

5. Environmental Non-Radiological Programs

PORTS environmental monitoring activities cover both radiological and non-radiological contaminants. Chapter 4 discusses radiological monitoring, and this chapter describes the site's efforts to monitor potential non-radiological contaminants in air, surface water, sediment, and biota.

The *Environmental Monitoring Plan for the Portsmouth Gaseous Diffusion Plant* (DOE 2017c) specifies non-radiological monitoring requirements for ambient air, surface water, sediment, and fish, and the *On-Site Waste Disposal Facility (OSWDF) Performance Standards Verification Plan* (DOE 2021b) describes the non-radiological monitoring requirements associated with operation of the On-Site Waste Disposal Facility. Non-radiological data are not collected for all sampling locations or all monitoring programs.

Environmental permits issued by Ohio EPA to Fluor-BWXT Portsmouth, Mid-America Conversion Services, or Centrus specify discharge limitations, monitoring requirements, and reporting requirements for air emissions and water discharges. Centrus data for NPDES water discharges are included in this section to provide a more complete picture of environmental monitoring at PORTS. Centrus data for water discharges are provided for informational purposes only, however, as Centrus operates independently of DOE and is regulated by the Nuclear Regulatory Commission.

This chapter includes data for air, surface water, sediment, and biota (fish). DOE also conducts an extensive groundwater monitoring program at PORTS that includes both radiological and non-radiological constituents. Chapter 6 describes the groundwater monitoring program.

5.1 Air

Permitted air emission sources at PORTS release non-radiological air pollutants, and Section 5.1.1 discusses these airborne discharges. DOE also monitors ambient air for non-radiological air pollutants that could be present due to decontamination and decommissioning activities at PORTS.

5.1.1 Airborne Discharges

Fluor-BWXT Portsmouth is responsible for numerous air emission sources associated with the former gaseous diffusion production and support facilities. These sources included the boilers at the X-600 Steam Plant Complex prior to their demolition in 2013. Based on the X-600 Steam Plant Complex's emission rate, Fluor-BWXT Portsmouth air emission sources were classified as a major source of air pollutants as defined in 40 *CFR* Part 70.

Fluor-BWXT Portsmouth is required to submit the annual Ohio EPA Fee Emissions Report to describe the emissions of selected non-radiological air pollutants. For 2021, Fluor-BWXT Portsmouth emissions of non-radiological air pollutants included 13.62 tons of particulate matter and 1.18 tons of organic compounds. Emissions for 2021 are associated with the X-627 Groundwater Treatment Facility and plant roads and parking areas.

Because the DUF₆ Conversion Facility emits only a small quantity of non-radiological air pollutants, Ohio EPA requires a Fee Emissions Report for this facility only once every two years, in odd-numbered years. The report states increments of emissions: zero, less than 10 tons, 10 to 50 tons, more than 50 tons, and more than 100 tons. Mid-America Conversion Services reported less than 10 tons per year of specified non-radiological air pollutants in 2021.

US EPA also requires annual reporting of greenhouse gas emissions including carbon dioxide, methane, and nitrous oxide. In 2021, Fluor-BWXT Portsmouth reported emissions of 9,155.2 metric tons of carbon dioxide, 0.18 metric ton of methane, and 0.018 metric ton of nitrous oxide. These emissions resulted from burning natural gas at the X-690 Boilers, which provide steam to portions of the plant.

Another potential air pollutant present at PORTS is asbestos released by decontamination and decommissioning of plant facilities. Asbestos emissions are controlled by a system of work practices. The amount of asbestos removed and disposed of is reported to Ohio EPA. In 2021, approximately 202,687 pounds of asbestos-containing materials (net weight) were shipped off site. Asbestos was not detected in ambient air samples collected as part of the ambient air monitoring program in 2021 (see Section 5.1.2.4).

5.1.2 Ambient Air Monitoring

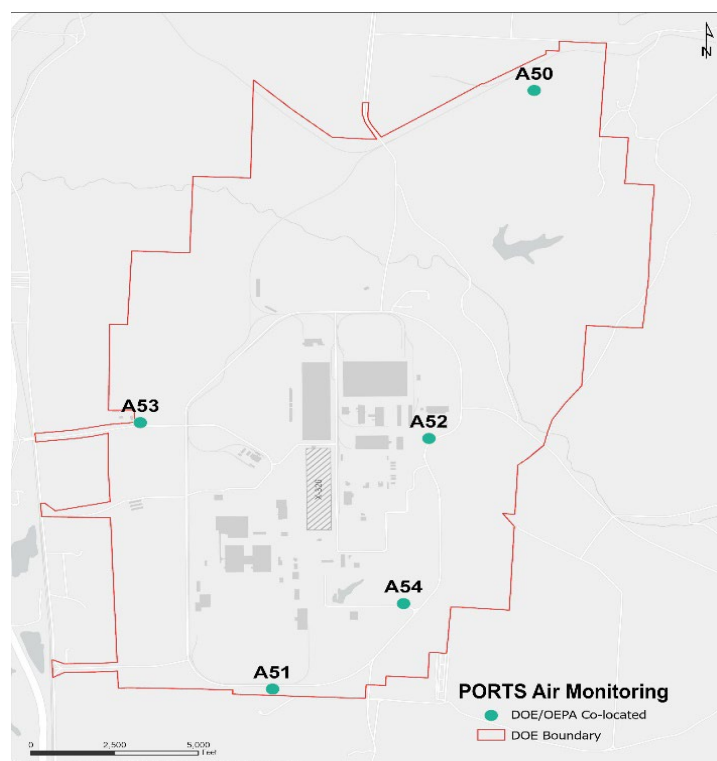


Figure 5.1. DOE/Ohio EPA air monitoring stations

DOE and Ohio EPA run an ambient air monitoring program at PORTS to monitor non-radionuclides that may be released to the environment during decontamination and decommissioning.

Five stations monitor particulate matter, metals, volatile organic compounds, and fibers and asbestos, as shown in Figure 5.1. DOE and Ohio EPA collect samples from each location using separate sampling equipment. Ohio EPA provides air monitoring data to the public on the Ohio EPA website under the heading Special Sampling – Portsmouth GDP [here](#). DOE provides data in PEGASIS [here](#).

Ambient air monitoring also occurs at the On-Site Waste Disposal Facility, and results are discussed separately in Section 5.1.3.

Section 5.1.4 discusses results for 15 ambient air monitoring stations that measure fluoride (see Figure 4.1). Fluoride

detected at the ambient air monitoring stations could be present due to background concentrations, since fluoride occurs naturally in the environment; from activities associated with the former gaseous diffusion process; and from operation of the DUF₆ Conversion Facility.

5.1.2.1 Particulate Matter

Particulate matter is a mixture of very small solid particles and liquid droplets in air. Particulate matter includes dust from construction sites, unpaved roads, and fields as well as smoke produced by fires. Numerous industrial processes emit particulate matter, and it is also produced by coal- or gas-burning power plants and gasoline and diesel fuel burned by vehicles.

DOE and Ohio EPA measure two sizes of particulate matter, PM₁₀ and PM_{2.5}. The numbers refer to the size of the particles: 10 microns or less and 2.5 microns or less. These particles are very small; in

comparison, the typical diameter of a human hair is about 70 microns. Air monitors at each of the five sampling locations (see Figure 5.1) continuously measure PM₁₀ and PM_{2.5}.

The National Ambient Air Quality Standards set a 24-hour average of 150 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for PM₁₀ in ambient air. This standard applies to geographic areas and not to individual industrial facilities, but the standard is useful in evaluating PORTS monitoring data. Data collected by DOE in 2021 had a maximum 24-hour average for PM₁₀ of 61 $\mu\text{g}/\text{m}^3$ at station A50, below the 150 $\mu\text{g}/\text{m}^3$ standard.

The National Ambient Air Quality Standards set a 24-hour average of 35 $\mu\text{g}/\text{m}^3$ for PM_{2.5} in ambient air and a primary annual average standard of 12 $\mu\text{g}/\text{m}^3$. As is the case for the PM₁₀ standards, these limits apply to geographic areas and not to individual industrial facilities. However, the standards are useful in evaluating PORTS monitoring data. For data collected by DOE in 2021, the maximum 24-hour average for PM_{2.5} was 25 $\mu\text{g}/\text{m}^3$ at station A52, which is below the 35 $\mu\text{g}/\text{m}^3$ standard. The annual averages measured at the stations were 8 $\mu\text{g}/\text{m}^3$, which are below the 12 $\mu\text{g}/\text{m}^3$ standard.

Hourly measurements for PM₁₀ and PM_{2.5} from the Ohio EPA stations are available in real time on the Ohio EPA website [here](#). Summaries of data collected by Ohio EPA are also available on this website.

5.1.2.2 Metals

Metals are a component of particulate matter because metals are naturally present in soil. Metals are also released to the air from burning coal, natural gas, diesel fuel, or gasoline and from numerous industrial processes. DOE and Ohio EPA monitor ambient air for 11 metals designated by Ohio EPA as hazardous air pollutants. These metals could be present in excavated soil and demolition debris at PORTS. One 24-hour sample is collected every six days following the Ohio EPA sampling schedule.

DOE completed an air dispersion modeling evaluation in 2020 to assess potential off-site concentrations of pollutants dispersing from decontamination and decommissioning activities and operation of the On-Site Waste Disposal Facility (DOE 2020). As part of this modeling, DOE developed a screening level for each contaminant called a maximum acceptable ground level concentration. The maximum acceptable ground level concentration is a screening level with a safety factor that Ohio EPA believes will not cause significant adverse human or environmental impacts. Table 5.1 summarizes the metals monitored at PORTS, the maximum detected concentration of each metal in 2021, and the maximum acceptable ground level concentration. All metals detected in ambient air were less than the associated maximum acceptable ground level concentration.

Table 5.1. Metals monitored by DOE in PORTS ambient air

Metal	Maximum detected concentration ($\mu\text{g}/\text{m}^3$)	MAGLC ($\mu\text{g}/\text{m}^3$)	% of MAGLC
Antimony	0.0200	11.9	0.17%
Arsenic	0.00107	0.238	0.45%
Beryllium	0.000257	0.00119	22%
Cadmium	0.00206	0.0476	4.3%
Chromium	0.0833	1.19	6.0%
Cobalt	0.00324	0.476	0.68%
Lead	0.0590	1.19	5.0%
Manganese	0.0936	0.476	20%
Mercury	0.000247	0.595	0.042%
Nickel	0.150	2.38	6.3%
Selenium	0.00823	4.76	0.17%

Acronyms and abbreviations:

$\mu\text{g}/\text{m}^3$ = microgram per cubic meter

MAGLC = maximum acceptable ground level concentration

DOE data for the ambient air monitoring program are available in PEGASIS [here](#). Ohio EPA provides air monitoring data to the public on their website [here](#).

5.1.2.3 Volatile Organic Compounds

Volatile organic compounds are also present in ambient air, primarily due to exhaust from cars and trucks (especially diesel-powered vehicles), but also from power plants that burn coal or natural gas and from other industrial activities. DOE and Ohio EPA monitor ambient air for 20 volatile organic compounds designated by Ohio EPA as hazardous air pollutants. These volatile organic compounds are monitored because they may be present in soil excavated within the X-231A/B Oil Biodegradation Plots and X-740 groundwater plume (see Sections 3.3.1.3 and 3.3.3). These volatile organic compounds could be released to the air during soil excavation, treatment of water collected during the soil excavation, and other decontamination and decommissioning activities. One 24-hour sample is collected every six or 12 days, dependent on site activities, following the Ohio EPA sampling schedule.

Table 5.2 summarizes the volatile organic compounds monitored at PORTS and the maximum detected concentration of each volatile organic compound in 2021.

Table 5.2. Volatile organic compounds monitored by DOE in PORTS ambient air

Volatile organic compound	Maximum detected concentration ^a
1,1,1-Trichloroethane	0.106
1,1,2-Trichloroethane	0.121
1,1-Dichloroethane	0.100
1,1-Dichloroethene	0.114
1,2-Dichloroethane	0.106
1,4-Dioxane	0.313
2-Butanone	8.19
4-Methyl-2-pentanone	0.959
Benzene	0.546
Carbon disulfide	10.6
Carbon tetrachloride	0.192
Chloroethane	0.316
Chloroform	0.383
<i>cis</i> -1,2-Dichloroethene	0.269
Methylene chloride	22.1
Tetrachloroethene	3.9
Toluene	0.519
<i>trans</i> -1,2-Dichloroethene	0.103
Trichloroethene	0.533
Vinyl chloride	0.120

Note:

^aMaximum detected concentrations are shown in parts per billion by volume.

The air dispersion modeling evaluation assessed potential off-site concentrations of volatile organic compounds dispersing from decontamination and decommissioning activities and operation of the On-Site Waste Disposal Facility (DOE 2020) and developed a screening level for volatile organic compounds known as the maximum acceptable ground level concentration. The maximum acceptable ground level concentration for volatile organic compounds is based on protective values established for trichloroethene, which is the predominant volatile organic compound for the site. The maximum acceptable ground level concentration for total volatile organic compounds is 1334 $\mu\text{g}/\text{m}^3$. Concentrations of volatile organic compounds detected in ambient air in 2021 are less than this screening level.

5.1.2.4 Fibers and Asbestos

Asbestos fibers could be present in ambient air because decontamination and decommissioning at PORTS includes removing asbestos-containing materials. Asbestos may also be present due to its use in vehicle brakes and clutches, and from demolition or renovation of older homes or other buildings with materials such as siding, insulation, and floor tile that contain asbestos.

Because asbestos fibers are not typically detected in outdoor ambient air, DOE and Ohio EPA monitor ambient air for fibers, which can be asbestos or non-asbestos. If fibers are detected in the sample, the sample is then further analyzed for asbestos fibers. One 24-hour sample is collected every six days following the Ohio EPA sampling schedule. Fibers were detected by DOE at all five air stations in 2021, and each sample with a positive detection of fibers was further analyzed for asbestos fibers. The analysis showed that the fibers detected in samples collected by DOE in 2021 did not include asbestos fibers.

5.1.3 On-Site Waste Disposal Facility

DOE initiated air monitoring at the On-Site Waste Disposal Facility in April 2021, and the On-Site Waste Disposal Facility began operating on May 25, 2021. The ambient air monitoring program for the On-Site Waste Disposal Facility is designed to measure particulate matter and hazardous air pollutants, which include selected metals and volatile organic compounds that are primarily associated with operation of the facility. The ambient air monitoring stations at the On-Site Waste Disposal Facility can also detect pollutants released by decontamination, decommissioning, and other site activities. Air monitoring data are collected to demonstrate compliance with regulatory standards and to verify that pollutants are not present at levels that pose a risk to workers, the public, or the environment. The *On-Site Waste Disposal Facility (OSWDF) Performance Standards Verification Plan* (DOE 2021b) describes the ambient air monitoring program.

Ambient air is monitored at eight locations around the perimeter of the On-Site Waste Disposal Facility project area. Results for ambient air monitoring in 2021 do not indicate any issues to be addressed in operating the On-Site Waste Disposal Facility or implementing decontamination and decommissioning at PORTS. The *2021 On-Site Waste Disposal Facility Annual Project Status Report* (DOE 2022b) and data collected in 2021 are available in PEGASIS [here](#).

5.1.4 Fluoride

In 2021, samples for fluoride were collected weekly from 15 ambient air monitoring stations in and around PORTS (see Figure 4.3), including a background ambient air monitoring station (A37) located approximately 13 miles southwest of the plant.

Fluoride was not detected in 84 percent of the samples collected for the ambient air monitoring program in 2021. Concentrations of fluoride measured in samples collected at the background station (A37) ranged from below the analytical detection limit to $0.052 \mu\text{g}/\text{m}^3$. Concentrations of fluoride measured in samples collected at the off-site stations near PORTS ranged from below analytical detection limits to an ambient concentration of $0.058 \mu\text{g}/\text{m}^3$ at station A15, which is east-southeast of PORTS on Loop Road. This represents the maximum concentration of fluoride in ambient air in 2021. It is less than the maximum concentration detected in 2020, which was $0.097 \mu\text{g}/\text{m}^3$ at station A12, east of PORTS on McCorkle Road.

There is no standard for fluoride in ambient air. Concentrations of fluoride in ambient air around PORTS are within the range of ambient background concentrations measured in the United States (Agency for Toxic Substances and Disease Registry 2003).

5.2 Water

PORTS meets the Clean Water Act regulations through NPDES permits granted by Ohio EPA for effluent discharges. Non-radiological surface water monitoring primarily consists of sampling water discharges associated with the Fluor-BWXT Portsmouth, Mid-America Conversion Services, and Centrus NPDES-permitted outfalls. Surface water is also monitored in the On-Site Waste Disposal Facility project area. PCBs are monitored in on-site surface water downstream from the cylinder storage yards.

Surface water and groundwater are monitored at PORTS. Groundwater monitoring is discussed in Chapter 6, along with additional surface water monitoring conducted as part of the integrated groundwater monitoring program.

5.2.1 Water Discharges via NPDES Outfalls

DOE contractors Fluor-BWXT Portsmouth and Mid-America Conversion Services were responsible for 20 NPDES discharge points (outfalls) or sampling points at PORTS in 2021. Centrus was responsible for three outfalls. This section describes non-radiological discharges from these outfalls during 2021.

5.2.1.1 Fluor-BWXT Portsmouth NPDES Outfalls

In 2021, Fluor-BWXT Portsmouth was responsible for 18 outfalls or sampling points (see Figure 4.2). Nine outfalls discharge directly to surface water, and six outfalls discharge to another outfall before leaving the site. Fluor-BWXT Portsmouth also monitors three additional sampling points that are not discharge locations.

Ohio EPA selects the chemical parameters that must be monitored at each outfall based on the chemical characteristics of the water that flows into the outfall. Ohio EPA also sets discharge limitations for some of these parameters. For example, some of the Fluor-BWXT Portsmouth outfalls discharge water from the groundwater treatment facilities; therefore, the outfalls are monitored for selected volatile organic compounds (*trans*-1,2-dichloroethene and trichloroethene) because the groundwater treatment facilities treat water contaminated with volatile organic compounds. The following chemicals and water quality parameters were monitored at each Fluor-BWXT Portsmouth outfall in 2021:

- Fluor-BWXT Portsmouth NPDES Outfall 001 (X-230J7 East Holding Pond) – cadmium, chlorine, copper, total filterable residue (dissolved solids), fluoride, mercury, oil and grease, pH, silver, total suspended solids, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 002 (X-230K South Holding Pond) – bis(2-ethylhexyl)phthalate, cadmium, fluoride, mercury, ammonia-nitrogen, oil and grease, pH, selenium, silver, total suspended solids, and thallium
- Fluor-BWXT Portsmouth NPDES Outfall 003 (X-6619 Sewage Treatment Plant) – acute toxicity, ammonia-nitrogen, carbonaceous biochemical oxygen demand, copper, E. coli (May-October only), mercury, nitrite + nitrate, oil and grease, pH, silver, thallium, total suspended solids, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 004 (Cooling Tower Blowdown) – acute toxicity, beryllium, cadmium, chlorine, chromium, cobalt, copper, total filterable residue (dissolved solids), fluoride, mercury, nickel, oil and grease, total PCBs, pH, selenium, silver, total suspended solids, vanadium, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 005 (X-611B Lime Sludge Lagoon) – lead, mercury, pH, selenium, and total suspended solids

- Fluor-BWXT Portsmouth NPDES Outfall 009 (X-230L North Holding Pond) – bis(2-ethylhexyl)phthalate, chromium, copper, fluoride, iron, mercury, oil and grease, total PCBs, pH, silver, thallium, trichloroethene, total suspended solids, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 010 (X-230J5 Northwest Holding Pond) – chromium, copper, iron, lead, mercury, oil and grease, total PCBs, pH, selenium, thallium, total suspended solids, trichloroethene, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 011 (X-230J6 Northeast Holding Pond) – cadmium, chlorine, chromium, copper, fluoride, oil and grease, total PCBs, pH, selenium, total suspended solids, thallium, trichloroethene, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 015 (X-624 Groundwater Treatment Facility) – arsenic, barium, total PCBs, pH, silver, and trichloroethene
- Fluor-BWXT Portsmouth NPDES Outfall 602 (X-621 Coal Pile Runoff Treatment Facility) – iron, manganese, pH, and residue (settleable), total suspended solids
- Fluor-BWXT Portsmouth NPDES Outfall 604 (X-700 Bionitrification Facility) – copper, iron, nickel, nitrate-nitrogen, pH, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 605 (X-705 Decontamination Microfiltration System) – ammonia-nitrogen, chromium, hexavalent chromium, copper, Kjeldahl nitrogen, nickel, nitrate-nitrogen, nitrite-nitrogen, oil and grease, pH, sulfate, total suspended solids, trichloroethene, and zinc
- Fluor-BWXT Portsmouth NPDES Outfall 608 (X-622 Groundwater Treatment Facility) – trichloroethene, pH, and *trans*-1,2-dichloroethene
- Fluor-BWXT Portsmouth NPDES Outfall 610 (X-623 Groundwater Treatment Facility) – trichloroethene, pH, and *trans*-1,2-dichloroethene
- Fluor-BWXT Portsmouth NPDES Outfall 611 (X-627 Groundwater Treatment Facility) – pH and trichloroethene

As noted above, the Fluor-BWXT Portsmouth NPDES permit also identifies additional monitoring points that are not discharge points. Fluor-BWXT Portsmouth NPDES Station Number 801 is a surface water background monitoring location on the Scioto River upstream from Fluor-BWXT Portsmouth NPDES Outfalls 003 and 004. Samples are collected from this monitoring point to measure toxicity to minnows and another aquatic organism, *Ceriodaphnia*.

Fluor-BWXT Portsmouth NPDES Station Number 902 is a monitoring location on Little Beaver Creek downstream from Outfall 001. Fluor-BWXT Portsmouth NPDES Station Number 903 is a monitoring location on Big Run Creek downstream from Outfall 002. Water temperature is the only parameter measured at these two monitoring points.

The monitoring data detailed in the previous paragraphs are submitted to Ohio EPA in a monthly discharge monitoring report. These monthly discharge monitoring reports are provided to the public on the PEGASIS website [here](#). Discharge limitations at the Fluor-BWXT Portsmouth NPDES monitoring locations were exceeded on 24 occasions in 2021. The overall Fluor-BWXT Portsmouth NPDES compliance rate with the NPDES permit was 99 percent. Section 2.4.1 provides more information about these exceedances.

5.2.1.2 Mid-America Conversion Services NPDES Outfalls

Mid-America Conversion Services is responsible for the NPDES permit for the discharge of process wastewaters from the DUF₆ Conversion Facility. The Mid-America Conversion Services NPDES permit

provides monitoring requirements for two outfalls: Mid-America Conversion Services Outfall 001 and Mid-America Conversion Services Outfall 602. Figure 4.2 shows the location of these NPDES outfalls.

Monitoring requirements for Mid-America Conversion Services Outfall 001 are effective only when process wastewater is discharged through the outfall. No process wastewater was discharged through Outfall 001 in 2021; therefore, no monitoring was required.

Mid-America Conversion Services Outfall 602 monitors the discharge of process wastewater to the sanitary sewer, which flows to the X-6619 Sewage Treatment Plant that discharges through Fluor-BWXT Portsmouth NPDES Outfall 003. Process wastewater discharged from Mid-America Conversion Services Outfall 602 was monitored for pH and total flow.

The monitoring data collected in accordance with the Mid-America Conversion Services permit are submitted to Ohio EPA in a monthly discharge monitoring report. No exceedances of permit limitations at Mid-America Conversion Services Outfall 602 occurred during 2021 and there were no discharges through Outfall 001; therefore, the overall Mid-America Conversion Services compliance rate with the NPDES permit was 100 percent.

5.2.1.3 Centrus NPDES Outfalls

Centrus is responsible for three NPDES outfalls through which water is discharged from the site. These are shown in Figure 4.2. Two outfalls discharge directly to surface water, and one outfall discharges to Fluor-BWXT Portsmouth NPDES Outfall 003 before leaving the site. The following chemicals and water quality parameters are monitored at each outfall:

- Centrus NPDES Outfall 012 (X-2230M Southwest Holding Pond) – chlorine, mercury, oil and grease, pH, suspended solids, and total PCBs
- Centrus NPDES Outfall 013 (X-2230N West Holding Pond) – barium, cadmium, chlorine, copper, mercury, oil and grease, pH, suspended solids, total PCBs, and zinc
- Centrus NPDES Outfall 613 (X-6002A Recirculating Hot Water Plant particle separator) – chlorine and suspended solids

The monitoring data are submitted to Ohio EPA in a monthly discharge monitoring report. In May 2021, Centrus exceeded the daily and monthly permit limitations for suspended solids at Outfall 013 due to a culvert failure. Repairs were made and there were no additional exceedances in 2021. The overall Centrus compliance rate with the NPDES permit in 2021 was 99%.

5.2.2 On-Site Waste Disposal Facility Surface Water Monitoring

The On-Site Waste Disposal Facility began operating in May 2021. The *On-Site Waste Disposal Facility (OSWDF) Performance Standards Verification Plan* (DOE 2021b) describes the monitoring program developed to ensure that performance standards for protection of human health and the environment are met during operation of the facility. Surface water monitoring is designed to monitor the impact of waste handling activities associated with the On-Site Waste Disposal Facility on surface water within and flowing from the area. Two types of surface water monitoring are conducted: storm water discharge monitoring and surface water environmental surveillance monitoring.

Storm water discharge monitoring occurs at the discharge point of sedimentation and detention basins and ponds. This monitoring focuses on conventional industrial pollutants associated with activities supporting landfill operations that are conducted in the drainage area such as equipment storage and laydown, vehicle traffic, and maintenance. Four storm water discharge locations were monitored in 2021 for pH, oil and

grease, total suspended solids, cadmium, chromium, lead, and mercury. Data collected for the storm water discharges in 2021 did not identify any issues to be addressed in the operation of the On-Site Waste Disposal Facility. The *2021 On-Site Waste Disposal Facility Annual Project Status Report* (DOE 2022b) and data collected in 2021 are available on the PEGASIS website [here](#).

Surface water environmental surveillance monitoring is conducted downstream of discharges from sedimentation ponds and at locations downstream from areas where surface water runoff directly enters streams on the periphery of the On-Site Waste Disposal Facility. These locations include tributaries to Little Beaver Creek and Big Beaver Creek that may have continuous or intermittent flow.

Eight locations were monitored in 2021 for PCBs and chlorinated organics. Data collected at the On-Site Waste Disposal Facility surface water sampling locations in 2021 did not identify any issues to be addressed in the operation of the On-Site Waste Disposal Facility. The *2021 On-Site Waste Disposal Facility Annual Project Status Report* (DOE 2022b) and data collected in 2021 are available on the PEGASIS website [here](#).

5.2.3 Surface Water Monitoring Associated with Cylinder Storage Yards

Both filtered and unfiltered surface water samples are collected quarterly from four locations in the drainage basins downstream from the Mid-America Conversion Services X-745C, X-745E, and X-745G Cylinder Storage Yards (UDS X01, RM-8, UDS X02, and RM-10) shown in Figure 4.2. These locations are on the PORTS site and are not accessible to the public. Samples are analyzed for PCBs. PCBs were not detected in any of the surface water samples (filtered or unfiltered) collected during 2021. Section 5.3.2 presents the results for sediment samples collected as part of this program.

5.3 Sediment

In 2021, sediment monitoring at PORTS included local streams and the Scioto River upstream and downstream from PORTS and drainage basins downstream from the Mid-America Conversion Services cylinder storage yards.

5.3.1 Local Sediment Monitoring

Sediment is sampled annually as specified in the *Environmental Monitoring Plan for the Portsmouth Gaseous Diffusion Plant* (DOE 2017c). Samples are collected at the same locations upstream and downstream from PORTS where local surface water samples are collected, at the NPDES outfalls on the east and west sides of PORTS, and at a location on Big Beaver Creek upstream from the confluence with Little Beaver Creek (see Figure 4.6). In 2021, samples were analyzed for 20 metals and PCBs, in addition to the radiological parameters discussed in Chapter 4.

PCBs were detected at three on-site and five off-site sampling locations. Samples collected on site from Little Beaver Creek (RM-8), West Drainage Ditch (RM-10), and East Drainage Ditch (RM-11) contained PCBs at concentrations ranging from 23.4 to 76 micrograms per kilogram ($\mu\text{g}/\text{kg}$) or parts per billion (ppb). PCBs were also detected at the off-site sampling locations on Little Beaver Creek (RM-7), Big Beaver Creek (RM-13), Big Run Creek (RM-2), and the Scioto River (RM-6 and RM-1A) at concentrations ranging from 5.75 to 59.7 $\mu\text{g}/\text{kg}$. The concentrations of PCBs detected in the samples are less than the 240 $\mu\text{g}/\text{kg}$ risk-based regional screening level for PCB-1254/1260 developed by US EPA and utilized by Ohio EPA (US EPA 2020).

The results of metals sampling conducted in 2021 indicate that no appreciable differences are evident in the concentrations of metals present in sediment samples taken upstream from PORTS and downstream

from PORTS. Because metals occur naturally in the environment, the metals detected in the samples most likely did not result from activities at PORTS.

5.3.2 Sediment Monitoring Associated with Cylinder Storage Yards

Sediment samples are collected quarterly from four locations in the drainage basins downstream from the Mid-America Conversion Services X-745C, X-745E, and X-745G Cylinder Storage Yards (UDS X01, RM-8, UDS X02, and RM-10) and analyzed for PCBs. These locations, shown in Figure 4.2, are on the PORTS site and are not accessible to the public.

In 2021, PCBs were detected in at least one of the sediment samples collected at each location. The maximum concentration of PCBs (202.6 $\mu\text{g}/\text{kg}$) was detected in the third quarter sample collected at sampling location UDS X02. The concentrations of PCBs detected in 2021 are below the 1 ppm (1000 $\mu\text{g}/\text{kg}$) reference value set forth in the US EPA Region 5 *TSCA Approval for Storage for Disposal of PCB Bulk Product (Mixed) Waste*. This reference applies to the storage of DUF₆ cylinders at PORTS, which may have paint on the exterior of the cylinders that contains more than 50 ppm PCBs. None of the samples contained PCBs above the 240 $\mu\text{g}/\text{kg}$ (ppb) risk-based regional screening level for PCB-1254/1260 developed by US EPA and utilized by Ohio EPA (US EPA 2020). Section 5.2.2 presents the results for surface water samples collected as part of this program.

5.4 Biota

Fish samples are collected annually, if available, from the following locations:

- Little Beaver Creek (RW-8): on site at PORTS
- Big Beaver Creek (RW-15): off site upstream from the confluence with Little Beaver Creek
- Big Beaver Creek (RW-13): off site downstream from the confluence with Little Beaver Creek
- Scioto River (RW-1A): off site downstream from PORTS water discharges
- Scioto River (RW-6): off site upstream from PORTS water discharges at Piketon

In 2021, bass were caught in Big Beaver Creek at RW-13, Little Beaver Creek at RW-8, and the Scioto River at RW-1A at the surface water monitoring locations indicated in Figure 4.4. Fish samples were analyzed for PCBs in addition to the radiological parameters discussed in Chapter 4. Fish samples collected for this program included only the fish fillet—that is, only the portion of the fish that would be eaten by a person. Two samples of fish were analyzed from the bass caught at RW-8.

Table 5.3 summarizes the results of the PCB sampling for 2021 and compares the results to suggested consumption limits from the State of Ohio.

Table 5.3. PCB results in fish and Ohio advisory consumption limits

Ohio advisory consumption limits for PCBs in fish		
Unrestricted	1 meal/week	1 meal/month
Less than 50 µg/kg	50-220 µg/kg	220-1000 µg/kg
RW-1A PCBs: 6.83 µg/kg	RW-8 (regular sample) PCBs: 89.6 µg/kg	
RW-13 PCBs: 36.1 µg/kg	RW-8 (duplicate sample) PCBs: 68.2 µg/kg	

Note:

Source: *State of Ohio Cooperative Fish Tissue Monitoring Program Sport Fish Tissue Consumption Advisory Program* (Ohio EPA 2010).

The Ohio Sport Fish Consumption Advisory (Ohio Department of Health 2021), which advises the public on consumption limits for sport fish caught from all water bodies in Ohio, should be consulted before eating any fish caught in Ohio waters. The advisory recommends a limit of one meal per month for white bass (12 inches and over), common carp, and channel or flathead catfish caught in the Scioto River in Pike and Scioto Counties due to mercury and PCB contamination. The Ohio Department of Health advises limiting consumption of sport fish caught from all waterbodies in Ohio to one meal per week, unless there is a more or less restrictive advisory.