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**Y-12 GROUNDWATER PROTECTION PROGRAM
GROUNDWATER AND SURFACE WATER
SAMPLING AND ANALYSIS PLAN
FOR CALENDAR YEAR 2008**

September 2007

Prepared by

**ELVADO ENVIRONMENTAL LLC
Under Subcontract No. 4300054638**

for the

**Environmental Compliance Department
Environment, Safety, and Health Division
Y-12 National Security Complex
Oak Ridge, Tennessee 37831**

Managed by

**BWXT Y-12, L.L.C.
for the U.S. DEPARTMENT OF ENERGY
under contract No. DE-AC05-00OR22800**

**Y-12
NATIONAL
SECURITY
COMPLEX**

**MANAGED BY
BWXT Y-12, L.L.C.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

UCN-13672 (11-03)

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List of Acronyms and Abbreviations

ACO	Analytical Chemistry Organization
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BWXT	BWXT Y-12, L.L.C.
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	calendar year
DOE	U.S. Department of Energy
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
EPA	U.S. Environmental Protection Agency
GWPP	Groundwater Protection Program
GWMS	Groundwater Monitoring Schedule
MAROS	Monitoring and Remediation Optimization System
PDB	passive diffusion bag (sampler)
REDOX	oxidation-reduction potential
VOCs	volatile organic compounds
Y-12	Y-12 National Security Complex

1.0 INTRODUCTION

This plan provides a description of the groundwater and surface water quality monitoring activities planned for calendar year (CY) 2008 at the U.S. Department of Energy (DOE) Y-12 National Security Complex (Y-12) that will be managed by the Y-12 Groundwater Protection Program (GWPP). Groundwater and surface water monitoring performed by the GWPP during CY 2008 will be in accordance with DOE Order 540.1 requirements and the following goals:

- to protect the worker, the public, and the environment;
- to maintain surveillance of existing and potential groundwater contamination sources;
- to provide for the early detection of groundwater contamination and determine the quality of groundwater and surface water where contaminants are most likely to migrate beyond the Oak Ridge Reservation property line;
- to identify and characterize long-term trends in groundwater quality at Y-12; and
- to provide data to support decisions concerning the management and protection of groundwater resources.

Groundwater and surface water monitoring during CY 2008 will be performed primarily in three hydrogeologic regimes at Y-12: the Bear Creek Hydrogeologic Regime (Bear Creek Regime), the Upper East Fork Poplar Creek Hydrogeologic Regime (East Fork Regime), and the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime). The Bear Creek and East Fork regimes are located in Bear Creek Valley, and the Chestnut Ridge Regime is located south of Y-12 (Figure A.1). Additional surface water monitoring will be performed north of Pine Ridge, along the boundary of the Oak Ridge Reservation (Figure A.1).

Modifications to the CY 2008 monitoring program may be necessary during implementation. Changes in programmatic requirements may alter the analytes specified for selected monitoring wells or may add or remove wells from the planned monitoring network. All modifications to the monitoring program will be approved by the Y-12 GWPP manager and documented as addenda to this sampling and analysis plan.

The following sections of this report provide details regarding the CY 2008 groundwater and surface water monitoring activities. Section 2 describes the monitoring locations in each regime and the processes used to select the sampling locations. A description of the field measurements and laboratory analytes is provided in Section 3; sample collection methods and procedures are described in Section 4; and Section 5 lists the documents cited for more detailed operational and technical information.

The narrative sections of the report reference several appendices. Figures (maps and diagrams) and tables (excluding data summary tables presented in the narrative sections) are in Appendix A and Appendix B, respectively. Groundwater Monitoring Schedules (when issued) will be inserted in Appendix C, and addenda to this plan (if issued) will be inserted in Appendix D. Laboratory requirements (bottle lists, holding times, etc.) are provided in Appendix E. The updated sampling frequency for each monitoring well is in Appendix F, and an approved Waste Management Plan is provided in Appendix G.

2.0 MONITORING LOCATIONS

The monitoring locations to be sampled by the Y-12 GWPP during CY 2008 (Table B.1) were selected based on results of a comprehensive assessment of the Y-12 GWPP using the Monitoring and Remediation Optimization System (MAROS) software (BWXT Y-12, L.L.C. [BWXT] 2005). The MAROS assessment provided recommendations (e.g., sampling frequency) for the monitoring locations with sufficient analytical data obtained between CY 1996 and CY 2004. The monitoring wells selected for sample collection in CY 2008 include semiannual, annual, and biennial sampling frequencies (Appendix F). The sampling frequency for each location reflects subsequent evaluation of each MAROS recommendation including monitoring results obtained after CY 2004, as described in the Y-12 GWPP Monitoring Optimization Plan (BWXT 2006a). Additionally, the sampling frequency has been modified for 38 of the CY 2008 sampling wells, including a reduced frequency for 18 wells and an increased frequency for 20 wells (Appendix F). Reducing the sampling frequency for these wells is based on recommendations in the CY 2006 Groundwater Monitoring Report (BWXT 2007a). The increased sampling frequency is for 14 monitoring wells that were selected for review from the “to be determined” category in the Monitoring Optimization Plan and six wells that need results for at least four groundwater samples by CY 2010 to be included in a subsequent MAROS assessment.

The Y-12 GWPP monitoring network for CY 2008 includes 138 monitoring locations (Table B.1): 50 located in the Bear Creek Regime (Figure A.2), 13 located in the Chestnut Ridge Regime (Figure A.3), 71 located in the East Fork Regime (Figure A.4), and three located north of Pine Ridge (Figure A.5). Groundwater samples will be collected from a total of 124 monitoring wells, including 45 wells in the Bear Creek Regime (Figure A.2), eight wells in the Chestnut Ridge Regime, and 71 wells in the East Fork Regime (Figure A.4). Well GW-722, located in the East Fork Regime, contains a WestbayTM multiport sampling system and is scheduled for sample collection from five ports at different depths in the well (Figure A.6). Samples of groundwater discharging from four natural springs will be collected during CY 2008, including two springs (SS-4 and SS-5) in the Bear Creek Regime (Figure A.2) and two springs (SCR2.1SP and SCR2.2SP) in the Chestnut Ridge Regime (Figure A.3).

Surface water samples will be collected from a total of nine sampling locations during CY 2008, including two locations in the Bear Creek Regime, three locations in the Chestnut Ridge Regime, and four locations north of Pine Ridge. In the Bear Creek Regime, samples will be collected from Bear Creek at one sampling station located from about 4.5 kilometers upstream of the confluence of Bear Creek and East Fork Poplar Creek (BCK-04.55) and from one sampling station along a northern tributary (NT-01) to Bear Creek (Figure A.2). The tributaries located in the Chestnut Ridge Regime have been numbered from west to east (SCR1 through SCR5) and surface water samples will be collected from three of the tributaries at stations (SCR1.5SW, SCR3.5SW, and S17 [located in SCR5]) located along the north side of Bethel Valley Road (Figure A.3). The surface water sampling locations north of Pine Ridge include two tributaries (NPR12.0SW and NPR23.0SW) near the Scarboro Community and one location (GHK2.51ESW) near Country Club Estates (Figure A.5).

3.0 FIELD MEASUREMENTS AND ANALYTICAL PARAMETERS

Before collecting samples at each monitoring location, field personnel will record (on Field Data Sheets) the following field measurements (Table B.2):

- depth to the static water level in monitoring wells;
- pH;
- water temperature;
- conductivity;
- dissolved oxygen; and
- oxidation-reduction potential (REDOX)

Field measurement of dissolved oxygen and REDOX will not be obtained for sampling ports of monitoring wells equipped with a Westbay™ multiport sampling system. Instead of measuring the depth to the static water level in each Westbay™ sampling zone, the potentiometric head (in ft) will be calculated from subsurface pressure measurements obtained.

For this Sampling and Analysis Plan, specific analytes are grouped by analytical method or by type (e.g., trace metals) and referenced as parameter groups (Table B.1 and Table B.2). In addition to field measurements, all groundwater and surface water samples will be analyzed for the following suite of parameters (identified as the Standard Administrative Parameter Group):

- miscellaneous laboratory analytes (turbidity, total suspended solids and total dissolved solids);
- major anions;
- trace metals (includes major cations);
- a comprehensive suite of volatile organic compounds (VOCs); and
- gross alpha and gross beta activity.

In addition to the analytes included in the Standard Administrative Parameter Group, samples from selected locations will be analyzed for specific radionuclides and/or methanol. The radionuclide analyses will supplement gross alpha and/or gross beta activity results, especially in cases where the gross activity reporting limits are elevated from interferences caused by a high dissolved solid content of the groundwater sample (see Appendix E).

4.0 SAMPLE PLANNING, COLLECTION, AND HANDLING

Previous Y-12 GWPP Sampling and Analysis Plans assembled the monitoring locations into sample groups (e.g., BC-1) for sample collection, sample tracking, and data management purposes. However, using dedicated sampling equipment and varying sampling frequencies over time have made the sample groups unnecessary. The monitoring locations will continue to be grouped by hydrogeologic regime to provide manageable geographic areas for planning purposes, and the specific CY quarter for sample collection is provided for each monitoring location (Table B.1).

A Groundwater Monitoring Schedule (GWMS) will be prepared by GWPP personnel for each quarterly sampling event of CY 2008. Each GWMS (four per year) will be issued before sample collection begins, will specify the sequence for collecting samples from the monitoring locations scheduled for the quarter, and will include information necessary for field personnel to collect the required samples (e.g., containment requirements and previous pumping rates used to sample each well). The GWMS is considered to be an integral part of this document; when issued, the GWMS for each CY 2008 quarterly sampling event will be inserted in Appendix C.

Unfiltered samples will be collected semiannually (46 samples) or annually (114 samples, including 20 biennial samples) from the monitoring locations during CY 2008. As summarized below, the number of samples to be collected during each CY quarter will range from 33 to 45, for an annual total of 160 samples.

HYDROGEOLOGIC REGIME/AREA	NUMBER OF SAMPLES PER QUARTER OF CY 2008			
	1st	2nd	3rd	4th
Bear Creek Regime	37	0	28	0
Chestnut Ridge Regime	0	6	0	8
East Fork Regime	1	39	16	22
North of Pine Ridge	0	0	0	3
TOTAL:	38	45	44	33

Personnel from the Sampling Services Section of the Y-12 Environment Compliance Department will be responsible for collection, transportation, and chain-of-custody control of all groundwater and surface water samples. Based on the analytical parameters for the CY 2008 monitoring locations (Table B.1 and Table B.2), personnel with the Y-12 Analytical Chemistry Organization (ACO) will prepare bottle lists that specify the sample container type, size, preservative, and the laboratory test identification needed for each sampling location (see Appendix E). Additionally, ACO personnel will generate a weekly tracking report to record the sample collection date and time for each monitoring location, and the date that analyses are scheduled for completion or if analysis is completed. Sample collection will be performed in accordance with the most recent version of operating procedures for obtaining groundwater samples (BWXT 2002a, BWXT 2004, BWXT 2006b, and BWXT 2007b) and surface water samples (BWXT 2002b). All field and laboratory activities will be performed in accordance with applicable requirements of the Y-12 Integrated Safety Management System and task-specific job hazard analyses.

Groundwater samples will be collected using the low-flow minimal drawdown method (low-flow method) during CY 2008 from all monitoring wells, except for one well (GW-722) equipped with a Westbay™ multiport sampling system. For the low-flow method, a bladder pump is permanently installed in each well that is scheduled for sample collection. If well construction prevents permanent installation (e.g., flush-mounted wells), then the pump and tubing will be installed at least 24 hours before sample collection and will

be removed when sampling is completed. In accordance with the groundwater sampling procedure for the low-flow method (BWXT 2007b), groundwater is purged, and subsequently sampled, from the well at a flow rate (<300 milliliters per minute) which ensures minimal drawdown of the static water level, therefore isolating the stagnant water column above the intake of the pump. Groundwater samples are collected from a well after the water level is in steady-state drawdown (<0.1 ft over a 15-minute interval) and field parameters (pH, conductivity, water temperature, REDOX, and dissolved oxygen) have stabilized (minimal variation over four consecutive readings).

Groundwater sampling and pressure profiling using a Westbay™ multiport sampling system at well GW-722 in the East Fork Regime will be performed in accordance with the operating procedures (BWXT 2002a and BWXT 2006b). The groundwater samples from each sampling port (Figure A.6) will be collected in 250-milliliter nonvented stainless steel Westbay™ sample collection bottles filled at the designated depth in the well. Once filled, the bottles will be raised to the surface and the groundwater will be transferred to laboratory sample containers. The sample collection bottles will be lowered, filled, and retrieved as many times as needed to completely fill the laboratory sample bottles. Groundwater in the first sample collection bottles retrieved from each sampling port will be used as a “formation rinse” to obtain field measurements and to condition the sample collection bottle for each zone.

In conjunction with the low-flow sampling method, passive diffusion bag (PDB) samplers also will be used to evaluate VOC concentrations in groundwater at two wells (GW-322 and GW-612) located at the Chestnut Ridge Security Pits (Table B.1). A PDB is polyethylene bag (semipermeable membrane) that is filled with deionized water, lowered to the monitored interval of the well, and remains in the well for at least two weeks to allow VOC concentrations in the bag to reach equilibrium (passive diffusion) with the surrounding groundwater. After retrieval, sample bottles for VOC analyses will be filled with water from the PDB. Analytical results for the PDB samplers (and collection costs) will be compared to the low-flow sampling results to determine if using PDBs is acceptable in areas where VOCs are the only contaminant of concern.

In addition to the groundwater and surface water samples, field blanks and equipment rinsate samples will be collected at the frequencies and analyzed for the parameter groups specified on Table B.1. Field blank samples will be collected for at least 1% of the samples. Therefore, two field blank samples will be collected during CY 2008: in the East Fork Regime during the second quarter and in the Chestnut Ridge Regime during the fourth quarter. An equipment rinsate sample will be collected from Westbay well GW-722 (Table B.1) immediately after field-cleaning the sampling equipment used to collect samples from the last sampling port (GW-722-17).

Trip blank samples and field duplicate samples will be prepared and handled in accordance with the *Field Quality Control Samples* operating procedure (BWXT 2007c) and will be analyzed using applicable procedures. Trip blank samples will be prepared for each cooler used to transport samples for volatile organic analyses. Because duplicate samples will be collected from at least 10% of the sampling locations, a total of 16 field duplicate samples will be collected during CY 2008: six in the Bear Creek Regime, two in the Chestnut Ridge Regime, and eight in the East Fork Regime (Table B.1).

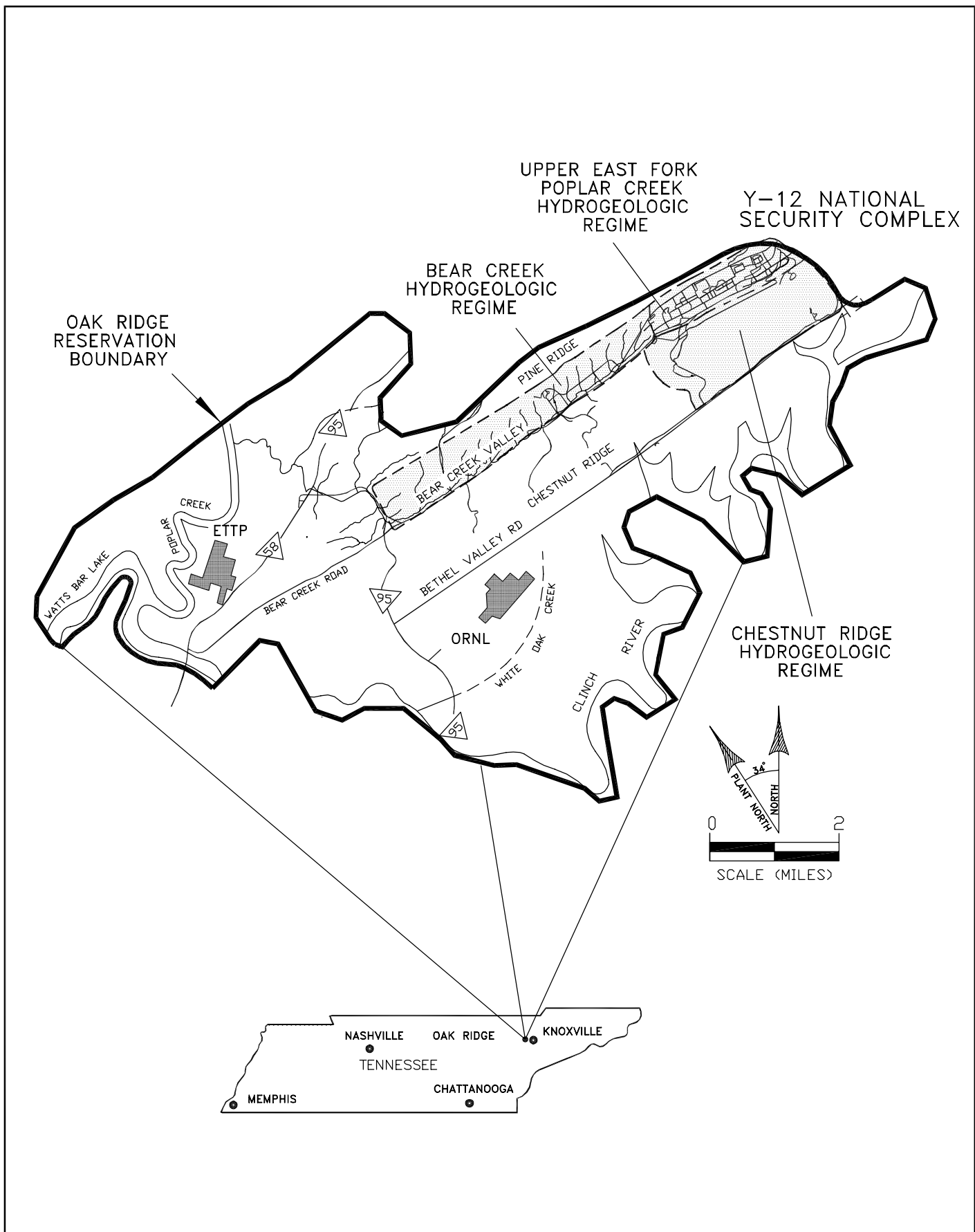
All groundwater and surface water samples will be relinquished under chain-of-custody control to the appropriate Y-12 ACO laboratory that will perform the analyses. The Y-12 ACO laboratories will perform each analyses within established holding times and deliver results in hard copy and electronic format within established turnaround times (see Appendix E).

5.0 REFERENCES

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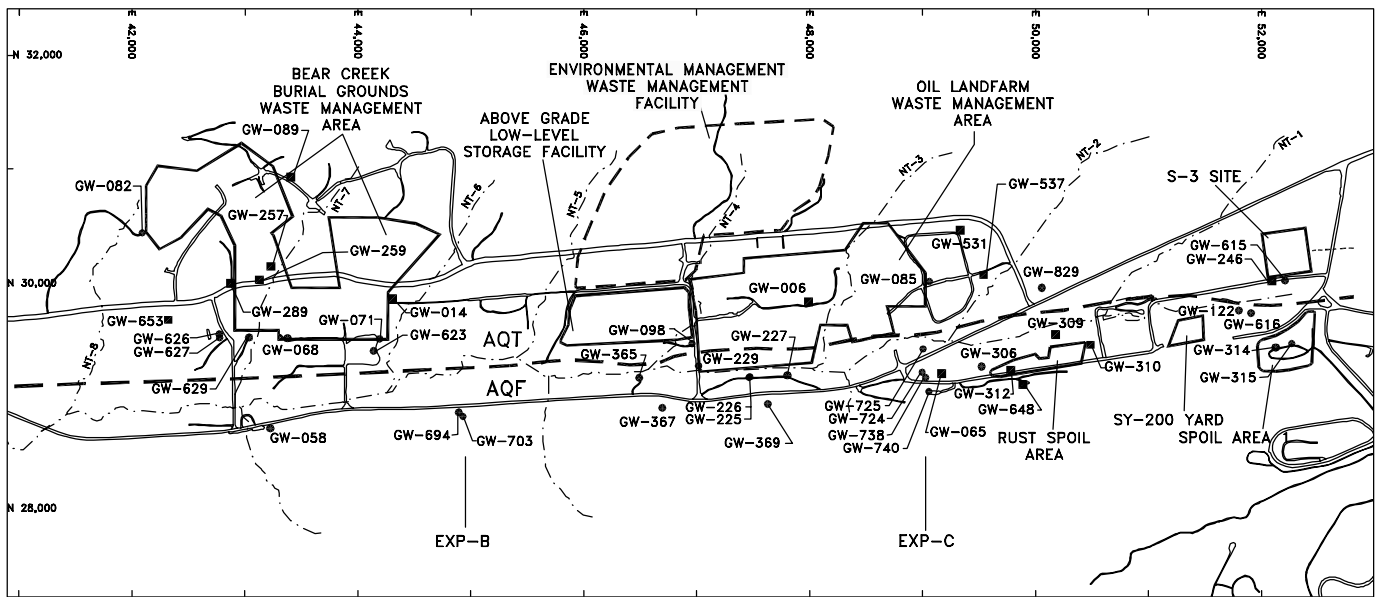
APPENDIX A

FIGURES

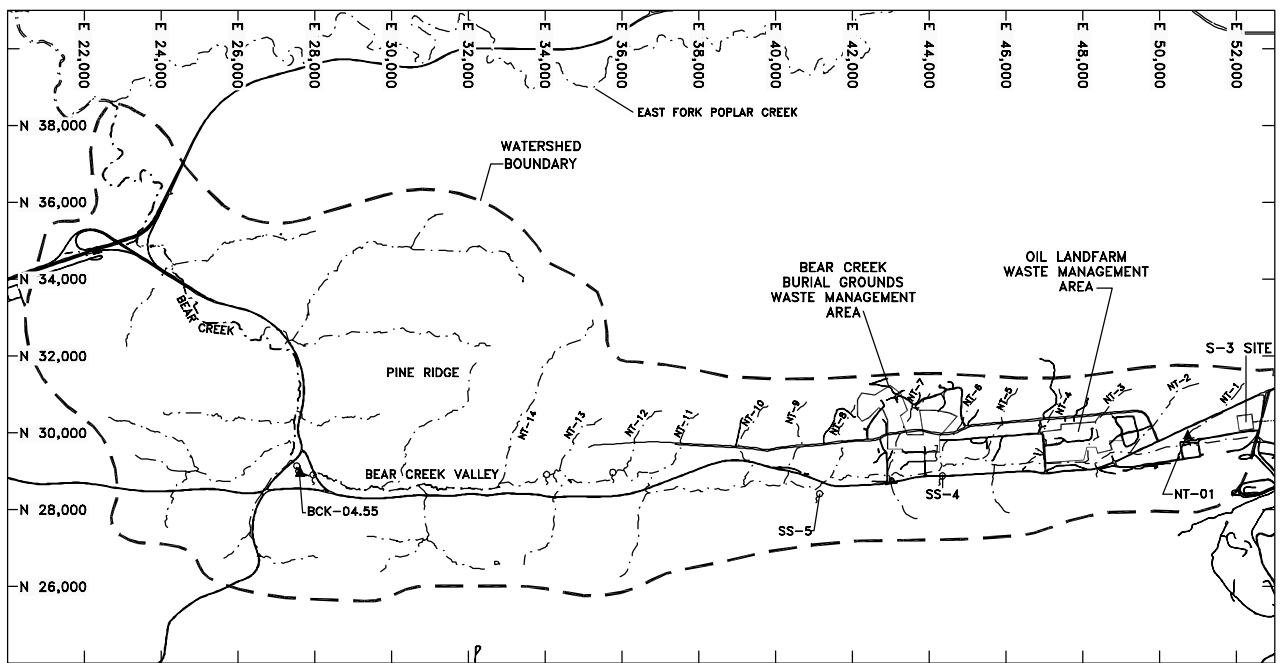


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Fig. A.1. Hydrogeologic regimes at the Y-12 National Security Complex.



MONITORING WELL LOCATIONS



SPRING AND SURFACE WATER SAMPLING LOCATIONS

EXPLANATION

- — Water Table Monitoring Well
- — Bedrock Monitoring Well
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Station
- EXP-C — Exit Pathway, Maynardville Limestone Picket
- — Surface Drainage Feature
- NT-5 — North Tributary
- AQT — Aquitard
- - - - - — Approximate Nolichucky Shale\Maynardville Limestone Contact
- AQF — Aquifer

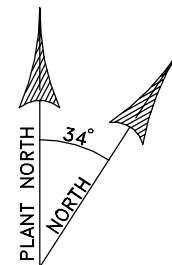
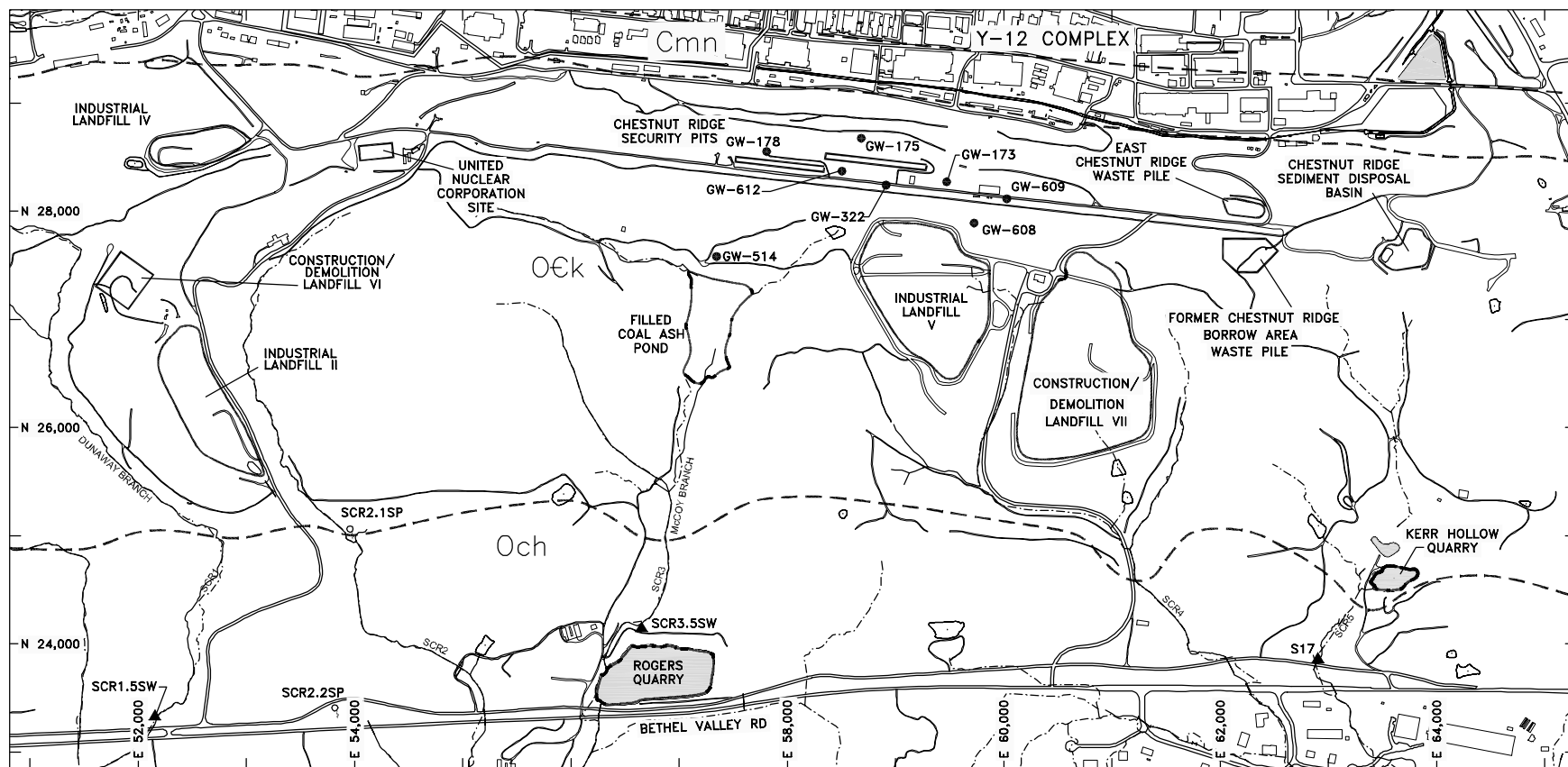


Fig. A.3. CY 2008 sampling locations in the Chestnut Ridge Hydrogeologic Regime.
A-3



EXPLANATION

- — Water Table Monitoring Well
- — Bedrock Monitoring Well
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Location

- — Surface Drainage Feature
- — Boundary of Site
- - - Surface Geologic Contact
- Emn — Maynardville Limestone
- Ock — Knox Group
- Och — Chickamauga Group

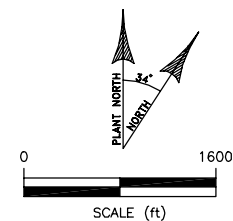


Fig. A.4. CY 2008 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime.

A-4

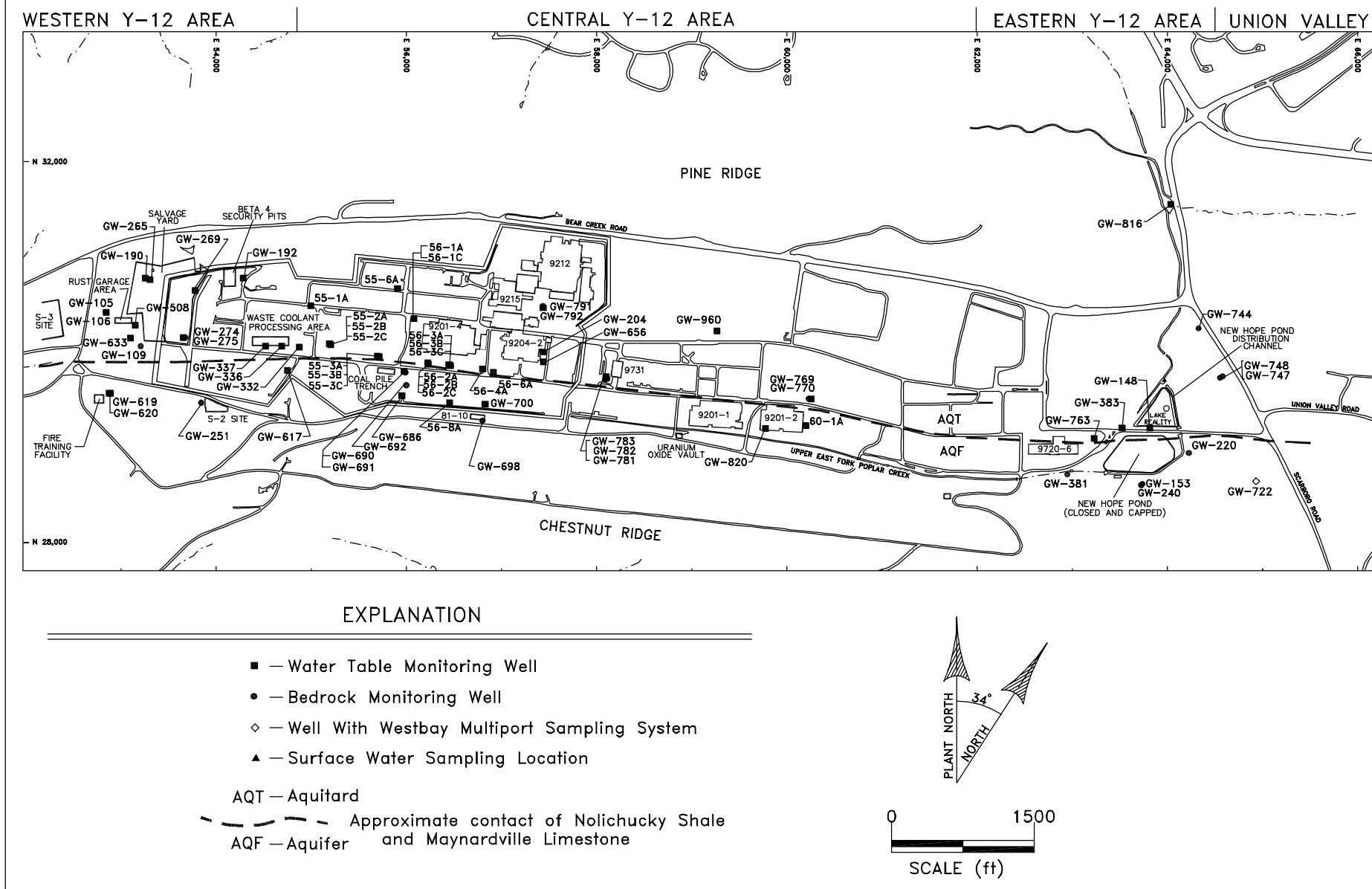
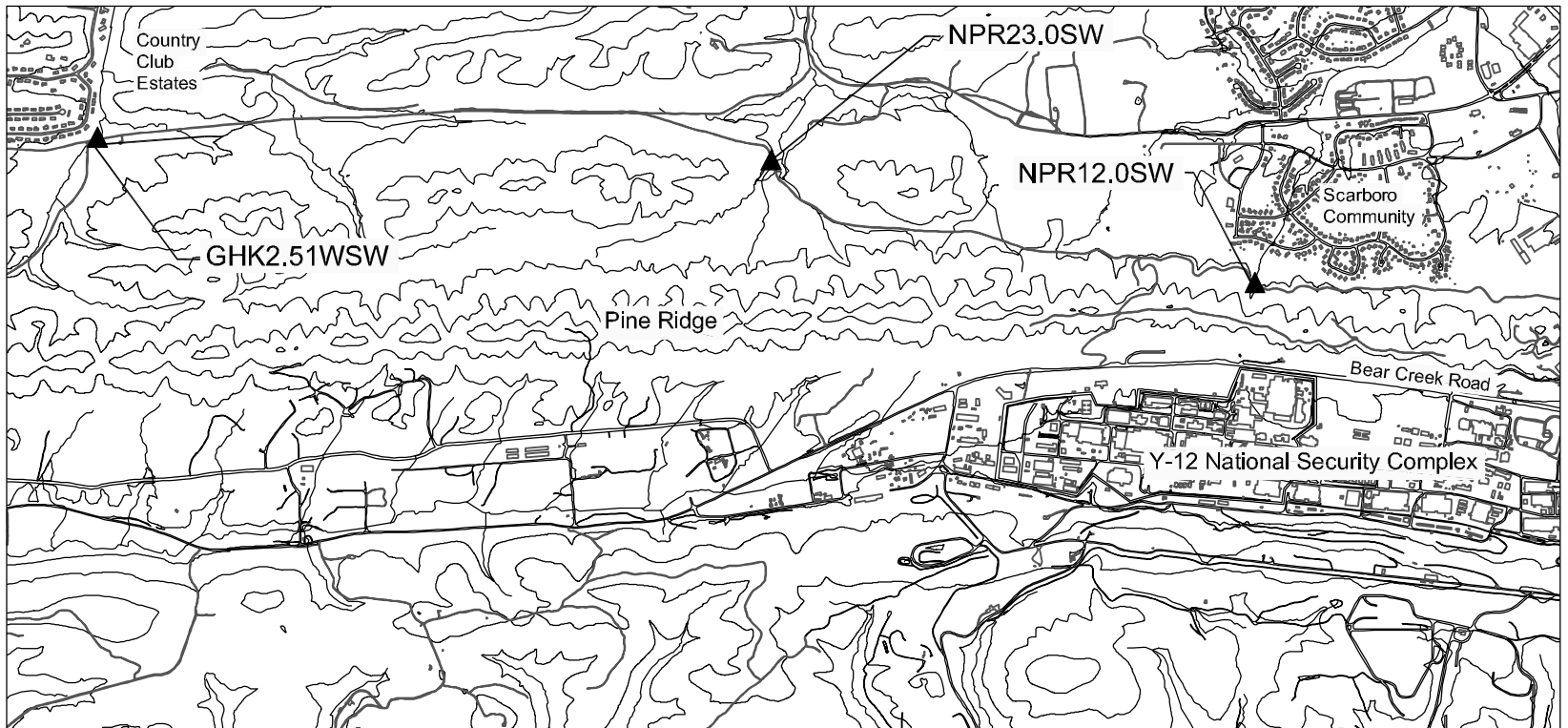


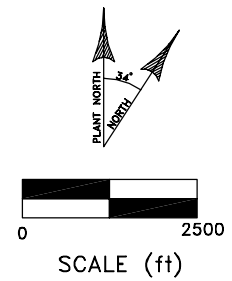
Fig. A.5. CY 2008 surface water sampling locations north of Pine Ridge.

A-5



EXPLANATION

▲ Surface Water Sampling Location



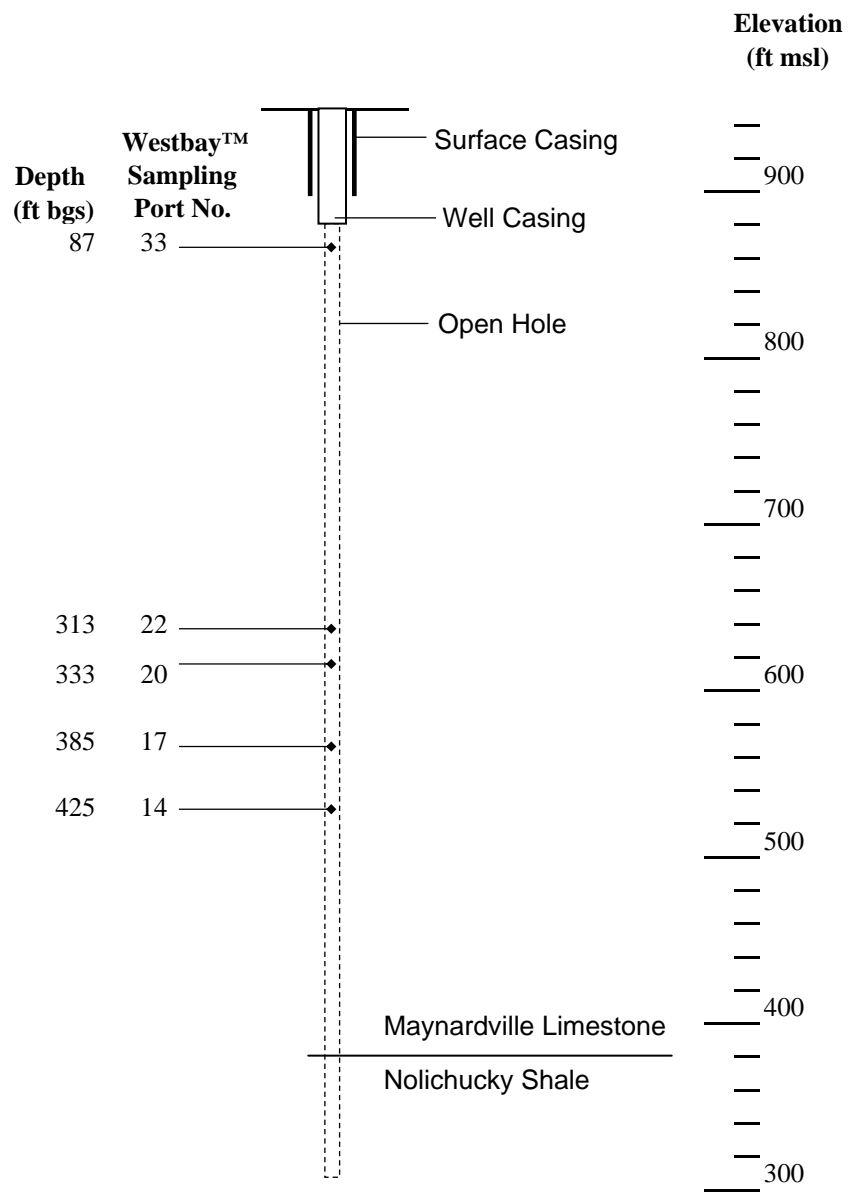


Fig. A.6. Westbay™ monitoring system sampling port depths in well GW-722.

APPENDIX B

TABLES

**Table B.1 Sampling locations, frequency, and analytical parameters for groundwater
and surface water monitoring during CY 2008**

Sampling Point ¹	Location ²	Hydrostrat. Unit ³	Tag Depth ⁴	Samples Collected in CY 2008 ⁵				Parameters ⁶
				Q1	Q2	Q3	Q4	
Bear Creek Hydrogeologic Regime								
GW-006	OLF	Aquitard	51.08	Y		Y		STD
GW-014	BG	Aquitard	14.50			Y		STD
GW-058	BG	Aquifer	48.90	Y				STD
GW-065	OLF	Aquifer	36.89	Y		Y		STD
GW-068	BG	Aquitard	86.10			Y		STD
GW-071	BG	Aquitard	218.40	Y		Y		STD
GW-082	BG	Aquitard	38.45			Y		STD
GW-085	OLF	Aquitard	62.34	Y		Y		STD
GW-089	BG	Aquitard	27.97			Y		STD
GW-098	OLF	Aquitard	105.65	Y				STD
GW-122	S3	Aquifer	145.28	Y				STD
GW-225	OLF	Aquifer	203.30	Y		Y		STD
GW-226	OLF	Aquifer	58.47	Y		Y		STD
GW-227	OLF	Aquifer	42.64	Y				STD
GW-229	OLF	Aquifer	51.45	D				STD
GW-246	S3	Aquitard	76.50	Y		Y		STD, RAD(3,12)
GW-257	BG	Aquitard	36.63			Y		STD
GW-259	BG	Aquitard	35.74	Y		Y		STD
GW-289	BG	Aquitard	43.14			Y		STD
GW-306	RS	Aquifer	60.66	Y		Y		STD, RAD(12)
GW-309	RS	Aquifer	40.06	Y		D		STD, RAD(12)
GW-310	RS	Aquifer	30.47	Y				STD, RAD(12)
GW-312	RS	Aquifer	42.10	Y				STD
GW-314	SPI	Aquifer	118.15	Y		Y		STD
GW-315	SPI	Aquifer	105.98	Y				STD
GW-365	OLF	Aquifer	152.49	Y				STD
GW-367	OLF	Aquifer	153.48	Y		Y		STD
GW-369	OLF	Aquifer	150.30	D				STD
GW-531	LD	Aquitard	41.28			Y		STD
GW-537	OLF	Aquitard	27.35			Y		STD, RAD(12)
GW-615	S3	Aquitard	246.84			Y		STD, RAD(3,12)
GW-616	S3	Aquitard	270.59			Y		STD
GW-623	BG	Aquitard	277.93	Y		Y		STD
GW-626	BG	Aquitard	80.92	Y		Y		STD
GW-627	BG	Aquitard	270.96	Y		Y		STD
GW-629	BG	Aquitard	314.59	Y		Y		STD
GW-648	RS	Aquifer	82.47	Y				STD
GW-653	BG	Aquitard	41.53			D		STD
GW-694	EXP-B	Aquifer	207.27	Y				STD
GW-703	EXP-B	Aquifer	185.29	Y				STD
GW-724	EXP-C	Aquifer	293.60	Y				STD
GW-725	EXP-C	Aquifer	145.42	D				STD
GW-738	EXP-C	Aquifer	91.78	Y				STD
GW-740	EXP-C	Aquifer	192.67	Y				STD
GW-829	OLF	Aquitard	118.68			Y		STD, RAD(3,12)

Table B.1 (continued)

Sampling Point ¹	Location ²	Hydrostrat. Unit ³	Tag Depth ⁴	Samples Collected in CY 2008 ⁵				Parameters ⁶
				Q1	Q2	Q3	Q4	
Bear Creek Hydrogeologic Regime (continued)								
BCK-04.55	EXP-SW	.	.	Y				STD
NT-01	EXP-SW	.	.	Y				STD
SS-4	EXP-SW	.	.	D				STD
SS-5	EXP-SW	.	.	Y				STD
Chestnut Ridge Hydrogeologic Regime								
GW-173	CRSP	Aquifer	167.34		Y		D	STD
GW-175	CRSP	Aquifer	169.49				Y	STD
GW-178	CRSP	Aquifer	134.68				Y	STD
FB-GW-322	CRSP	.	.				Y	VOC(1)
GW-322	CRSP	Aquifer	191.99				Y*	STD
GW-514	FCAP	Aquifer	197.13				Y	STD
GW-608	CRSP	Aquifer	219.80				Y	STD
GW-609	CRSP	Aquifer	268.80				Y	STD
GW-612	CRSP	Aquifer	256.28				Y*	STD
S17	EXP-SW	.	.		Y			STD
SCR1.5SW	EXP-SW	.	.		Y			STD
SCR2.1SP	EXP-SW	.	.		Y			STD
SCR2.2SP	EXP-SW	.	.		D			STD
SCR3.5SW	EXP-SW	.	.		Y			STD
Upper East Fork Poplar Creek Hydrogeologic Regime								
55-1A	GRIDB2	Aquitard	19.22		Y			STD
55-2A	GRIDB3	Aquitard	13.98		Y			STD, VOC(3)
55-2B	GRIDB3	Aquitard	27.69		D			STD, VOC(3)
55-2C	GRIDB3	Aquitard	76.00		Y			STD, VOC(3)
FB-55-3A	B9201-5	.	.		Y			VOC(1)
55-3A	B9201-5	Aquitard	14.25		Y			STD, VOC(3)
55-3B	B9201-5	Aquitard	37.98		Y			STD, VOC(3)
55-3C	B9201-5	Aquitard	77.43		Y			STD, VOC(3)
55-6A	B9103	Aquitard	12.77		Y			STD
56-1A	Y12	Aquitard	18.95		Y			STD
56-1C	Y12	Aquitard	73.45		Y			STD
56-2A	GRIDC3	Aquitard	15.03		Y			STD, VOC(3)
56-2B	GRIDC3	Aquitard	38.63		Y			STD, VOC(3)
56-2C	GRIDC3	Aquitard	77.03		Y			STD, VOC(3)
56-3A	Y12	Aquitard	17.92		Y			STD, VOC(3)
56-3B	Y12	Aquitard	30.85		D			STD, VOC(3)
56-3C	Y12	Aquitard	55.35		Y			STD, VOC(3)
56-4A	Y12	Aquitard	12.60		Y			STD, VOC(3)
56-6A	Y12	Aquitard	20.97		Y			STD, VOC(3)
56-8A	Y12	Aquifer	25.44		Y			STD
60-1A	Y12	Aquifer	23.10				Y	STD
GW-105	S3	Aquitard	19.40		Y			STD
GW-106	S3	Aquitard	74.10		D			STD
GW-109	S3	Aquitard	125.45		Y			STD, RAD(3,12)
GW-148	NHP	Aquifer	13.93			Y		STD
GW-153	NHP	Aquifer	60.84			Y		STD
GW-190	B4	Aquitard	29.84		Y			STD
GW-192	B4	Aquitard	21.58		Y			STD

Table B.1 (continued)

Sampling Point ¹	Location ²	Hydrostrat. Unit ³	Tag Depth ⁴	Samples Collected in CY 2008 ⁵				Parameters ⁶
				Q1	Q2	Q3	Q4	
Upper East Fork Poplar Creek Hydrogeologic Regime (continued)								
GW-204	T0134	Aquitard	20.23				Y	STD
GW-220	NHP	Aquifer	49.00	Y		D		STD
GW-240	NHP	Aquifer	32.55			Y		STD
GW-251	S2	Aquifer	50.04		Y			STD
GW-265	SY	Aquitard	25.68		Y			STD
GW-269	SY	Aquitard	33.50		Y			STD
GW-274	SY	Aquitard	36.12		Y			STD, RAD(3,12)
GW-275	SY	Aquitard	68.47		Y			STD, RAD(3,12)
GW-332	WC	Aquitard	27.07		Y			STD
GW-336	WC	Aquitard	23.93		Y			STD
GW-337	WC	Aquitard	25.33		Y			STD
GW-381	NHP	Aquifer	61.01			Y		STD
GW-383	NHP	Aquitard	26.54			Y		STD
GW-508	RG	Aquitard	15.11		Y		Y	STD
GW-617	EXP-E	Aquifer	20.69				Y	STD
GW-619	FTF	Aquifer	43.63				D	STD, RAD(12)
GW-620	FTF	Aquifer	77.91				Y	STD
GW-633	RG	Aquitard	15.15		Y			STD, RAD(12)
GW-656	T0134	Aquitard	20.60				Y	STD
GW-686	CPT	Aquifer	16.23				Y	STD
GW-690	CPT	Aquifer	53.25				Y	STD
GW-691	CPT	Aquifer	20.39				Y	STD
GW-692	CPT	Aquifer	53.05				Y	STD
GW-698	B8110	Aquifer	74.88		D		Y	STD
GW-700	B8110	Aquifer	33.19				Y	STD
GW-722-14	EXP-J	Aquifer	425.00			Y		STD
GW-722-17	EXP-J	Aquifer	385.00			Y		STD
ER-GW-722-17	EXP-J	.	.			Y		VOC(1)
GW-722-20	EXP-J	Aquifer	333.00			Y		STD
GW-722-22	EXP-J	Aquifer	313.00			Y		STD
GW-722-33	EXP-J	Aquifer	87.00			D		STD
GW-744	GRIDK1	Aquitard	69.28			Y		STD
GW-747	GRIDK2	Aquitard	82.33			Y		STD
GW-748	GRIDK2	Aquitard	29.80			Y		STD
GW-763	GRIDJ3	Aquitard	20.41			Y		STD
GW-769	GRIDG3	Aquitard	62.73		Y		Y	STD
GW-770	GRIDG3	Aquitard	21.68		Y		Y	STD
GW-781	GRIDE3	Aquitard	71.07				Y	STD
GW-782	GRIDE3	Aquitard	38.23				Y	STD
GW-783	GRIDE3	Aquitard	17.98				Y	STD
GW-791	GRIDD2	Aquitard	72.45				Y	STD
GW-792	GRIDD2	Aquitard	31.99				Y	STD
GW-816	EXP-SR	Aquitard	17.99			Y		STD
GW-820	B9201-2	Aquifer	17.18		Y		D	STD
GW-960	GRIDF2	Aquitard	.		Y		Y	STD
GHK2.51WSW	EXP-SW	.	.				Y	STD
NPR12.0SW	EXP-SW	.	.				Y	STD
NPR23.0SW	EXP-SW	.	.				Y	STD

Table B.1 (continued)

Notes:

- 1
 - BCK - Bear Creek Kilometer (surface water station)
 - ER - Equipment rinsate sample
 - FB - Field blank sample
 - GW - Groundwater monitoring well
 - GHK - Gum Hollow Kilometer (surface water station)
 - NPR - North of Pine Ridge (surface water station)
 - NT - North Tributary to Bear Creek (surface water station)
 - S17 - Surface water station in SCR5
 - SCR - South Chestnut Ridge (spring or surface water station)
 - SS - Spring sampling location: South Side of Bear Creek
- 2
 - B4 - Beta-4 Security Pits
 - B8110 - Building 81-10
 - B9103 - Building 9103
 - B9201-2 - Building 9201-2
 - B9201-5 - Building 9201-5
 - BG - Bear Creek Burial Grounds Waste Management Area
 - CPT - Coal Pile Trench
 - CRSP - Chestnut Ridge Security Pits
 - EXP-B - Exit Pathway Picket B
 - EXP-C - Exit Pathway Picket C
 - EXP-E - Maynardville Limestone Exit Pathway Picket E
 - EXP-J - Maynardville Limestone Exit Pathway Picket J
 - EXP-NPR - Surface water sampling station located where drainage exits the Oak Ridge Reservation, north of Pine Ridge
 - EXP-SR - Exit pathway well in the gap through Pine Ridge along Scarboro Road
 - EXP-SW - Spring or Surface Water Location
 - FCAP - Filled Coal Ash Pond
 - FTF - Fire Training Facility
 - GRID - Comprehensive Groundwater Monitoring Plan Grid Location
 - LD - Lysimeter Demonstration Site
 - NHP - New Hope Pond
 - OLF - Oil Landfarm Waste Management Area
 - RG - Rust Garage Area
 - RS - Rust Spoil Area
 - S2 - S-2 Site
 - S3 - S3 Site
 - SPI - Spoil Area I
 - SY - Y-12 Salvage Yard
 - T0134 - Underground Storage Tank 0134-U
 - WCPA - Waste Coolant Processing Area
 - Y12 - Y-12 Complex
- 3 Hydrostratigraphic Unit:
 - Aquifer - Formations of the Knox Group and the Maynardville Limestone (Conasauga Group)
 - Aquitard - Formations of the Conasauga Group, excluding the Maynardville Limestone
- 4 Tag Depth:
 - The distance measured (in ft) from the top of the well casing to the bottom of the well, as recorded during well inspections.
 - For well GW-722, the value is the depth (below the top of well casing) of the sampling port.

Table B.1 (continued)

Notes: (continued)

- 5 Details regarding the monitoring frequency for each location is provided in Appendix F. Groundwater Monitoring Schedules (Appendix C) provide the sequence for collecting samples during each quarterly sampling event and includes the waste stream identification for groundwater purged from each monitoring well. The Waste Management Plan for sampling activities is in Appendix G.

- Y - Sample collection will be performed during the CY 2008 quarter
- D - A field duplicate sample will collected in addition to the regular sample
- * - Sample collection also with a passive diffusion bag sampler

- 6 Table B.2 provides a comprehensive list of analytes, analytical methods, and the associated parameter group.

- STD - Standard administrative parameter group, including the following elementary parameter groups:

- FLD - Field measurements
- CHEM - Miscellaneous laboratory analytes (e.g., dissolved solids) and anions
- MET(1) - Metals
- VOC(1) - Volatile organic compounds
- RAD(1) - Gross alpha and gross beta activity

Radionuclide Elementary Parameter Groups:

- RAD(3) - Uranium-234, -235, and -238
- RAD(12) - Technetium-99

Table B.2. Field measurements and analytes that comprise the elementary parameter groups for CY 2008 groundwater and surface water samples

Parameter Group	Measurement or Analyte	Analytical Method¹	Reporting Limit²	Units³
FLD	Depth to Water	NA	NA	ft
	Water Temperature	NA	NA	centigrade
	pH	NA	NA	pH units
	Conductivity	NA	NA	μmho/cm
	Dissolved Oxygen	NA	NA	ppm
	Oxidation-Reduction Potential (REDOX)	NA	NA	mV
CHEM (miscellaneous)	Total Dissolved Solids	SM 2540C 18	1	mg/L
	Total Suspended Solids	SM 2540D 18	1	mg/L
	Turbidity	EPA-180.1	0.1	NTU
CHEM (anions)	Bicarbonate	SM 2320B 18	1.0	mg/L
	Carbonate	SM 2320B 18	1.0	mg/L
	Chloride	SW846-9056	0.2	mg/L
	Fluoride	SM 4500F 18	0.1	mg/L
	Nitrate (as Nitrogen)	SW846-9056	0.028	mg/L
	Sulfate	SW846-9056	0.25	mg/L
MET(1)	Aluminum	SW846-6010B	0.2	mg/L
	Antimony	SW846-6020	0.0025	mg/L
	Arsenic	SW846-6020	0.005	mg/L
	Barium	SW846-6010B	0.004	mg/L
	Beryllium	SW846-6010B	0.0005	mg/L
	Boron	SW846-6010B	0.1	mg/L
	Cadmium	SW846-6020	0.0025	mg/L
	Calcium	SW846-6010B	0.2	mg/L
	Chromium	SW846-6020	0.01	mg/L
	Cobalt	SW846-6010B	0.02	mg/L
	Copper	SW846-6010B	0.02	mg/L
	Iron	SW846-6010B	0.05	mg/L
	Lead	SW846-6020	0.0005	mg/L
	Lithium	SW846-6010B	0.01	mg/L
	Magnesium	SW846-6010B	0.2	mg/L
	Manganese	SW846-6010B	0.005	mg/L
	Mercury	SW846-7470	0.0002	mg/L
	Molybdenum	SW846-6010B	0.05	mg/L
	Nickel	SW846-6020	0.005	mg/L
	Potassium	SW846-6010B	2	mg/L
	Selenium	SW846-6020	0.01	mg/L
	Silver	SW846-6010B	0.02	mg/L

Table B.2 (continued)

Parameter Group	Analyte	Analytical Method ¹	Reporting Limit ²	Units ³
MET(1) (continued)	Sodium	SW846-6010B	0.2	mg/L
	Strontium	SW846-6010B	0.005	mg/L
	Thallium	SW846-6020	0.0005	mg/L
	Thorium	SW846-6010B	0.2	mg/L
	Uranium	SW846-6020	0.0005	mg/L
	Vanadium	SW846-6010B	0.02	mg/L
	Zinc	SW846-6010B	0.05	mg/L
VOC(1)	Acetone	SW846-8260B-UP	10	µg/L
	Acrolein	SW846-8260B-UP	10	µg/L
	Acrylonitrile	SW846-8260B-UP	5	µg/L
	Benzene	SW846-8260B-UP	5	µg/L
	Bromochloromethane	SW846-8260B-UP	5	µg/L
	Bromodichloromethane	SW846-8260B-UP	5	µg/L
	Bromoform	SW846-8260B-UP	5	µg/L
	Bromomethane	SW846-8260B-UP	5	µg/L
	2-Butanone	SW846-8260B-UP	5	µg/L
	Carbon disulfide	SW846-8260B-UP	5	µg/L
	Carbon tetrachloride	SW846-8260B-UP	5	µg/L
	Chlorobenzene	SW846-8260B-UP	5	µg/L
	Chloroethane	SW846-8260B-UP	5	µg/L
	2-Chloroethylvinyl ether	SW846-8260B-UP	10	µg/L
	Chloroform	SW846-8260B-UP	5	µg/L
	Chloromethane	SW846-8260B-UP	5	µg/L
	Dibromochloromethane	SW846-8260B-UP	5	µg/L
	1,2-Dibromo-3-chloropropane	SW846-8260B-UP	10	µg/L
	1,2-Dibromoethane	SW846-8260B-UP	5	µg/L
	Dibromomethane	SW846-8260B-UP	5	µg/L
	1,2-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	trans-1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	Dichlorodifluoromethane	SW846-8260B-UP	5	µg/L
	1,1-Dichloroethane	SW846-8260B-UP	5	µg/L
	1,2-Dichloroethane	SW846-8260B-UP	5	µg/L
	1,1-Dichloroethene	SW846-8260B-UP	5	µg/L
	cis-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
	trans-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
	1,2-Dichloropropane	SW846-8260B-UP	5	µg/L

Table B.2 (continued)

Parameter Group	Analyte	Analytical Method ¹	Reporting Limit ²	Units ³
VOC(1) (continued)	cis-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	trans-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	Ethanol	SW846-8260B-UP	200	µg/L
	Ethylbenzene	SW846-8260B-UP	5	µg/L
	Ethyl methacrylate	SW846-8260B-UP	5	µg/L
	2-Hexanone	SW846-8260B-UP	5	µg/L
	Iodomethane	SW846-8260B-UP	5	µg/L
	4-Methyl-2-pentanone	SW846-8260B-UP	5	µg/L
	Methylene chloride	SW846-8260B-UP	5	µg/L
	Styrene	SW846-8260B-UP	5	µg/L
	1,1,1,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
	1,1,2,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
	Tetrachloroethene	SW846-8260B-UP	5	µg/L
	Toluene	SW846-8260B-UP	5	µg/L
	Total Xylene	SW846-8260B-UP	5	µg/L
	1,1,1-Trichloroethane	SW846-8260B-UP	5	µg/L
	1,1,2-Trichloroethane	SW846-8260B-UP	5	µg/L
	Trichloroethene	SW846-8260B-UP	5	µg/L
	Trichlorofluoromethane	SW846-8260B-UP	5	µg/L
	1,2,3-Trichloropropane	SW846-8260B-UP	10	µg/L
	1,1,2-Trichloro-1,2,2-trifluoroethane	SW846-8260B-UP	5	µg/L
	Vinyl acetate	SW846-8260B-UP	10	µg/L
	Vinyl chloride	SW846-8260B-UP	2	µg/L
VOC(3)	Methanol	SW846-8015B	5,000	µg/L
RAD(1)	Gross Alpha Activity	EPA-900.0	5	pCi/L
RAD(1)	Gross Beta Activity	EPA-900.0	10	pCi/L
RAD(3)	Uranium-234, -235, & -238	Y/P65-7061	0.4	pCi/L
RAD(12)	Technetium-99	Y/P65-7060	15	pCi/L

Notes:

1 N/A - Not Applicable

Field measurements are performed in accordance with the following BWXT Management Requirements operating procedures:

Field Measurement	Procedure	Field Measurement	Procedure
Depth to Water	Y50-71-015	Dissolved Oxygen	Y50-71-032
Water Temperature	Y50-71-030, -014	REDOX	Y50-71-033
pH	Y50-71-031, -014	Pressure Profile	Y50-71-019
Conductivity	Y50-71-034, -022		

Table B.2 (continued)

Notes: (continued)

1 (continued)

Analytical methods from:

- EPA - *Methods for Chemical Analysis of Water and Wastes* (U.S. Environmental Protection Agency 1983)
- SM - *Standard Methods for the Evaluation of Water and Wastewater, 18th Edition* (American Public Health Association 1992)
- SW846 - *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (U.S. Environmental Protection Agency 1996)
- BWXT ACO Procedures applicable to the methods shown above in the table:

Method	ACO Procedure	Method	ACO Procedure
EPA-180.1	Y/P65-7615	SW846-6010B	Y50-AC-65-0040
EPA-900.0	Y50-AC-65-7074	SW846-6020	Y/P65-0034
		SW846-7470	Y50-AC-65-7470
SM 2320B 18	Y/P65-7639	SW846-8015B	Y/P65-7348
SM 2540C 18	Y-50-AC-65-7914	SW846-8260B-UP	Y/P65-SW846-8260B
SM 2540D 18	Y/P65-7918	SW846-9056	Y50-AC-65-7619
SM 4500F 18	Y/P65-7602	Y/P65-7060	Y/P65-7060
		Y/P65-7061	Y/P65-7061

2 NA - not applicable

VOC(1,3) - Reporting limits are contract-required quantitation limits; also report estimated values (with qualifier) below this limit and above the method detection limit.

RAD(1,3,12) - Reporting limits are target minimum detectable activities (MDAs) that may be obtained under optimal analytical conditions; actual MDAs are sample-specific and may vary significantly from the target value.

3 ft - feet
 µg/L - micrograms per liter
 µmho/cm - micromhos per centimeter
 mg/L - milligrams per liter
 mV - millivolts
 NTU - nephelometric turbidity units
 ppm - parts per million
 pCi/L - picoCuries per liter

APPENDIX C

CY 2008 GROUNDWATER MONITORING SCHEDULES (Insert When Issued, Before Each Quarterly Sampling Event)

APPENDIX D

**ADDENDA TO THE CY 2008 SAMPLING AND ANALYSIS PLAN
(if issued)**

APPENDIX E

LABORATORY REQUIREMENTS (Bottle Lists, Holding Times, Turnaround Time, Elevated Minimum Activity)

STD

Parameter	Lab Tests	Chemical Preservative ¹	Bottle Types/Size
Anions, Turbidity, Fluoride, Carbonate and Bicarbonate	ANIONS, TURBIDITY, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP, ICP-MS, and Hg)	ICP6010, ICPMSGW, HG7470	HNO ₃	1 - 500 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV	HNO ₃	1 – 1 L polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) (one per cooler)	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **LIMS LAB TEST ID**
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S,
SOLIDS-TOT-D, TURBIDITY
MET(1) ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1) Gross Alpha Beta (GROSSAB-ENV)

¹ Samples chilled to 4 +/- 2C

STD, RAD (3,12)

Parameter	Lab Tests	Chemical Preservative ¹	Bottle Types/Size
Anions, Turbidity, Fluoride, Carbonate and Bicarbonate	ANIONS, TURBIDITY, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP, ICP-MS, and Hg)	ICP6010, ICPMSGW, HG7470	HNO ₃	1 - 500 mL polyethylene
Gross Alpha/Beta, Tc-99 and Uranium-234, 235, -238	GROSSAB-ENV TC99-ENV ASPECU-ENV	HNO ₃	1 – 1 L polyethylene & 1 – 500-mL polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) (one per cooler)	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:

LIMS LAB TEST ID

CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S,
 SOLIDS-TOT-D, TURBIDITY
MET(1) ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1) Gross Alpha Beta (GROSSAB-ENV)
RAD(3,12) TC-99LS-ENV, and ASPECU-ENV

¹ Samples chilled to 4 +/- 2C

STD, RAD (12)

Parameter	Lab Tests	Chemical Preservative ¹	Bottle Types/Size
Anions, Turbidity, Fluoride, Carbonate and Bicarbonate	ANIONS, TURBIDITY, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP, ICP-MS, and Hg)	ICP6010, ICPMSGW, HG7470	HNO ₃	1 - 500 mL polyethylene
Gross Alpha/Beta and Tc-99	GROSSAB-ENV TC99-ENV	HNO ₃	1 – 1 L polyethylene &
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) (one per cooler)	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:

LIMS LAB TEST ID

CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S,
 SOLIDS-TOT-D, TURBIDITY
 MET(1) ICP6010, ICPMSGW and HG7470
 VOC(1) VOA8260GW
 RAD(1) Gross Alpha Beta (GROSSAB-ENV)
 RAD(12) TC-99LS-ENV

¹ Samples chilled to 4 +/- 2C

STD,VOC (3)

Parameter	Lab Tests	Chemical Preservative ¹	Bottle Types/Size
Anions, Turbidity, Fluoride, Carbonate and Bicarbonate	ANIONS, TURBIDITY, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	ICP6010, ICPMSGW, HG7470	HNO ₃	1 - 500 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV	HNO ₃	1 – 1 L polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Methanol	NHO8015	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) (one per cooler)	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **LIMS LAB TEST ID**
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S,
SOLIDS-TOT-D, TURBIDITY
MET(1) ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1)Gross Alpha Beta (GROSSAB-ENV)
METHANOL NHO8015

¹ Samples chilled to 4 +/- 2C

WESTBAY

Parameter	Lab Tests	Chemical Preservative ¹	Bottle Types/Size
Anions, Turbidity, Fluoride, Carbonate and Bicarbonate	ANIONS, TURBIDITY, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP, ICP-MS, and Hg)	ICP6010, ICPMSGW, HG7470	HNO ₃	1 - 250 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV	HNO ₃	1 – 500 mL polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) (one per cooler)	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **LIMS LAB TEST ID**
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S,
SOLIDS-TOT-D, TURBIDITY
MET(1) ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1) Gross Alpha Beta (GROSSAB-ENV)

¹ Samples chilled to 4 +/- 2C

VOC (1)

Parameter	Lab Tests	Chemical Preservative ¹	Bottle Types/Size
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids

STD:

VOC(1)

LIMS LAB TEST ID

VOA8260GW

¹ Samples chilled to 4 +/- 2C

ESTABLISHED HOLDING TIMES

Parameter	Holding Times
Alkalinity (Carbonate, Bicarbonate)	14 days
Anions (Chloride, Nitrate, Sulfate)	48 hr
Fluoride	28 days
Mercury	28 days
Metals (ICP, ICPMS)	6 months
Radiochemistry (except tritium)	6 months
Solids, Total Dissolved	7 days
Solids, Total Suspended	7 days
Tritium	No EPA guidance
VOA	7 days

ESTABLISHED TURNAROUND TIMES

The Groundwater Protection Program and the Analytical Chemistry Organization (ACO) laboratory have agreed upon a turnaround time, such that the analytical data generated from each sampling location will be completed within 35 days of receipt. Every two weeks, data that has been approved since the previous two-week period will be transmitted in the form of hard copy of the approved lab reports for each location, along with an electronic copy in a standardized and compatible format (please see the most recent version of the *Y-12 Plant Groundwater Protection Program Data Management Plan*).

ELEVATED MINIMUM DETECTABLE ACTIVITY

Groundwater samples with high TDS (>1,000 mg/L) typically have elevated minimum detectable activities (MDAs) for gross alpha (> 15 pCi/L) and gross beta (> 50 pCi/L). However, the MDAs for specific isotopic analyses are unaffected by the sample solid content. For samples with gross activity results that are less than an elevated MDA, and specific isotopic analyses have not been requested, the laboratory will issue a request to analyze for the principal alpha- or beta-emitting isotopes. That is, if the gross alpha MDA exceeds 15 pCi/L and the result is less than 15 pCi/L, then the laboratory will request analyses of isotopic uranium (by method Y/P65-7061). Similarly, if a sample has an elevated gross beta MDA (>50 pCi/L) and the result is less than the MDA, then the laboratory would request analysis of technetium-99 activity. These requests will be approved by the Y-12 Groundwater Protection Program manager, or designee, before analyses are performed.

APPENDIX F

CY 2008 SAMPLING FREQUENCY FOR MONITORING WELLS

Appendix F. CY 2008 Sampling Frequency for Monitoring Wells

Monitoring Well	Regime ¹	Sampling Frequency ²		No. of Samples ³ 1996-2007	Explanation ⁴ (CY 2008 differs from MOP)
		GWPP MOP	CY 2008		
55-1A	EF	Annual	Annual	5	
55-2A	EF	Semiannual	Annual	4	GWMR
55-2B	EF	Semiannual	Annual	9	GWMR
55-2C	EF	Annual	Annual	11	
55-3A	EF	Semiannual	Annual	5	GWMR
55-3B	EF	Semiannual	Annual	5	GWMR
55-3C	EF	Semiannual	Annual	6	GWMR
55-6A	EF	TBD	Even	3	Selected for Review
56-1A	EF	Semiannual	Annual	4	GWMR
56-1C	EF	TBD	Annual	1	Selected for Review
56-2A	EF	Annual	Annual	6	
56-2B	EF	Annual	Annual	6	
56-2C	EF	Annual	Annual	8	
56-3A	EF	Semiannual	Annual	4	GWMR
56-3B	EF	Semiannual	Annual	4	GWMR
56-3C	EF	Semiannual	Annual	5	GWMR
56-4A	EF	Semiannual	Annual	4	GWMR
56-6A	EF	Semiannual	Annual	4	GWMR
56-8A	EF	Semiannual	Annual	4	GWMR
60-1A	EF	Semiannual	Annual	4	GWMR
GW-006	BC	TBD	Even	8	Selected for Review
GW-014	BC	Semiannual	Annual	8	GWMR
GW-058	BC	Even	Even	1	
GW-065	BC	TBD	SemiAnnual	0	Selected for Review
GW-068	BC	Even	Even	3	
GW-071	BC	Semiannual	SemiAnnual	10	
GW-082	BC	Annual	Annual	19	
GW-085	BC	Semiannual	SemiAnnual	24	
GW-089	BC	Odd	Annual	1	MAROS
GW-098	BC	Annual	Annual	8	
GW-105	EF	Annual	Annual	4	
GW-106	EF	Annual	Annual	4	
GW-109	EF	Annual	Annual	8	
GW-122	BC	Annual	Annual	4	
GW-148	EF	Even	Even	11	
GW-153	EF	Annual	Annual	24	
GW-173	CR	TBD	Even	2	Selected for Review
GW-175	CR	Even	Even	6	
GW-178	CR	Even	Even	3	
GW-190	EF	TBD	Even	2	Selected for Review
GW-192	EF	Annual	Annual	16	
GW-204	EF	Annual	Annual	19	
GW-220	EF	Semiannual	SemiAnnual	31	
GW-225	BC	Semiannual	SemiAnnual	16	
GW-226	BC	Semiannual	SemiAnnual	22	
GW-227	BC	Even	Even	2	
GW-229	BC	Annual	Annual	12	

Appendix F. CY 2008 Sampling Frequency for Monitoring Wells

Monitoring Well	Regime ¹	Sampling Frequency ²		No. of Samples ³ 1996-2007	Explanation ⁴ (CY 2008 differs from MOP)
		GWPP MOP	CY 2008		
GW-240	EF	Annual	Annual	10	
GW-246	BC	Semiannual	SemiAnnual	6	
GW-251	EF	Annual	Annual	25	
GW-257	BC	Annual	Annual	4	
GW-259	BC	Even	SemiAnnual	0	MAROS
GW-265	EF	Semiannual	Annual	5	GWMR
GW-269	EF	Semiannual	Annual	7	GWMR
GW-274	EF	Annual	Annual	7	
GW-275	EF	Annual	Annual	6	
GW-289	BC	Annual	Annual	8	
GW-306	BC	TBD	SemiAnnual	0	Selected for Review
GW-309	BC	Even	SemiAnnual	0	MAROS
GW-310	BC	Even	Even	3	
GW-312	BC	Even	Even	2	
GW-314	BC	TBD	SemiAnnual	0	Selected for Review
GW-315	BC	Annual	Annual	22	
GW-322	CR	Even	Even	5	
GW-332	EF	Annual	Annual	5	
GW-336	EF	Annual	Annual	5	
GW-337	EF	Annual	Annual	9	
GW-365	BC	Even	Even	4	
GW-367	BC	Even	SemiAnnual	0	MAROS
GW-369	BC	Odd	Annual	1	MAROS
GW-381	EF	Annual	Annual	15	
GW-383	EF	Semiannual	Annual	27	GWMR
GW-508	EF	TBD	SemiAnnual	0	Selected for Review
GW-514	CR	Even	Even	4	
GW-531	BC	TBD	Annual	0	Selected for Review
GW-537	BC	Annual	Annual	25	
GW-608	CR	TBD	Even	7	Selected for Review
GW-609	CR	Even	Even	16	
GW-612	CR	Annual	Annual	9	
GW-615	BC	Annual	Annual	7	
GW-616	BC	Annual	Annual	6	
GW-617	EF	Even	Even	6	
GW-619	EF	Even	Even	6	
GW-620	EF	Annual	Annual	25	
GW-623	BC	TBD	SemiAnnual	0	Selected for Review
GW-626	BC	Semiannual	SemiAnnual	12	
GW-627	BC	Semiannual	SemiAnnual	28	
GW-629	BC	Even	Annual	6	MAROS
GW-633	EF	Even	Even	14	
GW-648	BC	TBD	Annual	0	Selected for Review
GW-653	BC	Annual	Annual	24	
GW-656	EF	Annual	Annual	7	
GW-686	EF	Semiannual	Annual	6	GWMR

Appendix F. CY 2008 Sampling Frequency for Monitoring Wells

Monitoring Well	Regime ¹	Sampling Frequency ²		No. of Samples ³ 1996-2007	Explanation ⁴ (CY 2008 differs from MOP)
		GWPP MOP	CY 2008		
GW-690	EF	Annual	Annual	7	
GW-691	EF	Annual	Annual	5	
GW-692	EF	Annual	Annual	6	
GW-694	BC	Annual	Annual	10	
GW-698	EF	Semiannual	SemiAnnual	20	
GW-700	EF	Annual	Annual	7	
GW-703	BC	Annual	Annual	22	
GW-722-14	EF	Annual	Annual	39	
GW-722-17	EF	Annual	Annual	39	
GW-722-20	EF	Annual	Annual	39	
GW-722-22	EF	Annual	Annual	39	
GW-722-33	EF	Annual	Annual	39	
GW-724	BC	Annual	Annual	22	
GW-725	BC	Annual	Annual	24	
GW-738	BC	Annual	Annual	23	
GW-740	BC	Annual	Annual	23	
GW-744	EF	Annual	Annual	24	
GW-747	EF	Annual	Annual	24	
GW-748	EF	Even	Even	7	
GW-763	EF	Annual	Annual	27	
GW-769	EF	Semiannual	SemiAnnual	25	
GW-770	EF	Semiannual	SemiAnnual	25	
GW-781	EF	Annual	Annual	11	
GW-782	EF	Annual	Annual	26	
GW-783	EF	Annual	Annual	13	
GW-791	EF	Annual	Annual	25	
GW-792	EF	Annual	Annual	11	
GW-816	EF	Annual	Annual	24	
GW-820	EF	Semiannual	SemiAnnual	10	
GW-829	BC	Even	Even	13	
GW-960	EF	TBD	SemiAnnual	2	New Location

Appendix F. CY 2008 Sampling Frequency for Monitoring Wells

Notes:

1. Regime

BC = Bear Creek Hydrogeologic Regime

CR = Chestnut Ridge Hydrogeologic Regime

EF = Upper East Fork Poplar Creek Hydrogeologic Regime

2. Sampling frequency

GWPP MOP = as specified in the Y-12 Groundwater Protection Program Monitoring Optimization Plan (BWXT 2006a)

CY 2008 = the updated sampling frequency for use beginning in CY 2008

Annual = Sample collection once per year

Even = Sample collection every other year, starting in 2006

Odd = Sample collection every other year, starting in 2007

Semiannual = Sample collection twice per year

3. Number of Samples collected from 1996-2007

The number of data points available for a MAROS assessment, based on the earliest date (January 1996) for data that was used in the initial assessment (BWXT 2005).

4. Explanation for sampling locations where the updated sampling frequency differs from the MOP sampling frequency. These changes are primarily based on the number of samples that would be included in a subsequent MAROS assessment (collected since January 1996).

GWPP = frequency reduced recommended in the CY 2006 Groundwater Monitoring Report (BWXT 2007)

MAROS = frequency increased to obtain the minimum number of samples (4 data points) needed within the subsequent 3-year (CY 2008-2010) period to perform the next MAROS assessment.

APPENDIX G

MANAGEMENT OF PURGED GROUNDWATER

APPENDIX G.1

WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN
for
Waste Streams generated from
Y-12 Groundwater Protection Program
Sampling Activities

Date Issued – 12/18/06

prepared by:

Y-12 Groundwater Protection Program
Environmental Compliance Department
Y-12 National Security Complex
P.O. Box 2009
Oak Ridge, TN 37831

managed by:

BWXT Y-12, LLC

for the:

U.S. Department of Energy
Under Contract Number:
DE-AC05-00OR22800

This document has been reviewed by a Y-12 DC/
UCNI RO and has been determined to be
UNCLASSIFIED and contains no UCNI. This
review does not constitute clearance for Public
Release.

Name: L. W. McMahon [signature on file]

Date: 12/18/06

Approvals

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BWXT Y-12, LLC
Environmental Officer

12/18/06
Date

Mary Wiginton [signature on file]
Mary Wiginton
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12/18/06
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12/18/06
Date

Mark Burris [signature on file]
Brad E Skaggs or Mark S. Burris
BWXT Y-12, LLC
Environmental Compliance

12/18/06
Date

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization ³	Segregation Requirements	Packaging	Disposal Path
Purge water² that is not contained	Non-hazardous, non-radiological contaminated waters. Analytical results indicate constituents in the water are less than Safe Drinking Water Act Maximum Contaminant Levels (MCL). In addition, historical knowledge of relevant groundwater plumes at the Y-12 National Security Complex confirm the non-detection of contaminants, or the detection of contaminants (J values), but still below the MCL. See the most current GWPP Groundwater Monitoring Data Compendium	Not contained	Not contained	ACO technicians will dispense/dispose of waters directly to ground surface at the well location.

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization ³	Segregation Requirements	Packaging	Disposal Path
SID¹ 2212 purge water² (non-regulated and non-hazardous purge water)	<p>Non-hazardous, contaminated waste waters. Analytical results indicate concentration in the water exceed the MCL. These waters can contain nitrate concentration > 100 mg/L, Uranium >0.03 mg/L, and Uranium isotopes > 4% of DCG. Waters commonly contain the following typical halogenated compounds (not inclusive) that exceed the MCL, but are below RCRA TCLP levels, include: Tetrachloroethene, Trichloroethene, cis-1,2-Dichloroethene, Carbon Tetrachloride, 1,1-Dichloroethane, Methylene Chloride, and Vinyl Chloride. Other radioisotopes present consist of Tc-99 and daughter products of Uranium.</p> <p>Although not regulated, this waste water is contained, handled, and sent for disposal as a Best Management Practice (BMP) at Y-12. As a BMP, this contaminated purge water is not place on clean surfaces (soils) or near surface water tributaries. Annual groundwater data evaluation, multiple sampling event, and groundwater plume characteristics provide ample evidence of this classification.</p>	<p>Segregate non-regulated waste waters from other GWPP waste waters that contain a RCRA hazardous waste (SID 2214 and 2216).</p> <p>Waste streams¹ have been characterized and established per well location and are published in GWPP's annual GWPP Sampling and Analysis Plan.</p> <p>Waters can be combined and bulk as necessary in a DOT approved container.</p>	<p>Place in a DOT approved container.</p> <p>The above containers are compatible with the purge water and meet packaging requirements specified in Master Profile WW-01</p> <p>Label containers in accordance with Y71-310, <i>Waste Container Labeling</i></p>	<p>SID 2212 waste stream meets the waste acceptance criteria of Master Profile WW-01. Sampling data is used to complete Attachment G of UCN 2109. If Uranium is present, above detection levels, then a wt %U235 sample is required to determine enrichment, and a duplicate sample is required if results are >0.93 wt U235. All other constituents listed in WW-01 have been quantified through current analytical results, previous analyses, historical data (prior to 1996), and groundwater plume composition. A Process Knowledge form attached to each UCN 2109 documents the presence of constituents seen in SID 2212 waters and the absence of other such constituents. This waste stream is disposed at Y-12 National Security Complex's onsite treatment facility with authorization from Waste Treatment Operations. Depending on enrichment content, normal disposal would be at either the West End Treatment Facility (WETF) or the Central Pollution Control Facility (CPCF).</p>

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization ³	Segregation Requirements	Packaging	Disposal Path
<p>SID¹ 2214 purge water² (purge water from multiple F-listed RCRA groundwater wells, along with rinse waters from sampling equipment and disposables, bulked into the same drum. All waste water carries the F039 waste code).</p>	<p>Hazardous waste waters (no radiological contaminants). Characterization based upon well location. Wells located down-gradient of the Bear Creek Burial Grounds between north tributary (NT) 6 and NT 8, and north of Bear Creek. Purge water most likely contains leachate from the BCBGs and is considered RCRA F-listed (40 CFR Part 261.31) based on established documentation (F039 leachate is comprised of F codes: F001, F002, F004, and F005).</p> <p>Typical halogenated volatile organic compounds detected in the SID 2214 waters, which are above the MCL include: Tetrachloroethene, Trichloroethene, 1,2-Dichloroethene, 1,1-Dichloroethene, 1,1,1-Trichloroethane, 1,1-Dichloroethane, Methylene Chloride, and Vinyl Chloride. Typically Benzene and other total petroleum hydrocarbons have also been identified.</p>	<p>Segregate RCRA F-listed waste waters from non-regulated waste waters (SID 2212) and RCRA Characteristic waste waters (SID 2216).</p> <p>Waste waters are bulked/accumulated at RCRA Satellite Accumulation Area (SAA) #SA-993, under the direction of the SAA Operator or Alternate Operator</p>	<p>Place in a DOT approved container.</p> <p>Waste is transported as DOT Class 9 under a Bill of Lading listing the assigned EPA waste code. Transporter has received DOT training.</p> <p>The above containers are compatible with the purge water and meet packaging requirements specified in Master Profile WW-01</p> <p>Label containers in accordance with Y71-310, <i>Waste Container Labeling</i></p>	<p>Send SID 2214 waste waters to 90-Day Yard for further management. RCRA F-listed waste are prohibited under Master Profile WW-01, except under special arrangement with DOE, or approved by Waste Treatment Coordinator for waste that can be treated at CPCF or Groundwater Treatment Facility (GWTF). SID 2214 waste waters have been approved for treatment at GWTF with the following prohibitions: waters with Uranium above detection (based on waste sample analyses) and Nitrates in concentration > 100 mg/L. All other constituents listed in WW-01 have been quantified through current analytical results, previous analyses, historical data (prior to 1996), and groundwater plume composition. A Process Knowledge form attached to each UCN 2109 documents the presence and absence of WW-01 constituents seen in SID 2214 waters. This waste stream is disposed at Y-12 National Security Complex's onsite treatment facility with authorization from Waste Treatment Operations.</p>

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization ³	Segregation Requirements	Packaging	Disposal Path
<p>SID¹ 2216 purge water² (purge water from multiple RCRA characteristic wells bulked into the same drum. The EPA waste code is dependent on the well location).</p>	<p>Hazardous waste waters (mixed and non-radiological contaminated). Analytical results indicate that concentrations exceed a RCRA Toxicity Contaminant Leaching Procedure (TCLP - 40 CFR Part 261.24). Annual groundwater data evaluation, plume evaluations, and repeated sampling events give weighted evidence to this classification (wells may receive this classification if concentrations have been consistently approaching the RCRA TCLP levels).</p> <p>SID 2216 waste water can contain the following EPA waste codes: D005 – Barium D006 - Cadmium D018 – Benzene D019 – Carbon Tetrachloride D029 – 1,1-Dichloroethene D039 – Tetrachloroethene D040 – Trichloroethene D043 – Vinyl Chloride</p> <p>In addition to the above, these waters may contain the following volatile organic compounds: 1,2-Dichloroethene, 1,1,2-Trichloro-1,2,2-trifluoroethane, 1,1,1-Trichloroethane, 1,1-Dichloroethane, Acetone, Methylene Chloride, Chloroform and other total petroleum hydrocarbons. These waters may can contain trace metals, nitrate concentration > 100 mg/L, Uranium >0.03 mg/L, Uranium isotopes > 4% of DCG, and other radioisotopes (Tc99 and daughter products of Uranium).</p>	<p>Segregate RCRA characteristic waste waters from non-regulated waste waters (SID 2212) and RCRA F-listed waste waters (SID 2216).</p> <p>RCRA characteristic waste waters are bulked/accumulated at RCRA Satellite Accumulation Area (SAA) #SA-992, under the direction of the SAA Operator or Alternate Operator</p>	<p>Place in a DOT approved container.</p> <p>Waste is transported as DOT Class 9 under a Bill of Lading listing the assigned EPA waste code. Transporter has received DOT training.</p> <p>The above containers are compatible with the purge water and meet packaging requirements specified in Master Profile WW-01</p> <p>Label containers in accordance with Y71-310, <i>Waste Container Labeling</i></p>	<p>Send SID 2216 waste waters to 90-Day Yard for further management. SID 2216 waste waters meet the waste acceptance criteria of Master Profile WW-01. Waters with Uranium above detection (based on waste sample analyses) require a wt %U235 sample to determine enrichment and a duplicate sample is required if results are >0.93 wt U235. Nitrates concentration > 10 mg/L must be indicated. All other constituents listed in WW-01 have been quantified through current analytical results, previous analyses, historical data (prior to 1996), and groundwater plume composition. A Process Knowledge form attached to each UCN 2109 documents the presence and absence of WW-01 constituents seen in SID 2216 waters. This waste stream is disposed at Y-12 National Security Complex's onsite treatment facility with authorization from Waste Treatment Operations. Depending on enrichment content, waste waters are disposed at the West End Treatment Facility (WETF) or the Central Pollution Control Facility (CPCF).</p>

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization ³	Segregation Requirements	Packaging	Disposal Path
<p>Disposables and sampling equipment in contact with RCRA characteristic or F-listed purge water:</p> <p>Sampling equipment: includes sample pumps, tubing, sample trays, and flow-through cells (all components). These items meet the definition of a “container” under RCRA.</p> <p>Non-absorbent disposables – include: gloves, plastic bags, and instrument probes</p> <p>Absorbent disposables – includes paper towels, wipes, clothes, litmus paper. During normal sampling operations these items should not come into contact with RCRA characteristic or F-listed waste waters.</p>	<p>Non-hazardous solid waste and RCRA empty containers. The sampling equipment and disposables which comes in contact with RCRA purge waters will not be subject to RCRA if:</p> <p>1) The waste can be sufficiently removed from non-absorbent material (disposables), such as nitrile gloves, plastic surfaces, instrument probes, and external surfaces of sample bottles by rinsing such items. All rinse water must be collected and bulked under the appropriate RCRA waste stream (SID 2216 or 2214).</p> <p>2) Sampling equipment that meets the definition of a “container” under RCRA and is not subject to regulation once the container is “empty” as defined under 40 CFR Part 261.7, paragraph (b). To meet this requirement all fluids must be sufficiently drained from the equipment, by normal means as possible, and then rinsed at least once to remove residue. All rinse water must be collected and bulked under the appropriate RCRA waste stream (SID 2216 or 2214).</p> <p>3) Absorbent disposable such as wipes, paper towels, or clothes that are use to remove/clean/dry any addition liquids/residues RCRA empty containers, once the items are rinsed, are also not subject to RCRA. Litmus paper, if used for its intended purpose, and does not come into contact with F039 waste water, is also not subject to RCRA.</p>	<p>Segregate non-regulated waste streams from those items subject to RCRA. all</p> <p>Sampling equipment: can be reused as necessary for the multiple sampling events and are not regulated.</p> <p>Non-absorbent disposables – once rinsed are not regulated.</p> <p>Absorbent disposables –. Items used to wipe/dry/clean RCRA empty containers are not regulated and can also be disposed of into sanitary trash (profile S-020). If these items do come into contact with RCRA waste water, the items are subject to regulation. These items must be wrung out as much as possible (water collected) and segregated from non-regulated items.</p>	<p>ALL non-regulated items – dispose of into the appropriate sanitary waste receptacle or dumpster, as specified under Master Profile S-020.</p> <p>Any items subject to RCRA regulation must be place in a DOT approved container and labeled in accordance with procedure Y71-310, <i>Waste Container Labeling</i>. Waste is transported as DOT Class 9 under a Bill of Lading, listing the assigned EPA waste code, to the 90-Day Yard for further management. Transporter has received DOT training.</p>	<p>All the items listed below require authorization from Y-12 Waste Management prior to disposal in Sanitary Trash</p> <p>Sampling equipment – once the item is no longer of use, or can no longer be used, the item can be disposed of in sanitary trash (Waste Profile No. S-020).</p> <p>Non-absorbent disposables – after items are rinsed, collect the rinse solution and bulk with SID 2216 or 2214 purge water, and then dispose of the item in sanitary trash (S-020).</p> <p>Absorbent disposables – not subject to regulation can be disposed into sanitary trash (S-020).</p> <p>Absorbent material that comes into contact with RCRA Characteristic (SID 2216) purge water, by process knowledge the whole material if tested under the TCLP would not exceed TCLP levels, and therefore the item can be disposed into sanitary trash (S-020).</p> <p>Absorbent material that comes into contact with RCRA F-listed waste waters (SID 2214) will be subject to regulation and must be send to the 90-Day Yard for further management (Master Profile HW-01). Final disposal path will be determined by Navarro-GEM to an off-site RCRA TSD.</p>

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization ³	Segregation Requirements	Packaging	Disposal Path
All disposables and equipment used for GWPP purposes (non F-listed wells): Sampling pumps, gloves, wipes, tubing, litmus paper, instrument probes, sample trays, and flow-through cells.	Non-hazardous solid waste. Characterization is not required.	Segregate F-listed contaminated items from non F-listed contaminated items.	N/A	Items not in contact with any F-listed purge water can be disposed in sanitary trash (profile S020) with authorization from Y-12 Waste Management. All sampling equipment is to be reused till the item is no longer of use and then disposed of in sanitary trash. All Sanitary waste placed in the approved on-site Solid Waste Disposal Facility (Industrial Landfill)
Waters/Fluids generated during well development of existing wells (well development is performed on an as needed basis, prior to sampling, to maintain groundwater flow to well. Five to 10 well casing volumes are generated)	Well development of existing wells will utilize the most recent sampling analytical results and will follow the three waste streams (SIDs) for purge water.	Segregate water based on the three existing waste streams for purge water	Based on volume and waste stream ID number. Containers could consist of drums, polytanks, or tankers.	See the three purge water waste streams IDs above

¹ “SID” – “Stream Identification Number” are the pre-established waste streams identification (ID) for purge waters generated at Y-12. These waste streams were established by Y-12 Waste Operations, prior to 1995, and have been utilized to segregate waste waters. The waste stream ID is established for the coming Calendar Year (CY) for each well location to be monitored; based upon characterization of the most recent sampling results for that well location. These are published an appendix to GWPP’s annual Sampling and Analysis Plan (published 2-3 months prior the start of the CY), and the waste stream is established for any other wells added during that CY and documented in addenda to this plan.

² “Purge Water” – unusable portion of groundwater purged from a well prior to sample collection. Water is in a liquid form, (99.9% liquid) with normally < 100 mg/L of suspended solids. Water contains contaminants that are in solution (dissolved phase) with little sediment load.

³ Analytical results (past and present) from sampling events are used to characterize purge water. The GWPP uses a standardized parameter list for every sample, which includes:

1. ICP metals (SW846- EPA 6010B), ICPMS metals (EPA-200.8), Mercury (SW846 – 7470) – includes Uranium metal (0.0005 mg/L)
2. Anions – Alkalinity, Chloride, Fluoride, Nitrates, Sulfates
3. Volatile Organic Compound – SW846 – EPA 8260B
4. Gross Alpha and Gross Beta (EPA-900.0)

The following radioisotopes have been analyzed for on an as needed basis: Tritium, Tc-99, Isotopic Uranium, Total Uranium and wt% U235, and other heavy radioisotopes (Am241, Np 237, I129, Thorium, Radium).

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Waste Identification Tag (UCN 2114B)
for SID 2212 purge water

SID
2212

WASTE IDENTIFICATION	
TO BE COMPLETED BY REQUESTER	
2109 NUMBER	UCN 2109#
DISPOSAL FORM DATE	Start date of drum
LLW START DATE	"N/A"
MATERIAL DESCRIPTION	Purged groundwater from multiple wells. All water is under waste stream SID 2212
TYPE AND SIZE OF CONTAINER (for example, 55-gallon steel drum)	55-gallon poly drum
LOCATION OF MATERIAL	9108
DEPARTMENT	50001328 / Y-12 ECD
SIGNATURE	signature / date
TO BE COMPLETED BY PLANT DISPOSAL COORDINATOR	
CHECKED BY	DATE
COMMENTS	
Barcode #	
Owner: ER Schultz	
374-3285	

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Hazardous Waste Identification Tag (UCN 2114A)
for SID 2214 purge water

orange
border

SID 2214

HAZARDOUS WASTE IDENTIFICATION

TO BE COMPLETED BY REQUESTER

2109 NUMBER "TSD"

DISPOSAL FORM DATE

ACCUMULATION START DATE

MATERIAL DESCRIPTION "Purged groundwater :
US EPA waste code: F039"

TYPE AND SIZE OF CONTAINER (for example, 55-gallon steel drum) "55 gallon poly drum"

LOCATION OF MATERIAL "SA-993/Bldg 9108"

DEPARTMENT "SCM01328/Y-12 ECD"

SIGNATURE "signature / date"

TO BE COMPLETED BY PLANT DISPOSAL COORDINATOR

CHECKED BY DATE

COMMENTS "Barcode #"
"Owner: E.R. Schultz"
"576-3285"

UCN-2114A (2-06)

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← leave blank

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Hazardous Waste Identification Tag (UCN 2114A)
for SID 2216 purge water

SID 2216

HAZARDOUS WASTE IDENTIFICATION

TO BE COMPLETED BY REQUESTER

2109 NUMBER
"7150"

DISPOSAL FORM DATE

ACCUMULATION START DATE

MATERIAL DESCRIPTION
*"Purged groundwater:
USEPA waste codes: D005, D006,
D018, D019, D029, D039, D040,
and D043"*

TYPE AND SIZE OF CONTAINER
(for example, 55-gallon steel drum)
"55-gallon poly drum"

LOCATION OF MATERIAL
"SA-992 / Bldg 9108"

DEPARTMENT
"50001328 / Y-12 ECD"

SIGNATURE
signature / date

TO BE COMPLETED BY PLANT DISPOSAL COORDINATOR

CHECKED BY

DATE

COMMENTS
Barcode #
Owner: E.R. Schultz
574-3285

UCN-2114A (2-06)

← orange border

← leave blank

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APPENDIX G.2

WASTE STREAM IDENTIFICATION FOR PURGED GROUNDWATER

**Table G.2. Waste stream identity and RCRA waste code for groundwater purged
from wells to be sampled during CY 2008**

Regime	CY 2008 Locations	Quarter Sampled				Waste Stream ID (SID #)	RCRA Waste Code
		Q1	Q2	Q3	Q4		
Bear Creek	GW-006	Y		Y		SID 2212	.
	GW-014			Y		SID 2214	F039
	GW-058	Y				Not Contained	.
	GW-065	Y		Y		SID 2212	.
	GW-068			Y		SID 2216	D043
	GW-071	Y		Y		SID 2214	F039
	GW-082			Y		SID 2214	F039
	GW-085	Y		Y		SID 2212	.
	GW-089			Y		SID 2214	F039
	GW-098	Y				SID 2212	.
	GW-122	Y				SID 2212	.
	GW-225	Y		Y		SID 2212	.
	GW-226	Y		Y		SID 2212	.
	GW-227	Y				SID 2212	.
	GW-229	Y				SID 2212	.
	GW-246	Y		Y		SID 2212	.
	GW-257			Y		SID 2214	F039
	GW-259	Y		Y		SID 2212	.
	GW-289			Y		SID 2214	F039
	GW-306	Y		Y		SID 2212	.
	GW-309	Y		Y		SID 2212	.
	GW-310	Y				SID 2212	.
	GW-312	Y				SID 2212	.
	GW-314	Y		Y		SID 2212	.
	GW-315	Y				SID 2212	.
	GW-365	Y				SID 2212	.
	GW-367	Y		Y		SID 2212	.
	GW-369	Y				SID 2212	.
	GW-531			Y		SID 2212	.
	GW-537			Y		SID 2212	.
	GW-615			Y		SID 2216	D005
	GW-616			Y		SID 2212	.
	GW-623	Y		Y		SID 2214	F039
	GW-626	Y		Y		SID 2214	F039
	GW-627	Y		Y		SID 2214	F039
	GW-629	Y		Y		SID 2214	F039
	GW-648	Y				SID 2212	.
	GW-653			Y		SID 2214	F039
	GW-694	Y				SID 2212	.
	GW-703	Y				SID 2212	.
	GW-724	Y				SID 2212	.
	GW-725	Y				SID 2212	.
	GW-738	Y				SID 2212	.
	GW-740	Y				SID 2212	.
	GW-829			Y		SID 2212	.

Table G.2 (continued)

Regime	CY 2008 Locations	Quarter Sampled				Waste Stream ID (SID #)	RCRA Waste Code
		Q1	Q2	Q3	Q4		
Chestnut Ridge	GW-173		Y		Y	SID 2212	.
	GW-175				Y	SID 2212	.
	GW-178				Y	Not Contained	.
	GW-322				Y	SID 2212	.
	GW-514				Y	Not Contained	.
	GW-608				Y	Not Contained	.
	GW-609				Y	Not Contained	.
	GW-612				Y	SID 2212	.
East Fork	55-1A		Y			Not Contained	.
	55-2A		Y			SID 2212	.
	55-2B		Y			SID 2216	D039
	55-2C		Y			SID 2216	D039
	55-3A		Y			SID 2216	D039, D040
	55-3B		Y			SID 2216	D039, D040, D043
	55-3C		Y			SID 2216	D039, D040, D043
	55-6A		Y			Not Contained	.
	56-1A		Y			Not Contained	.
	56-1C		Y			SID 2212	.
	56-2A		Y			SID 2212	.
	56-2B		Y			SID 2216	D039
	56-2C		Y			SID 2216	D039, D040
	56-3A		Y			SID 2212	.
	56-3B		Y			SID 2212	.
	56-3C		Y			SID 2216	D039
	56-4A		Y			SID 2212	.
	56-6A		Y			Not Contained	.
	56-8A		Y			SID 2212	.
	60-1A				Y	Not Contained	.
	GW-105		Y			SID 2212	.
	GW-106		Y			SID 2212	.
	GW-109		Y			SID 2216	D006
	GW-148			Y		SID 2212	.
	GW-153			Y		SID 2212	.
	GW-190		Y			Not Contained	.
	GW-192		Y			SID 2212	.
	GW-204				Y	SID 2212	.
	GW-220	Y		Y		SID 2216	D019
	GW-240			Y		SID 2212	.
	GW-251		Y			SID 2212	.
	GW-265		Y			SID 2212	.
	GW-269		Y			SID 2212	.
	GW-274		Y			SID 2216	D039
	GW-275		Y			SID 2216	D005
	GW-332		Y			SID 2216	D039
	GW-336		Y			SID 2212	.
	GW-337		Y			SID 2216	D039, D040
	GW-381			Y		SID 2212	.
	GW-383			Y		SID 2212	.

Table G.2 (continued)

Regime	CY 2008 Locations	Quarter Sampled				Waste Stream ID (SID #)	RCRA Waste Code
		Q1	Q2	Q3	Q4		
East Fork (continued)	GW-508		Y		Y	SID 2216	D018
	GW-617				Y	Not Contained	.
	GW-619				Y	SID 2212	.
	GW-620				Y	Not Contained	.
	GW-633		Y			SID 2216	D018
	GW-656				Y	SID 2216	D040
	GW-686				Y	SID 2212	.
	GW-690				Y	SID 2212	.
	GW-691				Y	SID 2216	D039
	GW-692				Y	SID 2212	.
	GW-698		Y		Y	SID 2216	D040
	GW-700				Y	SID 2212	.
	GW-722-14			Y		SID 2212	.
	GW-722-17			Y		SID 2212	.
	GW-722-20			Y		SID 2212	.
	GW-722-22			Y		SID 2212	.
	GW-722-33			Y		Not Contained	.
	GW-744			Y		Not Contained	.
	GW-747			Y		Not Contained	.
	GW-748			Y		Not Contained	.
	GW-763			Y		SID 2212	.
	GW-769		Y		Y	SID 2212	.
	GW-770		Y		Y	SID 2212	.
	GW-781				Y	Not Contained	.
	GW-782				Y	SID 2212	.
	GW-783				Y	SID 2212	.
	GW-791				Y	SID 2212	.
	GW-792				Y	Not Contained	.
	GW-816			Y		Not Contained	.
	GW-820		Y		Y	SID 2216	D039, D040
	GW-960		Y		Y	Not Contained	.

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