL) and UJ (ND).</p> <p>*See Back*</p> <p>See above under method blank for action.</p> <p>See above under method blank for action.</p> <p>Attach copy of Form III (3). Circle all contaminants; indicate action to be taken, action level if applicable, and samples affected.</p>
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<p>Interference Check Sample</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> ICS analyzed at proper frequency</p> <p><input type="checkbox"/> <input type="checkbox"/> ICS AB %R 80%-120%</p> <p>For samples with interference concentrations > 50% of interference concentration in ICS solution A:</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Are positive ICS A results >IDL for analytes not present in the ICS A solution?</p> <p><input type="checkbox"/> <input type="checkbox"/> Are negative ICS A results >2XIDL for analytes not present in the ICS A solution?</p>	<p>An ICS must be run at the beginning and end of run or every 8 hours.</p> <p>Interference's are Calcium, Aluminum, Iron and Magnesium.</p> <p>If yes, J sample result (>2XIDL) for that analyte.</p> <p>If yes, UJ (ND) sample result for that analyte.</p>
--	--

<p>Matrix Spikes CFW-S</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> All compounds are within %R of 75-125% excluding results exceeding the spike concentration by $\geq 4x$</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Were post-digestion spikes reported on VB for ICP, flame, Hg and CN for unacceptable pre-digestion spike recoveries</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/> Was a field blank used for spike analysis</p>	<p>Attach copy of Form V (Part 1) 5A for noncompliant % Recoveries.</p> <p>Circle all non-compliances and indicate qualifiers.</p> <p>Ba $\frac{MS}{134} \frac{MSD}{136} (75-125) - \text{All results ND, -NO action}$</p> <p>Ag $RPD = 36.3 (20)$</p> <p>- Applies to all Groundwater Samples CFW Samples</p>
--	---

OK per case narrative

OK per case narrative

- CFW-6 UJ
 - CFW-S
 - CFW-SDUP
 - CFW-1
- ↓

Method Blank

$TI \ 0.00239 \text{ mg/L} \times 5 = 0.01195 \text{ mg/L}$

Applies to: SP-1

- Result ND, no action necessary

[Faint, mostly illegible text, likely bleed-through from the reverse side of the page]

[Handwritten notes or stamps on the right margin, including what appears to be a date 'MAY 20 1964']

[Faint text at the bottom left, possibly a signature or reference]



Laboratory Duplicate CFW-5

Was a field blank used as the lab duplicate

Is the RPD within control limits of $\pm 20\%$ (35% for soil) for sample values $> 5x$ CRDL

Is the control limit of \pm CRDL (35% for soil) met for sample values $< 5x$ CRDL

Was a duplicate analyzed for every matrix and every 20 samples or batch

Attach copy of Lab-Duplicate form for criteria not met. Indicate exceeded limits, samples affected, and action taken.

Fe 32.4, 24.2 RPD = 29.0

Applies to: CFW Samples

CFW-6 J
CFW-5 JH
CFW-SDUP JH
CFW-1 J

Field Duplicate CFW-5

For sample values $> 5x$ CRDL, the RPD control limit of $\pm 30\%$ (50% for soil) was met

For sample values $< 5x$ CRDL, the control limit of $\pm 2x$ CRDL (4x CRDL for soil) was met

Attach list of samples that did not meet criteria requirements and qualifiers used.

Laboratory Control Samples (LCS)

Percent recoveries are within limits of 80-120% for aqueous samples and within control limits for soils. Lab Limits (85-115)

An LCS was analyzed for each matrix, batch of samples, or every 20 samples.

Attach copy of Form VII (7) from for all noncompliant recoveries. Circle non-compliances and indicate qualifiers, and samples affected.

Ag LCS 77.6 LCSD 78.4

Applies to all samples UJ

J-MW-101

Furnace AA Analysis

Spike recovery criteria ($85 \leq \% R \leq 115$) was met

Duplicate injection criteria met

Are "M" flags present on Form I's indicating failing duplicate injection criteria

Are "S" flags present on Form I's indicating MAS analysis was required

Attach sheet indicating criteria not met and qualifiers used.

AS 119 118 J-MW-101
CF 119 116 = ND > No Action
Zn 119 116
Fe 119 116 J - All Iron results

Serial Dilution

Are any percent difference criteria $> 15\%$

Are results of the diluted samples $>$ the original sample results

Attach copy of Serial Dilution Form for criteria not met. Circle criteria not met, samples affected, and qualifiers used.

Reviewer's Signature: Amala Z...

Date: 4 / 17 / 08

Comments: B...

OK per case narrative

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Cyanide

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	3/29/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
Blank	3/27/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/27/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/27/08	QC	YES	O.K.	YES	See attached checklists
Blank	3/29/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/29/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/29/08	QC	YES	O.K.	YES	See attached checklists
AK03136MS	3/29/08	SK	YES	O.K.	YES	See attached checklists
AK03136MSD	3/29/08	SK	YES	O.K.	YES	See attached checklists

NOTE

1.0	FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
2.0	Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
3.0	Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

Project: Yankee Rowe
Project #: 3617087152/02.01
Date: 4-16-08

Method: Cyanide
Laboratory and SDG: AK030, AK031, AK032¹²
Reviewer: AZ

Sample IDs: CFW-6, SW-1, SW-3, SW-4, SW-5, SW-2, CFW-1, CFW-5, CFW-5 DUP

1. Case Narrative and Data Package Completeness

OK

2. Holding Time

14 days - OK

3. QC Blanks

Method Blank - ND

4. Initial Calibration Results

NA

5. Continuing Calibration Results

NA

6. Laboratory Control Sample Review

OK

7. Field Duplicate Precision

CFW-5 - Results both ND

8. Matrix Spike Results (if applicable)

CFW-5 - OK



A handwritten signature and the date '4/20/08' are located in the bottom right corner of the page.

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Chloride, Nitrate, Sulfate

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/27/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	3/28/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
WBLK	3/26/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/26/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/26/08	QC	YES	O.K.	YES	See attached checklists
WBLK	3/27/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/27/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/27/08	QC	YES	O.K.	YES	See attached checklists
AK03136MS	3/27/08	SK	YES	O.K.	YES	See attached checklists
AK03136MSD	3/27/08	SK	YES	O.K.	YES	See attached checklists

NOTE

1.0	FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
2.0	Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
3.0	Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

Project: Yankee Rowe
Project #: 3617087152/02.01
Date: 4-16-08

Method: Nitrate, Chloride, Sulfate
Laboratory and SDG: AK030, AK031, AK032^{AK}
Reviewer: AZ

Sample IDs: CFW-6, SW-1, SW-3, SW-4, SW-5, SW-2, CFW-1, CFW-5, CFW-5 DUP

1. Case Narrative and Data Package Completeness

OK

2. Holding Time

NO₃ - 48 hr - OK
Cl - 28 days - OK
SO₄ - 28 days - OK

3. QC Blanks

Method Blank - ND

4. Initial Calibration Results

NA

5. Continuing Calibration Results

NA

6. Laboratory Control Sample Review

OK

7. Field Duplicate Precision

CFW-5	Cl	2.3, 2.2	RPD = 4.4
	NO ₃	Results	ND
	SO ₄	2.3, 2.3	RPD = 0.0

8. Matrix Spike Results (if applicable)

CFW-5 - OK

[Handwritten Signature]
4/22/08

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Alkalinity

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/28/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	3/28/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
Blank	3/28/08	BL	YES	O.K.	YES	See attached checklists
AK03048DUP	3/28/08	DU	YES	O.K.	YES	See attached checklists
LCS	3/28/08	QC	YES	O.K.	YES	See attached checklists
Blank	3/28/08	BL	YES	O.K.	YES	See attached checklists
LCS (Low)	3/28/08	QC	YES	O.K.	YES	See attached checklists
LCS (High)	3/28/08	QC	YES	O.K.	YES	See attached checklists
AK03136MS	3/28/08	SK	YES	O.K.	YES	See attached checklists
AK03136MSD	3/28/08	SK	YES	O.K.	YES	See attached checklists

NOTE

- 1.0 FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike
- 2.0 Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported.
- 3.0 Requirements for SK, DU, and QC per section D.

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

Project: Yankee Rowe Method: Alkalinity
Project #: 3617087152/02.01 Laboratory and SDG: AK030, AK031
Date: 4-16-08 Reviewer: AZ

Sample IDs: CFW-6, SW-1, SW-3, SW-4, SW-5, SW-2, CFW-1,
CFW-5, CFW-5 DUP

1. Case Narrative and Data Package Completeness

OK

2. Holding Time

14 days - OK

3. QC Blanks

Method Blank -

4. Initial Calibration Results

NA

5. Continuing Calibration Results

NA

6. Laboratory Control Sample Review

OK

7. Field Duplicate Precision

CFW-5 69, 63 RPD = 9.1

8. Matrix Spike Results (if applicable)

CFW-5 - OK

AZ
4/2/08

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Chemical Oxygen Demand (COD)

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/29/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/29/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/29/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/29/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/29/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	3/29/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
Blank	3/29/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/29/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/29/08	QC	YES	O.K.	YES	See attached checklists
Blank	3/29/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/29/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/29/08	QC	YES	O.K.	YES	See attached checklists
AK03136MS	3/29/08	SK	YES	O.K.	YES	See attached checklists
AK03136MSD	3/29/08	SK	YES	O.K.	YES	See attached checklists

NOTE

- | | |
|-----|--|
| 1.0 | FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike |
| 2.0 | Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported. |
| 3.0 | Requirements for SK, DU, and QC per section D. |

I. All Requested analyses performed on all samples? X Yes No

II. Resolution of Sample Processing/Missing Analytes comments:

No processing issues or missing analytes

III. Resolution of Sample Processing/Missing Analytes comments:

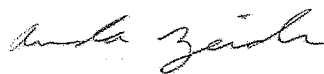
No processing issues or missing analytes

IV. Resolution of Anomalies in QC, Duplicates, Spikes, or Blanks (Identified above):

No qualifications required. See attached checklists for details.

V. Data verification calculation sheets are attached(at least one calculation per batch) NA

Reviewer: Amanda Zeidler

Signature: 

Date: April 17, 2008

Project: Yankee Rowe
Project #: 3617087152/02.01
Date: 4-16-08

Method: COD
Laboratory and SDG: AK030, AK031, AK032^{A2}
Reviewer: AZ

Sample IDs: CFW-6, SW-1, SW-3, SW-4, SW-5, SW-2, CFW-1,
CFW-5, CFW-5 DUP

1. Case Narrative and Data Package Completeness

OK

2. Holding Time

28 days - OK

3. QC Blanks

Method Blank - ND

4. Initial Calibration Results

NA

5. Continuing Calibration Results

NA

6. Laboratory Control Sample Review

OK

7. Field Duplicate Precision

CFW-5 18,17 RPD = 5.7

8. Matrix Spike Results (if applicable)

CFW-5 - OK

[Handwritten signature]
4/22/08

ATTACHMENT C

ASSESSMENT OF DATA QUALITY

List each analysis individually. Use a separate table for QC. Duplicates, Blanks and Spikes. (Several pages will be required for each batch)

Total Dissolved Solids (TDS)

Sample ID	Analysis Date	Sample Designator (Note 1)	All Scheduled Analyses Performed?	Sample Processing Comments?	Units Correct?	Assessment Criteria (Note 2) (Note 3)
CFW-6	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-1	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-3	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-4	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-5	3/28/08	FS	YES	O.K.	YES	See attached checklists
SW-2	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-1	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-5	3/29/08	FS	YES	O.K.	YES	See attached checklists
CFW-5-DUP	3/29/08	DU (Field)	YES	O.K.	YES	See attached checklists
Laboratory QC						
LRB	3/28/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/28/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/28/08	QC	YES	O.K.	YES	See attached checklists
LRB	3/29/08	BL	YES	O.K.	YES	See attached checklists
LCS	3/29/08	QC	YES	O.K.	YES	See attached checklists
LCSD	3/29/08	QC	YES	O.K.	YES	See attached checklists

NOTE

- | | |
|-----|--|
| 1.0 | FS = Field Sample, BL = Blank, QC = Lab Quality Control. DU = Duplicate, SK = Spike |
| 2.0 | Reported MDC ~ Required MDC for FS, DU, BL. Yield for all samples evaluated when reported. |
| 3.0 | Requirements for SK, DU, and QC per section D. |

ATTACHMENT D

REVIEW OF CHAIN OF CUSTODY AND SAMPLE DOCUMENTATION

**SDG: 3Y-YR-001
(NEL Sample #: AK03044-51)**

Sampling Event Date(s) 3/24/08 - 3/25/08 Shipment Date 3/25/08

Wells Sampled in this Batch:

- I. All samples identified on COC forms? Yes No
- II. Samples obtained match those required by sampling plan? Yes No
- III. Verification of unbroken chain of custody for samples? Yes No
- IV. Samples received intact by laboratory? Yes No
- V. Sample flush volumes and flow parameters consistent with historical data and acceptable?
 Yes No
- VI. Sample non-radiological parameters consistent with historical data and acceptable?
 Yes No
- VII. All preservative and container requirements met? Yes No
- VIII. Samples obtained match those required by sampling plan? Yes No
- IX. Evaluation for accepting sample for any questions I - VIII answered "NO" (indicate if resample will be done prior to shipment):

One VOA vial associated with sample SW-3 was found broken upon receipt. All other VOA vials associated with this sample arrived intact and were used for analysis.

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

JPC 4/23/08

ATTACHMENT D

REVIEW OF CHAIN OF CUSTODY AND SAMPLE DOCUMENTATION

SDG: 3Y-YR-001
(NEL Sample #: AK03134-40)

Sampling Event Date(s) 3/26/08 Shipment Date 3/27/08

Wells Sampled in this Batch:

- I. All samples identified on COC forms? Yes No
- II. Samples obtained match those required by sampling plan? Yes No
- III. Verification of unbroken chain of custody for samples? Yes No
- IV. Samples received intact by laboratory? Yes No
- V. Sample flush volumes and flow parameters consistent with historical data and acceptable?
 Yes No
- VI. Sample non-radiological parameters consistent with historical data and acceptable?
 Yes No
- VII. All preservative and container requirements met? Yes No
- VIII. Samples obtained match those required by sampling plan? Yes No
- IX. Evaluation for accepting sample for any questions I - VIII answered "NO" (indicate if resample will be done prior to shipment):

No problems found with COC or sample documentation.

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

JPC 4/29/08

ATTACHMENT D

REVIEW OF CHAIN OF CUSTODY AND SAMPLE DOCUMENTATION

SDG: 3Y-YR-001
(NEL Sample #s: AK03134-40)

Sampling Event Date(s) 3/25/08 – 3/26/08 Shipment Date 3/26/08

Wells Sampled in this Batch:

- I. All samples identified on COC forms? Yes No
- II. Samples obtained match those required by sampling plan? Yes No
- III. Verification of unbroken chain of custody for samples? Yes No
- IV. Samples received intact by laboratory? Yes No
- V. Sample flush volumes and flow parameters consistent with historical data and acceptable?
 Yes No
- VI. Sample non-radiological parameters consistent with historical data and acceptable?
 Yes No
- VII. All preservative and container requirements met? Yes No
- VIII. Samples obtained match those required by sampling plan? Yes No
- IX. Evaluation for accepting sample for any questions I - VIII answered "NO" (indicate if resample will be done prior to shipment):

One VOA vial associated with sample SP-1 was found broken upon receipt. All other VOA vials associated with this sample arrived intact and were used for analysis.

Reviewer: Amanda Zeidler

Signature: *Amanda Zeidler*

Date: April 17, 2008

JPE 4/23/08