Y/TS-2031/R3

Y-12 GROUNDWATER PROTECTION PROGRAM MONITORING OPTIMIZATION PLAN FOR GROUNDWATER MONITORING WELLS AT THE U.S. DEPARTMENT OF ENERGY Y-12 NATIONAL SECURITY COMPLEX, OAK RIDGE, TENNESSEE

Elvado Environmental LLC
April 2017 | Revision 3

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Revision 3

April 2017

Prepared by

ELVADO ENVIRONMENTAL LLC
Under Subcontract No. 4300100622

for the

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

Managed by

Consolidated Nuclear Security, LLC
Management & Operating Contractor
for the
Y-12 National Security Complex and Pantex Plant
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List of Acronyms and Abbreviations

B&W Y-12	Babcock & Wilcox Technical Services Y-12, LLC
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BCV	Bear Creek Valley
BWXT	BWXT Y-12, L.L.C.
calendar year	CY
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CNS	Consolidated Nuclear Security, LLC
COC	contaminant(s) of concern
DOE	U.S. Department of Energy
DQOs	data quality objectives
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
EM	Environmental Management
GWMR	Groundwater Monitoring Report
GWPP	Groundwater Protection Program
MAROS	Monitoring and Remediation Optimization System
ORR	Oak Ridge Reservation
PCP	post-closure permit
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SPM	selective parameter monitoring
SWDF	Solid Waste Disposal Facility
Y-12	Y-12 National Security Complex

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1.0 INTRODUCTION

This document is the monitoring optimization plan for groundwater monitoring wells associated with the U.S. Department of Energy (DOE) Y-12 National Security Complex (Y-12) in Oak Ridge, Tennessee (Figure A.1). The plan describes the technical approach that is implemented under the Y-12 Groundwater Protection Program (GWPP) to focus available resources on the monitoring wells at Y-12 that provide the most useful hydrologic and groundwater quality monitoring data. The technical approach is based on the GWPP status designation for each well (Section 2.0). Under this approach, wells granted "active" status are used by the GWPP for hydrologic monitoring and/or groundwater quality sampling (Section 3.0), whereas wells granted "inactive" status are not used for either purpose. The status designation also defines the frequency at which the GWPP will inspect applicable wells, the scope of these well inspections, and extent of any maintenance actions initiated by the GWPP (Section 3.0). Details regarding the ancillary activities associated with implementation of this plan (e.g., well inspection) are deferred to the referenced GWPP plans (Section 4.0).

This plan applies to 550 groundwater wells associated with Y-12 and related waste management areas and facilities located within three hydrogeologic regimes (Figure A.1): 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 Regime encompasses a section of Bear Creek Valley (BCV) immediately west of Y-12. The East Fork Regime encompasses most of the Y-12 process, operations, and support facilities in BCV. For this plan, the East Fork Regime includes a section of Union Valley east of the DOE Oak Ridge Reservation (ORR) boundary along Scarboro Road that is located hydraulically downgradient (along strike) from Y-12. The Chestnut Ridge Regime encompasses a section of Chestnut Ridge directly south of Y-12 that is bound on the west by a surface drainage feature (Dunaway Branch) and on the east by Scarboro Road. For this plan, the Chestnut Ridge Regime includes an area known as the South Campus Facility that is located west of Scarboro Road and south of Bethel Valley Road. The GWPP maintains an extensive database of construction details and related information for the monitoring wells in each hydrogeologic regime (including wells that have been destroyed or intentionally plugged and abandoned); the most recent version of the database was issued in December 2013 (Babcock & Wilcox Technical Services Y-12, LLC [B&W Y-12] 2013a).

This plan does not apply to 369 temporary piezometers or other specialized groundwater monitoring/sampling devices that have been or may be installed for research purposes, hydrologic tests, pilot studies, or short-term investigations. Additionally, this document does not apply to 141 groundwater monitoring wells located in western BCV that were formerly maintained by the GWPP before organizational stewardship responsibility was relinquished in February 2006.

This plan will be reviewed and updated every three years as specified in the *Groundwater Protection Program Management Plan for the U.S. Department of Energy Y-12 National Security Complex, Oak Ridge, Tennessee* (B&W Y-12 2014).

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2.0 MONITORING WELL STATUS

For this plan, the groundwater monitoring wells at Y-12 are assigned active status (Table B.1) or inactive status (Table B.2) in accordance with the decision process illustrated on Figure A.2. Although the wells granted either status may be suitable for hydrologic monitoring and groundwater sampling, only wells granted active status will be used for either purpose by the GWPP.

The wells in each hydrogeologic regime that are granted active or inactive status under the GWPP reflect decisions made in response to the findings of an independent assessment of the GWPP that was completed in December 2005 (BWXT Y-12, L.L.C. [BWXT] 2005) and a subsequent supplemental assessment completed in January 2009 (B&W Y-12 2009). Both assessments, hereafter referenced as the baseline GWPP assessment and the supplemental GWPP assessment, respectively, included quantitative evaluations performed using *Monitoring and Remediation Optimization System* (MAROS) proprietary computer software. Only data that meet GWPP data quality objectives (DQOs) were used as MAROS input, with sampling results obtained during January 1995 - December 2004 evaluated under the baseline GWPP assessment, and sampling results obtained during January 1986 - December 2007 evaluated under the supplemental GWPP assessment. Quantitative evaluations performed by the MAROS software included temporal trend analyses (linear regression) and non-parametric trend analyses (Mann-Kendall) for each applicable contaminant of concern (COC) in the groundwater at each well. Also, for each COC, the MAROS software performed spatial analyses using a weighted "area-of-influence" approach (implemented using Delaunay triangulation) to determine the relative value (significance) of data generated by each well. For each applicable well, the results of these MAROS-based "well sufficiency" and "well redundancy" evaluations from the baseline and supplemental assessments of the GWPP were factored into the designation of active or inactive well status.

The designated status of each well will not change unless warranted by future circumstances and approved by the GWPP Manager. For example, a well that currently is granted inactive status may be used to replace a nearby well granted active status that has been irreparably damaged or destroyed. Additionally, the sampling frequency of a well may be reduced if the contaminant concentrations show a persistent decreasing or stable trend over time.

2.1 ACTIVE STATUS

As detailed in the following respective subsections, active status under the GWPP is granted to a total of 358 wells at Y-12, including 134 wells located in the Bear Creek Regime (Figure A.3), 138 wells located in the East Fork Regime (Figure A.4), and 86 wells located in the Chestnut Ridge Regime (Figure A.5). The wells granted active status serve one or more of the three monitoring purposes outlined below and specified on Table B.1.

- Wells used by the GWPP for site-wide monitoring per the requirements and objectives of DOE Order 436.1, *Departmental Sustainability*, and DOE Order 458.1, *Radiation Protection of the Public and the Environment*, which hereafter are referenced collectively as DOE Order Monitoring.
- Wells designated for use under one or more regulatory-driven monitoring programs.
- Wells used to monitor groundwater surface elevations (hydrologic monitoring).

Active status under the GWPP also will be granted to any newly installed well that meets the design and construction standards described in the *Monitoring Well Installation Plan for the Department of Energy Y-12 Plant, Oak Ridge, Tennessee* (Lockheed Martin Energy Systems, Inc. 1997) and serves an ongoing regulatory

monitoring program or provides data suited to the technical purposes or programmatic objectives of the GWPP. New wells that do not meet these criteria will be granted inactive status.

2.1.1 DOE Order Monitoring

Active status is granted to each well at Y-12 that serves the following objectives and requirements specified by DOE Order 436.1 and 458.1 for site-wide monitoring of groundwater that has been or could be impacted by facility operations at Y-12:

- determine and document baseline conditions of groundwater quality and quantity;
- demonstrate compliance with and implementation of all applicable state and federal regulations and DOE orders;
- ensure early detection of groundwater pollution or contamination from an operating facility or practice and provide an early warning to trigger appropriate response actions to unplanned releases of contaminants to the subsurface;
- identify existing and potential groundwater contamination sources and to maintain surveillance of these sources;
- evaluate groundwater quality in areas where contaminants have the potential to migrate off-site;
- meet long-term objectives for monitoring in areas where wastes and other subsurface contaminants will remain after all active site operations have ceased; and
- support decisions concerning land-use practices and the management of groundwater resources.

To achieve DOE Order Monitoring objectives, the GWPP performs hydrologic and groundwater quality monitoring in conjunction with concurrent regulatory-driven groundwater quality monitoring performed by other organizations. Groundwater quality monitoring performed by the GWPP is focused on (1) surveillance monitoring in areas of known, suspected, or potential sources of groundwater contamination at Y-12, and (2) perimeter/exit pathway monitoring at site boundary locations and in the primary pathways for groundwater transport of mobile contaminants from Y-12. Occasionally, special hydrogeologic and/or water quality studies are implemented by the GWPP as part of surveillance monitoring.

Excluding wells designated for regulatory-driven monitoring programs, there are 153 wells currently granted active status that serve the purposes of DOE Order Monitoring (Table B.1), including 54 wells located in the Bear Creek Regime (Fig. A.3), 87 wells located in the East Fork Regime (Fig. A.4), and 12 wells located in the Chestnut Ridge Regime (Fig. A.5). Most of these wells are used for surveillance monitoring and the total number of wells that are sampled from year to year changes depending on sampling frequency optimization (see Sect. 3.2) and the discretion of the GWPP Manager. The network of sampling locations for perimeter/exit-pathway monitoring includes 11 wells located in the East Fork Regime at the eastern end of Y-12 between Upper East Fork Poplar Creek and Scarboro Road (Fig. A.4). However, data from several regulatory wells, and from surface water and spring monitoring locations supplement data from these wells to meet perimeter/exit pathway monitoring requirements in each regime. For example, in the Bear Creek Regime, the designated perimeter/exit pathway monitoring wells are RCRA wells located approximately 6,500 ft southwest of the BCBG along a strike-normal transect across the Maynardville Limestone (Figure A.3), which provides the principal pathways for mobile groundwater contaminants to migrate westward beyond the current extent of contamination in BCV. Furthermore, selected springs and surface water stations located along Bethel Valley Road in main channels of drainage features are the designated perimeter/exit pathway monitoring locations in the Chestnut Ridge Regime (Figure A.5).

Groundwater sampling and analysis activities implemented by the GWPP for the purposes of DOE Order Monitoring are performed in accordance with standardized GWPP monitoring protocols described and/or referenced in the annual Sampling and Analysis Plan (SAP) issued by the GWPP for each calendar year (CY). Data (field measurements and analytical results) obtained for DOE Order Monitoring obtained during each CY are presented and evaluated in a Groundwater Monitoring Report (GWMR) issued annually by the GWPP.

2.1.2 Regulatory Monitoring Programs

Active status is granted to each groundwater monitoring well that is identified in the current respective Resource Conservation and Recovery Act (RCRA) post-closure permit (PCP) for the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime. Each PCP defines the requirements for RCRA post-closure groundwater monitoring at the specified sites in the corresponding hydrogeologic regime. Collectively, the PCPs designate a total of 60 wells for RCRA post-closure detection monitoring and/or RCRA post-closure corrective action monitoring (Table B.1).

Active status is granted to 75 monitoring wells at Y-12 that serve Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA) monitoring purposes (Table B.1). The data from these wells meet requirements of remediation effectiveness monitoring in each watershed (hydrologic regime) and detection monitoring at the Environmental Monitoring Waste Management Facility in the Bear Creek Regime.

Active status is granted to the 12 wells designated for SWDF detection monitoring at three nonhazardous solid waste landfills located in the Chestnut Ridge Regime (Table B.1): Sanitary Landfill II, Industrial Landfill V, and Construction/Demolition Landfill VII. Active status also is granted to six wells designated for SWDF Assessment Monitoring Phase 3 at Industrial Landfill IV, including a downgradient "plume boundary well" located at the United Nuclear Corporation Site, which is an inactive CERCLA-regulated facility.

Ongoing RCRA-, CERCLA-, and SWDF-related groundwater sampling and analysis activities in each hydrogeologic regime at Y-12 are implemented by the DOE-Environmental Management (EM) contractor and not by the GWPP. Nevertheless, the regulatory monitoring programs employ similar or technically equivalent groundwater sampling methods and laboratory analytical procedures. Consequently, the field and laboratory data obtained for the regulatory monitoring programs generally meet the DQOs of the GWPP, as defined in the most recent version of the *Y-12 Groundwater Protection Program Data Management Plan* (B&W Y-12 2012), and are suitable for the purposes of DOE Order Monitoring.

2.1.3 Hydrologic Monitoring

Active status is granted to each groundwater monitoring well that is part of the respective regime-wide network of wells used for monitoring groundwater surface elevations in the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime. Section 3.1 provides details regarding the hydrologic monitoring wells in each regime. Using fixed networks of hydrologic monitoring wells in each regime ensures that the GWPP obtains adequate, equivalent, consistent, and representative groundwater elevation data.

2.1.4 Qualitative Review

Regardless of the other applicable criteria, active status may be granted to any well at Y-12 that, based on the objective professional judgment of the GWPP Manager, is considered suitable for the technical purposes and/or programmatic objectives of the GWPP.

2.2 INACTIVE STATUS

Based on the criteria listed below, inactive status under the GWPP currently is granted to 192 groundwater monitoring wells at Y-12, including 104 wells in the Bear Creek Regime, 63 wells in the East Fork Regime, and 25 wells in the Chestnut Ridge Regime (Table B.2).

- Wells for which the design and construction details are not known or do not meet GWPP technical standards, and wells that do not meet other GWPP requirements (e.g., all-weather access).
- Wells for which groundwater quality and hydrologic monitoring data are not available or are no longer needed to serve the technical or programmatic purposes of the GWPP.
- Wells for which the baseline (BWXT 2005) or the supplemental (B&W Y-12 2009) assessments of the GWPP recommend discontinued groundwater quality monitoring under the GWPP (Figure A.2). The assessment criteria included quantitative well redundancy evaluation to differentiate wells that provide less significant data from one or more neighboring wells and, therefore, do not warrant continued groundwater sampling (unless specifically required under a regulatory-driven monitoring program).

As noted previously, a well currently granted inactive status under the GWPP may be re-assigned active status in response to programmatic or technical changes. Similarly, active status will be re-assigned to any well currently granted inactive status that becomes incorporated into ongoing RCRA, CERCLA, or SWDF monitoring programs at Y-12.

3.0 MONITORING WELL UTILIZATION

As described in the following subsections, each groundwater monitoring well at Y-12 that is granted active status under the GWPP is generally suitable for hydrologic monitoring and/or groundwater quality sampling. To ensure their continued use for either purpose, the wells will be appropriately inspected and maintained.

3.1 HYDROLOGIC MONITORING

A total of 221 wells at Y-12 that are granted active status under the GWPP are designated for hydrologic monitoring (Table B.1), including 79 wells in the Bear Creek Regime, 65 wells in the East Fork Regime, and 77 wells in the Chestnut Ridge Regime. The respective network of hydrologic monitoring wells in each regime provides the geographic coverage needed to determine regime-wide groundwater surface elevations, evaluate localized groundwater flow patterns, and calculate representative hydraulic gradients.

The elevation of the groundwater surface throughout the Bear Creek Regime, East Fork Regime, and Chestnut Ridge Regime will be determined at least annually based on the depth-to-water measurements recorded for the hydrologic monitoring wells in each regime. To ensure the most contemporaneous regime-wide data, measurements of the depth to water in all of the hydrologic monitoring wells in each regime will be completed in the shortest time practical. The depth to water in each well will be measured in accordance with the most recent approved version of the applicable GWPP procedure or functionally equivalent procedure. Annual depth-to-water measurements will be obtained during alternating wet (winter and spring) and dry (summer and fall) seasonal flow conditions. The GWPP and the DOE-EM contractor share the annual hydrologic monitoring data and collect the data during alternating years. The GWPP obtains depth-to-water measurements in odd numbered years during seasonally wet weather and high groundwater flow conditions.

3.2 GROUNDWATER QUALITY SAMPLING

The GWPP defines the groundwater quality sampling requirements (sampling frequency, sampling method, field measurements, and laboratory analytes) for each well granted active status under the GWPP, excluding wells that serve RCRA, CERCLA, or SWDF monitoring programs. The sampling frequency only applies to sampling performed under the GWPP and does not replace or supersede any regulatory and/or permit-driven sampling frequency specified for applicable wells granted active status (e.g., wells designated for RCRA Monitoring).

The groundwater sampling frequency for each well used for DOE Order Monitoring at Y-12 is based on results of MAROS-based quantitative evaluations performed under the supplemental assessment of the GWPP and the professional judgment of the GWPP Manager (Table B.1). Output from the MAROS evaluations specified one of the following recommended sampling frequencies for each well: semiannual, annual, biennial, every five years, or eliminate (discontinue sampling). The GWPP Manager assigned the CY (even or odd) sampling schedule for wells with a biennial or five-year sampling frequency (Table B.1). The annual SAP issued by the GWPP shows the required sampling frequency for all applicable wells scheduled for sampling during the CY.

The annual GWMR issued by the GWPP presents an evaluation of the groundwater monitoring results obtained each CY. Based on the results of the annual evaluations, the GWMR may contain recommendations to alter the sampling frequency for applicable wells. Any such recommended changes are evaluated by the GWPP Manager and, if approved, are reflected in the subsequent annual SAP issued by the GWPP.

Only unfiltered groundwater quality samples are collected by the GWPP; filtered samples are obtained only if specifically requested by the GWPP Manager (or authorized designee). The use of low impact sampling methods (e.g., low-flow, minimal drawdown) typically yields non-turbid groundwater samples and therefore eliminates the need for routine filtered sample results. All sampling and related field activities (e.g., depth-to-water measurements) are performed in accordance with the methods described in the GWPP procedures, or functionally equivalent procedures used by other organizations responsible for implementation of the regulatory monitoring programs at Y-12.

Historically, all groundwater samples collected by the GWPP were analyzed for a comprehensive suite of inorganic, organic, and radiological analytes referred to as the Standard Administrative Parameter Group. Beginning in January 2009, selective parameter monitoring (SPM) for a reduced list of analytes was adopted for groundwater samples from a subset of monitoring wells for which available data clearly demonstrate that the selected parameters provide sufficient data for GWPP purposes. Groundwater samples from wells selected for SPM periodically may be analyzed for the full Standard Administrative Parameter Group to verify consistency with historical data or to meet programmatic requirements of the GWPP.

3.3 INSPECTION AND MAINTENANCE

Groundwater monitoring wells at Y-12 are regularly inspected and actively maintained to ensure that they continue to yield representative hydrologic and groundwater quality monitoring data. The active or inactive status designation for each well determines the frequency at which the GWPP will inspect the applicable wells, the scope of these inspections, and the extent of maintenance response actions. Inspection and maintenance activities will be performed in accordance with the most recent version of the *Y-12 Groundwater Protection Program Monitoring Well Inspection and Maintenance Plan* (Consolidated Nuclear Security, LLC [CNS] 2016), which applies only to the wells for which the GWPP assumes organizational responsibility. The DOE-EM contractor retains responsibility for the wells that are used for RCRA-, CERCLA-, and SWDF-related groundwater monitoring, with respective inspection and maintenance requirements defined and/or referenced in the governing regulatory documents (see Section 2.1.1).

Wells granted active status that are monitored by the GWPP (per the SAP for the CY and per hydrologic monitoring schedules) will be inspected each year. During the inspection of each well, the security status (locked or unlocked well cap) will be verified and the applicable above-ground components (identification tag, cap, lock hasp, lock, concrete pad, and protective posts) will be assessed for visible damage, deterioration, and functionality. All-weather access to each well also will be evaluated during the annual inspection. Every three years, as a qualitative check on down-hole conditions in each well granted active status, the total depth to the bottom of the well will be measured and compared to the Reference Tag Depth for the well (B&W Y-12 2013b). Based on the outcome of each inspection, the GWPP Manager will initiate the necessary and appropriate maintenance actions needed to ensure the access, security, physical condition, and performance of the applicable well(s).

Wells granted inactive status under the GWPP will be inspected once every three years (CNS 2016). Based on the outcome of each inspection, the GWPP Manager will initiate only those maintenance actions needed to ensure the security and identification of each well, such as replacement of inoperable well locks and identification tags. Also, damaged wells that may represent an uncontrolled conduit from the surface to the subsurface will be repaired or plugged and abandoned as quickly as possible.

4.0 REFERENCES

Babcock & Wilcox Technical Services Y-12, LLC (B&W Y-12). 2009. *Supplemental Assessment of the Y-12 Groundwater Protection Program Using Monitoring and Remediation Optimization System Software.* Prepared by Elvado Environmental LLC and GSI Environmental, Inc. (Y/TS-2118).

B&W Y-12. 2012. *Y-12 Groundwater Protection Program Data Management Plan.* Prepared by the Environment, Safety, and Health Division and the Information Technology Organization (Y/TS-2007/R4).

B&W Y-12. 2013a. *Updated Subsurface Data Base for Bear Creek Valley, Chestnut Ridge, and Parts of Bethel Valley on the U.S. Department of Energy Oak Ridge Reservation.* Prepared by the Y-12 Environment, Safety, and Health Division (Y/TS-881/R6).

B&W Y-12. 2013b. *Y-12 Groundwater Protection Program CY 2012 Triennial Report of the Monitoring Well Inspection and Maintenance Program, Y-12 National Security Complex, Oak Ridge, Tennessee.* Prepared by the Y-12 Environment, Safety, and Health Division (Y/TS-2352).

B&W Y-12. 2014. *Groundwater Protection Program Management Plan for the U.S. Department of Energy Y-12 National Security Complex, Oak Ridge, Tennessee.* Prepared by Elvado Environmental LLC. (Y/TS-2357).

BWXT Y-12 L.L.C. 2005. *Assessment of the Groundwater Protection Program, Y-12 National Security Complex, Oak Ridge, Tennessee.* Prepared by Groundwater Services, Inc. (Y/TS-1984).

Consolidated Nuclear Security, LLC (CNS) 2016. *Y-12 Groundwater Protection Program Monitoring Well Inspection and Maintenance Plan.* Prepared by the Y-12 Environment, Safety, and Health Division (Y/TS-1215/R5).

Lockheed Martin Energy Systems, Inc. 1997. *Monitoring Well Installation Plan for the Department of Energy Y-12 Plant, Oak Ridge, Tennessee.* Prepared by Science Applications International Corporation (Y/SUB/00-KFX63/C/1).

APPENDIX A

FIGURES

Elvado: GWPPfig1 06/03/16

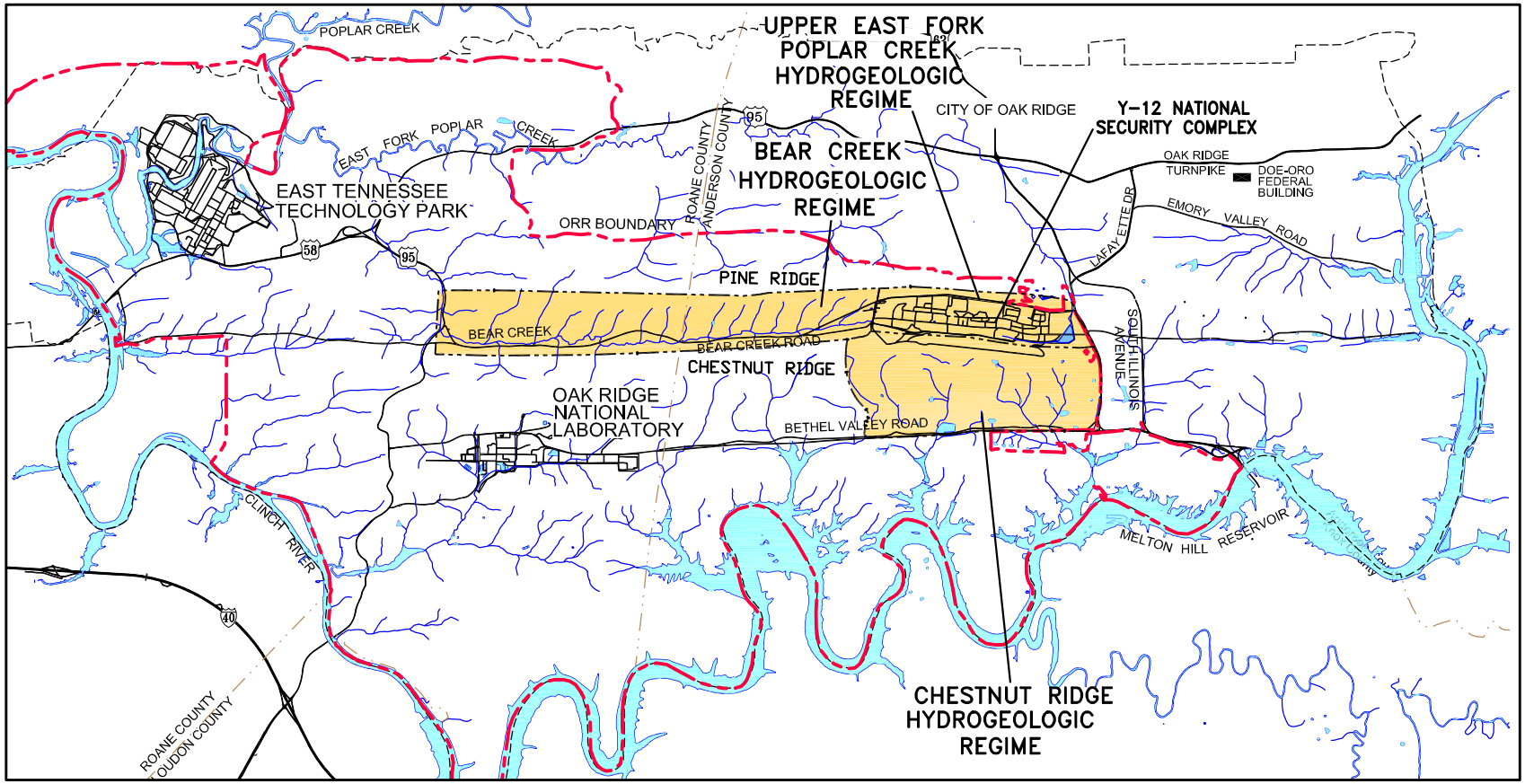


Fig. A.1. Hydrogeologic regimes at the Y-12 National Security Complex.

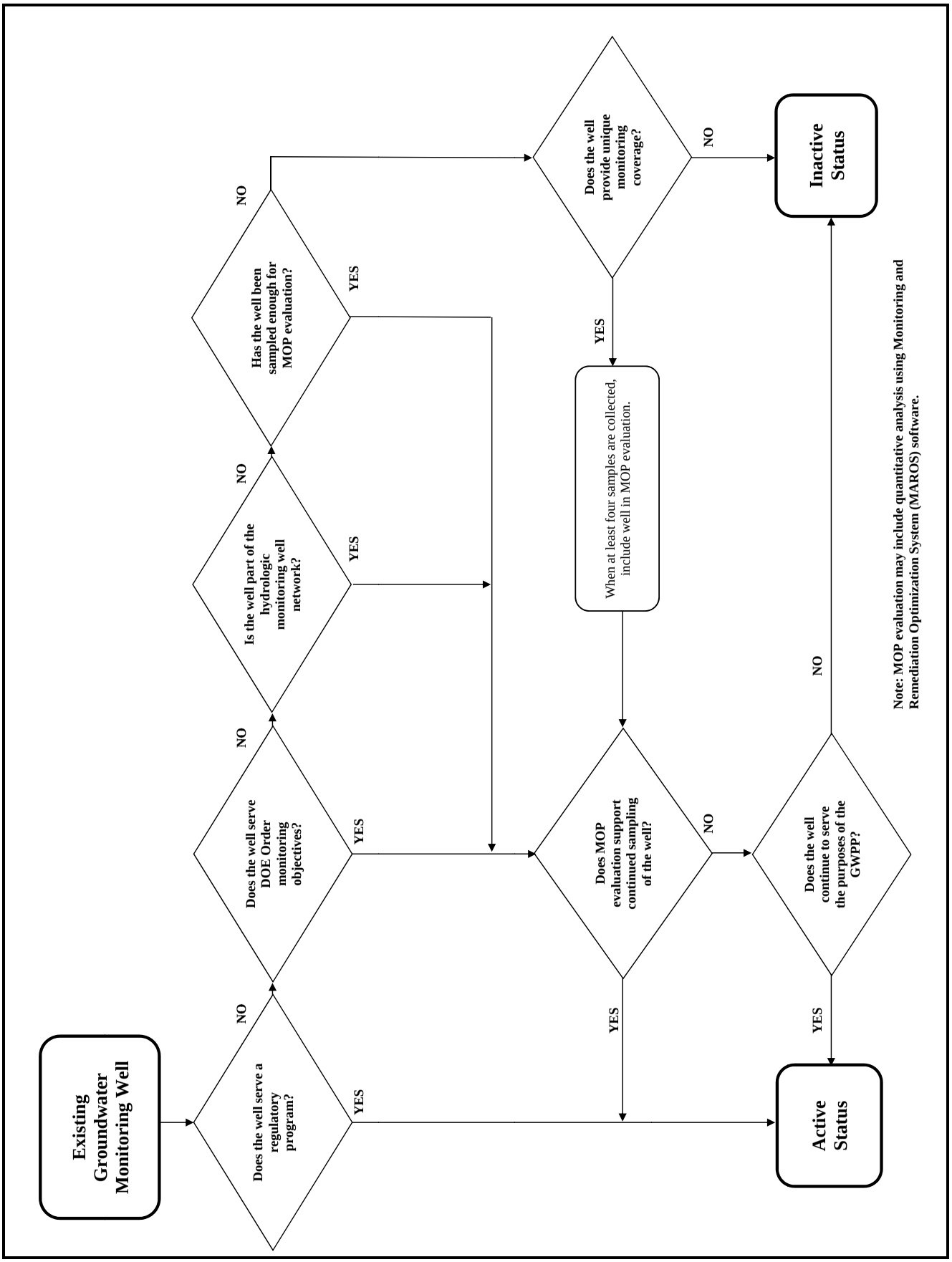
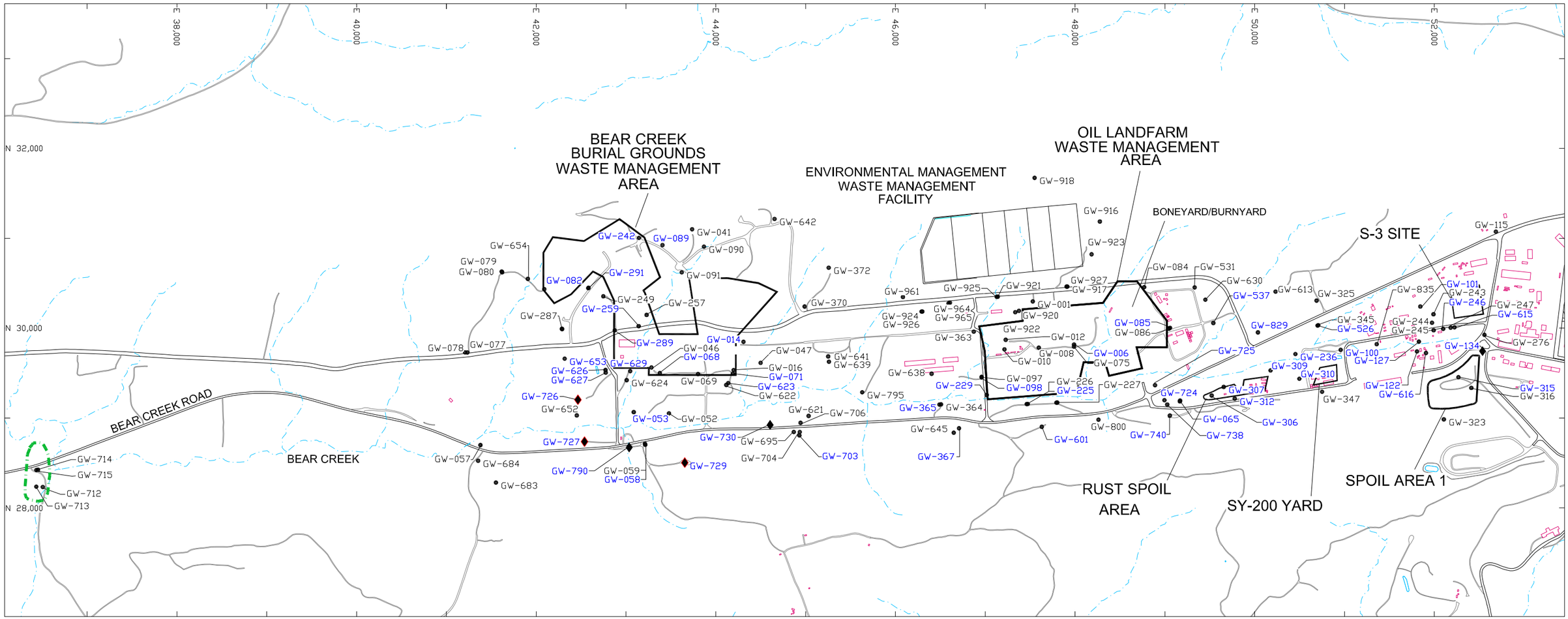


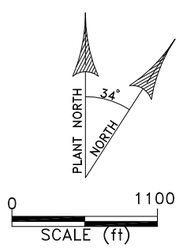
Fig. A.2. Process used to designate the status of groundwater monitoring wells at the Y-12 National Security Complex.



EXPLANATION

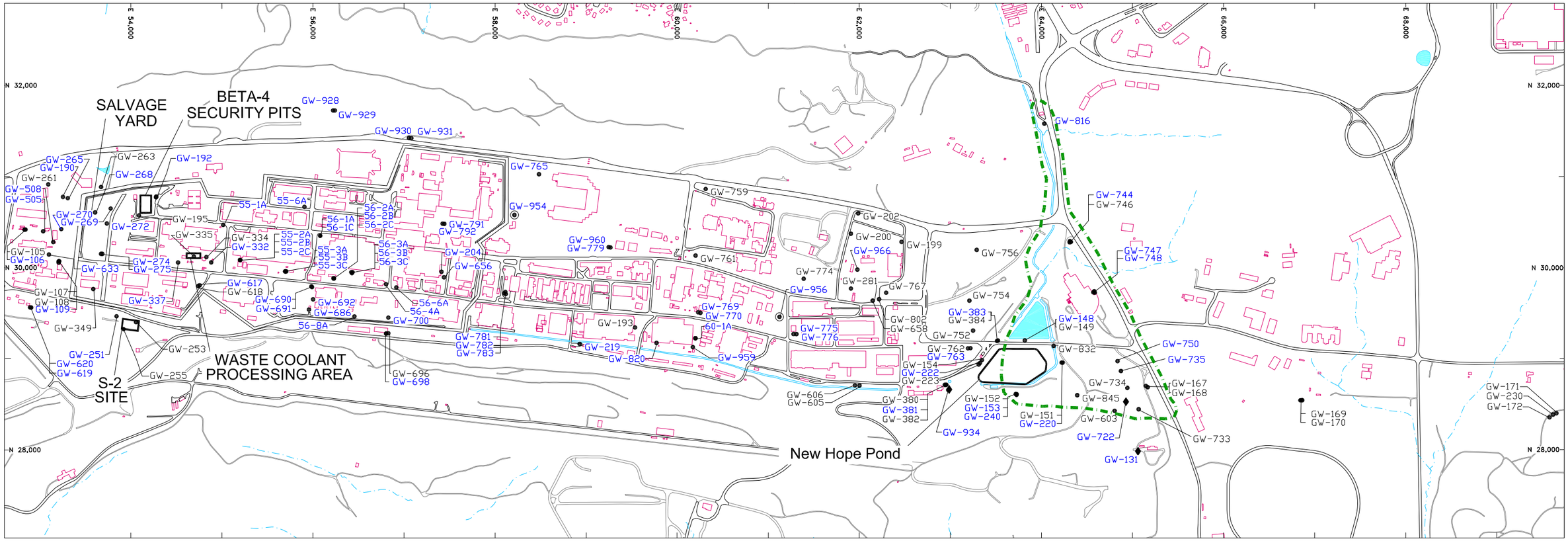
Monitoring wells shown in blue text are sampled by the Y-12 Groundwater Protection Program

- Active groundwater monitoring well
- Active Westbay groundwater monitoring well
- Surface drainage feature
- Principal Waste Management Sites
- Perimeter/exit pathway monitoring area



MOP17_3 03-16

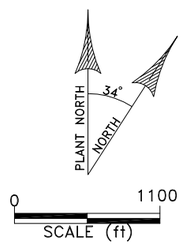
Fig.A.3. Locations of groundwater monitoring wells in the Bear Creek Hydrogeologic Regime that are granted active status under the Y-12 Groundwater Protection Program.



EXPLANATION

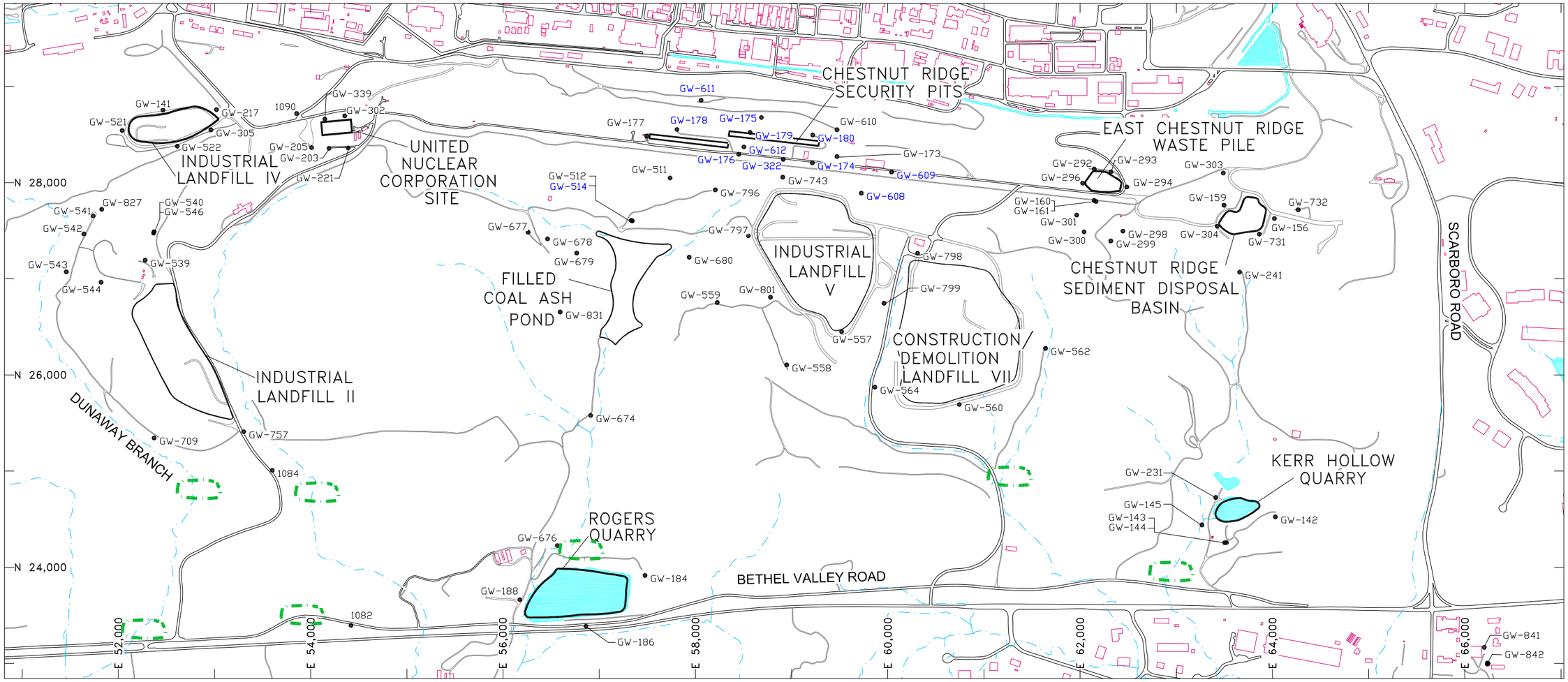
Monitoring wells shown in blue text are sampled by the Y-12 Groundwater Protection Program

- Active groundwater monitoring well
- Active BarCad groundwater monitoring well
- Active Westbay groundwater monitoring well
- Surface drainage feature
- Principal Waste Management Sites
- Perimeter/exit pathway monitoring area



MOP17_4 03-16

Fig.A.4. Locations of groundwater monitoring wells in the Upper East Fork Poplar Creek Hydrogeologic Regime that are granted active status under the Y-12 Groundwater Protection Program.



EXPLANATION

Monitoring wells shown in blue text are sampled by the Y-12 Groundwater Protection Program

- Active groundwater monitoring well
- Surface drainage feature
- Principal Waste Management Sites
- Perimeter/exit pathway monitoring area (Springs, Seeps, and Surface Water Stations)

PLANT NORTH / NORTH 34°

0 1100
SCALE (ft)

MOP17_5 04-19

Fig.A.5. Locations of groundwater monitoring wells in the Chestnut Ridge Hydrogeologic Regime that are granted active status under the Y-12 Groundwater Protection Program.

APPENDIX B

TABLES

Table B.1 Groundwater monitoring wells that are granted active status under the Y-12 Groundwater Protection Program

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
1082	CR	.	.	.	●	.	.
1084	CR	.	.	.	●	.	.
1090	CR	.	●	.	●	.	.
55-1A	EF	.	.	.	●	●	5 Year (2018)
55-2A	EF	.	.	.	●	●	Biennial (Odd)
55-2B	EF	.	.	.	.	●	Annual
55-2C	EF	.	.	.	.	●	Biennial (Odd)
55-3A	EF	.	.	.	●	●	Biennial (Odd)
55-3B	EF	.	.	.	.	●	Annual
55-3C	EF	.	.	.	.	●	Biennial (Odd)
55-6A	EF	.	.	.	●	●	5 Year (2018)
56-1A	EF	.	.	.	●	●	Biennial (Even)
56-1C	EF	.	.	.	.	●	Biennial (Even)
56-2A	EF	.	.	.	●	●	Biennial (Odd)
56-2B	EF	.	.	.	.	●	Annual
56-2C	EF	.	.	.	.	●	Biennial (Odd)
56-3A	EF	.	.	.	.	●	Biennial (Odd)
56-3B	EF	.	.	.	.	●	Biennial (Odd)
56-3C	EF	.	.	.	.	●	Annual
56-4A	EF	.	.	.	.	●	Annual
56-6A	EF	.	.	.	.	●	Biennial (Even)
56-8A	EF	.	.	.	●	●	Biennial (Even)
60-1A	EF	.	.	.	●	●	Biennial (Even)
GW-001	BC	.	.	.	●	.	.
GW-006	BC	.	.	.	.	●	Biennial (Even)
GW-008	BC	●	.	.	●	.	.
GW-010	BC	●	.	.	●	.	.
GW-012	BC	●	.	.	●	.	.
GW-014	BC	●	.	.	●	●	Biennial (Even)
GW-016	BC	.	.	.	●	.	.
GW-041	BC	.	.	.	●	.	.
GW-046	BC	●	.	.	●	.	.
GW-047	BC	.	.	.	●	.	.
GW-052	BC	.	.	.	●	.	.
GW-053	BC	.	.	.	●	●	Biennial (Odd)
GW-057	BC	.	.	.	●	.	.
GW-058	BC	.	.	.	.	●	Biennial (Odd)
GW-059	BC	.	.	.	●	.	.
GW-065	BC	.	.	.	●	●	5 Year (2019)
GW-068	BC	.	.	.	.	●	Biennial (Even)
GW-069	BC	●	.	.	●	.	.
GW-071	BC	●	.	.	.	●	Biennial (Odd)

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-075	BC	●	.	.	.	.	.
GW-077	BC	.	●	.	.	.	.
GW-078	BC	.	●	.	●	.	.
GW-079	BC	.	●	.	.	.	.
GW-080	BC	.	●	.	●	.	.
GW-082	BC	●	.	.	●	●	Biennial (Even)
GW-084	BC	.	.	.	●	.	.
GW-085	BC	.	.	.	.	●	Annual
GW-086	BC	.	.	.	●	.	.
GW-089	BC	.	.	.	.	●	5 Year (2018)
GW-090	BC	.	.	.	●	.	.
GW-091	BC	.	.	.	●	.	.
GW-097	BC	.	.	.	●	.	.
GW-098	BC	.	.	.	.	●	5 Year (2019)
GW-100	BC	.	.	.	●	●	Biennial (Odd)
GW-101	BC	●	.	.	●	●	5 Year (2019)
GW-105	EF	.	.	.	●	.	.
GW-106	EF	.	.	.	.	●	Biennial (Even)
GW-107	EF	.	.	.	●	.	.
GW-108	EF	●	.	.	●	.	.
GW-109	EF	●	.	.	.	●	Biennial (Even)
GW-115	BC	.	.	.	●	.	.
GW-122	BC	.	.	.	.	●	Biennial (Odd)
GW-127	BC	●	.	.	●	●	Biennial (Odd)
GW-131 (10)	EF	.	.	.	.	●	TBD
GW-134 (10)	BC	.	.	.	.	●	TBD
GW-141	CR	.	.	●	●	.	.
GW-142	CR	.	.	.	●	.	.
GW-143	CR	■	●	.	.	.	.
GW-144	CR	■	●	.	●	.	.
GW-145	CR	■	●	.	●	.	.
GW-148	EF	.	.	.	●	●	Biennial (Even)
GW-149	EF	.	●	.	.	.	.
GW-151	EF	.	●	.	●	.	.
GW-152	EF	.	●	.	●	.	.
GW-153	EF	.	●	.	.	●	Biennial (Odd)
GW-154	EF	.	●	.	●	.	.
GW-156	CR	■	.	.	●	.	.
GW-159	CR	■	.	.	●	.	.
GW-160	CR	.	.	.	●	.	.
GW-161	CR	■	.	.	.	.	.
GW-167	EF	.	.	.	●	.	.
GW-168	EF	.	●	.	.	.	.

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-169	EF	.	●	.	●	.	.
GW-170	EF	.	●	.	.	.	.
GW-171	EF	.	●	.	.	.	.
GW-172	EF	.	●	.	.	.	.
GW-173	CR	.	.	.	●	.	.
GW-174	CR	.	.	.	●	●	5 Year (2022)
GW-175	CR	●	.	.	●	●	5 Year (2022)
GW-176	CR	.	.	.	●	●	5 Year (2022)
GW-177	CR	●	.	.	●	.	.
GW-178	CR	.	.	.	●	●	5 Year (2022)
GW-179	CR	.	.	.	●	●	5 Year (2022)
GW-180	CR	.	.	.	●	●	5 Year (2022)
GW-184	CR	.	.	.	●	.	.
GW-186	CR	.	.	.	●	.	.
GW-188	CR	.	.	.	●	.	.
GW-190	EF	.	.	.	.	●	5 Year (2018)
GW-192	EF	.	.	.	●	●	5 Year (2018)
GW-193	EF	●	.	.	●	.	.
GW-195	EF	.	.	.	●	.	.
GW-199	EF	.	.	.	●	.	.
GW-200	EF	.	.	.	●	.	.
GW-202	EF	.	.	.	●	.	.
GW-203	CR	.	●	.	●	.	.
GW-204	EF	.	.	.	●	●	Annual
GW-205	CR	.	●	●	●	.	.
GW-217	CR	.	.	●	●	.	.
GW-219	EF	.	●	.	●	●	Biennial (Odd)
GW-220	EF	.	.	.	.	●	Annual
GW-221	CR	.	●	.	●	.	.
GW-222	EF	.	.	.	.	●	Biennial (Even)
GW-223	EF	.	●	.	.	.	.
GW-225	BC	.	.	.	.	●	Biennial (Even)
GW-226	BC	.	.	.	●	.	.
GW-227	BC	.	.	.	●	.	.
GW-229	BC	.	.	.	●	●	Biennial (Odd)
GW-230	EF	.	●	.	.	.	.
GW-231	CR	■	●	.	●	.	.
GW-236	BC	.	.	.	●	●	Biennial (Odd)
GW-240	EF	.	.	.	.	●	Biennial (Odd)
GW-241	CR	.	.	.	●	.	.
GW-242	BC	.	.	.	●	●	Biennial (Odd)
GW-243	BC	●	.	.	.	.	.
GW-244	BC	●	.	.	.	.	.

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-245	BC	●	.	.	●	.	.
GW-246	BC	●	.	.	.	●	Biennial (Even)
GW-247	BC	●	.	.	.	.	.
GW-249	BC	.	.	.	●	.	.
GW-251	EF	.	.	.	●	●	Biennial (Even)
GW-253	EF	●	●	.	●	.	.
GW-255	EF	.	.	.	●	.	.
GW-257	BC	●	.	.	●	.	.
GW-259	BC	.	.	.	.	●	5 Year (2018)
GW-261	EF	.	.	.	●	.	.
GW-263	EF	.	.	.	●	.	.
GW-265	EF	.	.	.	.	●	Biennial (Odd)
GW-268	EF	.	.	.	.	●	Biennial (Odd)
GW-269	EF	.	.	.	.	●	Biennial (Odd)
GW-270	EF	.	.	.	.	●	Biennial (Even)
GW-272	EF	.	.	.	.	●	Biennial (Even)
GW-274	EF	●	.	.	.	●	Annual
GW-275	EF	●	.	.	.	●	Annual
GW-276	BC	●	.	.	●	.	.
GW-281	EF	.	●	.	.	.	.
GW-287	BC	.	.	.	●	.	.
GW-289	BC	●	.	.	●	●	Biennial (Odd)
GW-291	BC	●	.	.	●	●	5 Year (2020)
GW-292	CR	■	.	.	●	.	.
GW-293	CR	■	.	.	.	.	.
GW-294	CR	■	.	.	.	.	.
GW-296	CR	■	.	.	.	.	.
GW-298	CR	●	.	.	●	.	.
GW-299	CR	.	.	.	●	.	.
GW-300	CR	.	.	.	●	.	.
GW-301	CR	■	.	.	●	.	.
GW-302	CR	.	.	.	●	.	.
GW-303	CR	.	.	.	●	.	.
GW-304	CR	.	.	.	●	.	.
GW-305	CR	.	●	●	●	.	.
GW-306	BC	.	.	.	.	●	5 Year (2018)
GW-307	BC	.	.	.	●	●	Biennial (Even)
GW-309	BC	.	.	.	●	●	5 Year (2018)
GW-310	BC	.	.	.	●	●	5 Year (2019)
GW-312	BC	.	.	.	.	●	Biennial (Even)
GW-315	BC	.	.	.	.	●	Biennial (Even)
GW-316	BC	.	.	.	●	.	.
GW-322	CR	.	.	.	●	●	5 Year (2022)

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-323	BC	.	.	.	●	.	.
GW-325	BC	.	.	.	●	.	.
GW-332	EF	.	.	.	.	●	Biennial (Odd)
GW-334	EF	.	.	.	●	.	.
GW-335	EF	.	.	.	●	.	.
GW-337	EF	.	.	.	.	●	Biennial (Odd)
GW-339	CR	.	.	.	●	.	.
GW-345	BC	.	.	.	●	.	.
GW-347	BC	.	.	.	●	.	.
GW-349	EF	.	.	.	●	.	.
GW-363	BC	●	■	.	.	.	.
GW-364	BC	.	.	.	●	.	.
GW-365	BC	.	.	.	.	●	Biennial (Odd)
GW-367	BC	.	.	.	.	●	5 Year (2018)
GW-370	BC	.	.	.	●	.	.
GW-372	BC	.	.	.	●	.	.
GW-380	EF	.	●	.	●	.	.
GW-381	EF	.	●	.	.	●	Annual
GW-382	EF	.	●	.	.	.	.
GW-383	EF	.	●	.	●	●	Biennial (Even)
GW-384	EF	.	●	.	.	.	.
GW-505	EF	.	.	.	.	●	Biennial (Odd)
GW-508	EF	.	.	.	.	●	Biennial (Odd)
GW-511	CR	.	.	.	●	.	.
GW-512	CR	.	.	.	●	.	.
GW-514	CR	.	.	.	.	●	5 Year (2022)
GW-521	CR	●	.	●	●	.	.
GW-522	CR	.	.	●	●	.	.
GW-526	BC	.	.	.	.	●	Annual
GW-531	BC	.	.	.	●	●	Biennial (Odd)
GW-537	BC	.	.	.	●	●	Annual
GW-539	CR	.	.	.	●	.	.
GW-540	CR	.	.	■	.	.	.
GW-541	CR	.	.	.	●	.	.
GW-542	CR	.	.	.	●	.	.
GW-543	CR	.	.	.	●	.	.
GW-544	CR	.	.	.	●	.	.
GW-546	CR	.	.	.	●	.	.
GW-557	CR	●	.	■	●	.	.
GW-558	CR	.	.	.	●	.	.
GW-559	CR	.	.	.	●	.	.
GW-560	CR	.	.	■	●	.	.
GW-562	CR	●	.	■	●	.	.

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-564	CR	.	.	■	●	.	.
GW-601	BC	.	.	.	.	●	Biennial (Even)
GW-603	EF	.	.	.	●	.	.
GW-605	EF	●	●	.	●	.	.
GW-606	EF	●	●	.	●	.	.
GW-608	CR	●	.	.	●	●	5 Year (2022)
GW-609	CR	●	.	.	●	●	5 Year (2022)
GW-610	CR	.	.	.	●	.	.
GW-611	CR	.	.	.	●	●	5 Year (2022)
GW-612	CR	.	.	.	●	●	5 Year (2022)
GW-613	BC	.	.	.	●	.	.
GW-615	BC	●	.	.	.	●	Biennial (Odd)
GW-616	BC	.	.	.	.	●	Biennial (Odd)
GW-617	EF	.	.	.	●	●	5 Year (2018)
GW-618	EF	.	●	.	.	.	.
GW-619	EF	.	.	.	●	●	Biennial (Even)
GW-620	EF	.	.	.	.	●	Biennial (Even)
GW-621	BC	.	.	.	●	.	.
GW-622	BC	.	.	.	●	.	.
GW-623	BC	.	.	.	.	●	Biennial (Odd)
GW-624	BC	.	.	.	●	.	.
GW-626	BC	.	.	.	●	●	Biennial (Even)
GW-627	BC	.	.	.	.	●	Biennial (Even)
GW-629	BC	.	.	.	.	●	TBD
GW-630	BC	.	.	.	●	.	.
GW-633	EF	.	.	.	.	●	Biennial (Even)
GW-638	BC	.	.	.	●	.	.
GW-639	BC	.	■	.	.	.	.
GW-641	BC	.	.	.	●	.	.
GW-642	BC	.	.	.	●	.	.
GW-645	BC	.	.	.	●	.	.
GW-652	BC	.	.	.	●	.	.
GW-653	BC	.	.	.	●	●	Biennial (Even)
GW-654	BC	.	.	.	●	.	.
GW-656	EF	.	.	.	.	●	Annual
GW-658	EF	.	●	.	.	.	.
GW-674	CR	.	.	.	●	.	.
GW-676	CR	.	.	.	●	.	.
GW-677	CR	.	.	.	●	.	.
GW-678	CR	.	.	.	●	.	.
GW-679	CR	.	.	.	●	.	.
GW-680	CR	.	.	.	●	.	.
GW-683	BC	.	●	.	●	.	.

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-684	BC	.	●	.	.	.	.
GW-686	EF	.	.	.	●	●	Biennial (Odd)
GW-690	EF	.	.	.	.	●	Biennial (Even)
GW-691	EF	.	.	.	●	●	Biennial (Even)
GW-692	EF	.	.	.	.	●	Annual
GW-695	BC	.	.	.	●	.	.
GW-696	EF	.	.	.	●	.	.
GW-698	EF	.	.	.	.	●	Annual
GW-700	EF	.	.	.	.	●	Biennial (Odd)
GW-703	BC	.	.	.	.	●	5 Year (2022)
GW-704	BC	.	●	.	.	.	.
GW-706	BC	.	●	.	.	.	.
GW-709	CR	.	.	■	●	.	.
GW-712	BC	●	●	.	.	.	.
GW-713	BC	●	●	.	.	.	.
GW-714	BC	●	●	.	.	.	.
GW-715	BC	.	.	.	●	.	.
GW-722 (5)	EF	.	●	.	.	●	Annual
GW-724	BC	.	.	.	.	●	Annual
GW-725	BC	.	.	.	.	●	Biennial (Even)
GW-726 (8)	BC	.	.	.	.	●	TBD
GW-727 (10)	BC	.	.	.	.	●	TBD
GW-729 (10)	BC	.	.	.	.	●	TBD
GW-730 (8)	BC	.	.	.	.	●	TBD
GW-731	CR	■	.	.	●	.	.
GW-732	CR	■	.	.	●	.	.
GW-733	EF	●	●	.	●	.	.
GW-734	EF	.	●	.	●	.	.
GW-735	EF	.	●	.	●	●	Biennial (Odd)
GW-738	BC	.	.	.	.	●	Biennial (Even)
GW-740	BC	.	.	.	.	●	Biennial (Even)
GW-743	CR	.	.	.	●	.	.
GW-744	EF	.	●	.	.	●	Annual
GW-746	EF	.	.	.	●	.	.
GW-747	EF	.	●	.	.	●	Annual
GW-748	EF	.	.	.	●	●	Biennial (Even)
GW-750	EF	.	●	.	.	●	Biennial (Odd)
GW-752	EF	.	.	.	●	.	.
GW-754	EF	.	.	.	●	.	.
GW-756	EF	.	.	.	●	.	.
GW-757	CR	.	.	■	●	.	.
GW-759	EF	.	.	.	●	.	.
GW-761	EF	.	.	.	●	.	.

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-762	EF	.	●	.	.	.	.
GW-763	EF	.	●	.	●	●	Biennial (Even)
GW-765	EF	.	.	.	●	●	Biennial (Odd)
GW-767	EF	.	.	.	●	.	.
GW-769	EF	.	.	.	.	●	Annual
GW-770	EF	.	.	.	●	●	Annual
GW-774	EF	.	.	.	●	.	.
GW-775	EF	.	.	.	.	●	Biennial (Odd)
GW-776	EF	.	.	.	●	●	Biennial (Odd)
GW-779	EF	.	.	.	.	●	Biennial (Odd)
GW-781	EF	.	.	.	.	●	Biennial (Even)
GW-782	EF	.	.	.	.	●	Annual
GW-783	EF	.	.	.	●	●	Annual
GW-790	BC	.	.	.	.	●	TBD
GW-791	EF	.	.	.	.	●	Annual
GW-792	EF	.	.	.	●	●	Biennial (Even)
GW-795	BC	.	.	.	●	.	.
GW-796	CR	●	.	■	●	.	.
GW-797	CR	.	●	■	●	.	.
GW-798	CR	.	●	■	●	.	.
GW-799	CR	●	.	■	●	.	.
GW-800	BC	.	.	.	●	.	.
GW-801	CR	●	.	■	●	.	.
GW-802	EF	.	●	.	.	.	.
GW-816	EF	.	.	.	●	●	Annual
GW-820	EF	.	.	.	.	●	Annual
GW-827	CR	.	.	.	●	.	.
GW-829	BC	.	.	.	●	●	Biennial (Even)
GW-831	CR	●	.	.	●	.	.
GW-832	EF	.	●	.	●	.	.
GW-835	BC	.	.	.	●	.	.
GW-841	CR	.	●	.	.	.	.
GW-842	CR	.	●	.	.	.	.
GW-845	EF	.	●	.	.	.	.
GW-916	BC	.	■	.	●	.	.
GW-917	BC	.	■	.	●	.	.
GW-918	BC	.	■	.	●	.	.
GW-920	BC	.	■	.	.	.	.
GW-921	BC	.	■	.	●	.	.
GW-922	BC	.	■	.	●	.	.
GW-923	BC	.	.	.	●	.	.
GW-924	BC	.	■	.	●	.	.
GW-925	BC	.	■	.	.	.	.

Table B.1 (continued)

Well Number and Location [1]		Active Status Criteria [2]					GWPP Sampling Frequency [3]
		Regulatory Monitoring			Hydrologic Monitoring	DOE Order Monitoring	
		RCRA	CERCLA	SWDF			
GW-926	BC	.	■	.	.	.	.
GW-927	BC	.	■	.	.	.	.
GW-928	EF	.	.	.	.	●	5 Year (2019)
GW-929	EF	.	.	.	●	●	5 Year (2019)
GW-930	EF	.	.	.	.	●	5 Year (2019)
GW-931	EF	.	.	.	.	●	5 Year (2019)
GW-934 (8)	EF	.	.	.	.	●	5 Year (2020)
GW-954 (3)	EF	.	.	.	.	●	TBD
GW-956 (4)	EF	.	.	.	.	●	TBD
GW-959	EF	.	.	.	.	●	Biennial (Odd)
GW-960	EF	.	.	.	●	●	Biennial (Odd)
GW-961	BC	.	■	.	.	.	.
GW-964	BC	.	■	.	.	.	.
GW-965	BC	.	■	.	.	.	.
GW-966	EF	.	.	.	.	●	TBD

Notes:

1. ( ) - Number of discrete depth intervals monitored in the well (Westbay™ or Barcad™ wells)

   BC – Bear Creek Hydrogeologic Regime
   CR – Chestnut Ridge Hydrogeologic Regime
   EF – Upper East Fork Poplar Creek Hydrogeologic Regime

2. Regulatory Monitoring – Specified well designated for groundwater monitoring performed in accordance with one or more of the following regulatory monitoring programs (“.” – not applicable for specified well):

   Resource Conservation and Recovery Act (RCRA)
   ■ – Post-Closure Detection Monitoring
   ● – Post-Closure Corrective Action Monitoring

   Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
   ■ – Detection Monitoring
   ● – Remediation Effectiveness Monitoring

   Nonhazardous Solid Waste Disposal Facility (SWDF)
   ■ – Detection Monitoring
   ● – Assessment Monitoring Phase 3

   Hydrologic Monitoring – Specified well designated for annual groundwater elevation monitoring.

   DOE Order Monitoring – Specified well designated for site-wide groundwater monitoring per the objectives and requirements defined in DOE Order 436.1 and DOE Order 458.1.

Table B.1 (continued)

Notes: (continued)

3. Groundwater Protection Program (GWPP) sampling frequency for DOE Order Monitoring.

Annual – groundwater sample collected each year, alternating seasonally wet and dry weather/flow conditions

Biennial – groundwater sample collected every two years (even or odd numbered year)

Semiannual – groundwater sample collected during seasonally wet and dry weather/flow conditions

TBD – to be determined

5 Year – groundwater sample collected every five years (year of next sampling event)

Table B.2 Groundwater monitoring wells that are granted inactive status under the Y-12 Groundwater Protection Program

Well Number and Location [1]		Inactive Status Criteria [2]		
		Unknown/Inadequate Well Construction	Low Priority/Need for Additional Data	Well Redundancy Evaluation
54-2A	EF	.	●	.
55-1B	EF	.	●	.
55-1C	EF	.	.	●
56-7A	EF	.	●	.
58-2A	EF	.	●	.
59-1A	EF	.	●	.
59-1B	EF	.	.	●
59-1C	EF	.	.	●
60-1B	EF	.	.	●
CH-143	CR	●	.	.
CH-157	CR	●	.	.
CH-185	CR	●	.	.
CH-189	CR	●	.	.
GW-011	BC	.	●	.
GW-013	BC	.	.	●
GW-015	BC	.	●	.
GW-017	BC	.	●	.
GW-018	BC	.	●	.
GW-040	BC	.	●	.
GW-042	BC	.	●	.
GW-045	BC	.	●	.
GW-054	BC	.	.	●
GW-055	BC	.	●	.
GW-056	BC	.	●	.
GW-061	BC	.	●	.
GW-062	BC	.	●	.
GW-064	BC	.	●	.
GW-066	BC	.	●	.
GW-067	BC	●	.	.
GW-070	BC	.	●	.
GW-072	BC	.	.	●
GW-073	BC	.	.	●
GW-074	BC	.	●	.
GW-081	BC	.	●	.
GW-083	BC	.	.	●
GW-094	BC	.	.	●
GW-095	BC	.	.	●
GW-096	BC	.	●	.
GW-097A	BC	.	●	.
GW-117	BC	.	●	.
GW-118	BC	.	●	.
GW-119	BC	.	●	.

Table B.2 (continued)

Well Number and Location [1]		Inactive Status Criteria [2]		
		Unknown/Inadequate Well Construction	Low Priority/Need for Additional Data	Well Redundancy Evaluation
GW-120	BC	.	.	●
GW-121	BC	.	●	.
GW-123	BC	.	●	.
GW-124	BC	.	●	.
GW-125	BC	.	●	.
GW-126	BC	.	●	.
GW-132	EF	.	●	.
GW-133	BC	.	●	.
GW-135	BC	.	●	.
GW-146	CR	.	●	.
GW-147	CR	.	●	.
GW-150	EF	.	.	●
GW-158	CR	.	●	.
GW-162	BC	.	●	.
GW-163	BC	.	●	.
GW-164	BC	.	●	.
GW-165	CR	.	●	.
GW-166	CR	.	●	.
GW-181	CR	.	.	●
GW-183	EF	.	.	●
GW-185	CR	.	●	.
GW-187	CR	.	●	.
GW-189	CR	.	●	.
GW-191	EF	.	.	●
GW-194	EF	.	.	●
GW-196	EF	.	●	.
GW-197	EF	.	●	.
GW-198	EF	.	●	.
GW-206	EF	.	●	.
GW-207	EF	.	●	.
GW-208	EF	.	●	.
GW-218	EF	.	.	●
GW-224	CR	.	●	.
GW-228	BC	.	●	.
GW-232	EF	.	●	.
GW-237	BC	.	.	●
GW-239	EF	.	.	●
GW-248	BC	.	.	●
GW-250	BC	.	.	●
GW-252	EF	.	.	●
GW-258	BC	.	●	.
GW-262	EF	.	●	.
GW-264	EF	.	●	.

Table B.2 (continued)

Well Number and Location [1]	Inactive Status Criteria [2]		
	Unknown/Inadequate Well Construction	Low Priority/Need for Additional Data	Well Redundancy Evaluation
GW-271 EF	.	●	.
GW-273 EF	.	.	●
GW-277 BC	.	.	●
GW-282 EF	.	.	●
GW-283 EF	.	.	●
GW-284 EF	.	●	.
GW-285 EF	.	●	.
GW-286 BC	.	●	.
GW-288 BC	.	●	.
GW-290 BC	.	●	.
GW-308 BC	.	●	.
GW-311 BC	.	●	.
GW-313 BC	.	.	●
GW-314 BC	.	.	●
GW-317 BC	.	●	.
GW-318 CR	.	●	.
GW-319 CR	.	●	.
GW-324 BC	.	●	.
GW-331 EF	.	●	.
GW-333 EF	.	●	.
GW-336 EF	.	.	●
GW-338 EF	.	.	●
GW-342 BC	.	●	.
GW-343 BC	.	●	.
GW-344 BC	.	●	.
GW-346 BC	.	●	.
GW-348 BC	.	.	●
GW-350 EF	.	●	.
GW-366 BC	.	.	●
GW-368 BC	.	.	●
GW-369 BC	.	.	●
GW-371 BC	.	●	.
GW-373 BC	.	●	.
GW-374 BC	.	●	.
GW-375 BC	.	.	●
GW-376 BC	.	●	.
GW-385 EF	.	.	●
GW-513 CR	.	.	●
GW-520 BC	.	.	●
GW-532 BC	.	●	.
GW-533 BC	.	●	.
GW-534 BC	.	●	.
GW-535 BC	.	●	.

Table B.2 (continued)

Well Number and Location [1]	Inactive Status Criteria [2]		
	Unknown/Inadequate Well Construction	Low Priority/Need for Additional Data	Well Redundancy Evaluation
GW-538 BC	.	●	.
GW-563 CR	.	●	.
GW-567 CR	.	●	.
GW-569 CR	.	●	.
GW-576 CR	.	●	.
GW-602 BC	.	●	.
GW-604 EF	.	●	.
GW-614 BC	.	●	.
GW-625 BC	.	●	.
GW-628 BC	.	●	.
GW-631 EF	.	●	.
GW-632 EF	.	●	.
GW-634 EF	.	●	.
GW-636 BC	.	.	●
GW-637 BC	.	.	●
GW-640 BC	.	●	.
GW-643 BC	.	●	.
GW-646 BC	.	.	●
GW-647 BC	.	●	.
GW-648 BC	.	.	●
GW-649 BC	.	●	.
GW-651 BC	.	.	●
GW-655 BC	.	●	.
GW-657 EF	.	.	●
GW-659 EF	.	.	●
GW-673 CR	.	●	.
GW-681 CR	.	●	.
GW-682 CR	.	●	.
GW-685 BC	.	●	.
GW-688 EF	.	●	.
GW-693 EF	.	●	.
GW-694 BC	.	.	●
GW-697 EF	.	●	.
GW-699 EF	.	●	.
GW-701 EF	.	●	.
GW-702 EF	.	●	.
GW-705 BC	.	●	.
GW-710 BC	.	●	.
GW-711 BC	.	●	.
GW-723 BC	.	●	.
GW-728 BC	●	.	.
GW-736 BC	.	.	●
GW-737 BC	.	●	.

Table B.2 (continued)

Well Number and Location [1]		Inactive Status Criteria [2]		
		Unknown/Inadequate Well Construction	Low Priority/Need for Additional Data	Well Redundancy Evaluation
GW-739	BC	.	.	●
GW-742	CR	.	.	●
GW-745	EF	.	.	●
GW-751	EF	.	.	●
GW-753	EF	.	.	●
GW-755	EF	.	●	.
GW-758	EF	.	●	.
GW-760	EF	.	.	●
GW-764	EF	.	.	.
GW-766	EF	.	.	●
GW-768	EF	.	●	.
GW-773	EF	.	.	●
GW-794	BC	.	.	●
GW-803	EF	.	●	.
GW-804	EF	.	●	.
GW-811	BC	.	●	.
GW-812	BC	.	●	.
GW-813	BC	.	●	.
GW-814	BC	.	●	.
GW-815	BC	.	●	.
GW-819	EF	.	●	.

Notes:

1. BC – Bear Creek Hydrogeologic Regime

   CR – Chestnut Ridge Hydrogeologic Regime

   EF – Upper East Fork Poplar Creek Hydrogeologic Regime

2. Unknown/Inadequate Well Construction – design and construction details for the well are not available or do not meet the technical standards of the GWPP, including wells that do not meet other GWPP requirements (e.g., all-weather access).

   Low Priority/Need for Additional Monitoring Data – based on the location of the well and available monitoring data, there is no compelling priority or need to obtain additional groundwater quality and/or hydrologic monitoring data to serve the current technical objectives or programmatic purposes of the GWPP.

   Well Redundancy Evaluation – continued use of the well for groundwater quality sampling and hydrologic monitoring was discontinued based on results of quantitative statistical evaluation of "well redundancy" as described in respective reports documenting the baseline assessment (BWXT 2005) and supplemental assessment (B&W Y-12 2009) of the GWPP.

   "." - – Criteria not applicable for specified well