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Revision 1

HANFORD ATOMIC ENERGY ACT SITEWIDE GROUNDWATER MONITORING PLAN

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

U.S. DEPARTMENT OF ENERGY | Richland Operations Office

P.O. Box 550
Richland, Washington 99352

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Executive Summary

The *Atomic Energy Act of 1954* (AEA)[1] was promulgated to ensure the proper management of radioactive materials. Through the AEA, the U.S. Department of Energy (DOE) regulates the control of radioactive materials under its authority. Accordingly, DOE promulgated a series of regulations and directives to protect human health and the environment (HHE) from potential risks associated with radioactive materials. Sections of the AEA authorize DOE to establish radiation protection standards for itself and its contractors through DOE Orders and Contractor Requirements Documents.

This revision of the AEA sampling and analysis plan was implemented to address changes to well monitoring networks, constituents of interest, and sampling frequencies based on the annual review process. The objective of this plan is to identify an optimized groundwater monitoring program that provides representative descriptions of groundwater contamination and is integrated with other monitoring programs. This groundwater monitoring plan presents the DOE approach and expectations for monitoring radiological releases to groundwater at the Hanford Site in Washington State and monitoring the general condition of groundwater at the Hanford Site. The sampling and analysis plan and data quality objectives (DQOs) are specifically described in this plan.

Requirements for groundwater monitoring associated with environmental surveillance under the AEA are implemented through DOE Order 458.1, *Radiation Protection of the Public and Environment*,[2] and DOE Order 435.1, *Radioactive Waste Management*[3] (primarily applied in DOE Manual 435.1-1 Chg 2, *Radioactive Waste Management Manual*[4]). These DOE Orders and their associated manuals and guidance implement AEA requirements across the DOE complex and include groundwater monitoring to detect, characterize, and respond to releases of radionuclides. Specifically, this

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[1] *Atomic Energy Act of 1954,* as amended, 42 USC 2011, Pub. L. 83-703, 68 Stat. 919. Available at: https://science.energy.gov/~/media/bes/pdf/nureg_0980_v1_no7_june2005.pdf.

[2] DOE Order 458.1 Admin Chg 3, 2011, *Radiation Protection of the Public and the Environment*, U.S. Department of Energy, Washington, D.C. Available at: https://www.directives.doe.gov/directives-documents/400-series/0458.1-BOrder/@@images/file.

[3] DOE Order 435.1 Chg 1, 2007, *Radioactive Waste Management*, U.S. Department of Energy, Washington, D.C. Available at: https://www.directives.doe.gov/directives-documents/0435.1-BOrder-c1.

[4] DOE Manual 435.1-1 Chg 2, 2011, *Radioactive Waste Management Manual*, U.S. Department of Energy, Office of Environmental Management, Available at: https://www.directives.doe.gov/directives-documents/400-series/0435.1-DManual-1-admchg2.

monitoring plan considers DOE-HDBK-1216-2015, *Environmental Radiological Effluent Monitoring and Environmental Surveillance*,[5] which is a handbook that provides guidance to address the monitoring requirements in DOE Order 458.1. The handbook supports a need-based approach to determine the type, frequency, and location of groundwater monitoring for radionuclides of interest to demonstrate protection of HHE.

At the Hanford Site, the AEA is implemented along with the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA)[6]; the *Resource Conservation and Recovery Act of 1976* (RCRA)[7]; and other Washington State regulations. The *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)[8] states that RCRA and CERCLA will be integrated, and DOE Order 458.1 also requires an integrated monitoring program. Each program has different monitoring objectives and sampling requirements, although they often consider the same wells as sampling points for practical reasons. This monitoring plan is considered a "living document" and includes an approach for routinely evaluating the continued need for monitoring at a given location, as well as guidelines for reducing the scope of the monitoring program as remediation efforts are completed.

At this time, integration of monitoring occurs at three levels: network well selection, sample event scheduling, and sharing analysis results for common analytes. Where possible, wells that are used in one or more programs have been preferentially selected for monitoring since co-sampling is more efficient and supports consistency across programs (e.g., one sampling event is used to meet multiple program requirements).

Selection of locations for Hanford Site groundwater sampling is based on monitoring objectives, results of existing observations and measurements, historical knowledge, and/or professional judgment. There is an existing foundation of knowledge regarding sources of Hanford Site contamination and historical impacts to groundwater.

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[5] DOE-HDBK-1216-2015, 2015, *Environmental Radiological Effluent Monitoring and Environmental Surveillance*, DOE Handbook, U.S. Department of Energy, Washington, D.C. Available at: https://www.id.energy.gov/eser/DOC/DOE-HDBK-1216-2015v2.pdf.

[6] *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at: https://www.csu.edu/cerc/researchreports/documents/CERCLASummary1980.pdf.

[7] *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq. Available at: https://www.gpo.gov/fdsys/pkg/STATUTE-90/pdf/STATUTE-90-Pg2795.pdf

[8] Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: http://www.hanford.gov/?page=81.

Well locations have been selected to provide representative measurements and observations of groundwater contamination or apparent bounding conditions consistent with requirements of multiple regulatory programs (e.g., CERCLA, RCRA, and Washington State). Selected wells are in areas that are known or potential sources of radionuclide contamination posing potential risks to drinking water or offsite receptors. This monitoring plan also achieves the following:

- Identifies non-DOE waste sites, facilities, and/or activities that are known or potential sources of groundwater contamination on, or with the potential to migrate onto, the Hanford Site
- Identifies contamination existing in the vadose zone or the aquifer that has the potential to migrate off the Hanford Site
- Provides a general approach to determine when wells can be removed from the network, or the frequency of sampling or number of analytes that can be reduced at a given well

The sampling and analysis plan includes a quality assurance project plan, a field sampling plan, waste management considerations, and health and safety considerations. Detailed tables are provided listing the wells that are identified for compliance with AEA monitoring requirements. Sampling frequency and analytes are identified for each well based on the needs identified during the DQO process, which reflects the expectations for compliance with DOE Order 458.1 and DOE Order 435.1, including consideration of the guidance and recommendations provided in DOE-HDBK-1216-2015.

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Terms

AEA	*Atomic Energy Act of 1954*
AEC	Atomic Energy Commission
ALARA	as low as reasonably achievable
AWLN	Automated Water Level Network
CA	composite analysis
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CSM	conceptual site model
DAS	Disposal Authorization Statement
DCS	Derived Concentration Standard
DOE	U.S. Department of Energy
DOE-HQ	DOE Headquarters
DOE-RL	DOE Richland Operations Office
DOT	U.S. Department of Transportation
DQA	data quality assessment
DQI	data quality indicator
DQO	data quality objective
DUA	data usability assessment
DUP	laboratory sample duplicate
EB	equipment blank
ECO	Environmental Compliance Officer
Ecology	Washington State Department of Ecology
EMP	Environmental Monitoring Plan
EMS	environmental management system
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
FFTF	Fast Flux Test Facility
FSO	Field Sample Operations

FTB	full trip blank
FWS	Field Work Supervisor
GC/MS	gas chromatography/mass spectrometry
GEA	gamma energy analysis
GPC	gas proportional counting
GWIA	groundwater interest area
HASQARD	*Hanford Analytical Services Quality Assurance Requirements Document*
HEIS	Hanford Environmental Information System
HHE	human health and environment
HLW	high-level waste
IATA	International Air Transportation Association
IC	ion chromatography
ICP-MS	inductively coupled plasma-mass spectrometry
IDF	Integrated Disposal Facility
IDMS	Integrated Document Management System
ISMS	Integrated Safety Management System
LCS	laboratory control sample
LERF	Liquid Effluent Retention Facility
LLW	low-level waste
LLWMA	low-level waste management area
LSC	liquid scintillation counting
MB	method blank
MDC	minimum detectable concentration
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
N/A	not applicable
NTU	nephelometric turbidity unit
P&T	pump and treat
PA	performance assessment

PSQ	principal study question
QA	quality assurance
QAPjP	quality assurance project plan
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RCT	radiological control technician
RIMS	Richland Integrated Management System
RPD	relative percent difference
S&GRP	Soil and Groundwater Remediation Project
SAF	Sampling Authorization Form
SALDS	State-Approved Land Disposal Site
SMR	Sample Management and Reporting
SPLIT	field split sample
SUR	surrogate
TED	total effective dose
TEDF	Treated Effluent Disposal Facility
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and disposal
TWRWP	Tank Waste Retrieval Work Plan
UPR	unplanned release
USGS	U.S. Geological Survey
VOC	volatile organic compound

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1 Introduction

The U.S. Department of Energy (DOE) is responsible for environmental management of the Hanford Site. This includes implementation of Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), which was signed in 1989. This agreement outlines the interagency process for implementing the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) and the *Resource Conservation and Recovery Act of 1976* (RCRA). Under the *Atomic Energy Act of 1954* (AEA), DOE is self-regulating for the management of nuclear materials and control of radiation exposures to its employees, contractors, and the public. Congress gave DOE (and its predecessors) the authority and responsibility for managing the production and use of nuclear materials under its jurisdiction and for ensuring the protection of workers and the public from these activities. This management is implemented through DOE Orders and Directives (i.e., DOE Order 458.1 Admin Chg 3, *Radiation Protection of the Public and the Environment*; DOE Order 435.1 Chg 1, *Radioactive Waste Management*; and DOE Order 436.1, *Departmental Sustainability*). DOE has not relinquished this responsibility under the Tri-Party Agreement (Ecology et al., 1989); rather, DOE conducts activities in accordance with both sets of requirements.

DOE is obligated "...to establish requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of the Department of Energy (DOE) pursuant to the *Atomic Energy Act of 1954, as amended* (AEA)". DOE has established radiation protection standards for itself, its contractors, and the public, as defined in DOE Order 458.1. DOE Order 458.1 requires that "DOE or DOE contractors operating sites or implementing projects involving radiological activities that can affect the public or environment, establish and maintain..." an environmental radiological protection program that complies with this order. DOE further "ensures that all Department of Energy radioactive waste is managed in a manner that is protective of worker and public health and safety, and the environment" through DOE Order 435.1. With RCRA, Congress has waived the sovereign immunity of all federal agencies with regard to federal and state regulation of solid waste and hazardous waste. With CERCLA, Congress has waived federal agency sovereign immunity with regard to financial liability for cleanup of releases of hazardous substances (including radionuclides) into the environment, and in Section 9620, "Federal Facilities," Congress required DOE to conduct cleanup of its facilities under U.S. Environmental Protection Agency (EPA) oversight. These tasks were further implemented through Executive Order 12580, *Superfund Implementation*, where the President of the United States delegated to DOE the authority to carry out all CERCLA removal and remedial actions on its facilities, under Section 9604(a), and determine cleanup standards under Section 9621.

Executive Order 12088, *Federal Compliance with Pollution Control Standards*, requires the heads of executive agencies to ensure that all federal facilities and activities comply with applicable pollution control standards and take all actions necessary for prevention, control, and abatement of environmental pollution. DOE Order 436.1, *Departmental Sustainability*, introduces the general requirement for monitoring as part of an integrated environmental management system (EMS). The EMS is specified to be compliant with International Standards Organization Standard ISO 14001, *Environmental Management Systems*. ISO 14001 states, "The organization shall monitor, measure, analyze and evaluate its environmental performance...and the effectiveness of the environmental management system...". This monitoring plan is intended to comply with the AEA groundwater environmental surveillance and reporting requirements associated with DOE Order 435.1, DOE Order 436.1, and DOE Order 458.1 (described further in Section 1.6).

It is the policy of DOE to conduct environmental surveillance programs, including groundwater monitoring, in order to demonstrate that the public and environment are adequately protected during DOE operations, and that operations comply with DOE and other applicable federal, state, and local radiation

standards and requirements. It is also DOE policy that departmental monitoring and surveillance programs be integrated with other monitoring programs in a manner that is capable of detecting and quantifying unplanned releases (UPRs) and meeting high standards of quality and credibility.

Groundwater monitoring is a critical element of the DOE environmental surveillance and reporting program at the Hanford Site. Past disposal and leakage of hazardous and radioactive waste contaminated portions of the vadose zone and unconfined aquifer, which can continue to serve as sources for future groundwater contamination. Groundwater from the unconfined aquifer regionally discharges into the Columbia River, which is a potential exposure point of contaminants to human and ecological receptors.

Through a data quality objectives (DQO) process (Appendix A), the AEA monitoring well network has been systematically defined and optimized to establish an integrated, sitewide monitoring network sufficient to meet all AEA monitoring and analytical requirements. To the extent possible, the AEA monitoring network draws upon existing wells and analytical activities used to meet other regulatory commitments. The network is expected to expand or contract, and sampling frequencies may be modified as sources and areas of contamination are added or removed from consideration as contamination is reduced through remedial activities. Monitoring also provides necessary information to support decisions regarding future releases of land from DOE control.

Generally speaking, the AEA groundwater monitoring requirements are expected to endure longer than requirements imposed by other programs (i.e., CERCLA and RCRA) since DOE Order 458.1(4)(e)(9) requires that, as long as DOE maintains control of an area, "...environmental monitoring must be conducted to characterize routine and non-routine releases of radioactive material from radiological activities, estimate the dispersal pattern in the environs, characterize the pathway(s) of exposure to members of the public and estimate the doses to individuals and populations in the vicinity of the site or operation commensurate with the nature of the DOE radiological activities and the risk to the public and environment." As contaminated sites within the Hanford Site undergo RCRA treatment, storage, and disposal (TSD) unit closure and as CERCLA remedial actions progress, the frequency of sampling and the number of monitoring wells is expected to decrease in those areas. As DOE reduces the footprint of the Hanford Site in the future, AEA monitoring may no longer be necessary outside the new boundary.

1.1 Hanford Site Description

For the purposes of this monitoring plan, the Hanford Site is defined by the boundary identified in Figure 1-1. This is also the boundary of the Hanford Site for purposes of CERCLA Section 121 and the Tri-Party Agreement (Ecology et al., 1989). The Hanford Site is broadly divided into the River Corridor and the Central Plateau regions. The River Corridor is the portion of the Hanford Site located along the Columbia River and the Central Plateau is in the middle of the Hanford Site (i.e., Plateau Area boundary in Figure 1-1). The Central Plateau is further divided into an Inner Area encompassing the region where chemical processing and waste management activities occurred, and an Outer Area comprised of the open area where limited processing activities occurred. The Inner Area is anticipated to be the final footprint area of the Hanford Site, which will be dedicated to waste management and containment of residual wastes.

The Hanford Site former operational areas were given numerical names (Figure 1-1): the 100-BC, 100-K, 100-N, 100-D, 100-H, and 100-F Areas housed nuclear reactors; and chemical separation occurred at the 200 West and 200 East Areas. The 300 Area was the location of fuel-manufacturing operations, as well as experimental and laboratory facilities, and the 400 Area housed a research nuclear reactor. Although not

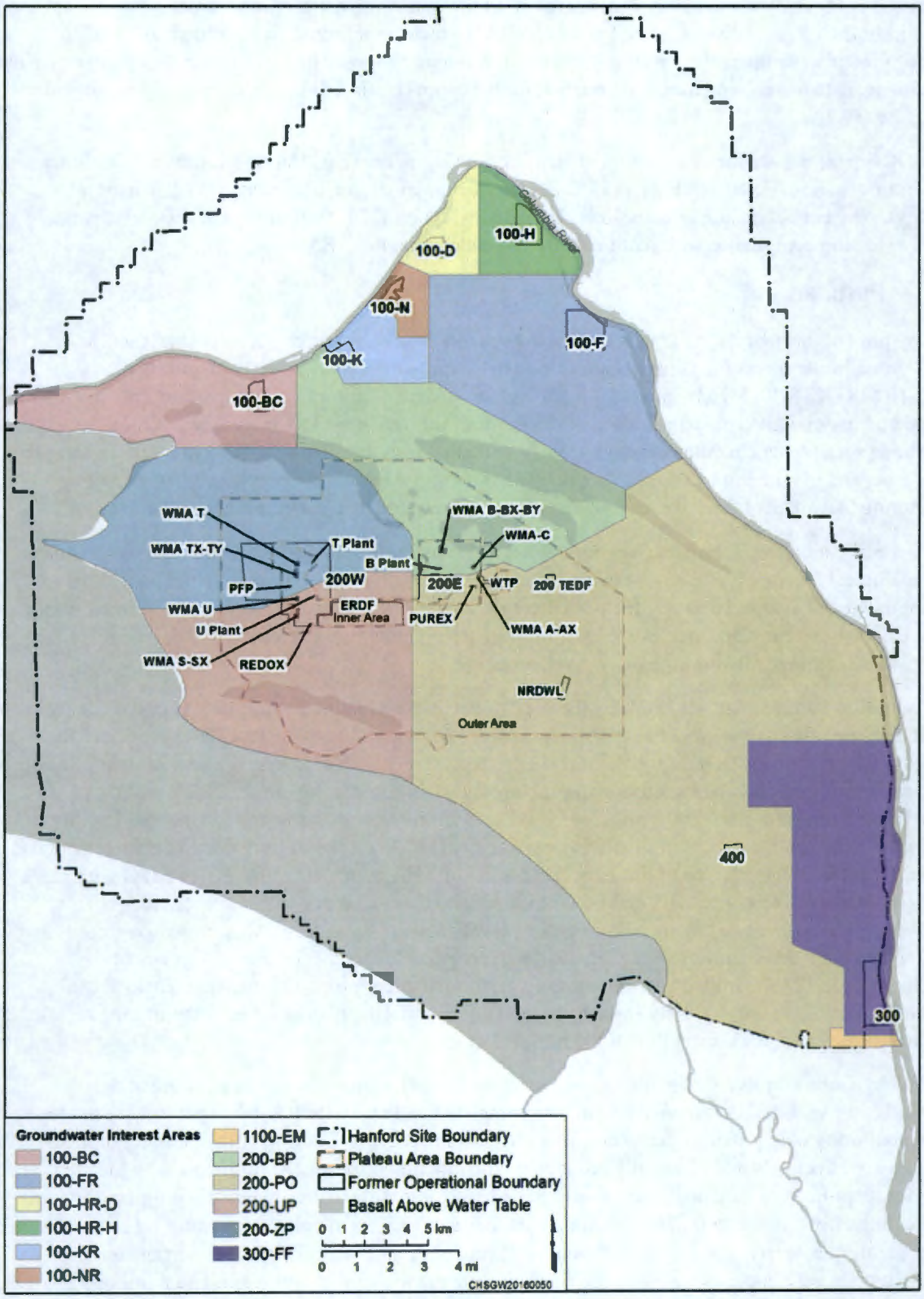

Figure 1-1. Hanford Site and Groundwater Interest Areas

identified in Figure 1-1, the 600 Area includes all of the remaining areas of the Hanford Site. Figure 1-1 also illustrates the groundwater interest areas (GWIAs) which are informal areas defined by DOE and include groundwater operable units (OU) and the intervening regions. The GWIA's are designed to provide scheduling, data review, and data interpretation for the entire Hanford Site. AEA monitoring is organized using the GWIAs.

Non-DOE facilities are located within the Hanford Site boundary (e.g., Energy Northwest's Columbia Generating Station, PNNL's LIGO and US Ecology commercial low-level waste [LLW] disposal facility). Any contamination or emissions associated with non-DOE facilities are addressed separately when assessing compliance with requirements associated with the AEA.

1.2 Purpose

The purpose of this monitoring plan is to establish and document the current technical basis for the AEA groundwater monitoring at the Hanford Site by incorporating appropriate components of DOE-HDBK-1216-2015, *Environmental Radiological Effluent Monitoring and Environmental Surveillance*, including but not limited to identification of the facilities that are subject to monitoring; existing vadose zone and groundwater conditions that may result in offsite exposures; and specific contaminants, sampling frequency, and monitoring locations that will be used to meet AEA requirements for groundwater monitoring that are not otherwise set forth in monitoring required by a performance assessment (PA).

AEA-specific monitoring provides key input for estimating current and potential future doses to human and ecological receptors. These dose calculations demonstrate the protection of the public and the environment and also serve as one factor in determining the frequency and extent of AEA monitoring. Dose calculations can also serve as an input for decisions regarding the release of land, leading to the ability to discontinue monitoring in any given area.

AEA-specific requirements also address the need to obtain data required to perform Hanford Sitewide or waste site-specific analyses and to maintain a Disposal Authorization Statement (DAS) required for DOE disposal facilities under DOE Manual 435.1-1 Chg 2, *Radioactive Waste Management Manual*. Sites that have a current DAS and associated site-specific groundwater monitoring are the 200 West Area Low-Level Burial Grounds, 200 East Area Low-Level Burial Grounds, Integrated Disposal Facility (IDF), and Environmental Restoration Disposal Facility (ERDF). Tank closure documentation may also include specific monitoring commitments. Integration of AEA monitoring that is associated with these facilities (e.g., tank closures, IDF, and ERDF) is conducted by reference to the relevant plans. This monitoring plan is intended to provide a baseline level of sampling to meet AEA monitoring needs and to demonstrate how this monitoring is integrated with programs under the Tri-Party Agreement (Ecology et al., 1989). Groundwater monitoring performed under programs such as a Tank Waste Retrieval Work Plan are relatively short-lived, and this monitoring plan provides a monitoring regime that can be returned to at the completion of the retrieval process.

AEA obligations may eventually become the primary driver for groundwater monitoring at the Hanford Site as CERCLA remedial actions are completed and many RCRA TSD units are clean closed. This monitoring plan provides the means to ensure that the AEA monitoring obligations continue to be met and are effectively and efficiently integrated with other monitoring commitments. The locations and analytes identified are included in an optimized sampling schedule to ensure that the programs are not duplicating efforts in the field. This document identifies the AEA groundwater monitoring network suited to the Hanford Site cleanup mission at this time. It supersedes all radionuclide monitoring contained in RCRA groundwater monitoring plans, AEA monitoring not associated with a PA, and monitoring formerly included in DOE/RL-2012-59, *Surveillance Groundwater Monitoring on the Hanford Site*. It is

intended to be a "living document" that will undergo routine updates and should represent Hanford Site conditions at the time of each revision. The maintenance of the plan is discussed further in section 1.7.

1.3 Site History

The federal government has owned the Hanford Site (including land and water rights) and operated its facilities for more than 60 years. The Hanford Site was first owned in the 1940s by the Manhattan Engineering District of the U.S. Army Corps of Engineers, a predecessor agency of DOE. In accordance with accepted industrial practices of that time, a substantial portion of relatively low-activity liquid radioactive waste was disposed by direct discharge to the Columbia River and either surface soil or near-surface features, such as cribs and trenches. These releases have affected groundwater in many Hanford locations. The liquid radioactive wastes previously disposed at the Hanford Site are associated with specific activities in three main areas of the site:

- Preparation of nuclear fuel and target assemblies in the 300 Area for use in nuclear reactors
- Operation of nuclear reactors for plutonium production in the 100 Area
- Processing of irradiated nuclear fuel assemblies and targets in the 200 Areas on the Central Plateau for subsequent processing and product purification to extract plutonium, uranium, and other strategic nuclear materials

An overview of the types of liquid wastes historically generated by these activities and their general disposition pathways are shown in Figure 1-2.

Engineering controls and effluent monitoring programs were used to limit the amount of radioactivity released to the Columbia River from the water used to cool the reactors. For example, a 1959 report notes that the concentration of radionuclides in effluent water being released to the river was limited to 5 % of the maximum permissible concentration for occupational exposure (Page 6 of HW-SA-40, *Disposal of Industrial Radioactive Waste Waters at Hanford*). Liquid wastes containing higher concentrations of radionuclides were not discharged to the Columbia River but were instead transferred to the 200 Areas for subsequent land disposal. The total volume of liquid wastes from the 100 Area that was managed by land disposal is estimated to be about 300 million m^3 (80 billion gal), containing a total activity of nearly 11,000 Ci (Page 18 of TRAC-0151-VA, *Historical Perspective of Radioactively Contaminated Liquid and Solid Wastes Discharged or Buried in the Ground at Hanford*).

Project evaluations to guide plans for disposing Hanford Site liquid wastes are documented as early as the spring of 1943. A waste management plan developed by DuPont (DUH-11064, *Project 9536 – 300 Area Waste Disposal*), the site contractor at that time, outlined disposition pathways based on four categories of waste from the 200 Areas: (1) byproduct waste (a slurry), (2) metal solution waste, (3) low-activity waste, and (4) innocuous waste. The first two categories represented high-level waste (HLW), and their disposal plan identified disposition in tanks that were to be located at least 300 m (1,000 ft) from other buildings or operating areas; the disposition plan for low-activity wastes was the same. For the fourth category, the plan was discharge to an open basin following neutralization and dilution, with subsequent evaluation to assess the appropriateness of discharge to an open ditch for disposal, with no spacing limitations; activity thresholds were included to determine the appropriateness of this last discharge.

The practices of disposing liquid radioactive wastes on soil at the Hanford Site began in the mid-1940s and continued into the 1990s, when all facilities that had supported the site defense mission ceased operations. The practice of direct discharges was supported by early Manhattan Engineering District of the U.S. Army Corps of Engineers investigations beginning in the 1940s that guided facility construction and operation, including studies conducted by the project team.

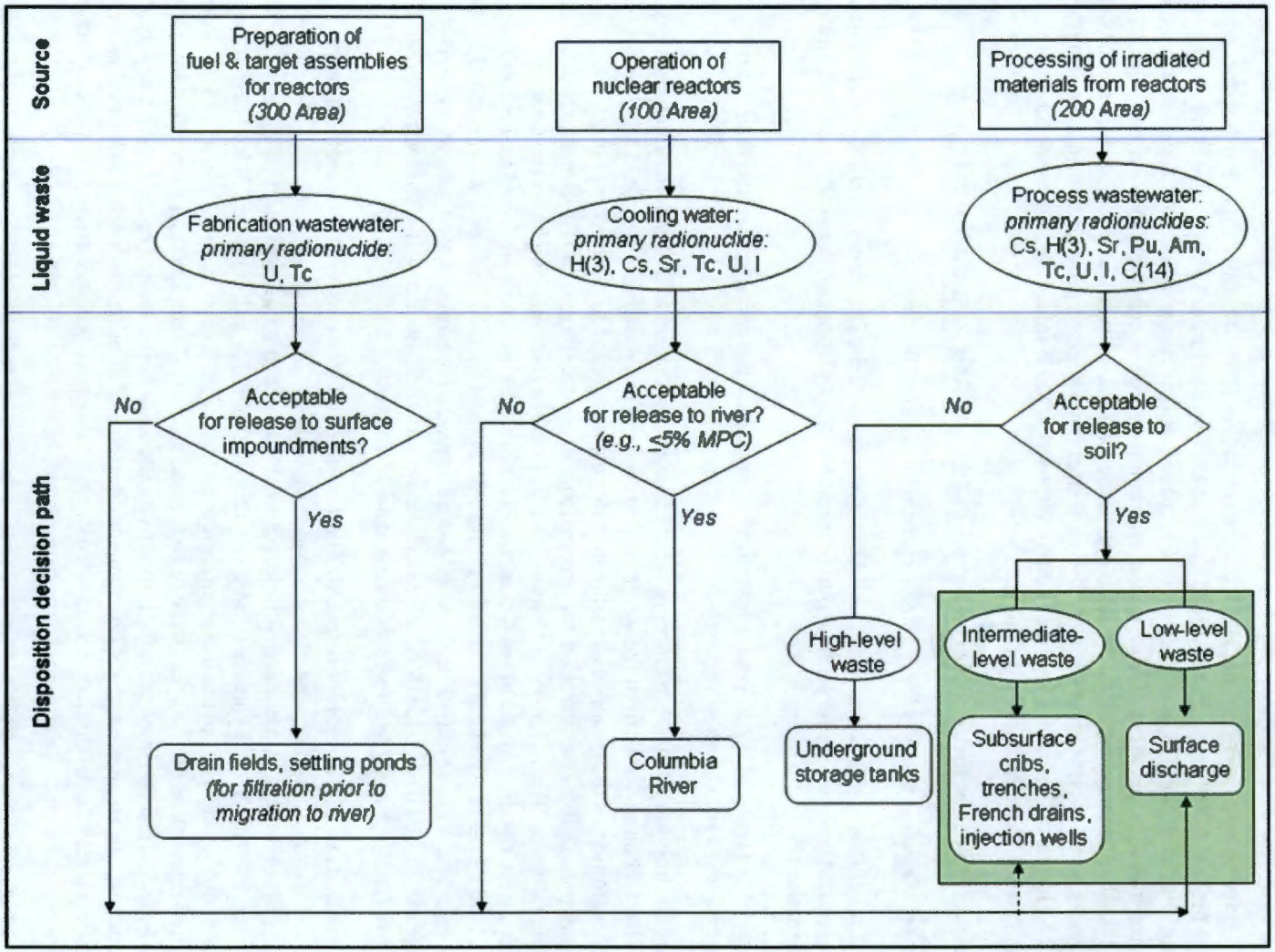

Figure 1-2. Overview of Historical Sources and Disposition Paths for Hanford Site Liquid Wastes

Results were summarized in a report issued in the early stages of the project (Parker, 1944, *Rough Draft on "Soil and Ground-Water Contamination from 200 and 300 Area Process Water"*), which indicate that considerations were being taken by the Manhattan Project and the site contractor at that time (General Electric) to address environmental health and safety.

The U.S. Geological Survey (USGS) also assisted General Electric in evaluating site geology to assess its suitability for waste disposal, including discharge of liquid wastes onto soil (Parker and Piper, 1949, *Geologic and Hydrologic Features of the Richland Area, Washington, Relevant to Disposal of Waste at the Hanford-Directed Operations of the Atomic Energy Commission*). This suite of studies designed to assess and address site suitability for facility construction, operation, and waste disposal illustrates the considerable research and development effort underlying the Hanford Site liquid waste disposal procedures. Both field and laboratory studies, including those by independent scientific organizations, guided the preparation of site-specific procedures for disposing liquid radioactive wastes.

The Hanford Site was expected to be excessed and decommissioned at the end of World War II. However, after the war ended, operations continued under the U.S. Atomic Energy Commission (AEC) and, in fact, expanded as the Cold War escalated from the 1940s into the 1950s and beyond. The expanded operations resulted in larger volumes of liquid radioactive wastes requiring disposal. Storage in underground tanks was capacity-constrained and posed an operational problem with considerable cost implications, resulting in alternative disposal methods being considered for the larger volumes of relatively low-activity wastes. Those methods included disposal in surface and near-surface facilities, such as trenches (ditches) and buried cribs (typically 4.6 to 6 m [15 to 20 ft] below surface, constructed with stabilizing materials such as rock or timber). Reverse (or injection) wells were also identified and were among the first engineered structures designed for the disposal of liquid radioactive wastes not targeted to be retained in Hanford Site underground tanks. Before wide-scale implementation of these techniques, additional studies were conducted to address potential contaminant migration concerns.

For many years, discharge to soil (surface and subsurface) was an accepted practice for managing liquid radioactive wastes. In the United States, this approach was used for wastes containing low concentrations of radionuclides; it did not extend to direct discharge of liquid HLW from reprocessing spent nuclear fuel to soil. Those wastes were (and are) generally stored in large underground tanks. This approach was taken to allow for retrieval of the waste if it was subsequently determined to have national (military) or commercial value.

While discharges of liquid radioactive wastes were largely associated with waste streams having relatively low concentrations of radionuclides, waste streams having higher radionuclide loadings were also managed in this manner from 1946 to 1956 due to limited storage capacity. These waste streams contained a relatively small fraction of the initial radionuclide inventory and included liquid wastes associated with plutonium purification processes and HLW supernatant after being cycled through HLW storage tanks (to allow for settling of solids). Evaporator bottoms from concentrating some HLW were also discharged to soil disposal units in 1954; this occurred once in each of the 200 East and 200 West Areas and represented the largest discharge of radionuclides to ground from reprocessing activities (WHC-MR-0227, *Tank Wastes Discharged Directly to the Soil at the Hanford Site*).

It is notable that DOE predecessor organizations (i.e., U.S. Army Corps of Engineers and subsequently AEC) took extra measures to control potential impacts from liquid radioactive waste. For example, some liquid wastes were disposed of in subsurface features (e.g., dry wells and cribs) to minimize exposure to workers and reduce the likelihood that radioactive contaminants could become airborne after the water evaporated or enter the food chain by waterfowl or animals ingesting plants growing in these areas (HW-

SA-40). More attention was given to those pathways because, at the time, the potential for groundwater contamination with subsequent ingestion as drinking water was not considered likely.

AEC's Radiation protection standard RPS 3.1, *Standards and Controls for Human Exposure to Ionizing Radiations*, was published in 1960 and included limits for both public and occupational exposures, as well as the concept of limiting all human exposures to levels that are as low as practical, which is the predecessor of the current as low as reasonably achievable (ALARA) requirement. Limits for permissible levels of exposure to members of the public had not been included in the previous version of this liquid waste disposal requirement.

The first formal recommendations setting acceptable levels of radiation exposure for members of the public were issued by the Federal Radiation Council, with publication in the Federal Register on May 18, 1960. It is noteworthy that RPS 3.1 in the 1960 update of the *Manual of Radiation Protections Standards* is dated March 1, 1960; in other words, the Hanford Site was using these recommendations a few months prior to their issuance as formal direction. This illustrates that Hanford Site contractors were exercising due diligence in their approach to managing these wastes and controlling radiation doses at the site as radiation protection standards were changing and being developed.

The use of direct liquid waste disposal is no longer routine as it was in the past, which is due to a better understanding of environmental migration and the conditions needed to protect groundwater resources. It is generally recognized that the use of lagoons or infiltration ponds is not an acceptable waste management practice in most environmental settings. Such approaches have not been used at the Hanford Site for many years. However, the past disposal program was based on standard industrial practices during that time and was considered an effective approach for disposing these wastes.

1.4 Scope

This monitoring plan addresses all Hanford Site facilities or activities, whether active or retired, that contain or manage radioactive materials or have the potential to result in significant doses via drinking water or to an offsite receptor. This includes former fuel fabrication and research facilities in the 300 Area, reactor operation areas in the 400 and 100 Areas, fuel reprocessing operating areas in the 200 Areas, and all associated liquid and solid waste storage and disposal facilities in the 200 Areas and surrounding 600 Area. The facilities and existing groundwater contaminant plumes located adjacent to the Columbia River present an imminent potential pathway for offsite exposure. The reprocessing plants and associated facilities in the 200 Areas contain substantially higher radionuclide inventories but are more distant from potential exposure points.

The AEA mandates the protection of human health and environment (HHE) from exposure to radioactivity from DOE operations. Groundwater monitoring is a key component of demonstrating protection. DOE-HDBK-1216-2015 states that the monitoring program should provide compliance data necessary for all applicable regulations (i.e., an integrated approach); this includes the monitoring requirements of CERCLA, RCRA, and other regulations applicable to the Hanford Site. Figure 1-3 illustrates the different applicable environmental monitoring programs at the Hanford Site. Each program has its own set of requirements, but reporting from the different programs is also integrated as part of annual environmental surveillance reporting. Each program provides some element of monitoring data that contributes to an integrated approach to support overall Hanford Site environmental surveillance needs. Figure 1-3 also highlights that, although there may be a number of different monitoring regimes, DOE remains accountable under its regulatory authority for integrated reporting of monitoring data to demonstrate protectiveness of HHE. Integration between monitoring programs is also addressed in Appendix A.

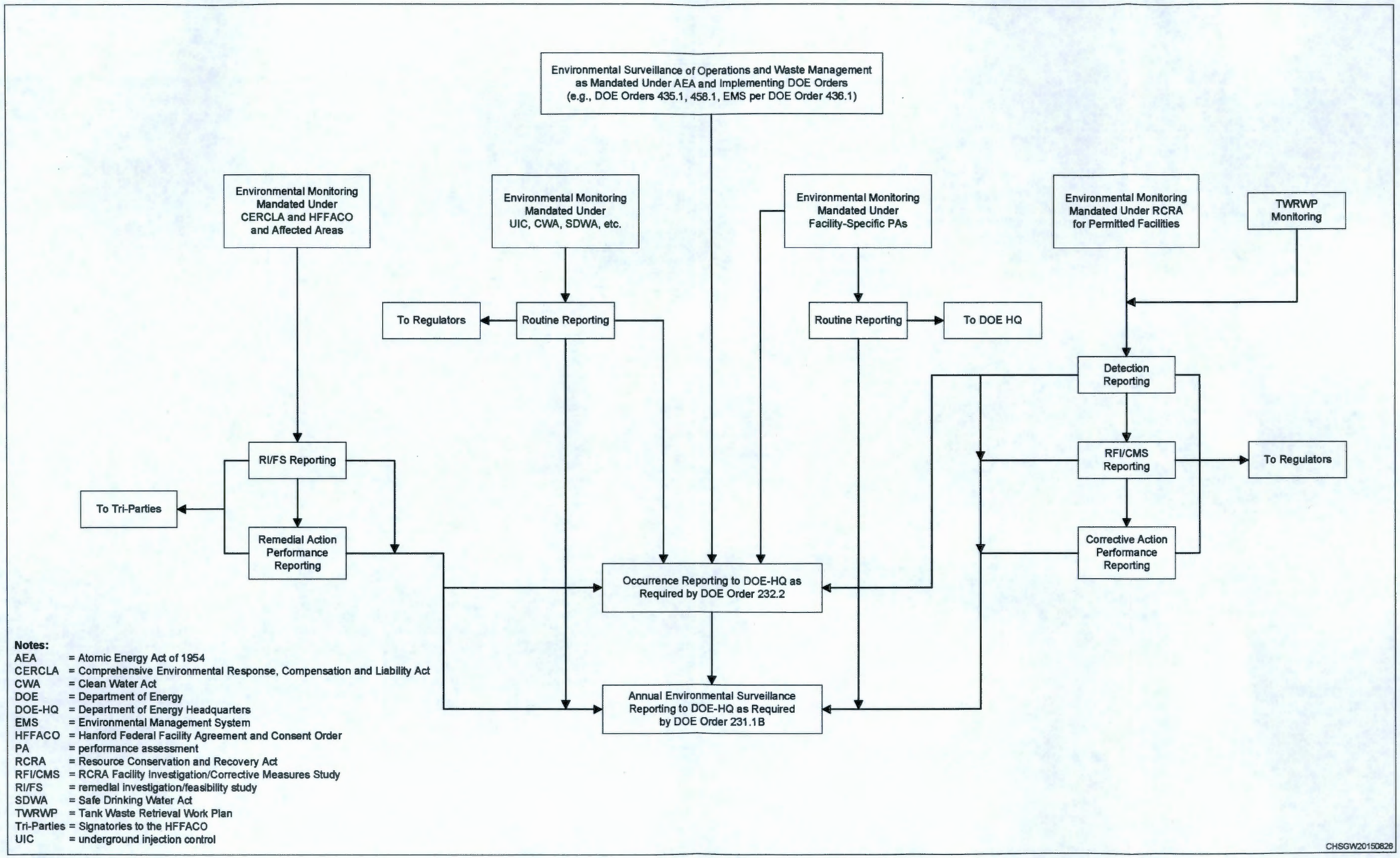

Figure 1-3. Hanford Site Groundwater Monitoring Programs and Reporting

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1.5 Requirements

The regulatory framework governing groundwater monitoring at the Hanford Site consists of federal and state regulations, agreements, and DOE Orders. The AEA provides the framework for protection associated with contamination in the environment as a result of DOE activities. DOE implements AEA requirements with a series of directives to protect HHE from potential risks associated with radioactive materials. DOE Order 436.1 introduces the general requirement for monitoring as part of an integrated EMS. Requirements for effluent monitoring and environmental surveillance of groundwater are specifically addressed in DOE Order 458.1 and DOE Order 435.1. Background on the monitoring expectations associated with these two DOE Orders is introduced in Table 1-1, and monitoring for the different regulatory programs is summarized below.

Although the compliance aspects are associated with radioactivity, historical AEA sampling has included contaminants such as nitrate as an indicator of contaminant migration and to characterize potential non-DOE contamination sources (e.g., agricultural, leased property, and local industrial).

Table 1-1. Summary of DOE Orders Related to Groundwater Monitoring

Programmatic Driver	Applicability	Documentation	Selection of Well Location	Monitoring Purpose
DOE Order 436.1, *Departmental Sustainability*	All site activities under an EMS	Identified site-specific requirements under the EMS	Need-based; to be integrated with overall surveillance and monitoring	Document baseline conditions, provide input for ongoing environmental management in support of departmental sustainability
DOE Order 435.1, *Radioactive Waste Management*	Disposal facilities operating under a DAS	Facility-specific monitoring plan	Based on the results of performance assessments and composite analyses, integrated with overall monitoring program	Document baseline conditions, verify compliance, confirm functional performance
DOE Order 458.1, *Radiation Protection of the Public and the Environment*	All site sources of radioactivity	Groundwater sampling and analysis plan for AEA (integrated with CERCLA, RCRA, and other monitoring programs)	Need-based; monitoring to be integrated with overall site surveillance	Document baseline conditions, identify source contributions, estimate dispersal, pathways of exposure, support dose estimates and decisions regarding release of land

AEA = *Atomic Energy Act of 1954*
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DAS = Disposal Authorization Statement
DOE = U.S. Department of Energy
EMS = environmental management system
RCRA = *Resource Conservation and Recovery Act of 1976*

1.6 Atomic Energy Act of 1954

The AEA groundwater monitoring well locations and sampling are based on the characteristics of the site and the expected evolution of any plume from the overall perspective of demonstrating protection of HHE. AEA-specific requirements for groundwater monitoring and reporting are described in detail in the following subsections.

1.6.1 DOE Order 436.1

DOE Order 436.1 is the high-level directive that introduces the requirement for environmental monitoring as part of an integrated environmental protection program. The EMS monitoring requirements of DOE Order 436.1, as defined in ISO 14001, *Environmental Management Systems*, is implemented by DOE/RL-91-50, *Hanford Site Environmental Monitoring Plan* (hereinafter called the Hanford Site Environmental Monitoring Plan [EMP]) and is required for DOE sites. This requirement is implemented through development of an EMS conforming to ISO 14001, *Environmental Management Systems*, which includes the following monitoring requirements:

> *...9.1.1 The organization shall monitor, measure, analyze and evaluate its environmental performance...The organization shall ensure that calibrated or verified monitoring and measurement equipment is used and maintained, as appropriate...The organization shall evaluate its environmental performance and the effectiveness of the environmental management system...The organization shall communicate relevant environmental performance information both externally and internally...The organization shall retain appropriate documented information as evidence of the monitoring, measurement, analysis and evaluation results.*

Monitoring information collected under DOE Order 436.1 is not limited to assessment of radiological conditions, as described in Section A.5.1 of the standard:

> *The operations of an organization can have a variety of characteristics. For example, characteristics related to monitoring and measurement of wastewater discharge may include biological and chemical oxygen demand, temperature, and acidity. Data collected from monitoring and measurement can be analyzed to identify patterns and obtain information. Knowledge gained from this information can be used to implement corrective and preventive action.*

DOE Order 436.1 requires that all DOE organizations, and all sites under their purview, ensure that the site Integrated Safety Management System (ISMS) includes implementation of an EMS that provides for systematic planning, integrated execution, and evaluation of programs for protection of HHE, pollution prevention, and site compliance with applicable environmental protection requirements. Monitoring is addressed via the requirement for an EMS (DOE Order 436.1[4][c][3]).

The DOE Richland Operations Office (DOE-RL) ISMS (called the Richland Integrated Management System [RIMS]) includes a section specifically addressing components of the Hanford Site EMP (DOE/RL-91-50). This program is used at the Hanford Site to implement environmental monitoring specified in DOE Order 436.1. RIMS identifies the Hanford Site EMP (DOE/RL-91-50) as the mechanism through which environmental monitoring requirements are implemented at the Hanford Site.

The Hanford Site EMP (DOE/RL-91-50) is implemented on two distinct and independent levels, in part due to the large size of the Hanford Site, the diversity of activities performed onsite, and the number of contractors responsible for the various activities. This structure was established to ensure that potential

impacts associated with Hanford Site activities are evaluated and that Hanford Site operations are not negatively impacting HHE or natural and cultural resources.

The first level of the program addresses the operational aspects of environmental protection. Contractors are required to implement the environmental protection requirements stated in DOE Order 436.1 through their respective Contractor Requirements Document. This includes the requirements for major contractors to integrate their EMS into their respective ISMS and to perform effluent or environmental monitoring as appropriate at or near active and inactive facilities onsite. The requirements of federal and state laws, regulations, and permits related to facilities are addressed at this level.

The second level of the program ensures the protection of site workers, the public, and environmental resources on and around the site from all operations at the Hanford Site. To accomplish this, DOE and its contractors must implement the monitoring requirements identified in DOE Order 435.1, DOE Order 436.1, and DOE Order 458.1. The activities at this level include groundwater monitoring, sitewide environmental surveillance, meteorological monitoring, natural and cultural resources monitoring, and an assessment of cumulative environmental impacts related to Hanford Site activities. This monitoring plan focuses on the groundwater monitoring component of these requirements.

RIMS describes the Hanford Site EMP (DOE/RL-91-50) in terms of the following requirements:

- Ensure the early identification of, and appropriate response to, potentially adverse environmental impacts associated with DOE operations. This includes pre-operational characterizations and assessments, effluent and emissions monitoring, and environmental surveillance onsite and offsite.
- Provide mechanisms and information that demonstrate compliance with applicable environmental compliance; public health; and resource protection laws, regulations, and DOE Orders.
- Demonstrate that Hanford Site operations are being conducted to ensure protection of workers and the public.
- Provide assurance that Hanford Site activities are conducted in ways that are protective of air, water, land, and other natural and cultural resources.
- Mandate participation in Hanford Site land-use planning activities, human health and ecological risk assessments, and long-term stewardship plans. The EMPs and resource management plans ensure consideration of environmental protection requirements throughout each activity's planning, operation, closure, and post-closure lifecycle.

Ensure that environmental monitoring sample collection methods, sample analyses, data interpretations, and reporting are consistent across the Hanford Site to ensure consistency and comparability of data.

Environmental monitoring activities involve multiple DOE organizations and site contractors that are motivated by different missions and regulatory requirements. Monitoring activities are closely aligned with the needs of ongoing Hanford Site environmental cleanup, restoration, and assessment activities. Monitoring and surveillance information is used extensively by numerous projects under the purview of DOE-RL.

Environmental monitoring activities are integrated throughout the Hanford Site, to the extent practicable, to avoid collecting duplicate data. Such integration minimizes the duplication of capabilities and resources, optimizes operational efficiencies, maximizes the amount of useful information generated, and results in lower costs to DOE. Monitoring activities are conducted in a manner that ensures the capture,

preservation, perpetuation, and use of the institutional knowledge obtained during more than 60 years of monitoring on and near the Hanford Site.

1.6.2 DOE Order 435.1

DOE Order 435.1 was established to ensure that all DOE radioactive waste is managed in a manner that is protective of HHE. From a groundwater monitoring perspective, it is relevant to the continued operation of LLW disposal facilities at the Hanford Site. Low-level burial grounds in the 200 East Area and 200 West Area, IDF, ERDF, and other closed facilities (e.g., landfill closed tank farm waste management areas) are subject to DOE Order 435.1 and the implementation requirements in DOE Manual 435.1-1. Each operating facility must have a DAS, and closure facilities (e.g., tanks) must have documentation that includes commitments for groundwater monitoring.

Monitoring for LLW disposal facilities or other closed facilities containing radiological wastes (e.g., landfill closed tank farm waste management areas) addresses a number of different considerations, including groundwater protection. A specific monitoring plan is required for disposal facilities and for facilities co-located with other potential or existing sources; the plan is integrated with the overall AEA monitoring program. The basis for the monitoring plan, as described in DOE Manual 435.1-1(IV)(R)(3), includes the following information:

a. *The site-specific performance assessment (PA) and composite analysis (CA) shall be used to determine the media, locations, radionuclides, and other substances to be monitored.*

b. *The environmental monitoring program shall be designed to include measuring and evaluating releases, migration of radionuclides, disposal unit subsidence, and changes in disposal facility and disposal site parameters which may affect long-term performance.*

c. *The environmental monitoring programs shall be capable of detecting changing trends in performance to allow application of any necessary corrective action prior to exceeding the performance objectives in this Chapter.*

These requirements highlight the broader expectations for monitoring LLW disposal facilities. Monitoring programs for lined disposal facilities (e.g., ERDF and IDF) or a closed radiological facility (i.e., landfill closed tank farm waste management area) regulated under DOE Order 435.1 may have to anticipate the potential for releases far into the future, depending on projections of the PA and CA modeling. The relative timing of releases from a disposal facility and other sources may also have to be considered. Separate monitoring plans are developed and maintained as part of the documentation for the DAS for each new LLW facility. Thus, details of these monitoring activities are not specifically addressed in this monitoring plan; however, the monitoring and sampling activities are integrated with the overall groundwater monitoring program to optimize well trips and reduce analytical costs.

The CA requirement was designed to address cases where other sources and existing contamination at the site may significantly interact and contribute to total doses associated with the projected plume from the LLW disposal facility under consideration. The CA is essentially used for disposal facilities to assess compliance with the total dose requirement in DOE Order 458.1, but also includes an administrative limit of 30 mrem/yr total effective dose (TED). The CA often becomes the basis for groundwater monitoring associated with compliance with DOE Manual 435.1-1 because it may not be possible to segregate specific contributions to aquifer plumes associated with a given disposal facility from other contamination in the area. The CA, along with modeling efforts for other regulatory requirements, therefore provides

a conceptual site model (CSM) that is a useful tool to support decisions regarding design and sampling of an AEA well network to support compliance with the total dose limits identified in DOE Order 458.1.

The CA is evaluated and revised, as applicable, as conditions change at the site (e.g., sources added or removed, plumes remediated, and new information obtained). In terms of site compliance monitoring, the maintenance of the CA will become important in assessing not only compliance, but in determining the evolution of AEA monitoring needs.

1.6.3 DOE Order 458.1

The purpose of DOE Order 458.1 is to establish the requirements to protect HHE against undue risk from radiation associated with radiological activities conducted under the control of DOE pursuant to the AEA. DOE Order 458.1 includes, for example, dose limits, requirements related to release and clearance of property, and requirements for protection of groundwater. DOE Order 458.1 is particularly relevant for closing radioactive facilities or contaminated areas that are not addressed under other regulatory agreements.

The AEA monitoring requirements in DOE Order 458.1(4)(e)(9) were established to characterize routine and nonroutine releases, estimate the dispersal pattern in the environment, characterize pathway(s) of exposure to members of the public, and estimate the doses to individuals and populations near the site commensurate with the nature of DOE radiological activities and protection of HHE. Monitoring is also required for any waste left in place until health risks are within acceptable limits (regulated via DOE Manual 435.1-1). The AEA requirements identify the measurements and observations required to perform sitewide or location-specific analyses to assess impacts to HHE.

Monitoring is conducted for the duration of the hazard to provide evidence that the TED to a member of the public is expected to be less than 100 mrem/yr. Offsite doses are calculated as part of the annual Hanford Site Environmental Report. Groundwater protection and monitoring are addressed in DOE Order 458.1(4)(i)(2) as follows:

- *Groundwater must be protected from radiological contamination to ensure compliance with dose limits in the Order and consistent with ALARA process requirements. To this end, DOE must ensure that:*
  - *Baseline conditions of the ground water quantity and quality are documented*
  - *Possible sources of, and potential for, radiological contamination are identified and assessed*
  - *Strategies to control radiological contamination are documented and implemented*
  - *Monitoring methodologies are documented and implemented*
  - *Groundwater monitoring activities are integrated with other environmental monitoring activities*

DOE-STD-1196-2011, *Derived Concentration Technical Standard*, was released in 2011 to support determining compliance with DOE Order 458.1. This standard establishes Derived Concentration Standard (DCS) values on a radionuclide- and pathway-specific basis, reflecting the current state of knowledge and practice in radiation protection. DCSs are quantities used in the design and conduct of radiological environmental protection programs at DOE facilities and sites. The standards represent the activity concentration of a given radionuclide in either water or air that results in a member of the public

receiving a 100 mrem TED following continuous exposure for one year for each of the following pathways: ingestion of water, submersion in air, and inhalation.

DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, is a technical standard that was released in 2002 to support compliance with DOE Order 458.1, with respect to radiological effects of DOE activities on populations of ecological receptors. The standard identifies screening and assessment protocols and identifies the dose limits for aquatic and terrestrial receptors related to water and soil contamination and associated food chain effects. The graded approach includes provisions to consider average activity concentrations for screening applied to a specific area as the basis for demonstrating compliance.

1.6.4 Integration with Monitoring for Other Regulatory Requirements

Each of the monitoring programs implemented at the Hanford Site (AEA, CERCLA, RCRA, and other regulations) view groundwater monitoring through a particular set of requirements:

- The AEA is primarily concerned with protection of HHE by limiting the radiological dose that workers and the public may receive due to DOE activities.
- RCRA is primarily concerned with protecting HHE by preventing the release of hazardous chemical substances to the environment and excludes radionuclides.
- CERCLA is primarily concerned with protecting HHE by cleanup of past-practice radiological and chemical contamination.

A key difference is that the AEA looks at radiological dose as a measure of protection, while RCRA and CERCLA consider risk, which is generally a probability of harm that is calculated using both the exposure dose and the expectations of injury risk for a range of doses. All three approaches require information about the concentrations of contaminants in the environment. All of the monitoring programs share wells and sampling efforts but may require different analyses, so they are integrated as part of the scheduling process. At the Hanford Site, programs are integrated such that when sampling activities are conducted, the needs of all of the programs are addressed on a single trip to a given well. Analytical results are also shared across programs to avoid duplication of analytical activities.

The anticipated duration for required groundwater monitoring under the various programs is very different. RCRA groundwater monitoring focuses on active operations of TSD units until closure. After closure, if a waste is left in place, monitoring is required to detect releases of hazardous constituents into the environment, likely on the scale of decades. CERCLA groundwater monitoring is required until the remedy is completed. As CERCLA, RCRA, and other remediation activities are completed for a given area, the extent and frequency of monitoring and sampling activities are expected to ramp down. Some level of AEA monitoring must be continued as long as DOE maintains control of the land. A crosswalk of AEA, CERCLA, and RCRA monitoring locations is presented in Chapter 3.

1.6.5 Additional Monitoring Plans and Commitments

Other commitments for groundwater monitoring/reporting included under the AEA:

- ERDF monitoring plan (CP-60152 (WCH-579), *Performance Assessment Monitoring Plan for the Environmental Restoration Disposal Facility*)
- Low-Level Waste Management Areas (LLWMAs) 1, 2, 3, and 4 monitoring plan (DOE/RL-2000-72, *Performance Assessment Monitoring Plan for the Hanford Site Low-Level Burial Grounds*)
- IDF monitoring plan (RPP-6877, *Integrated Disposal Facility Preoperational Monitoring Plan*)

- State-Approved Land Disposal Site (SALDS) (PNNL-13121, *Groundwater Monitoring and Tritium-Tracking Plan for the 200 Area State-Approved Land Disposal Site*)
- SALDS tritium exemption under DOE Order 5400.5, *Radiation Protection of the Public and the Environment*
- Tank Waste Retrieval Work Plans, as issued

This groundwater monitoring plan does not duplicate or replace the listed documents. The groundwater monitoring needs identified in these plans are integrated with the AEA monitoring program.

1.6.6 Evaluation of Liquid Effluent Water Releases

DOE Order 458.1 requires monitoring of liquid effluents to prevent unacceptable exposure of the public and ecological receptors to radiation. Liquid effluents are discharged at the Hanford Site in the 100 Area Pump and Treat (P&T), 200 West Area P&T, and SALDS. These effluents and their monitoring requirements are integrated into the AEA monitoring plan and reported in annual groundwater reports. Effluent monitoring at the 100 Area P&T and 200 West P&T are monitoring based on DOE guidance from DOE-HDBK-1216-2015 table 3-1 and annual calculation of DCS sum of fractions for effluent. Effluent from ETF is monitored based on information collected under routine operations. More information regarding effluent monitoring is discussed in Section 7.4 of Appendix A.

1.7 Groundwater Monitoring Plan Maintenance

This monitoring plan is intended to be a "living document" that will be reviewed and updated on a predictable maintenance schedule. It will be reviewed annually, and updated, as necessary, at a minimum of every six years in alignment with the sampling schedule identified in this plan. Annual reviews conducted in accordance with DOE Order 435.1 will also provide a routine evaluation, specific to disposal facilities and tank closure, and will identify changes that may prompt modifications to this plan.

The following examples should be considered to determine the need to update or revise the plan:

- Do any new PAs need to be incorporated?
  - Integrate PA monitoring requirements with the overall AEA program.
- Has there been a new CA or changes to a CSM that would change monitoring requirements (e.g., change in flow direction or expected migration of plumes)?
- Has remediation been completed at a CERCLA groundwater operable unit that would change the monitoring requirements?
  - Add, subtract, or change analytes or sampling frequency.
- Does information in the Hanford Environmental Information System (HEIS) database suggest any new trends or indications of new sources that could significantly contribute to the offsite dose?

1.7.1 Changes from Revision 0

An annual review was conducted to evaluate the effectiveness of the monitoring plan and based on impetus from the change control process, discussed in 1.7.2, it was concluded that a revision to the monitoring plan was needed. Table 1-2 summarizes the changes to the monitoring plan for each GWIA.

This plan was further revised to update the QaPjP to conform with current language and to update current waste control/management plans that supersede older documents listed in chapter 4 of this plan. Changes

to Section 7.4 of Appendix A were also made to reflect current evaluations of liquid releases from the P&T systems and new monitoring system requirements.

Table 1-2. Summary of Changes to GWIA in Revision 1

GWIA	Changes to monitoring network
100-BC	None
100-FR	Removed decommissioned wells from network.
100-HR-D	Removed injection well 199-D5-128.
100-HR-H	Added aquifer tube C7649 to monitor existing strontium-90 plume.
100-KR	Amended sampling frequencies of wells in the 100 KE area. Removed decommissioned well 199-K-23. Added new and proposed wells to monitoring network. Updated sampling frequency of effluent monitoring wells to match current monitoring frequency discussed in A7.4.3.
100-NR	Added existing well 199-N-374 and aquifer tube C6134 to monitor tritium plume along shoreline.
1100-EM	None
200-BP	Removed dry wells, decommissioned wells, non-operational wells, and wells with access issues. Updated sampling frequency for LLWMA well 299-E27-17 to reflect required sampling determined by PA. Added proposed wells to network to replace decommissioned well 299-E27-4 and monitor B complex.
200-PO	Removed decommissioned wells, wells not on the Well Access List, wells with access issues, and dry wells. Add proposed well 699-43-43B to monitor iodine-129 plume.
200-UP	Removed cancelled wells, remove wells not on the Well Access List and wells with access issues. Add LLWMA-4 well 299-W18-21 to the monitoring network and proposed wells to monitor current plumes in the OU.
200-ZP	Removed wells that are candidates for decommissioning and removed Ringold confined well 699-47-80AQ due to groundwater chemistry

Table 1-2. Summary of Changes to GWIA in Revision 1

GWIA	Changes to monitoring network
	issues. Added proposed wells to monitoring network.
300-FF	Updated sampling schedule at well 399-6-3 from low river stage to high river stage to ensure sampling capabilities. Added proposed well 699-S6-E3 to monitor uranium plume.
No GWIA	Added water supply well 699-S18-51 to monitoring network.

1.7.2 Modification of Well Network

As site remediation and disposal activities evolve and land-use assumptions and controls are implemented, the requirements of the groundwater monitoring network will also evolve. For instance, the denser networks required to support active remediation efforts are expected to change to fewer wells and/or reduced sampling frequency following waste site and/or facility remediation. There is a general expectation that the extent of monitoring will decrease as remediation progresses, which is the emphasis in this section. However, there are also conditions that could result in the need to increase the extent or frequency of monitoring (e.g., new sources, changing flow directions, and detections above the thresholds identified in Appendix A).

Decisions regarding the scope of monitoring in any well require consideration of integrated information regarding dose criteria, trends, modeling results, sources, and other objectives related to monitoring. Figure 1-4 includes examples of considerations related to ramping down monitoring, as documented in DOE Guide 450.1-6, *Ground Water Surveillance Monitoring Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*. As a general starting point, five factors should be considered to support decisions to discontinue or reduce the scope of AEA monitoring at any given well:

- Existing activity concentrations at the well result in doses that are reasonably expected to meet DOE Order 458.1 and DOE Order 435.1 requirements.
- Sampling trends suggest that activity concentrations are decreasing consistently or are approaching a steady state at an acceptable level.
- All sources that could significantly contribute to activity concentrations at a well have been identified and addressed.
- Modeling results and understanding of the CSM demonstrate that future activity concentrations at that location are reasonably expected to remain below acceptable concentrations.
- Any additional monitoring objectives have been satisfied for the well (e.g., regulatory commitments and agreements).

In general, if all of these factors can be satisfied for a given well, it will provide strong evidence to discontinue monitoring at a well, recognizing that some monitoring in a given area must be maintained as long as DOE maintains control of the land. If there is sufficient uncertainty regarding any of these factors,

there may also be recommendations to continue monitoring but at a reduced frequency and/or sampling and analysis for a more limited set of analytes. Significant changes to the monitoring network (e.g., removal of wells, changing sampling frequency, or changing analysis at a given well) must be tracked using a change control process maintained with this document and incorporated in the routine updates to this monitoring plan.

Highlight 2: Ramp-Down Strategies

Ramp-down strategies help conserve resources spent on monitoring. They can be viewed as: 1) an intermediate step in an exit strategy in situations where eventually all monitoring will be terminated or 2) the final phase of a monitoring strategy for those remedies where monitoring in perpetuity will be required. Ramp-down strategies should include criteria that can allow the following.

Eliminate unnecessary analytes, including:

- Analytes not found in initial samples and for which there is no evidence of a release (some analytes may be included to monitor geochemical conditions pursuant to demonstrating conditions will support natural attenuation mechanisms;
- Analytes not identified above detection limits in three successive samples; and
- Analytes detected at less than half the action level for at least three successive samples and displaying a static or downward trend.

Eliminate redundant locations (wells), including:

- Wells in the interior of plumes whose boundaries are defined by other wells (these wells may be needed to support performance monitoring for response such as monitored natural attenuation);
- Wells outside plumes and not deemed to be in the pathway of on-coming plumes and not required to establish background;
- Wells duplicated by proximate wells on the same isopleth; and
- Wells for which analytical data will have no clear use in future decision making such as consideration of when to implement a contingency.

Reduce sampling frequency:

- Initial quarterly sampling is needed to establish seasonal variations. Annual monitoring helps identify variations from changes in precipitation (wet versus dry years). Beyond those distinctions, sampling frequency should be selected on the basis of the slope of the observed trend lines, the degree to which empirical data match predictions, and the relative velocity of groundwater. The more predictable the data are, the less need there is for frequent confirmation.
- Monitoring is only required when there is uncertainty as to the fate and transport of contaminants and the effectiveness of remedies that are implemented. As the uncertainty is reduced, or as its consequences become less significant, the need for further monitoring is diminished. Similarly, slow moving groundwater requires less frequent monitoring because trends are slower to develop and there is more time to respond.

Source: DOE Guide 450.1-6, *Ground Water Surveillance Monitoring Implementation Guide for Use with DOE O 450.1, Environmental Protection Program* (archived).

Figure 1-4. Considerations for Ramp-Down Strategies

1.7.3 Change Control

The Soil and Groundwater Remediation Project (S&GRP) RCRA, CERCLA, AEA Integration Groundwater manager (or designee) is responsible for providing plan updates to field personnel and ensuring that the groundwater monitoring plan is current. Version control is maintained by the administrative document control process. Table 1-3 defines the types of changes that may affect the groundwater monitoring plan and the associated approvals, notifications, and documentation requirements.

Table 1-3. Change Control for Monitoring Plans

Type of Change	Action	Documentation
Temporary addition of wells or site-specific constituents or increased sampling frequency that do not impact the requirements of DOE Orders 435.1, 436.1, and/or 458.1.	S&GRP RCRA, CERCLA, AEA Integration Groundwater manager approves temporary change; provides informal notice to DOE-RL.	SMR organization's integrated groundwater monitoring schedule
Unintentional impact to groundwater monitoring plan including one-time missed well sampling due to operational constraints, delayed sample collection, broken pump, lost bottle set, missed sampling of indicator parameters, loss of samples in transit or laboratory accident.	S&GRP RCRA, CERCLA, AEA Integration Groundwater manager provides electronic notification to DOE-RL.	Annual groundwater monitoring report
Planned change to groundwater monitoring activities, including addition or deletion of specific constituents, change of sampling frequency for specific constituents, or changes to well network.	S&GRP RCRA, CERCLA, AEA Integration Groundwater manager obtains DOE-RL approval; revise monitoring plan.	Revised AEA groundwater monitoring plan
Anticipated unavoidable changes (e.g., dry wells).	S&GRP RCRA, CERCLA, AEA Integration Groundwater manager provides electronic notification to DOE-RL; revise monitoring plan.	Annual groundwater monitoring report and revised groundwater monitoring plan

Sources: DOE Order 435.1, *Radioactive Waste Management*; DOE Order 436.1, *Departmental Sustainability*; and DOE Order 458.1. *Radiation Protection of the Public and the Environment.*

AEA = *Atomic Energy Act of 1954*

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*

DOE-RL = DOE Richland Operations Office

RCRA = *Resource Conservation and Recovery Act of 1976*

S&GRP = Soil and Groundwater Remediation Project

SMR = Sample Management and Reporting

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2 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPjP) establishes the quality requirements for environmental data collection. It includes planning, implementation, and assessment of sampling tasks, field measurements, laboratory analysis, and data review. This chapter describes the applicable environmental data collection requirements and controls based on the quality assurance (QA) elements found in EPA/240/B-01/003, *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5), and DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document* (HASQARD). DoD/DOE QSM, 2013, *Department of Defense/Department of Energy Consolidated Quality System Manual for Environmental Laboratories* is also discussed. Section 7.8 of the *Hanford Federal Facility Agreement and Consent Order Action Plan* (Ecology et al., 1989b; hereinafter called the Tri-Party Agreement Action Plan) requires the quality assurance (QA)/quality control (QC) and sampling and analysis activities to specify the QA requirements for past-practice processes. This QAPjP also describes applicable requirements and controls based on guidance in Washington State Department of Ecology (Ecology) Publication No. 04-03-030, *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies,* and EPA/240/R-02/009, *Guidance for Quality Assurance Project Plans* (EPA QA/G-5). This QAPjP supplements the contractor's environmental QA program plan.

The QAPjP references are included in Chapter 6. The QAPjP includes the following sections, which describe the quality requirements and controls applicable to Hanford Site OU sampling activities:

- Section 2.1, "Project Management"
- Section 2.2, "Data Generation and Acquisition"
- Section 2.3, "Assessment and Oversight"
- Section 2.4, "Data Review and Usability"

2.1 Project Management

This section addresses planned management approaches, project goals, and documentation.

2.1.1 Project/Task Organization

The contractor, or approved subcontractor, is responsible for planning, coordinating, sampling, and shipping samples to an analytical laboratory for testing. The contractor is also responsible for preparing and maintaining configuration control of the groundwater monitoring plan and assisting the DOE-RL project manager in obtaining approval of the groundwater monitoring plan and future proposed revisions. The project organization (for routine groundwater monitoring) is described in the following subsections and is illustrated in Figure 2-1.

2.1.1.1 DOE-RL Project Manager

Hanford Site cleanup is the responsibility of DOE-RL. The DOE-RL project manager is responsible for authorizing the contractor to perform activities at the Hanford Site under CERCLA, RCRA, AEA, and the Tri-Party Agreement (Ecology et al., 1989).

2.1.1.2 DOE-RL Technical Lead

The DOE-RL technical lead is responsible for providing day-to-day oversight of contractor work scope performance, helping the contractor identify and resolve issues, and providing technical input to the DOE-RL project manager.

2.1.1.3 Soil and Groundwater Remediation Project Manager

The S&GRP manager provides oversight for all groundwater monitoring activities and coordinates with DOE-RL and primary contractor management in support of sampling and reporting tasks. The S&GRP manager also provides support to the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager to ensure work is performed safely and cost effectively.

2.1.1.4 S&GRP RCRA, CERCLA, AEA Integration Groundwater Manager

The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager is responsible for direct management of activities performed to meet AEA groundwater monitoring requirements. The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager coordinates with and reports to DOE-RL and primary contractor management regarding AEA groundwater monitoring requirements. The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager (or delegate) works closely with the environmental compliance officer (ECO), QA, Health and Safety, and the Sample Management and Reporting (SMR) organizations to integrate these and other technical disciplines in planning and implementing the work scope. The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager assigns scientists to provide technical expertise.

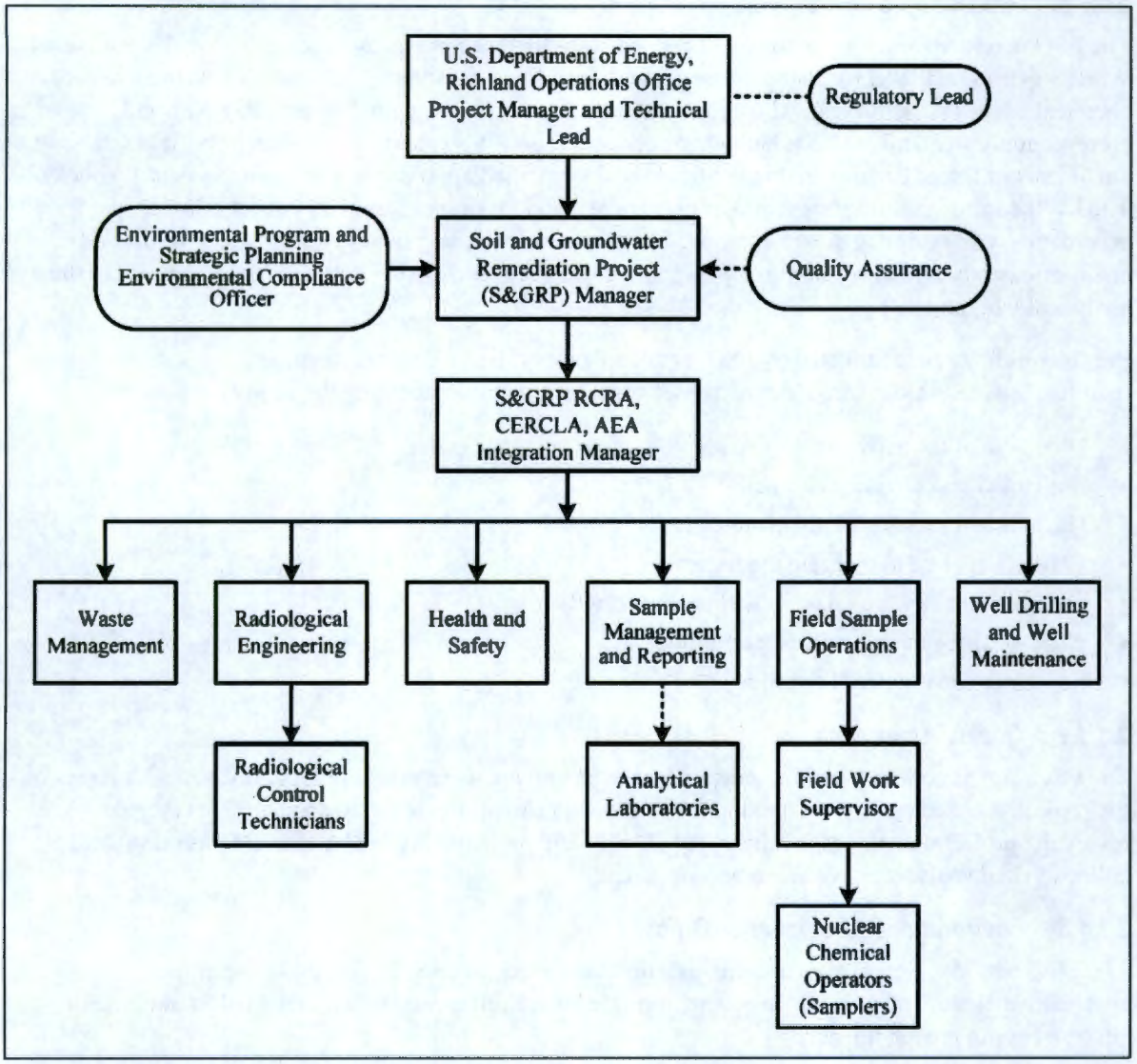

Figure 2-1. Project Organization

2.1.1.5 Sample Management and Reporting

The SMR group oversees offsite analytical laboratories, coordinates laboratory analytical work to ensure laboratories conform to the requirements of this plan, and verifies laboratories are qualified for performing Hanford Site analytical work. The SMR group generates field sampling documents, labels, and instructions for field sampling personnel and develops the sample authorization form (SAF), which provides information and instruction to the analytical laboratories. The SMR group ensures field sampling documents are revised to reflect approved changes. The SMR group receives analytical data from the laboratories, ensures the data are appropriately reviewed, performs data entry into the Hanford Environmental Information System (HEIS) database, and arranges for data validation and recordkeeping. The SMR group is responsible for resolving sample documentation deficiencies or issues associated with Field Sample Operations (FSO), laboratories, or other entities. The SMR group is responsible for informing the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager of any issues reported by the analytical laboratories.

2.1.1.6 Field Sample Operations

The FSO is responsible for planning and coordinating field sampling resources and provides the Field Work Supervisor (FWS) for routine groundwater sampling operations. The FWS directs the nuclear chemical operators (samplers), who collect samples in accordance with this sampling plan and corresponding standard methods and work packages. The FWS ensures deviations from field sampling documents or issues encountered in the field are documented appropriately (e.g., in the field logbook). The FWS ensures samplers are appropriately trained and available. Samplers collect samples in accordance with sampling documentation. Samplers also complete field logbooks, data forms, and chain-of-custody forms, including any shipping paperwork, and enable delivery of the samples to the analytical laboratory.

Pre-job briefings are conducted by FSO, in accordance with work management and work release requirements, to evaluate activities and associated hazards by considering the following factors:

- Objective of the activities
- Individual tasks to be performed
- Hazards associated with the planned tasks
- Controls applied to mitigate the hazards
- Environment in which the job will be performed
- Facility where the job will be performed
- Equipment and material required

2.1.1.7 Quality Assurance

The QA point of contact provides independent oversight and is responsible for addressing QA issues on the project, overseeing implementation of the project QA requirements. Responsibilities include reviewing project documents including the QAPjP, and participating in QA assessments on sample collection and analysis activities, as appropriate.

2.1.1.8 Environmental Compliance Officer

The ECO provides technical oversight, direction, and acceptance of project and subcontracted environmental work and also develops appropriate mitigation measures with the goal of minimizing adverse environmental impacts.

2.1.1.9 Health and Safety

The Health and Safety organization is responsible for coordinating industrial safety and health support within the project as carried out through health and safety plans, job hazard analyses, and other pertinent safety documents required by federal regulation or internal primary contractor work requirements.

2.1.1.10 Radiological Engineering

Radiological Engineering is responsible for the following:

- Radiological engineering and project health physics support.
- Conducting as low as reasonably achievable (ALARA) reviews, exposure and release modeling, and radiological controls optimization.
- Identifying radiological hazards and ensuring appropriate controls are implemented to maintain worker exposures to hazards at ALARA levels.

- Interfacing with the project Health and Safety representative and other appropriate personnel, as needed, to plan and direct project radiological control technician (RCT) support.

2.1.1.11 Waste Management

Waste Management is responsible for identifying waste management sampling/characterization requirements to ensure regulatory compliance and for interpreting data to determine waste designations and profiles. Waste Management communicates policies and practices and ensures project compliance for storage, transportation, disposal, and waste tracking in a safe and cost-effective manner.

2.1.1.12 Analytical Laboratories

The analytical laboratories analyze samples in accordance with established procedures and the requirements of this plan, and provide necessary data packages containing analytical and QC results. Laboratories provide explanations of results to support data review and in response to resolution of analytical issues. Statements of work flow down quality requirements consistent with the HASQARD (DOE/RL-98-68). The laboratories are evaluated under the DOE Consolidated Audit Program, or their successor programs, to DoD/DOE QSM (2013) requirements and must be accredited by EPA and Ecology for the analyses performed for the CH2M HILL Plateau Remediation Company (CHPRC).

2.1.2 Problem Definition/Background

Appendix A includes a detailed description of the problem definition, and the basis for selection of wells and sampling needs to meet the AEA groundwater monitoring requirements.

2.1.3 Project/Task Description

The project description is provided in Chapter 1 of this monitoring plan. Chapter 3 provides the parameters to be monitored, along with the monitoring wells and frequency of sampling. Information on the collection and analyses of groundwater from the monitoring network is provided in this chapter and in Chapter 3.

2.1.4 Quality Assurance Objectives and Criteria

The QA objective of this plan is to ensure that the analytical data are of known and appropriate quality to meet the evaluation requirements stated in the monitoring plan and support AEA requirements and compliance decisions. In support of this objective, statistics and data descriptors known as data quality indicators (DQIs) are used to help determine the acceptability and utility of data to the user. The principal DQIs are precision, accuracy, representativeness, comparability, completeness, bias, and sensitivity. These DQIs are defined in Table 2-1.

Data quality is defined by the degree of rigor in the acceptance criteria assigned to the DQIs.
The applicable QC guidelines, DQI acceptance criteria, and levels of effort for assessing data quality are dictated by the intended use of the data and the requirements of the analytical methods. DQIs are evaluated during the data usability assessment (DUA) process.

Table 2-1. Data Quality Indicators

DQI	Definition	Determination Methodologies	Corrective Actions
Precision	Precision measures the agreement among a set of replicate measurements. Field precision is assessed through	Use the same analytical instrument to make repeated analyses on the same sample.	If duplicate data do not meet objective: • Evaluate apparent cause (e.g., sample heterogeneity).

Table 2-1. Data Quality Indicators

DQI	Definition	Determination Methodologies	Corrective Actions
	the collection and analysis of field duplicates. Analytical precision is estimated by duplicate/replicate analyses, usually on laboratory control samples, spiked samples, and/or field samples. The most commonly used estimates of precision are the relative standard deviation and, when only two samples are available, the relative percent difference.	Use the same method to make repeated measurements of the same sample within a single laboratory. Acquire replicate field samples for information on sample acquisition, handling, shipping, storage, preparation, and analytical processes and measurements.	• Request reanalysis or re-measurement. • Qualify the data before use.
Accuracy	Accuracy is the closeness of a measured result to an accepted reference value. Accuracy is usually measured as a percent recovery. Quality control analyses used to measure accuracy include standard recoveries, laboratory control samples, spiked samples, and surrogates.	Analyze a reference material or reanalyze a sample to which a material of known concentration or amount of pollutant has been added (a spiked sample).	If recovery does not meet objective: • Qualify the data before use. • Request reanalysis or re-measurement.
Representativeness	Sample representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. It is dependent on the proper design of the sampling program and will be satisfied by ensuring the approved plans were followed during sampling and analysis. Groundwater monitoring locations (e.g., wells) may exhibit changing conditions and functionality over time. These changes may affect the representativeness of samples collected from the locations. This may include physical, chemical, or biological fouling of wells, and the	Evaluate whether measurements are made and physical samples collected in such a manner that the resulting data appropriately reflect the environment or condition being measured or studied.	If results are not representative of the system sampled: • Identify the reason for the results not being representative. • Flag for further review. • Review data for usability. • If data are usable, qualify the data for limited use and define the portion of the system that the data represent. • If data are not usable, flag as appropriate. • Redefine sampling and measurement requirements and protocols. • Resample and reanalyze, as appropriate. • Identify corrective actions related to wells and other monitoring locations to enhance sample representativeness. • Implement corrective actions at monitoring locations as needed

Table 2-1. Data Quality Indicators

DQI	Definition	Determination Methodologies	Corrective Actions
	presence of inert suspended solids in samples.		in accordance with procedures (e.g., well cleaning and redevelopment).
Comparability	Comparability expresses the degree of confidence with which one data set can be compared to another. It is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the approved plans are followed and that proper sampling and analysis techniques are applied.	Use identical or similar sample collection and handling methods, sample preparation and analytical methods, holding times, and quality assurance protocols.	If data are not comparable to other data sets: • Identify appropriate changes to data collection and/or analysis methods. • Identify quantifiable bias, if applicable • Qualify the data, as appropriate. • Resample and/or reanalyze if needed. • Revise sampling/analysis protocols to ensure future comparability.
Completeness	Completeness is a measure of the amount of valid data collected compared to the amount planned. Measurements are considered to be valid if they are unqualified or qualified as estimated data during validation. Field completeness is a measure of the number of samples collected versus the number of samples planned. Laboratory completeness is a measure of the number of valid measurements compared to the total number of measurements planned.	Compare the number of valid measurements completed (samples collected or samples analyzed) with those established by the project's quality criteria (data quality objectives or performance/ acceptance criteria).	If data set does not meet completeness objective: • Identify appropriate changes to data collection and/or analysis methods. • Identify quantifiable bias, if applicable. • Resample and/or reanalyze if needed. • Revise sampling/analysis protocols to ensure future completeness.
Bias	Bias is the systematic or persistent distortion of a measurement process that causes error in one direction (e.g., the sample measurement is consistently lower than the sample's true value). Bias can be introduced during sampling, analysis, and data evaluation. Analytical bias refers to deviation in one direction (i.e., high, low, or unknown)	Sampling bias may be revealed by analysis of replicate samples. Analytical bias may be assessed by comparing a measured value in a sample of known concentration to an accepted reference value or by determining the recovery of a known amount of contaminant	For sampling bias: • Properly select and use sampling tools. • Institute correct sampling and subsampling procedures to limit preferential selection or loss of sample media. • Use sample handling procedures, including proper sample preservation, that limit the loss or gain of constituents to the sample media.

Table 2-1. Data Quality Indicators

DQI	Definition	Determination Methodologies	Corrective Actions
	of the measured value from a known spiked amount.	spiked into a sample (matrix spike).	• Analytical data that are known to be affected by either sampling or analytical bias are flagged to indicate possible bias. • Laboratories that are known to generate biased data for a specific analyte are asked to correct their methods to remove the bias as best as practicable. Otherwise, samples are sent to other laboratories for analysis.
Sensitivity	Sensitivity is an instrument's or method's minimum concentration that can be reliably measured (i.e., instrument detection limit, or limit of quantitation, or minimum detectable concentration for radiochemical analyses).	Determine the minimum concentration or attribute to be measured by an instrument (instrument detection limit) or by a laboratory (limit of quantitation, or minimum detectable concentration). The lower limit of quantitation* is the lowest level that can be routinely quantified and reported by a laboratory. The minimum detectable concentration is the minimum activity concentration that is practically measurable with a radiochemical measurement system.	If detection limits do not meet objective: • Request reanalysis or re-measurement using methods or analytical conditions that will meet required detection or limit of quantitation. • Qualify/reject the data before use.

Source: SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update V*, as amended.

* For purposes of this groundwater monitoring plan, the lower limit of quantitation is interchangeable with the practical quantitation limit.

DQI = data quality indicator

2.1.5 Special Training/Certification

Workers receive a level of training that is commensurate with their responsibility for collecting and transporting groundwater samples according to the training plan maintained for workers handling radionuclides. The FWS, in coordination with line management, will ensure that special training requirements for field personnel are met.

Training has been instituted by the contractor management team to meet training and qualification programs that satisfy multiple training drivers imposed by applicable DOE, *Code of Federal Regulations*, and *Washington Administrative Code* requirements. For example, the environmental, safety, and health training program provides workers with the knowledge and skills necessary to execute their assigned duties safely.

Training records are maintained for each employee in an electronic training record database. The contractor's training organization maintains the training records system. Line management confirms that an employee's training is appropriate and up-to-date prior to performing any fieldwork.

2.1.6 Documents, Records, and Reporting

This subsection describes records management for documents related to the AEA at the Hanford Site.

2.1.6.1 Records Management

Records will be managed according to PRC-MP-IRM-40119, *Document Control and Records Management Plan*, or equivalent, for scientific and technical information and public information repository and administrative record files.

2.1.6.2 Records Location

Records may be stored in the Integrated Document Management System (IDMS), HEIS, or other electronic format and/or in hard copy format. Documentation and records, regardless of medium or format, are controlled in accordance with internal work requirements and processes that ensure accuracy and retrievability of stored records.

2.1.6.3 Field Records

Logbooks and data forms are required for field activities. The logbook must be identified with a unique project name and number. Individuals responsible for the logbooks will be identified in the front of the logbook, and only authorized individuals may make entries into the logbooks. Logbooks will be controlled in accordance with internal work requirements and processes. Additional details about expectations for logbooks and data forms are provided in Section 3.4.

The FWS, SMR, and any field crew supervisors are responsible for ensuring field instructions are maintained and aligned with any revisions or approved changes to the groundwater monitoring plan. SMR will ensure that any deviations from the plan are reflected in revised field sampling documents for the samplers and analytical laboratory. The FWS or appropriate field crew supervisors will ensure deviations from the plan or problems encountered in the field are documented appropriately (e.g., in the field logbook).

The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager, FWS, or designee is responsible for communicating field corrective action requirements and ensuring immediate corrective actions are applied to field activities. The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager is also responsible for ensuring project files are setup, as appropriate, and/or maintained. The project files will contain project records or references to their storage locations. Project files generally include, as appropriate, the following information:

- Operational records and logbooks
- Data forms
- Global positioning system data (a copy will be provided to SMR)
- Inspection or assessment reports and corrective action reports

- Field summary reports
- Interim progress reports
- Final reports
- Forms required by WAC 173-160 and the master drilling contract

The following records are managed and maintained by SMR personnel:

- Completed field sampling logbooks
- Field drilling and analytical data
- Groundwater sample reports and field sample reports
- Chain-of-custody forms
- Sample receipt records
- Laboratory data packages
- Analytical data verification and validation reports
- Analytical data "case file purges" (i.e., raw data purged from laboratory files) provided by offsite analytical laboratories

The laboratory is responsible for maintaining, and having available upon request, the following items:

- Analytical logbooks
- Raw data and QC sample records
- Standard reference material and/or proficiency test sample data
- Sample chain-of-custody and sample storage temperature logs
- Instrument calibration information
- Training records for employees, as they relate to analytical methods
- Laboratory state accreditation records
- Laboratory audit records

2.1.6.4 Groundwater Reporting

Convenience copies of laboratory analytical results are maintained in the HEIS database. Records may be stored in either electronic (e.g., in the managed records area of IDMS) or hardcopy (e.g., DOE Records Holding Area) format. Documentation and records, regardless of medium or format, are controlled in accordance with internal work requirements and processes that ensure accuracy and retrievability of stored records.

DQA approaches used for this monitoring activity are described in Section 2.4.3 of this plan. The approaches to data reduction and interpretation for AEA monitoring are described in Section 2.4.4 of this plan. Reporting of groundwater monitoring information will be made in selected specific formats and work products.

Reports presenting updated interpretations of Hanford Site groundwater chemistry and water-level data are prepared and issued annually (e.g., DOE/RL-2017-66, *Hanford Site Groundwater Monitoring Report for 2017*). The annual Hanford Site Groundwater Monitoring Report will include a specific section describing the AEA groundwater monitoring activities, including a summary of monitoring completeness. This report will remain the primary venue for presentation of measurements, observations, and interpretations of non-radiological groundwater contaminant information.

Evaluation of groundwater dose, including distribution of calculated doses compared to DCS for groundwater will be presented in the Annual Hanford Site Environmental Report to support the cumulative pathways requirements of DOE Order 458.1. Facility-specific performance assessment reports will be issued by the specific facility operations.

Evaluation of effluent from P&T operations will be presented in the annual P&T report.

2.1.6.5 Occurrence Reporting

Contractor requirements for reporting of unexpected or out of compliance groundwater measurements are described in DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, Attachment 1: "For reportable occurrences, contractors must categorize the occurrences, notify DOE as required, and prepare and submit Occurrence Reports. At sites with more than one facility management contractor, contractors may arrange for one of the contractors to prepare and submit reports for the entire site. However, each contractor must ensure that Occurrence Reports are submitted properly for activities within its scope of work."

It is also required that, "The documentation and distribution requirements must be satisfied by using the DOE centralized unclassified operational database, the computerized Occurrence Reporting and Processing System. DOE Order 232.2A, Attachment 3 provides information on the required content for an occurrence report and Attachment 4 includes a model for occurrence reporting."

DOE Order 232.2A, Attachment 2 provides Occurrence Reporting Criteria with significance categories reflecting the level of risk. The significance categories include the following:

- **Significance Category 1:** Non-Operational Emergency events that caused actual harm, posed the potential for immediate harm or mission interruption due to safety system failure and required prompt mitigative action, or constituted an egregious noncompliance with regulatory requirements that created the potential for actual harm or mission interruption.
- **Significance Category 2:** Circumstances that reflected degraded safety margins (necessitating prompt management attention along with modified normal operations) to prevent an adverse effect on safe facility operations; worker or public safety and health, including significant personnel injuries; regulatory compliance; or public/business interests.
- **Significance Category 3:** Events or circumstances with localized implications including personnel injury, environmental releases, equipment damage or hazardous circumstances that were locally contained and did not immediately suggest broader systemic concerns.
- **Significance Category 4:** Events or circumstances that were mitigated or contained by normal operating practices, but where reporting provides potential learning opportunities for others.
- **Significance Category R:** Recurring occurrences are those identified as recurring, either directly or through periodic analysis of occurrences and other nonreportable events.

DOE Order 232.2A, Attachment 2 also includes detailed descriptions of specific groups, subgroups, and criteria for reporting requirements. Groundwater monitoring activities under the AEA can result in a need for reporting under Group 5 (Environmental) and Group 6 (Contamination/Radiation Control). The requirements applicable for groundwater monitoring are summarized in the following paragraphs.

A groundwater measurement for the AEA monitoring program could potentially trigger a need for reporting under Group 5, Subgroup A (Releases), Criterion 1, which is considered Significance Category 3 and is flagged as requiring DOE Headquarters (DOE-HQ) reporting. The criterion for this

case is, "Any release (onsite or offsite) of a hazardous or extremely hazardous substance, including radionuclides from a DOE facility above federally permitted releases in a quantity equal to or exceeding the federal reportable quantities specified (see specifications in 40 CFR 302, "Designation, Reportable Quantities, and Notification," and 40 CFR 355, "Emergency Planning and Notification, and CERCLA Section 101[10], Federally Permitted Releases")."

Group 6, Subgroup B (Spread of Radioactive Contamination) includes criteria that also may be triggered by a groundwater monitoring measurement. For Criterion 1, offsite contamination due to DOE operations/activities, the reporting criteria are tied to exceedances of DOE-approved authorized limits developed under DOE Order 458.1 or, if there are no authorized limits, the total contamination values in 10 CFR 835, "Occupational Radiation Protection," Appendix D, "Surface Contamination Values." Measurements exceeding these values would be considered Significance Category 2 and would require DOE-HQ reporting. For the Hanford Site, an action level requirement for reporting to DOE-RL has been established equivalent to 75 % of the authorized limit (e.g., 75 % of the 100 mrem/yr TED limit in DOE Order 458.1, or 75 % of a maximum contaminant level) for exposures of a member of the public or protection of groundwater, as applicable. This reporting trigger will apply to measurements at the site boundary where it coincides with a known or potential exposure point.

For Criterion 4, onsite legacy radioactive contamination due to DOE operations/activities, the threshold is 10 times the values in 10 CFR 835, Appendix D, with some exclusions (e.g., posted areas). This is considered Significance Category 4 and would not generally require DOE-HQ reporting.

2.1.7 Maintenance of Groundwater Monitoring Locations

The groundwater monitoring locations selected for the AEA monitoring program (e.g., wells and aquifer tubes) may require routine or episodic maintenance to ensure that representative samples are available for analyses. Site procedures for well maintenance and repair will be applied as appropriate to maintain sample locations. Well maintenance actions are initiated by project personnel involved in sample collection and/or data management by submitting a well concern report. The condition of sampling locations may be evaluated annually for corrective action, or, alternatively, specific maintenance requirements may be implemented as problems are identified. Some conditions that may initiate maintenance actions are:

- Broken or missing well caps and covers on well casings.
- Damaged or missing well protection bollards, protective casing, or surface monuments.
- Missing well labels or identifiers.
- Broken or inaccessible aquifer tubes.
- Inoperable sampling pumps.
- Reduced well productivity due to fouling and/or corrosion of subsurface well components.
- Excessive turbidity in samples from wells.
- Well becoming unusable due to declining water table elevation.

Operable unit-specific well maintenance plans will be implemented as appropriate to ensure the functionality of groundwater monitoring locations and representativeness of groundwater monitoring measurements. The *Well Maintenance Plan for the 100-HR-3 and 100-KR-4 Groundwater Treatment Facilities* (SGW-58236) is currently in place, along with the *200 West Area Groundwater Pump-and-Treat Facility Extraction and Injection Well Maintenance Plan* (DOE/RL-2010-78).

2.2 Data Generation and Acquisition

This section addresses data generation and acquisition to ensure the project's methods for sampling, measurement and analysis, data collection or generation, data handling, and QC activities are appropriate and documented. The requirements for instrument calibration and maintenance, supply inspections, and data management are also addressed.

2.2.1 Analytical Method Requirements

Analytical method requirements for samples collected are presented in Table 2-2. Updated EPA methods may be substituted for the analytical methods identified in Table 2-2. The new method shall achieve project DQOs as well or better than the replaced method.

2.2.2 Field Analytical Methods

Field screening and survey data will be measured in accordance with HASQARD (DOE/RL-96-68) requirements (as applicable). Field analytical methods may also be performed in accordance with instrument manufacturer instructions. Table 2-2 provides the parameters identified for field analyses.

Table 2-2. Analytical Requirements for Groundwater Analysis

Constituent	Analytical Method[a]	Highest Allowable Practical Quantitation Limit[b] or MDC (µg/L or pCi/L)
Americium-241	Alpha spectrometry	1 pCi/L
Carbon-14	LSC	50 pCi/L
Cesium-137	GEA	15 pCi/L
Chlorine-36	GPC	100 pCi/L
Cobalt-60	GEA	25 pCi/L
Gamma energy analysis	GEA	2 pCi/L
Iodine-129	GEA	1 pCi/L
Neptunium-237	Alpha spectrometry	1pCi/L
Nitrate	EPA SW-846 Method 9056 or EPA method 300	250 µg/L
Plutonium-239/240	Alpha spectrometry	1 pCi/L
Plutonium-241	Alpha spectrometry	25 pCi/L
Radium-226	GEA or Lucas cell	1.0 pCi/L
Radium-226/228	GEA or Lucas cell	3 pCi/L
Selenium-79	LSC	50 pCi/L
Strontium-90	GPC	2 pCi/L
Technetium-99	LSC	50 pCi/L

Table 2-2. Analytical Requirements for Groundwater Analysis

Constituent	Analytical Method[a]	Highest Allowable Practical Quantitation Limit[b] or MDC (µg/L or pCi/L)
Thorium-230	Alpha spectrometry	1 pCi/L
Tritium	LSC	700 pCi/L
Total Uranium	EPA SW-846 Method 6020	1 µg/L
Uranium-233/234	Alpha spectrometry	1 pCi/L
Uranium-235	Alpha spectrometry	1 pCi/L
Uranium-238	Alpha spectrometry	1 pCi/L
Field Parameters[c]		
Dissolved oxygen	Field	N/A
Temperature	Field	N/A
Turbidity	Field	N/A
pH	Field	N/A
Specific conductance	Field	N/A

Note: The information in this table does not represent EPA requirements but is intended solely as guidance.

a. For EPA Method 300.0, see EPA/600/R-93/100, *Methods for the Determination of Inorganic Substances in Environmental Samples*. For four-digit EPA methods, see SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update V*. Equivalent methods may be substituted.

b. Highest allowable practical quantitation limits are specified in contracts with analytical laboratories. Actual quantitation limits vary by laboratory and may be lower than required contractually. Method detection limits are three to five times lower than quantitation limits.

c. Field parameters are included in analytical requirements for support of physical and chemical evaluations of groundwater conditions.

EPA = U.S. Environmental Protection Agency
GEA = gamma energy analysis
GPC = gas proportional counting
LSC = liquid scintillation counting
MDC = minimum detectable concentration
N/A = not applicable

2.2.3 Quality Control

QC requirements specified in the plan must be followed in the field and analytical laboratory to ensure that reliable data are obtained. Field QC samples will be collected to evaluate the potential for cross-contamination and to provide information pertinent to sampling variability. Laboratory QC samples estimate the precision, bias, and matrix effects of the analytical data. Field and laboratory QC sample requirements are summarized in Table 2-3. Acceptance criteria for field and laboratory QC are shown in Table 2-4. Data will be qualified and flagged in the HEIS database, as appropriate.

Table 2-3. Project Quality Control Requirements

Sample Type	Frequency	Characteristics Evaluated
Field Quality Control		
Field duplicates	1 in 20 sample	Precision, including sampling and analytical variability
Field splits	As needed When needed, the minimum is one for every analytical method, for analyses performed	Precision, including sampling, analytical, and inter-laboratory
Full trip blanks	1 for every 20 samples for each media collected	Cross-contamination from containers or transportation
Field transfer blanks	One each day volatile organic compounds are sampled	Contamination from sampling site
Equipment blanks	As needed If only disposable equipment is used or equipment is dedicated to a particular well, then an equipment blank is not required. Otherwise, one for every 20 samples.[a]	Adequacy of sampling equipment decontamination and contamination from nondedicated equipment
Analytical Quality Control[b]		
Laboratory duplicates	One per analytical batch[c]	Laboratory reproducibility and precision
Matrix spikes	One per analytical batch[c]	Matrix effect/laboratory accuracy
Matrix spike duplicates	One per analytical batch[c]	Laboratory accuracy and precision
Laboratory control samples	One per analytical batch[c]	Laboratory accuracy
Method blanks	One per analytical batch[c]	Laboratory contamination
Surrogates	Added to each sample and QC sample	Recovery/yield
Carrier	Added to each sample and quality control sample	Recovery/yield
Tracer	Added to each sample and quality control sample	Recovery/yield

Note: The information in this table does not represent EPA requirements but is intended solely as guidance.

a. For portable pumps, equipment blanks are collected one for every 10 well trips. Whenever a new type of nondedicated equipment is used, an equipment blank will be collected every time sampling occurs until it can be shown that less frequent collection of equipment blanks is adequate to monitor the decontamination methods for the nondedicated equipment.

b. Batching across projects is allowed for similar matrices (e.g., all Hanford Site groundwater).

c. Unless not required by, or different frequency is called out in laboratory analysis methods.

EPA = U.S. Environmental Protection Agency

Table 2-4. Quality Control and Acceptance Criteria for Field and Laboratory Quality Control Samples

Analysis	Quality Control	Acceptance Criteria	Corrective Action
Anions			
Anions by IC (nitrate)	MB	<MDL <5% sample concentration	Flagged with "C"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP/MSD[c]	≤20% RPD[b]	Review data[a]
	MS/ MSD[c]	75 to 125% recovery	Flagged with "N"
	EB, FTB	< MDL < 5% sample concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Metals			
Uranium (total) by ICP-MS	MB	<MDL <5% sample concentration	Flagged with "C"
	LCS	80 to 120% recovery	Flag with "o"[d]
	MS/MSD[c]	≤ 20% RPD[b]	Review data[a]
	MS/MSD[c]	75 to 125% recovery	Flagged with "N"
	EB, FTB	< MDL < 5% sample concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Radiochemical Analyses			
AEA (Thorium, Uranium, Radium-226, Neptunium, Plutonium, Americium, and Curium isotopics)	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	Tracer	30 to 105% recovery	Review data[a]
	EB, FTB	< MDC < 5% sample activity concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]

Table 2-4. Quality Control and Acceptance Criteria for Field and Laboratory Quality Control Samples

Analysis	Quality Control	Acceptance Criteria	Corrective Action
Carbon-14	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	MS	75-125% recovery	Flag with "N"
	EB, FTB	< MDC < 5% sample activity concentratio	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Chlorine-36	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	Tracer	30 to 105% recovery	Review data[a]
	Carrier	40 to 110% recovery	Review data[a]
	EB, FTB	< MDC < 5% sample activity concentratio	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
GEA	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	EB, FTB	< MDC < 5% sample activity concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Iodine-129	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	Tracer	30-105% recovery	Review data[d]
	EB, FTB	< MDC < 5% sample activity concentration	Flagged with "Q"

Table 2-4. Quality Control and Acceptance Criteria for Field and Laboratory Quality Control Samples

Analysis	Quality Control	Acceptance Criteria	Corrective Action
	Field duplicate	≤20% RPD[b]	Review data[a]
Selenium-79	MB	<MDC <5% sample activity concentration	Flagged with "B"
	DUP	≤20% RPD[b]	Review data[a]
	Carrier	40-110% recovery	Review data[a]
	EB, FTB	< MDC < 5% sample activity concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Strontium-90	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	Tracer	30 to 105% recovery	Review data[a]
	Carrier	40 to 110% recovery	Review data[a]
	EB, FTB	< MDC < 5% sample activity concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Technetium-99	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	MS	75 to 125% recovery	Flagged with "N"
	EB, FTB	< MDC < 5% sample activity concentration	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]
Tritium	MB	<MDC <5% sample activity concentration	Flagged with "B"
	LCS	80 to 120% recovery	Flag with "o"[d]
	DUP	≤20% RPD[b]	Review data[a]
	MS	75 to 125% recovery	Flagged with "N"

Table 2-4. Quality Control and Acceptance Criteria for Field and Laboratory Quality Control Samples

Analysis	Quality Control	Acceptance Criteria	Corrective Action
	EB, FTB	< MDL < 5% sample activity concentratio	Flagged with "Q"
	Field duplicate	≤20% RPD[b]	Review data[a]

Notes: The information in this table does not represent EPA requirements but is intended solely as guidance.

This table applies primarily to laboratory analyses.

a. After review, corrective actions are determined on a case-by-case basis. Corrective actions may include a laboratory recheck or flagging the data as suspect (Y flag) or rejected (R flag).

b. Applies when at least one result is greater than the laboratory PQL (chemical analyses) or greater than five times the MDC (radiochemical analyses)..

d. Apply with SMR concurrence.

AEA = alpha energy analysis
DUP = laboratory sample duplicate
EB = equipment blank
EPA = U.S. Environmental Protection Agency
FTB = full trip blank
GC/MS = gas chromatography/mass spectrometry
GEA = gamma energy analysis
IC = ion chromatography
ICP-MS = inductively coupled plasma – mass spectrometry
LCS = laboratory control sample
MB = method blank
MDC = minimum detectable concentration
MDL = method detection limit
MS = matrix spike
MSD = matrix spike duplicate
QC = quality control
RPD = relative percent difference
SUR = surrogate

Data flags:

B, C = possible laboratory contamination: analyte was detected in the associated method blank - laboratory applied

o = result may be biased: associated laboratory control sample result was outside the acceptance limits – laboratory applied

N = result may be biased: associated matrix spike result was outside the acceptance limits – laboratory applied r

T = result may be biased: associated matrix spike result was outside the acceptance limits (GC-MS only) – laboratory applied

Q = problem with associated field QC blank: results were out of limits – HEIS review.

2.2.4 Field Quality Control Samples

Field QC samples are collected to evaluate the potential for cross-contamination and provide information pertinent to field sampling variability and laboratory performance to help ensure that reliable data are obtained. Field QC samples include field duplicates, field split samples (SPLITs), and three types of field blanks (full trip blanks [FTBs] and equipment blanks [EBs]). Field blanks are typically prepared using high-purity reagent water[9]. QC sample definitions and their required frequency for collection are described in this subsection:

[9] Reagent water is high-purity water that is generally defined as water that has been distilled, deionized, or any combination of distillation, deionization, reverse osmosis, activated carbon filtration, ion exchange, particulate filtration, or other polishing techniques (DOE/RL-96-68).

- **Field duplicates:** Independent samples collected as close as possible to the same time and same location as the scheduled sample and are intended to be identical. Field duplicates are placed in separate sample containers and are analyzed independently. Field duplicates are used to determine precision for both sampling and laboratory measurements.

- **Field splits (SPLITs):** Two samples collected as close as possible to the same time and same location and are intended to be identical. SPLITs will be stored in separate containers and analyzed by different laboratories for the same analytes. SPLITs are interlaboratory comparison samples used to evaluate comparability between laboratories.

- **Full trip blanks (FTBs):** Bottles prepared by the sampling team prior to traveling to the sampling site. The preserved bottle set is either for volatile organic analysis only or identical to the set that will be collected in the field. It is filled with high-purity reagent water, and the bottles are sealed and transported (unopened) to the field in the same storage containers used for samples collected that day. Collected FTBs are typically analyzed for the same constituents as the samples from the associated sampling event. FTBs are used to evaluate potential contamination of the samples attributable to the sample bottles, preservative, handling, storage, and transportation.

- **Equipment blanks (EBs):** Reagent water passed through or poured over the decontaminated sampling equipment identical to the sample set collected and placed in sample containers, as identified on the SAF. EB sample bottles are placed in the same storage containers with the samples from the associated sampling event. EB samples will be analyzed for the same constituents as the samples from the associated sampling event. EBs are used to evaluate the effectiveness of the decontamination process. EBs are not required for disposable sampling equipment.

2.2.4.1 Laboratory Quality Control Samples

Internal QA/QC programs are maintained by the laboratories used by the project. Laboratory QA includes a comprehensive QC program that includes the use of matrix spikes (MSs), matrix duplicates, matrix spike duplicates (MSDs), laboratory control samples (LCSs), surrogates (SURs), method blanks (MBs), tracers, and carriers. These QC analyses are required by EPA methods (e.g., those in SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition; Final Update V*, as amended) and will be run at the frequency specified in the respective references, unless superseded by agreement. The QC checks outside of control limits are documented in analytical laboratory reports during DQAs, if performed. Laboratory QC and their typical frequencies are listed in Table 2-3. Acceptance criteria are shown in Table 2-4. The various laboratory QC samples are described below:

- **Laboratory duplicate:** An intralaboratory replicate sample that is used to evaluate the precision of a method in a given sample matrix.

- **Matrix spike (MS):** An aliquot of a sample spiked with a known concentration of target analyte(s). The MS is used to assess the bias of a method in a given sample matrix. Spiking occurs prior to sample preparation and analysis.

- **Matrix spike duplicate** (MSD)**:** A replicate spiked aliquot of a sample that is subjected to the entire sample preparation and analytical process. MSD results are used to determine the bias and precision of a method in a given sample matrix.

- **Laboratory control sample (LCS):** A control matrix (e.g., reagent water) spiked with analytes representative of the target analytes or a certified reference material that is used to evaluate laboratory accuracy.

- **Method blank (MB):** An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The MB is carried through the complete sample preparations and analytical procedure and is used to quantify contamination resulting from the analytical process.
- **Surrogate (SUR):** A compound added to all samples in the analysis batch (field samples and QC samples) prior to preparation. SURs are typically similar in chemical composition to the analyte being determined, yet are not normally encountered. SURs are expected to respond to the preparation and measurement systems in a manner similar to the analytes of interest. Because SURs are added to all standards, samples, and QC samples, they are used to evaluate overall method performance in a given matrix. SURs are used only in organic analyses.
- **Tracer:** A tracer is a known quantity of radioactive isotope that is different from that of the isotope of interest but is expected to behave similarly and is added in known quantities to samples to determine the overall chemical yield for the analytical preparation steps. Tracer recovery is a measure of the amount of analyte lost in performing the method, and sample results are generally corrected based on tracer recovery.
- **Carrier:** Carriers are typically nonradioactive (e.g., natural strontium) substances added in known quantities to samples to determine the overall chemical yield for the analytical preparation steps. As with a tracer, carrier recovery is a measure of the amount of analyte lost in performing the method and sample results are generally corrected based on carrier recovery.

Laboratories are required to analyze samples within the holding times specified in Table 2-5. In some instances, constituents in the samples not analyzed within the holding times may be compromised by volatilizing, decomposing, or other chemical changes. Data from samples analyzed outside the holding times are flagged in the HEIS database with an "H."

2.2.5 Measurement Equipment

Each measuring equipment user is responsible to ensure that equipment is functioning as expected, properly handled, and properly calibrated at required frequencies in accordance with methods governing control of the measuring equipment. Onsite environmental instrument testing, inspection, calibration, and maintenance will be recorded in accordance with approved methods. Field screening instruments will be used, maintained, and calibrated per manufacturer specifications and other approved methods.

2.2.6 Instrument and Equipment Testing, Inspection, and Maintenance

Collection, measurement, and testing equipment should meet applicable standards (e.g., ASTM International, formerly the American Society for Testing and Materials) or should have been evaluated as acceptable and valid in accordance with instrument-specific methods, requirements, and specifications. Software applications will be acceptance tested prior to use in the field.

Table 2-5. Preservation, Container, and Holding-Time Guidelines for Laboratory Analyses

Constituent/ Parameter	Minimum Volume	Container Type[a]	Preservation[b]	Holding Time
Nitrate by ion chromatography	60 mL	Narrow-mouth poly or glass	Store ≤6°C	48 hours

Table 2-5. Preservation, Container, and Holding-Time Guidelines for Laboratory Analyses

Constituent/ Parameter	Minimum Volume	Container Type[a]	Preservation[b]	Holding Time
Uranium by inductively coupled plasma/mass spectrometry metals	250 mL	Narrow-mouth poly or glass	Adjust pH to <2 with nitric acid	6 months
Alpha spectrometry (americium-241, isotopic plutonium, isotopic uranium,)	1 L for all alpha spectrometry	Narrow-mouth poly or glass	Adjust pH to <2 with nitric acid	6 months
Carbon-14	2 × 1 L	Narrow-mouth poly or glass	None	6 months
Gamma energy analysis	500 mL	Square poly	Adjust pH to <2 with nitric acid	6 months
Iodine-129	2 × 4 L	Narrow-mouth poly or glass	None	6 months
Radium-226	2 x 1 L	Narrow-mouth poly or glass	Adjust pH to <2 with nitric acid	6 months
Selenium-79	1 L	Narrow-mouth poly or glass	Adjust pH to <2 with nitric acid	6 months
Strontium-90 (total beta radiostrontium)	2 × 1 L	Wide-mouth poly or glass	Adjust pH to <2 with nitric acid	6 months
Technetium-99 by liquid scintillation	1 L	Narrow-mouth glass	Adjust pH to <2 with hydrochloric acid	6 months
Tritium	250 mL	Narrow-mouth glass	None	6 months

Notes:

The information in this table does not represent EPA requirements but is intended solely as guidance.

This table only applies to laboratory analyses. Specific conductance, pH, dissolved oxygen, temperature, and turbidity are not listed as they are measured in the field.

a. Under the "Container" heading, the term "poly" stands for EPA clean polyethylene bottles.

b. For preservation identified as stored at ≤6°C, the sample should be protected against freezing unless it is known that freezing will not impact the sample integrity.

EPA = U.S. Environmental Protection Agency

Measurement and testing equipment used in the field or in the laboratory will be subject to preventive maintenance measures to minimize downtime. Laboratories must maintain and calibrate their equipment. Maintenance requirements (e.g., documentation of routine maintenance) will be included in the individual laboratory and onsite organization's QA plan or operating protocols, as appropriate. Maintenance of laboratory instruments will be consistent with applicable Hanford Site requirements.

2.2.7 Instrument/Equipment Calibration and Frequency

Field equipment calibration is discussed in Section 2.2.5 and Chapter 3. Analytical laboratory instruments are calibrated in accordance with the laboratory QA plan and applicable Hanford Site requirements.

2.2.8 Inspection/Acceptance of Supplies and Consumables

Consumables, supplies, and reagents will be reviewed in accordance with test methods identified in SW-846 and will be appropriate for their use. Supplies and consumables used in support of sampling and analysis activities are procured in accordance with internal work requirements and processes. Responsibilities and interfaces necessary to ensure that items procured/acquired for the contractor meet the specific technical and quality requirements must be in place. The procurement system ensures that purchased items comply with applicable procurement specifications. Supplies and consumables are checked and accepted by users prior to use.

2.2.9 Nondirect Measurements

Data obtained from sources such as computer databases, programs, literature files, and historical databases will be technically reviewed to the same extent as the data generated as part of any sampling and analysis QA/QC effort. All data used in evaluations will be identified by source.

2.2.10 Data Management

The SMR organization (in coordination with the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager) is responsible for ensuring analytical data are appropriately reviewed, managed, and stored in accordance with the applicable programmatic requirements governing data management methods.

Electronic data access, when appropriate, will be through a Hanford Site database (e.g., HEIS). Where electronic data are not available, hardcopies will be provided per Section 9.6 of the Tri-Party Agreement (Ecology et al., 1989b).

Laboratory errors are reported to SMR. For reported laboratory errors, a sample issue resolution form is initiated in accordance with applicable methods. This process is used to document analytical errors and establish their resolution with the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager. These forms become a permanent part of the analytical data package for future reference and records management.

2.3 Assessment and Oversight

Assessment and oversight activities address the effectiveness of project implementation and associated QA/QC activities. The purpose of assessment is to ensure that the QAPjP is implemented as prescribed.

2.3.1 Assessments and Response Actions

Management assessments and/or independent assessments may be performed to verify compliance with the requirements outlined in this SAP, project field instructions, the QAPjP, methods, and regulatory requirements. Deficiencies identified by these assessments will be reported in accordance with existing programmatic requirements. The project line management chain coordinates the corrective actions/deficiency resolutions in accordance with the QA program, the corrective action management program, and associated methods implementing these programs. When appropriate, corrective actions will be taken by the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager. A DUA will be performed for the identified SAP activities. The DUA results will be provided to the S&GRP, RCRA, CERCLA, and AEA Integration Groundwater manager. No other planned assessments have been identified. If circumstances arise in the field dictating the need for additional assessments, then additional assessments will be performed.

Oversight activities in the analytical laboratories, including corrective action management, are conducted in accordance with laboratory QA plans. The SMR group oversees offsite analytical laboratories and verifies that laboratories are qualified for performing Hanford Site analytical work.

2.3.2 Reports to Management

Management will be made aware of deficiencies identified by self-assessments, corrective actions from ECOs, and findings from QA assessments and surveillances. Issues reported by the laboratories are communicated to SMR, which then initiates a sample issue resolution form. This process is used to document analytical or sample issues and establish resolution with the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager.

2.4 Data Review, Usability, and Interpretation

This section addresses the QA activities that occur after data collection. Implementation of these activities determines whether the data conform to the specified criteria, thus satisfying the project objectives.

2.4.1 Data Review and Verification

Data review and verification are performed to confirm sampling, chain-of-custody and analytical documentation are complete. This review includes linking sample numbers to specific sampling locations, reviewing sample collection dates and sample preparation and analysis dates to assess whether holding times have been met, and reviewing QC data to determine whether analyses have met the data quality requirements specified in this plan.

The criteria for verification include, but are not limited to, review for contractual compliance (samples were analyzed as requested), use of the correct analytical method, transcription errors, correct application of dilution factors, appropriate reporting of dry weight versus wet weight, and correct application of conversion factors. Field QA/QC results also will be reviewed to ensure data are usable.

The project scientist (assigned by the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager) will perform a data review to help determine if observed changes reflect improved/degraded groundwater quality or potential data errors, and this review may result in submittal of a request for data review on questionable data. The laboratory may be asked to check calculations or re-analyze the sample, or the well may be resampled. Results of the data review process are used to flag the data appropriately in the HEIS database and/or to add comments.

2.4.2 Data Validation

Data validation activities are performed at the discretion of the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager and under the direction of the SMR organization. Data validation activities will be based on EPA functional guidelines.

2.4.3 Reconciliation with User Requirements

The purpose of reconciliation with user requirements is to determine if quantitative data are of the correct type and are of adequate quality and quantity to meet the project data needs. The data quality assessment (DQA process) is the scientific and statistical evaluation of previously verified and validated data to determine if information obtained from environmental data operations are of the right type, quality, and quantity to support their intended use (usability). The DQA process uses the entirety of the collected data to determine usability for decision making. If a statistical sampling design was utilized during field sampling activities, then the DQA will be performed following guidance in EPA QA/G-9S, Data Quality Assessment Statistical Methods for Practitioners. When judgmental (focused) sampling designs are implemented in the field, data quality indicators (DQIs) such as precision, accuracy, representativeness,

comparability, completeness, and sensitivity for the specific data sets (individual data packages) will be evaluated in accordance with EPA QA/G-8, Guidance on Environmental Data Verification and Data Validation. Data verification and data validation are integral to both the statistical DQA data evaluation process and the DQI evaluation process. Results of the DQA or DQI processes will be used by the contractor S&GRP RCRA, CERCLA, AEA Integration Groundwater manager to interpret the data and determine if the data quality objectives for this activity have been met.

For routine groundwater monitoring undertaken through this groundwater monitoring plan, results of the DQI process are captured in QC associated with the annual Hanford Site groundwater report (e.g., DOE/RL-2017-66), which evaluates field and laboratory QC and the usability of data. A more robust assessment of data usability will be performed at the discretion of the S&GRP RCRA, CERCLA, AEA Integration Groundwater manager and documented in a report overseen by SMR.

2.4.4 Data Reduction and Interpretation

After data are determined to be suitable by the S&GRP RCRA, CERCLA, AEA Integration groundwater manager, the acceptable data are used to interpret groundwater conditions at the site. Interpretive techniques and data reduction processes are described in Section A5.1 in Appendix A of this plan and include the following additional processes:

- **Dose Calculations:** Activity concentrations of the target radionuclides will be accumulated for each monitoring location using a sum-of-fractions calculation to derive the TED following the process described in DOE-STD-1196-2011. Additional dose calculations will produce the cumulative beta/photon dose for the drinking water dose comparison. Uranium mass concentration will be summarized for comparison to the MCL and cumulative alpha emitter activity concentration will be calculated for comparison to the alpha MCL.

- **Trend plots:** Constituent concentrations graphed versus time to determine increases, decreases, and fluctuations. This information may be used in tandem with hydrographs and/or water level maps to determine if concentrations relate to changes in water level or in groundwater flow directions.

- **Contaminant distribution maps:** Distributions of constituents in the aquifer will be mapped to determine the extent of contamination. Changes in contaminant distribution over time assist in determining groundwater movement and growth or attenuation of contaminant plumes. Both concentration and dose distribution will be evaluated. The apparent effects of liquid effluent discharges will be evaluated.

- **Contaminant ratios:** These rations can be used to distinguish between different contamination sources.

- **Hydrographs:** Water levels graphed versus time to determine decreases, increases, seasonal, or manmade fluctuations in groundwater levels. Water levels are measured before sampling each well.

- **Water-level maps:** Water-level elevations from multiple wells may be used to construct contour maps and estimate flow directions. Groundwater flow is assumed to be perpendicular to the contours (lines of equal potential).

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3 Field Sampling Plan

The groundwater monitoring program employs documented procedures for sampling methods, equipment and its use, cleaning and decontamination, records and documentation, and sample management. Chapter 2 of this monitoring plan is the QAPjP, which details sample collection, sample preservation, chain-of-custody control, analytical procedures, and field and laboratory QA/QC necessary for the groundwater monitoring plan. This chapter provides more specific elements of the sampling protocols and techniques used for this monitoring plan and identifies the monitoring wells, constituents to be analyzed, and sampling frequency to meet the AEA requirements at the Hanford Site.

3.1 Sample Location, Frequency, and Constituents to be Monitored

The technical basis for sampling is described in detail in Appendix A. Appendix B provides information on well construction and screened intervals for the wells. Well networks, sampling frequency, and constituents have been identified for each GWIA and are shown in Tables 3-1 through 3-12. The well network, sampling frequency, and constituents identified for wells not associated with a GWIA are provided in Table 3-13. Table 3-14 lists the wells associated with specific principal study questions (PSQs).

Well maintenance problems and sampling logistics may delay scheduled sampling events, which are scheduled by month. The FWS determines the specific times within a given month that a well is sampled. If a well cannot be sampled at the times determined by the FWS, then the FWS, SMR, and project scientist consult on how best to recover or reschedule the sampling event as close to the original sampling date as possible. Missed sampling events that are not rescheduled within the same month are given top priority when rescheduling in the following month. Missed or cancelled sampling events are reported to DOE-RL and are included in the annual groundwater monitoring report (e.g., DOE/RL-2017-66).

Appendix A contains the criteria used to identify the wells needed to answer each of the PSQs from the DQO process and to determine the sampling frequency. During the annual review process and evaluation of TED at wells the current sampling frequency of wells were evaluated using the applicable PSQs and table A-10. Elevated levels of contaminants in two wells in the 100-KR OU prompted increased sampling frequency for those analytes. Consideration was also given to determine if the analyte or analytes driving the calculated TED at each well were detects or non-detects and if the analyte exceeded DWS. Some wells are co-sampled with other monitoring programs (e.g., monitored to meet RCRA or CERCLA requirements). Monitoring requirements for other programs are described in separate groundwater monitoring plans. Details regarding the process of well selection are provided in Chapter A7 of Appendix A.

3.2 Integrated Monitoring Network

Appendix A provides an extended discussion of the DQO evaluation, as well as plate maps detailing monitoring well locations. The selected monitoring locations are the product of an approach to integrate groundwater monitoring that is already conducted for other regulations as part of an overall strategy to meet the requirements of the AEA. The approach involves shared sampling and analysis efforts to eliminate duplication of effort and sampling conducted at multiple-year frequencies. Implementation and routine evaluations of this field sampling plan, the staggered sampling strategy, and the ramp-down strategies are expected to result in reduced monitoring costs as remediation is completed on the Hanford Site.

Sample collection and analysis under this SAP will focus on radiological analytes and nitrate. The AEA groundwater monitoring program will rely on existing RCRA, CERCLA, and *Clean Water Act (Federal Water Pollution Control Act of 1977)* monitoring activities for collection and analysis of groundwater

samples for non-radiological constituents of interest. This approach will make most effective integration of the existing monitoring programs. The AEA groundwater monitoring program will access and utilize the measurement data from the other programs to support required AEA surveillance reporting activities. As RCRA and/or CERCLA sites are closed or remedied, the AEA groundwater monitoring plan may integrate and continue to monitor non-radiological constituents that have historically exceeded action levels but are no longer monitored under other programs.

3.3 Sampling Methods

Sampling methods may include, but are not limited to, the following:

- Chemical and physical field screening (i.e., field measurements)
- Radiological screening
- Groundwater sampling
- Aquifer tube sampling
- P&T system effluent sampling
- Water-level measurements

Water level measurements will be collected prior to collecting groundwater samples. Manual measurements of depth to water in wells will be made using electronic tape measuring devices in each well prior to sample collection. A subset of existing wells at Hanford are identified for use in the Automated Water Level Network (AWLN). This is a network of selected well locations equipped with water level measurement pressure transducers and automated data logging capability. This system provides high-frequency groundwater elevation measurements, with particular focus on portions of the site near the Columbia River where groundwater elevations change frequently and affect groundwater gradients. Wells in the AEA network that are part of the AWLN system are identified in Table 3-14. In addition, specific water level monitoring efforts have been implemented in the 200 East Area where groundwater gradient is known to be very small. These efforts use high-precision measurements to ensure adequate understanding of the groundwater flow direction in the central portion of the Central Plateau.

Groundwater samples will be collected according to the current revision of applicable operating methods. Groundwater samples are collected after field measurements of purged groundwater have stabilized:

- **pH:** Two consecutive measurements agree within 0.2 pH units.
- **Temperature:** Two consecutive measurements agree within 0.2°C.
- **Conductivity:** Two consecutive measurements agree within 10 % of each other.
- **Turbidity:** Less than 5 nephelometric turbidity units (NTUs) prior to sampling (or project scientist recommendation).

Absent any special requirements, wells are purged using the three saturated open interval volume method. Stable field readings are also required. The default pumping rate is 7.5 to 45 L/min (2 to 12 gal/min), depending on the pump, although this is not practical at every well. For those few wells where the purge volumes are extraordinarily large, the wells are purged for a minimum of one hour and then sampled when stable field readings are obtained.

Table 3-1. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-BC GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
05-M	Aquifer tube	Plume	H-3, Sr-90	NA	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
06-M	Aquifer tube	116-B-11	H-3, Sr-90	NA	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B2-12	Groundwater well	Ringold confined aquifer	H-3	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B2-14	Groundwater well	Plume	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B3-1	Groundwater well	116-B-1	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B3-46	Groundwater well	116-C-1	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B3-47	Groundwater well	116-B-11	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B3-52	Groundwater well	116-C-5	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B4-1	Groundwater well	105-B	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B4-4	Groundwater well	105-B	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B4-7	Groundwater well	105-C	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B4-8	Groundwater well	105-B	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B4-15	Groundwater well	Plume	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B5-2	Groundwater well	105-B	H-3, Sr-90	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B8-9	Groundwater well	105-C	H-3	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
199-B9-3	Groundwater well	Plume	H-3	2	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
699-63-90	Groundwater well	Offsite NO_3	NO_3	6	6	6	—	6	6	6	6	6	6	6	6	6	—	1
699-66-103	Groundwater well	Offsite NO_3	NO_3	6	6	6	—	6	6	6	6	6	6	6	6	6	—	1
699-68-105	Groundwater well	Offsite NO_3	NO_3	6	6	6	—	6	6	6	6	6	6	6	6	6	—	1

Table 3-1. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-BC GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
AT-B-3-S	Aquifer tube	Plume	Sr-90	NA	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
C6230	Aquifer tube	116-B-11, 116-B-1	Sr-90	NA	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6
C7725	Aquifer tube	Plume	Sr-90	NA	2[b]	2	1	6	6	6	6	6	6	6	6	6	1	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

NA = Not Applicable

Table 3-2. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-FR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-F5-1	Groundwater well	116-F-14, 116-F-2	Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-4	Groundwater well	116-F-6	Sr-90, H-3	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-6	Groundwater well	100-F-34	Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-43B	Groundwater well	Ringold confined aquifer	—	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-46	Groundwater well	Plume	Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-47	Groundwater well	116-F-6	Sr-90, H-3	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-48	Groundwater well	105-F	Sr-90, Cs-137, Cl-36	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-54	Groundwater well	116-F-2	Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2

Table 3-2. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-FR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-F5-55	Groundwater well	116-F-14	Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F5-56	Groundwater well	105-F	Sr-90, Cs-137, Cl-36, U	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F7-1	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
199-F7-2	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
199-F7-3	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
199-F8-2	Groundwater well	116-F-4	Sr-90, U, H-3	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F8-3	Groundwater well	118-F-6, 118-F-1	H-3, C-14, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
199-F8-4	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
199-F8-7	Groundwater well	118-F-6	H-3, C-14, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
699-60-32	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-62-31	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-63-25A	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-64-27	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-66-23	Independent piezometer	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-67-26	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-71-30	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-71-34	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-75-28	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2

Table 3-2. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-FR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
699-75-31	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-75-34B	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
699-77-36	Groundwater well	Plume	NO_3	2	6	6	6	6	6	6	6	6	6	6	6	6	6	2
AT-F-1-S	Aquifer tube	Plume	Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
C6302	Aquifer tube	Plume	Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2
C6306	Aquifer tube	Plume	Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	2

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

NA = Not Applicable

Table 3-3. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-HR-D GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-D2-6	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D3-2	Groundwater well	118-D-2	H-3	2	6	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D3-5	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-20	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-83	Groundwater well	Plume	Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-85	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-3. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-HR-D GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-D4-86	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-95	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-96	Groundwater well	Plume	H-3	2	6	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-99	Groundwater well	118-D-2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D4-101	Groundwater well	Plume	H-3	2	6	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-15	Groundwater well	105-D	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-16	Groundwater well	116-D-1A&B	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-17	Groundwater well	105-DR	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-18	Groundwater well	105-DR	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-19	Groundwater well	105-DR	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-123	Groundwater well	116-D-1A&B	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-132	Groundwater well	116-D-1A&B	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-141	Groundwater well	Ringold confined aquifer	—	2	6	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D5-142	Groundwater well	116-D-1A&B	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D8-53	Groundwater well	116-D-7/ 116-DR-1&2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D8-54A	Groundwater well	116-D-7/ 116-DR-1&2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D8-68	Groundwater well	116-D-7/ 116-DR-1&2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
199-D8-70	Groundwater well	116-D-7/ 116-DR-1&2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-3. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-HR-D GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-D8-71	Groundwater well	116-D-7/ 116-DR-1&2	H-3, Sr-90	2	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
699-97-48C	Groundwater well	Ringold confined aquifer	—	2	6	2	6	6	6	6	6	6	6	6	6	6	6	6
C6278	Aquifer tube	116-D-7/ 116-DR-1&2	Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-15-2	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-15-3	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-15-4	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-16-3	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-16-4	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-17-2	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-17-3	Aquifer tube	116-D-7/ 116-DR-1&2	H-3, Sr-90	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6
DD-44-4	Aquifer tube	118-D-2	H-3	NA	2[b]	2	6	6	6	6	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

NA = Not Applicable

Table 3-4. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-HR-H GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	Tc-99	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	C-14	Se-79	GEA	NO_3
47-D	Aquifer tube	116-H-7	Sr-90	NA	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H2-1	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H3-2C	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H3-6	Groundwater well	116-H-1	H-3, Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H3-9	Groundwater well	Ringold confined aquifer	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6	1
199-H3-10	Groundwater well	Ringold confined aquifer	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6	1
199-H3-11	Groundwater well	105-H	H-3, Sr-90, Cl-36	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H3-12	Proposed well	183-H	Sr-90, U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H3-21	Proposed well	116-H-7	H-3, Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H3-22	Proposed well	183-H	Sr-90, U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H3-29	Groundwater well	183-H	Sr-90, U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-4	Groundwater well	183-H	Sr-90, U	1	1[b]	6	6	1	6	6	6	6	6	6	6	6	6	6
199-H4-8	Groundwater well	183-H	U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-12A	Groundwater well	183-H	U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-12C	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-13	Groundwater well	116-H-7	H-3, Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-15CP	Hosted piezometer	Upper basalt-confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-15CQ	Hosted piezometer	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-15CR	Hosted piezometer	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-15CS	Hosted piezometer	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-4. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-HR-H GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	Tc-99	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	C-14	Se-79	GEA	NO_3
199-H4-16	Groundwater well	116-H-7	Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-45	Groundwater well	116-H-1	H-3, Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-46	Groundwater well	105-H	H-3, Sr-90, Cl-36	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-47	Groundwater well	105-H	H-3, Sr-90, Cl-36	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-63	Groundwater well	116-H-7	Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-65	Groundwater well	183-H	U	1	6	6	6	1	6	6	6	6	6	6	6	6	6	6
199-H4-69	Groundwater well	116-H-7	Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-83	Groundwater well	116-H-7	Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-84	Groundwater well	183-H	U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-85	Groundwater well	183-H	U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-88	Groundwater well	183-H	Tc-99, U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-89	Groundwater well	183-H	Tc-99, U	SA	6	SA[b]	6	SA	6	6	6	6	6	6	6	6	6	6
199-H4-90	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H4-91	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-H6-1	Groundwater well	116-H-1	Sr-90	1	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
699-97-43C	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-97-45B	Groundwater well	Ringold confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
C7649	Aquifer Tube	116-H-7	Sr-90	NA	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6
C7650	Aquifer Tube	116-H-7	Sr-90	NA	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-4. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-HR-H GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	Tc-99	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	C-14	Se-79	GEA	NO_3

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

6 = sampling and analysis of this constituent every sixth year

SA = semiannual sampling to coincide with RCRA sampling schedule

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

NA = Not Applicable

RCRA = *Resource Conservation and Recovery Act of 1976*

Table 3-5. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-KR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Cs-137	Cl-36	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	Se-79	GEA	NO_3
19-M	Aquifer tube	116-K-1	H-3, Sr-90	NA	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
22-D	Aquifer tube	116-K-2	H-3, Sr-90	NA	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-13	Groundwater well	116-KE-2	Cs-137, H-3, Sr-90	1	6	3	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-18	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-19	Groundwater well	116-K-2, effluent monitoring	H-3, Sr-90	1	1	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-20	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-21	Groundwater well	116-K-2	H-3, Sr-90	1	2[b]	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-22	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-32A	Groundwater well	105-KE, 100-K-1, 116-KE-1, 116-KE-3, 118-K-1	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6

Table 3-5. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-KR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Cs-137	Cl-36	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	Se-79	GEA	NO_3
199-K-32B	Groundwater well	Ringold confined aquifer	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
199-K-34	Groundwater well	105-KW, 116-KW-1, 116-KW-2	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-37	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-106A	Groundwater well	105-KW, 116-KW-1, effluent monitoring	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-107A	Groundwater well	105-KW, 116-KW-2	Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-108A	Groundwater well	105-KW, effluent monitoring	C-14, H-3	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-111A	Groundwater well	118-K-1	H-3	1	6	—	—	6	1	6	6	6	6	6	6	6	6	6	6	6
199-K-113A	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-114A	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-115A	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-116A	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-119A	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-120A	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-125A	Groundwater well	116-K-2, effluent monitoring	H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-127	Groundwater well	116-K-2, effluent monitoring	H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-132	Groundwater well	105-KW, 116-KW-1	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6

Table 3-5. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-KR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Cs-137	Cl-36	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	Se-79	GEA	NO_3
199-K-137	Groundwater well	105-KW	C-14, H-3, effluent monitoring	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-138	Groundwater well	105-KW, 116-KW-1	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-139	Groundwater well	105-KW, 116-KW-1, 116-KW-2	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-140	Groundwater well	105-KW	Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-141	Groundwater well	105-KE, 100-K-1, 116-KE-1, 116-KE-3	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-142	Groundwater well	105-KE, 100-K-1, 116-KE-1, 116-KE-3	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-144	Groundwater well	116-K-1	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-145	Groundwater well	116-K-1, 116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-150	Groundwater well	Effluent monitoring	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-157	Groundwater well	118-K-1	H-3	1	1	—	—	1	1	6	6	6	6	6	6	6	1	6	6	6
199-K-160	Groundwater well	Effluent monitoring	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-161	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-162	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-166	Groundwater well	Effluent monitoring	C-14, Sr-90	1	1[b]	—	—	1[b]	6	6	6	6	6	6	6	6	1	6	6	6
199-K-168	Groundwater well	105-KW, 116-KW-1, 116-KW-2	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6

Table 3-5. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-KR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Cs-137	Cl-36	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	Se-79	GEA	NO_3
199-K-178	Groundwater well	105-KE, 100-K-1, 116-KE-1, 116-KE-3	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-181	Groundwater well	105-KE, 100-K-1, 116-KE-3	Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-183	Groundwater well	Effluent monitoring	C-14, Sr-90	1	1[b]	—	—	1[b]	6	6	6	6	6	6	6	6	1	6	6	6
199-K-184	Groundwater well	105-KW	C-14, H-3	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-185	Groundwater well	105-KW, 116-KW-1	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-189	Groundwater well	105-KE, 100-K-1, 116-KE-1, 116-KE-3	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-190	Groundwater well	105-KE, 100-K-1, 116-KE-3	Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-191	Groundwater well	Effluent monitoring	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-192	Groundwater well	Ringold confined aquifer	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
199-K-196	Groundwater well	105-KW, 116-KW-1	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-198	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-199	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-200	Groundwater well	116-K-2	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-201	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-202	Groundwater well	105-KE, 100-K-1, 116-KE-1, 116-KE-3	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6

Table 3-5. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-KR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Cs-137	Cl-36	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	Se-79	GEA	NO_3
199-K-203	Groundwater well	116-KE-1	C-14, H-3	1	1[b]	—	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-204	Groundwater well	116-KW-1	C-14, H-3	1	1[b]	—	6	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-205	Groundwater well	Effluent monitoring	C-14, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-207	Groundwater well	118-K-1	H-3	1	6	—	—	6	1	6	6	6	6	6	6	6	6	6	6	6
199-K-208	Groundwater well	116-K-2, 118-K-1	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-210	Groundwater well	116-K-1, 116-KE-1	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-212	Groundwater well	116-K-2	H-3, Sr-90	1	6	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-221	Groundwater well	105-KE, 100-K-1, 116-KE-3	C-14, Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	1	6	1	1
199-K-222	Groundwater well	105-KE, 100-K-1	Cl-36, Cs-137, H-3, Sr-90	1	1[b]	3	6	1[b]	1	6	6	6	6	6	6	6	1	6	1	1
199-K-223	Groundwater well	Effluent monitoring	C-14, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6
199-K-227	Groundwater well	118-K-1	H-3	1	6	—	—	6	1	6	6	6	6	6	6	6	6	6	6	6
199-K-232	Groundwater well	116-K-1	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	6	6	6	6
199-K-234	Groundwater well	116-KE-4	C-14, H-3, Sr-90	1	1[b]	—	—	1	1	6	6	6	6	6	6	6	6	6	6	6
699-78-62	Groundwater well	Effluent monitoring	C-14, H-3, Sr-90	1	1[b]	—	—	1[b]	1	6	6	6	6	6	6	6	1	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year)

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

Table 3-5. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-KR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Cs-137	Cl-36	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	Se-79	GEA	NO_3

GWIA = groundwater interest area

NA = Not Applicable

Table 3-6. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-NR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-N-2	Groundwater well	116-N-1	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-3	Groundwater well	116-N-1	H-3, Sr-90, U	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-14	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-19	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-21	Groundwater well	Plume	NO_3	1	2[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-27	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-28	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-32	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-34	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-41	Groundwater well	116-N-3	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-50	Groundwater well	Plume	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-51	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-57	Groundwater well	Plume	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-64	Groundwater well	116-N-1	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-67	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-6. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-NR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-N-72	Groundwater well	Plume	NO_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-N-73	Groundwater well	Plume	NO_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-N-74	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-75	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-76	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-77	Groundwater well	Plume	NO_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-N-80	Groundwater well	Ringold confined aquifer	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-81	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-92A	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-96A	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-103A	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-104A	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-105A	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-106A	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-122	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-123	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-146	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-147	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-6. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-NR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-N-165	Groundwater well	Plume	NO_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
199-N-172	Groundwater well	Plume	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-173	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-183	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-184	Groundwater well	116-N-1	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-186	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-187	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-188	Groundwater well	116-N-3	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-346	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-347	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-348	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-349	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-350	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-351	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-352	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-353	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-354	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-355	Groundwater well	116-N-1	Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-6. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-NR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3
199-N-356	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-357	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-358	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-359	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-360	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-361	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-362	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-363	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-364	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-365	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-366	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-367	Groundwater well	116-N-1	H-3, Sr-90	1	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
199-N-374	Groundwater Well	105-N	H-3, Sr-90	1	1	1	6	6	6	6	6	6	6	6	6	6	6	6
C6132	Aquifer tube	Plume	NO_3, Sr-90	NA	1[b]	6	6	6	6	6	6	6	6	6	6	6	6	1
C6320	Aquifer tube	105-N	Sr-90	NA	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
C7934	Aquifer tube	105-N	H-3, Sr-90	NA	1	1	6	6	6	6	6	6	6	6	6	6	6	6
C7936	Aquifer tube	105-N	H-3, Sr-90	NA	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6
C7939	Aquifer tube	105-N	H-3, Sr-90	NA	1[b]	1	6	6	6	6	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

Table 3-6. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 100-NR GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Sr-90	H-3	Total U	Pu-239/ 240	Pu-241	Am-241	U-233/ 234	U-235	U-238	Tc-99	C-14	Se-79	GEA	NO_3

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

NA = Not Applicable

Table 3-7. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 1100-EM GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	Sr-90	Tc-99	C-14	Se-79	GEA	NO_3
699-S30-E10A	Groundwater well	Horn Rapids Landfill, Framatome	U	1	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-S30-E15A	Groundwater well	Offsite NO_3	NO_3, U	3	3	6	6	6	3	6	6	6	6	6	6	6	6	1
699-S31-E8A	Groundwater well	Horn Rapids Landfill, Framatome, offsite NO_3	NO_3, U	1	3	6	6	6	1	6	6	6	6	6	6	6	6	1
699-S31-E10A	Groundwater well	Horn Rapids Landfill, Framatome, offsite NO_3	NO_3, U	1	6	6	6	6	1	6	6	6	6	6	6	6	6	1
699-S31-E10C	Groundwater well	Horn Rapids Landfill, Framatome, offsite NO_3	NO_3, U	1	3	6	6	6	1	6	6	6	6	6	6	6	6	1
699-S31-E10D	Groundwater well	Horn Rapids Landfill, Framatome	U	1	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-S31-E11	Groundwater well	Horn Rapids Landfill, Framatome	U	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-S32-E13B	Groundwater well	Horn Rapids Landfill, Framatome	U	3	3	6	6	6	3	6	6	6	6	6	6	6	6	6

Notes: Uranium groundwater contamination originated from the industrial site presently operated by Framatome (formerly AREVA), but under previous site ownership.

The U.S. Department of Energy retains ownership of Horn Rapids Landfill after planned transfer of property in the southern portion of the Hanford Site.

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

Sample Frequency:

Table 3-7. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 1100-EM GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	Sr-90	Tc-99	C-14	Se-79	GEA	NO_3

1 = sampling and analysis of this constituent on an annual basis
3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year)
6 = sampling and analysis of this constituent every sixth year
AEA = *Atomic Energy Act of 1954*
GEA = Gamma Energy Analysis
GWIA = groundwater interest area

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/ 240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/ 234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E24-25	Groundwater well	216-C-1	I-129	2	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E26-8	Groundwater well	Upper basalt-confined aquifer	I-129	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E26-10	Groundwater well	LERF	H-3, I-129	1	—	—	2	6	6	6	6	1	6	6	6	6	6	6	6	6	6
299-E26-11	Groundwater well	LERF	H-3, I-129	1	—	—	2	6	6	6	6	1	6	6	6	6	6	6	6	6	6
299-E26-14	Groundwater well	LERF	H-3, I-129, Sr-90, Tc-99	1	—	—	2	6	6	6	6	1	6	6	6	6	6	6	6	6	6
299-E26-77	Groundwater well	LERF	H-3, I-129, Sr-90, Tc-99	1	—	—	2	6	6	6	6	1	6	6	6	6	6	6	6	6	6
299-E26-79	Groundwater well	LERF	H-3, I-129	1	—	—	2	6	6	6	6	1	6	6	6	6	6	6	6	6	6
299-E27-5	Groundwater well	216-C-10	I-129	2	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E27-8	Groundwater well	LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E27-9	Groundwater well	LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E27-10	Groundwater well	LLWMA-2, 216-B-2-1, 216-B-2-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E27-11	Groundwater well	LLWMA-2, 216-B-2-1, 216-B-2-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E27-12	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-13	Groundwater well	241-C	Gross Beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-14	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-15	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-16	Groundwater well	216-B-2 Ditches, migration pathway from B Complex	I-129, Tc-99	1	—	—	1	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E27-17	Groundwater well	LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E27-19	Groundwater well	216-B-2 Ditches, migration pathway from B Complex	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E27-21	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-22	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-23	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-24	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E27-25	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-26	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-40	Proposed well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E27-155	Groundwater well	241-C	Gross beta, gamma activity, I-129, Tc-99, U	Q	Q	Q	2	6	6	6	Q[b]	6	Q	6	6	6	6	Q[b]	Q[b]	Q	6
299-E28-1	Groundwater well	216-B-5 and migration pathway from B Complex	I-129	1	—	—	—	6	6	2[b]	1[b]	6	6	6	6	6	6	6	6	6	6
299-E28-2	Groundwater well	216-B-9 and migration pathway from 216-B-12 Crib	Sr-90	1	—	—	—	6	6	2[b]	1[b]	6	1	6	6	6	6	6	6	6	6
299-E28-3	Groundwater well	216-B-5 and migration pathway from 216-B-12 Crib	—	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E28-4	Groundwater well	216-B-59 and migration pathway from 216-B-12 Crib	—	1	—	—	2	6	6	2[b]	1[b]	1	1	6	6	6	6	6	6	6	6
299-E28-5	Groundwater well	Migration pathway from B Complex	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E28-6	Groundwater well	UPR-200-E-77 and migration pathway from 216-B-12 Crib	U, Tc-99	1	—	—	—	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E28-7	Groundwater well	216-B-5	Sr-90, Tc-99	1	—	—	—	6	6	2[b]	1[b]	6	1	6	6	6	6	6	6	6	6
299-E28-8	Groundwater well	Migration pathway from B Complex	—	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E28-9	Groundwater well	216-B-12	Tc-99	1	—	—	—	6	6	6	1[b]	6	3	6	6	6	6	6	6	6	6
299-E28-13	Groundwater well	216-B-56 and migration pathway from 216-B-12 Crib	Tc-99	1	—	—	—	6	6	6	1[b]	6	2	6	6	6	6	6	6	6	6
299-E28-17	Groundwater well	216-B-10A&B and migration pathway from 216-B-12 Crib	U, Tc-99	1	—	—	—	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E28-18	Groundwater well	216-B-62 and migration pathway from 216-B-12 Crib	Tc-99	1	—	—	—	6	6	6	1[b]	6	2	6	6	6	6	6	6	6	6
299-E28-21	Groundwater well	216-B-62	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E28-23	Groundwater well	216-B-5	Cs-137, I-129, Sr-90, Tc-99	1	2	—	2	2[b]	6	2[b]	1[b]	6	6	6	6	6	6	6	6	6	6
299-E28-24	Groundwater well	216-B-5, migration pathway from B Complex and 216-B-12 Crib	H-3, I-129, Sr-90, U, Tc-99	1	2	—	2	2[b]	6	2[b]	1[b]	1	1	6	6	6	6	6	6	6	6
299-E28-25	Groundwater well	216-B-5	I-129, Sr-90	2	2	—	2	2[b]	6	2[b]	6	6	6	6	6	6	6	6	6	6	6
299-E28-26	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E28-27	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E28-28	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E28-30	Groundwater well	216-B-12	Tc-99	1	—	—	—	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E28-34	Proposed well	Migration pathway form B Complex	U, I-129, Tc-99	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E29-54	Groundwater well	216-B-6 and migration pathway from 216-B-12 Crib	U, Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E32-2	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-3	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-4	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-5	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-6	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-7	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-8	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-9	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E32-10	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E33-1A	Groundwater well	216-B-46	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-3	Groundwater well	216-B-45	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-9	Groundwater well	241-BY	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-12	Groundwater well	Upper basalt-confined aquifer	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-14	Groundwater well	Plume	Tc-99	1	—	—		6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-15	Groundwater well	216-B-8 and migration pathway from BY Cribs	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-17	Groundwater well	216-B-8 and migration pathway from BY Cribs	I-129, Tc-99	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E33-20	Groundwater well	216-B-11A&B and migration pathway from BY Cribs	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-21	Groundwater well	216-B-36	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-28	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E33-29	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E33-30	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E33-31	Groundwater well	241-BX and migration pathway from BY Cribs plume	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-32	Groundwater well	241-BX and migration pathway from BY Cribs plume	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-33	Groundwater well	216-B-63 and migration pathway from BY Cribs plume	I-129, Tc-99	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-34	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E33-35	Groundwater well	LLWMA-1	H-3, I-129, Tc-99, U	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E33-36	Groundwater well	216-B-63 and migration pathway from BY Cribs, and 241-B plumes	I-129, Tc-99	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-37	Groundwater well	216-B-2 Ditches, migration pathway from B Complex	—	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E33-38	Groundwater well	216-B-47	I-129, Tc-99, U	1	—	2	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-39	Groundwater well	Plume and migration pathway from BY Cribs plumes	I-129, Tc-99	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-40	Groundwater well	Upper basalt-confined aquifer	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-41	Groundwater well	241-BX	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-42	Groundwater well	241-BX	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-43	Groundwater well	241-BX	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-44	Groundwater well	241-BY	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-47	Groundwater well	241-B and migration pathway from BY Cribs, 241-BX-102, and 241-B plumes	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-48	Groundwater well	241-B and migration pathway from BY Cribs and 241-BX-102 plumes	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-49	Groundwater well	241-BX and migration pathway from BY Cribs and 241-BX-102 plumes	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-50	Groundwater well	Upper basalt-confined aquifer	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-205	Groundwater well	241-BY	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E33-265	Groundwater well	LLWMA-1	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-266	Groundwater well	LLWMA-1	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-334	Groundwater well	241-BX	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-335	Groundwater well	241-BX	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-337	Groundwater well	241-B and migration pathway from 241-BX-102 plume	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-338	Groundwater well	241-B and migration pathways from BY Cribs, and 241-B plumes	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-339	Groundwater Well	241-B and migration pathways from BY Cribs, and 241-B plumes	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-340	Groundwater well	Upper basalt-confined aquifer	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-E33-341	Groundwater well	216-B-48	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-342	Groundwater well	241-BY	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E33-343	Groundwater well	241-B and migration pathways from BY Cribs, and 241-BX-102	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-345	Groundwater well	241-B and migration pathways from BY Cribs, and 241-BX-102	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E33-350[c]	Groundwater well	216-B-7A&B, 216-B-8	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-351[c]	Groundwater well	241-B	H-3, I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-360	Groundwater well	241-B and migration pathways from BY Cribs, and 241-BX-102	—	1	—	—	2	6	6	6	1[b]	1	1	6	6	6	6	6	6	6	6
299-E33-361	Groundwater well	Plume, and migration pathway from BY Cribs, 241-BX-102, and 241-B plumes	I-129, Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
299-E34-2	Groundwater well	LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E34-8	Groundwater well	216-B-63, LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E34-9	Groundwater well	LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E34-10	Groundwater well	216-B-63, LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
299-E34-12	Groundwater well	216-B-63, LLWMA-2	H-3, I-129, Sr-90, Tc-99	SA	—	—	SA	6	6	6	SA[b]	SA	SA	6	6	6	6	6	6	6	6
699-42-40A	Groundwater well	216-B-3C RAD, Ringold confined aquifer	H-3, I-129	1	—	—	2	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-42-40C	Groundwater well	Upper basalt-confined aquifer	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-43-41F	Groundwater well	216-B-3B RAD	—	1	—	—	2	6	6	6	1[b]	1	6	6	6	6	6	6	6	6	6
699-43-41G	Groundwater well	Ringold confined aquifer	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-44-39B	Groundwater well	216-B-3	I-129	2	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
699-45-42	Groundwater well	Plume	I-129	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-46-91	Groundwater well	ModuTanks	—	1	—	—	2	6	6	6	1[b]	1	6	6	6	6	6	6	6	6	6
699-47-53B	Proposed well	Plume	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-47-55	Proposed well	Plume	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-48-50B	Groundwater well	Plume	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-49-55A	Groundwater well	Plume	—	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
699-49-55B	Groundwater well	Upper basalt-confined aquifer	—	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
699-49-57A	Groundwater well	Plume	I-129, Tc-99	1	—	—	2	6	6	6	2[b]	1	6	6	6	6	6	6	6	6	6
699-49-57B	Groundwater well	Upper basalt-confined aquifer	—	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
699-50-56	Groundwater well	Plume	Tc-99	1	—	—	—	6	6	6	1[b]	2	6	6	6	6	6	6	6	6	6
699-50-59	Groundwater well	Plume	I-129	1	—	—	2	6	6	6	1[b]	2	6	6	6	6	6	6	6	6	6
699-52-55	Groundwater well	Plume	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-52-55B	Groundwater well	Upper basalt-confined aquifer	—	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-53-47B	Groundwater well	216-A-25	Sr-90	2	—	—	—	6	6	2[b]	6	6	6	6	6	6	6	6	6	6	6
699-53-48A	Groundwater well	216-A-25	Sr-90	2	—	—	—	6	6	2[b]	6	6	6	6	6	6	6	6	6	6	6
699-53-55B	Groundwater well	Plume	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-53-55C	Groundwater well	Plume	Tc-99	1	—	—	—	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-54-48	Groundwater well	216-A-25	Sr-90	2	—	—	—	6	6	2[b]	6	6	6	6	6	6	6	6	6	6	6

Table 3-8. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-BP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
699-54-49	Groundwater well	216-A-25	Sr-90	2	—	—	—	6	6	2[b]	6	6	6	6	6	6	6	6	6	6	6
699-55-50C	Groundwater well	216-A-25	Sr-90	2	—	—	—	6	6	2[b]	6	6	6	6	6	6	6	6	6	6	6
699-55-55	Groundwater well	Plume	I-129	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
699-55-57	Groundwater well	Plume	Tc-99	1	—	—	2	6	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-55-60A	Groundwater well	216-N-7	Tc-99, U	1	—	—	2	6	6	6	1[b]	6	1	6	6	6	6	6	6	6	6
699-57-59	Groundwater well	Plume	I-129	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
699-59-58	Groundwater well	Plume	—	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
699-60-60	Piezometer host	Plume	—	2	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

c. Perched water wells.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis
2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)
3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year)
6 = sampling and analysis of this constituent every sixth year
Q = sampling and analysis of this constituent on a quarterly basis to meet negotiated sample frequency
SA = semiannual sampling to support agreed upon RCRA sampling needs

AEA = *Atomic Energy Act of 1954*
GEA = Gamma Energy Analysis
GWIA = groundwater interest area
LERF = Liquid Effluent Retention Facility
LLWMA = low-level waste management area
RCRA = *Resource Conservation and Recovery Act of 1976*
UPR = unplanned release

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E13-5	Groundwater well	BC Cribs	Cs-137, Co-60, H-3, Sr-90	2	2	—	2	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E13-7	Groundwater well	BC Trenches	Cs-137, H-3, Sr-90	2	2	—	—	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E13-11	Groundwater well	BC Trenches	Cs-137, H-3, Sr-90	2	2	—	—	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E13-12	Groundwater well	BC Trenches	Cs-137, H-3, Sr-90	2	2	—	—	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E13-14	Groundwater well	BC Trenches	Cs-137, H-3, Sr-90	2	2	—	—	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E13-16	Groundwater well	BC Trenches	Cs-137, H-3, Sr-90	2	2	—	—	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E13-18	Groundwater well	BC Trenches	Cs-137, H-3, Sr-90	2	2	—	—	—	6	6	2[b]	6	2	6	6	6	6	6	6	6	6	6
299-E16-2	Groundwater well	216-A-30	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E17-1	Groundwater well	216-A-10	H-3, I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	2	6	6	6	6	6	6	6	6	6
299-E17-3	Groundwater well	216-A-27	H-3, I-129, Sr-90, U	2	—	—	—	2	6	6	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E17-9	Groundwater well	216-A-36B	H-3, I-129, Sr-90, U	2	—	—	—	2	6	6	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E17-12	Groundwater well	216-A-45	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-13	Groundwater well	216-A-45	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-14	Groundwater well	216-A-36B	H-3, I-129, Sr-90, Tc-99, U	2	—	—	—	2	6	6	2[b]	2[b]	2	2	6	6	6	6	6	6	6	6
299-E17-15	Groundwater well	216-A-36B	H-3, I-129, Sr-90, Tc-99, U	2	—	2	—	2	6	6	2[b]	2[b]	2	2	6	6	6	6	6	6	6	6
299-E17-16	Groundwater well	216-A-36B	H-3, I-129, Sr-90, Tc-99, U	2	—	—	—	2	6	6	2[b]	2[b]	2	2	6	6	6	6	6	6	6	6
299-E17-17	Groundwater well	216-A-36B	H-3, I-129, Sr-90, U	2	—	—	—	2	6	6	2[b]	6	2	2	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E17-18	Groundwater well	216-A-36B	H-3, I-129, Sr-90, U	2	—	—	—	2	6	6	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E17-19	Groundwater well	216-A-10	H-3, I-129, Sr-90, U	2	—	—	—	2	6	6	6	6	2	2	6	6	6	6	6	6	6	6
299-E17-20	Groundwater well	216-A-10	H-3, I-129, Sr-90	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-21	Groundwater well	IDF	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-22	Groundwater well	216-A-45	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-23	Groundwater well	IDF	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-25	Groundwater well	Plume	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E17-26	Groundwater well	IDF	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E18-1	Groundwater well	IDF	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E23-1	Groundwater well	Plume	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E24-3	Groundwater well	216-A-9	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
299-E24-4	Groundwater well	216-A-9	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
299-E24-5	Groundwater well	216-A-9	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
299-E24-16	Groundwater well	216-A-10	H-3, I-129, Sr-90, U	2	—	—	—	2	6	6	6	6	2	2	6	6	6	6	6	6	6	6
299-E24-17	Groundwater well	216-A-10	H-3, I-129, Sr-90	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E24-18	Groundwater well	IDF	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E24-20	Groundwater well	216-A-40, 241-A, 241-AX	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
299-E24-21	Groundwater well	IDF	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E24-22	Groundwater well	241-A	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	2	6	6	6	6	6	6	6	6
299-E24-23	Groundwater well	216-A-2, -4, -21, -26, -26A, -31	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	2[b]	2	2	6	6	6	6	6	6	6	6
299-E24-24	Groundwater well	IDF	H-3	2	—	—	—	—	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E24-33	Groundwater well	241-AX	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	2	6	6	6	6	6	6	6	6
299-E25-2	Groundwater well	216-A-1, 216-A-7	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
299-E25-3	Groundwater well	216-A-6	Cs-137, H-3, I-129, Sr-90, U	2	2	—	—	2	6	6	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-6	Groundwater well	216-A-8	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-8	Groundwater well	216-A-8	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-10	Groundwater well	216-A-8	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-11	Groundwater well	216-A-30	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-12	Groundwater well	216-A-30	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-17	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-18	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-19	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E25-20	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-21	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-22	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-23	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-24	Groundwater well	216-A-37-1, 216-A-37-2, 216-A-42	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-26	Groundwater well	216-A-29	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E25-28	Groundwater well	216-A-29	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-29P	Hosted piezometer	Plume	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	2
299-E25-29Q	Hosted piezometer	Plume	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	2
299-E25-32P	Hosted piezometer	216-A-29	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E25-32Q	Hosted piezometer	Plume	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E25-34	Groundwater well	216-A-29	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E25-35	Groundwater well	216-A-29	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-36	Groundwater well	216-A-2, -4, -21, -26, -26A, -31	Cs-137, H-3, I-129, Pu-239/240, Sr-90, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
299-E25-37	Groundwater well	Plume	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E25-39	Groundwater well	Plume	H-3, I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-40	Groundwater well	216-A-39, 241-A, 241-AX	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	6	6	6	6	6	6	6	6	6
299-E25-41	Groundwater well	241-AX	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	6	2	6	6	6	6	6	6	6	6
299-E25-42	Groundwater well	216-A-29	I-129, Tc-99	2	—	—	—	2	6	6	6	2[b]	2	6	6	6	6	6	6	6	6	6
299-E25-43	Groundwater well	216-A-29	H-3. I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-44	Groundwater well	Plume	H-3. I-129	2	—	—	—	2	6	6	6	6	2	6	6	6	6	6	6	6	6	6
299-E25-47	Groundwater well	216-A-37-1	Cs-137, H-3, I-129, Pu-239/240, Sr-90, Tc-99, U	2	2	—	—	2	2[b]	2[b]	2[b]	6	2	2	6	6	6	6	6	6	6	6
299-E25-48	Groundwater well	216-A-29	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E25-93	Groundwater well	241-A	I-129, Sr-90, Tc-99	2	—	—	—	2	6	6	2[b]	2[b]	6	2	6	6	6	6	6	6	6	6
299-E25-94	Groundwater well	241-A	I-129, Sr-90, Tc-99	2	—	—	—	2	6	6	2[b]	2[b]	6	2	6	6	6	6	6	6	6	6
299-E25-237	Groundwater well	241-A	I-129, Tc-99, U	2	—	2	—	2	6	6	6	2[b]	6	2	6	6	6	6	6	6	6	6
299-E26-2	Groundwater well	216-A-24	H-3, I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E26-4	Groundwater well	216-A-24	H-3, I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E26-5	Groundwater well	216-A-24	H-3, I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E26-12	Groundwater well	216-A-29	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
299-E26-13	Groundwater well	216-A-29	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
499-S0-7	Groundwater well	Drinking water supply	H-3, U, Co-60	1	—	—	1	1	1[b]	1[b]	1[b]	1[b]	1	1	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1	1

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
499-S0-8	Groundwater well	Drinking water supply	H-3, U, Co-60	1	—	—	1	1	1[b]	1[b]	1[b]	1[b]	1	1	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1	1
499-S1-7B	Groundwater well	FFTF	H-3, U, Co-60, Ru-106	2	—	—	2	—	6	6	6	6	2	2	6	6	6	6	6	6	6	6
499-S1-8J	Groundwater well	Drinking water supply	H-3, U, Co-60	1	—	—	1	1	1[b]	1[b]	1[b]	1[b]	1	1	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1	1
499-S1-8K	Groundwater well	FFTF	H-3, U, Co-60, Ru-106	2	—	—	2	—	6	6	6	6	2	2	6	6	6	6	6	6	6	6
699-2-3	Groundwater well	200 East	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-2-6A	Groundwater well	200 East	H-3, I-129	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-2-7	Groundwater well	Plume	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-8-17	Groundwater well	200 East	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-8-25	Groundwater well	Plume	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-10-54A	Groundwater well	Offsite NO_3	NO_3	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-17-5	Groundwater well	Plume	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-20-20	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-20-E12O	Hosted piezometer	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-20-E12S	Hosted piezometer	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-20-E5A	Groundwater well	200 East	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-21-6	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-24-1P	Independent piezometer	Upper basalt-confined aquifer	—	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-26-15A	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-26-33	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
699-26-35A	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-28-40	Piezometer host	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-28-40P	Hosted piezometer	Ringold confined aquifer	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-29-4	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-31-11	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-31-31	Piezometer host	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-32-22A	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-32-22B	Groundwater well	Upper basalt-confined aquifer	—	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-32-43	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-33-42	Groundwater well	200 East	H-3	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-33-56	Groundwater well	Plume	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-34-41B	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-34-42	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-35-9	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-35-57[c]	Groundwater well	US Ecology	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-35-58[c]	Groundwater well	US Ecology	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-36-58A[c]	Groundwater well	US Ecology	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-36-58B[c]	Groundwater well	US Ecology	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
699-37-43	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-37-47A	Groundwater well	Plume	H-3, I-129, Sr-90, Tc-99, U	1	—	—	—	1	6	6	1[b]	1[b]	1	1	6	6	6	6	6	6	6	1
699-37-E4	Groundwater well	200 East	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-38-15	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-39-39	Groundwater well	Plume	H-3, NO_3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-40-1	Groundwater well	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-40-33A	Groundwater well	TEDF	I-129	3	—	—	—	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-40-36	Groundwater well	TEDF, Ringold confined aquifer	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-41-1A	Groundwater well	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-41-23	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-41-35	Groundwater well	TEDF	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-41-40	Groundwater well	216-B-3C RAD, Ringold confined aquifer	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-41-42	Groundwater well	Plume	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-42-12A	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-42-37	Groundwater well	TEDF, Ringold confined aquifer	—	3	—	—	—	—	3[b]	3[b]	3[b]	3[b]	3	6	3[b]	3[b]	3[b]	3[b]	3[b]	3[b]	3	6
699-42-39A	Groundwater well	216-B-3C RAD	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-42-39B	Groundwater well	216-B-3C RAD, Ringold confined aquifer	—	3	—	—	—	—	3[b]	3[b]	3[b]	3[b]	3	6	3[b]	3[b]	3[b]	3[b]	3[b]	3[b]	3	6
699-42-42B	Groundwater well	216-B-3	H-3, I-129	3	—	—	—	3	3[b]	3[b]	3[b]	3[b]	3	6	3[b]	3[b]	3[b]	3[b]	3[b]	3[b]	3	6
699-43-3	Groundwater well	200 East	H-3, I-129	1	—	—	—	1	6	6	6	6	1	6	6	6	6	6	6	6	6	6

Table 3-9. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-PO GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	Ra-226/228	Co-60	I-129	Pu-239/240	Pu-241	Sr-90	Tc-99	H-3	Total U	Am-241	U-233/234	U-235	U-238	C-14	Se-79	GEA	NO_3
699-43-43B	Proposed Well	216-B-3	H-3, I-129	2	—	—	—	1	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-43-45	Groundwater well	216-B-3	I-129	2	—	—	—	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-46-4	Groundwater well	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-46-21B	Groundwater well	200 East	H-3, I-129	3	—	—	—	3	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-47-5	Groundwater well	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-48-7A	Groundwater well	Plume	H-3	1	—	—	—	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6
699-49-13E	Groundwater well	Water supply well, plume	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-52-19	Groundwater well	Plume	H-3	3	—	—	—	—	6	6	6	6	3	6	6	6	6	6	6	6	6	6
699-S2-34B	Groundwater well	Water supply well	—	1	—	—	—	—	1[b]	1[b]	1[b]	1[b]	1	1	1[b]	1[b]	1[b]	1[b]	1[b]	1[b]	1	1
699-S8-19	Groundwater well	Offsite NO_3	NO_3	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
C6384	Aquifer tube	200 East	H-3	NA	2	—	2	—	6	6	6	6	1	6	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

c. Identified wells are part of the US Ecology groundwater monitoring network. Data are collected by others and provided to Soil and Groundwater. Sampling and analysis is not scheduled as part of the AEA monitoring program. However, provided data should be reviewed annually.

Sampling Frequency:

1 = sampling and analysis of this constituent on an annual basis
2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)
3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year
6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*
FFTF = Fast Flux Test Facility
GEA = Gamma Energy Analysis
GWIA = groundwater interest area
IDF = Integrated Disposal Facility
NA = Not Applicable
TEDF = Treated Effluent Disposal Facility

Table 3-10. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-UP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Co-60	I-129	Se-79	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	GEA	NO_3
299-W15-37	Groundwater well	216-Z-20	NO_3	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	3
299-W17-3	Groundwater well	Plume	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
299-W18-15	Groundwater well	216-U-10	U	3	6	—	—	6	6	6	6	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W18-21	Groundwater well	LLWMA-4	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
299-W18-22	Groundwater well	LLWMA-4	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
299-W18-40	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W18-260	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-6	Groundwater well	216-S-23	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
299-W19-12	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-34A	Groundwater well	Plume	Tc-99, U	3	6	—	—	6	6	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W19-34B	Groundwater well	Plume	Tc-99, U	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
299-W19-36	Groundwater well	Plume	Tc-99, U	1	6	—	—	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-39	Groundwater well	216-U-17	U	1	6	—	—	6	6	—	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-41	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-42	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-43	Groundwater well	Plume	Tc-99, U	1	6	—	—	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-44	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-45	Groundwater well	241-U	Tc-99	1	3[b]	3	—	3[b]	3[b]	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-46	Groundwater well	Plume	U	1	6	—	3	6	6	3[b]	3	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-47	Groundwater well	241-U	Tc-99	1	6	—	—	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
299-W19-48	Groundwater well	216-U-17	U	1	6	—	—	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-49	Groundwater well	Plume	I-129, Tc-99, U	1	6	—	3	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-101	Groundwater well	Plume	Tc-99, U	1	6	—	3	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-105	Groundwater well	216-U-8	U	1	6	—	3	6	6	3[b]	3	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-107	Groundwater well	Plume	Tc-99	1	6	—	—	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-113	Groundwater well	Plume	Tc-99, U	3	6	—	—	6	6	6	6	6	6	6	3	6	6	6	6	6
299-W19-114	Groundwater well	Plume	Tc-99, U	3	6	—	—	6	6	6	6	6	6	6	3	6	6	6	6	6
299-W19-115	Groundwater well	216-U-1&2	Tc-99, U	1	6	—	3	6	6	1[b]	3	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W19-116	Groundwater well	Plume	U	1	6	—	3	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6

Table 3-10. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-UP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Co-60	I-129	Se-79	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	GEA	NO_3
299-W20-1	Proposed well	Plume	I-129, U	1	6	—	3	6	6	1[b]	6	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W21-2	Groundwater well	Plume	I-129	3	6	—	3	6	3[b]	6	6	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W21-3	Groundwater well	ERDF	H-3, I-129	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
299-W22-10	Groundwater well	216-S-8	H-3, Tc-99	1	6	—	3	2[b]	1[b]	1[b]	1	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-24P	Hosted piezometer	Ringold confined aquifer	—	3	6	—	3	6	6	6	6	6	6	6	6	6	6	6	6	6
299-W22-47	Groundwater well	Plume	Tc-99	1	6	—	—	6	6	1[b]	3	6	6	6	6	6	6	6	6	6
299-W22-69	Groundwater well	241-SX	Tc-99	1	6	—	3	6	6	1[b]	3	6	6	6	6	6	6	6	6	6
299-W22-72	Groundwater well	216-S-7	I-129, Tc-99	1	6	3	3	3[b]	3[b]	1[b]	1	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-79	Groundwater well	216-U-12	I-129, U	3	6	—	3	6	3[b]	3[b]	3	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-80	Groundwater well	241-SX	Tc-99	3	6	—	—	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
299-W22-81	Groundwater well	241-SX	H-3, Tc-99	1	6	—	—	6	6	1[b]	1	6	6	6	6	6	6	6	6	6
299-W22-82	Groundwater well	Plume	H-3, Tc-99	1	6	—	—	6	6	1[b]	1	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-83	Groundwater well	Plume	H-3, Tc-99	1	6	—	3	2[b]	3[b]	1[b]	3	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-84	Groundwater well	241-S	Tc-99	1	6	—	—	6	6	1[b]	3	6	6	6	6	6	6	6	6	6
299-W22-85	Groundwater well	241-SX	H-3, Tc-99	1	6	—	—	6	6	1[b]	1	6	6	6	6	6	6	6	6	6
299-W22-86	Groundwater well	Plume	Tc-99	1	6	—	3	2[b]	6	1[b]	1	6	6	6	6	6	6	6	6	6
299-W22-87	Groundwater well	216-U-12	U	3	6	—	3	3[b]	3[b]	6	3	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-88	Groundwater well	Plume	I-129	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
299-W22-89	Groundwater well	241-SX	Tc-99, H-3	3	6	—	—	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
299-W22-90	Groundwater well	Plume	H-3, Tc-99	3	6	—	—	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
299-W22-91	Groundwater well	241-SX	H-3, Tc-99	3	6	—	—	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
299-W22-92	Groundwater well	216-S-13	Tc-99	3	6	—	—	6	6	3[b]	6	6	6	6	6	6	6	6	6	6
299-W22-93	Groundwater well	241-S	—	1	3[b]	3	—	2[b]	3[b]	1[b]	1	6	6	6	6	6	6	6	6	6
299-W22-94	Groundwater well	241-SX	Tc-99	1	6	—	—	6	6	1[b]	3	6	6	6	6	6	6	6	6	6
299-W22-95	Groundwater well	216-S-9	H-3, I-129, Tc-99, U	1	6	—	3	3[b]	3[b]	1[b]	3	6	6	6	6	6	6	6	6	6
299-W22-96	Groundwater well	Plume	H-3, I-129, Tc-99	1	6	3	3	3[b]	3[b]	1[b]	1	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W22-113	Groundwater well	241-SX	H-3, Tc-99	1	6	—	—	6	6	1[b]	1	6	6	6	6	6	6	6	6	6

Table 3-10. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-UP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Co-60	I-129	Se-79	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	GEA	NO_3
299-W22-114	Groundwater well	Plume	H-3, I-129	1	6	—	3	6	6	6	1	6	6	6	6	6	6	6	6	6
299-W22-115	Groundwater well	241-SX	H-3, Tc-99	1	6	—	—	6	6	1[b]	1	6	6	6	6	6	6	6	6	6
299-W22-116	Groundwater well	241-SX	H-3, Tc-99	1	6	—	—	2[b]	6	1[b]	1	6	6	6	6	6	6	6	6	6
299-W23-4	Groundwater well	216-S-21	H-3	1	6	—	—	6	6	6	1	1[b]	1[b]	1[b]	1	6	6	6	6	6
299-W23-19	Groundwater well	241-SX	H-3, Tc-99	1	3[b]	3	3	1[b]	3[b]	1[b]	1	6	6	6	6	6	6	6	6	6
299-W23-20	Groundwater well	241-S	Tc-99	1	6	—	—	3[b]	6	1[b]	3	6	6	6	6	6	6	6	6	6
299-W23-21	Groundwater well	241-SX	H-3	1	6	—	3	3[b]	6	1[b]	1	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W23-236	Groundwater well	241-SX	H-3, Tc-99	3	6	—	—	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
299-W26-13	Groundwater well	216-S-10P	—	3	3[b]	3	—	6	6	6	6	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W26-14	Groundwater well	216-S-10D	—	3	6	—	—	6	3[b]	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6	6
299-W27-2	Groundwater well	216-S-10D	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
699-17-70	Groundwater well	Offsite NO_3	NO_3	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	1
699-19-88	Groundwater well	Offsite NO_3	NO_3	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	1
699-26-89	Groundwater well	Offsite NO_3	NO_3	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	1
699-32-62	Piezometer host	Plume	—	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-32-70B	Groundwater well	Plume	H-3	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-32-72A	Piezometer host	216-S-19	—	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
699-32-76	Groundwater well	216-S-10D	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
699-33-74	Groundwater well	216-S-14	H-3	3	6	—	3	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
699-33-75	Groundwater well	216-S-10D	—	3	6	—	3	6	6	3[b]	6	6	6	6	6	6	6	6	6	6
699-33-76	Groundwater well	216-S-10D	—	3	6	—	3	6	6	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6	6
699-34-61	Groundwater well	Plume	—	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-34-72	Groundwater well	216-S-26	H-3, I-129	3	3[b]	3	3	6	6	3[b]	3	6	6	6	6	6	6	6	6	6
699-35-59[c]	Groundwater well	US Ecology	—	6	—	—	—	—	6	6	6	6	6	6	6	6	6	6	6	6
699-35-66A	Groundwater well	ERDF	H-3, I-129	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
699-35-78A	Groundwater well	Plume	—	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-36-61A	Groundwater well	Plume	H-3	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-36-66B	Groundwater well	ERDF	H-3, I-129	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
699-36-70A	Groundwater well	ERDF	I-129, U	3	6	—	3	6	6	6	3	6	6	6	3	6	6	6	6	6
699-36-70B	Groundwater well	Plume	H-3, I-129	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6

Table 3-10. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-UP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	C-14	Co-60	I-129	Se-79	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	GEA	NO_3
699-37-66	Groundwater well	ERDF	H-3, I-129	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
699-38-61	Groundwater well	Plume	H-3	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-38-65	Independent piezometer	Plume	—	3	6	—	3	6	6	6	3	6	6	6	6	6	6	6	6	6
699-38-68A	Groundwater well	ERDF	H-3, I-129	2	6	—	3	6	6	2[b]	3	6	6	6	6	6	6	6	6	6
699-38-70B	Groundwater well	Plume	—	6	6	—	—	6	6	6	6	6	6	6	6	6	6	6	6	6
699-38-70C	Groundwater well	Plume	—	1	6	—	3	6	6	1[b]	6	6	6	6	6	6	6	6	6	6
699-39-68	Groundwater well	Plume	I-129	1	6	—	1	6	6	1	1	6	6	6	6	6	6	6	6	6
699-40-62	Groundwater well	Plume	—	3	6	—	—	6	6	6	3	6	6	6	6	6	6	6	6	6
699-40-65	Groundwater well	Plume	—	2	6	—	—	6	6	2[b]	6	6	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

c. Sampling constituents and frequencies subject to availability from US Ecology.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

2 = sampling and analysis of this constituent on a biennial basis (i.e., every other year)

3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year)

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

ERDF = Environmental Restoration Disposal Facility

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

LLWMA = low-level waste management area

Table 3-11. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-ZP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	I-129	Pu-239/ 240	Pu-241	Ra-226	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	C-14	Se-79	GEA	NO_3
299-W5-1	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W6-6	Groundwater well	SALDS	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
299-W6-11	Groundwater well	Plume	NO_3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	3
299-W6-15	Groundwater well	Plume	I-129	3	—	3	6	6	—	6	6	6	6	6	6	6	6	6	6	6
299-W6-17	Proposed well	Plume	I-129	3	—	3	6	6	—	6	6	6	6	6	6	6	6	6	6	6

Table 3-11. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-ZP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	I-129	Pu-239/240	Pu-241	Ra-226	Sr-90	Tc-99	H-3	U-233/234	U-235	U-238	Total U	C-14	Se-79	GEA	NO_3
299-W7-3	Groundwater well	LLWMA-3	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	—	6	6	3	3[b]	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6
299-W9-2	Groundwater well	LLWMA-3	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W10-1	Groundwater well	216-T-5	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W10-23	Groundwater well	241-T	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W10-24	Groundwater well	241-T	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W10-26	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W10-27	Groundwater well	241-TY	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W10-28	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W10-29	Groundwater well	LLWMA-3	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W10-30	Groundwater well	LLWMA-3	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W10-31	Groundwater well	LLWMA-3	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W10-33	Groundwater well	216-T-7	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W11-14	Groundwater well	216-T-33	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
299-W11-18	Groundwater well	218-W-1A	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W11-33Q	Hosted piezometer	Plume	H-3, I-129	3	—	3	6	6	—	6	6	3	6	6	6	6	6	6	6	6
299-W11-39	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-40	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-41	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6

Table 3-11. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-ZP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	I-129	Pu-239/240	Pu-241	Ra-226	Sr-90	Tc-99	H-3	U-233/234	U-235	U-238	Total U	C-14	Se-79	GEA	NO_3
299-W11-42	Groundwater Well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-43	Groundwater well	216-T-35	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W11-45	Groundwater well	216-T-14, 216 T-15	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W11-46	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-47	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-49	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
299-W11-50	Groundwater well	Plume	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-88	Groundwater well	Ringold confined aquifer	I-129, Tc-99, U	3	—	3	6	6	—	6	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6
299-W11-90	Groundwater well	Plume	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
299-W11-92	Groundwater well	241-TY	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W11-96	Groundwater well	T Plant	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
299-W12-2	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W12-3	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W12-4	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-11	Groundwater well	241-TX	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-13	Groundwater well	241-TX	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-14	Groundwater well	241-TX	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-15	Groundwater well	241-TX	H-3, I-129, Tc-99	3	—	3	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-16	Groundwater well	216-T-28	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3

Table 3-11. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-ZP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	I-129	Pu-239/240	Pu-241	Ra-226	Sr-90	Tc-99	H-3	U-233/234	U-235	U-238	Total U	C-14	Se-79	GEA	NO_3
299-W14-17	Groundwater well	Plume	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W14-18	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W14-19	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W14-20	Groundwater well	241-TX	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-21	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-22	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-73	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W14-74	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W15-1	Groundwater well	216-Z-5	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-7	Groundwater well	216-Z-7	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-11	Groundwater well	216-Z-16	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-17	Groundwater well	LLWMA-4	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W15-30	Groundwater well	LLWMA-4	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W15-33	Groundwater well	216-Z-16	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-34	Groundwater well	216-Z-5	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-36	Groundwater well	216-Z-20	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-40	Groundwater well	216-T-21 through -25	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W15-43	Groundwater well	216-T-21 through -25	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W15-44	Groundwater well	241-TX	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6

Table 3-11. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-ZP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	I-129	Pu-239/240	Pu-241	Ra-226	Sr-90	Tc-99	H-3	U-233/234	U-235	U-238	Total U	C-14	Se-79	GEA	NO_3
299-W15-46	Groundwater well	216-Z-9	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-47	Groundwater well	216-Z-9	Pu, NO_3, CCl_4	3	—	—	3[b]	3	—	6	6	6	6	6	6	6	6	6	6	3
299-W15-83	Groundwater well	LLWMA-4	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W15-94	Groundwater well	LLWMA-4	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W15-152	Groundwater well	LLWMA-4	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W15-224	Groundwater well	LLWMA-4	Tc-99, U, Ra-226, Cs-137, Sr-90	3	3	SA	6	6	3	3[b]	SA[b]	6	6	6	6	SA	6	6	6	6
299-W15-225	Groundwater well	216-T-21 through -25	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W15-763	Groundwater well	216-T-19	H-3, Sr-90, Cs-137, NO_3	3	3	—	6	6	—	3[b]	6	3	6	6	6	6	6	6	6	3
299-W15-765	Groundwater well	241-TY	Tc-99	3	—	—	6	6	—	6	3[b]	6	6	6	6	6	6	6	6	6
299-W17-2	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
299-W18-1	Groundwater well	216-Z-12	Pu, NO_3, CCl_4	3	—	—	3[b]	3[b]	—	6	6	6	6	6	6	6	6	6	6	3
299-W18-6	Groundwater well	216-Z-1A	Pu, NO_3, CCl_4	3	—	—	3[b]	3[b]	—	6	6	6	6	6	6	6	6	6	6	3
299-W18-7	Groundwater well	216-Z-1A	Pu, NO_3, CCl_4	3	—	—	3[b]	3[b]	—	6	6	6	6	6	6	6	6	6	6	3
699-43-69	Groundwater well	Ringold confined aquifer	I-129, Tc-99, U	3	—	3	6	6	—	6	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6
699-44-70B	Proposed well	Plume	NO_3	3	—	6	6	6	—	6	6	6	6	6	6	6	6	6	6	3
699-45-69C	Groundwater well	Ringold confined aquifer	I-129, Tc-99, U	3	—	3	6	6	—	6	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6
699-47-60	Groundwater well	Ringold confined aquifer	I-129, Tc-99, U	3	—	3	6	6	—	6	3[b]	6	3[b]	3[b]	3[b]	3	6	6	6	6
699-48-77C	Groundwater well	SALDS	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
699-48-77D	Groundwater well	SALDS	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
699-48-96	Groundwater well	Offsite NO_3	NO_3	6	—	—	6	6	—	6	6	6	6	6	6	6	6	6	6	1

Table 3-11. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 200-ZP GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	Cs-137	I-129	Pu-239/ 240	Pu-241	Ra-226	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	C-14	Se-79	GEA	NO_3
699-49-100C	Groundwater well	Offsite NO_3	NO_3	6	—	—	6	6	—	6	6	6	6	6	6	6	6	6	6	1
699-49-79	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
699-50-74	Groundwater well	SALDS	H-3	3	—	—	6	6	—	6	6	3	6	6	6	6	6	6	6	6
699-51-75	Piezometer host	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6
699-55-76	Groundwater well	Plume	H-3, Tc-99	3	—	—	6	6	—	6	3[b]	3	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year)

6 = sampling and analysis of this constituent every sixth year

SA = semiannual sampling to support agreed upon RCRA sampling needs

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

LLWMA = low-level waste management area

RCRA = *Resource Conservation and Recovery Act of 1976*

SALDS = State-Approved Land Disposal Site

Table 3-12. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 300-FF GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	I-129	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	C-14	Se-79	GEA	NO_3
103mArray-US25	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-1	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-7	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-9	Groundwater well	Ringold confined aquifer	U	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
399-1-10A	Groundwater well	316-5	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-10B	Groundwater well	316-5	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6

Table 3-12. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 300-FF GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	I-129	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	C-14	Se-79	GEA	NO_3
399-1-16A	Groundwater well	300 Area	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-16B	Groundwater well	316-5	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-16C	Groundwater well	Ringold confined aquifer	U	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
399-1-17A	Groundwater well	300 Area	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-17B	Groundwater well	316-5	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-17C	Groundwater well	Ringold confined aquifer	U	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
399-1-18A	Groundwater well	316-5	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-18B	Groundwater well	316-5	U	6	—	6	6	6	6	6	6	SA	6	6	6	6	6	6	6
399-1-18C	Groundwater well	Ringold confined aquifer	U	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
399-1-23	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-56	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-57	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-62	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-63	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-1-67	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-2-1	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-2-2	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-2-3	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6

Table 3-12. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 300-FF GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	I-129	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	C-14	Se-79	GEA	NO_3
399-2-32	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-1	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-6	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-9	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-10	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-33	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-37	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-3-38	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-4-1	Groundwater well	Offsite NO_3	NO_3	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	1
399-4-7	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-4-9	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-4-10	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-4-11	Groundwater well	Offsite NO_3	NO_3, U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	1
399-4-12	Groundwater well	300 Area, offsite NO_3	NO_3, U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	1
399-4-14	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-5-4B	Groundwater well	Offsite NO_3	NO_3	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	1
399-6-3	Groundwater well	618-7	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-6-5	Groundwater well	Offsite NO_3	NO_3	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	1
399-8-1	Groundwater well	618-7	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-8-2	Groundwater well	618-7	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6

Table 3-12. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 300-FF GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	I-129	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	C-14	Se-79	GEA	NO_3
399-8-3	Groundwater well	300 Area	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-8-5A	Groundwater well	618-7	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
399-8-5C	Groundwater well	Ringold confined aquifer	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	1
699-9-E2	Groundwater well	Columbia Generating Station	—	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
699-10-E12	Piezometer host	Near-river exposure point	U	1	—	6	6	1	6	6	6	1	6	6	6	6	6	6	6
699-11-E4F	Groundwater well	Water supply well	U	1	1	1[b]	1[b]	1	1[b]	1[b]	1[b]	1	1[b]	1[b]	1[b]	1[b]	1[b]	1	1
699-11-E5A	Groundwater well	Water supply well	U	1	1	1[b]	1[b]	1	1[b]	1[b]	1[b]	1	1[b]	1[b]	1[b]	1[b]	1[b]	1	1
699-12-2C	Groundwater well	618-11	H-3, U, Tc-99	1	—	6	3[b]	1	6	6	6	1	6	6	6	6	6	6	6
699-13-0A	Groundwater well	618-11	H-3, U, Tc-99	1	—	6	3[b]	1	6	6	6	1	6	6	6	6	6	6	6
699-13-1C	Groundwater well	Water supply well	U	1	1	1[b]	1[b]	1	1[b]	1[b]	1[b]	1	1[b]	1[b]	1[b]	1[b]	1[b]	1	1
699-13-1E	Groundwater well	618-11	H-3	1	—	6	6	1	6	6	6	1	6	6	6	6	6	6	6
699-13-2D	Groundwater well	618-11	H-3, U, Tc-99	1	—	6	3[b]	1	6	6	6	1	6	6	6	6	6	6	6
699-13-3A	Groundwater well	618-11	H-3, U, Tc-99	1	—	6	3[b]	1	6	6	6	1	6	6	6	6	6	6	6
699-S6-E3	Groundwater well	618-10	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
699-S6-E4B	Groundwater well	618-10	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
699-S6-E4D	Groundwater well	618-10	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
699-S6-E4E	Groundwater well	618-10	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
699-S6-E4F	Groundwater well	618-10	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6

Table 3-12. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring at 300-FF GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	I-129	Sr-90	Tc-99	H-3	U-233/ 234	U-235	U-238	Total U	Pu-239/ 240	Pu-241	Am-241	C-14	Se-79	GEA	NO_3
699-S27-E9A	Groundwater well	Offsite NO_3	NO_3	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S27-E14	Groundwater well	Offsite NO_3	NO_3	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S28-E12	Groundwater well	Offsite NO_3	NO_3	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S29-E11	Groundwater well	Framatome	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
699-S29-E16A	Groundwater well	Offsite NO_3	NO_3	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S29-E16C	Groundwater well	Ringold confined aquifer	U	6	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S30-E11A	Groundwater well	Framatome	U	1	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-1-M	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-2-M	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-4-M	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-5-S	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-6-S	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-7-S	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
AT-3-8-S	Aquifer tube	Offsite NO_3	NO_3	NA	—	6	6	6	6	6	6	6	6	6	6	6	6	6	1
C6341	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
C6347	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6
C6350	Aquifer tube	300 Area	U	NA	—	6	6	6	6	6	6	1	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

b. Well and constituent are also part of the AEA sampling occurring a minimum of every six years.

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

3 = sampling and analysis of this constituent on a triennial basis (i.e., every third year)

6 = sampling and analysis of this constituent every sixth year

SA = semiannual sampling to support agreed upon RCRA sampling needs

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

NA = Not Applicable

RCRA = *Resource Conservation and Recovery Act of 1976*

Table 3-13. Selected Monitoring Locations, Analytes, and Measurement Frequency for AEA Groundwater Monitoring Not Associated with a GWIA

Feature Name	Well Type	Sample Purpose	Contaminant(s)[a]	Groundwater Elevation	H-3	Total U	Pu-239/240	Pu-241	Am-241	U-233/234	U-235	U-238	Sr-90	Tc-99	C-14	Se-79	GEA	NO_3
699-S18-51	Groundwater Well	Water supply well	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
699-S34-E15	Groundwater well	Offsite NO_3	NO_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S36-E13A	Groundwater well	Offsite NO_3 and H-3	NO3, H-3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S37-E14	Groundwater well	Offsite NO_3 and H-3	NO_3, H-3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S41-E12	Groundwater well	Off-site NO_3 and H-3	NO_3, H-3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S42-E8A	Groundwater well	Offsite NO_3 and H-3	NO_3, H-3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	1
699-S24-19P	Hosted piezometer	Upper basalt-confined aquifer	—	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

a. Listed contaminants do not include contaminants that are included only as part of the AEA sampling occurring a minimum of every six years

Sample Frequency:

1 = sampling and analysis of this constituent on an annual basis

6 = sampling and analysis of this constituent every sixth year

AEA = *Atomic Energy Act of 1954*

GEA = Gamma Energy Analysis

GWIA = groundwater interest area

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
05-M	100-BC	X	—	—	X	—	—	—	2	Yes	—	Yes
06-M	100-BC	X	—	X	X	—	—	—	3	Yes	—	Yes
199-B2-12	100-BC	X	—	X	—	X	—	—	3	—	—	No
199-B2-14	100-BC	X	—	—	X	—	—	—	2	Yes	AWLN	Yes
199-B3-1	100-BC	X	—	X	X	—	—	—	3	Yes	—	Yes
199-B3-46	100-BC	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-B3-47	100-BC	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-B3-52	100-BC	—	—	X	X	—	—	—	2	Yes	—	Yes
199-B4-1	100-BC	—	—	X	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-B4-4	100-BC	—	—	X	X	—	—	—	2	Yes	—	Yes
199-B4-7	100-BC	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-B4-8	100-BC	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-B4-15	100-BC	—	—	X	X	—	—	—	2	—	—	No
199-B5-2	100-BC	—	—	X	X	—	—	—	2	Yes	—	Yes
199-B8-9	100-BC	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-B9-3	100-BC	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
699-63-90	100-BC	—	—	—	—	—	—	X	1	—	—	No
699-66-103	100-BC	—	—	—	—	—	—	X	1	—	—	No
699-68-105	100-BC	—	—	—	—	—	—	X	1	—	—	No
AT-B-3-S	100-BC	X	—	—	X	—	—	—	2	Yes	—	Yes
C6230	100-BC	X	—	X	X	—	—	—	3	Yes	—	Yes
C7725	100-BC	X	—	—	X	—	—	—	2	Yes	—	Yes
199-F5-1	100-FR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-F5-4	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F5-6	100-FR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-F5-43B	100-FR	X	—	—	—	X	—	—	2	—	Historical AEA	No
199-F5-46	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F5-47	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F5-48	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F5-54	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F5-55	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F5-56	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F7-1	100-FR	—	—	X	X	—			2	Yes	—	Yes
199-F7-2	100-FR	—	—	X	X	—			2	Yes	—	Yes
199-F7-3	100-FR	—	—	X	X	—			2	Yes	—	Yes
199-F8-2	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-F8-3	100-FR	—	—	X	X	—	—	—	2	—	—	No
199-F8-4	100-FR	—	—	X	X	—			2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-F8-7	100-FR	—	—	X	X	—	—	—	2	Yes	—	Yes
699-60-32	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-62-31	100-FR	—	—	X	X	—			2	Yes	—	Yes
699-63-25A	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-64-27	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-66-23	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-67-26	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-71-30	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-71-34	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-75-28	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-75-31	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-75-34B	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
699-77-36	100-FR	—	—	X	X	—			2	Yes	AWLN	Yes
AT-F-1-S	100-FR	X	—	X	X	—	—	—	3	—	—	No
C6302	100-FR	X	—	X	X	—	—	—	3	Yes	—	Yes
C6306	100-FR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-D2-6	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D3-2	100-HR-D	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
199-D3-5	100-HR-D	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-D4-20	100-HR-D	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-D4-83	100-HR-D	X	—	—	X	—	—	—	2	Yes	—	Yes
199-D4-85	100-HR-D	X	—	—	X	—	—	—	2	Yes	—	Yes
199-D4-86	100-HR-D	X	—	—	X	—	—	—	2	Yes	AWLN	Yes
199-D4-95	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D4-96	100-HR-D	X	—	—	X	—	—	—	2	Yes	—	Yes
199-D4-99	100-HR-D	X	—	—	X	—	—	—	2	Yes	—	Yes
199-D4-101	100-HR-D	X	—	—	X	—	—	—	2	Yes	—	Yes
199-D5-15	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D5-16	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-D5-17	100-HR-D	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-D5-18	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D5-19	100-HR-D	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-D5-123	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D5-132	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D5-141	100-HR-D	—	—	—	—	X	—	—	1	Yes	—	Yes
199-D5-142	100-HR-D	—	—	X	X	—	—	—	2	Yes	—	Yes
199-D8-53	100-HR-D	X	—	X	X	—	—	—	3	Yes	—	Yes
199-D8-54A	100-HR-D	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-D8-68	100-HR-D	X	—	X	X	—	—	—	3	Yes	—	Yes
199-D8-70	100-HR-D	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-D8-71	100-HR-D	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
699-97-48C	100-HR-D	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
C6278	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-15-2	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-15-3	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-15-4	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-16-3	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-16-4	100-HR-D	X	—	X	X	—	—	—	3	Yes	—	Yes
DD-17-2	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-17-3	100-HR-D	X	—	X	X	—	—	—	3	—	—	No
DD-44-4	100-HR-D	X	—	—	X	—	—	—	2	Yes	—	Yes
47-D	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
199-H2-1	100-HR-H	X	—	—	—	X	—	—	2	Yes	AWLN	Yes
199-H3-2C	100-HR-H	—	—	—	—	X	—	—	1	Yes	—	Yes
199-H3-6	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
199-H3-9	100-HR-H	X	—	—	—	X	—	—	2	Yes	—	Yes
199-H3-10	100-HR-H	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
199-H3-11	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-H3-12	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H3-21	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H3-22	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H3-29	100-HR-H	X	—	—	—	X	—	—	2	Yes	—	Yes
199-H4-4	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
199-H4-8	100-HR-H	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
199-H4-12A	100-HR-H	X	—	X	X	—	—	—	3	Yes	RCRA	Yes
199-H4-12C	100-HR-H	X	—	—	—	X	—	—	2	Yes	RCRA	Yes
199-H4-13	100-HR-H	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-H4-15CP	100-HR-H	—	—	—	—	X	—	—	1	Yes	—	Yes
199-H4-15CQ	100-HR-H	X	—	—	—	X	—	—	2	Yes	—	Yes
199-H4-15CR	100-HR-H	X	—	—	—	X	—	—	2	Yes	—	Yes
199-H4-15CS	100-HR-H	X	—	—	—	X	—	—	2	Yes	—	Yes
199-H4-16	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H4-45	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H4-46	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H4-47	100-HR-H	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-H4-63	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
199-H4-65	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H4-69	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H4-83	100-HR-H	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-H4-84	100-HR-H	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
199-H4-85	100-HR-H	—	—	X	X	—	—	—	2	Yes	—	Yes
199-H4-88	100-HR-H	X	—	—	—	—	—	—	1	—	RCRA	Yes
199-H4-89	100-HR-H	X	—	—	—	—	—	—	1	—	RCRA	Yes
199-H4-90	100-HR-H	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
199-H4-91	100-HR-H	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
199-H6-1	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
699-97-43C	100-HR-H	—	—	—	—	X	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-97-45B	100-HR-H	—	—	—	—	X	—	—	1	Yes	—	Yes
C7649	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
C7650	100-HR-H	X	—	X	X	—	—	—	3	Yes	—	Yes
19-M	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
22-D	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-13	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-18	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-19	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-20	100-KR	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-K-21	100-KR	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-K-22	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-32A	100-KR	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-K-32B	100-KR	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
199-K-34	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-37	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-106A	100-KR	—	—	X	X	—	X	—	3	Yes	—	Yes
199-K-107A	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-108A	100-KR	—	—	X	X	—	X	—	3	Yes	AWLN	Yes
199-K-111A	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-113A	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-114A	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-115A	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-116A	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-119A	100-KR	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-K-120A	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-125A	100-KR	X	—	X	X	—	X	—	4	Yes	—	Yes
199-K-127	100-KR	—	—	X	X	—	X	—	3	Yes	—	Yes
199-K-132	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-137	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-K-138	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-139	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-140	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-141	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-142	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-144	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-145	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-150	100-KR	X	—	—	X	—	X	—	3	Yes	—	Yes
199-K-157	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-160	100-KR	X	—	—	X	—	X	—	3	Yes	AWLN	Yes
199-K-161	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-162	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-166	100-KR	—	—	—	X	—	X	—	2	Yes	—	Yes
199-K-168	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-178	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-181	100-KR	X	—	—	X	—	—	—	2	Yes	—	Yes
199-K-183	100-KR	—	—	—	X	—	X	—	2	Yes	—	Yes
199-K-184	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-185	100-KR	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-K-189	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-190	100-KR	X	—	—	X	—	—	—	2	Yes	AWLN	Yes
199-K-191	100-KR	—	—	—	X	—	X	—	2	Yes	AWLN	Yes
199-K-192	100-KR	—	—	—	—	X	—	—	1	Yes	—	Yes
199-K-196	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-198	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-199	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-200	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-201	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-202	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-K-203	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-204	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-205	100-KR	—	—	—	X	—	X	—	2	Yes	—	Yes
199-K-207	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-208	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-210	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-212	100-KR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-K-221	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-222	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-223	100-KR	—	—	—	X	—	X	—	2	Yes	—	Yes
199-K-227	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-K-232	100-KR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-K-234	100-KR	—	—	X	X	—	—	—	2	Yes	—	Yes
699-78-62	100-KR	—	—	—	X	—	X	—	2	—	AWLN	No
199-N-2	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
199-N-3	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
199-N-14	100-NR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-N-19	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-21	100-NR	—	—	—	X	—	—	—	1	Yes		Yes
199-N-27	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-28	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
199-N-32	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
199-N-34	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
199-N-41	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
199-N-50	100-NR	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
199-N-51	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-57	100-NR	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
199-N-64	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-67	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-N-72	100-NR	—	—	—	X	—	—	—	1	Yes	RCRA, AWLN	Yes
199-N-73	100-NR	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
199-N-74	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
199-N-75	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-76	100-NR	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
199-N-77	100-NR	—	—	—	X	—	—	—	1	Yes	RCRA, AWLN	Yes
199-N-80	100-NR	—	—	—	—	X	—	—	1	Yes	—	Yes
199-N-81	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
199-N-92A	100-NR	X	—	X	X	—	—	—	3	Yes	AWLN	Yes
199-N-96A	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-103A	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-104A	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-105A	100-NR	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
199-N-106A	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-122	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-123	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-146	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-147	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-165	100-NR	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
199-N-172	100-NR	—	—	—	X	—	—	—	1	Yes	—	Yes
199-N-173	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-183	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-184	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-186	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-187	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-188	100-NR	—	—	X	X	—	—	—	2	Yes	—	Yes
199-N-346	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-347	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-348	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
199-N-349	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-350	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-351	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-352	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-353	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-354	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-355	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-356	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-357	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-358	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-359	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-360	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-361	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-362	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-363	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-364	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-365	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-366	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-367	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
199-N-374	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
C6132	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
C6320	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
C7934	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
C7936	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
C7939	100-NR	X	—	X	X	—	—	—	3	Yes	—	Yes
699-S30-E10A	1100-EM	—	—	—	—	—	—	X	1	—	—	No
699-S30-E15A	1100-EM	X	—	—	—	—	—	X	2	—	Historical AEA	Yes
699-S31-E8A	1100-EM	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S31-E10A	1100-EM	—	—	—	—	—	—	X	1	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-S31-E10C	1100-EM	—	—	—	—	—	—	X	1	—	—	No
699-S31-E10D	1100-EM	—	—	—	—	—	—	X	1	—	—	No
699-S31-E11	1100-EM	—	—	—	—	—	—	X	1	—	—	No
699-S32-E13B	1100-EM	—	—	—	—	—	—	X	1	—	—	No
299-E24-25	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E26-8	200-BP	—	—	X	X	—	—	—	2	—	Historical AEA	Yes
299-E26-10	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E26-11	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E26-14	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E26-77	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E26-79	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E27-5	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E27-8	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-9	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-10	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-11	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-12	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-13	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-14	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-15	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-16	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-17	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-19	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E27-21	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-22	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-23	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-24	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-25	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E27-26	200-BP	—	—	X	X	—	—	—	2	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-E27-40	200-BP	—	—	X	X	—	—	—	2	—	RCRA, TWRWP	Yes
299-E27-155	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA, TWRWP	Yes
299-E28-1	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-2	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-3	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E28-4	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-5	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-E28-6	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-7	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-8	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-E28-9	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E28-13	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-17	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-18	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-21	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-23	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-24	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-25	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-26	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E28-27	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E28-28	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E28-30	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E28-34	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E29-54	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E32-2	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E32-3	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E32-4	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E32-5	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E32-6	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-E32-7	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E32-8	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E32-9	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-E32-10	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-1A	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E33-3	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E33-9	200-BP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-E33-12	200-BP	—	—	—	—	X	—	—	1	Yes	—	Yes
299-E33-14	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E33-15	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E33-17	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-20	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-21	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E33-28	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-29	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-30	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E33-31	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-32	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-33	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-34	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA, AWLN	Yes
299-E33-35	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-E33-36	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E33-37	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E33-38	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-39	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-E33-40	200-BP	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
299-E33-41	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-42	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-43	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-E33-44	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-47	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-48	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-49	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-50	200-BP	—	—	—	—	X	—	—	1	Yes	RCRA	Yes
299-E33-205	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-265	200-BP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-E33-266	200-BP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-E33-334	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-335	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-337	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-338	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-339	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-340	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-E33-341	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-342	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-343	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-345	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E33-350	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E33-351	200-BP	—	—	X	X	—	—	—	2	—	—	No
299-E33-360	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E33-361	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E34-2	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E34-8	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E34-9	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E34-10	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E34-12	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-42-40A	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-42-40C	200-BP	—	—	—		X	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-43-41F	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-43-41G	200-BP	—	—	—		X	—	—	1	—	Historical AEA	Yes
699-44-39B	200-BP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-45-42	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-46-91	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-47-53B	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-47-55	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-48-50B	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-49-55A	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-49-55B	200-BP	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
699-49-57A	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-49-57B	200-BP	—	—	—	—	X	—	—	1	Yes	—	Yes
699-50-56	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-50-59	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-52-55	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-52-55B	200-BP	—	—	—	—	X	—	—	1	Yes	—	Yes
699-53-47B	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-53-48A	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-53-55B	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-53-55C	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-54-48	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-54-49	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-55-50C	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-55-55	200-BP	—	—	—	X	—	—	—	1	—	—	No
699-55-57	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-55-60A	200-BP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-57-59	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-59-58	200-BP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-60-60	200-BP	—	—	—	X	—	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-E13-5	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E13-7	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E13-11	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E13-12	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E13-14	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E13-16	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E13-18	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E16-2	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E17-1	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E17-3	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E17-9	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E17-12	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E17-13	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E17-14	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E17-15	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E17-16	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E17-17	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E17-18	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E17-19	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E17-20	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E17-21	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E17-22	200-PO	—	—	X	X	—	—	—	2	—	Historical AEA	Yes
299-E17-23	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E17-25	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E17-26	200-PO	—	—	X	X	—	—	—	2	—	Historical AEA	Yes
299-E18-1	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E23-1	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E24-3	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E24-4	200-PO	—	—	X	X	—	—	—	2	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-E24-5	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E24-16	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E24-17	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E24-18	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E24-20	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E24-21	200-PO	—	—	X	X	—	—	—	2	—	Historical AEA	Yes
299-E24-22	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E24-23	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E24-24	200-PO	—	—	X	X	—	—	—	2	—	Historical AEA	Yes
299-E24-33	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-2	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-3	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-6	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-8	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-10	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-11	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-12	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-17	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-18	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-19	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-20	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-21	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-22	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-23	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-24	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E25-26	200-PO	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-E25-28	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-29P	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E25-29Q	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-E25-32P	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-32Q	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E25-34	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-35	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-36	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-37	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E25-39	200-PO	—	—	—	X	—	—	—	1	—	—	No
299-E25-40	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-41	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-42	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-43	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E25-44	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
299-E25-47	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-48	200-PO	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-E25-93	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-94	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-E25-237	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E26-2	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E26-4	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
299-E26-5	200-PO	—	—	X	X	—	—	—	2	—	—	No
299-E26-12	200-PO	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-E26-13	200-PO	—	—	X	X	—	—	—	2	—	RCRA	Yes
499-S0-7	200-PO	—	X	—	—	—	—	—	1	Yes	—	Yes
499-S0-8	200-PO	—	X	—	—	—	—	—	1	Yes	—	Yes
499-S1-7B	200-PO	—	—	X	X	—	—	—	2	—	—	No
499-S1-8J	200-PO	—	X	—	—	—	—	—	1	Yes	—	Yes
499-S1-8K	200-PO	—	—	X	X	—	—	—	2	—	—	No
699-2-3	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-2-6A	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-2-7	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-8-17	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-8-25	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-10-54A	200-PO	—	—	—	—	—	—	X	1	Yes	—	Yes
699-17-5	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-20-20	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-20-E12O	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-20-E12S	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-20-E5A	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-21-6	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-24-1P	200-PO	—	—	—	—	X	—	—	1	Yes	—	Yes
699-26-15A	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-26-33	200-PO	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-26-35A	200-PO	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
699-28-40	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-28-40P	200-PO	—	—	—	—	X	—	—	1	—	—	No
699-29-4	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-31-11	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-31-31	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-32-22A	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-32-22B	200-PO	—	—	—	—	X	—	—	1	Yes	—	Yes
699-32-43	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-33-42	200-PO	—	—	—	X	—	—	—	1	—	—	No
699-33-56	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-34-41B	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-34-42	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-35-9	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-35-57	200-PO	—	—	X	X	—	—	—	2	—	—	No
699-35-58	200-PO	—	—	X	X	—	—	—	2	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-36-58A	200-PO	—	—	X	X	—	—	—	2	—	—	No
699-36-58B	200-PO	—	—	X	X	—	—	—	2	—	—	No
699-37-43	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-37-47A	200-PO	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
699-37-E4	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-38-15	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-39-39	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-40-1	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-40-33A	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-40-36	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
699-41-1A	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-41-23	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-41-35	200-PO	—	—	X	X	—	—	—	2	—	—	No
699-41-40	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
699-41-42	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-42-12A	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-42-37	200-PO	—	—	X	X	—	—	—	2	—	Historical AEA	Yes
699-42-39A	200-PO	—	—	X	X	—	—	—	2	Yes	—	Yes
699-42-39B	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-42-42B	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-43-3	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-43-43B	200-PO	—	—	X	X	—	—	—	2	—	RCRA	Yes
699-43-45	200-PO	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-46-21B	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes
699-46-4	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-47-5	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-48-7A	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
699-49-13E	200-PO	—	X	—	X	—	—	—	2	Yes	—	Yes
699-52-19	200-PO	—	—	—	X	—	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-S2-34B	200-PO	—	X	—	—	—	—	—	1	Yes	—	Yes
699-S8-19	200-PO	—	—	—	—	—	—	X	1	Yes	—	Yes
C6384	200-PO	X	—	—	X	—	—	—	2	Yes	—	Yes
299-W15-37	200-UP	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
299-W17-3	200-UP	—	—		X	—	—	—	1	—	—	No
299-W18-15	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W18-21	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W18-22	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W18-40	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W18-260	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W19-6	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W19-12	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W19-34A	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W19-34B	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W19-36	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
299-W19-39	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W19-41	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W19-42	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W19-43	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W19-44	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W19-45	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W19-46	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W19-47	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W19-48	200-UP	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
299-W19-49	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W19-101	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
299-W19-105	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W19-107	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
299-W19-113	200-UP	—	—	—	X	—	—	—	1	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-W19-114	200-UP	—	—	—	X	—	—	—	1	—	—	No
299-W19-115	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W19-116	200-UP	—	—	—	X	—	—	—	1	—	—	No
299-W20-1	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W21-2	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W21-3	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W22-10	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W22-24P	200-UP	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
299-W22-47	200-UP	—	—	—	X	—	—	—	1	Yes	RCRA	Yes
299-W22-69	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W22-72	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W22-79	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W22-80	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W22-81	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W22-82	200-UP	—	—	—	X	—	—	—	1	—	RCRA	Yes
299-W22-83	200-UP	—	—	—	X	—	—	—	1	Yes	RCRA, AWLN	Yes
299-W22-84	200-UP	—	—	X	X	—	—	—	2	—	RCRA, AWLN	Yes
299-W22-85	200-UP	—	—	X	X	—	—	—	2	—	RCRA, AWLN	Yes
299-W22-86	200-UP	—	—	—	X	—	—	—	1	Yes	RCRA, AWLN	Yes
299-W22-87	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W22-88	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
299-W22-89	200-UP	—	—	—	X	—	—	—	1	—	RCRA	Yes
299-W22-90	200-UP	—	—	—	X	—	—	—	1	—	—	No
299-W22-91	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W22-92	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W22-93	200-UP	—	—	X	X	—	—	—	2	—	—	No
299-W22-94	200-UP	—	—	X	X	—	—	—	2	—	AWLN	No
299-W22-95	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W22-96	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-W22-113	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W22-114	200-UP	—	—	—	X	—	—	—	1	—	—	No
299-W22-115	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W22-116	200-UP	—	—	X	X	—	—	—	2	—	AWLN	No
299-W23-4	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W23-19	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W23-20	200-UP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W23-21	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W23-236	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W26-13	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W26-14	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W27-2	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-17-70	200-UP	—	—	—	—	—	—	X	1	—	—	No
699-19-88	200-UP	—	—	—	—	—	—	X	1	—	—	Yes
699-26-89	200-UP	—	—	—	—	—	—	X	1	—	—	No
699-32-62	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-32-70B	200-UP	—	—	—	X	—	—	—	1	—	—	No
699-32-72A	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-32-76	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-33-74	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-33-75	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-33-76	200-UP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
699-34-61	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-34-72	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-35-59	200-UP	—	—	X	X	—	—	—	2	—	—	No
699-35-66A	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-35-78A	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
699-36-61A	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
699-36-66B	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-36-70A	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-36-70B	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-37-66	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-38-61	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
699-38-65	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
699-38-68A	200-UP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-38-70B	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-38-70C	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-39-68	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-40-62	200-UP	—	—	—	X	—	—	—	1	Yes	—	Yes
699-40-65	200-UP	—	—	—	X	—	—	—	1	Yes	AWLN	Yes
299-W5-1	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W6-6	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W6-11	200-ZP	—	—	—	X	—	X	—	2	—	WAC	Yes
299-W6-15	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W6-17	200-ZP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W7-3	200-ZP	—	—	X	X	—	—	—	2	Yes		Yes
299-W9-2	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W10-1	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W10-23	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W10-24	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W10-26	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W10-27	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W10-28	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W10-29	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W10-30	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA, ALWN	Yes
299-W10-31	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W10-33	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W11-14	200-ZP	—	—	X	X	—	—	—	2	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-W11-18	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W11-33Q	200-ZP	—	—	—	X	—	—	—	1	Yes	—	Yes
299-W11-39	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W11-40	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W11-41	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W11-42	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W11-43	200-ZP	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
299-W11-45	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W11-46	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W11-47	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W11-49	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W11-50	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W11-88	200-ZP	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
299-W11-90	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W11-92	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W11-96	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W12-2	200-ZP	—	—	—	X	—	—	—	1	—	Historical AEA	Yes
299-W12-3	200-ZP	—	—	—	X	—	—	—	1	—	Historical AEA	Yes
299-W12-4	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W14-11	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W14-13	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W14-14	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
299-W14-15	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W14-16	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W14-17	200-ZP	—	—	X	X	—	—	—	1	—	RCRA	Yes
299-W14-18	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W14-19	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W14-20	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W14-21	200-ZP	—	—	—	X	—	—	—	1	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
299-W14-22	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W14-73	200-ZP	—	—	—	X	—	—	—	1	—	Historical AEA	Yes
299-W14-74	200-ZP	—	—	—	X	—	—	—	1	—	Historical AEA	Yes
299-W15-1	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-7	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W15-11	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W15-17	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W15-30	200-ZP	—	—	X	X	—	—	—	2	—	RCR	Yes
299-W15-33	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W15-34	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-36	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-40	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-43	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-44	200-ZP	—	—	X	X	—	—	—	2	—	RCRA, AWLN	Yes
299-W15-46	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W15-47	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-83	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W15-94	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W15-152	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W15-224	200-ZP	—	—	X	X	—	—	—	2	—	RCRA	Yes
299-W15-225	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W15-763	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W15-765	200-ZP	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
299-W17-2	200-ZP	—	—	—	X	—	—	—	1	—	—	No
299-W18-1	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
299-W18-6	200-ZP	—	—	X	X	—	—	—	2	—	—	No
299-W18-7	200-ZP	—	—	X	X	—	—	—	2	—	—	No
699-43-69	200-ZP	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
699-44-70B	200-ZP	—	—	—	X	—	—	—	1	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-45-69C	200-ZP	—	—	—	—	X	—	—	1	Yes	AWLN	Yes
699-47-60	200-ZP	—	—	—	—	X	—	—	1	Yes	—	Yes
699-48-77C	200-ZP	—	—	X	X	—	—	—	2	—	WAC	Yes
699-48-77D	200-ZP	—	—	X	X	—	—	—	2	—	WAC	Yes
699-48-96	200-ZP	—	—	—	—	—	—	X	1	—	—	No
699-49-100C	200-ZP	—	—	—	—	—	—	X	1	—	—	Yes
699-49-79	200-ZP	—	—	—	X	—	—	—	1	—	WAC	Yes
699-50-74	200-ZP	—	—	X	X	—	—	—	2	Yes	—	Yes
699-51-75	200-ZP	—	—	—	X	—	—	—	1	—	WAC	Yes
699-55-76	200-ZP	—	—	—	X	—	—	—	1	—	—	No
103mArray-US25	300-FF	X	—	X	X	—	—	—	3	—	—	No
399-1-1	300-FF	X	—	X	X	—	—	—	3	Yes	—	Yes
399-1-7	300-FF	—	—	—	X	—	—	—	1	Yes	—	Yes
399-1-9	300-FF	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
399-1-10A	300-FF	X	—	X	X	—	—	—	3	Yes	RCRA, AWLN	Yes
399-1-10B	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
399-1-16A	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA, AWLN	Yes
399-1-16B	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
399-1-16C	300-FF	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
399-1-17A	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
399-1-17B	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
399-1-17C	300-FF	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
399-1-18A	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
399-1-18B	300-FF	—	—	X	X	—	—	—	2	Yes	RCRA	Yes
399-1-18C	300-FF	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
399-1-23	300-FF	—	—	X	X	—	—	—	2	—	AWLN	No
399-1-56	300-FF	—	—	X	X	—	—	—	2	—	—	No
399-1-57	300-FF	X	—	—	X	—	—	—	2	Yes	—	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
399-1-62	300-FF	—	—	X	X	—	—	—	2	—	—	No
399-1-63	300-FF	—	—	X	X	—	—	—	2	—	—	No
399-1-67	300-FF	—	—	X	X	—	—	—	2	—	—	No
399-2-1	300-FF	X	—	X	X	—	—	—	3	Yes	—	Yes
399-2-2	300-FF	X	—	—	X	—	—	—	2	Yes	—	Yes
399-2-3	300-FF	X	—	X	X	—	—	—	3	—	—	No
399-2-32	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
399-3-1	300-FF	X	—	X	X	—	—	—	3	—	—	No
399-3-6	300-FF	—	—	—	X	—	—	—	1	Yes	—	Yes
399-3-9	300-FF	X	—	—	X	—	—	—	2	Yes	—	Yes
399-3-10	300-FF	X	—	—	X	—	—	—	2	—	—	No
399-3-33	300-FF	X	—	—	X	—	—	—	2	—	—	No
399-3-37	300-FF	—	—	X	X	—	—	—	2	—	—	No
399-3-38	300-FF	—	—	—	X	—	—	—	1	—	—	No
399-4-1	300-FF	—	—	—	—	—	—	X	1	Yes	—	Yes
399-4-7	300-FF	X	—	—	X	—	—	—	2	Yes	AWLN	Yes
399-4-9	300-FF	X	—	—	X	—	—	—	2	—	—	No
399-4-10	300-FF	X	—	—	X	—	—	—	2	Yes	—	Yes
399-4-11	300-FF	—	—	—	—	—	—	X	1	Yes	—	Yes
399-4-12	300-FF	X	X	—	X	—	—	X	4	Yes	—	Yes
399-4-14	300-FF	—	—	—	X	—	—	—	1	Yes	—	Yes
399-5-4B	300-FF	—	—	—	—	—	—	X	1	—	—	No
399-6-3	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
399-6-5	300-FF	—	—	—	—	—	—	X	1	—	—	No
399-8-1	300-FF	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
399-8-2	300-FF	—	—	X	X	—	—	—	2	—	—	No
399-8-3	300-FF	—	—	—	X	—	—	—	1	—	—	No
399-8-5A	300-FF	—	—	X	X	—	—	—	2	Yes	AWLN	Yes
399-8-5C	300-FF	—	—	—	—	X	—	—	1	—	Historical AEA	Yes

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
699-9-E2	300-FF	—	—	—	X	—	—	—	1	Yes	—	Yes
699-10-E12	300-FF	X	—	—	X	—	—	—	2	Yes	—	Yes
699-11-E4F	300-FF	—	X	—	—	—	—	—	1	—	—	No
699-11-E5A	300-FF	—	X	—	—	—	—	—	1	—	—	No
699-12-2C	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-13-0A	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-13-1C	300-FF	—	X	—	—	—	—	—	1	Yes	—	Yes
699-13-1E	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-13-2D	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-13-3A	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-S6-E3	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-S6-E4B	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-S6-E4D	300-FF	—	—	X	X	—	—	—	2	—	—	No
699-S6-E4E	300-FF	—	—	X	X	—	—	—	2	Yes	—	Yes
699-S6-E4F	300-FF	—	—	X	X	—	—	—	2	—	—	No
699-S27-E9A	300-FF	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S27-E14	300-FF	—	—	—	—	—	—	X	1	—	AWLN—	No
699-S28-E12	300-FF	—	—	—	—	—	—	X	1	Yes	—	Yes
699-S29-E11	300-FF	—	—	—	—	—	—	X	1	—	—	No
699-S29-E16A	300-FF	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S29-E16C	300-FF	—	—	—	—	X	—	—	1	—	Historical AEA	Yes
699-S30-E11A	300-FF	—	—	—	—	—	—	X	1	—	—	No
AT-3-1-M	300-FF	X	—	—	X	—	—	—	2	—	—	No
AT-3-2-M	300-FF	X	—	X	X	—	—	—	3	—	—	No
AT-3-4-M	300-FF	X	—	—	X	—	—	—	2	—	—	No
AT-3-5-S	300-FF	X	—	—	X	—	—	—	2	—	—	No
AT-3-6-S	300-FF	X	—	—	X	—	—	—	2	—	—	No
AT-3-7-S	300-FF	X	—	—	X	—	—	—	2	—	—	No
AT-3-8-S	300-FF	—	—	—	—	—	—	X	1	—	—	No

Table 3-14. PSQs Associated with Monitoring Locations and Integration with Other Groundwater Monitoring Programs

Feature Name	GWIA	PSQ #1	PSQ #2	PSQ #3	PSQ #4	PSQ #5	PSQ #6	PSQ #10	Number of PSQs Met	CERCLA	Other	Will Well be Co-Sampled?
C6341	300-FF	X	—	—	X	—	—	—	2	—	—	No
C6347	300-FF	X	—	—	X	—	—	—	2	—	—	No
C6350	300-FF	X	—	—	X	—	—	—	2	—	—	No
699-S18-51	Offsite	—	—	—	—	—	—	X	1	—	—	No
699-S34-E15	Offsite	—	—	—	—	—	—	X	1	—	—	No
699-S36-E13A	Offsite	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S37-E14	Offsite	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S41-E12	Offsite	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S42-E8A	Offsite	—	—	—	—	—	—	X	1	—	Historical AEA	Yes
699-S24-19P	Offsite	—	—	—	—	X	—	—	1	—	Historical AEA	Yes

Note: PSQs are identified in Appendix A, Table A-8.

a. Wells included in the automated water level network are subject to change and are not controlled by this document.

AEA = *Atomic Energy Act of 1954*
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
GWIA = groundwater interest area
PSQ = principal study question
RCRA = *Resource Conservation and Recovery Act of 1976*
TWRWP = Tank Waste Retrieval Work Plan
WAC = *Washington Administrative Code*

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After field measurements have stabilized, the hose supplying water to the flow-through cell is disconnected, and a clean stainless-steel drop leg is attached for sampling. The flow rate is reduced during sampling to minimize loss of volatiles, if any, and to prevent overfilling the bottles. Sample bottles are filled in a sequence designed to minimize loss of volatiles, if any. Filtered samples are collected after the unfiltered samples. For some constituents (e.g., metals) both filtered and unfiltered samples are analyzed. If additional samples require filtration (e.g., turbidity greater than 5 NTUs), an inline disposable 0.45 μm filter is used.

Three types of environmental-grade sampling pumps (i.e., portable Grundfos®[10] electric submersible pumps, Hydrostar®[11] positive displacement pumps, and permanently installed submersible electric pumps) are typically used at Hanford Site monitoring wells. Individual pumps are selected based on the unique characteristics of the well and the sampling requirements. A small number of wells will not support pumps to be used for sampling due to the yield or the physical characteristics of the well. In these cases, a grab sample may be obtained using a bailer or other approved device.

For certain types of samples, preservatives are required. While the preservative may be added to the collection bottles before sample collection, preservatives may also be added immediately after sample collection. Samples may require filtering in the field, as noted on the chain-of-custody form. To ensure sample and data usability, the sampling associated with this field sampling plan will be performed in accordance with HASQARD (DOE/RL-96-68) in regard to sample collection, collection equipment, and sample handling.

Sample containers, preservatives, and holding times are specified in Table 2-5 for groundwater samples. These requirements are consistent with the analytical methods specified in Table 2-2. The final container type and volumes are identified on the chain-of-custody form. Once a sample bottle is filled, the clock starts for analytical holding-time restrictions.

Holding time is the maximum allowable time period between sample collection and analysis. Exceeding required holding times could result in contaminant concentration changes due to volatilization, decomposition, or other chemical alterations. Required holding times depend on the constituent and are listed in analytical method compilations such as APHA/AWWA/WEF, 2012, *Standard Methods for the Examination of Water and Wastewater*, and SW-846. Recommended holding times are also provided in HASQARD (DOE/RL-96-68).

3.3.1 Decontamination of Sampling Equipment

Sampling equipment will be single use or decontaminated in accordance with the routine sampling equipment decontamination methods. To prevent potential sample contamination, use decontaminated or single-use equipment for each sampling activity.

Avoid the following ways cross-contamination or background contamination may compromise samples:

- Improperly storing or transporting sampling equipment and sample containers.
- Contaminating the equipment or sample bottles by setting them on or near contamination sources (e.g., uncovered ground).

[10] Grundfos® is a registered trademark of Grundfos Holding A/S Corporation Denmark, Bjerringbro, Denmark.

[11] Hydrostar® is a registered trademark of Kayaba Kogyo Kabushiki Kaisha Corporation, Tokyo, Japan.

- Handling bottles or equipment with dirty hands or gloves.
- Improperly decontaminating equipment before sampling or between sampling events.

3.3.2 Radiological Field Data

Alpha and beta/gamma data collection in the field will be used, as needed, to support sampling and analysis efforts. Radiological screening will be performed by the RCT or other qualified personnel. The RCT will record field measurements, noting the sample depth and the instrument reading. Measurements will be relayed to the field personnel (for aquifer tubes and wells) for daily inclusion in field logbook or operational records, as applicable.

The following information will be distributed to personnel performing work in support of this sampling and analysis plan:

- Instructions to RCTs on the methods required to measure sample activity and media for gamma, alpha, and/or beta emissions, as appropriate.
- Information regarding the portable radiological field instrumentation, including a physical description of the instruments, radiation and energy response characteristics, calibration/maintenance and performance testing descriptions, and application/operation of the instrument. These instruments are commonly used at the Hanford Site to obtain measurements of removable surface contamination and direct measurements of the total surface contamination.
- Instructions regarding the minimum requirements for documenting radiological controls information in accordance with 10 CFR 835, "Occupational Radiation Protection."
- Instructions for managing the identification, creation, review, approval, storage, transfer, and retrieval of radiological information.
- Minimum standards and practices necessary for preparing, performing, and retaining radiological-related information.
- Requirements associated with preparing and transporting regulated material.
- Daily reports of radiological surveys and measurements collected during field investigation activities will be cross-referenced between laboratory analytical data and radiological screening measurements to facilitate interpreting the investigation results).

3.3.3 Water Levels

A measurement of depth to water is recorded in each well prior to sampling using calibrated electrical measuring tapes. Two consecutive measurements are taken that agree within 6 mm (0.02 ft); the depth to water is recorded along with the date, time, measuring tape number, and other pertinent information. The depth to groundwater is subtracted from the elevation of a reference point (usually the top of the casing) to obtain the water-level elevation. Tops of casings are known elevation reference points because they have been surveyed to local reference data. Adjustments are made to the depth-to-water measurement where the measurement point does not coincide with the reference point.

A subset of existing wells at Hanford are identified for use in the AWLN. This is a network of selected well locations equipped with water level measurement pressure transducers and automated data logging capability. This system provides high-frequency groundwater elevation measurements, with particular focus on portions of the site near the Columbia River where groundwater elevations change frequently and affect groundwater gradients. Wells in the AEA network that are part of the AWLN system are

identified in Table 3-14. In addition, specific water level monitoring efforts have been implemented in the 200 East Area where groundwater gradient is known to be very small. These efforts use high-precision measurements to ensure adequate understanding of the groundwater flow direction in the central portion of the Central Plateau.

3.4 Documentation of Field Activities

Logbooks or data forms are required for field activities and will be used in accordance with HASQARD (DOE/RL-96-68) requirements. A logbook must be identified with a unique project name and number. The individual(s) responsible for logbooks will be identified in the front of the logbook, and only authorized persons may make entries in logbooks. Logbook entries will be reviewed by the FWS, cognizant scientist/engineer or a responsible manager; the review will be documented with a signature and date. Logbooks will be permanently bound, waterproof, and ruled with sequentially numbered pages. Pages will not be removed from logbooks for any reason. Entries will be made in indelible ink. Corrections will be made by marking through the erroneous data with a single line, entering the correct data, and initialing and dating the changes.

Data forms may be used to collect field information; however, the information recorded on data forms must follow the same requirements as those for logbooks. The data forms must be referenced in the logbooks.

Information to be recorded in logbooks or on the data forms includes the following:

- Day and date; time task started; weather conditions; and names, titles, and organizations of personnel performing the task.
- Purpose of visit to the task area.
- Site activities in specific detail (e.g., maps and drawings) or the forms used to record such information (e.g., soil boring log or well completion log). Also, details of any field tests that were conducted; reference to any forms that were used, other data records, and methods followed in conducting the activity.
- Details of any field calibrations and surveys that were conducted. Reference any forms that were used, other data records, and the methods followed in conducting the calibrations and surveys.
- Details of any samples collected and the preparation (if any) of splits, duplicates, matrix spikes, or blanks. Reference the methods followed in sample collection or preparation; list location of sample collected, sample type, each label or tag numbers, sample identification, sample containers and volume, preservation method, packaging, chain-of-custody form number, and analytical request form number pertinent to each sample or sample set; and note the time and the name of the individual to whom custody of samples was transferred.
- Time, equipment type, serial or identification number, and methods followed for decontaminations and equipment maintenance performed. Reference the page number(s) of any logbook where detailed information is recorded.
- Any equipment failures or breakdowns that occurred, with a brief description of repairs or replacements.

3.5 Corrective Actions and Deviations for Sampling Activities

The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager, FWS, appropriate field crew supervisors, and SMR personnel must document deviations from protocols, problems pertaining to sample collection, chain-of-custody forms, target analytes, contaminants, sample transport, or noncompliant monitoring. Examples of deviations include samples not collected because of field conditions.

As appropriate, such deviations or problems will be documented (e.g., in the field logbook) in accordance with internal corrective action methods. The S&GRP RCRA, CERCLA, AEA Integration Groundwater manager, FWS, field crew supervisors, or SMR personnel will be responsible for communicating field corrective action requirements and ensuring that immediate corrective actions are applied to field activities.

Changes in sample activities that require notification, approval, and documentation will be performed as specified in Section 1.7.3 and table 1-3.

3.6 Calibration of Field Equipment

Onsite environmental instruments are calibrated in accordance with the manufacturer's operating instructions, internal work requirements and processes, and/or field instructions that provide direction for equipment calibration or verification of accuracy by analytical methods. Calibration records shall include the raw calibration data, identification of the standards used, associated reports, date of analysis, and analyst's name or initials. The results from all instrument calibration activities are recorded in accordance with HASQARD requirements (DOE/RL-96-68).

Field instrumentation calibration and QA checks will be performed as follows:

- Prior to initial use of a field analytical measurement system.
- At the frequency recommended by the manufacturer or methods, or as required by regulations.
- Upon failure to meet specified QC criteria.
- Calibration of radiological field instruments on the Hanford Site is performed by the MSA prime contractor, as specified by their calibration program.
- Daily calibration checks will be performed and documented for each instrument used. These checks will be made on standard materials sufficiently like the matrix under consideration for direct comparison of data. Analysis times will be sufficient to establish detection efficiency and resolution.
- Using standards for calibration that are traceable to a nationally recognized standard agency source or measurement system. Manufacturer's recommendations for storage and handling of standards (if any) will be followed. Expired standards will not be used for calibration.

3.7 Sample Handling

Sample handling and transfer will be in accordance with established methods to preclude loss of identity, damage, deterioration, and loss of sample. Custody seals or custody tape will be used to verify sample integrity has been maintained during sample transport. The custody seal will be inscribed with the sampler's initials and date. If during the chain-of-custody process it is discovered that the custody tape has been tampered with or broken on both the sample bottle and the cooler, the sample will be analyzed

but the results will include a flag to indicate custody was broken. If the sample data did not trend with the other data or were not as expected, the data from the sample would be flagged accordingly.

A sampling and analytical database is used to track samples from the point of collection through the laboratory analysis process.

3.7.1 Containers

Samples will be collected, where and when appropriate, in break-resistant containers. The field sample collection record will indicate the laboratory lot number of the bottles used in sample collection. When commercially pre-cleaned containers are used in the field, the name of the manufacturer, lot identification, and certification will be retained for documentation.

Containers shall be capped and stored in an environment that minimizes the possibility of sample container contamination. If contamination of the stored sample containers occurs, corrective actions shall be implemented to prevent reoccurrences. Contaminated sample containers cannot be used for a sampling event. Container sizes may vary depending on laboratory-specific volumes/requirements for meeting analytical detection limits. Container types and sample amounts/volumes are identified on the chain-of-custody form.

The Radiological Engineering organization will measure the contamination levels and the dose rates associated with the filled sample containers. This information, along with other data, will be used to select proper packaging, marking, labeling, and shipping paperwork and to verify that the sample can be received by the analytical laboratory in accordance with laboratory radioactivity acceptance criteria. If the dose rate on the outside of a sample container or the curie content exceeds levels acceptable by an offsite laboratory, the FWS (in consultation with the SMR organization), can send smaller volumes to the laboratory. Suggested container types and sample amounts/volumes are identified in Table 2-5.

3.7.2 Container Labeling

Each sample is identified by affixing a standardized label or tag on the container that will contain the sample identification number. The label will identify or provide reference to associate the sample with the date and time of collection, preservative used (if applicable), analysis required, and collector's name or initials. Sample labels may be either preprinted or handwritten in indelible or waterproof ink.

3.7.3 Sample Custody

Sample custody will be maintained in accordance with existing protocols to ensure that sample integrity is maintained throughout the analytical process. Chain of custody protocols will be followed throughout sample collection, transfer, analysis, and disposal to ensure sample integrity is maintained. A chain of custody record will be initiated in the field at the time of sampling and will accompany each set of samples shipped to any laboratory.

Shipping requirements will determine how sample shipping containers are prepared for shipment. The analyses requested for each sample will be indicated on the accompanying chain of custody form. Each time the responsibility for the custody of the sample changes, new and previous custodians will sign the record and note the date and time. The field sampling team will make a copy of the signed record before sample shipment and transmit the copy to the SMR group. The following minimum information is required on a completed chain-of-custody form:

- Project name
- Collectors' names

- Unique sample number
- Date and time of collection (or traceable reference thereto) of sample collection
- Matrix
- Preservatives
- Chain of possession information (i.e., signatures and printed names of all individuals involved in the transfer of sample custody and storage locations, and dates of receipt and relinquishment)
- Requested analyses (or reference thereto)
- Number of sample containers per unique sample identification number
- Shipped-to information (i.e., analytical laboratory performing the analysis)

Samplers should note any anomalies with the samples. If anomalies are found, samplers should inform SMR so special direction for analysis may be provided to the laboratory if deemed necessary.

3.7.4 Sample Transportation

Packaging and transportation instructions shall comply with applicable transportation regulations and DOE requirements. Regulations for classifying, describing, packaging, marking, labeling, and transporting hazardous materials, hazardous substances, and hazardous wastes are enforced by the U.S. Department of Transportation (DOT) as described in 49 CFR 171, "Transportation," "General Information, Regulations, and Definitions," through 177, "Carriage by Public Highway." Carrier-specific requirements defined in the current edition of International Air Transportation Association (IATA) *Dangerous Goods Regulations* shall also be used when preparing sample shipments conveyed by air freight providers.

Samples containing hazardous constituents above regulated amounts shall be considered hazardous material in transportation and transported according to DOT/IATA requirements. If the sample material is known or can be identified, then it will be packaged, marked, labeled, and shipped according to the specific instructions for that material. Appropriate laboratory notifications will be made, if necessary, through the SMR project coordinator.

Materials are classified by DOT/IATA as radioactive when the isotope specific activity concentration and the exempt consignment limits described in 49 CFR 173, "Shippers—General Requirements for Shipments and Packagings," are exceeded. Samples shall be screened, or relevant historical data will be used, to determine if these values are exceeded. When screening or historical data indicate samples are radioactive, they shall be properly classified, described, packaged, marked, labeled, and transported according to DOT/IATA requirements.

Prior to shipping radioactive samples to the laboratory, the organization responsible for shipping shall notify the laboratory of the approximate number of and radiological levels of the samples. This notification is conducted through the SMR project coordinator. The laboratory is responsible for ensuring that the applicable license limits are not exceeded. Prior to sample receipt, the laboratory shall provide SMR with written acceptance for samples with elevated radioactive contamination or dose.

4 Management of Waste

Waste materials are generated during sample collection, processing, and subsampling activities. Waste will be managed in accordance with the appropriate waste control/management plans (e.g., DOE/RL-2004-30, *Waste Control Plan for the 100-BC-5 Operable Unit*, DOE/RL-2004-31, *Waste Control Plan for the 100-FR-3 Operable Unit*, DOE/RL-97-01, *Interim Action Waste Management Plan for the 100-HR-3 and 100-KR-4 Operable Units*, DOE/RL-2000-41, *Interim Action Waste Management Plan for the 100-NR-2 Operable Unit*, DOE/RL-2017-64, *Post Remedial Investigation Waste Control Plan and Removal Action Waste Management Plan for the 200-BP-5 Groundwater Operable Unit*, DOE/RL-2004-18, *Waste Control Plan for the 200-PO-1 Operable Unit*, DOE/RL-2016-13, *Waste Management Plan for the 200-UP-1 Groundwater Operable Unit*, DOE/RL-2009-124, *200 West Pump and Treat Operations and Maintenance Plan*, and DOE/RL-2000-56, *Waste Management Plan for the 300-FF-5 Operable Unit*). For waste designation purposes, HEIS data for the wells listed in Tables 3-1 through 3-13 will be evaluated, and the maximum concentration for each analyte over the most recent 5-year period will be evaluated for use in creating a waste profile, if required.

Miscellaneous solid waste that has contacted suspect dangerous waste will be managed as dangerous waste. Purgewater and decontamination fluids will be collected and managed in accordance with DOE/RL 2011 41, Hanford Site Strategy for Management of Investigation Derived Waste; and DOE/RL 2009 80, Investigation Derived Waste Purgewater Management Work Plan. Waste materials requiring collection will be placed in containers appropriate for the material and the receiving facility in accordance with the applicable waste management or waste control plan and applicable substantive federal and/or state requirements.

Packaging and labeling during waste storage and transportation will meet WAC 173-303, "Dangerous Waste Regulations," and DOT requirements, as appropriate. Packaging exceptions to DOT requirements may be used for onsite waste shipments if documented as such and if the packaging provides an equivalent degree of safety during transportation.

Offsite analytical laboratories are responsible for disposing of unused sample quantities and wastes generated during the analytical process. Pursuant to 40 CFR 300.440, "National Oil and Hazardous Substances Pollution Contingency Plan," "Procedures for Planning and Implementing Off-Site Response Actions," approval from DOE-RL is required before returning unused samples or waste from offsite laboratories.

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5 Health and Safety

DOE established the hazardous waste operations safety and health program pursuant to the *Price-Anderson Amendments Act of 1988* to ensure the safety and health of workers involved in mixed-waste site activities. The program was developed to comply with the requirements of 10 CFR 851, "Worker Safety and Health Program," which incorporates the standards of 29 CFR 1910.120, "Occupational Safety and Health Standards," "Hazardous Waste Operations and Emergency Response;" 10 CFR 830, "Nuclear Safety Management;" and 10 CFR 835, "Occupational Radiation Protection." The health and safety program defines the chemical, radiological, and physical hazards and specifies the controls and requirements for daily work activities on the overall Hanford Site. Personnel training; control of industrial safety and radiological hazards; personal protective equipment; site control and general emergency response to spills, fire, accidents, injury, site visitors; stop work authority; and incident reporting are governed by the health and safety program. Site-specific health and safety plans [e.g., SGW-41472, *Soil and Groundwater Remediation Project Site Specific Health and Safety Plan (HASP)*, Rev. 9 or subsequent revisions] will be used to supplement the general health and safety program.

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Childers, Heather M

From: Dodge, Bonnie J
Sent: Wednesday, December 19, 2018 1:45 PM
To: Childers, Heather M
Subject: RE: Message from Childers, Heather M (3762530)

Support maps revision 0 did not change for revision 1. Please cross reference as they are.

Bonnie Dodge
Records Specialist
RS&I
CH2M
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SOIL & GROUNDWATER
CH2MHILL
Plateau Remediation Company
a Jacobs company

The contents of this message may be personal and do not reflect the views or position of the U.S. Department of Energy or the Federal Government.

From: Childers, Heather M <heather_m_childers@rl.gov>
Sent: Wednesday, December 19, 2018 1:32 PM
To: Dodge, Bonnie J <bonnie_j_dodge@rl.gov>
Subject: Message from Childers, Heather M (3762530)