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July 31, 2026

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Dear Madam and Sirs:

2025 ON-SITE WASTE DISPOSAL FACILITY ANNUAL PROJECT STATUS REPORT

Enclosed is the U.S. Department of Energy's (DOE's) On-Site Waste Disposal Facility Annual Project Status Report for the Portsmouth Gaseous Diffusion Plant environmental monitoring activities during the calendar year 2025. The report is submitted in accordance with the On-Site Waste Disposal Facility Performance Standards Verification Plan (DOE/PPPO/03-0803&D4) approved by the Ohio Environmental Protection Agency.

If you have any questions, please contact Steve Schaeffer of my staff at (740) 897-2322.

Sincerely,

MILTON LILLY

Digitally signed by MILTON LILLY
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Milton J. Lilly
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Enclosure:
On-Site Waste Disposal Facility Annual Project Status Report

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2025 On-Site Waste Disposal Facility Annual Project Status Report for the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

U.S. Department of Energy
DOE/PPPO/03-1383&D1

June 2026

This document has been approved for public release:

Richard Henderson (signature on file) 05/20/2026
Classification Office Date

2025 On-Site Waste Disposal Facility Annual Project Status Report for the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

U.S. Department of Energy
DOE/PPPO/03-1383&D1

June 2026

By
Southern Ohio Cleanup Company LLC, under Contract 89303323DEM000089

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CONTENTS

FIGURES

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TABLES

ACRONYMS

680 SSL	680 Sandstone layer
720 SSL	720 Sandstone layer
AMSL	above mean sea level
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
CAMU	corrective action management unit
CUSUM	cumulative summation
D&D	deactivation and demolition
D&D DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DCS	derived concentration standard
DOE	U.S. Department of Energy
EMP	Environmental Monitoring Plan
HAP	hazardous air pollutant
ILTS	Interim Leachate Treatment System
IMTA	Impacted Material Transfer Area
MAGLC	maximum acceptable ground-level concentrations
MLTS	Modular Leachate Treatment System
mrem	millirem
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
OSWDF	on-site waste disposal facility
PCB	polychlorinated biphenyl
PM	particulate matter
PM_{10}	particulate matter 10 micrometers in diameter and smaller
PORTS	Portsmouth Gaseous Diffusion Plant
PSVP	Performance Standards Verification Plan
RCRA	Resource Conservation and Recovery Act
TBC	to-be-considered (guidance)
TCE	trichloroethene
TSCA	Toxic Substances Control Act of 1976
VOC	volatile organic compound
SVOC	semi-volatile organic compound
WAC	waste acceptance criteria

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) is conducting deactivation and demolition (D&D) of the process buildings and other associated facilities that are no longer in use at the Portsmouth Gaseous Diffusion Plant (PORTS). D&D activities are completed in accordance with *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (D&D DFF&O) (Ohio EPA 2012). This administrative order establishes the regulatory framework for conducting D&D activities at PORTS under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.

An on-site waste disposal facility (OSWDF) is under construction and continues operation in the northeast portion of PORTS for disposal of waste generated by D&D. Low-level radioactive wastes, hazardous wastes as defined in Subtitle C of the Resource Conservation and Recovery Act (RCRA), and wastes defined by the Toxic Substances Control Act of 1976 (TSCA) that meet waste acceptance criteria are disposed of in the OSWDF. Waste placement in the first completed cell of the OSWDF (Cell 1) began on May 25, 2021. Cells 4 and 5 followed with waste placement beginning in April 2022. Placement continued in Cells 1, 4, and 5 during the 2022, 2023, and 2024 placement periods. Cell 2 began placement in May of 2025 and waste placement continued in Cells 1, 4, and 5 during the 2025 placement period.

The *On-Site Waste Disposal Facility (OSWDF) Performance Standards Verification Plan* (OSWDF PSVP) (DOE 2023b) is part of the OSWDF Final Design Package concurred with by the Ohio Environmental Protection Agency (Ohio EPA). The OSWDF PSVP describes the monitoring requirements for leachate, groundwater, seeps, surface water, air, and external radiation developed to ensure that performance standards for protection of human health and the environment are met during operation of the OSWDF. The OSWDF PSVP includes the requirement for this OSWDF Annual Project Status Report to provide the results of routine monitoring conducted at the OSWDF during the previous calendar year.

The *On-Site Waste Disposal Facility (OSWDF) Operations and Maintenance Plan* (OSWDF O&M Plan) (DOE 2023a) is another document that was part of the OSWDF Final Design Package concurred with by Ohio EPA. The OSWDF O&M Plan states that data generated from operation, maintenance, and monitoring activities will be reported on a calendar year basis in the project-specific annual update (i.e., the OSWDF Annual Project Status Report).

This OSWDF Annual Project Status Report provides the results of routine monitoring conducted at the OSWDF during 2025. This report includes statistical evaluations for Berea monitoring wells, the results of dose calculations completed in accordance with the OSWDF PSVP, and waste placement information. Monitoring results for 2025 are summarized below.

LEACHATE

Samples were collected from the leachate collection systems, leak detection systems, and horizontal monitoring wells in Cells 1, 2, 4, and 5 if water was present. Organic compounds, metals, dioxins/furans, radionuclides and other parameters were detected in samples from the leachate collection systems and leak detection systems for Cells 1, 2, 4, and 5 in 2025. Samples collected from the Cell 1 horizontal monitoring well contained metals, radionuclides and other parameters at concentrations less than or similar to detections in pre-operational samples collected from the OSWDF Project Area. No issues were identified that could compromise the performance of the leachate management system. DOE will continue to monitor as planned in accordance with the OSWDF PSVP.

GROUNDWATER

Twenty-five monitoring wells and two trench wells were part of the monitoring program for the OSWDF Project Area in 2025. Three of these monitoring wells that are screened at the interface of the Sunbury and Cuyahoga Formations were not sampled in 2025 due to insufficient water in the monitoring wells. In general, little or no water is expected in these monitoring wells.

As specified in the OSWDF PSVP applicable or relevant and appropriate requirements (ARARs), monitoring results were evaluated against concentration limits for hazardous constituents specified in Ohio Administrative Code (OAC) 3745-54-94 (for Berea monitoring wells only) and the administrative levels determined during preoperational sampling as specified in the Preoperational Data Summary (Davis November 15, 2022).

Administrative levels for some chlorinated organics, metals, polychlorinated biphenyls (PCBs), radionuclides, and indicator parameters were exceeded in 2025. These administrative levels are nonregulatory internal limits intended to allow early identification and correction of conditions that could impact the performance of the OSWDF. The administrative levels exceedances were reviewed, and no issues were identified that affect the operation or performance of the OSWDF as discussed in Section 4.2.2.2.

The groundwater monitoring program includes detection monitoring at the downgradient Berea monitoring wells. Five monitoring wells were part of this program in 2025. The detection monitoring program requires notification of Ohio EPA if a statistical control limit (the Shewhart control limit) for specified monitoring parameters is exceeded in two consecutive sampling events. No exceedances of statistical control limits required Ohio EPA notification in 2025.

SEEPS

No seeps were identified that would require sampling during the quarterly seep surveys in 2025; therefore, no samples were collected.

STORM WATER DISCHARGES

Five sedimentation and detention ponds are present in the OSWDF Project Area. Discharges from these ponds were sampled in 2025. Samples were collected for selected water quality parameters and metals. Results are compared to benchmark concentrations provided in OSWDF PSVP.

Total suspended solids were measured at levels above the benchmark concentration limit of 100 mg/L in Sedimentation and Detention Pond 1B and Temporary Sediment Basin A in 2025. Levels of total suspended solids measured in the ponds ranged from less than 1 mg/L to 181 mg/L. The exceedances of the benchmark concentration limit in the first and third quarters were due to precipitation prior to or during the sample collection. PORTS received approximately 0.5 to 1 inches of rainfall at each of the sampling events that exceeded the benchmark concentration. These results are discussed in Section 5.1.2.

The pH was measured at levels above the benchmark concentration limit of 9 standard units (SU) in Sedimentation and Detention Pond 1B, Sedimentation and Detention Pond 2, and Temporary Sediment Basin A in 2025. Levels of pH measured in the ponds ranged from 6.54 SU to 9.53 SU. The exceedances of the benchmark concentration limit were influenced by the limited amount of flow through the pond and the presence of algae.

SURFACE WATER

Surface water is monitored in the unnamed streams around the OSWDF Project Area and in Little Beaver Creek upstream and downstream from surface water flowing from the OSWDF Project Area. Monitoring results are evaluated against the administrative levels determined during preoperational sampling as specified in the Preoperational Data Summary (Davis November 15, 2022).

Administrative levels for several chlorinated organics, PCBs, and radionuclides were exceeded in 2025. Some of the exceedances were in samples collected at the Little Beaver Creek monitoring location upstream from the OSWDF. The administrative level exceedances do not indicate any issues to be addressed in the operation of the OSWDF.

AIR

Ambient air is monitored at eight locations around the perimeter of the OSWDF Project Area. Ambient concentrations of particulate matter (PM), PCBs, total volatile organic compounds (VOCs), trichloroethene (TCE), metals, and uranium are evaluated against the low, medium, and high action levels developed by the air models (DOE 2020a and DOE 2023d) and provided in the OSWDF PSVP.

No medium or high action levels for ambient air were exceeded in 2025. The low action levels for metals and total VOCs were exceeded in numerous samples in 2025. A project level review of these low action level exceedances determined that the exceedances are indicative of the low levels of metals and VOCs present in ambient air. Occasional exceedances of low action levels by these analytes are monitored, but expected, at OSWDF due to the amount of exposed contaminated soil present at the project during placement of engineered fill material from soil excavations. There were no low action level exceedances of PCBs or total uranium in 2025.

EXTERNAL RADIATION

The external radiation monitoring program measures background radiation and radiation that may result from waste handling activities associated with the OSWDF Project Area at ambient air monitoring stations near the north and east DOE property boundaries and at the intersection of North Access Road and Fog Road (the west side of the OSWDF area).

Radiation (measured as dose) was within the background levels measured at off-site and on-site monitoring locations at four of the five monitored locations. These four monitoring locations ranged from 21 to 28 millirem (mrem)/quarter. Radiation measured at one location was consistently higher than the other locations, which may be due to the clay stockpile and processing area located southwest of the monitoring location. This monitoring location ranged from 28 to 35 mrem/quarter. Clay in this area is from the natural weathering and degradation of the shale rock formations that contain naturally-occurring radionuclides. A dose rate survey completed in 2018 during construction of the OSWDF found background radiation rates as high as 26 mrem/quarter (12 microrem/hour) in excavation areas with exposed shale, sandstone, and clay (FBP 2021).

DOSE

As specified in the OSWDF PSVP ARARs, DOE Order 458.1 and Ohio Department of Health regulation OAC 3701:1-54-08(B)(1) limit the dose to a member of the public to 25 mrem/year resulting from management, storage and disposal of low-level waste. Exposure pathways for air, external radiation, groundwater, and surface water have been assessed for these dose calculations.

The maximum potential dose to a member of the public from radionuclides that could be associated with operations at the OSWDF is 0.028 mrem, based on the radionuclides sampled in ambient air at Station X780-A04 on the northeastern PORTS property boundary. This dose was calculated and reported in the *Radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) 2025 Annual Report*

(DOE 2026). External radiation detected at the OSWDF was consistent with background radiation measured at on-site and off-site locations; therefore, the dose at Station X780-A04 from external radiation associated with operation of the OSWDF is zero. Groundwater and surface water monitored at the OSWDF Project Area are not used as drinking water sources; therefore, the dose to a member of the public from ingestion of radionuclides in groundwater or surface water from the OSWDF Project Area is zero. The total dose that could be attributable to a member of the public from operation of the OSWDF (ambient air, external radiation, groundwater, and surface water) is 0.0282 mrem/year, which is less than the 25 mrem/year limit set by DOE Order 458.1.

1. INTRODUCTION

The Portsmouth Gaseous Diffusion Plant (PORTS), which enriched uranium via the gaseous diffusion process from 1954 to 2001, is one of three uranium enrichment facilities that have operated in the United States. PORTS is located in a rural area of Pike County, Ohio, on a 5.4-square-mile site. The site is 2 miles east of the Scioto River in a small valley running parallel to and approximately 130 feet above the Scioto River floodplain.

The U.S. Department of Energy (DOE) is responsible for deactivation and demolition (D&D) of the gaseous diffusion process buildings and associated facilities and areas, environmental restoration, waste disposal associated with DOE activities, depleted uranium hexafluoride conversion, and management of other non-leased facilities at PORTS.

1.1 PROJECT BACKGROUND

DOE is conducting D&D of the process buildings and other associated facilities that are no longer in use at PORTS in accordance with *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (D&D DFF&O) (Ohio EPA 2012). This administrative order establishes the regulatory framework for conducting D&D activities at the PORTS under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.

The *Record of Decision for the Site-Wide Waste Disposition Evaluation Project* (Waste Disposition Record of Decision) (DOE 2015b) selected a combination of on-site and off-site disposal, including construction of an on-site waste disposal facility (OSWDF) for disposal of waste generated by D&D. Low-level radioactive wastes, hazardous wastes as defined in Subtitle C of the Resource Conservation and Recovery Act of 1976 (RCRA), and wastes defined by the Toxic Substances Control Act of 1976 (TSCA) that meet the waste acceptance criteria (WAC) for the OSWDF are planned for disposal. Combinations of the aforementioned waste types ("mixed wastes") are also planned for disposal at the OSWDF. Initial construction activities for the OSWDF, located in the northeast portion of PORTS, began in 2015. Cell 1 was the first completed cell of the OSWDF and waste placement began on May 25, 2021. Cells 4 and 5 followed with waste placement beginning in April 2022. Placement continued in Cells 1, 4, and 5 during the 2022, 2023, and 2024 placement periods. Cell 2 began placement in May of 2025 and waste placement continued in Cells 1, 4, and 5 during the 2025 placement period.

The OSWDF is designed to include up to 12 individual waste disposal cells. Each cell is built in a modular fashion with individual lining systems. The modular design of the OSWDF allows for progressive construction, filling, and closure of cells consistent with the rate of waste generated by D&D. The Impacted Material Transfer Area (IMTA) is currently under construction on approximately seven acres adjacent to the OSWDF. The IMTA will provide temporary staging of waste, typically when a grid is not available for placement of the specific type of debris or in the winter when meeting compaction requirements cannot be achieved during freeze and thaw cycles. Figure 1.1 shows the OSWDF Project Area and PORTS.

Support infrastructure for the OSWDF includes a surface water management system, leachate management systems, haul roads, truck scale, wheel wash (not yet constructed), access roads, security fencing, temporary and permanent offices and trailers, equipment maintenance areas, parking areas, and utilities. The surface water management system separates potentially impacted surface water (i.e., surface water that has the potential to be contaminated) from surface water (i.e., uncontaminated) to ensure proper collection, treatment, analysis, and release. The leachate management systems provide collection and transmission for treatment of leachate and wastewater. A dedicated waste hauling route outside of

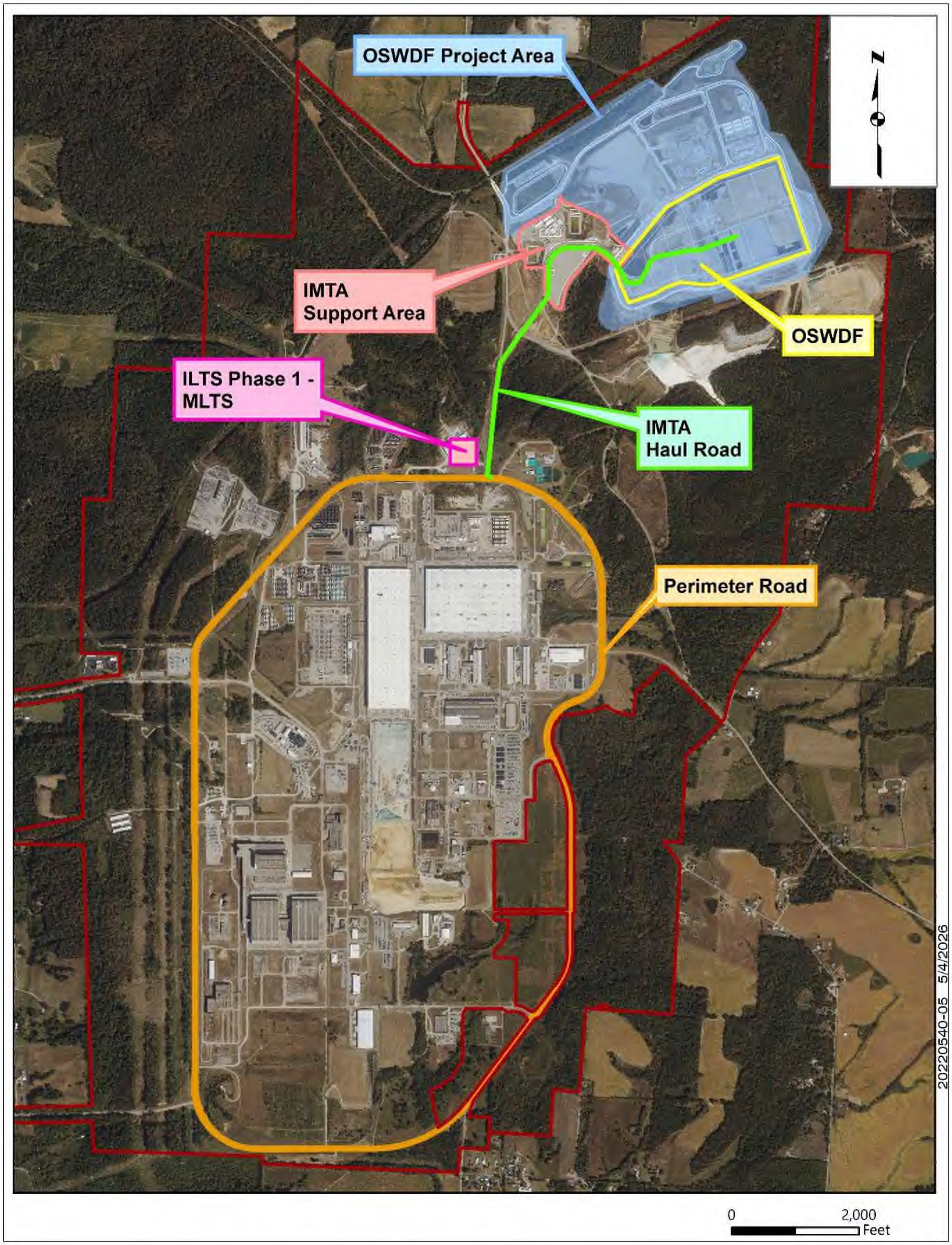

Figure 1.1. The OSWDF Project Area and PORTS.

Perimeter Road, the IMTA Haul Road, facilitates efficient transportation to the IMTA and OSWDF. Portions of the IMTA Haul Road are currently under construction.

Currently, leachate is treated by the Interim Leachate Treatment System (ILTS) Phase 1 – Modular Leachate Treatment System (MLTS). The MLTS is constructed at the location of the future ILTS Phase 2. The number of cells that can receive waste during initial operations is limited by the capacity of the MLTS to treat leachate while still meeting discharge requirements. The ILTS Phase 2 will have the capacity to treat impacted water from the IMTA, IMTA support systems, the OSWDF, and other site operations, as needed.

Contaminated soil from designated site sources is used as the fill material needed for placement of D&D waste in the OSWDF. To facilitate use of contaminated soil as fill, the Ohio Environmental Protection Agency (Ohio EPA) Director approved the OSWDF as a treatment, storage, and disposal Corrective Action Management Unit (CAMU) and the IMTA as a treatment and storage CAMU via the Waste Disposition Record of Decision. The OSWDF CAMU designations provide a mechanism to remove and consolidate facility-wide contamination from various areas (e.g., contaminated soil from plumes and closed landfill units within Perimeter Road) in the OSWDF. The Waste Disposition Record of Decision also establishes that a portion of PORTS is an area of contamination (AOC). Using the AOC allows the movement of waste within the confines of the AOC without triggering the generation of hazardous waste that would result in the need for additional handling requirements.

1.2 MONITORING PROGRAM

The OSWDF Final Design Package includes the *On-Site Waste Disposal Facility (OSWDF) Performance Standards Verification Plan* (OSWDF PSVP) (DOE 2023b). The OSWDF PSVP describes the monitoring program developed to ensure that performance standards for protection of human health and the environment are met during operation of the OSWDF. The Ohio EPA concurred with the OSWDF PSVP in May 2020. Any changes or amendments to the OSWDF PSVP and field change notices affecting the OSWDF PSVP must be concurred with by Ohio EPA as described in the *Comprehensive On-Site Waste Disposal Facility Remedial Design/Remedial Action Work Plan* (Comprehensive OSWDF RD/RA Work Plan) (DOE 2018). The latest revision to the OSWDF PSVP was approved through the field change notice process in April 2023.

The Waste Disposition Record of Decision (DOE 2015b) includes the applicable or relevant and appropriate requirements (ARARs) and to-be-considered (guidance) (TBC) for protection of human health and the environment that are applicable to the OSWDF PSVP. These ARARs include the RCRA Subtitles C and D; the TSCA; Ohio Administrative Code (OAC) solid waste rules, and internal DOE rules and policies related to the design and operation of a low-level (radioactive) waste disposal facility. The OSWDF PSVP includes a complete list of the ARARs and TBCs that form the basis for the OSWDF monitoring program.

The OSWDF PSVP was developed by 1) identifying the regulatory requirements and the performance standards associated with the monitoring program; 2) identifying the potential pathways for contaminant migration; and 3) monitoring these pathways to verify that waste placement operations are being conducted in a manner that is protective of human health and the environment, and that the remedy components are functioning as designed. The OSWDF PSVP includes monitoring requirements for leachate, groundwater, seeps, surface water, air, and external radiation.

1.2.1 Annual Reporting

The OSWDF PSVP requires an annual project status report that provides the results of routine monitoring conducted at the OSWDF during the previous calendar year. This OSWDF Annual Project Status Report also includes statistical evaluations for Berea monitoring wells and the results of dose calculations completed in accordance with the OSWDF PSVP.

Other plans that are part of the operating requirements for the OSWDF also include information to be reported in the OSWDF Annual Project Status Report. The Comprehensive OSWDF RD/RA Work Plan (DOE 2018) states that DOE will annually report the amount and type of waste disposed of in the OSWDF to include volume by waste classification with the location defined by a three-dimensional grid system. Section 2 and Appendix A provide waste disposal information.

The *Waste Acceptance Criteria Implementation Plan for the On-Site Waste Disposal Facility* (WAC Implementation Plan) (DOE 2020b) states the annual report will provide a summary, by waste type, of the materials placed into the OSWDF for the reporting year and cumulatively since waste placement activities were initiated. Per the WAC Implementation Plan, the annual report will provide a running total of the amount of decomposable materials (Type 4) placed in the OSWDF and each individual cell. Section 2 and Appendix A provide waste disposal information.

The *On-Site Waste Disposal Facility (OSWDF) Operations and Maintenance Plan* (OSWDF O&M Plan) (DOE 2023a) states that the OSWDF Annual Project Status Report will include the waste placement report for the year, including updates of tracked limits for placement of Type 4 materials in each cell and in the OSWDF overall. Section 2 and Appendix A provide waste disposal information.

The OSWDF O&M Plan also states that minor and significant spills (as defined in the OSWDF O&M Plan) will be documented in the OSWDF Annual Project Status Report. Spill locations will be identified using Geographic Information System equipment. The OSWDF Annual Project Status Report will document the material spilled; the date, time, and location of the spill; the actions taken to remove the spill; and disposition of the waste generated. Section 9 provides information on spills at the OSWDF in 2025. No minor or significant spills occurred at the OSWDF in 2025.

Data associated with operation of the MLTS are not included in this OSWDF Annual Project Status Report. The *Wastewater Treatment Systems Performance Standards Verification Plan* (DOE 2023c) states that combined effluent from the three treatment trains is represented by samples and the associated analytical data collected from National Pollutant Discharge Elimination System (NPDES) Outfall 004. Data for NPDES Outfall 004 are provided to Ohio EPA in monthly discharge monitoring reports. Discharge monitoring reports and the data that comprise the reports are available at pegasis.ports.pppo.gov.

1.2.2 Organization of the Annual Report

This OSWDF Annual Project Status Report is organized as follows:

- Section 2, Waste Placement, summarizes waste placement information for the current year and cumulatively (since the start of waste placement).

- Section 3, Leachate, summarizes the components of the leachate management system installed in each cell, the leachate monitoring program, and the results of leachate monitoring for 2025.

- Section 4, Groundwater, includes a summary of the geology of the OSWDF Project Area, the groundwater and seep monitoring programs, results of groundwater monitoring in 2025, and quarterly seep surveys in 2025.

- Section 5, Surface Water, includes the storm water discharge monitoring program, surface water surveillance monitoring program, and the results of these programs in 2025.

- Section 6, Air, discusses the ambient air monitoring program and results in 2025.

- Section 7, External Radiation, discusses the external radiation monitoring program and results in 2025.

- Section 8, Dose, discusses the exposure pathways, exposure scenarios, and dose calculations (if necessary) for ambient air, groundwater, and surface water that are used to evaluate the potential dose to the public from OSWDF operations in 2025.

- Section 9, Operations and Maintenance, includes information about the action leakage rate and spills in 2025.

- Appendix A includes a table of waste placement information.

- Appendix B includes tables of monitoring parameters and sampling frequencies for leachate, groundwater/seeps, storm water discharges, surface water, and ambient air.

- Appendix C includes tables of the limits used to evaluate environmental monitoring data (the OAC limits and administrative levels applicable to groundwater, the benchmark concentrations applicable to storm water discharges, the administrative levels applicable to surface water, and action levels applicable to ambient air).

- Appendix D includes a summary of the statistical evaluations for downgradient Berea groundwater monitoring wells.

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2. WASTE PLACEMENT AND TRACKING

The Comprehensive OSWDF RD/RA Work Plan (DOE 2018), OSWDF O&M Plan (DOE 2023a), and WAC Implementation Plan (DOE 2020b) require reporting of waste placement and tracking information in the OSWDF Annual Project Status Report. This section and Appendix A provide the waste placement and tracking information required by these plans.

The WAC Implementation Plan (DOE 2020b) provides waste acceptance requirements for the OSWDF and describes the tracking requirements for waste generated by D&D and placed in the OSWDF. The OSWDF O&M Plan provides detailed information about waste placement and compaction activities and requirements.

Waste disposed of in the OSWDF is categorized and tracked as one of five types of material. A general description of each of these materials is provided below. The Impacted Materials Placement Plan, which is Appendix B of the OSWDF O&M Plan, provides additional information about these material types.

- Type 1 material is soil and soil-like materials that do not contain hard agglomerations greater than 12 inches. Soil-like material includes crushed concrete.

- Type 2 material is debris such as concrete, metal, debris and other waste resulting from D&D activities. This impacted material can be compacted during waste placement.

- Type 3 material is large debris that cannot be compacted.

- Type 4 material includes decomposable materials such as contaminated vegetative waste as well as bulk paper products, pallets, utility poles, and sewage plant waste. Type 4 material is limited per cell (479 cubic yards). The WAC Implementation Plan requires removal and/or quantifies the amount of incidental Type 4 materials present within loads of other waste types received into the OSWDF.

- Type 5 material requires special handling. These items have special requirements for size and placement.

Low-level radioactive waste is disposed of in the OSWDF. RCRA hazardous waste and materials contaminated with polychlorinated biphenyls (PCBs) that are regulated under TSCA are also approved to be disposed of in the OSWDF. RCRA hazardous waste codes (if applicable) and PCB characterization information are also tracked for each material type.

Each cell of the OSWDF is divided into grids for placement of waste. The locations of these grids are recorded relative to permanent survey benchmarks. The records of waste dispositioned in the OSWDF include the material type, waste source, waste characterization (RCRA or PCB), cell number, cell grid (the horizontal location of the waste in the cell), and cell lift (the elevation location of the waste in the cell). The quantity of asbestos dispositioned is determined by surveying the volume placed in the asbestos grid of the cell. After waste placement, the waste is surveyed and the volume finalized.

In 2025 waste placement operations occurred in Cells 1, 2, 4, and 5. Cells 3, 6, 7, 8, 9, 10, 11, and 12 were not operational during this time. Appendix A provides the waste placement report for 2025, which includes the three-dimensional cell location, waste source, material type, RCRA hazardous waste code (if applicable), and PCB characterization for the materials placed in Cells 1, 2, 4, and 5. Table 2.1 summarizes the volume of waste by material type disposed in each cell in 2025 and since operation of the

OSWDF began. These volumes represent in-place cubic yards. In-place cubic yards is defined as the amount of space the waste takes up in the cell after compaction.

Table 2.1. Volume of waste (in-place cubic yards) placed in the OSWDF – 2025 and total

Cell Number	Type 1 Soil		Type 2 Debris		Type 3 Large Debris		Type 4 Decomposable[a]		Type 5 Special Handling		Combined Total	
	2025	Total	2025	Total	2025	Total	2025	Total	2025	Total	2025	Total
1	7,067	173,686	887	77,751	0	1,036	0	(47)	0	75	7,954	252,548
2	28,285	28,285	1,913	1,913	1,142	1,142	0	0	0	0	31,340	31,340
3[b]	-	-	-	-	-	-	-	-	-	-	-	-
4	4,108	222,711	744	117,133	299	952	0	(77)	0	267	5,151	341,063
5	0	34,453	0	10,166	0	505	0	(5)	0	36	0	45,160
6[b]	-	-	-	-	-	-	-	-	-	-	-	-
7[c]	-	-	-	-	-	-	-	-	-	-	-	-
8[c]	-	-	-	-	-	-	-	-	-	-	-	-
9[c]	-	-	-	-	-	-	-	-	-	-	-	-
10[c]	-	-	-	-	-	-	-	-	-	-	-	-
11[c]	-	-	-	-	-	-	-	-	-	-	-	-
12[c]	-	-	-	-	-	-	-	-	-	-	-	-
Total	39,460	459,135	3,544	206,963	1,441	3,635	(0)	(129)	0	378	44,445	670,111

[a] Type 2 material total volume includes incidental Type 4 material. The amount of Type 4 incidental material shown in parentheses.
[b] Cell is under construction but not operational as of the end of 2025.
[c] Cell is planned but not under construction as of the end of 2025.

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3. LEACHATE

The purpose of the OSWDF Leachate Management System is to capture, contain, and convey leachate generated within the OSWDF. The system is also designed to provide prompt detection of leaks. The elements of the Leachate Management System associated with each landfill cell that require sampling and analysis are the leachate collection system, leak detection system, and horizontal monitoring well. Liquid that accumulates within each of these three systems is sampled in accordance with the OSWDF PSVP.

The leachate collection system removes leachate that accumulates on the OSWDF liner system (see Figure 3.1). For example, precipitation that falls in a cell that is currently receiving waste is collected by the leachate collection system. Leachate that accumulates in the leachate collection system drainage layer within each cell is conveyed along the slope of the OSWDF floor to a perforated section of leachate collection system pipe. Leachate that enters the perforated section of the pipe is then conveyed by gravity toward the perimeter of the cell and into the cell's designated valve house. Each cell also includes a redundant leachate collection system pipe that is used if the primary pipe becomes clogged or damaged. During normal operations, the redundant leachate collection system pipe is not in use.

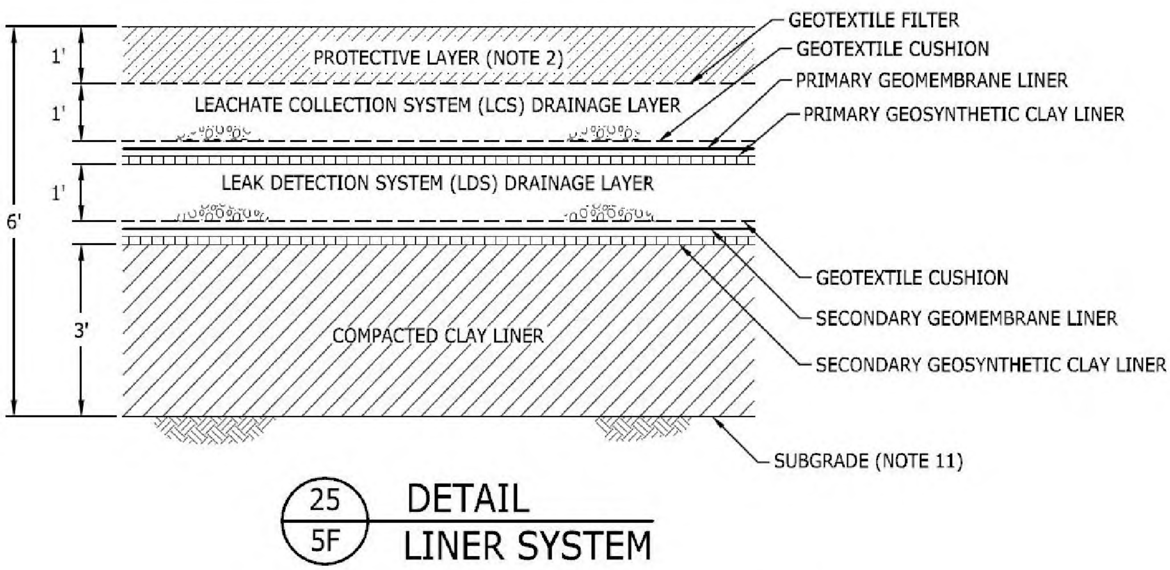

Figure 3.1. Leachate collection and leak detection systems.

The leak detection system is located between the primary and secondary liners (see Figure 3.1). The leak detection system monitors the integrity and performance of the primary composite liner system, although liquid in the leak detection system can be present from several sources (i.e., condensate). If liquids collect within the leak detection system drainage layer, they are conveyed by gravity to the cell's designated valve house through the leak detection system pipe and into a containment tank.

A horizontal monitoring well is installed under the clay liner for each OSWDF cell (see Figure 3.2). The horizontal well monitors the penetrations through the primary and secondary liner systems for the leachate collection system and leak detection system. The horizontal monitoring well should remain dry during operation and after closure of the OSWDF. If liquid is found, it is sampled.

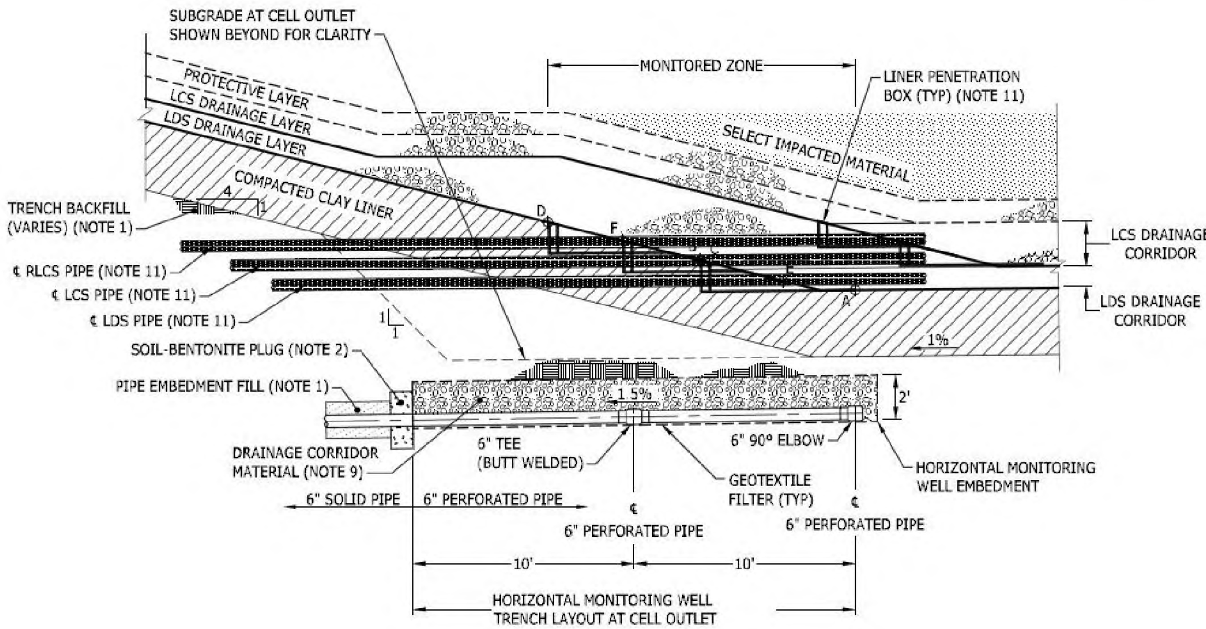

Figure 3.2. Leachate management system and horizontal monitoring well.

The OSWDF PSVP provides additional information about the construction and operation of the OSWDF Leachate Management System. A leachate management system will also be part of the IMTA. When the IMTA begins operation, additional information about the system will be added to this report.

3.1 LEACHATE MONITORING PROGRAM

Table B-1 in Appendix B lists the specific parameters monitored in samples collected from the leachate monitoring system components (leachate collection system, leak detection system, and horizontal monitoring well). In general, samples are collected as follows:

- Monthly for field parameters (pH and specific conductance), PCBs, and chlorinated organics as required by regulations for TSCA landfills.

- Quarterly for radionuclides.

- Semiannually for hazardous constituents identified in the Appendix to OAC 3745-54-98 (equivalent to Appendix IX) and contaminants of potential concern identified in the *Remedial Investigation and Feasibility Study Report for the Site-wide Waste Disposition Evaluation Project* (Waste Disposition RI/FS) (DOE 2014b).

During operation of the OSWDF, any parameters detected in samples from the leachate collection system that are not already part of the groundwater monitoring program will be included in the groundwater monitoring program for the following year (i.e., parameters detected in leachate in calendar year 2025 will be monitored in groundwater in 2026). Section 3.2 lists the parameters detected in samples collected from the leachate collection system in 2025 that will be added to the groundwater monitoring program in 2026.

3.2 LEACHATE MONITORING RESULTS

Operational samples for the leachate management system components of the OSWDF were collected for Cells 1, 2, 4, and 5. In 2025, samples were collected from the following locations associated with the Cells 1, 2, 4, and 5 leachate management systems. Sufficient liquid for sampling was not present during 2025 in Cells 1, 2, and 4 leak detection systems. No liquid was present in the Cell 4 and Cell 5 horizontal monitoring wells, therefore, no samples were collected during 2025.

- X780-VH01-V0132, the leachate collection system pipe in Valve House 1
- X780-VH02-V0232, the leachate collection system pipe in Valve House 2
- X780-VH04-V0432, the leachate collection system pipe in Valve House 4
- X780-VH05-V0532, the leachate collection system pipe in Valve House 5
- X780-VH05-T0501, the leak detection system containment tank in Valve House 5
- X780-45HW, the horizontal monitoring well for Cell 1
- X780-46HW, the horizontal monitoring well for Cell 2

3.2.1 Cell 1 Leachate Monitoring Results

The Cell 1 leachate management system, which consists of the leachate collection system, redundant leachate collection system, leak detection system, and horizontal monitoring well, is sampled monthly, if sufficient liquid is present. During 2025, the leachate collection system had sufficient liquid available for sampling from January through May. The Cell 1 leak detection system was not sampled during 2025 due to no or insufficient liquid present for sampling. DOE will continue to monitor these systems as planned in accordance with the OSWDF PSVP.

Table 3.1 summarizes the monitoring parameters detected in samples collected from Cell 1 leachate collection system (X780-VH01-V0132) during operational sampling in 2025.

Table 3.1. Monitoring parameters detected in samples collected from the Cell 1 leachate collection system and leak detection system – 2025

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[c]
Chlorinated organics		
Trichloroethene (µg/L)	0.375-0.496	-
Metals		
Barium (µg/L)	22.3-22.8	-
Cadmium (µg/L)	0.295	-
Copper (µg/L)	7.78	-
Fluoride (µg/L)	405-423	-
Iron (µg/L)	593-1,000	-
Magnesium (µg/L)	203,000-208,000	-
Manganese (µg/L)	6.72-7	-
Mercury (ng/L)	1.45-1.48	-
Nickel (µg/L)	34.4-37.8	-
Selenium (µg/L)	25.4-30.1	-
Thallium (µg/L)	5.94	-
Zinc (µg/L)	29.3-32.3	-
Other parameters		
Dissolved solids (mg/L)	2,370-2,400	-
Sulfide (mg/L)	0.074	-

Table 3.1. Monitoring parameters detected in samples collected from the Cell 1 leachate collection system and leak detection system – 2025 (continued)

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[c]
Radionuclides		
Technetium-99 (pCi/L)	108-136	-
Uranium (µg/L)	27.8-37.3	-
Uranium-233/234 (pCi/L)	20.6-25.1	-
Uranium-235/236 (pCi/L)	1.25-1.31	-
Uranium-238 (pCi/L)	9.15-12.3	-

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]If only one number is provided for the range, it is the only detection of the parameter. If a "-" is present, there were no detections of the parameter.
[c]The leak detection system was not sampled in 2025 (insufficient liquid).

The parameters listed in Table 3.1 for the leachate collection system will be included in the groundwater monitoring program in 2026. The radionuclides that were detected in leachate are already part of the groundwater monitoring program.

Although water is generally not expected in the horizontal monitoring wells during operation of the OSWDF, water has been present in Cell 1 horizontal monitoring well since the construction of Cell 1. A post-installation video inspection in 2019 revealed out-of-tolerance conditions in the leachate management system pipes between Cell 1 and Valve House 1. The leachate management system was excavated in the spring/summer of 2020 to correct the sagging conditions identified during the video inspection.

During that second construction period in March through July 2020, a significant amount of rain occurred. Rain water saturated the trenches of the horizontal monitoring well and surrounding subgrade of the Cell 1 liner. Although most of the rainwater volume drained through the horizontal monitoring well later in 2020, the trenches associated with the horizontal monitoring well between Cell 1 and Valve House 1 remained saturated. The remaining water under the liner was squeezed out due to waste placement in Cell 1 during the placement season in 2021. In 2022 and 2023, the Cell 1 horizontal monitoring well contained water each month. The quantity of water collected during the placement seasons increased when waste placement started in the Cell 1 catchment area and decreased again at the end of the placement season (see Figure 3.3).

In 2024, the Cell 1 horizontal monitoring well contained water each month at a consistent rate. A detailed evaluation was performed on the construction activities, precipitation, analytical results, groundwater levels in vertical monitoring wells, and the water in the Cell 1 horizontal monitoring well to determine if the Cell 1 horizontal monitoring well was impacted by the Cell 1 leachate from the OSWDF or groundwater from the much deeper formations monitored by vertical monitoring wells. The following was determined.

- Sufficient water for sampling was not present in the Cell 1 leak detection system; therefore, the water in the Cell 1 horizontal monitoring well was not from the Cell 1 leachate collection system.

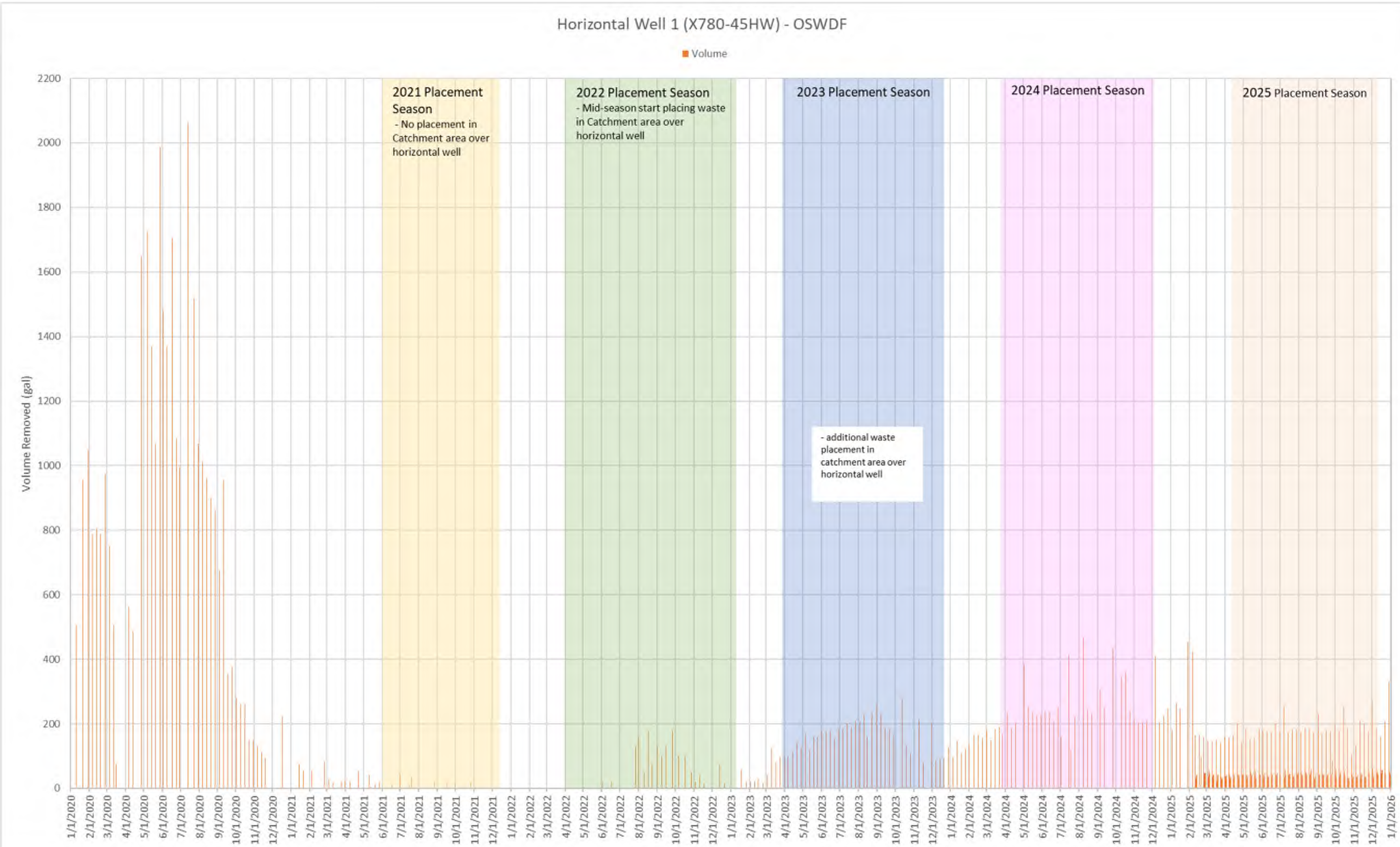

Figure 3.3. Cell 1 horizontal monitoring well volumes.

- The Cell 1 horizontal monitoring well continued to produce a stable amount of water when pumped during drought and heavy rain conditions, thus, not showing an influence from surface water infiltrating the horizontal pipe trench bed.
- Additional samples were collected from the raw water line, groundwater wells (Berea and 680 Sandstone), Cell 1 leachate collection system, and the 720 trench wells to compare the water chemistry of each with the horizontal monitoring well water. No correlation was determined between these potential sources.

At the end of 2024, DOE developed plans to continue to evaluate the potential for the existence of sources that may have been contributing to the water in the Cell 1 horizontal monitoring well. During 2025, the Cell 1 horizontal monitoring well contained water each month. Water was pumped on a daily to weekly schedule. The quantity of water collected each month was consistent over the course of the year. The following activities were completed in 2025.

- Completed daily to weekly pumping and monthly sampling on the Cell 1 horizontal monitoring well throughout 2025;
- Located the raw water line leak and excavated to repair the leak in August 2025;
- Installed five piezometers in 3rd quarter 2025 and monitored water level data and confirmed the existence of sandstone;
- Continued to evaluate data, water levels, and quantity of water pumped from piezometers to assess suitable locations for conducting a tracer test and pump test, if needed; and
- Evaluated the Cell 1 horizontal monitoring well analytical results compared to analytical results from the baseline (for example, conductivity is consistent with data from the sandstone layer).

The approach moving forward is to continue evaluating water volume and the potential sources for the water in the Cell 1 horizontal monitoring well by:

- Continue daily to weekly pumping and monthly sampling;
- Evaluate the possibility of two sandstone zones;
- Perform a pump test, if needed, to determine hydraulic connection and the feasibility of dewatering the Cell 1 horizontal monitoring well trench; and
- Conduct a tracer test to confirm potential pathways from water sources to the Cell 1 horizontal monitoring well.

Samples collected from the Cell 1 horizontal monitoring well in 2025 contained PCBs, metals, and uranium at concentrations less than or similar to detections in pre-operational groundwater samples collected from the OSWDF Project Area.

Any new quantity and quality information from the samples collected from the horizontal monitoring well and associated leak detection system is continuously evaluated for leak detection purposes as specified in the OSWDF PSVP.

Table 3.2 summarizes the monitoring parameters detected in samples collected from the horizontal monitoring well for Cell 1 (X780-45HW) during operational sampling in 2025.

Table 3.2. Monitoring parameters detected in samples collected from the Cell 1 horizontal monitoring well – 2025

Detected parameter (unit)[a]	Detection range[b]
Polychlorinated biphenyls	
PCBs (µg/L)	0.0463
Chlorinated organics	
Methylene chloride (µg/L)	0.51
Organics	
Di-n-butyl phthalate (µg/L)	5.92-7.9
Di-n-octylphthalate (µg/L)	6.18
Metals	
Aluminum (µg/L)	166-183
Antimony (µg/L)	6.31
Barium (µg/L)	19.5-20.2
Chromium (µg/L)	4.94-5.46
Chromium, trivalent (µg/L)	4.94-5.46
Cobalt (µg/L)	1.1-1.38
Iron (µg/L)	115-1,730
Magnesium (µg/L)	288,000-378,000
Manganese (µg/L)	38.7-217
Mercury (ng/L)	0.272-0.386
Nickel (µg/L)	6.19-6.29
Zinc (µg/L)	11.5-42.8
Other parameters	
Chemical oxygen demand (mg/L)	9.19
Dissolved solids (mg/L)	2,910-3,470
Radionuclides	
Uranium (µg/L)	6.24-13.5
Uranium-233/234 (pCi/L)	4.11-7.47
Uranium-235/236 (pCi/L)	0.177-0.698
Uranium-238 (pCi/L)	2.06-4.42

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]If only one number is provided for the range, it is the only detection of the parameter.

3.2.2 Cell 2 Leachate Monitoring Results

The Cell 2 leachate management system, which consists of the leachate collection system, redundant leachate collection system, leak detection system, and horizontal monitoring well, is sampled monthly, if sufficient liquid is present. The Cell 2 leachate collection system contained sufficient liquid for sampling from the beginning of placement in Cell 2 (May 2025) through the end of the year (December 2025). Although water is generally not expected in the horizontal monitoring wells during operation of the OSWDF, water was present in Cell 2 horizontal monitoring well in May. Sufficient liquid was not present for sampling in the Cell 2 leak detection system in 2025. DOE will continue to monitor these systems as planned in accordance with the OSWDF PSVP.

Table 3.3 summarizes the monitoring parameters detected in samples collected from Cell 2 leachate collection system (X780-VH02-V0232) during operational sampling in 2025.

Table 3.3. Monitoring parameters detected in samples collected from the Cell 2 leachate collection system and leak detection system – 2025

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[c]
Chlorinated organics		
Methylene chloride (µg/L)	2.05-2.26	-
Organics		
Bis(2-ethylhexyl)phthalate (µg/L)	0.725	-
Metals		
Aluminum (µg/L)	104	-
Antimony (µg/L)	5.14	-
Barium (µg/L)	34.3-34.8	-
Iron (µg/L)	54.9-163	-
Lead (µg/L)	5.43	-
Magnesium (µg/L)	134,000-136,000	-
Manganese (µg/L)	6.78-9.74	-
Mercury (ng/L)	0.253-0.289	-
Nickel (µg/L)	4.11-5.03	-
Selenium (µg/L)	9.13-9.48	-
Other parameters		
Dissolved solids (mg/L)	1,630-1,650	-
Fluoride (mg/L)	0.51-0.522	-
Radionuclides		
Technetium-99 (pCi/L)	7.12-7.32	-
Uranium (µg/L)	7.01-17	-
Uranium-233/234 (pCi/L)	2.68-6.89	-
Uranium-235/236 (pCi/L)	0.381	-
Uranium-238 (pCi/L)	2.35-5.66	-

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]If only one number is provided for the range, it is the only detection of the parameter. If a "-" is present, there were no detections of the parameter.
[c]The leak detection system was not sampled in 2025 (insufficient liquid).

The parameters listed in Table 3.3 for the leachate collection system will be included in the groundwater monitoring program in 2026. The radionuclides that were detected in leachate are already part of the groundwater monitoring program.

In May, the Cell 2 horizontal monitoring well contained sufficient liquid to collect samples. Following the sampling event, the horizontal monitoring well was pumped to remove all liquid present at that time. Approximately 150 gallons of liquid were removed during the May pumping event. No liquid recharge has been observed since that event.

Table 3.4 summarizes the monitoring parameters detected in samples collected from the horizontal monitoring well for Cell 2 (X780-46HW) during operational sampling in 2025.

Table 3.4. Monitoring parameters detected in samples collected from the Cell 2 horizontal monitoring well – 2025

Detected parameter (unit)[a]	Detection range[b]
Chlorinated pesticides	
Beta-BHC (µg/L)	0.00708
Radionuclides	
Uranium (µg/L)	4.82
Uranium-233/234 (pCi/L)	2.78
Uranium-238 (pCi/L)	1.61

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]If only one number is provided for the range, it is the only detection of the parameter.

Samples collected from the Cell 2 horizontal monitoring well in 2025 contained a chlorinated pesticide and uranium at concentrations less than or similar to detections in pre-operational groundwater samples collected from the OSWDF Project Area.

Any new quantity and quality information from the samples collected from the horizontal monitoring well and associated leak detection system is continuously evaluated for leak detection purposes as specified in the OSWDF PSVP.

3.2.3 Cell 4 Leachate Monitoring Results

The Cell 4 leachate management system, which consists of the leachate collection system, redundant leachate collection system, leak detection system, and horizontal monitoring well, is sampled monthly, if liquid is present. During 2025, the leachate collection system had sufficient liquid available for sampling from January through May. The Cell 4 leak detection system and horizontal monitoring well were not sampled during 2025 due to no or insufficient liquid present for sampling. DOE will continue to monitor these systems as planned in accordance with the OSWDF PSVP.

Table 3.5 summarizes the monitoring parameters detected in samples collected from the Cell 4 leachate collection system (X780-VH04-V0432) during operational sampling in 2025.

Table 3.5. Monitoring parameters detected in samples collected from the Cell 4 leachate collection system and leak detection system – 2025

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[c]
Polychlorinated biphenyls		
PCBs (µg/L)	0.224	-
Chlorinated organics		
1,1-Dichoroethane (µg/L)	0.46-0.5	-
Cis-1,2-Dichloroethene (µg/L)	0.41-0.67	-
Trichloroethene (µg/L)	1.02-1.5	-
Organics		
Di-n-butyl phthalate (µg/L)	9.57	-

Table 3.5. Monitoring parameters detected in samples collected from the Cell 4 leachate collection system and leak detection system – 2025 (continued)

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[c]
Metals		
Barium (µg/L)	24.4	-
Fluoride (µg/L)	394	-
Iron (µg/L)	1,080	-
Lead (µg/L)	8.49	-
Magnesium (µg/L)	225,000	-
Manganese (µg/L)	43.2	-
Mercury (ng/L)	0.592	-
Nickel (µg/L)	89.7	-
Selenium (µg/L)	15.1	-
Thallium (µg/L)	7.81	-
Zinc (µg/L)	31.1	-
Dioxins/furans		
2,3,7,8-Tetrachlorodibenzofuran (pg/L)	2.16	-
Octachloro-dibenzo[b,e][1,4]dioxin (pg/L)	0.962	-
Other parameters		
Chemical oxygen demand (mg/L)	11.9	-
Dissolved solids (mg/L)	2,430	-
Radionuclides		
Technetium-99 (pCi/L)	37.1-51.1	-
Uranium (µg/L)	14.2-20	-
Uranium-233/234 (pCi/L)	8.23-13.2	-
Uranium-235/236 (pCi/L)	0.47-0.678	-
Uranium-238 (pCi/L)	4.66-6.62	-

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]If only one number is provided for the range, it is the only detection of the parameter. If a "-" is present, there were no detections of the parameter.
[c]The leak detection system was not sampled in 2025 (insufficient liquid).

The parameters listed in Table 3.5 for the leachate collection system will be included in the groundwater monitoring program in 2026. The radionuclides that were detected in leachate are already part of the groundwater monitoring program.

3.2.4 Cell 5 Leachate Monitoring Results

The Cell 5 leachate management system, which consists of the leachate collection system, redundant leachate collection system, leak detection system, and horizontal monitoring well, is sampled monthly, if liquid is present. During 2025, the Cell 5 leachate collection system had sufficient liquid available for sampling from January through June and August through November. Although liquid is generally not expected in the leak detection system during operation of the OSWDF, a sufficient amount of liquid for sampling was present in August and October of 2025. Samples collected in August and October included water captured in the containment tank since the previous samples were collected.

All parameters detected in Cell 5 leak detection system were compared to the detected parameters for Cell 5 leachate collection system during the same time frame in 2025. No correlation was present between the two sets of sampling data. For example, technetium-99 was detected in the Cell 5 leachate collection system in 2025 but was not detected in the leak detection system. Since technetium-99 is considered to be the highest concentration nuclide in the OSWDF and is highly mobile in water, the absence of technetium-99 shows the water in the leak detection system is not from Cell 5 leachate collection system. The liquid present in the leak detection system is liquid from the leak detection system drainage layer that is slowly being squeezed out as waste is placed in Cell 5.

During 2025, no liquid was present in the Cell 5 horizontal monitoring well. DOE will continue to monitor these systems as planned in accordance with the OSWDF PSVP.

Table 3.6 summarizes the monitoring parameters detected in samples collected from the Cell 5 leachate collection system (X780-VH05-V0532) and leak detection system (X780-VH05-T0501) during operational sampling in 2025.

Table 3.6. Monitoring parameters detected in samples collected from the Cell 5 leachate collection system and leak detection system – 2025

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[b]
Organics		
Methylene chloride (µg/L)	2.19	-
Trichloroethene (µg/L)	0.38	-
Metals		
Aluminum (µg/L)	2,590-12,200	396
Antimony (µg/L)	6.49	11
Arsenic (µg/L)	6.02	-
Barium (µg/L)	38.4-107	17.9
Cadmium (µg/L)	0.275	-
Chromium (µg/L)	3.95-18.5	-
Chromium, trivalent (µg/L)	3.95-18.5	-
Cobalt (µg/L)	10.3	1.12
Copper (µg/L)	35.7-55.4	411
Fluoride (µg/L)	501-560	315
Iron (µg/L)	23,800-27,900	9,610
Lead (µg/L)	33-63.5	76.7
Magnesium (µg/L)	32,000-59,900	201,000
Manganese (µg/L)	71.3-230	312
Mercury (ng/L)	0.733-27.5	1.25
Nickel (µg/L)	168-570	73.8
Selenium (µg/L)	-	9.11
Tin (µg/L)	-	6.25
Vanadium (µg/L)	6.35-44.8	-
Zinc (µg/L)	116-118	40.7
Dioxins/furans		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (pg/L)	84.6	-
Octachloro-dibenzo[b,e][1,4]dioxin (pg/L)	2,130-135,000	37
Chlorinated herbicides		-
2,4-D (µg/L)	0.515	-
Other parameters		
Chemical oxygen demand (mg/L)	31.2	9.89
Dissolved solids (mg/L)	529-824	2,390

Table 3.6. Monitoring parameters detected in samples collected from the Cell 5 leachate collection system and leak detection system – 2025 (continued)

Detected parameter (unit)[a]	Leachate collection system detection range[b]	Leak detection system detection range[b]
Radionuclides		
Technetium-99 (pCi/L)	23-74.7	-
Uranium (μg/L)	11.6-53.6	22.4-36.4
Uranium-233/234 (pCi/L)	7.34-33.3	9.2-15.7
Uranium-235/236 (pCi/L)	0.57-1.62	0.363-0.793
Uranium-238 (pCi/L)	3.8-17.8	7.47-12.1

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]If only one number is provided for the range, it is the only detection of the parameter. If a "-" is present, there were no detections of the parameter.

The parameters listed in Table 3.6 for the leachate collection system will be included in the groundwater monitoring program in 2026. The radionuclides that were detected in leachate are already part of the groundwater monitoring program.

3.3 ACTION LEAKAGE RATE

This section provides information about the action leakage rate, if any, in the OSWDF Project Area in 2025.

The action leakage rate defines the maximum design flow rate that the primary composite liner system can remove without the fluid head on the liner exceeding 1 ft. The action leakage rate for each OSWDF cell is 212 gallons/acre/day. The OSWDF O&M Plan provides additional information about the calculation for the action leakage rate and notification requirements if the action leakage rate is exceeded. The action leakage rate was not exceeded in 2025.

4. GROUNDWATER

The OSWDF groundwater monitoring program includes sampling of groundwater monitoring wells installed in the Berea Sandstone aquifer and the Cuyahoga, Sunbury, and Gallia Formations (where these units are present) and monitoring trench wells installed in the 720 Sandstone Layer (720 SSL). Groundwater seeps associated with the Cuyahoga Sandstone are also monitored as part of groundwater monitoring for the OSWDF. Section 4.1 discusses the geology of the OSWDF area, Section 4.2 discusses the monitoring program and results for groundwater monitoring wells, and Section 4.3 discusses the monitoring program for seeps.

4.1 GEOLOGY

The OSWDF is located in an upland area in the northeast section of PORTS that is predominantly outside the erosion valley of the ancestral Portsmouth River, which affects the majority of the industrialized, internal portion of the site. The Gallia and Minford Formations that predominate in the internal area of the site are only found in the north and west portions of the OSWDF Project Area, overlying either Sunbury Shale or Berea Sandstone.

The geology below the OSWDF is comprised of multiple layers (see Figure 4.1). The uppermost layer, called the regolith, consists of unconsolidated and poorly consolidated materials overlying bedrock. The following sections summarize information about the regolith and the uppermost bedrock formations that are relevant to the groundwater system below the OSWDF. The OSWDF PSVP and *Hydrogeologic Report for Study Area D (Proposed On-site Disposal Cell Location)* (DOE 2014a) provide additional information about the geology in the OSWDF Project Area.

4.1.1 Regolith

The regolith averages 6 ft thick in the OSWDF Project Area, with a minimum thickness of 1 ft and a maximum of 14.5 ft. The regolith in this area typically includes topsoil, soil, clay, silt, alluvium, weathered rock, and other geologic material deposited as cover. All or some of these material types can overlie the bedrock in both lowland and upland surfaces. The topography (i.e., hilly terrain) and stratigraphy (i.e., layering) within the OSWDF Project Area are responsible for the morphology of the streams and the existence of seeps observed within the area. Ephemeral and intermittent streams result from the conveyance of surface water from the higher elevations to the lower elevations of the area.

Water often occupies pore spaces in the regolith. Prior to construction of the OSWDF, numerous ephemeral seeps were identified in the OSWDF Project Area. These seeps resulted from surface water infiltrating the soil and being intercepted by the weathered bedrock, where migration occurred from the bedrock to the ground surface. The initial construction of the OSWDF significantly altered the topography in the area and reduced the recharge area, minimizing and/or eliminating the observed streams and ephemeral seeps in the OSWDF Project Area. Ephemeral seeps that remain after construction of the OSWDF may be present in the perimeter areas around the OSWDF, but are not considered a significant component of the groundwater system beneath the OSWDF. Section 4.3 describes the monitoring program for seeps identified in the OSWDF Project Area.

4.1.2 Cuyahoga Formation

The Cuyahoga Formation is located immediately below the regolith and averages 80 ft thick between the top of the Cuyahoga Formation and the top of the Sunbury Shale. In some areas, borings show the Cuyahoga has a thickness of slightly over 100 ft without encountering the Sunbury. The Cuyahoga Formation underlies the entire OSWDF footprint, but is not present under the support areas located west and northwest of the facility. The Cuyahoga Formation in the OSWDF Project Area is predominantly shale interbedded with siltstones and sandstones, and the interbeds exhibit stratigraphic variability

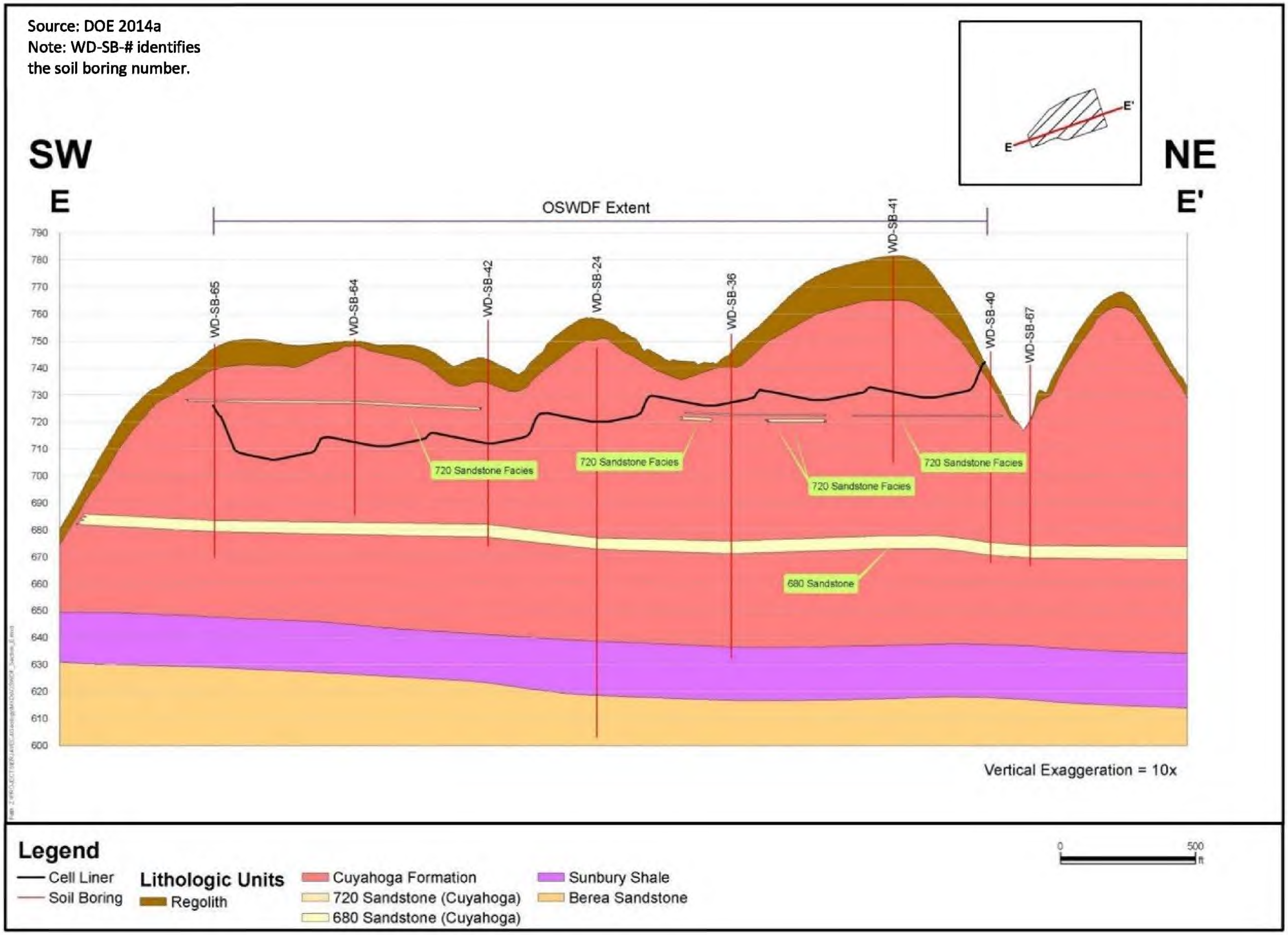

Figure 4.1. Geology in the OSWDF.

throughout the formation. The Cuyahoga Formation was deposited in deltaic, fluvial, and marginal marine environments, which explains the variable nature of the stratigraphy.

The Cuyahoga Formation contains a zone consisting of several layers of interbedded and discontinuous sandstone lenses at an elevation of around 720 ft above mean sea level (AMSL) (referred to as the 720 SSL) and a deeper continuous sandstone layer at an elevation of around 680 ft (referred to as the 680-ft Sandstone Layer [680 SSL]). In addition, there are some generally discontinuous sandstone layers both above and below the 720 SSL; these are more common in the upper section of the Cuyahoga Formation than in the lower section.

As defined by Ohio EPA, the 680 SSL and the 720 SSL are considered significant zones of saturation, but they are not classified as aquifers according to Ohio EPA's definition of an aquifer in OAC 3745-27-01(A)(5). Monitoring wells installed in the Cuyahoga are installed in the 680 SSL and are designated by a "C" at the end of the monitoring well name (e.g., X780-C02-05C).

4.1.3 Sunbury Shale

The Sunbury Shale averages 20 ft thick in the OSWDF Project Area where the formation is not eroded. The Sunbury is an aquitard, and it generally prevents water in the Cuyahoga Formation from reaching the Berea Sandstone. The Sunbury is a laminated to thin-bedded, organic-rich, fissile, silty black shale that was formed in an anoxic marine environment. The formation often has a petroliferous odor. Pyrite (an iron sulfide) is a common accessory constituent, and is more common near the base of the formation where a layer up to 3 in. thick is present. Higher concentrations of other metals such as cadmium, selenium, arsenic, nickel, and uranium, typically in trace concentrations in the rest of the Sunbury, are more associated with this base layer. The Sunbury layer underlies the entire OSWDF footprint but is not present under the support areas located west and northwest of the facility.

Monitoring wells installed in the Sunbury are installed in the interface of the Sunbury and Cuyahoga Formations and are designated by a "S" or "SA" at the end of the monitoring well name (e.g., X780-C02-04S and X780-C09-20SA). Little or no water is expected to be present in the Sunbury monitoring wells.

4.1.4 Berea Sandstone

The Berea Sandstone underlies the entire OSWDF Project Area. The lithology of the Berea Sandstone is a fine- to medium-grained sandstone formed in deltas that were located along shallow seas present in Ohio during the Late Devonian period. The formation has well-developed joint sets and fractures, and has both primary porosity and permeability and secondary porosity related to the joints and fractures.

The Berea Sandstone occurs at an average elevation of approximately 625 ft AMSL. The upper 10-ft to 15-ft layer of the Berea Sandstone, which has a total thickness of approximately 35 ft, consists of a massive (and generally homogeneous) sandstone bed. The 20-ft-thick Sunbury Shale is located directly above the Berea Sandstone, separating the Berea from the Cuyahoga.

The Berea Sandstone is under confined (artesian) conditions beneath the OSWDF Project Area and represents the uppermost aquifer. Monitoring wells installed in the Berea are designated by a "B" or "BA" at the end of the monitoring well name (e.g., X737-05B and X780-C06-12BA).

4.1.5 Minford and Gallia Formations

The Gallia and Minford Formations that predominate in the internal area of PORTS are only found in the north and west portions of the OSWDF Project Area, overlying either Sunbury Shale or Berea Sandstone. The Cuyahoga Formation is absent in these areas.

The Minford member is a lacustrine deposit consisting of two units with a gradational contact: the upper unit is predominantly silty clay with some very fine-grained sand and the lower silt unit is composed of clayey silt and very fine to fine-grained sand. Currently no groundwater monitoring wells are installed in the Minford Formation in the OSWDF Project Area. Minford monitoring wells may be installed in the future on the western edge of the project area near the IMTA. Monitoring wells installed in the Minford are designated by an "M" at the end of the monitoring well name (e.g., X780-C22-42M).

The Gallia Formation is a fluvial deposit underlying the Minford at a depth of approximately 25 ft below ground surface. The Gallia typically consists of a red-brown, clayey, medium to coarse sand and gravel. It overlies bedrock and has a mean thickness of slightly greater than 3 ft. The Gallia is usually poorly-sorted, often containing silt and clay as well as numerous pebble to cobble-sized rock fragments. The coarser sands and gravels usually occur near the base of the unit and were deposited as point bar and/or channel lag deposits. The contact between the Minford and Gallia members varies from gradational to sharp.

Gallia monitoring wells are present on the west side of the OSWDF Project Area. Monitoring wells installed in the Gallia are designated by a "G" at the end of the monitoring well name (e.g., X737-06G).

4.2 GROUNDWATER MONITORING

Groundwater monitoring is designed to ensure that operation of the OSWDF does not impact groundwater beneath the area. Groundwater monitoring wells are routinely sampled to confirm that releases have not occurred, and to detect, characterize, and respond to releases if necessary.

4.2.1 Groundwater Monitoring Program

The Berea Sandstone is the uppermost aquifer underlying the OSWDF Project Area. A monitoring trench constructed around the south and southeastern corner of the OSWDF monitors the remaining 720 SSL outside the OSWDF impacted material disposal limit. Additional monitoring wells monitor sandstone in the Cuyahoga Formation and the interface of the Sunbury and Cuyahoga Formations, as well as the Minford and Gallia Formations (where these units are present). Section 4.1 summarizes the geology of the OSWDF Project Area.

Figure 4.2 shows the OSWDF groundwater monitoring wells that were in use for operational sampling in 2025. Table 4.1 lists these OSWDF monitoring wells with the associated geologic formation, associated OSWDF cell, and function (upgradient or downgradient). For example, monitoring well X780-C01-01B is installed in the Berea Sandstone and provides upgradient groundwater data for Cells 3, 5, 6, and 8.

Table B-2 in Appendix B lists the specific parameters monitored as part of the OSWDF groundwater monitoring program in 2025. In general, samples were collected as follows:

- Monthly for field parameters (pH and specific conductance), PCBs, and chlorinated organics as required by regulations for TSCA landfills.

- Quarterly for the indicator parameters that comprise the detection monitoring program required by the applicable groundwater ARAR, OAC 3745-54-98.

- Semiannually for radionuclides.

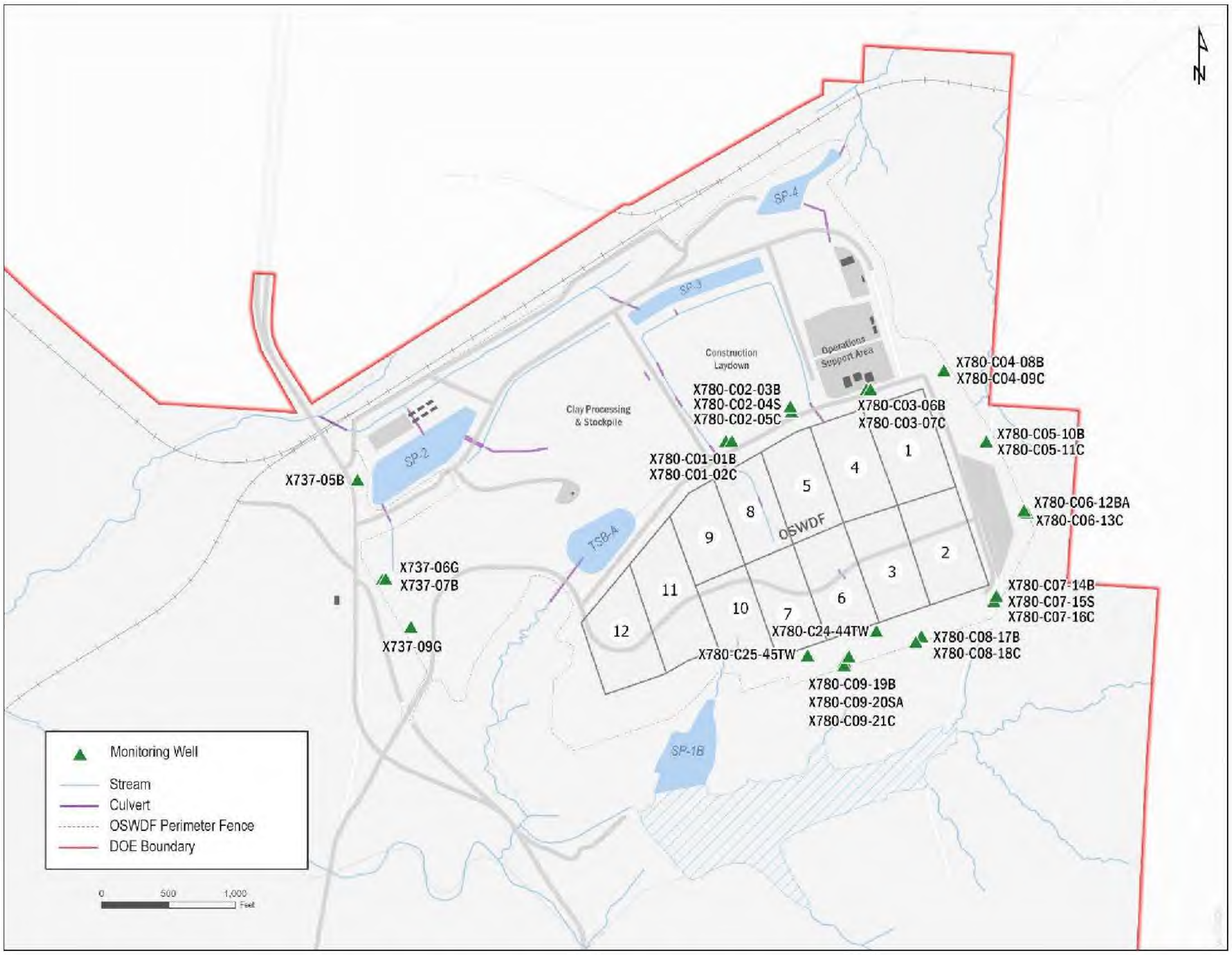

Figure 4.2. OSWDF groundwater monitoring wells in 2025.

- Semiannually for parameters detected in leachate collection system in 2024: metals (aluminum, arsenic, barium, beryllium, cadmium, chromium, chromium (trivalent), cobalt, copper, lead, magnesium, manganese, mercury, nickel, selenium, thallium, tin, vanadium, zinc), dioxins/furans (octachloro-dibenzo[b,e][1,4]dioxin), and other parameters (chemical oxygen demand, dissolved solids, fluoride).

During operation of the OSWDF, any parameters detected in leachate samples from the leachate collection system that are not already part of the groundwater monitoring program will be added to the groundwater monitoring program for the following year. In 2024, metals, volatile organics, dioxins/furans, and other parameters were detected in the leachate collection system. These parameters were added to the groundwater monitoring for 2025. Section 3.2 discusses the parameters detected in samples collected from leachate collection system in 2025 that will be added to the groundwater monitoring program in 2026.

Water levels are also measured semiannually for each OSWDF monitoring well (or the level is recorded as dry if insufficient water is present in the monitoring well for measurement). Water level measurements for Berea monitoring wells are used to prepare a potentiometric surface map for the Berea Formation in the OSWDF Project Area.

Table 4.1. OSWDF groundwater monitoring wells

Monitoring well	Formation	Purpose: upgradient/downgradient/sidegradient and cell numbers[a]
X737-05B	Berea Sandstone	Downgradient for Sedimentation and Detention Pond 2
X737-06G	Gallia	Limit of Gallia[b]
X737-07B	Berea Sandstone	Upgradient for IMTA
X737-09G	Gallia	Limit of Gallia[b]
X780-C01-01B	Berea Sandstone	Upgradient for Cells 3, 5, 6, 8
X780-C01-02C	680 Sandstone	Upgradient for Cells 1 to 12
X780-C02-03B	Berea Sandstone	Upgradient for Cells 1 to 4
X780-C02-04S	Sunbury/Cuyahoga	Upgradient for Cells 1 to 4
X780-C02-05C	680 Sandstone	Upgradient for Cells 1 to 8
X780-C03-06B	Berea Sandstone	Upgradient for Cell 1
X780-C03-07C	680 Sandstone	Upgradient for Cell 1
X780-C04-08B	Berea Sandstone	Sidegradient
X780-C04-09C	680 Sandstone	Downgradient for Cells 1, 4, 5
X780-C05-10B	Berea Sandstone	Downgradient for Cells 1 and 4
X780-C05-11C	680 Sandstone	Downgradient for Cells 1 to 6
X780-C06-12BA	Berea Sandstone	Downgradient for Cells 1 to 6, 8
X780-C06-13C	680 Sandstone	Downgradient for Cells 1 to 6
X780-C07-14B	Berea Sandstone	Downgradient for Cells 1 to 9
X780-C07-15S	Sunbury/Cuyahoga	Downgradient for Cells 1 to 9
X780-C07-16C	680 Sandstone	Downgradient for Cells 1 to 6, 8
X780-C08-17B	Berea Sandstone	Downgradient for Cells 3, 5 to 11
X780-C08-18C	680 Sandstone	Downgradient for Cells 3, 5 to 9
X780-C09-19B	Berea Sandstone	Downgradient for Cells 7 to 11
X780-C09-20SA	Sunbury/Cuyahoga	Downgradient for Cells 7 to 11
X780-C09-21C	680 Sandstone	Downgradient for Cells 5 to 10
X780-C24-44TW	720 Sandstone	Downgradient for Cells 2, 3, 6, and 7
X780-C25-45TW	720 Sandstone	Downgradient for Cells 7 and 10

[a]The purpose for any individual monitoring well is subject to change based on groundwater conditions (flow direction, etc.) as construction of the OSWDF proceeds.
[b]These existing monitoring wells are installed on the edge of the Gallia Formation. The Gallia is not present in the rest of the OSWDF Project Area.

Per the ARARs identified in the OSWDF PSVP, concentrations of hazardous constituents identified in OAC 3745-54-93 that are detected in the Berea monitoring wells are evaluated against maximum concentration limits or action levels specified in OAC 3745-54-94 or alternative limits specified in the Preoperational Data Summary (Davis November 15, 2022) (see Table C-1 in Appendix C).

Parameters detected in Berea and non-Berea monitoring wells are evaluated against the administrative levels determined during preoperational sampling and provided in the Preoperational Data Summary (Davis November 15, 2022). Table C-1 in Appendix C lists the administrative levels for groundwater monitoring wells. Administrative levels are set at the highest detection of a parameter during preoperational sampling. If the parameter was not detected, the administrative level is set at any detection of the parameter. In the case that an administrative level is below the maximum concentration limit specified in OAC 3745-54-94, then the parameter is evaluated against the OAC concentration limit. These administrative levels are intended to allow early identification and correction of conditions that could impact long-term performance of the OSWDF and/or cause performance standards for protectiveness to be exceeded.

4.2.2 Groundwater Monitoring Results

This section provides a discussion of results for groundwater monitoring wells and trench wells sampled in 2025. Because of the differences in requirements for Berea monitoring wells, non-Berea monitoring wells (Gallia, Cuyahoga, or Sunbury) and trench wells (720 Sandstone), results are discussed separately for each monitoring well grouping. Groundwater monitoring data for 2025 are available at pegasis.ports.pppo.gov.

4.2.2.1 Berea monitoring wells

Data collected for the Berea groundwater monitoring wells are evaluated as follows:

- Groundwater elevations are measured semiannually to prepare a potentiometric surface map for the Berea aquifer in the OSWDF Project Area.
- Groundwater elevations measured for each sampling event are evaluated for unexpected changes as described in the OSWDF PSVP.
- A statistical evaluation of selected indicator parameters is completed for compliance with the RCRA detection monitoring program.
- Per the ARARs identified in the OSWDF PSVP, data for hazardous constituents identified in OAC 3745-54-93 are evaluated against concentration limits specified in OAC 3745-54-94 or alternative limits specified in the Preoperational Data Summary (Davis November 15, 2022).
- Monitoring parameters are evaluated against the administrative levels determined during preoperational sampling as specified in the Preoperational Data Summary (Davis November 15, 2022).

The following sections describe the results of each of these evaluations.

Groundwater elevations. Depth to water is measured in the Berea monitoring wells semiannually during the site-wide survey of groundwater elevations that is used to prepare the site-wide potentiometric map. Figure 4.3 shows the semiannual potentiometric maps for the Berea aquifer based on the groundwater elevations collected in January and July of 2025. Groundwater flow is to the east-southeast and has remained consistent with conditions prior to OSWDF construction. The hydraulic conductivity of the Berea sandstone in the OSWDF area is 0.10 feet per day. The linear velocity of groundwater at the OSWDF was calculated to be 0.01 feet per day by using the Darcy equation.

Groundwater elevations measured at monitoring well X780-C08-17B were not used to prepare the potentiometric surface maps. The groundwater elevations measured in this monitoring well previously did not agree with the elevations measured at the other Berea monitoring wells. Groundwater elevations in the Berea monitoring wells typically vary by about 1 ft between when the monitoring wells were first sampled in 2019 and the end of 2025. The groundwater elevation in monitoring well X780-C08-17B has changed by more than 20 ft: from 652.88 ft in July 2019 to 630.29 ft in December 2025. In 2024 and 2025 the groundwater elevations for X780-C08-17B have started to align with the other Berea wells in the area. However, the geochemistry of this monitoring well is still significantly different from the other Berea monitoring wells. A new monitoring well was installed in early 2023 through a field change notice (FBP-ER-OSDC-WD-PLN-0094-R9-02) to the OSWDF PSVP. The new well, X780-C08-17BA, was evaluated and has similar characteristics as X780-C08-17B. In 2024, Ohio EPA and DOE discussed that X780-C08-17B and X780-C08-17BA are thought to be installed in a confined aquifer. It was decided to

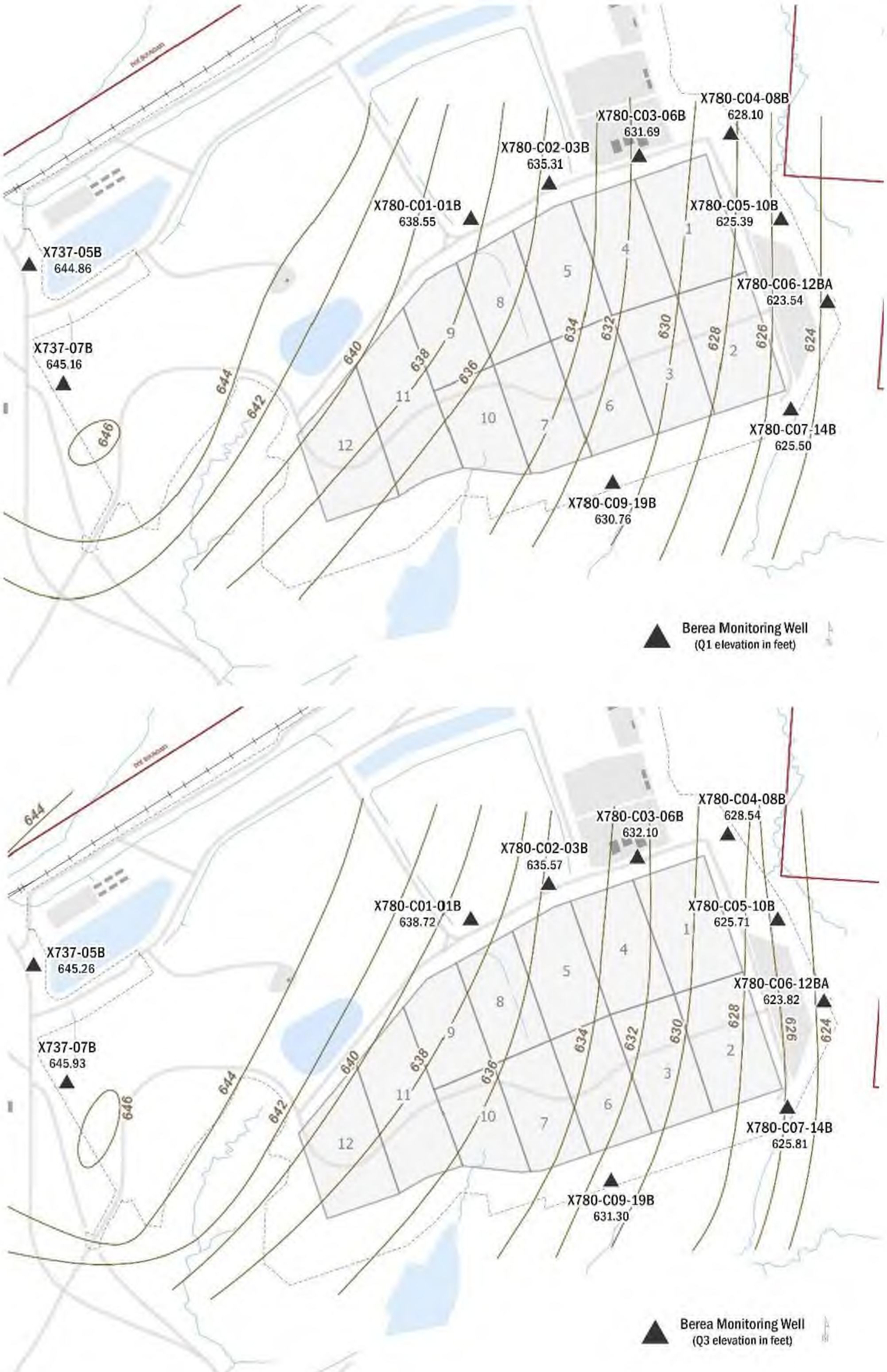

Figure 4.3. 2025 Berea Formation potentiometric surface maps.

continue monitoring both wells for a 12-month period then reevaluate with the new data. At the end of this period in 2025 conditions in these wells still reflected a confined aquifer. Since both wells are good wells, it was decided that both wells will be sampled and presented in the annual report starting in 2026. No data for X780-C08-17BA is included in this report but will be in future reports.

The OSWDF PSVP also states that the quantity of water in each groundwater monitoring well will be monitored for unexpected changes. Table 4.2 shows the groundwater elevation based on the depth to water measured during each sampling event from January through December of 2025.

Table 4.2. Groundwater elevations (ft) at Berea groundwater monitoring wells – 2025

Month	Upgradient or sidegradient monitoring wells					
	X737-05B	X737-07B	X780-C01-01B	X780-C02-03B	X780-C03-06B	X780-C04-08B
January	644.68	644.80	638.45	635.41	631.86	628.45
February	645.25	645.67	638.38	635.22	631.70	628.09
March	644.98	645.58	638.91	635.66	632.20	628.62
April	**646.16**	646.54	638.92	635.77	631.98	628.36
May	645.54	646.29	638.64	635.52	632.22	628.62
June	645.38	646.12	638.72	635.63	632.16	628.36
July	645.28	645.88	638.71	635.61	632.04	627.46
August	644.87	645.61	638.66	635.55	632.05	628.51
September	644.70	644.85	638.48	635.45	631.92	628.32
October	644.43	644.75	638.54	635.44	632.05	628.43
November	644.43	644.75	638.61	635.58	631.90	628.27
December	644.45	644.78	638.46	635.40	631.93	628.34

Month	Downgradient monitoring wells				
	X780-C05-10B	X780-C06-12BA	X780-C07-14B	X780-C08-17B	X780-C09-19B
January	625.63	623.31	625.58	630.25	630.54
February	625.71	623.83	625.48	629.83	630.78
March	625.88	623.72	625.61	**628.34**[a]	631.27
April	625.46	624.08	626.07	**629.50**[a]	631.37
May	625.90	624.04	625.88	629.77	631.38
June	625.50	623.89	625.89	629.83	631.40
July	625.68	623.83	625.80	630.17	631.35
August	625.66	623.95	625.88	630.18	631.41
September	625.54	623.66	625.65	630.13	631.18
October	625.66	623.65	625.50	**628.98**[a]	631.07
November	625.78	623.90	625.71	629.20	631.20
December	626.18	624.33	625.80	630.29	631.25

[a]Investigated as described in the following paragraphs.

Groundwater elevations measured in Berea monitoring wells during operational sampling in 2025 varied by less than 1 ft between months in each monitoring well except X780-C08-17B and X737-05B. As discussed above, the monthly groundwater elevations for X780-C08-17B have been known to vary by more than 1 ft from the time the well was installed.

The groundwater elevation reported in April for monitoring well X737-05B was investigated because the change compared to the previous and/or following months were more than 1 ft. Groundwater sampling logs were checked for potential data entry errors, and no errors were identified.

RCRA detection monitoring. As described in the ARARs in the OSWDF PSVP for groundwater, detection monitoring of the uppermost aquifer (the Berea aquifer in the OSWDF Project Area) is completed per OAC 3745-54-97 to demonstrate that contaminants have not migrated from the OSWDF Project Area to the aquifer, and to detect potential releases associated with OSWDF operations to the aquifer, if a release should occur. Groundwater quality indicators (alkalinity, ammonia, calcium, chloride, iron, nitrate/nitrite, potassium, sodium, and sulfate) are evaluated statistically after each quarterly sampling event in accordance with OAC 3745-54-97(D) and as described in the OSWDF PSVP. The downgradient Berea monitoring wells evaluated in 2025 are X780-C05-10B, X780-C06-12BA, X780-C07-14B, X780-C08-17B, and X780-C09-19B.

Two intra-well control limits, called 1) the Shewhart control limit, and 2) the cumulative summation (CUSUM) control limit, were calculated using historical baseline data for each monitoring well. The Shewhart control limit is sensitive to rapid increases in the concentrations of indicator parameters whereas the CUSUM control chart limit is sensitive to gradual increases in indicator parameters. If an indicator parameter is not detected in more than 50% of the baseline data samples, an upper prediction limit is used to evaluate data instead of the Shewhart and CUSUM control limits. Ohio EPA is notified when the Shewhart control limit for any of the indicator parameters is exceeded at any of the downgradient Berea monitoring wells in two consecutive sampling events. Exceedances of the CUSUM control limits do not require Ohio EPA notification.

Appendix D provides a summary of the statistical evaluations completed for the OSWDF Berea monitoring wells in 2025.

The Shewhart control limit was exceeded in three monitoring wells in 2025, as listed below.

- X780-C05-10B: sodium (first quarter)
- X780-C07-14B: sodium (first quarter)
- X780-C08-17B: iron (second quarter).

As stated in the OSWDF PSVP, the consecutive exceedances of an analyte require a notification to Ohio EPA. No notifications were required in 2025.

The Shewart control limits for iron in monitoring well X780-C08-17B were also exceeded in the second, third and fourth quarters in 2023 and in all four quarters in 2024. Ohio EPA and DOE discussed the continuing statistical exceedances in groundwater monitoring well X780-C08-17B in 2024. DOE proposed to postpone the formal statistical notification for X780-C08-17B for a 12-month period. At the end of the 12-month period DOE will reevaluate the data and discuss options with Ohio EPA. This path forward was approved by Ohio EPA in September 2024 (Stutler September 27, 2024). Plans are in progress to discuss the X780-C08-17B data from this 12-month period.

An upper prediction limit is used to evaluate nitrate/nitrite and sulfate in several monitoring wells because nitrate/nitrite and sulfate were not detected in more than 50% of the baseline samples. There were no exceedances of upper prediction limits in 2025.

CUSUM control limits were exceeded in two monitoring wells in 2025. As stated in the OSWDF PSVP, Ohio EPA does not require notification for these exceedances. CUSUM exceedances are summarized below:

- X780-C07-14B: sodium (first quarter)
- X780-C08-17B: iron (first, second, third, and fourth quarters).

Although the CUSUM control limits were exceeded, the levels do not indicate any issues to be addressed in the operation of the OSWDF.

Evaluation of concentration limits specified in OAC 3745-54-94 and administrative levels. Per the ARARs identified in the OSWDF PSVP, monitoring parameters detected in the Berea monitoring wells are evaluated against the concentration limits specified in OAC 3745-54-94, if alternative limits are below the specified concentration limits, or alternative limits specified in the Preoperational Data Summary (Davis November 15, 2022). Parameters detected in the Berea monitoring wells are also evaluated against the administrative levels determined during preoperational sampling described in the Preoperational Data Summary (Davis November 15, 2022) with the exception of the indicator parameters that are statistically evaluated as part of the detection monitoring program (discussed previously in this section). Administrative levels are established below regulatory thresholds to allow early identification and correction to conditions that could impact long-term performance of the OSWDF or lead to exceedance of performance standards. Results that exceed these administrative levels in two consecutive sampling events prompt further evaluation. Table C-1 in Appendix C lists the OAC concentration limits and the administrative levels established for Berea monitoring wells in the Preoperational Data Summary (Davis November 15, 2022).

In 2025, Berea groundwater monitoring wells were sampled for PCBs, chlorinated organics, metals, dioxins/furans, indicator parameters, and radionuclides. All samples were collected for X780-C07-14B, however due to a shipping error, the VOC sample for October was not analyzed.

Table 4.3 summarizes the monitoring parameters detected at the Berea groundwater monitoring wells during operational sampling in 2025 and the associated OAC concentration limit and administrative level for each detected parameter.

Table 4.3. Monitoring parameters detected at Berea groundwater monitoring wells – 2025

Detected parameter (unit)[a]	OAC concentration limit[b]	Administrative level[c]	Detection range[d]
Polychlorinated biphenyls			
PCBs (µg/L)	0.5	0.96	0.1-**1.43**
Chlorinated organics			
2,4,5-T (µg/L)	-	detect	**0.141**
Chloroform (µg/L)	-	detect	**0.77**
Chloromethane (µg/L)		detect	**0.47-1.44**
Delta-BHC (µg/L)	-	detect	**0.0215**
Endrin aldehyde (µg/L)	-	detect	0.00719
Heptachlor epoxide (µg/L)	0.2	detect	0.0392
Methylene chloride (µg/L)	5	3.09	0.51-**18.3**
Methoxychlor (µg/L)	40	detect	**0.0836-0.141**
Silvex (µg/L)	50	detect	**0.199**

Table 4.3. Monitoring parameters detected at Berea groundwater monitoring wells – 2025 (continued)

Detected parameter (unit)[a]	OAC concentration limit[b]	Administrative level[c]	Detection range[d]
Metals			
Aluminum (µg/L)	-	2,760	80.3
Arsenic (µg/L)	10	87.6	6.27-13.4
Barium (µg/L)	2,000	239	14.4-**240**
Chromium (µg/L)	100	47.1	1.08-31.4
Chromium, trivalent (µg/L)	-	47.1	1.07-31.4
Cobalt (µg/L)	-	13.7	1.24-1.69
Iron (µg/L)	85.1		33.9-11,100
Lead (µg/L)	15	11.1	5.11-8.92
Magnesium (µg/L)	-	47,200	1,180-**464,000**
Manganese (µg/L)	-	562	2.56-537
Mercury (µg/L)	2	1	0.000216-0.00837
Nickel (µg/L)	-	46.9	1.51-3.95
Selenium (µg/L)	50	131	6.47-35.7
Thallium (µg/L)	2	11.1	7.31
Tin (µg/L)	-	detect	**4.08-22**
Zinc (µg/L)	-	689	3.69-28.1
Other parameters			
Chemical oxygen demand (mg/L)	-	280	9.28-74.2
Dissolved solids (mg/L)	-	4,820	192-4,790
Fluoride (µg/L)	-	900	63.4-841
Radionuclides			
Thorium-230 (pCi/L)	-	0.46	**4.3**
Uranium (µg/L)	30	6.25	0.549-2.32
Uranium-233/234 (pCi/L)	-	6.36	0.284-2.12
Uranium-238 (pCi/L)	-	2.08	0.177-0.754

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]Concentration limit provided in OAC 3745-54-94.
[c]Administrative level provided in the Preoperational Data Summary (Davis November 15, 2022). "Detect" indicates that the administrative level is any detection of the parameter.
[d]If only one number is provided for the range, it is the only detection of the parameter. Detections in bold type exceed the administrative level.

Chloroform, chloromethane, and methylene chloride were detected above the administrative levels in 2025. Each of the parameters were detected at numerous wells and are considered to be sample contaminants. The administrative levels for each of these are any detection of the parameter.

Several metals were detected above administrative levels during the semiannual sampling in 2025. Barium was detected above the administrative level of 239 µg/L in the second quarter of 2025 at X780-C01-01B (240 µg/L). Magnesium was detected at X780-C08-17B in the second and fourth quarters at 464,000 and 431,000 µg/L, respectively, which exceeded the administrative level of 47,200 µg/L. Tin was detected above the administrative level in the second and fourth quarters. Two locations, X737-05B and X737-07B, were detected in both quarters at levels ranging from 7.58 to 22 µg/L. Each of the other locations had a singular detection during either the second or fourth quarter, with results ranging from 4.08 to 11.2 µg/L. The administrative level for tin is any detection of the analyte.

Several pesticides (delta-BHC, endrin aldehyde, heptachlor, and methoxychlor) and herbicides (2,4,5-T and silvex) were detected in 2025. All were detected only once except methoxychlor which was detected once at two different locations. The administrative level for all these analytes is any detection.

PCBs were detected above the administrative level of 0.96 µg/L at X780-C09-19B in July 2025 at 1.43 µg/L. PCBs were not detected above the administrative level in any of the other monthly samples.

In the third quarter, thorium-230 was detected at 4.3 pCi/L at monitoring well X780-C09-19B, which exceeds the administrative level (0.46 pCi/L). This exceedance was the only detection in Berea wells during 2025.

The administrative level exceedances are infrequent and do not indicate any issues to be addressed in the operation of the OSWDF. Groundwater monitoring data for 2025 are available at pegasis.ports.pppo.gov.

4.2.2.2 Cuyahoga/Gallia/Sunbury (non-Berea) monitoring wells

Data collected for the Cuyahoga, Gallia, and Sunbury (non-Berea) groundwater monitoring wells are evaluated as follows:

- Groundwater elevations are evaluated for unexpected changes.
- Monitoring parameters are evaluated against the administrative levels determined during preoperational sampling as specified in the Preoperational Data Summary (Davis November 15, 2022).

The following sections describe the results of each of these evaluations. Note that no samples were collected in 2025 from Sunbury/Cuyahoga monitoring wells X780-C02-04S, X780-C07-15S, and X780-C09-20SA due to insufficient water in the monitoring wells. Therefore, no sampling of the Sunbury/Cuyahoga monitoring wells could be completed.

Groundwater elevations. The OSWDF PSVP states that the quantity of water in each groundwater monitoring well will be monitored for unexpected changes. Table 4.4 shows the groundwater elevation based on the depth to water measured during each sampling event in 2025.

Table 4.4. Groundwater elevations (ft) at non-Berea groundwater monitoring wells – 2025

Month	Upgradient monitoring wells					
	X737-06G	X737-09G	X780-C01-02C	X780-C02-05C	X780-C03-07C	X780-C04-09C
January	644.93	647.99	689.38	690.07	677.78	688.39
February	645.85	648.47	689.14	689.81	677.21	688.21
March	645.76	648.70	689.78	690.45	676.23	**691.74**[a]
April	646.69	648.56	689.87	690.69	676.15	688.78
May	646.48	648.95	690.11	690.81	677.10	689.33
June	646.27	648.80	690.22	690.97	676.68	688.93
July	646.04	648.85	689.97	690.61	676.15	688.69
August	645.71	648.96	689.55	690.39	675.81	688.55
September	645.00	647.69	689.02	689.59	675.17	687.34
October	644.84	648.28	688.66	689.34	675.22	687.73
November	644.90	648.37	688.68	689.67	**676.47**[a]	688.01
December	644.76	648.09	688.55	689.82	675.96	688.16

Table 4.4. Groundwater elevations (ft) at non-Berea groundwater monitoring wells – 2025 (continued)

Month	Downgradient or sidegradient monitoring wells				
	X780-C05-11C	X780-C06-13C	X780-C07-16C	X780-C08-18C	X780-C09-21C
January	678.72	679.78	685.03	686.65	684.11
February	679.57	678.45	684.83	685.62	682.45
March	679.53	679.73	684.90	685.26	683.20
April	680.69	679.89	685.58	686.48	683.26
May	680.43	679.88	685.72	686.59	684.12
June	679.42	680.28	685.52	695.88	682.78
July	678.92	680.05	685.20	685.92	682.75
August	678.45	679.23	684.56	685.58	**680.02**[a]
September	677.73	679.45	684.17	684.95	681.02
October	677.77	679.13	683.59	685.02	681.61
November	677.77	679.41	684.06	685.10	681.87
December	678.44	679.14	683.95	685.33	**678.71**[a]

[a]Investigated as described in the following paragraphs.

In the Gallia and most of the Cuyahoga monitoring wells, groundwater elevations measured during operational sampling in 2025 varied by less than 1 to 2 ft in each monitoring well. However, monthly variations were investigated in three monitoring wells: X780-C03-07C, X780-C04-09C, and X780-C09-21C.

The groundwater elevation reported in November for monitoring well X780-C03-07C and March for monitoring well X780-C04-09C was investigated because the change compared to the previous and/or following months were more than 2 ft. Groundwater sampling logs were checked for potential data entry errors, and no errors were identified.

The groundwater elevation was also investigated for monitoring well X780-C09-21C in August and December. This monitoring well shows a wider variation in month-to-month groundwater elevation measurements than the other Cuyahoga monitoring wells since the monitoring well was first sampled in 2019. This pattern of wider variations in groundwater elevations appears to be typical for this monitoring well. The groundwater elevation for December 2025 was compared to elevations measured in January and February 2026, which showed the same variation.

Evaluation of administrative levels. Administrative levels are established below regulatory thresholds to allow early identification and correction to conditions that could impact long-term performance of the OSWDF or lead to exceedance of performance standards. Results that exceed these administrative levels in two consecutive sampling events prompt further evaluation.

In 2025, samples from non-Berea groundwater monitoring wells were analyzed for PCBs, chlorinated organics, metals, dioxins/furans, indicator parameters, and radionuclides, if sufficient water was available in the monitoring well. No samples were collected in 2025 from Sunbury/Cuyahoga monitoring wells X780-C02-04S, X780-C07-15S, and X780-C09-20SA due to lack of water in these wells.

All samples were collected for X780-C09-21C, however in August the PCB/pesticide sample was not analyzed due to laboratory error. Monitoring well X780-C03-07C produces very little water for sampling. Although samples were collected from the well in 2025, for most sampling events there was not enough water in the well to collect samples for all monitoring parameters. Samples that could not be collected due to lack of water are listed below:

- January: semi-volatile organic compounds (SVOCs), pesticides/PCBs, radionuclides
- April: dioxins/furans, chemical oxygen demand, dissolved solids, fluoride, mercury
- May: pesticides/PCBs
- July: pesticides/PCBs, herbicides, SVOCs, radionuclides
- August: pesticides/PCBs, herbicides, SVOCs
- September: pesticides/PCBs
- October: dioxins/furans, herbicides, pesticides/PCBs, chemical oxygen demand, dissolved solids, fluoride, mercury
- November: herbicides, pesticides/PCBs
- December: pesticides/PCBs

Monitoring results were evaluated against the administrative levels established in the Preoperational Data Summary (Davis November 15, 2022) and summarized in Table C-1 in Appendix C.

Table 4.5 summarizes the monitoring parameters detected at the non-Berea groundwater monitoring wells during operational sampling in 2025 and the associated administrative level for each detected parameter. The administrative levels for the detected parameters were not exceeded in two consecutive sampling events from the OSWDF non-Berea monitoring wells in 2025 with the exception of tin at monitoring well X737-06G. These administrative level exceedances do not indicate any issues at the OSWDF.

Table 4.5. Monitoring parameters detected at non-Berea groundwater monitoring wells – 2025

Detected parameter (unit)[a]	**Administrative level**[b]	**Detection range**[c]
Polychlorinated biphenyls		
PCBs (µg/L)	detect	**0.0825-0.494**
Chlorinated organics		
2,4-D (µg/L)	detect	**0.206-0.219**
Alpha-BHC (µg/L)	detect	**0.00797**
Chloromethane (µg/L)	detect	**1.85**
Endrin aldehyde (µg/L)	detect	**0.00993-0.0326**
Heptachlor epoxide (µg/L)	detect	**0.0133-0.0452**
Methylene chloride (µg/L)	detect	**0.57-15.2**
Methoxychlor (µg/L)	detect	**0.0892**
Metals		
Barium (µg/L)	267	10-132
Chromium (µg/L)	58.1	1.49-13.5
Chromium, trivalent (µg/L)	58.1	1.49-13.5
Cobalt (µg/L)	40.8	1.18-3.6
Copper (µg/L)	73.9	4.13-7.26
Lead (µg/L)	42.5	3.36-13.5
Magnesium (µg/L)	1,290,000	10,000-1,250,000
Manganese (µg/L)	1,380	2.04-734
Mercury (µg/L)	0.0546	0.000261-0.00191
Nickel (µg/L)	154	1.77-39.6
Selenium (µg/L)	488	8.9-314
Tin (µg/L)	11	2.62-64.8
Zinc (µg/L)	3,620	3.54-60.1

Table 4.5. Monitoring parameters detected at non-Berea groundwater monitoring wells – 2025 (continued)

Detected parameter (unit)[a]	Administrative level[b]	Detection range[c]
Indicator parameters		
Alkalinity (mg/L)	1,010	98.3-919
Ammonia (mg/L)	5.45	0.019-2.34
Calcium (mg/L)	404	19.7-417
Chloride (mg/L)	95.3	1.48-89.7
Iron (mg/L)	85.1	0.0321-7.64
Nitrate/nitrite (mg/L)	5.54	0.0428-5.88
Potassium (mg/L)	44.3	1.33-35
Sodium (mg/L)	568	18.4-505
Sulfate (mg/L)	8,420	27-6,170
Other parameters		
Chemical oxygen demand (mg/L)	207	9.09-41.7
Dissolved solids (mg/L)	8,860	219-**9,460**
Fluoride (µg/L)	1,150	51.8-556
Radionuclides		
Uranium (µg/L)	22.8	0.531-10.5
Uranium-233/234 (pCi/L)	10.8	0.328-7.15
Uranium-235/236 (pCi/L)	0.394	0.18
Uranium-238 (pCi/L)	7.61	0.169-3.5

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]Administrative level provided in the Preoperational Data Summary (Davis November 15, 2022). "Detect" indicates that the administrative level is any detection of the parameter.
[c]If only one number is provided for the range, it is the only detection of the parameter. Detections in bold type exceed the administrative level.

Two chlorinated organics, chloromethane and methylene chloride, were detected in 2025. Chloromethane was detected in the June monthly sample and methylene chloride was detected at least once at each of the non-Berea wells monthly samples in 2025. Administrative levels for these parameters are any detection of the parameter. Both chloromethane and methylene chloride are considered to be sample contaminants.

Dissolved solids were detected at X780-C01-02C during the second quarter at 9,460 mg/L, which exceeds the administrative level of 8,860 mg/L. Dissolved solids were not detected above the administrative level in any of the other samples collected from non-Berea monitoring wells in 2025.

One herbicide, 2,4-D, was detected once at X780-C03-07C and X780-C04-09C in 2025. Administrative levels for 2,4-D is any detection of the parameter. No other herbicides were detected in the samples collected.

Pesticides were detected at seven monitoring wells in 2025 at low levels. Alpha-BHC, endrin aldehyde, heptachlor epoxide, and methoxychlor were each detected at various groundwater wells and during different sampling events. Administrative levels for these parameters are any detection of the parameter.

PCBs were detected at three monitoring wells. In July PCBs were detected at X780-C01-02C and X780-C04-09C at concentrations of 0.494 and 0.122 µg/L, respectively. In September PCBs were detected at a concentration of 0.0825 µg/L at X780-C02-05C. PCBs were not detected in any of the other monthly samples. The administrative level for PCBs is any detection of the analyte.

The administrative level exceedances are infrequent and do not indicate any issues to be addressed in the operation of the OSWDF. Groundwater monitoring data for 2025 are available at pegasis.ports.pppo.gov.

4.2.2.3 720 Sandstone trench monitoring wells

Data collected for the 720 Sandstone trench groundwater monitoring wells are evaluated as follows:

- Monitoring parameters are evaluated against the administrative levels determined during preoperational sampling.

Evaluation of administrative levels. Administrative levels are established below regulatory thresholds to allow early identification and correction to conditions that could impact long-term performance of the OSWDF or lead to exceedance of performance standards. Results that exceed these administrative levels in two consecutive sampling events prompt further evaluation.

Sampling for 720 Sandstone groundwater monitoring wells started in May of 2025 and were analyzed for PCBs, chlorinated organics, metals, dioxins/furans, indicator parameters, and radionuclides.

Table 4.6 summarizes the monitoring parameters detected at the 720 Sandstone trench groundwater monitoring wells during operational sampling in 2025 and administrative level for each detected parameter.

Table 4.6. Monitoring parameters detected at 720 Sandstone trench groundwater monitoring wells – 2025

Detected parameter (unit)[a]	Administrative level[b]	Detection range[c]
Organics		
Chlordane (μg/L)	detect	**1.41**
Chloromethane (μg/L)	detect	**0.61**
Heptachlor (μg/L)	detect	**0.163**
Methylene chloride (μg/L)	detect	**1.66-5.08**
Metals		
Aluminum (μg/L)	detect	**120**
Barium (μg/L)	detect	**20.5-33.1**
Chromium (μg/L)	detect	**2.86-4.31**
Chromium, trivalent (μg/L)	0.694	**2.86-4.31**
Cobalt (μg/L)	16.7	12.5-**17.2**
Magnesium (μg/L)	525,000	323,000-**563,000**
Manganese (μg/L)	1,100	941-1,070
Mercury (μg/L)	0.000675	0.000208-0.000339
Nickel (μg/L)	39.3	24.5-36.6
Selenium (μg/L)	detect	**8.23-223**
Thallium (μg/L)	5.66	**5.99-8.97**
Tin (μg/L)	5.07	4.49-**72.4**
Zinc (μg/L)	425	9.19-**621**
Indicator parameters		
Alkalinity (mg/L)	640	584-**826**
Ammonia (mg/L)	0.613	0.314-**0.793**
Calcium (mg/L)	410	251-338
Chloride (mg/L)	55.3	23.2-36.7
Iron (mg/L)	1.28	0.316-**8.1**
Potassium (mg/L)	25.3	17.5-21.9
Sodium (mg/L)	287	188-248
Sulfate (mg/L)	2,890	1,700-2,660

Table 4.6. Monitoring parameters detected at 720 Sandstone trench groundwater monitoring wells – 2025 (continued)

Detected parameter (unit)[a]	Administrative level[b]	Detection range[c]
Other parameters		
Chemical Oxygen Demand (mg/L)	10.9	10.7
Dissolved Solids (mg/L)	4,580	3,750-**4,740**
Fluoride (µg/L)	535	168-232
Radionuclides		
Thorium-230 (pCi/L)	detect	**2.66**
Uranium (µg/L)	25.3	6.69-17.8
Uranium-233/234 (pCi/L)	14.1	3.66-10.1
Uranium-238 (pCi/L)	8.47	2.23-5.93

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]Administrative level provided in the Preoperational Data Summary (Davis November 15, 2022). "Detect" indicates that the administrative level is any detection of the parameter.
[c]If only one number is provided for the range, it is the only detection of the parameter. Detections in bold type exceed the administrative level.

Two chlorinated organics, chloromethane and methylene chloride, were detected in 2025. Chloromethane was detected in the July monthly sample at X780-C24-44TW at a level of 0.61 µg/L. Methylene chloride was detected at both X780-C24-44TW and X780-C25-45TW in numerous monthly samples in 2025. Administrative levels for these parameters are any detection of the parameter, however, both chloromethane and methylene chloride are sample contaminants.

Several metals were detected above administrative levels during the semiannual sampling in 2025. Barium, cobalt, magnesium, thallium, tin, and zinc were all detected above the respective administrative level in the second quarter of 2025. Aluminum, chromium (trivalent chromium), cobalt, magnesium, and selenium were all detected above the respective administrative level during the fourth quarter. Most parameters were detected above the administrative level at both X780-C24-44TW and X780-C25-45TW.

Dissolved solids were detected at X780-C24-44TW during the fourth quarter at 4,740 mg/L, which exceeds the administrative level of 4,580 mg/L. Dissolved solids were not detected above the administrative level in any of the other samples collected from the trench monitoring wells in 2025.

Three indicator parameters, alkalinity, ammonia, and iron, were detected above the administrative level. Alkalinity was detected at X780-C24-44TW in second, third, and fourth quarters at 671 mg/L, 729 mg/L, and 826 mg/L, respectively, above the administrative level of 640 mg/L. X780-C25-45TW had one detection of alkalinity above the administrative level in fourth quarter at 705 mg/L in the regular sample and 706 mg/L in the duplicate sample. Ammonia was detected above the administrative level of 0.613 mg/L at X780-C24-44TW in the second, third, and fourth quarters. Iron was detected above the administrative level at X780-C24-44TW in the second and fourth quarters at 1.45 mg/L and 4.77 mg/L, respectively. In the third quarter, iron was detected at 8.1 mg/L at X780-C25-45TW. The administrative level for iron is 1.28 mg/L. No other indicator parameters were detected above administrative levels.

Two pesticides were detected in the fourth quarter duplicate sample at X780-C25-45TW. Chlordane was detected at 1.41 µg/L and heptachlor was detected at 0.163 µg/L. The administrative level for chlordane and heptachlor is any detection of the parameter. Neither parameter was detected in the regular sample.

4.3 SEEPS

Seep results from the horizontal movement of groundwater through the soil that emerges at the surface. The OSWDF Project Area is monitored for seeps associated with the Cuyahoga Sandstone.

4.3.1 Seep Monitoring Program

Seeps with water associated with the Cuyahoga Sandstone (720 SSL and the 680 SSL) are the primary focus of seep monitoring in the OSWDF Project Area. These seeps may also emerge in the OSWDF perimeter drainage channel.

Areas around the OSWDF are surveyed quarterly for the presence of seeps: approximately 72 hours after a significant rain event (defined as 0.5 in. of rainfall within a 24-hour period). Three areas around the OSWDF are monitored for seeps.

- The areas of primary focus are the south side of the OSWDF to the X-611B and the southeast side of the OSWDF sloping into the wooded areas. These areas are downgradient of the OSWDF.

- The areas to the north and west of the OSWDF or upgradient of the facility are mostly developed for support areas. Although seeps are not expected to be prominent in these areas, undeveloped areas within 300 ft of the waste placement footprint are investigated for seeps and monitored as appropriate.

- Seeps are monitored along the sloped banks of the unnamed tributary located on the western side of the OSWDF and the eastern side of the IMTA.

Ephemeral seeps, or seeps that discharge only for a short time, are generally not monitored as part of this program. To verify whether an observed seep is ephemeral, it is evaluated for the following factors: continual saturation of the surrounding soil; vegetative growth that indicates constant saturation, such as rushes and cattails; and continued periodic observation during wet and dry weather periods. If a seep is determined to be ephemeral and there are no extenuating issues, it is not sampled or monitored on a regular basis.

Seeps identified in the OSWDF Project Area are to be documented using a global positioning system. Any seep identified for monitoring is to be sampled quarterly for technetium-99, trichloroethene (TCE), and uranium, if water is available. These seeps are also analyzed annually after a significant storm event for parameters detected in leachate during the previous year, if adequate water volume is available. If significant parameters (i.e., non-natural or elevated background parameters) are detected in this annual sample, seeps are sampled more frequently (up to two storm events per year) for those parameters. Seeps are evaluated against the same administrative levels as groundwater. An evaluation will be conducted if results are above administrative levels per the OSWDF PSVP.

4.3.2 Seep Monitoring Results

Quarterly seep surveys were completed on March 24, June 10, September 25, and November 24, 2025. These seep surveys were documented in a field log book. No seeps that would require sampling as described in the OSWDF PSVP were identified in 2025; therefore, no seep samples were collected.

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5. SURFACE WATER

Surface water monitoring is designed to monitor the impact of waste handling activities associated with the OSWDF Project Area on surface water within and flowing from the area. Two types of surface water monitoring are being conducted during on-site disposal operations: 1) storm water discharge monitoring, and 2) surface water environmental surveillance monitoring.

5.1 STORM WATER DISCHARGE MONITORING

Storm water discharge monitoring occurs at the discharge point of sedimentation and detention basins/ponds. This monitoring focuses on conventional industrial pollutants associated with landfill operations support activities that are conducted in the drainage area, such as equipment storage and laydown, vehicle traffic, and maintenance.

The basins/ponds subject to discharge monitoring also serve as sediment control devices for non-impacted construction area storm water runoff. This runoff is managed under the General Permit Authorization for Storm Water Discharges Associated with Construction Activity Under the NPDES (General Permit for Construction Activity) as referenced in the PSVP. The sediment ponds collect surface water from both non-impacted construction areas and non-impacted operational support areas. The majority of the surface water collected originates in construction areas.

5.1.1 Storm Water Monitoring Program

Storm water discharge monitoring locations are located at the discharge point of the following ponds/basins (see Figure 5.1).

- X783SEDPD01B-OF: Monitors discharge from Sedimentation and Detention Pond 1B.
- X783SEDPD02-OF: Monitors discharge from Sedimentation and Detention Pond 2.
- X783SEDPD03-OF: Monitors discharge from Sedimentation and Detention Pond 3.
- X783SEDPD04-OF: Monitors discharge from Sedimentation and Detention Pond 4.
- X783SEDPDA-OF: Monitors discharge from Temporary Sediment Basin A.

Samples are collected monthly, if water is available, and analyzed for oil and grease and total suspended solids. Samples are collected quarterly for cadmium, chromium, lead, mercury, and hardness (a water quality parameter used to assess concentrations of cadmium and lead). Samples are also tested in the field for pH and specific conductance each time a sample is collected. Table B-3 in Appendix B summarizes these monitoring parameters.

Sample results are evaluated against the benchmark concentrations provided in the OSWDF PSVP (DOE 2023b). An investigation of the drainage basin will be conducted if a benchmark concentration is exceeded or an increasing trend is experienced. Table C-2 in Appendix C lists the benchmark concentrations for storm water monitoring.

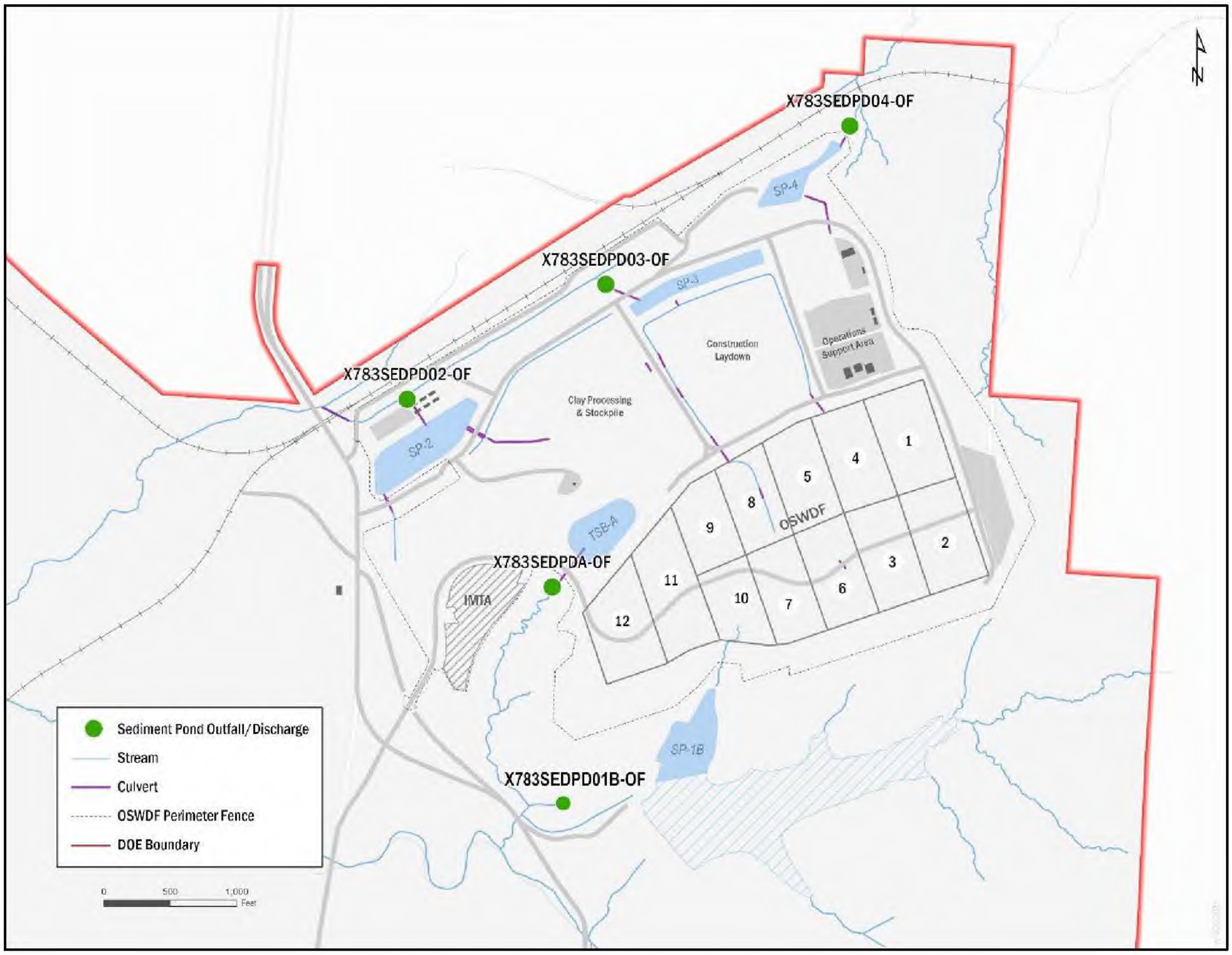

Figure 5.1. Storm water discharge (sediment pond) monitoring locations.

5.1.2 Storm Water Monitoring Results

In August 2025, samples were not collected at any of the storm water sampling locations due to a lack of water. In addition, the metals and hardness samples during second quarter for X783SEDPD02-OF, X783SEDPD03-OF, and X783SEDPD04-OF were lost during shipping; therefore, the samples could not be analyzed.

Table 5.1 summarizes the monitoring parameters detected at the storm water discharge monitoring locations during operational sampling in 2025.

Table 5.1. Monitoring parameters detected at storm water discharge monitoring locations – 2025

Detected parameter (unit)[a]	Benchmark concentration[b]	Detection range
Cadmium (µg/L)	7.8[c]	0.29-0.381
Chromium (µg/L)	100	1.76-5.56
Lead (µg/L)	227[c]	3.12-5.1
Mercury (ng/L)	1700	0.536-5.24
Oil and grease (mg/L)	15	1.4-4.48
pH (SU)	9	6.54-**9.53**
Total suspended solids (mg/L)	100	0.745-**181**

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]Benchmark concentrations are provided in the OSWDF PSVP (DOE 2023b).
[c]The benchmark concentrations for lead and cadmium are based on the hardness of the sample and increase as the hardness increases. The benchmark concentration provided is based on the lowest hardness measurement in 2025 (166 mg/L).
SU-standard units

In 2025, total suspended solids were measured at levels above the benchmark concentration limit of 100 mg/L at two sedimentation ponds on two occasions as summarized in Table 5.2.

Table 5.2. Exceedances of the benchmark concentration for total suspended solids at storm water discharge monitoring locations – 2025

Monitoring location	Date	Result (mg/L)[a]
Sedimentation and Detention Pond 1B	February 13	111/104[b]
Temporary Sediment Basin A	September 23	181

[a]The benchmark concentration for total suspended solids is 100 mg/L as provided in the OSWDF PSVP (DOE 2023b).
[b]Results for regular and duplicate samples, respectively

A drainage basin/pond investigation was performed in response to each of these exceedances of the benchmark concentration limit for total suspended solids. The conclusions from these investigations determined that the exceedances of the benchmark concentration limit were due to precipitation prior to or during the sample collection. PORTS received approximately 0.5 inches of rainfall leading up to the sampling event in February. In September there was almost 1 inch of rainfall leading up to the sampling.

In 2025, pH was measured at levels above the benchmark concentration limit of 9 standard units (SU) at three sedimentation ponds on five occasions as summarized in Table 5.3.

Table 5.3. Exceedances of the benchmark concentration for pH at storm water discharge monitoring locations – 2025

Monitoring location	Date	Result (SU)[a]
Sedimentation and Detention Pond 1B	July 14	9.04
Sedimentation and Detention Pond 2	May 14	9.53
Sedimentation and Detention Pond 2	July 15	9.31
Sedimentation and Detention Pond 2	November 4	9.20
Temporary Sediment Basin A	July 14	9.20

[a]The benchmark concentration for pH is 9 SU as provided in the OSWDF PSVP (DOE 2023b).

The pH in the sedimentation ponds are influenced by the amount of flow through the ponds and the presence of algae, among other factors. The water being clear can support algae growth; algae in the presence of light absorb carbon dioxide, which is acidic in water, thus making the water more alkaline. A drainage basin/pond investigation was performed in response to each of these exceedances of the benchmark concentration limit for pH. Inspections of the drainage basins/ponds after the high pH readings led to the conclusion that no cause other than the natural growth of algae within the pond was likely responsible. Algaecide applications have been scheduled.

Sedimentation and Detention Pond 1B discharges to a tributary of Big Beaver Creek that is monitored via X780-SW06 (see Figure 5.1). The pH measured at this monitoring location for July was 7.99 SU. Sedimentation and Detention Pond 2 discharges to a tributary of Big Beaver Creek that is monitored via X780-SW02 (see Figure 5.1). The pH measured at this monitoring location for May and November were 7.7 SU and 6.88 SU, respectivly. Samples were not able to be collected in July at X780-SW02. Temporary Sediment Basin A discharges to an unnamed stream that is monitored by X780-SW05. The pH level measured at X780-SW05 in July was 7.0 SU. The pH results for these surface water monitoring locations indicate that the slightly elevated pH measured at Sedimentation and Detention Ponds 1B and 2 and Temporary Sediment Basin A did not adversely affect pH in the respective downstream surface water locations.

Analytical data for storm water discharge monitoring are available at pegasis.ports.pppo.gov.

5.2 SURFACE WATER MONITORING

Environmental surveillance monitoring of selected surface water locations is conducted to confirm that OSWDF operations and associated activities are not adversely impacting or contaminating surface water.

5.2.1 Surface Water Monitoring Program

Surface water environmental surveillance monitoring is conducted downstream of discharges from sedimentation ponds. Locations are also downstream from areas where surface water runoff directly enters streams from OSWDF peripheral areas and the non-impacted haul route outside Perimeter Road. These locations include tributaries to Little Beaver Creek and Big Beaver Creek that may have continuous or intermittent flow. Figure 5.2 shows the surface water sampling locations. The purpose of each monitoring location is described below.

- X780-SW01 monitors runoff from the non-impacted north side of the OSWDF Project Area that is captured and discharged from Sedimentation and Detention Ponds 2 and 3. Surface water flows to the southwest, north through a culvert beneath the railroad, then southwest in a tributary that discharges to Little Beaver Creek.

- X780-SW02 monitors runoff from the non-impacted north and east sides of the OSWDF Project Area that is captured and discharged from Sedimentation and Detention Pond 4 as well as small tributaries inside the OSWDF Project Area. Surface water flows north through a culvert under Schuster Road and eventually to Big Beaver Creek.

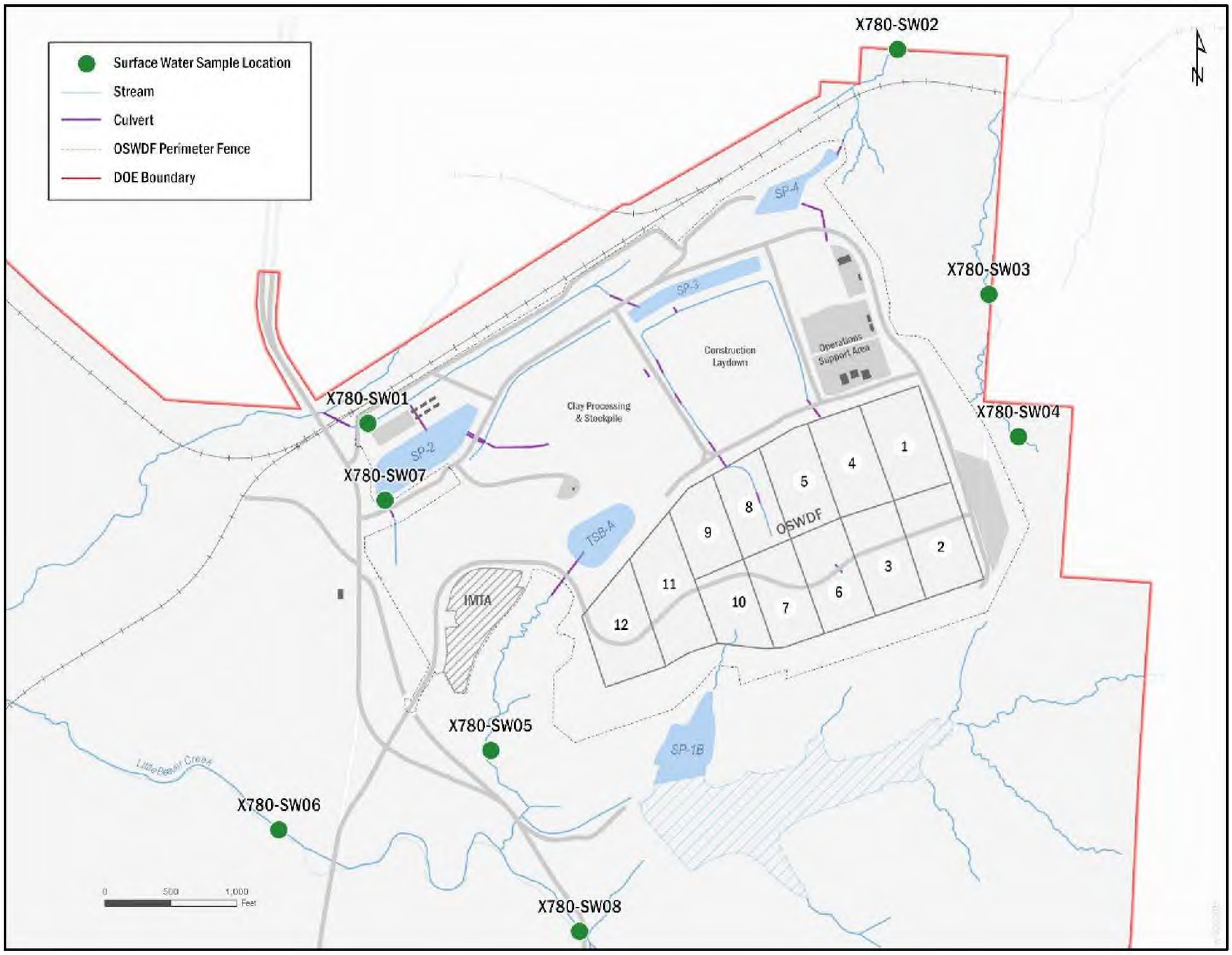

Figure 5.2. Surface water monitoring locations.

- X780-SW03 monitors runoff from the non-impacted east side of the OSWDF Project Area that does not flow to a sedimentation and detention pond. This intermittent stream flows north and eventually to Big Beaver Creek.

- X780-SW04 monitors the intermittent stream as it enters the DOE property on the east side of the OSWDF Project Area upstream from any impacts that could be attributed to the OSWDF Project Area. Surface water flows north and eventually discharges to Big Beaver Creek.

- X780-SW05 monitors the unnamed stream southeast of the IMTA that receives non-impacted runoff from the hillside below the IMTA as well as runoff that is captured and discharged from Temporary Sediment Basin A. Surface water flows south to Little Beaver Creek.

- X780-SW06 monitors Little Beaver Creek at the confluence of the most downstream tributary to Little Beaver Creek that receives runoff from the North Access Road, Sedimentation Pond 1B, and the future IMTA Haul Road.

- X780-SW07 monitors runoff from the OSWDF Access Control Facility and the IMTA Support Areas where it discharges into Sedimentation and Detention Pond 2.

- X780-SW08 monitors Little Beaver Creek upstream from any impacts that could be attributed to the OSWDF Project Area.

Surface water samples are collected if water is present at the sampling location. Some sampling locations, especially those on the eastern side of the OSWDF Project Area, may have intermittent flow and therefore may be dry during some portions of the year. Samples are collected only if water is flowing at the location (i.e., unconnected puddles of standing water are not sampled).

Samples are collected monthly, if water is available, and analyzed for total PCBs and chlorinated organics as required by regulations for TSCA landfills. Samples are collected quarterly for radionuclides. Samples are also tested in the field for pH and specific conductance each time a sample is collected. Table B-4 in Appendix B summarizes the monitoring parameters for surface water.

Surface water sampling results are evaluated against the administrative levels established in the Preoperational Data Summary (Davis, November 15, 2022) and summarized in Table C-3 in Appendix C. Administrative levels for surface water are the maximum concentration detected for each parameter during preoperational sampling. If the parameter was not detected during preoperational sampling, the administrative level is any detection of the parameter. Two sets of administrative levels are established for surface water: one set for Little Beaver Creek sampling locations (X780-SW06 and X780-SW08) and another set for the remaining sampling locations. The separate administrative levels for Little Beaver Creek are necessary because Little Beaver Creek is impacted by other PORTS discharges and surface water sources located upstream from the OSWDF Project Area.

Establishing the administrative levels for surface water results at preoperational levels is designed to verify that systems and processes designed to prevent release of non-sediment pollutants to surface water are performing as designed and preventing impacts to existing stream conditions. Results for upstream monitoring locations (X780-SW04 and X780-SW08) are also used to evaluate results at downstream monitoring locations (X780-SW03 and X780-SW06, respectively). Increases in contaminants over preoperational levels or upstream locations will prompt further evaluation to identify the cause of the increase. Exceedance of these administrative levels is not a violation of regulatory requirements, nor does it mean protection of human health and the environment has been compromised.

5.2.2 Surface Water Monitoring Results

The following sections discuss operational sampling results for PCBs, chlorinated organics, and radionuclides at Little Beaver Creek and non-Little Beaver Creek locations in 2025. Analytical data for surface water monitoring are available at pegasis.ports.pppo.gov.

5.2.2.1 Little Beaver Creek

Samples were collected monthly in 2025 and analyzed for total PCBs and chlorinated organics (see Appendix B, Table B-4). Samples were collected quarterly and analyzed for radionuclides (americium-241, neptunium-237, plutonium-238, plutonium-239/240, technetium-99, thorium-230, uranium, uranium-233/234, uranium-235/236, and uranium-238).

Table 5.4 summarizes the monitoring parameters detected at Little Beaver Creek sampling locations during operational sampling in 2025. Results are provided separately for X780-SW08 because it is upstream from the OSWDF Project Area and is impacted by other PORTS discharges and surface water sources located upstream from the OSWDF Project Area.

Table 5.4. Monitoring parameters detected at Little Beaver Creek surface water monitoring locations – 2025

Detected parameter (unit)[a]	Administrative level[b]	Detection range X780-SW06[c]	Detection range X780-SW08[c]
Polychlorinated biphenyls			
PCBs (µg/L)	detect	ND	**1.56**
Chlorinated organics			
cis-1,2-Dichloroethene (µg/L)	3.59	0.49-0.608	0.58-1.65
Delta-BHC (µg/L)	detect	**0.00895**	**0.0113**
Heptachlor (µg/L)	detect	**0.0159**	ND
Heptachlor epoxide (µg/L)	detect	**0.0172**	ND
Methoxychlor (µg/L)	detect	ND	**0.0571**
Methylene chloride (µg/L)	detect	**1.36**	**0.55-0.59**
Trichloroethene (µg/L)	7.14	0.46-1.06	0.38-3.04
Radionuclides			
Technetium-99 (pCi/L)	9.06	**9.51**	8.49-**15.5**
Thorium-230 (pCi/L)	0.16	**1.77**	ND
Uranium (µg/L)	1.2	0.623-**1.8**	**1.31-1.93**
Uranium-233/234 (pCi/L)	2.38	0.395-1.48	0.376-2.15
Uranium-235/236 (pCi/L)	detect	ND	**0.207**
Uranium-238 (pCi/L)	0.385	0.207-**0.595**	**0.418-0.615**

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]Administrative level provided in the Preoperational Data Summary (Davis November 15, 2022).
[c]If only one number is provided for the range, it is the only detection of the parameter. Detections in bold type exceed the administrative level. ND – not detected

Several chlorinated organics were detected above the administrative level in the samples collected in 2025. These include one detection each for delta-BHC, heptachlor, heptachlor epoxide, and methoxychlor. Methylene chloride was detected in several samples at both X780-SW06 and X780-SW08; however, this parameter is a sample contaminant. Administrative levels for these parameters are any detection of the parameter.

PCBs were detected at X780-SW08 in the July sample at 1.56 µg/L. PCBs were not detected in any of the other samples collected from the surface water monitoring locations in 2025.

No transuranics (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) were detected in samples collected from Little Beaver Creek in 2025.

Technetium-99 was detected in samples collected from locations on Little Beaver Creek, X780-SW06 and X780-SW08, in the first and fourth quarters. One sample collected from each of the sampling locations on Little Beaver Creek (X780-SW06 and X780-SW08) exceeded the administrative level for technetium-99 in the fourth quarter at 9.51 pCi/L and 15.5 pCi/L, respectively. Some site contaminants are occasionally detected in Little Beaver Creek surface water samples; however, these detections are inconsistent and do not indicate any issues.

At X780-SW06, thorium-230, uranium, and uranium-238 were detected above the administrative levels. Thorium-230 was detected above the administrative level of 0.16 pCi/L in the second quarter at 1.77 pCi/L. Uranium and uranium-238 were detected above the administrative levels in the fourth quarter. Uranium was detected at 1.8 µg/L and uranium-238 at 0.595 pCi/L which exceeded the administrative levels of 1.2 µg/L and 0.385 pCi/L, respectively.

At X780-SW08, uranium, uranium-235/236, and uranium-238 were detected above the administrative levels. Uranium-235/236 was detected at 0.207 pCi/L in the fourth quarter. The administrative level for this parameter is any detection of the parameter. Uranium and uranium-238 were both detected in the second and fourth quarters of 2025. Uranium has an administrative level of 1.2 μg/L and was detected at 1.31 μg/L in the second quarter and 1.93 μg/L in the fourth quarter. Uranium-238 was detected at 0.418 pCi/L in the second quarter and 0.615 pCi/L in the fourth quarter, which exceeded the administrative level of 0.385 pCi/L.

Uranium-233/234 was detected at low levels in samples collected from both Little Beaver Creek monitoring locations. These detections were less than the applicable administrative level (see Table 5.4).

The administrative level exceedances are infrequent and do not indicate any issues to be addressed in the operation of the OSWDF.

5.2.2.2 Non-Little Beaver Creek

Non-Little Beaver Creek sampling locations are the surface water sampling locations in the unnamed tributaries near the OSWDF that flow to Little Beaver Creek or Big Beaver Creek. Figure 5.2 shows the surface water sampling locations and Section 5.2.1 includes a description of each surface water sampling location.

In 2025, the following monthly samples were not collected at non-Little Beaver Creek surface water sampling locations due to lack of flow or frozen water:

- January 2025: X780-SW07
- July 2025: X780-SW02, X780-SW03, and X780-SW04
- August 2025: X780-SW01, X780-SW02, X780-SW03, X780-SW04, X780-SW05, and X780-SW07
- October 2025: X780-SW04.

In addition to the above samples, the radionuclide samples during second quarter for X780-SW07 were lost during shipping; therefore, the samples could not be analyzed.

Table 5.5 summarizes the monitoring parameters detected at the non-Little Beaver Creek sampling locations during operational sampling in 2025.

Table 5.5. Monitoring parameters detected at non-Little Beaver Creek surface water monitoring locations – 2025

Detected parameter (unit)[a]	Administrative level[b]	Detection range[c]
Polychlorinated biphenyls		
PCBs (µg/L)	detect	**0.116-0.312**
Chlorinated Organics		
Dinoseb (µg/L)	detect	**0.0956**
Endrin aldehyde (µg/L)	detect	**0.00988**
Heptachlor (µg/L)	detect	**0.0542**
Heptachlor epoxide (µg/L)	detect	**0.266**
Methoxychlor (µg/L)	detect	**0.103**
Methylene chloride (µg/L)	detect	**0.57-4.49**
Radionuclides		
Uranium (µg/L)	5.48	0.589-4.55
Uranium-233/234 (pCi/L)	3.49	0.242-2.98
Uranium-235/236 (pCi/L)	0.394	0.143
Uranium-238 (pCi/L)	1.82	0.194-1.52

[a]Monitoring parameters that are not listed were not detected in any of the samples.
[b]Administrative level provided in the Preoperational Data Summary (Davis November 15, 2022). "Detect" indicates that the administrative level is any detection of the parameter.
[c]If only one number is provided for the range, it is the only detection of the parameter. Detections in bold type exceed the administrative level.

Several chlorinated organics were detected in the samples collected in 2025. Dinoseb, endrin aldehyde, heptachlor, heptachlor epoxide, and methylene chloride were each detected once in 2025, except for methylene chloride. Methylene chloride, a sample contaminant, was detected multiple times at concentrations ranging from 0.57 to 4.49 µg/L. These parameters were not detected during preoperational sampling; therefore, the administrative level is any detection. No other chlorinated organics were detected in any of the other samples collected in 2025.

PCBs were detected at three locations, X780-SW01, X780-SW03, and X780-SW04, in 2025. In May, PCBs were detected in the duplicate sample collected at X780-SW01 at 0.116 µg/L. In November, PCBs were detected in samples collected at X780-SW03 and X780-SW04 at 0.312 ug/L and 0.122 ug/L, respectively. No other PCBs were detected at these locations or any other surface water location in 2025.

No transuranics (americium-241, neptunium-237, plutonium-238, and plutonium-239/240) were detected in samples collected from non-Little Beaver Creek monitoring locations in 2025. Additionally, technetium-99 was not detected in the surface water samples collected from non-Little Beaver Creek locations.

Uranium, uranium-233/234, uranium-235/236, and uranium-238 were detected at low levels in samples collected from non-Little Beaver Creek monitoring locations. These detections were less than the applicable administrative levels (see Table 5.5).

As discussed previously, administrative levels are established below regulatory thresholds to allow early identification and correction of conditions that could impact long-term performance of the OSWDF or lead to exceedance of performance standards. The administrative level exceedances do not show any type of trends that indicate an impact to the long-term performance of the OSWDF or lead to exceedance of performance standards/regulatory thresholds at the OSWDF.

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6. AIR

The OSWDF ambient air monitoring program is designed to measure particulate matter (PM), radionuclides, and hazardous air pollutants (HAPs), which include selected metals and VOCs, that are primarily associated with operation of the OSWDF. The OSWDF ambient air monitoring stations can also detect pollutants released by D&D and other site activities. Air monitoring data are collected to demonstrate compliance with regulatory standards and verify that pollutants are not present at levels that pose a risk to workers, the public, and the environment.

6.1 AIR MONITORING PROGRAM

Air dispersion modeling was conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model to assess potential on-site and off-site concentrations of pollutants resulting from selected D&D activities and operation of the OSWDF. Separate modeling assessments are performed to support specific D&D activities and waste placement as the work scope changes over time. The action levels associated with a model are in effect until either the current air model is superseded by a new model, or the project is completed and no further air monitoring is deemed necessary to support the work scope. Below is a summary of air modeling assessments that have been completed at PORTS:

- The *Air Emissions Modeling Report for the Onsite Waste Disposal Facility (OSWDF), Soil Excavation Projects, and X-326 Process Building Demolition* (DOE 2020a) (X-326 Air Model) was conducted in 2020 to support the X-326 Process Building demolition and associated D&D and waste placement activities. The X-326 Air Model and associated action levels were in effect from the start of D&D activities in 2021 until superseded by the X-333 Air Model on March 1, 2025.

- The *Air Emissions Modeling Report for the On-Site Waste Disposal Facility (OSWDF), Soil Excavation Projects, and X-333 Process Building Demolition* (DOE 2023d) (X-333 Air Model) was conducted in 2023 to support the X-333 Process Building demolition and associated D&D and waste placement activities. The X-333 Air Model and associated action levels became effective on March 1, 2025 and were still in effect at the end of 2025.

The predominant wind direction at PORTS indicates that emissions from PORTS are likely to disperse in a northeasterly direction from the source. As a result, the maximum off-site concentrations of uranium, metal HAPs, and PM_{10} (particulate matter with a particle size of 10 microns or less) typically occur at the northeast property boundary of the site, which includes the OSWDF Project Area.

The X-326 Air Model was used to assist in locating the OSWDF air monitoring stations. Project-level monitoring occurs at six stations, X780-A01 through X780-A06, which are distributed around the perimeter of the OSWDF Project Area to detect airborne contaminant concentrations associated with waste handling and placement activities and other OSWDF operations and activities. These monitoring locations were selected based on probable pollutant dispersion directions predicted by modeling, physical terrain, accessibility, placement of project personnel, and proximity to the site boundary.

Two other non-project-specific air monitoring stations are located at the OSWDF, A70 and A50. Station A70 (identified as AM1 in the air model reports), is located inside the PORTS boundary near the off-site location with the highest predicted concentrations of uranium, metal HAPs, and PM_{10} in the X-326 Air Model. Station A50 is one of five co-located air monitoring stations operated jointly by DOE and the Ohio EPA air monitoring program. DOE PM_{10} data from the continuous PM monitor at A50 are included in this report. Other monitoring conducted at Station A50 is outside the scope of the OSWDF PSVP. Figure 6.1 shows the locations of the OSWDF air monitoring stations.

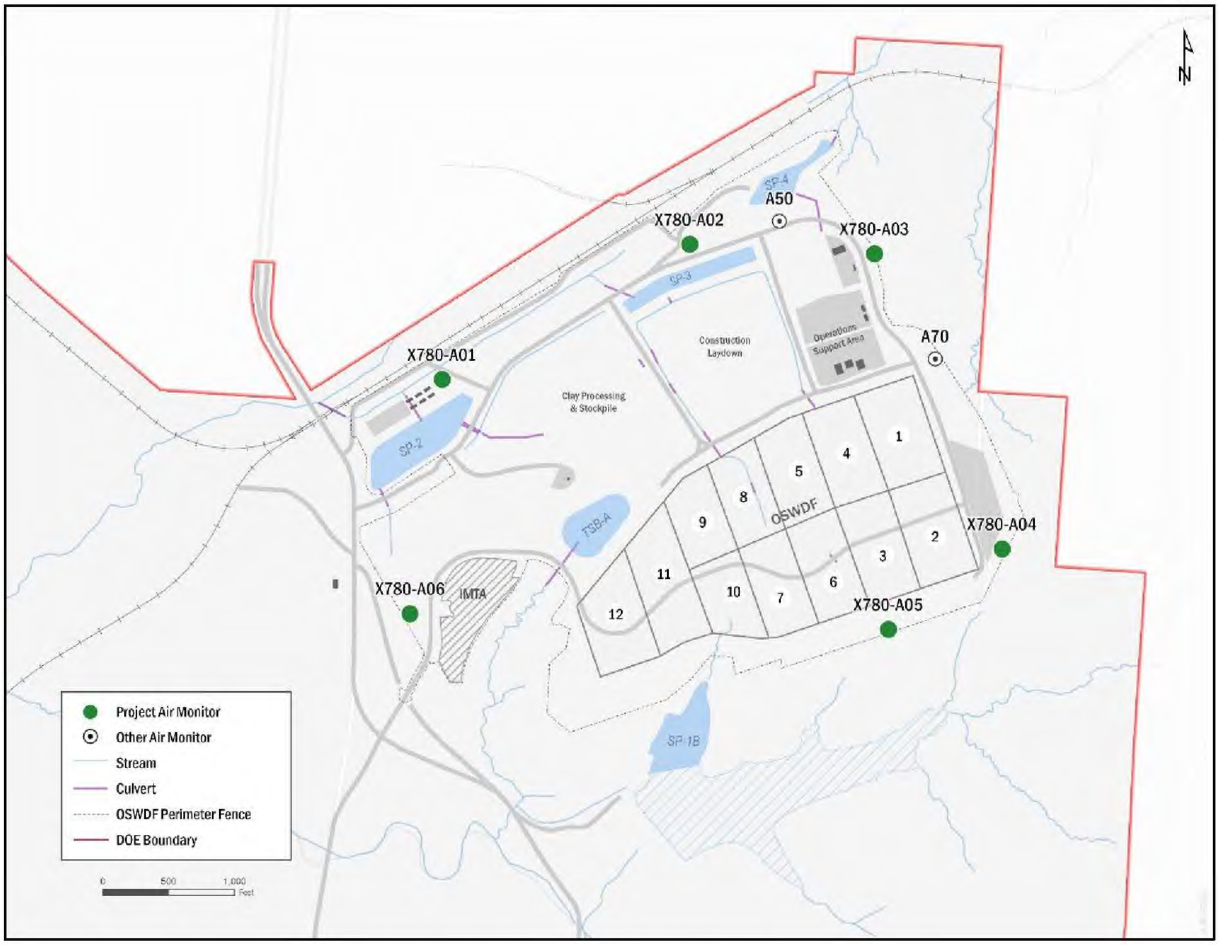

Figure 6.1. Ambient air monitoring stations.

Ambient air monitoring stations at the site capture pollutants from D&D activities and the OSWDF, as well as from other on-site sources and broader local, regional, and national air quality backgrounds. Soil excavation projects that are part of D&D can release PM, VOCs, and other pollutants. Local vehicle traffic can contribute to VOCs detected at PORTS. Fires in the local region and as far away as the western United States and Canada have occasionally affected PM measured at PORTS. Metals are present in dust that can be transported in ambient air from off-site activities. Background levels of many of the air pollutants monitored at the OSWDF are expected to be detected at the OSWDF ambient air monitoring stations.

Seven ambient air monitoring stations at OSWDF are equipped with monitors for radionuclides (as particulate), metals, PCBs, and VOCs. Although A50 has additional monitoring equipment, only the PM_{10} data at A50 fall within the scope of this document. Appendix B, Table B-5 lists the specific radionuclides, metals, and VOC parameters for which laboratory analyses are performed. Three locations at OSWDF (A50, A70, and X780-A04) monitor PM_{10}. Table 6.1 identifies the type of air monitoring at each location. The following paragraphs provide additional information about the sampling equipment and sampling frequencies for each type of monitoring.

Radionuclides. Radiological particulate samples are collected on a continuous high-volume sampler. Filters are collected weekly and composited into a monthly sample.

Metals. Particulate for HAP metals analysis is collected using a high-volume sampler for one 24-hour sample per week.

PCBs. PCB samples consist of both a filter and a polyurethane foam element. One 24-hour sample is collected once per month.

VOCs. Samples for VOCs are collected using a vacuum canister equipped with a timer assembly. The canister collects one 24-hour sample per week.

Table 6.1. Ambient air station monitoring parameters

Station	Location	Rad Part	PCBs	Metal HAPs	VOC HAPs	Total VOCs	PM_{10}
X780-A01	Northwest of OSWDF North of IMTA	●	●	●	●	●	-
X780-A02	North/northwest of OSWDF Northeast of IMTA	●	●	●	●	●	-
X780-A03	North/northeast of OSWDF Northeast of IMTA	●	●	●	●	●	-
X780-A04	East/southeast of OSWDF East of IMTA	●	●	●	●	●	●
X780-A05	South of OSWDF West of IMTA	●	●	●	●	●	-
X780-A06	West of OSWDF West of IMTA	●	●	●	●	●	-
A70[a]	Northeast of OSWDF Northeast of IMTA	●	●	●	●	●	●
A50	North of OSWDF Northeast of IMTA	-	-	-	-	-	●

[a]Station A70 is identified as AM1 in the air modeling assessments.
Rad. Part – radionuclide particulate.

PM_{10}. PM_{10} is measured using a real-time, continuous PM mass monitor. PM_{10} values are transmitted remotely as an hourly average and rolled up into a daily average for each of the three locations.

Retrospective sample results are reported by the laboratory as 'per sample' results and used in conjunction with air volumes, calibration data, and meteorological data to calculate the ambient air concentration.

Ambient concentrations of PM_{10}, total PCBs, total VOCs, TCE, metals, and uranium are evaluated against low, medium, and high action levels established by the applicable air model. Separate action levels were developed for Station A70 because this station represents the off-site location with the highest predicted concentrations of uranium, metal HAPs, and PM_{10} in the air modeling assessments.

Table C-4 in Appendix C lists the low, medium, and high action levels in effect during 2025 for ambient air monitoring. The high action level for PM_{10} is based on the U.S. Environmental Protection Agency National Ambient Air Quality Standard (NAAQS). The high action levels for PCBs, VOCs, metal HAPs, and total uranium are based on the maximum acceptable ground-level concentrations (MAGLC) for these pollutants, which were calculated in the air model assessments in accordance with Ohio EPA's air toxic analysis guidance.

Medium action levels are 75% of the associated high action level. Ohio EPA is notified as described in the OSWDF PSVP if a medium or high action level is exceeded.

The methodology for establishing low action levels has varied between air modeling assessments. In the X-326 Air Model, the low action levels are equivalent to the maximum air pollutant concentration estimated by air dispersion modeling at the OSWDF project boundary and at Station A70. These low action levels were in effect from the beginning of 2025 until they were superseded by the X-333 Air Model, which took effect on March 1, 2025. In the X-333 Air Model, the low action levels are set to 50% of the MAGLC or NAAQS value. The X-333 Air Model low action levels were in effect from March 1, 2025 through the end of 2025. PM_{10} concentrations above the low action level for one hour (although the action level applies to a 24-hour average) triggers an automatic notification to project stakeholders and management so that field conditions can be evaluated in real-time and a quick response can be made to mitigate emissions. A summary of low action level exceedances is provided to management and DOE periodically to evaluate the effectiveness of project emission controls.

6.2 AIR MONITORING RESULTS

This section summarizes the ambient air monitoring results for 2025. Ambient air data collected by DOE at co-located monitoring stations (including A50) are available at pegasis.ports.pppo.gov. Ohio EPA PM_{10} data from the co-located monitor at Station A50 are provided at https://epa.ohio.gov/wps/portal/gov/epa/divisions-and-offices/air-pollution-control/reports-and-data/special-sampling-portsmouth-gdp.

During 2025, air monitoring results did not exceed medium or high action levels at any of the OSWDF air monitoring locations. Ambient concentrations of some metals and VOCs exceeded the applicable low action level at least once in 2025. Table 6.2 provides the maximum detections of ambient air monitoring parameters, low action levels, and the number of exceedances of the low action levels during 2025.

Low concentrations of metals exist in ambient air, especially near open soils, due to the geology and soil content of the region. Concentrations of metals detected at the OSWDF ambient air monitoring stations were similar to the metal concentrations detected in ambient air at the other on-site air monitors operated by DOE and Ohio EPA. The low action level exceedances for metals do not indicate any issues to be addressed in the operation of the OSWDF or implementation of D&D.

The low action level for total VOCs was exceeded at two OSWDF project monitoring stations and at Station A70 in 2025. The low action level exceedances in 2025 were similar to the VOC concentrations detected at other on-site ambient air monitors, and do not indicate any issues that need to be addressed in the operation of the OSWDF or implementation of D&D.

No transuranic radionuclides (americium-241, neptunium-237, plutonium-238, or plutonium-239/240), or uranium-235/236 were detected in OSWDF ambient air samples in 2025. Technetium-99, thorium-228, thorium-232, thorium-230, total uranium, uranium-233/234, and uranium-238 were detected in one or more of the OSWDF ambient air samples. There were no low action level exceedances for total uranium in 2025 at the OSWDF. Since no action levels were set for these radionuclides other than total uranium, the detections were compared to the DOE derived concentration standards (DCS) in the *Derived Concentration Technical Standard* (DOE 2022). Table 6.3 lists the maximum detection of each radionuclide for 2025. All radiological detections were less than 1% of the respective DCS (DOE 2022).

Table 6.2. Monitoring parameters detected and low action level exceedances at ambient air stations – 2025

Parameter		Maximum detection (μg/m³)	X-326 Air Model low action level (Jan-Feb 2025) (μg/m³)	X-333 Air Model low action level (Mar-Dec 2025) (μg/m³)	Number of low action level exceedances
Radionuclide	Uranium (Project)	1.87E-04	1.81E-03	2.381	0
	Uranium (A70)	1.67E-04	1.36E-03	2.381	0
Metal	Antimony (Project)	2.17E-03	2.01E-06	5.95	24
	Antimony (A70)	3.29E-03	1.54E-06	5.95	1
	Arsenic (Project)	2.65E-03	1.59E-06	0.12	6
	Arsenic (A70)	1.73E-03	1.21E-06	0.12	2
	Beryllium (Project)	none detected	1.74E-05	5.95E-04	0
	Beryllium (A70)	none detected	1.33E-05	5.95E-04	0
	Cadmium (Project)	1.93E-03	1.18E-05	0.024	4
	Cadmium (A70)	8.41E-04	8.97E-06	0.024	0
	Chromium (Project)	none detected	0.34	0.60	0
	Chromium (A70)	none detected	0.257	0.60	0
	Cobalt (Project)	1.04E-03	5.61E-06	0.24	21
	Cobalt (A70)	6.75E-04	4.28E-06	0.24	2
	Lead (Project)	3.72E-02	2.27E-05	0.60	9
	Lead (A70)	3.92E-03	1.73E-05	0.60	1
	Manganese (Project)	3.38E-02	6.44E-03	0.24	5
	Manganese (A70)	1.99E-02	4.91E-03	0.24	0
	Mercury (Project)	6.73E-05	2.93E-07	0.30	1
	Mercury (A70)	4.88E-05	2.23E-07	0.30	0
	Nickel (Project)	1.67E-03	2.87E-04	1.19	0
	Nickel (A70)	1.02E-03	2.19E-04	1.19	0
	Selenium (Project)	2.15E-03	4.96E-07	2.38	23
	Selenium (A70)	2.04E-03	3.79E-07	2.38	3
VOCs	Total VOC (Project)	409	16	667	3
	Total VOC (A70)	97	13	667	1
	TCE (Project)	0.18	12	667	0
	TCE (A70)	none detected	9	667	0
PCBs	Total PCBs (Project)	none detected	1.90E-04	6	0
	Total PCBs (A70)	9.77E-04	1.30E-04	6	0
Particulate[a]	PM_{10} (X780-A04)	61.2	75	75	0
	PM_{10} (A70)	74.2	80	75	0
	PM_{10} (A50)	43.9	-	-	-

[a]PM_{10} data uses local conditions, not standard temperature and pressure.

Table 6.3. Isotopic radionuclides detected at ambient air stations – 2025

Radionuclide	Maximum detection (pCi/m^3)	Location	DCS (DOE 2022)	Percentage of DCS
Technetium-99	1.82E-04	A70	2000	0.0000091%
Thorium-228	2.20E-05	X780-A05	0.1	0.022%
Thorium-230	4.83E-05	X780-A03	0.15	0.032%
Thorium-232	2.62E-05	X780-A04	0.037	0.071%
Uranium-233/234	6.62E-05	X780-A04	1.5	0.0044%
Uranium-238	6.19E-05	X780-A06	1.8	0.0034%

Section 8 discusses the potential dose to a member of the public from radionuclides detected in ambient air at the OSWDF Project Area.

7. EXTERNAL RADIATION

The external radiation monitoring program is designed to measure background radiation and radiation that may result from waste handling activities associated with the OSWDF Project Area.

7.1 EXTERNAL RADIATION MONITORING PROGRAM

The OSWDF external radiation monitoring network is designed to measure external radiation at ambient air monitoring stations near the north and east DOE property boundaries and at the intersection of North Access Road and Fog Road (the west side of the OSWDF area). Figure 7.1 shows the external radiation monitoring locations.

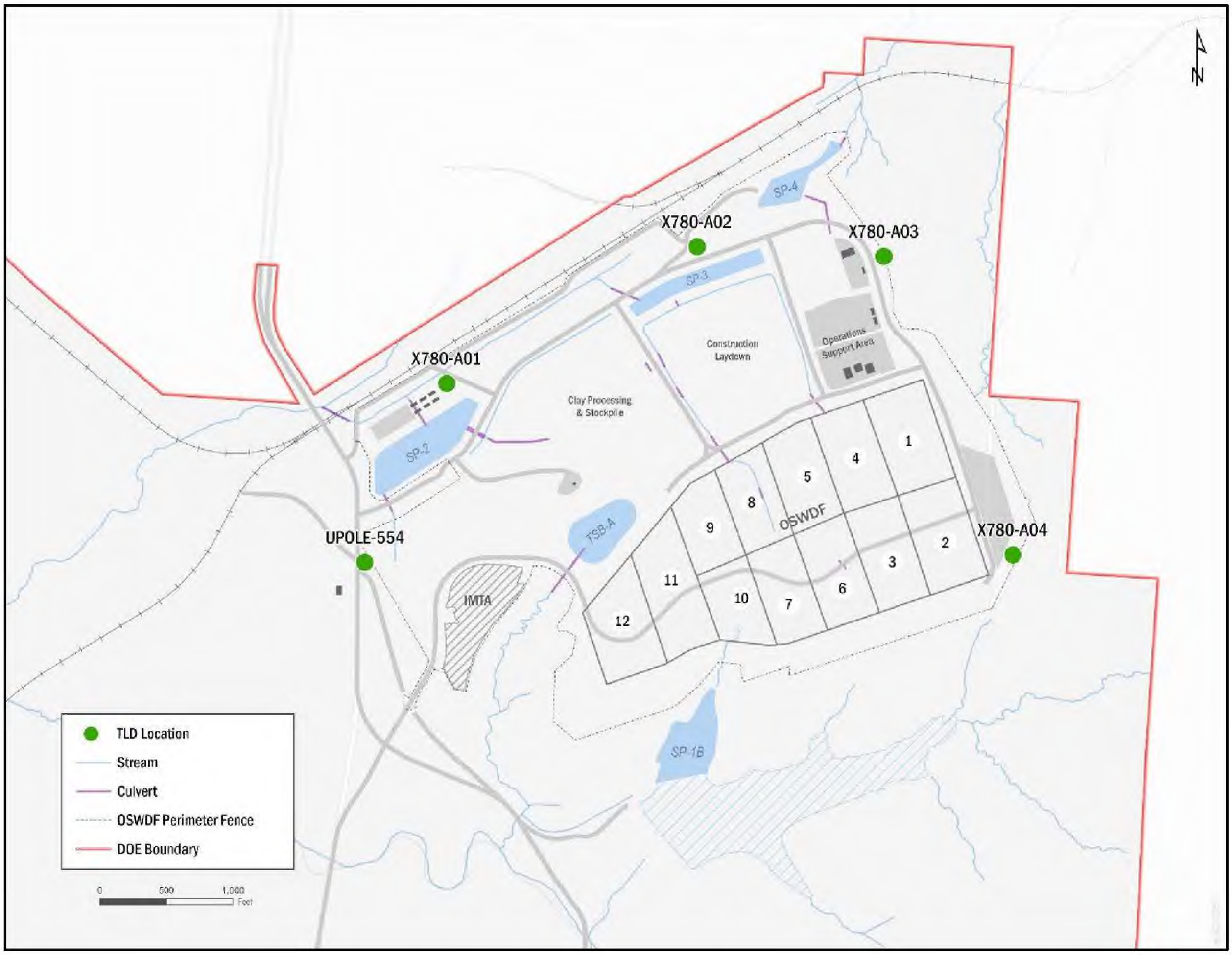

Figure 7.1. External radiation monitoring locations.

These locations were selected because the north and east property boundaries are accessible to the members of the public (the property owners and potentially other members of the public). The intersection of Fog Road and North Access Road (UPOLE-554 monitoring location) has been intermittently open to vehicle traffic since operation of the OSWDF. During normal operations, Fog Road is closed from 7 a.m. to 7 p.m., Monday through Friday.

Dosimeters measure radiation as a dose (in millirem [mrem]) that is reported in the following components:

- Deep dose: The deep dose equivalent that applies to external whole body exposure; the dose equivalent at a tissue depth of 1 cm. It includes dose for photon energies from approximately 10 kilo-electron volts to 6 mega-electron volts and neutrons.

- Eye dose: The eye dose equivalent applies to the external exposure of the lens of the eye and is the dose equivalent at a tissue depth of 0.3 cm. It includes dose for beta particles, neutrons, and photons.

- Shallow dose: The shallow dose equivalent applies to the external exposure of skin or an extremity and is the dose equivalent at a tissue depth of 0.007 cm averaged over an area of 1 cm^2. It includes dose for beta particles, neutrons, and photons.

Typically at PORTS, the measured deep dose, eye dose, and shallow dose are the same values.

The dosimeters used in the OSWDF external radiation monitoring program measure both background radiation and any radiation that may be present related to the OSWDF area. Background radiation is primarily cosmic and terrestrial radiation, but also includes global fallout from historic nuclear testing or nuclear accidents such as Chernobyl. Background radiation varies at specific locations based on local geology, nearby structures that could provide shielding or contain naturally-occurring radiation, agricultural use of fertilizer, and many other factors.

Higher concentrations of naturally-occurring radionuclides are present in the shale and sandstone hills at the northern PORTS property line and surrounding PORTS than in the clay and silt present in the center of PORTS where the former gaseous diffusion buildings are located. Therefore, external radiation measured at the OSWDF Project Area is expected to be higher than many locations based on the geology of the OSWDF Project Area, where the Cuyahoga sandstone is present and has been exposed due to project activities.

Two or more dosimeters are placed at each monitoring location, in accordance with the *DOE Handbook Environmental Radiological Effluent Monitoring and Environmental Surveillance* (DOE 2015a). A control dosimeter is also used to account for the extraneous dose received before or after the other dosimeters are placed in the field, such as during transport to and from the dosimeter processor. Dosimeters are changed and read quarterly per general industry practice.

7.2 EXTERNAL RADIATION MONITORING RESULTS

Dosimeters at the OSWDF monitoring locations were changed quarterly in 2025. Table 7.1 summarizes the results for dosimeters at the OSWDF in 2025.

Table 7.1. OSWDF external radiation monitoring results (in mrem) – 2025

Location	First quarter	Second quarter	Third quarter	Fourth quarter	Total
UPOLE-554	28	21	25	28	102
X780-A01	27	21	25	27	100
X780-A02	33	28	32	35	128
X780-A03	27	23	27	27	104
X780-A04	27	21	23	25	96
Control	20	17	18	22	77

Because background radiation varies at each location, the most accurate assessment of dosimetry data would compare the current radiation measurement at each location to the historical background radiation at that location. However, PORTS has only one partial quarter of radiation measurements at the monitoring locations prior to the beginning of waste placement. These pre-waste placement data indicate, however, radiation is highest at location X780-A02, with the other locations being similar.

A dose rate survey completed in November 2018 in the OSWDF project area found that dose rates ranged from 4 to 12 microrem/hour in the areas around the construction at the OSWDF (FBP 2021). These hourly dose rates equal quarterly dose rates from 9 to 26 mrem/quarter. The areas with the highest dose rate were the excavations for the landfill cells with exposed shale, sandstone, and clay.

Results for the OSWDF monitoring locations were compared to the results for eight off-site external radiation monitoring locations and one on-site external radiation monitoring location that are monitored in accordance with the PORTS *Environmental Monitoring Plan* (DOE 2017) (EMP). Figure 7.2 shows these EMP monitoring locations. Table 7.2 provides the results for these locations in 2025.

Table 7.2. EMP external radiation monitoring results (in mrem) – 2025

Location	First quarter	Second quarter	Third quarter	Fourth quarter	Total
		On-site monitoring location			
A8	27	27	34	37	125
		Off-site monitoring locations			
A12	23	22	29	32	106
A15	23	24	29	[a]	[a]
A23	24	26	31	34	115
A24	24	26	34	35	119
A28	22	23	29	30	104
A3	22	22	28	30	102
A6	23	23	30	33	109
A9	23	23	32	32	110
Control	17	16	20	21	74

[a]Location A15 was not analyzed in 4th quarter.

A8, the on-site monitoring location, was chosen for comparison because it is an undeveloped location at the northwest PORTS property line next to a ravine that exposes the Cuyahoga sandstone. The off-site monitoring locations are located around PORTS where the Cuyahoga sandstone is present.

All of these dosimeters (both OSWDF and EMP) were treated the same (placed in and removed from the field at the same time and shipped together). Results for each OSWDF monitoring location except X780-A02 are within the range of dose measurements at the off-site locations.

The annual dose measured at location X780-A02 is 128 mrem/year in 2025. Radiation may be higher at this location due to the clay stockpile and processing area located southwest of the monitoring location. Clay in this area is from the natural weathering and degradation of the shale rock formations that contain naturally-occurring radionuclides. The dose rate survey completed in November 2018 in the OSWDF project area (FBP 2021) also found that the highest dose rates were the excavations for the landfill cells with exposed shale, sandstone, and clay.

The following section (Section 8) discusses the potential dose to a member of the public from external radiation detected at the OSWDF Project Area.

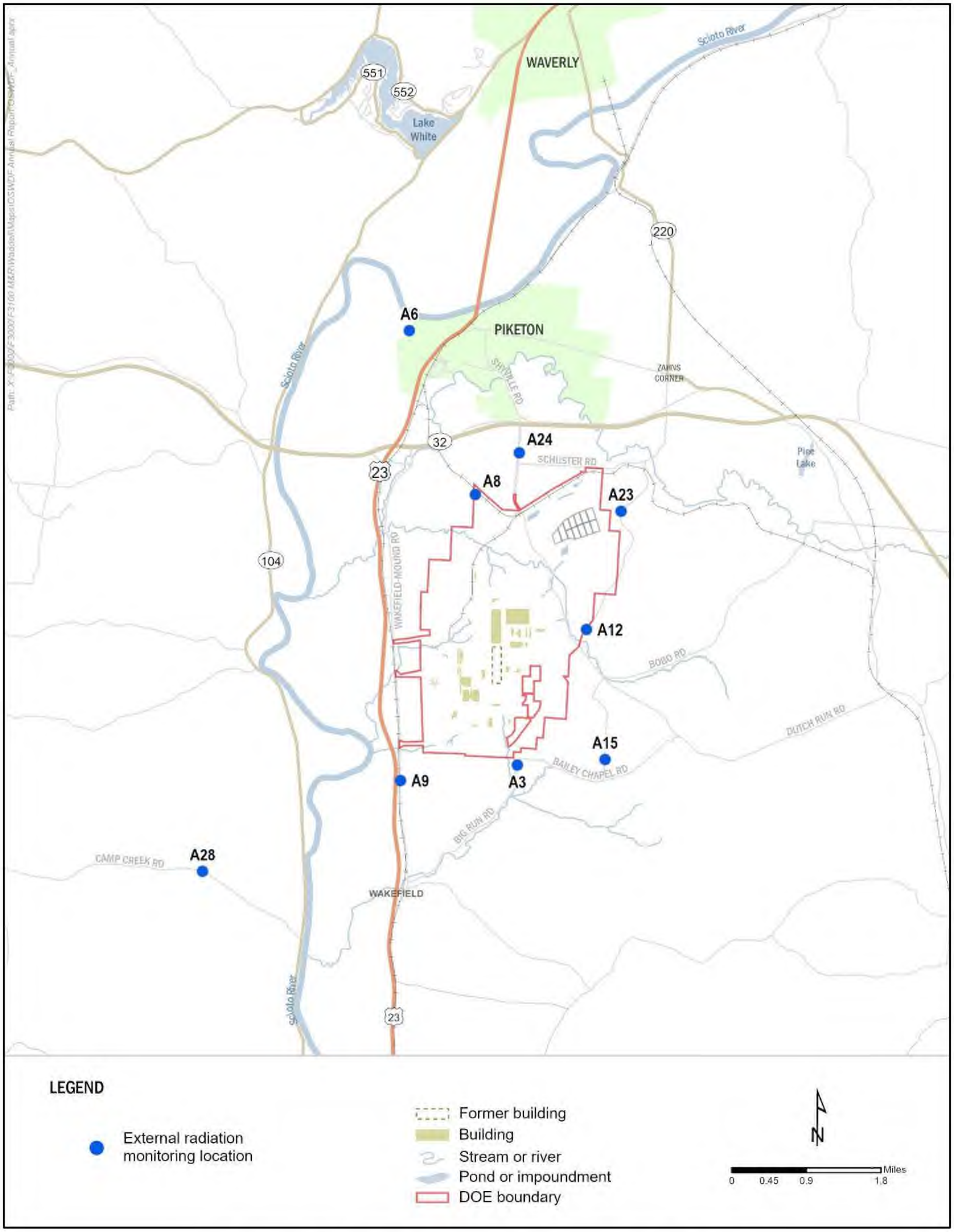

Figure 7.2. EMP external radiation monitoring locations.

8. DOSE

DOE Order 458.1 and Ohio Department of Health regulation OAC 3701:1-54-08(B)(1) limit the dose to a member of the public to 25 mrem/year resulting from management, storage, and disposal of low-level radioactive waste.

To demonstrate compliance with this dose limit, DOE has evaluated potential pathways of exposure for a member of the public. If an exposure pathway is identified, DOE then develops a realistic exposure scenario. Monitoring data are evaluated to determine if contaminants resulting from operation of the OSWDF are present above background values. If monitoring data identify radionuclides that could be attributable to PORTS, these data are used to calculate a dose to a member of the public.

Exposure pathways for air, external radiation, groundwater, and surface water have been assessed for these dose calculations as described in the following sections.

8.1 AIR

The dose that could be received by a hypothetical person present at each PORTS ambient air monitoring station is reported in the annual report as required by Title 40 of the *Code of Federal Regulations* Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon from DOE Facilities

Ambient air monitoring stations at the OSWDF Project Area (X780-A01, X780-A02, X780-A03, X780-A04, X780-A05, X780-A06, and A70) are used to evaluate airborne releases from OSWDF and IMTA operations. These ambient air monitoring stations are located on site and are not accessible to members of the public. Section 6 discusses the OSWDF ambient air monitoring program and the results of ambient air monitoring for radionuclides in 2025.

The annual average activity of a radionuclide detected in ambient air is used in conjunction with dose conversion factors generated by the NESHAP CAP88 model to determine a dose in mrem per year associated with a given activity of a radionuclide in air. The doses attributable to each radionuclide are then added to obtain the gross dose for each station. A net dose for each station is obtained by subtracting the dose at the site's background monitoring station near Otway, Ohio (approximately 13 miles southwest of PORTS).

As stated in the OSWDF PSVP, stations on the north, east, and west sides of the OSWDF project area (all stations except X780-A05) are considered when assessing a dose to a member of the public because these on-site stations are located near areas accessible to the public (see Figure 6.1). Stations X780-A01 and X780-A02 are near the northern property boundary. Stations X780-A03, X780-A04, and A70 are near the eastern property boundary. Station X780-A06 is on the west side of the OSWDF Project Area near Fog Road and North Access Road. Station A50 near the northern property boundary is also used in the dose assessment.

Table 8.1 lists the gross dose and net dose calculated for the OSWDF ambient air monitoring stations, Station A50, and the background station (A37).

Table 8.1. Doses (in mrem/year) at OSWDF ambient air monitoring stations – 2025

Station	Gross dose	Net dose
A70	0.041	0.013
A50	0.032	0.0041
X780-A01	0.030	0.0023
X780-A02	0.039	0.011
X780-A03	0.044	0.016
X780-A04	0.056	0.028
X780-A05	0.047	0.019
X780-A06	0.033	0.0050
A37 (background)[a]	0.028	-

Source: *Radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) 2025 Annual Report* (DOE 2026).

[a]A37, the background ambient air monitoring station, is near Otway, Ohio, approximately 13 miles southwest of PORTS.

The highest net dose at an OSWDF monitoring station used to assess dose to a member of the public from the OSWDF project area is 0.028 mrem/year at Station X780-A04, which is considered the dose to a member of the public from ambient air at the OSWDF Project Area.

8.2 EXTERNAL RADIATION

External radiation is measured in areas accessible to the public at the intersection of the North Access Road and Fog Road and near the north and east DOE property boundaries at the OSWDF Project Area. The data are used to assess the potential dose to a member of the public that routinely drives a vehicle on North Access Road/Fog Road or that would be present at the fence line monitoring locations. Section 7 provides the results of the external radiation monitoring for 2025.

8.3 GROUNDWATER AND SURFACE WATER

The primary exposure pathway for a member of the public to receive a dose from groundwater would be through ingestion of contaminated groundwater as drinking water. Currently, there is no groundwater contamination associated with the OSWDF Project Area that could cause a dose to a member of the public. The low levels of naturally-occurring uranium that can be detected in groundwater in southern Ohio are not indicative of groundwater contamination caused by activities at the OSWDF. Therefore, there is no dose to a member of the public from exposure to groundwater.

The most significant exposure pathway for a member of the public to receive a dose from surface water would be through ingestion of the untreated surface water as drinking water. No member of the public is known to use surface water from Big Beaver Creek or Little Beaver Creek for drinking water. Therefore, exposure to creek surface water at the sampling locations specified in this OSWDF PSVP is not a pathway that is considered when determining the potential dose to a member of the public from the OSWDF area.

9. OPERATIONS AND MAINTENANCE

This section provides information about the action leakage rate and minor or significant spills, if any, in the OSWDF Project Area in 2025.

9.1 SPILLS

The OSWDF O&M Plan states that minor and significant spills will be documented in the OSWDF Annual Project Status Report to include the material spilled; the date, time, and location of the spill; the actions taken to remove the spill; and disposition of the waste generated.

A minor spill is defined as a spill of a hazardous substance of greater than 1 gallon, or any spill of hazardous waste regardless of volume (except spills of hazardous waste meeting the definition of a significant spill), provided that the spill does not exceed a reportable quantity. A significant spill is a spill of any substance greater than a reportable quantity; or a spill/release that meets any of the following criteria:

- A fire that causes the release of toxic fumes,
- A fire that spreads, possibly igniting materials at other locations or causing heat-induced explosions,
- A spill that results in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard,
- A spill that cannot be contained on PORTS, resulting in off-PORTS soil contamination and/or groundwater or surface water pollution, or
- A release into the environment of a petroleum product with the potential for impacting streams by causing a sheen, or a significant quantity of oil (i.e., 25 gallons or more) that has reached or can potentially reach beyond the project boundary.

No minor or significant spills occurred at the OSWDF in 2025.

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10. REFERENCES

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APPENDIX A

WASTE TRACKING INFORMATION

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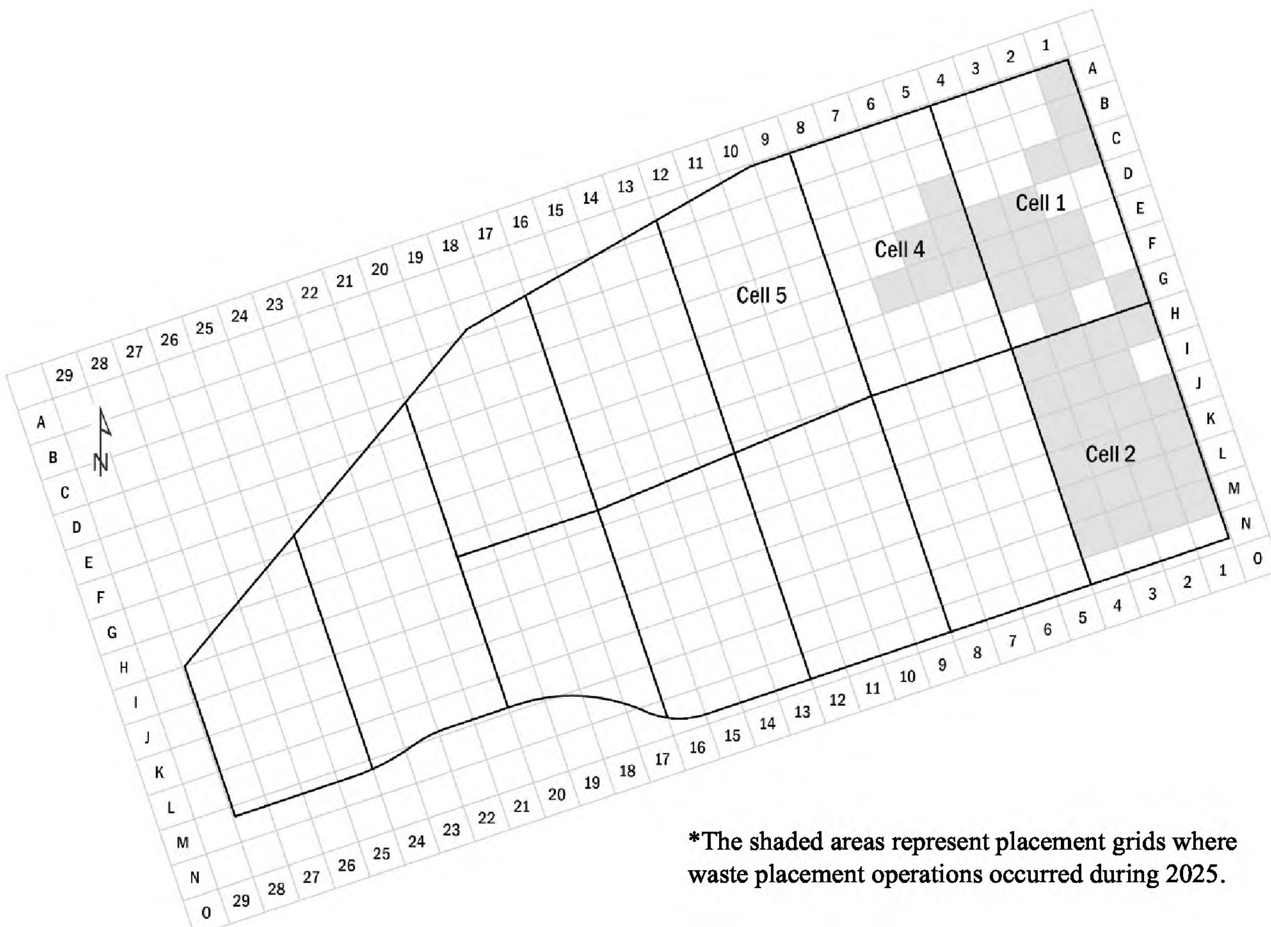
The following text explains the columns in Table A-1, A-2, and A-3:

Grid position (X,Y): the horizontal location in the cell.

Grid position (Z): the vertical position, or elevation, in the cell.



*The shaded areas represent placement grids where waste placement operations occurred during 2025.

Figure A.1. Waste placement grid.

Waste source:

- Balance of Plant = Plant support building projects
- 5-Unit = 5-Unit groundwater plume excavation project
- X-326 = X-326 process building project
- X-330 = X-330 process building project
- X-333 = X-333 process building project
- X-784 = X-784 OSWDF project

Material type:

- Type 1 material is soil and soil-like materials that do not contain hard agglomerations greater than 12 inches. Soil-like material includes crushed concrete.
- Type 2 material is debris such as concrete, metal, debris and other waste resulting from D&D activities. This impacted material can be compacted during waste placement.
- Type 3 material is large debris that cannot be compacted.
- Type 4 material includes decomposable materials such as contaminated vegetative waste as well as bulk paper products, pallets, utility poles, and sewage plant waste. Type 4 waste is limited per cell.
- Type 5 material requires special handling. These items have special requirements for size and placement.

RCRA hazardous waste code: RCRA hazardous waste code (F001, etc.), if applicable. None indicates that the material is not RCRA hazardous waste.

PCB waste characterization: PCB waste characterization, if applicable. None indicates that the material is not PCB waste.

Table A-1. Waste tracking information for OSWDF Cell 1 – 2025

Grid position (X,Y)	Grid (Z)	Waste source	Material type	RCRA hazardous waste code	PCB waste characterization
A1	S	5-Unit	Type 1	F001	NONE
B1	S	5-Unit	Type 1	F001	NONE
C1	S	5-Unit	Type 1	F001	NONE
C2	S	5-Unit	Type 1	F001	NONE
D3	23	5-Unit	Type 1	F001	NONE
D4	24	5-Unit	Type 1	F001	NONE
E2	11	X-333	Type 2	NONE	PCB Remediation
	12	X-333	Type 1	NONE	NONE
		5-Unit	Type 1	F001	NONE
	13	X-326	Type 1	NONE	PCB Remediation
		X-330	Type 2	NONE	NONE
		X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	14	X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
E3	11	X-333	Type 2	NONE	PCB Remediation
	12	5-Unit	Type 1	F001	NONE
	13	X-326	Type 1	NONE	PCB Remediation
		X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	14	X-326	Type 2	NONE	PCB Remediation
		X-330	Type 2	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
		5-Unit	Type 1	F001	NONE
		Balance of Plant	Type 2	NONE	NONE
E4	18	5-Unit	Type 1	F001	NONE
F2	11	X-333	Type 2	NONE	PCB Remediation
	12	5-Unit	Type 1	F001	NONE
	13	X-326	Type 1	NONE	PCB Remediation
		X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	14	X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE

Table A-1. Waste tracking information for OSWDF Cell 1 – 2025 (continued)

Grid position (X,Y)	Grid (Z)	Waste source	Material type	RCRA hazardous waste code	PCB waste characterization
F3	11	X-333	Type 1	NONE	NONE
		X-333	Type 2	NONE	PCB Remediation
		5-Unit	Type 2	F001	NONE
	12	5-Unit	Type 1	F001	NONE
	13	X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
	14	X-326	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
F4	13	5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
		X-784	Type 2	F001	PCB Remediation
		Balance of Plant	Type 2	NONE	NONE
	14	X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
	15	X-326	Type 1	NONE	PCB Remediation
		X-326	Type 2	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
G1	1	X-326	Type 1	NONE	PCB Remediation
G3	1	X-326	Type 1	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	4	X-326	Type 1	NONE	PCB Remediation

* Type 2 waste includes incidental Type 4 waste.

Table A-2. Waste tracking information for OSWDF Cell 2 – 2025

Grid position (X,Y)	Grid (Z)	Waste source	Material type	RCRA hazardous waste code	PCB waste characterization
H1	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	2	X-326	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	3	X-333	Type 1	NONE	NONE
H2	0	5-Unit	Type 1	F001	NONE
	1	X-330	Type 3	NONE	PCB Remediation
		X-333	Type 3	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	3	X-326	Type 1	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
H3	0	5-Unit	Type 1	F001	NONE
H4	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 1	NONE	PCB Remediation
		X-330	Type 3	NONE	PCB Remediation
		X-333	Type 3	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	3	X-326	Type 1	NONE	PCB Remediation
I2	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 1	NONE	PCB Remediation
I3	0	5-Unit	Type 1	F001	NONE
I4	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 1	NONE	PCB Remediation
		X-326	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	2	X-326	Type 2	NONE	PCB Remediation
	3	X-326	Type 1	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
J1	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	2	X-326	Type 1	NONE	PCB Remediation
		X-326	Type 2	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
	3	X-326	Type 1	NONE	PCB Remediation

Table A-2. Waste tracking information for OSWDF Cell 2 – 2025 (continued)

Grid position (X,Y)	Grid (Z)	Waste source	Material type	RCRA hazardous waste code	PCB waste characterization
J2	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 1	NONE	PCB Remediation
J3	0	5-Unit	Type 1	F001	NONE
J4	0	5-Unit	Type 1	F001	NONE
	1	X-333	Type 1	NONE	NONE
		X-333	Type 3	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	3	X-333	Type 1	NONE	NONE
K1	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 2	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
		5-Unit	Type 1	F001	NONE
	2	X-326	Type 1	NONE	PCB Remediation
		X-326	Type 2	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
	3	X-326	Type 1	NONE	PCB Remediation
K2	0	5-Unit	Type 1	F001	NONE
K3	0	5-Unit	Type 1	F001	NONE
K4	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 1	NONE	PCB Remediation
		X-326	Type 2	NONE	PCB Remediation
		X-333	Type 1	NONE	NONE
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	NONE	NONE
	2	X-326	Type 1	NONE	PCB Remediation
L1	0	5-Unit	Type 1	F001	NONE
	1	X-326	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	2	X-326	Type 1	NONE	PCB Remediation
		X-326	Type 2	NONE	PCB Remediation
		X-784	Type 2	F001	PCB Remediation
	3	X-326	Type 1	NONE	PCB Remediation
L2	0	5-Unit	Type 1	F001	NONE
L3	0	5-Unit	Type 1	F001	NONE
L4	0	5-Unit	Type 1	F001	NONE
M1	0	X-326	Type 1	NONE	PCB Remediation

Table A-2. Waste tracking information for OSWDF Cell 2 – 2025 (continued)

Grid position (X,Y)	Grid (Z)	Waste source	Material type	RCRA hazardous waste code	PCB waste characterization
M2	0	X-326	Type 1	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
M3	0	X-326	Type 1	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	1	5-Unit	Type 1	F001	NONE
M4	0	X-326	Type 1	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE

* Type 2 waste includes incidental Type 4 waste.

Table A-3. Waste tracking information for OSWDF Cell 4 – 2025

Grid position (X,Y)	Grid (Z)	Waste source	Material type	RCRA hazardous waste code	PCB waste characterization
C5	27	X-333	Type 1	NONE	NONE
D5	27	X-330	Type 2	NONE	NONE
		X-333	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
	28	5-Unit	Type 1	F001	NONE
D6	27	X-330	Type 2	NONE	NONE
		X-333	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	28	5-Unit	Type 1	F001	NONE
E5	25	X-330	Type 2	NONE	NONE
		X-333	Type 1	NONE	NONE
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
		X-784	Type 2	F001	PCB Remediation
	27	5-Unit	Type 1	F001	NONE
E6	23	X-333	Type 1	NONE	NONE
	25	X-333	Type 1	NONE	NONE
		X-333	Type 3	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
	26	5-Unit	Type 1	F001	NONE
	28	X-330	Type 2	NONE	PCB Remediation
		5-Unit	Type 1	F001	NONE
		5-Unit	Type 2	F001	NONE
		5-Unit	Type 2	NONE	NONE
		Balance of Plant	Type 2	NONE	NONE
E7	24	X-333	Type 2	NONE	PCB Remediation

* Type 2 waste includes incidental Type 4 waste.

APPENDIX B

ANALYTICAL PARAMETERS

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Table B-1. Analytical parameters for leachate monitoring

Parameter/ parameter type	Frequency	Parameter	
PCBs	Monthly	PCBs, total	
Chlorinated organics (EPA Method 624)	Monthly	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane
		1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
		1,1-Dichloroethane	1,1-Dichloroethene
		1,2,3-Trichloropropane	1,2-Dibromo-3-chloropropane
		1,2-Dichlorobenzene	1,2-Dichloroethane
		1,2-Dichloropropane	1,3-Dichlorobenzene
		1,4-Dichlorobenzene	2-Chloro-1,3-butadiene
		Allyl chloride	Bromodichloromethane
		Carbon tetrachloride	Chlorobenzene
		Chloroethane	Chloroform
		Chloromethane	*cis*-1,2-Dichloroethene
		cis-1,3-Dichloropropene	Dibromochloromethane
		Dichlorodifluoromethane	Methylene chloride
		Tetrachloroethene	*trans*-1,2-Dichloroethene
		trans-1,3-Dichloropropene	*trans*-1,4-Dichloro-2-butene
		Trichloroethene	Trichlorofluoromethane
		Vinyl chloride	
Chlorinated organics (EPA Method 625)	Monthly	1,2,4,5-Tetrachlorobenzene	1,2,4-Trichlorobenzene
		2,3,4,6-Tetrachlorophenol	2,4,5-Trichlorophenol
		2,4,6-Trichlorophenol	2,4-Dichlorophenol
		2,6-Dichlorophenol	2-Chloronaphthalene
		2-Chlorophenol	3,3'-Dichlorobenzidine
		3-Methylcholanthrene	4-Chloro-3-methylphenol
		4-Chlorobenzenamine	4-Chlorophenyl phenyl ether
		bis(2-Chloro-1-methylethyl)ether	bis(2-Chloroethoxy)methane
		bis(2-Chloroethyl) ether	Chlorobenzilate
		Hexachloro-1-propene	Hexachlorobenzene
		Hexachlorobutadiene	Hexachlorocyclopentadiene
		Hexachloroethane	Hexachlorophene
		Pentachlorobenzene	Pentachloroethane
		Pentachloronitrobenzene	Pentachlorophenol
Chlorinated pesticides (EPA Method 608)	Monthly	alpha-BHC	beta-BHC
		Chlordane	delta-BHC
		Endrin aldehyde	Heptachlor
		Heptachlor epoxide	Methoxychlor
		Toxaphene	
Chlorinated herbicides (EPA Method 615)	Monthly	2,4,5-T	2,4-D
		Dinoseb	Silvex

Table B-1. Analytical parameters for leachate monitoring (continued)

Parameter/ parameter type	Frequency	Parameter	
Organics (EPA Method 624)	Semiannual	1,2-Dibromoethane	1,4-Dioxane
		2-Butanone	2-Hexanone
		4-Methyl-2-pentanone	Acetone
		Acetonitrile	Acrolein
		Acrylonitrile	Benzene
		Bromoform	Bromomethane
		Carbon disulfide	Dibromomethane
		Ethyl cyanide	Ethyl methacrylate
		Ethylbenzene	Iodomethane
		Isobutanol	Methacrylonitrile
		Methyl methacrylate	Styrene
		Toluene	Total xylene
		Vinyl acetate	
Organics (EPA Method 625)	Semiannual	1,3,5-Trinitrobenzene	1,3-Dinitrobenzene
		1,4-Naphthoquinone	1-Naphthalenamine
		2,4-Dimethylphenol	2,4-Dinitrophenol
		2,4-Dinitrotoluene	2,6-Dinitrotoluene
		2-Acetylaminofluorene	2-Methyl-4,6-dinitrophenol
		2-Methylphenol	2-Methylpyridine
		2-Naphthalenamine	2-Nitrobenzenamine
		2-Nitrophenol	3,3'-Dimethylbenzidine
		3-Nitrobenzenamine	4-Aminobiphenyl
		4-Bromophenyl phenyl ether	4-Nitrobenzenamine
		4-Nitrophenol	4-Nitroquinoline-1-oxide
		5-(2-Propenyl)-1,3-benzodioxole (Safrole)	5-Nitro-o-toluidine
		7,12-Dimethylbenz(a)anthracene	a,a-Dimethylphenethylamine
		Acenaphthene	Acenaphthylene
		Acetophenone	Aniline
		Anthracene	Aramite
		Benzenemethanol	Benzo(ghi)perylene
		Bis(2-ethylhexyl)phthalate	Butyl benzyl phthalate
		Diallate	Dibenzofuran
		Diethyl phthalate	Dimethoate
		Dimethyl phthalate	Di-n-butyl phthalate
		Di-n-octylphthalate	Diphenylamine
		Disulfoton	Ethyl methanesulfonate
		Famphur	Isodrin
		Isophorone	Isosafrole
		m,p-cresol	Methapyrilene
		Methyl methanesulfonate	Methyl parathion
		Nitrobenzene	N-Nitrosodiethylamine
		N-Nitrosodimethylamine	N-Nitroso-di-n-butylamine
		N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine
		N-Nitrosomethylethylamine	N-Nitrosomorpholine
		N-Nitrosopiperidine	N-Nitrosopyrrolidine
		O,O,O-Triethylphosphorothioate	o-Toluidine
		Parathion	p-Dimethylaminoazobenzene

Table B-1. Analytical parameters for leachate monitoring (continued)

Parameter/ parameter type	Frequency	Parameter	
Organics (EPA Method 625)	Semiannual	Phenacetin	Phenanthrene
		Phenol	Phorate
		p-Phenylenediamine	Pronamide
		Pyridine	Sulfotepp
		Thionazin	
PAHs (EPA Method 625)	Semiannual	2-Methylnaphthalene	Benz(a)anthracene
		Benzo(a)pyrene	Benzo(b)fluoranthene
		Benzo(k)fluoranthene	Chrysene
		Dibenz(a,h)anthracene	Fluoranthene
		Fluorene	Indeno(1,2,3-cd)pyrene
		Naphthalene	Pyrene
Pesticides (EPA Method 608)	Semiannual	4,4'-DDD	4,4'-DDE
		4,4'-DDT	Aldrin
		Dieldrin	Endosulfan I
		Endosulfan II	Endosulfan sulfate
		Endrin	Kepone
		Lindane	
Metals (Various methods)	Semiannual	Aluminum	Antimony
		Arsenic	Barium
		Beryllium	Cadmium
		Chromium (total)	Chromium (hexavalent)
		Chromium (trivalent)	Cobalt
		Copper	Fluoride
		Iron	Lead
		Magnesium	Manganese
		Mercury	Nickel
		Selenium	Silver
		Thallium	Tin
		Vanadium	Zinc

Table B-1. Analytical parameters for leachate monitoring (continued)

Parameter/ parameter type	Frequency	Parameter	
Dioxins/furans (EPA Method 1613)	Semiannual	1,2,3,4,6,7,8-Heptachlorodibenzofuran	
		1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	
		1,2,3,4,7,8,9-Heptachlorodibenzofuran	
		1,2,3,4,7,8-Hexachlorodibenzofuran	
		1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	
		1,2,3,6,7,8-Hexachlorodibenzofuran	
		1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	
		1,2,3,7,8,9-Hexachlorodibenzofuran	
		1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	
		1,2,3,7,8-Pentachlorodibenzofuran	
		1,2,3,7,8-Pentachlorodibenzo-p-dioxin	
		2,3,7,8-Tetrachlorodibenzofuran	
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	
		2,3,4,6,7,8-Hexachlorodibenzofuran	
		2,3,4,7,8-Pentachlorodibenzofuran	
		Octachloro-dibenzo[b,e][1,4]dioxin	
		Octachlorodibenzofuran	
Other parameters (Various methods)	Semiannual	Chemical oxygen demand	Cyanide
		Dissolved solids	Sulfide
Radionuclides (Various methods)	Semiannual	Americium-241	Neptunium-237
		Plutonium-238	Plutonium-239/240
		Technetium-99	Thorium-230
		Uranium	Uranium-233/234
		Uranium-235/236	Uranium-238

Table B-2. Analytical parameters for groundwater monitoring

Parameter/ parameter type	Frequency	Parameter	
PCBs	Monthly	PCBs, total	
Chlorinated organics (EPA Method 624)	Monthly	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane
		1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
		1,1-Dichloroethane	1,1-Dichloroethene
		1,2,3-Trichloropropane	1,2-Dibromo-3-chloropropane
		1,2-Dichlorobenzene	1,2-Dichloroethane
		1,2-Dichloropropane	1,3-Dichlorobenzene
		1,4- Dichlorobenzene	2-Chloro-1,3-butadiene
		Allyl chloride	Bromodichloromethane
		Carbon tetrachloride	Chlorobenzene
		Chloroethane	Chloroform
		Chloromethane	*cis*-1,2-Dichloroethene
		cis-1,3-Dichloropropene	Dibromochloromethane
		Dichlorodifluoromethane	Methylene chloride
		Tetrachloroethene	*trans*-1,2-Dichloroethene
		trans-1,3-Dichloropropene	*trans*-1,4-Dichloro-2-butene
		Trichloroethene	Trichlorofluoromethane
		Vinyl chloride	
Chlorinated organics (EPA Method 625)	Monthly	1,2,4,5-Tetrachlorobenzene	1,2,4-Trichlorobenzene
		2,3,4,6-Tetrachlorophenol	2,4,5-Trichlorophenol
		2,4,6-Trichlorophenol	2,4-Dichlorophenol
		2,6-Dichlorophenol	2-Chloronaphthalene
		2-Chlorophenol	3,3'-Dichlorobenzidine
		3-Methylcholanthrene	4-Chloro-3-methylphenol
		4-Chlorobenzenamine	4-Chlorophenyl phenyl ether
		bis(2-Chloro-1-methylethyl)ether	bis(2-Chloroethoxy)methane
		bis(2-Chloroethyl) ether	Chlorobenzilate
		Hexachloro-1-propene	Hexachlorobenzene
		Hexachlorobutadiene	Hexachlorocyclopentadiene
		Hexachloroethane	Hexachlorophene
		Pentachlorobenzene	Pentachloroethane
		Pentachloronitrobenzene	Pentachlorophenol
Dioxins/furans (EPA Method 1613)	Semiannual	Octachloro-dibenzo[b,e][1,4]dioxin	

Table B-2. Analytical parameters for groundwater monitoring (continued)

Parameter/ parameter type	Frequency	Parameter	
Metals (Various methods)	Semiannual	Aluminum	Arsenic
		Barium	Beryllium
		Cadmium	Chromium (total)
		Chromium (trivalent)	Cobalt
		Copper	Fluoride
		Lead	Magnesium
		Manganese	Nickel
		Mercury	Selenium
		Thallium	Tin
		Vanadium	Zinc
Other parameters (Various methods)	Semiannual	Chemical Oxygen Demand (COD)	Dissolved solids
		fluoride	
Indicator parameters (Various methods)	Quarterly	Alkalinity	Ammonia
		Calcium	Chloride
		Iron	Nitrate/nitrite
		Potassium	Sodium
		Sulfate	
Radionuclides (Various methods)	Semiannual	Americium-241	Neptunium-237
		Plutonium-238	Plutonium-239/240
		Technetium-99	Thorium-230
		Uranium	Uranium-233/234
		Uranium-235/236	Uranium-238

Table B-3. Analytical parameters for storm water discharge monitoring

Parameter/ parameter type	Frequency	Parameter	
Other parameters	Monthly	Oil and grease	Total suspended solids
Metals	Quarterly	Cadmium	Chromium
		Lead	Mercury
		Hardness	

Table B-4. Analytical parameters for surface water environmental surveillance monitoring

Parameter/ parameter type	Frequency	Parameter	
PCBs	Monthly	PCBs, total	
Chlorinated organics (EPA Method 624)	Monthly	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane
		1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
		1,1-Dichloroethane	1,1-Dichloroethene
		1,2,3-Trichloropropane	1,2-Dibromo-3-chloropropane
		1,2-Dichlorobenzene	1,2-Dichloroethane
		1,2-Dichloropropane	1,3-Dichlorobenzene
		1,4-Dichlorobenzene	2-Chloro-1,3-butadiene
		Allyl chloride	Bromodichloromethane
		Carbon tetrachloride	Chlorobenzene
		Chloroethane	Chloroform
		Chloromethane	*cis*-1,2-Dichloroethene
		cis-1,3-Dichloropropene	Dibromochloromethane
		Dichlorodifluoromethane	Methylene chloride
		Tetrachloroethene	*trans*-1,2-Dichloroethene
		trans-1,3-dichloropropene	*trans*-1,4-Dichloro-2-butene
		Trichloroethene	Trichlorofluoromethane
		Vinyl chloride	
Chlorinated organics (EPA Method 625)	Monthly	1,2,4,5-Tetrachlorobenzene	1,2,4-Trichlorobenzene
		2,3,4,6-Tetrachlorophenol	2,4,5-Trichlorophenol
		2,4,6-Trichlorophenol	2,4-Dichlorophenol
		2,6-Dichlorophenol	2-Chloronaphthalene
		2-Chlorophenol	3,3'-Dichlorobenzidine
		3-Methylcholanthrene	4-Chloro-3-methylphenol
		4-Chlorobenzenamine	4-Chlorophenyl phenyl ether
		bis(2-Chloro-1-methylethyl)ether	bis(2-Chloroethoxy)methane
		bis(2-Chloroethyl) ether	Chlorobenzilate
		Hexachloro-1-propene	Hexachlorobenzene
		Hexachlorobutadiene	Hexachlorocyclopentadiene
		Hexachloroethane	Hexachlorophene
		Pentachlorobenzene	Pentachloroethane
		Pentachloronitrobenzene	Pentachlorophenol
Chlorinated organics (EPA Method 608)	Monthly	alpha-BHC	beta-BHC
		Chlordane	delta-BHC
		Endrin aldehyde	Heptachlor
		Heptachlor epoxide	Methoxychlor
		Toxaphene	
Chlorinated organics (EPA Method 615)	Monthly	2,4,5-T	2,4-D
		Dinoseb	Silvex

Table B-4. Analytical parameters for surface water environmental surveillance monitoring (continued)

Parameter/ parameter type	Frequency	Parameter	
Radionuclides (Various methods)	Quarterly	Americium-241	Neptunium-237
		Plutonium-238	Plutonium-239/240
		Technetium-99	Thorium-230
		Uranium	Uranium-233/234
		Uranium-235/236	Uranium-238

Table B-5. Analytical parameters for ambient air monitoring

Parameter/ parameter type	**Frequency**	**Parameter**	
Particulate	Continuous	PM_{10}	
PCBs (EPA-TO-4A)	Monthly	PCBs, total	
VOCs (EPA-TO-15)	Weekly	1,1,1-Trichloroethane	1,1,2-Trichloroethane
		1,1-Dichloroethane	1,1-Dichloroethene
		1,2-Dichloroethane	1,4-Dioxane
		2-Butanone	4-Methyl-2-pentanone
		Benzene	Carbon disulfide
		Carbon tetrachloride	Chloroethane
		Chloroform	*cis*-1,2-Dichloroethene
		Methylene chloride	Tetrachloroethene
		Toluene	Total VOCs
		trans-1,2-Dichloroethene	Trichloroethene
		Vinyl chloride	
Metals (Various methods)	Weekly	Antimony	Arsenic
		Beryllium	Cadmium
		Chromium	Cobalt
		Lead	Manganese
		Mercury	Nickel
		Selenium	
Radionuclides (Various methods)	Monthly	Technetium-99	Uranium
		Uranium-233/234	Uranium-235/236
		Uranium-238	
Radionuclides (Various methods)	Quarterly	Americium-241	Neptunium-237
		Plutonium-238	Plutonium-239/240
		Thorium-228	Thorium-230
		Thorium-232	

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APPENDIX C

CONCENTRATION LIMITS, ADMINISTRATIVE LEVELS, BENCHMARK CONCENTRATIONS, AND ACTION LEVELS

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Table C-1. Concentration limits and administrative levels for groundwater monitoring

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
PCBs (µg/L)	PCBs	**0.5**	**0.96**	detection	detection
Metals (µg/L)	Aluminum	-	**2760**	**52,200**	detection
	Antimony	**6**	**11.9**	**4.59**	detection
	Arsenic	**10**	**87.6**	**71.5**	detection
	Barium	**2,000**	**239**	**267**	detection
	Beryllium	**4**	**1.92**	**3.3**	detection
	Cadmium	**5**	**13.9**	**11.1**	detection
	Chromium	**100**	**47.1**	**58.1**	detection
	Chromium, hexavalent	-	detection	**10.5**	detection
	Chromium, trivalent	-	**47.1**	**58.1**	**0.694**
	Cobalt	-	**13.7**	**40.8**	**16.7**
	Copper	**1300**	**36.4**	**73.9**	detection
	Lead	**15**	**11.1**	**42.5**	**3.66**
	Magnesium	-	**47,200**	**1,290,000**	**525,000**
	Manganese	-	**562**	**1380**	**1,100**
	Mercury	**2**	**1**	**0.0546**	**0.000675**
	Nickel	-	**46.9**	**154**	**39.3**
	Selenium	**50**	**131**	**488**	detection
	Silver	-	**163**	**165**	**2.29**
	Thallium	**2**	**11.1**	**74.8**	**5.66**
	Tin	-	detection	**11**	**5.07**
	Vanadium	-	**27.7**	**138**	**2.6**
	Zinc	-	**689**	**3620**	**425**
Organics (µg/L) (EPA-624)	1,1,1,2-Tetrachloroethane	-	detection	detection	detection
	1,1,1-Trichloroethane	**200**	detection	detection	detection
	1,1,2,2-Tetrachloroethane	-	detection	detection	detection
	1,1,2-Trichloroethane	**5**	detection	detection	detection
	1,1-Dichloroethane	-	detection	detection	detection
	1,1-Dichloroethene	**7**	detection	detection	detection
	1,2,3-Trichloropropane	-	detection	detection	detection
	1,2,4-Trichlorobenzene	**70**	detection	detection	detection
	1,2-Dibromo-3-chloropropane	**0.2**	detection	detection	detection
	1,2-Dibromoethane	**0.05**	detection	detection	detection
	1,2-Dichlorobenzene	**600**	detection	detection	detection
	1,2-Dichloroethane	**5**	detection	detection	detection
	1,2-Dichloropropane	**5**	detection	detection	detection
	1,3-Dichlorobenzene	-	detection	detection	detection
	1,4-Dichlorobenzene	**75**	detection	detection	detection
	1,4-Dioxane	-	detection	detection	detection
	2-Butanone	-	detection	detection	detection
	2-Chloro-1,3-butadiene	-	detection	detection	detection
	2-Hexanone	-	detection	detection	detection
	4-Methyl-2-pentanone	-	detection	detection	detection

Table C-1. Concentration limits and administrative levels for groundwater monitoring (continued)

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
Organics (µg/L) (EPA-624)	Acetone	-	detection	detection	detection
	Acetonitrile	-	detection	detection	detection
	Acrolein	-	detection	detection	detection
	Acrylonitrile	-	detection	detection	detection
	Allyl chloride	-	detection	detection	detection
	Benzene	**5**	**2.76**	**1.26**	detection
	Bromodichloromethane	-	detection	detection	detection
	Bromoform	-	detection	detection	detection
	Bromomethane	-	detection	detection	detection
	Carbon disulfide	-	**3.07**	detection	detection
	Carbon tetrachloride	**5**	detection	detection	detection
	Chlorobenzene	**100**	detection	detection	detection
	Chloroethane	-	detection	detection	detection
	Chloroform	-	detection	detection	detection
	Chloromethane	-	detection	detection	detection
	cis-1,2-Dichloroethene	**70**	detection	detection	detection
	cis-1,3-Dichloropropene	-	detection	detection	detection
	Dibromochloromethane	-	detection	detection	detection
	Dibromomethane	-	detection	detection	detection
	Dichlorodifluoromethane	-	detection	detection	detection
	Ethyl cyanide	-	detection	detection	detection
	Ethyl methacrylate	-	detection	detection	detection
	Ethylbenzene	**700**	**1.18**	detection	detection
	Iodomethane	-	detection	detection	detection
	Isobutanol	-	**16.5**	detection	detection
	Methacrylonitrile	-	detection	detection	detection
	Methyl methacrylate	-	detection	detection	detection
	Methylene chloride	**5**	**3.09**	detection	detection
	Styrene	**100**	detection	**0.7**	detection
	Tetrachloroethene	**5**	detection	detection	detection
	Toluene	**1000**	**2.15**	**0.72**	detection
	Total Xylene	**10,000**	**2.34**	detection	detection
	trans-1,2-Dichloroethene	**100**	detection	detection	detection
	trans-1,3-Dichloropropene	-	detection	detection	detection
	trans-1,4-Dichloro-2-butene	-	detection	detection	detection
	Trichloroethene	**5**	detection	detection	detection
	Trichlorofluoromethane	-	detection	detection	detection
	Vinyl acetate	-	detection	detection	detection
	Vinyl chloride	**2**	detection	detection	detection
Organics (µg/L) (EPA-625)	1,2,4,5-Tetrachlorobenzene	-	detection	detection	detection
	1,3,5-Trinitrobenzene	-	detection	detection	detection
	1,3-Dinitrobenzene	-	detection	detection	detection
	1,4-Naphthoquinone	-	detection	detection	detection
	1-Naphthalenamine	-	detection	detection	detection
	2,3,4,6-Tetrachlorophenol	-	detection	detection	detection

Table C-1. Concentration limits and administrative levels for groundwater monitoring (continued)

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
Organics (µg/L) (EPA-625)	2,4,5-Trichlorophenol	-	detection	detection	detection
	2,4,6-Trichlorophenol	-	detection	detection	detection
	2,4-Dichlorophenol	-	detection	detection	detection
	2,4-Dimethylphenol	-	detection	detection	detection
	2,4-Dinitrophenol	-	detection	detection	detection
	2,4-Dinitrotoluene	-	detection	detection	detection
	2,6-Dichlorophenol	-	detection	detection	detection
	2,6-Dinitrotoluene	-	detection	detection	detection
	2-Acetylaminofluorene	-	detection	detection	detection
	2-Chloronaphthalene	-	detection	detection	detection
	2-Chlorophenol	-	detection	detection	detection
	2-Methyl-4,6-dinitrophenol	-	detection	detection	detection
	2-Methylnaphthalene	-	detection	**0.781**	detection
	2-Methylphenol	-	detection	detection	detection
	2-Methylpyridine	-	detection	detection	detection
	2-Naphthalenamine	-	detection	detection	detection
	2-Nitrobenzenamine	-	detection	detection	detection
	2-Nitrophenol	-	detection	detection	detection
	3,3'-Dichlorobenzidine	-	detection	detection	detection
	3,3'-Dimethylbenzidine	-	detection	detection	detection
	3-Methylcholanthrene	-	detection	detection	detection
	3-Nitrobenzenamine	-	detection	detection	detection
	4-Aminobiphenyl	-	detection	detection	detection
	4-Bromophenyl phenyl ether	-	detection	detection	detection
	4-Chloro-3-methylphenol	-	detection	detection	detection
	4-Chlorobenzenamine	-	detection	detection	detection
	4-Chlorophenyl phenyl ether	-	detection	detection	detection
	4-Nitrobenzenamine	-	detection	detection	detection
	4-Nitrophenol	-	detection	detection	detection
	4-Nitroquinoline-1-oxide	-	detection	detection	detection
	5-(2-Propenyl)-1,3-benzodioxole (Safrole)	-	detection	detection	detection
	5-Nitro-o-toluidine	-	detection	detection	detection
	7,12-Dimethylbenz(a)anthracene	-	detection	detection	detection
	a,a-Dimethylphenethylamine	-	detection	detection	detection
	Acenaphthene	-	**1.21**	**0.757**	detection
	Acenaphthylene	-	detection	detection	detection
	Acetophenone	-	detection	detection	detection
	Aniline	-	detection	detection	detection
	Anthracene	-	detection	detection	detection
	Aramite	-	detection	detection	detection
	Benz(a)anthracene	-	detection	detection	detection
	Benzenemethanol	-	detection	detection	detection
	Benzo(a)pyrene	**0.2**	detection	detection	detection
	Benzo(b)fluoranthene	-	detection	detection	detection
	Benzo(ghi)perylene	-	detection	detection	detection
	Benzo(k)fluoranthene	-	detection	detection	detection

Table C-1. Concentration limits and administrative levels for groundwater monitoring (continued)

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
Organics (µg/L) (EPA-625)	Bis(2-chloro-1-methylethyl)ether	-	detection	detection	detection
	Bis(2-chloroethoxy)methane	-	detection	detection	detection
	Bis(2-chloroethyl) ether	-	detection	detection	detection
	Bis(2-ethylhexyl)phthalate	**6**	**1.4**	**1.52**	detection
	Butyl benzyl phthalate	-	detection	**1.01**	detection
	Chlorobenzilate	-	detection	detection	detection
	Chrysene	-	detection	detection	detection
	Diallate	-	detection	detection	detection
	Dibenz(a,h)anthracene	-	detection	detection	detection
	Dibenzofuran	-	detection	detection	detection
	Diethyl phthalate	-	detection	detection	detection
	Dimethoate	-	detection	detection	detection
	Dimethyl phthalate	-	detection	detection	detection
	Di-n-butyl phthalate	-	**1.3**	**0.369**	detection
	Di-n-octylphthalate	-	detection	detection	detection
	Diphenylamine	-	detection	detection	detection
	Disulfoton	-	detection	detection	detection
	Ethyl methanesulfonate	-	detection	detection	detection
	Famphur	-	detection	detection	detection
	Fluoranthene	-	detection	detection	detection
	Fluorene	-	detection	detection	detection
	Hexachloro-1-propene	-	detection	detection	detection
	Hexachlorobenzene	**1**	detection	detection	detection
	Hexachlorobutadiene	-	detection	detection	detection
	Hexachlorocyclopentadiene	**50**	detection	detection	detection
	Hexachloroethane	-	detection	detection	detection
	Hexachlorophene	-	detection	detection	detection
	Indeno(1,2,3-cd)pyrene	-	detection	detection	detection
	Isodrin	-	detection	detection	detection
	Isophorone	-	detection	detection	detection
	Isosafrole	-	detection	detection	detection
	Kepone	-	detection	detection	detection
	m,p-cresol	-	detection	detection	detection
	Methapyrilene	-	detection	detection	detection
	Methyl methanesulfonate	-	detection	detection	detection
	Methyl parathion	-	detection	detection	detection
	Naphthalene	-	detection	**1.1**	detection
	Nitrobenzene	-	detection	detection	detection
	N-Nitrosodiethylamine	-	detection	detection	detection
	N-Nitrosodimethylamine	-	detection	detection	detection
	N-Nitroso-di-n-butylamine	-	detection	detection	detection
	N-Nitroso-di-n-propylamine	-	detection	detection	detection
	N-Nitrosomethylethylamine	-	detection	detection	detection
	N-Nitrosomorpholine	-	detection	detection	detection
	N-Nitrosopiperidine	-	detection	detection	detection
	N-Nitrosopyrrolidine	-	detection	detection	detection

Table C-1. Concentration limits and administrative levels for groundwater monitoring (continued)

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
Organics (µg/L) (EPA-625)	O,O,O-Triethylphosphorothioate	-	detection	detection	detection
	o-Toluidine	-	detection	detection	detection
	Parathion	-	detection	detection	detection
	p-Dimethylaminoazobenzene	-	detection	detection	detection
	Pentachlorobenzene	-	detection	detection	detection
	Pentachloroethane	-	detection	detection	detection
	Pentachloronitrobenzene	-	detection	detection	detection
	Pentachlorophenol	**1**	detection	detection	detection
	Phenacetin	-	detection	detection	detection
	Phenanthrene	-	detection	detection	detection
	Phenol	-	detection	detection	detection
	Phorate	-	detection	detection	detection
	p-Phenylenediamine	-	detection	detection	detection
	Pronamide	-	detection	detection	detection
	Pyrene	-	detection	detection	detection
	Pyridine	-	detection	detection	detection
	Sulfotepp	-	detection	detection	detection
	Thionazin	-	detection	detection	detection
Pesticides (µg/L) (EPA-608)	4,4'-DDD	-	detection	detection	detection
	4,4'-DDE	-	detection	detection	detection
	4,4'-DDT	-	detection	detection	detection
	Aldrin	-	detection	detection	0.00816
	alpha-BHC	-	detection	detection	detection
	beta-BHC	-	detection	detection	detection
	Chlordane	2	detection	detection	detection
	delta-BHC	-	detection	detection	detection
	Dieldrin	-	detection	detection	detection
	Endosulfan I	-	**0.2**	detection	detection
	Endosulfan II	-	detection	detection	detection
	Endosulfan sulfate	-	detection	detection	detection
	Endrin	**2**	detection	detection	detection
	Endrin aldehyde	-	detection	detection	detection
	Heptachlor	**0.4**	detection	detection	detection
	Heptachlor epoxide	**0.2**	detection	detection	detection
	Lindane	**0.2**	detection	detection	detection
	Methoxychlor	**40**	detection	detection	detection
	Toxaphene	**3**	detection	detection	detection
Herbicides (µg/L) (EPA-615)	2,4,5-T	-	detection	detection	detection
	2,4-D	**70**	detection	detection	detection
	Dinoseb	**7**	detection	detection	detection
	Silvex	**50**	detection	detection	detection

Table C-1. Concentration limits and administrative levels for groundwater monitoring (continued)

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
Dioxins/ furans (pg/L) (EPA-1613)	1,2,3,4,6,7,8-Heptachlorodibenzofuran	-	detection	detection	detection
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	-	detection	detection	detection
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	-	detection	detection	detection
	1,2,3,4,7,8-Hexachlorodibenzofuran	-	detection	detection	detection
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	-	detection	detection	detection
	1,2,3,6,7,8-Hexachlorodibenzofuran	-	detection	detection	detection
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	-	detection	detection	detection
	1,2,3,7,8,9-Hexachlorodibenzofuran	-	detection	detection	detection
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	-	detection	detection	detection
	1,2,3,7,8-Pentachlorodibenzofuran	-	detection	detection	detection
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	-	detection	detection	detection
	2,3,4,6,7,8-Hexachlorodibenzofuran	-	detection	detection	detection
	2,3,4,7,8-Pentachlorodibenzofuran	-	detection	detection	detection
	2,3,7,8-Tetrachlorodibenzofuran	-	detection	detection	detection
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	-	detection	detection	detection
	Heptachloro-dibenzo[b,e][1,4]dioxin	-	detection	detection	detection
	Heptachlorodibenzofuran	-	detection	detection	detection
	Hexachloro-dibenzo[b,e][1,4]dioxin	-	detection	detection	detection
	Hexachlorodibenzofuran	-	detection	detection	detection
	Octachloro-dibenzo[b,e][1,4]dioxin	-	**34.1**	**1500**	detection
	Octachlorodibenzofuran	-	detection	detection	detection
	Pentachloro-dibenzo[b,e][1,4]dioxin	-	detection	detection	detection
	Pentachlorodibenzofuran	-	detection	detection	detection
	Tetrachloro-dibenzo[b,e][1,4]dioxin	-	detection	detection	detection
	Total Tetrachlorodibenzofuran	-	detection	detection	detection
Indicator parameters (mg/L)	Alkalinity	-	-	**1010**	**640**
	Ammonia	-	-	**5.45**	**0.613**
	Calcium	-	-	**404**	**410**
	Chloride	-	-	**95.3**	**55.3**
	Iron	-	-	**85.1**	**1.28**
	Nitrate/Nitrite as Nitrogen	-	-	**5.54**	**0.218**
	Potassium	-	-	**44.3**	**25.3**
	Sodium	-	-	**568**	**287**
	Sulfate	-	-	**8420**	**2,890**
Other parameters (units as noted)	Chemical oxygen demand (COD) mg/L	-	**280**	**207**	**10.9**
	Cyanide µg/L	**200**	**3.21**	**8.56**	**12.9**
	Dissolved Solids mg/L	-	**4820**	**8860**	**4,580**
	Fluoride µg/L	-	**900**	**1150**	**535**
	Sulfide µg/L	-	**28.9**	**38.6**	**665**

Table C-1. Concentration limits and administrative levels for groundwater monitoring (continued)

Parameter/ parameter type	Parameter	OAC concentration limit	Berea administrative level	Non-Berea administrative level	Trench wells administrative level
Radionuclides (pCi/L except uranium in µg/L)	Americium-241	-	detection	detection	detection
	Neptunium-237	-	detection	detection	detection
	Plutonium-238	-	detection	detection	detection
	Plutonium-239/240	-	detection	detection	detection
	Technetium-99	-	detection	detection	detection
	Thorium-230	-	**0.46**	**1.16**	detection
	Uranium	**30**	**6.25**	**22.8**	**25.3**
	Uranium-233/234	-	**6.36**	**10.8**	**14.1**
	Uranium-235/236	-	**0.45**	**0.394**	**1.04**
	Uranium-238	-	**2.08**	**7.61**	**8.47**

OAC – Ohio Administrative Code

Table C-2. Benchmark concentrations for storm water discharge monitoring

Parameter	Concentration	
pH	6.5-9 standard units	
Oil and Grease	15 mg/L	
Total Suspended Solids	100 mg/L	
Cadmium	Hardness range (mg/L)	Concentration (µg/L)
	0-25	0.9
	25-50	1.5
	50-75	2.7
	75-100	3.9
	100-125	5.2
	125-150	6.5
	150-175	7.8
	175-200	9.2
	200-225	10.6
	225-250	12
	250-275	13.4
	275-300	14.9
	300-325	16.3
	325-350	17.8
	350-375	19.3
	375-400	20.8
	400+	21.6
Chromium	100 mg/L	
Lead	Hardness range (mg/L)	Concentration (µg/L)
	0-25	21
	25-50	35
	50-75	67
	75-100	103
	100-125	142
	125-150	184
	150-175	227
	175-200	272
	200-225	320
	225-250	368
	250-275	418
	275-300	470
	300-325	522
	325-350	576
	350-375	631
	375-400	687
	400+	715
Mercury	1700 ng/L	

Table C-3. Administrative levels for surface water environmental surveillance monitoring

Parameter/ parameter type	Parameter	Non-LBC administrative level	LBC administrative level
PCBs (µg/L)	PCBs	detection	detection
Chlorinated organics (µg/L) (EPA-624)	1,1,1,2-Tetrachloroethane	detection	detection
	1,1,1-Trichloroethane	detection	detection
	1,1,2,2-Tetrachloroethane	detection	detection
	1,1,2-Trichloroethane	detection	detection
	1,1-Dichloroethane	detection	detection
	1,1-Dichloroethene	detection	detection
	1,2,3-Trichloropropane	detection	detection
	1,2-Dibromo-3-chloropropane	detection	detection
	1,2-Dichlorobenzene	detection	detection
	1,2-Dichloroethane	detection	detection
	1,2-Dichloropropane	detection	detection
	1,3-Dichlorobenzene	detection	detection
	1,4-Dichlorobenzene	detection	detection
	2-Chloro-1,3-butadiene	detection	detection
	Allyl chloride	detection	detection
	Bromodichloromethane	detection	**0.93**
	Carbon tetrachloride	detection	detection
	Chlorobenzene	detection	detection
	Chloroethane	detection	detection
	Chloroform	detection	**0.41**
	Chloromethane	detection	**0.58**
	cis-1,2-Dichloroethene	detection	**3.59**
	cis-1,3-Dichloropropene	detection	detection
	Dibromochloromethane	detection	**1.86**
	Dichlorodifluoromethane	detection	detection
	Methylene chloride	detection	detection
	Tetrachloroethene	detection	detection
	trans-1,2-Dichloroethene	detection	detection
	trans-1,3-Dichloropropene	detection	detection
	Trans-1,4-Dichloro-2-butene	detection	detection
	Trichloroethene	detection	**7.14**
	Trichlorofluoromethane	detection	detection
	Vinyl chloride	detection	detection
Chlorinated organics (µg/L) (EPA-625)	1,2,4,5-Tetrachlorobenzene	detection	detection
	1,2,4-Trichlorobenzene	detection	detection
	2,3,4,6-Tetrachlorophenol	detection	detection
	2,4,5-Trichlorophenol	detection	detection
	2,4,6-Trichlorophenol	detection	detection
	2,4-Dichlorophenol	detection	detection
	2,6-Dichlorophenol	detection	detection
	2-Chloronaphthalene	detection	detection
	2-Chlorophenol	detection	detection
	3,3'-Dichlorobenzidine	detection	detection
	3-Methylcholanthrene	detection	detection
	4-Chloro-3-methylphenol	detection	detection

Table C-3. Administrative levels for surface water environmental surveillance monitoring (continued)

Parameter/ parameter type	Parameter	Non-LBC administrative level	LBC administrative level
Chlorinated organics (µg/L) (EPA-625) (continued)	4-Chlorobenzenamine	detection	detection
	4-Chlorophenyl phenyl ether	detection	detection
	bis(2-Chloro-1-methylethyl)ether	detection	detection
	Bis(2-chloroethoxy)methane	detection	detection
	Bis(2-chloroethyl) ether	detection	detection
	Chlorobenzilate	detection	detection
	Hexachloro-1-propene	detection	detection
	Hexachlorobenzene	detection	detection
	Hexachlorobutadiene	detection	detection
	Hexachlorocyclopentadiene	detection	detection
	Hexachloroethane	detection	detection
	Hexachlorophene	detection	detection
	Pentachlorobenzene	detection	detection
	Pentachloroethane	detection	detection
	Pentachloronitrobenzene	detection	detection
	Pentachlorophenol	detection	detection
Chlorinated organics (µg/L) (EPA-608)	alpha-BHC	detection	detection
	beta-BHC	**0.0118**	detection
	Chlordane	detection	detection
	delta-BHC	detection	detection
	Endrin aldehyde	detection	detection
	Heptachlor	detection	detection
	Heptachlor epoxide	detection	detection
	Methoxychlor	detection	detection
	Toxaphene	detection	detection
Chlorinated organics (µg/L) (EPA-615)	2,4,5-T	detection	detection
	2,4-D	detection	detection
	Dinoseb	detection	detection
	Silvex	detection	detection
Radionuclides (pCi/L except uranium in µg/L)	Americium-241	detection	detection
	Neptunium-237	detection	detection
	Plutonium-238	detection	detection
	Plutonium-239/240	detection	detection
	Technetium-99	detection	**9.06**
	Thorium-230	**0.218**	**0.16**
	Uranium	**5.48**	**1.2**
	Uranium-233/234	**3.49**	**2.38**
	Uranium-235/236	detection	detection
	Uranium-238	**1.82**	**0.385**

LBC – Little Beaver Creek

Table C-4. Action levels for ambient air monitoring

Pollutant Type/Parameter		X-326 Air Model low action level [a,b] (Jan-Feb 2025) (µg/m³)	X-333 Air Model low action level [a] (Mar-Dec 2025) (µg/m³)	Medium action level [a] (µg/m³)	High action level [a] (µg/m³)
Radionuclide Particulates	Uranium (Project) Uranium (A70)	1.81E-03 1.36E-03	2.381	3.572	4.762
Metal HAPs	Antimony (Project) Antimony (A70)	2.01E-06 1.54E-06	5.95	8.93	11.9
	Arsenic (Project) Arsenic (A70)	1.59E-06 1.21E-06	0.12	0.18	0.24
	Beryllium (Project) Beryllium (A70)	1.74E-05 1.33E-05	5.95E-04	0.000893	0.00119
	Cadmium (Project) Cadmium (A70)	1.18E-05 8.97E-06	0.024	0.036	0.048
	Chromium (Project) Chromium (A70)	0.34 0.257	0.60	0.89	1.19
	Cobalt (Project) Cobalt (A70)	5.61E-06 4.28E-06	0.24	0.36	0.48
	Lead (Project) Lead (A70)	2.27E-05 1.73E-05	0.60	0.89	1.19
	Manganese (Project) Manganese (A70)	6.44E-03 4.91E-03	0.24	0.36	0.48
	Mercury (Project) Mercury (A70)	2.93E-07 2.23E-07	0.30	0.45	0.60
	Nickel (Project) Nickel (A70)	2.87E-04 2.19E-04	1.19	1.79	2.38
	Selenium (Project) Selenium (A70)	4.96E-07 3.79E-07	2.38	3.57	4.76
VOCs	Total VOC (Project) Total VOC (A70)	16 13	667	1,001[c]	1,334[c]
VOC HAPs	Trichloroethene (Project) Trichloroethene (A70)	12 9	667	1,001[c]	1,334[c]
PCBs	Total PCBs (Project) Total PCBs (A70)	1.90E-04 1.30E-04	6	9	12
Particulate	PM10 (X780-A04) PM10 (A70)	75 80	75	113	150

[a]If an action level is less than the laboratory minimum detectable concentration, the minimum detectable concentration will apply.
[b]Low action levels differ by location. OSWDF Project indicates the action level applies at monitors X780-A01, X780-A02, X780-A03, X780-A04, X780-A05, and X780-A06.
[c]The medium and high action levels are based on the maximum acceptable ground level concentration for TCE which is the predominant VOC HAP.

HAP – hazardous air pollutant
OSWDF – on-site waste disposal facility
PCB – polychlorinated biphenyl
PM10 – particulate matter 10 micrometers in diameter and smaller
VOC – volatile organic compound

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APPENDIX D

STATISTICAL EVALUATION OF OSWDF DOWNGRADIENT BEREA COMPLIANCE MONITORING WELLS

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STATISTICAL EVALUATION OF OSWDF DOWNGRADIENT BEREA COMPLIANCE MONITORING WELLS - 2025

The downgradient OSWDF Berea monitoring wells evaluated in 2025 are X780-C05-10B, X780-C06-12BA, X780-C07-14B, X780-C08-17B, and X780-C09-19B.

The detection monitoring program for the OSWDF is based on Ohio EPA regulations for industrial waste landfills (OAC 3745-30-08 [effective February 1, 2008]). Statistical evaluation parameters are alkalinity, ammonia, calcium, chloride, iron, nitrate/nitrite (as nitrogen), potassium, sodium, and sulfate.

1.1 INTRA-WELL CONTROL CHARTS

Intra-well Shewhart-CUSUM (cumulative summation) control charts are constructed using historical baseline data for each compliance monitoring well. Baseline data were collected in 2019 and 2020 as part of pre-operational sampling at the OSWDF. The baseline data are periodically updated. For all five monitoring wells, the baseline data were updated in the first quarter of 2025 to include data through fourth quarter 2024 except for iron at X780-C08-17B. The baseline for iron at X780-C08-17B could not be updated due to exceeding the Shewhart control limit in all four quarters in 2024.

Control charts are constructed showing two control limits calculated using the baseline compliance monitoring well data. The CUSUM control chart is designed to indicate a "long-term" trend or accumulation above baseline and is used as an internal indicator for the early detection of gradual concentration increases at a monitoring well, but is not used to determine a statistically significant change requiring notification under OAC 3745-30-08(D)(8). The Shewhart control chart is designed to indicate a "short-term" or immediate spike in the concentration of an indicator parameter in a compliance monitoring well and is used to determine whether a statistically significant change has occurred requiring notification to Ohio EPA under OAC 3745-30-08(D)(8). Ohio EPA is notified when the Shewhart control limit for any of the indicator parameters is exceeded at any of the downgradient Berea monitoring wells in two consecutive quarterly sampling events.

The Shewhart control limits and CUSUM limits used for the control charts are based on the goal of attaining a site-wide 5% false positive rate while maintaining at least a 20% false negative rate (or 80% statistical power). Gibbons (1999) provides tables used to establish appropriate thresholds. In addition, verification resampling is incorporated into the control chart scheme if necessary to achieve the 5%/20% goal. An additional parameter (k) is used in calculating the CUSUM for future compliance monitoring well data, which are then compared to the h threshold. Selection of the k value (commonly selected to be approximately one-half the size of an important displacement, D) in conjunction with the h threshold is such that together they allow a displacement of two standard deviations (above baseline) to be detected quickly (i.e., between sampling rounds).

1.2 UPPER PREDICTION LIMITS

Nonparametric or Poisson prediction limits are calculated in cases where the percentage of nondetects exceeds 50% (for nitrate/nitrite and sulfate in some of the monitoring wells). In these cases, the pooled historical compliance monitoring well data (and possibly background monitoring well data) is used to calculate the prediction limits. Pooling of the historical compliance monitoring well data is necessary to obtain sufficient numbers of baseline/background data to attain a site-wide false positive rate of approximately 5% ($\alpha \sim 0.05$) using an individual test false positive rate of approximately 1% ($\alpha \sim 0.01$). These performance standards are consistent with OAC 3745-29-10(C)(7)(a-f) (effective June 1, 1994) and Federal regulations promulgated by U.S. EPA and codified in Title 40 of the Code of Federal Regulations Part 264, Subpart F, which are designed to provide an adequate balance between the site-wide and individual test false positive rates.

1.3 CONTROL CHART STATISTICS

The following tables provide the 2025 Shewhart control chart statistics followed by the CUSUM control chart statistics for each downgradient Berea OSWDF monitoring well.

Shewhart control chart statistics for monitoring well X780-C05-10B – 2025

Indicator parameter	Shewhart control limit (SCL)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	483	400	420	419	431
Ammonia (mg/L)	5.52	2.93	3.31	3.93	2.81
Calcium (mg/L)	28.7	24.2	25.4	23.2	22.7
Chloride (mg/L)	859	694	636	595	586
Iron (µg/L)	1,283	337	309	35.5	51.8
Nitrate/nitrite (as nitrogen) (mg/L)[b]	0.14	< 0.06	< 0.017	< 0.17	< 0.017
Potassium (mg/L)	13.6	12.1	10.6	10.6	9.82
Sodium (mg/L)	795	**801**	564	557	540
Sulfate (mg/L)[b]	9.18	< 1.3	0.418	< 0.266	< 0.532

[a]These results must not exceed the Shewhart control limit (SCL).
[b]Upper prediction limit. The upper prediction limit is used to evaluate data for nitrate/nitrite and sulfate because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite and sulfate were not detected.

CUSUM control chart statistics for monitoring well X780-C05-10B – 2025

Indicator parameter	Decision internal limit (h)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	493	409	409	409	417
Ammonia (mg/L)	5.86	2.86	2.86	3.43	2.88
Calcium (mg/L)	29.4	23.6	24.4	23.6	23.6
Chloride (mg/L)	889	650	625	625	625
Iron (µg/L)	1,404	314	314	314	314
Nitrate/nitrite (as nitrogen) (mg/L)[b]	-	-	-	-	-
Potassium (mg/L)	14.0	11.6	10.9	10.7	10.7
Sodium (mg/L)	827	754	727	694	644
Sulfate (mg/L)[b]	-	-	-	-	-

[a]These results should not exceed the decision internal limit (h).
[b]Nitrate/nitrite and sulfate are evaluated with the upper prediction limit in the previous table. The upper prediction limit is used to evaluate data for nitrate/nitrite and sulfate because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite and sulfate were not detected.

Shewhart control chart statistics for monitoring well X780-C06-12BA – 2025

Indicator parameter	Shewhart control limit (SCL)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	533	430	445	448	448
Ammonia (mg/L)	17.3	3.13	3.33	2.95	14.4
Calcium (mg/L)	49.9	9.5	10.5	9.67	9.86
Chloride (mg/L)	1,033	851	812	719	688
Iron (µg/L)	3,120	50.9	< 30	< 30	78
Nitrate/nitrite (as nitrogen) (mg/L)[b]	0.11	< 0.006	< 0.017	< 0.017	0.017
Potassium (mg/L)	82	14.4	12.5	10	10.6
Sodium (mg/L)	937	654	671	642	658
Sulfate (mg/L)	401	17	12.5	6.44	10.1

[a]These results must not exceed the Shewhart control limit (SCL).
[b]Upper prediction limit. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

CUSUM control chart statistics for monitoring well X780-C06-12BA – 2025

Indicator parameter	Decision internal limit (h)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	545	430	430	430	430
Ammonia (mg/L)	18.8	5.1	5.1	5.1	12.1
Calcium (mg/L)	54.5	12.7	12.7	12.7	12.7
Chloride (mg/L)	1,062	809	808	808	808
Iron (µg/L)	3,468	333	333	333	333
Nitrate/nitrite (as nitrogen) (mg/L)[b]	-	-	-	-	-
Potassium (mg/L)	89.6	24.9	24.9	24.9	24.9
Sodium (mg/L)	966	705	705	705	705
Sulfate (mg/L)	440	85.6	85.6	85.6	85.6

[a]These results should not exceed the decision internal limit (h).
[b]Nitrate/nitrite is evaluated with the upper prediction limit in the previous table. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

Shewhart control chart statistics for monitoring well X780-C07-14B – 2025

Indicator parameter	Shewhart control limit (SCL)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	531	429	458	457	456
Ammonia (mg/L)	5.66	2.85	2.95	3.22	2.38
Calcium (mg/L)	42	7.76	4.52	5.97	7.17
Chloride (mg/L)	862	701	627	571	588
Iron (µg/L)	2,618	< 40	< 30	< 30	33.9
Nitrate/nitrite (as nitrogen) (mg/L)[b]	0.507	0.559	< 0.017	< 0.023	< 0.017
Potassium (mg/L)	16.8	12.6	10.3	10.1	9.74
Sodium (mg/L)	734	**807**	531	561	554
Sulfate (mg/L)	6.96	2.22	1.1	< 2.46	1.23

[a]These results must not exceed the Shewhart control limit (SCL).
[b]Upper prediction limit. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

CUSUM control chart statistics for monitoring well X780-C07-14B – 2025

Indicator parameter	Decision internal limit (h)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	541	448	448	448	448
Ammonia (mg/L)	6.02	2.8	2.8	2.8	2.8
Calcium (mg/L)	45.3	15.3	15.3	15.3	15.3
Chloride (mg/L)	889	660	646	646	646
Iron (µg/L)	2,883	501	501	501	501
Nitrate/nitrite (as nitrogen) (mg/L)[b]	-	-	-	-	-
Potassium (mg/L)	17.6	11.5	10.8	10.8	10.8
Sodium (mg/L)	752	**780**	694	638	590
Sulfate (mg/L)	7.66	1.42	1.42	1.42	1.42

[a]These results should not exceed the decision internal limit (h).
[b]Nitrate/nitrite is evaluated with the upper prediction limit in the previous table. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

Shewhart control chart statistics for monitoring well X780-C08-17B – 2025

Indicator parameter	Shewhart control limit (SCL)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	1,088	869	907	942	957
Ammonia (mg/L)	4.44	1.99	2.39	2.44	1.52
Calcium (mg/L)	407	332	338	311	337
Chloride (mg/L)	85.2	29.6	59.8	30.7	27.2
Iron (µg/L)	820	573	**964**	473	370
Nitrate/nitrite (as nitrogen) (mg/L)[b]	0.47	< 0.085	< 0.017	< 0.017	< 0.017
Potassium (mg/L)	71	28.1	37.7	24.4	27.8
Sodium (mg/L)	597	392	386	368	393
Sulfate (mg/L)	5,760	2,330	2,660	2,450	2,340

[a]These results must not exceed the Shewhart control limit (SCL).
[b]Upper prediction limit. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

CUSUM control chart statistics for monitoring well X780-C08-17B – 2025

Indicator parameter	Decision internal limit (h)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	1,115	877	877	902	942
Ammonia (mg/L)	4.87	1.36	2.05	2.79	2.61
Calcium (mg/L)	422	311	334	330	352
Chloride (mg/L)	98.8	39.7	51.3	39.7	39.7
Iron (µg/L)	874	**8,064**	**8,558**	**8,559**	**8,458**
Nitrate/nitrite (as nitrogen) (mg/L)[b]	-	-	-	-	-
Potassium (mg/L)	76	31.5	31.5	31.5	31.5
Sodium (mg/L)	632	340	354	349	370
Sulfate (mg/L)	6,101	3,031	3,031	3,031	3,031

[a]These results should not exceed the decision internal limit (h).
[b]Nitrate/nitrite is evaluated with the upper prediction limit in the previous table. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

Shewhart control chart statistics for monitoring well X780-C09-19B – 2025

Indicator parameter	Shewhart control limit (SCL)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	520	333	366	238	340
Ammonia (mg/L)	5.82	2.81	2.66	3.17	2.17
Calcium (mg/L)	68.6	2.48	2.66	1.07	2.74
Chloride (mg/L)	617	502	446	409	387
Iron (µg/L)	1,434	122	48.3	107	110
Nitrate/nitrite (as nitrogen) (mg/L)[b]	0.13	0.067	< 0.017	0.12	< 0.017
Potassium (mg/L)	14.3	11	9.03	10.2	9.93
Sodium (mg/L)	535	387	381	364	367
Sulfate (mg/L)	44	< 1.3	0.47	< 0.836	0.564

[a]These results must not exceed the Shewhart control limit (SCL).
[b]Upper prediction limit. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

CUSUM control chart statistics for monitoring well X780-C09-19B – 2025

Indicator parameter	Decision internal limit (h)	First quarter[a]	Second quarter[a]	Third quarter[a]	Fourth quarter[a]
Alkalinity, total (mg/L)	549	291	323	291	297
Ammonia (mg/L)	6.19	2.91	2.91	2.91	2.91
Calcium (mg/L)	75.2	15.9	15.9	15.9	15.9
Chloride (mg/L)	642	464	456	416	416
Iron (µg/L)	1,575	306	306	306	306
Nitrate/nitrite (as nitrogen) (mg/L)[b]	-	-	-	-	-
Potassium (mg/L)	14.8	10.7	10.7	10.7	10.7
Sodium (mg/L)	556	367	367	367	367
Sulfate (mg/L)	49	4.05	4.05	4.05	4.05

[a]These results should not exceed the decision internal limit (h).
[b]Nitrate/nitrite is evaluated with the upper prediction limit in the previous table. The upper prediction limit is used to evaluate data for nitrate/nitrite because in more than 50% of the samples that make up the baseline data set for this monitoring well, nitrate/nitrite was not detected.

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