5. ENVIRONMENTAL NON-RADIOLOGICAL PROGRAM INFORMATION

5.1 SUMMARY

Non-radiological environmental monitoring at PORTS includes air, water, sediment, and fish. Monitoring of non-radiological parameters is required by state and federal regulations and/or permits, but is also performed to reduce public concerns about plant operations.

In 2020, DOE and Ohio EPA began a joint ambient air monitoring program at PORTS to monitor non-radiological air pollutants that could be present due to D&D activities at PORTS: particulate matter, metals, VOCs, and asbestos. Five ambient air monitoring stations located on site began operating in November/December of 2020. Monitoring data for these new locations showed low levels of particulate matter, metals, and VOCs that are within health-based standards. Asbestos was not detected. Other non-radiological data collected in 2020 are similar to data collected in previous years.

5.2 ENVIRONMENTAL NON-RADIOLOGICAL PROGRAM INTRODUCTION

Environmental monitoring programs at PORTS usually monitor both radiological and non-radiological constituents that could be released to the environment as a result of PORTS activities. The radiological components of each monitoring program were discussed in the previous chapter. The DOE *Environmental Monitoring Plan for the Portsmouth Gaseous Diffusion Plant* (DOE 2017a) specifies non-radiological monitoring requirements for ambient air, surface water, sediment, and fish. Non-radiological data are not collected for all sampling locations or all monitoring programs.

Environmental permits issued by Ohio EPA to FBP, MCS, or Centrus specify discharge limitations, monitoring requirements, and/or 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; as Centrus operates independently of the DOE and is regulated by the NRC.

Data for the following environmental media are included in this chapter:

- air
- surface water
- sediment
- biota (fish).

DOE also conducts an extensive groundwater monitoring program at PORTS that includes both radiological and non-radiological constituents. Chapter 6 provides information on the groundwater monitoring program, associated surface water monitoring, and water supply monitoring.

5.3 AIR

Permitted air emission sources at PORTS emit non-radiological air pollutants. Section 5.3.1 discusses airborne discharges of non-radiological air pollutants. DOE also monitors ambient air for non-radiological air pollutants that could be present due to D&D activities at PORTS. In 2020, DOE and Ohio EPA began a joint ambient air monitoring program at PORTS to monitor particulate matter, metals, VOCs, and asbestos at five ambient air monitoring stations. In addition, the ambient air monitoring program measures fluoride at monitoring stations within PORTS boundaries and in the surrounding area.

5.3.1 Airborne Discharges

FBP is responsible for numerous air emission sources associated with the former gaseous diffusion production facilities and support facilities. These sources, which included the boilers at the X-600 Steam

Plant Complex (prior to demolition in 2013), emitted more than 100 tons per year of non-radiological air pollutants specified by Ohio EPA, which caused FBP air emission sources to become a major source of air pollutants as defined in 40 CFR Part 70.

FBP is required to submit an annual report called the Ohio EPA Fee Emissions Report to report emissions of selected non-radiological air pollutants. FBP reported the following emissions of non-radiological air pollutants for 2020: 8.81 tons of particulate matter and 1.18 tons of organic compounds. Emissions for 2020 are associated with the X-627 Groundwater Treatment Facility and plant roads/parking areas.

The DUF_6 Conversion Facility emits only a small quantity of non-radiological air pollutants. Because of these small emissions, Ohio EPA requires a Fee Emissions Report only once every two years (in odd-numbered years). MCS reported less than 10 tons/year of specified non-radiological air pollutants in 2019 (the report requires reporting in increments of emissions: zero, less than 10 tons, 10-50 tons, more than 50 tons, and more than 100 tons).

U.S. EPA also requires annual reporting of greenhouse gas emissions (carbon dioxide, methane, and nitrous oxide). In 2020, FBP reported emissions of 12,287.8 metric tons of carbon dioxide, 0.24 metric ton of methane, and 0.024 metric ton of nitrous oxide. These emissions are 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 D&D of plant facilities. Asbestos emissions are controlled by a system of work practices. The amount of asbestos removed and disposed is reported to Ohio EPA. In 2020, approximately 1,000 lbs of asbestos-containing materials (net weight) were shipped from PORTS. Asbestos was not detected in ambient air samples collected as part of the ambient air monitoring program in 2020 (see Section 5.3.2.4).

5.3.2 Ambient Air Monitoring

In November/December of 2020, DOE and Ohio EPA began a joint ambient air monitoring program at PORTS to monitor non-radionuclides that may be released to the environment during D&D at PORTS. Ohio EPA began reporting selected data in November 2020 and DOE began reporting data in December 2020.

Five air monitoring stations were installed on site to monitor particulate matter, metals, VOCs, and fibers/asbestos. Figure 5.1 shows the locations of the joint DOE and Ohio EPA air monitors. Both DOE and Ohio EPA collect samples from each location. Ohio EPA provides air monitoring data to the public at epa.ohio.gov/dapc/ams/amsmain/amsspecsam-DOE. DOE provides data at pegasis.ports.pppo.gov.

DOE also operates 15 ambient air monitoring stations that measure fluoride (see Chapter 4, Figure 4.3). Fluoride detected at the ambient air monitoring stations could be present due to background concentrations (fluoride occurs naturally in the environment), activities associated with the former gaseous diffusion process, and operation of the DUF_6 Conversion Facility.

5.3.2.1 Particulate matter

Particulate matter is a mixture of very small solid particles and liquid droplets in air. Particulate matter is the dust produced at construction sites, on unpaved roads or fields, or the smoke produced by fires.

Particulate matter is also emitted by numerous industrial processes and is produced by coal or gas-burning power plants and gasoline and diesel fuel burned by cars and trucks. Particulate matter can be a health hazard when people inhale it.

DOE and Ohio EPA measure two sizes of particulate matter called PM10 and PM2.5. The 10 and 2.5 refer to the size of the particles, which are 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 (Figure 5.1) continuously measure PM10 and PM2.5.

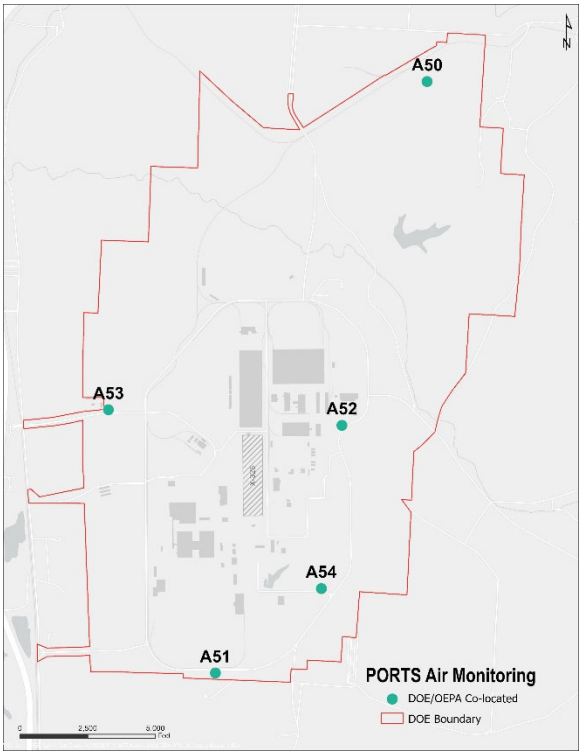

Figure 5.1. DOE/Ohio EPA air monitoring stations.

The National Ambient Air Quality Standards set a 24-hour average of 150 micrograms per cubic meter ($\mu g/m^3$) for PM10 in ambient air. Although this standard applies to geographic areas, not to individual industrial facilities, the standard is useful to evaluate PORTS monitoring data. DOE began reporting PM10 data at stations A51, A52, and A53 on December 1, 2020. Reporting for stations A50 and A54 began on December 9, 2020. For data collected by DOE in December 2020, the maximum 24-hour average for PM10 was 30.8 $\mu g/m^3$ at station A50, which is below the 150 $\mu g/m^3$ standard.

The National Ambient Air Quality Standards set a 24-hour average of 35 $\mu g/m^3$ for PM2.5 in ambient air and a primary annual average standard of 12 $\mu g/m^3$. Although these limits apply to geographic areas, not to individual industrial facilities, the standards are useful to evaluate PORTS monitoring data. DOE began reporting PM2.5 data at stations A51, A52, and A53 on December 1, 2020. Reporting for stations A50 and A54 began on December 9, 2020. For data collected by DOE in December 2020, the maximum 24-hour average for PM2.5 was 19 $\mu g/m^3$ at station A53, which is below the 35 $\mu g/m^3$ standard. The annual averages measured at the stations were 10 $\mu g/m^3$, which are also below the 12 $\mu g/m^3$ standard.

Hourly measurements for PM10 and PM2.5 from the Ohio EPA stations are available in real time at epa.ohio.gov/dapc/ams/amsmain/amsspecsam-DOE. Summaries of data collected by Ohio EPA are also available at the Ohio EPA website.

5.3.2.2 Metals

Metals are a component of particulate matter. Metals are present in particulate matter because metals are naturally present in soil. Metals are also released to the air from fuel combustion (burning coal, natural gas, diesel fuel, or gasoline) and 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. Samples are collected weekly (24-hour samples collected once every six days). DOE began sampling in December 2020.

DOE completed an air dispersion modeling evaluation in 2020 to assess potential off-site concentrations of pollutants dispersing from D&D activities and operation of the OSWDF (DOE 2020b). As part of this modeling, DOE developed a screening level for each contaminant called a maximum acceptable ground level concentration (MAGLC). The MAGLC is a screening level containing 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 2020, and the screening level (MAGLC). All metals detected in ambient air were less than the associated screening level.

Table 5.1. Metals monitored by DOE in PORTS ambient air

Metal	Maximum detected concentration (µg/m^3)	MAGLC (µg/m^3)	% of MAGLC
Antimony	0.00302	11.9	0.025%
Arsenic	not detected	0.238	-
Beryllium	not detected	0.00119	-
Cadmium	not detected	0.0476	-
Chromium	not detected	1.19	-
Cobalt	0.00171	0.476	0.36%
Lead	not detected	1.19	-
Manganese	0.0721	0.476	15%
Mercury	not detected	0.595	-
Nickel	0.0448	2.38	1.9%
Selenium	0.000679	4.76	0.014%

DOE data for the ambient air monitoring program are available on line at pegasis.ports.pppo.gov. Ohio EPA provides air monitoring data to the public at epa.ohio.gov/dapc/ams/amsmain/amsspecsam-DOE.

5.3.2.3 Volatile organic compounds

Volatile organic compounds (VOCs) 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 VOCs designated by Ohio EPA as hazardous air pollutants. These VOCs are monitored because they may be present in soil from areas that will be excavated within the X-231A/B Oil Biodegradation Plots and X-740 groundwater plume (see Chapter 3, Sections 3.3.1.3 and 3.3.3). These VOCs could be released to the air during soil excavation, treatment of water collected during the soil excavation, and other D&D activities. Samples are collected weekly or biweekly (24-hour samples collected once every 6 or 12 days). DOE began sampling in December 2020.

Table 5.2 summarizes the VOCs monitored at PORTS and the maximum detected concentration of each VOC in 2020. Since soil excavation and water treatment associated with D&D had not begun in 2020, these low levels of VOCs detected in ambient air are likely present primarily due to vehicle exhaust. Benzene and other VOCs are detected worldwide due to fuel combustion and other industrial activities. Methylene chloride and 2-butanone are also common laboratory contaminants and may have been detected in ambient air samples due to laboratory contamination.

Table 5.2. VOCs monitored by DOE in PORTS ambient air

VOC	Maximum detected concentration (ppbv)	Maximum detected concentration (µg/m^3)
1,1,1-Trichloroethane	not detected	-
1,1,2-Trichloroethane	not detected	-
1,1-Dichloroethane	not detected	-
1,1-Dichloroethene	not detected	-
1,2-Dichloroethane	0.061	0.25
1,4-Dioxane	not detected	-
2-Butanone	0.848	2.5
4-Methyl-2-pentanone	0.400	1.6
Benzene	0.287	0.92
Carbon disulfide	0.071	0.22
Carbon tetrachloride	0.085	0.53
Chloroethane	0.079	0.21
Chloroform	0.032	0.16
cis-1,2-Dichloroethene	not detected	-
Methylene chloride	3.59	12
Tetrachloroethene	0.105	0.71
Toluene	0.441	1.7
trans-1,2-Dichloroethene	not detected	-
Trichloroethene	0.071	0.38
Vinyl chloride	0.196	0.50

ppbv – parts per billion by volume. µg/m3 – microgram per cubic meter.

The air dispersion modeling evaluation in 2020 also assessed potential off-site concentrations of VOCs dispersing from D&D activities and operation of the OSWDF (DOE 2020b) and developed a screening level for VOCs (the MAGLC). The VOC MAGLC is based on protective values established for TCE, which is the predominant VOC contaminant for the site. The MAGLC for total VOCs is 1334 µg/m^3. Concentrations of VOCs detected in ambient air in 2020 are less than the screening level.

5.3.2.4 Fibers/asbestos

Asbestos fibers could be present in ambient air due to removal of asbestos-containing materials from D&D at PORTS. 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 that have materials containing asbestos (such as siding, insulation, and floor tile).

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 analyzed for asbestos fibers. Samples are collected weekly (24-hour samples collected once every six days). DOE began sampling in December 2020. No fibers, including asbestos fibers, were detected in the samples collected by DOE in 2020.

5.3.2.5 Fluoride

In 2020, samples for fluoride were collected weekly from 15 ambient air monitoring stations in and around PORTS (see Chapter 4, Figure 4.3), including a background ambient air monitoring station (A37) located approximately 13 miles southwest of the plant.

In 2020, fluoride was not detected in 76 percent of the samples collected for the ambient air monitoring program. The average ambient concentration of fluoride measured in samples collected at background station A37 was 0.0032 µg/m^3, which was calculated using the assumption that the concentration of

fluoride in air was zero for samples in which fluoride was not detected. This assumption ensures that the average concentration of fluoride in ambient air at the background location is not overestimated. Concentrations of fluoride measured in samples collected at the background station ranged from zero (below the analytical detection limit) to 0.014 µg/m^3.

For the locations around PORTS, if fluoride was not detected in a sample, the ambient concentration of fluoride was calculated assuming fluoride was present at the detection limit (instead of using zero as discussed for the background location). This assumption ensures that the average concentration of fluoride in air around PORTS is not underestimated because the fluoride was actually present at a concentration less than could be detected. Average ambient concentrations of fluoride measured at the stations around PORTS ranged from 0.0091 µg/m^3 at on-site stations A10 and A36 to 0.019 µg/m^3 at station A12 (east of PORTS on McCorkle Road). These concentrations are similar to the concentrations detected in 2019 (the highest average ambient concentration in 2019 was 0.019 µg/m^3 at station A10).

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 0.097 µg/m^3 at station A12 (east of PORTS on McCorkle Road). The maximum concentration of fluoride in ambient air in 2020 (0.097 µg/m^3) is less than the maximum concentration detected in 2019 (0.16 µg/m^{3}at station A24 — north of PORTS on Shyville Road). Concentrations of fluoride in ambient air around PORTS are within ambient background concentrations measured in the United States (Agency for Toxic Substances and Disease Registry 2003). There is no standard for fluoride in ambient air.

5.4 WATER

Surface water and groundwater are monitored at PORTS. Groundwater monitoring is discussed in Chapter 6, along with surface water monitoring conducted as part of the groundwater monitoring program. Non-radiological surface water monitoring primarily consists of sampling water discharges associated with the FBP, MCS, and Centrus NPDES-permitted outfalls. PCBs are monitored in on-site surface water downstream from the cylinder storage yards.

5.4.1 Water Discharges (NPDES Outfalls)

In 2020, DOE contractors (FBP and MCS) were responsible for 20 NPDES discharge points (outfalls) or sampling points at PORTS. Centrus was responsible for three outfalls. This section describes non-radiological discharges from these outfalls during 2020.

5.4.1.1 FBP NPDES outfalls

In 2020, FBP was responsible for 18 outfalls or sampling points. Nine outfalls discharge directly to surface water, and six outfalls discharge to another outfall before leaving the site. FBP also monitors three additional sampling points that are not discharge locations. Chapter 4, Section 4.3.4.1, provides a brief description of each FBP outfall or sampling point and provides a site diagram showing each FBP NPDES outfall/sampling point (see Chapter 4, Figure 4.4).

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 and sets discharge limitations for some of these parameters. For example, some of the FBP outfalls discharge water from the groundwater treatment facilities; therefore, the outfalls are monitored for selected VOCs (*trans*-1,2-dichloroethene and/or TCE) because the groundwater treatment facilities treat water contaminated with VOCs. Chemicals and water quality parameters monitored at each FBP outfall in 2020 are as follows:

- FBP 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.

- FBP 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.

- FBP 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.

- FBP 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.

- FBP NPDES Outfall 005 (X-611B Lime Sludge Lagoon) – lead, mercury, pH, selenium, and total suspended solids.

- FBP 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, TCE, total suspended solids, and zinc.

- FBP NPDES Outfall 010 (X-230J5 Northwest Holding Pond) – chromium, copper, iron, lead, mercury, oil and grease, total PCBs, pH, selenium, thallium, total suspended solids, TCE, and zinc.

- FBP NPDES Outfall 011 (X-230J6 Northeast Holding Pond) – cadmium, chlorine, chromium, copper, fluoride, oil and grease, total PCBs, pH, selenium, total suspended solids, thallium, TCE, and zinc.

- FBP NPDES Outfall 015 (X-624 Groundwater Treatment Facility) – arsenic, barium, total PCBs, pH, silver, and TCE.

- FBP NPDES Outfall 602 (X-621 Coal Pile Runoff Treatment Facility) – iron, manganese, pH, and residue (settleable), total suspended solids.

- FBP NPDES Outfall 604 (X-700 Biodenitrification Facility) – copper, iron, nickel, nitrate-nitrogen, pH, and zinc.

- FBP 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, TCE, and zinc.

- FBP NPDES Outfall 608 (X-622 Groundwater Treatment Facility) – TCE, pH, and *trans*-1,2-dichloroethene.

- FBP NPDES Outfall 610 (X-623 Groundwater Treatment Facility) – TCE, pH, and *trans*-1,2-dichloroethene.

- FBP NPDES Outfall 611 (X-627 Groundwater Treatment Facility) – pH and TCE.

The FBP NPDES Permit also identifies additional monitoring points that are not discharge points as described in the previous paragraphs. FBP NPDES Station Number 801 is a surface water background monitoring location on the Scioto River upstream from FBP NPDES Outfalls 003 and 004. Samples are

collected from this monitoring point to measure toxicity to minnows and another aquatic organism, *Ceriodaphnia*.

FBP NPDES Station Number 902 is a monitoring location on Little Beaver Creek downstream from FBP NPDES Outfall 001. FBP NPDES Station Number 903 is a monitoring location on Big Run Creek downstream from FBP NPDES Outfall 002. Water temperature is the only parameter measured at each of these 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 by DOE at pegasis.ports.pppo.gov. In 2020, discharge limitations at the FBP NPDES monitoring locations were exceeded on 15 occasions (see Table 5.3).

Table 5.3 FBP NPDES exceedances in 2020

Outfall	Parameter	Limit	Number of Exceedances	Date and Result[a]
001	Chlorine, total residual	0.05 mg/L (maximum daily)	1	September 2: 0.052 mg/L
003	Mercury	27 ng/L (monthly average)	4	September: 37 ng/L October: 45 ng/L November: 50 ng/L December: 30 ng/L
		0.00004 kg/day (monthly average loading)	2	October: 0.000055 kg/day November: 0.000065 kg/day
	Total suspended solids	18 mg/L (maximum daily)	1	December 28: 19 mg/L
005	pH	9.0 SU (maximum daily)	1	August 11: 9.19 SU
	Total suspended solids	15 mg/L (maximum daily)	5	Jan 2: 16 mg/L Jan 20: 17 mg/L February 17: 17 mg/L April 14: 20.2 mg/L August 7: 20.2 mg/L
		10 mg/L (monthly average)	1	January: 13.55 mg/L

[a]Units: kilogram per day (kg/day). milligram per liter (mg/L). nanogram per liter (ng/L). standard unit (SU).

Exceedances of the discharge limitations for total suspended solids were generally caused by a combination of excessive rainfall and operational issues at the outfall. Operational issues that contributed to the exceedances were corrected. The exceedance of the limit for pH at Outfall 005 was caused by a temporary under-dose of the chemical used to control pH and was found to be compliant within 50 minutes. The cause of the chlorine exceedance at Outfall 001 was not determined, however, operational samples collected 1.75 hours before and 2.5 hours after the non-compliant sample did not contain detectable amounts of chlorine.

The rolling annual average (12 ng/L) set by Ohio EPA for mercury at Outfall 003 was exceeded for the period of May 2019 through April 2020. The annual average for this time period was 15.9 ng/L. Exceedances of the rolling annual average and monthly limits for mercury at Outfall 003 are being addressed in accordance with the compliance schedule in the FBP NPDES permit that became effective on July 1, 2020.

In 2020, the overall FBP NPDES compliance rate with the NPDES permit was 99%.

5.4.1.2 MCS NPDES outfalls

MCS is responsible for the NPDES permit for the discharge of process wastewaters from the DUF_6 Conversion Facility. The MCS NPDES permit provides monitoring requirements for two outfalls: MCS Outfall 001 and MCS Outfall 602. Chapter 4, Figure 4.4 shows the location of the MCS NPDES outfalls. Monitoring requirements for MCS Outfall 001 are only effective when process wastewater is being discharged through the outfall. No process waste water was discharged through Outfall 001 in 2020; therefore, no monitoring was required.

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

The monitoring data collected in accordance with the MCS permit are submitted to Ohio EPA in a monthly discharge monitoring report. No exceedances of permit limitations at MCS Outfall 602 occurred during 2020; therefore, the overall MCS compliance rate with the NPDES permit was 100%.

5.4.1.3 Centrus NPDES outfalls

Centrus is responsible for three NPDES outfalls through which water is discharged from the site (see Chapter 4, Figure 4.4). Two outfalls discharge directly to surface water, and one outfall discharges to FBP NPDES Outfall 003 before leaving the site. Chapter 4, Section 4.3.4.2, provides a brief description of each Centrus NPDES outfall. Chemicals and water quality parameters monitored at each Centrus outfall are as follows:

- 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. No exceedances of permit limitations at Centrus Outfalls 012, 013, and 613 occurred during 2020; therefore, the overall Centrus compliance rate with the NPDES permit was 100%.

5.4.2 Surface Water Monitoring Associated with MCS Cylinder Storage Yards

Surface water samples (filtered and unfiltered) are collected quarterly from four locations in the drainage basins downstream from the MCS X-745C, X-745E, and X-745G Cylinder Storage Yards (UDS X01, RM-8, UDS X02, and RM-10 – see Chapter 4, Figure 4.4). These locations are on site at PORTS and 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 2020. Section 5.5.2 presents the results for sediment samples collected as part of this program.

5.5 SEDIMENT

In 2020, sediment monitoring at PORTS included local streams and the Scioto River upstream and downstream from PORTS and drainage basins downstream from the MCS cylinder storage yards.

5.5.1 Local Sediment Monitoring

Sediment samples are collected annually 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 Chapter 4, Figure 4.6). In 2020, 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 Big Run Creek (RM-3), Little Beaver Creek (RM-8) and West Drainage Ditch (RM-10) contained PCBs at concentrations ranging from 9.73 to 24.2 micrograms per kilogram (µg/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-5 and RM-15), and the Scioto River (RM-6 and RM-1A) at concentrations ranging from 5.13 to 14.6 µg/kg. The concentrations of PCBs detected in the samples are less than the risk-based regional screening level for PCB-1254/1260 developed by U.S. EPA and utilized by Ohio EPA: 240 µg/kg (U.S. EPA 2020).

The results of metals sampling conducted in 2020 indicate that no appreciable differences are evident in the concentrations of metals present in sediment samples taken upstream from PORTS and downstream from PORTS. Metals occur naturally in the environment. Accordingly, the metals detected in the samples most likely did not result from activities at PORTS.

5.5.2 Sediment Monitoring Associated with MCS Cylinder Storage Yards

Sediment samples are collected quarterly from four locations in the drainage basins downstream from the MCS 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 are on site at PORTS and not accessible to the public (see Chapter 4, Figure 4.4).

In 2020, PCBs were detected in at least one of the sediment samples collected at each location. The maximum concentration of PCBs (92.5 µg/kg) was detected in the first quarter sample collected at sampling location UDS X01. The concentrations of PCBs detected in 2020 are below the 1 ppm (1000 µg/kg) reference value set forth in the U.S. EPA Region 5 *TSCA Approval for Storage for Disposal of PCB Bulk Product (Mixed) Waste,* which applies to the storage of DUF_6 cylinders at PORTS that may have paint on the exterior of the cylinders that contains more than 50 ppm PCBs. None of the samples contained PCBs above the risk-based regional screening level for PCB-1254/1260 developed by U.S. EPA and utilized by Ohio EPA: 240 µg/kg (ppb) (U.S. EPA 2020).

Section 5.4.2 presents the results for surface water samples collected as part of this program.

5.6 BIOLOGICAL MONITORING - FISH

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 (Piketon).

In 2020, fish were caught at each of these locations. In the Scioto River, a catfish was caught at RW-6 and a drum was caught at RW-1A. Bass were caught in Little Beaver and Big Beaver Creeks. Chapter 4, Figure 4.6, shows the surface water monitoring locations where the fish were caught.

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 5.4 summarizes the results of the PCB sampling in off-site fish for 2020 and compares the results to suggested consumption limits from the State of Ohio.

Table 5.4. PCB results in fish and Ohio advisory consumption limits

	Ohio advisory consumption limits for PCBs in fish[a]		
	Unrestricted Less than 50 µg/kg	1 meal/week 50-220 µg/kg	1 meal/month 220-1000 µg/kg
PORTS 2020 off site fish samples		RW-15 PCBs:124 µg/kg RW-1A PCBs: 63.1 µg/kg RW-6 PCBs: 63.3 µg/kg	RW-13 PCBs: 862 µg/kg

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

PCBs were also detected in the fish samples collected on site from Little Beaver Creek (RW-8). One sample contained PCBs at 149 µg/kg, and the second sample contained PCBs at 3170 µg/kg. Ohio EPA recommends that fish containing PCBs above 1900 µg/kg should not be eaten. These samples consisted of several fish, which indicates that concentrations of contaminants in fish can vary even among similar fish. The fish collected on site from Little Beaver Creek are not at a location that would be accessible to the public.

The Ohio Sport Fish Consumption Advisory, available from the Ohio Department of Health, advises the public on consumption limits for sport fish caught from all water bodies in Ohio and should be consulted before eating any fish caught in Ohio waters (Ohio Department of Health 2021). 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/or PCB contamination. The Ohio Department of Health advises that everyone limit consumption of sport fish caught from all waterbodies in Ohio to one meal per week, unless there is a more or less restrictive advisory.