APPENDIX F: X-326 PROCESS BUILDING ABOVE-GRADE DEMOLITION AIR MONITORING PLAN

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ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
ARAR	applicable or relevant and appropriate requirement
CAM	continuous air monitor
CAP88	Clean Air Act Assessment Package-1988
CFR	*U.S. Code of Federal Regulations*
D&D	decontamination and decommissioning
DDP	Demolition Design Plan
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*
DOE	U.S. Department of Energy
DQO	data quality objective
eCAM	environmental continuous air monitor
EPA	U.S. Environmental Protection Agency
FBP	Fluor-BWXT Portsmouth LLC
HAP	hazardous air pollutant
iCAM	intelligent alpha/beta continuous air monitor
MAGLC	maximum acceptable ground-level concentration
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
OAC	*Ohio Administrative Code*
ODH	Ohio Department of Health
Ohio EPA	Ohio Environmental Protection Agency
OSWDF	On-site Waste Disposal Facility
PCB	polychlorinated biphenyl
PORTS	Portsmouth Gaseous Diffusion Plant
SADQ	*Sample Analysis Data Quality Assurance Project Plan*
SAP	Sampling and Analysis Plan
TBC	to-be-considered (guidance)
TLD	thermoluminescent dosimeter
TLV	threshold limit value
VOC	volatile organic compound

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F.1. INTRODUCTION

The U.S. Department of Energy's (DOE's) plan for the decontamination and decommissioning (D&D) operations of the former Portsmouth Gaseous Diffusion Plant (PORTS) and placing waste in the On-site Waste Disposal Facility (OSWDF) includes the above-grade demolition of the X-326 Process Building and closely associated structures and operation of the associated wastewater treatment operation as described in the main body of the *Above-Grade Demolition Design Plan for the X-326 Process Building and Associated Special Nuclear Material Monitoring Portals, Tie Lines, and Pipe Racks at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (X-326 Process Building [X-326] Demolition Design Plan [DDP]).

Contaminants present in the X-326 Process Building and related structures may be released as emissions as a result of D&D actions. This air monitoring plan provides the requirements for air monitoring during the above-grade demolition project based on evaluation of potential emissions and modeling of subsequent air dispersion that was completed in *Air Emissions Modeling Report for the On-site Waste Disposal Facility (OSWDF), Soil Excavation Projects, and X-326 Process Building Demolition at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (Multi-Project Air Model) (DOE 2020). The monitoring program is designed to ensure that radionuclides, polychlorinated biphenyls (PCBs), hazardous air pollutants (including metals and volatile organic compounds), and particulate matter do not become airborne at levels that pose a risk to site workers, the public, and the environment as a result of demolition activities. Air monitoring for worker protection is conducted outside of this air monitoring plan, under the *Worker Safety and Health Program* (Fluor-BWXT Portsmouth LLC [FBP] 2019).

Air monitoring under this plan will continue to address the X-326 project area and the operation of the X-622-1 wastewater treatment operation (C-Train) following completion of the active demolition phase until replaced by a subsequent air monitoring plan to address demolition of the at- and below-grade portions of the X-326 Process Building.

This appendix includes the rationale and design criteria for the air monitoring plan (Section F.1.1), the air emissions calculations and dispersion modeling performed to prepare the monitoring plan (Section F.2), and the specific air monitoring proposed for the X-326 Process Building above-grade demolition project (Section F.3.3), which includes a figure identifying the proposed monitoring parameters and locations. A brief summary of the records, reporting, and notifications required is discussed in Section F.4. Section F.5 lists the references cited for this plan.

F.1.1 RATIONALE AND DESIGN CRITERIA

This plan establishes requirements for air monitoring in conjunction with the X-326 Process Building above-grade demolition project and the C-Train wastewater treatment operation. Emission control measures to be implemented during demolition, including misting and fixatives, are described in the X-326 DDP (Section 5.3.5 and Table 5). Emission controls associated with the C-Train are included in the design included in Appendix C of this DDP.

The types and concentration of contaminants that may be encountered during demolition of the X-326 Process Building and the mechanical operations that comprise many of the work activities to be conducted ultimately define the types and levels of potential emissions which drive the types and levels of emission controls and air monitoring needed. Demolition actions and subsequent debris handling operations and pile management produce predictable levels of airborne emissions that vary in proportion to work activity, concentration of contaminants, local weather conditions and control measures employed. Modeling of emissions inputs with applicable wind direction and intensity data provides a

means to predict the levels of dispersed particulate and airborne contaminants at specific locations resulting demolition activities.

Results from dispersion modeling of potential emissions are then compared to the requirements that apply at specific locations (worker protection levels in the work zone and criteria applicable at the site boundary for protection of the public). Table F.1 summarizes the applicable or relevant and appropriate requirements (ARARs) and to-be-considered (guidance) (TBCs) that provide exposure limits and requirements related to demolition air monitoring. Other requirements, such as modeling guidance and selection of applicable exposure criteria also apply to air emissions, as described in subsequent text.

Table F.1. Summary of ARARs and TBCs Applicable to Demolition Air Monitoring

Regulation/Regulatory Citation	Summary of Requirement
Air Nuisances *OAC* 3745-15-07	A public nuisance with the emission or escape into the open air, from any source or sources whatsoever, of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, or any other substances or combinations of substances in such manner or in such amounts as to endanger the health, safety, or welfare of the public or cause unreasonable injury or damage to property shall not be caused.
Particulate *OAC* 3745-17-08	Reasonably achievable control measures to prevent particulate matter from becoming airborne shall be taken.
Radionuclides 40 *CFR* 61.92 NESHAP Subpart H	Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive an annual effective dose equivalent of 10 mrem.
Radiological Dose DOE Order 458.1(4)(b)[a]	Except as provided, exposure to individual members of the public from DOE radiological activities shall not exceed a total effective dose of 100 mrem/yr (and other limits as specified).

Note:
[a]TBC

CFR = U.S. Code of Federal Regulations
DOE = U.S. Department of Energy
NESHAP = National Emission Standards for Hazardous Air Pollutants
OAC = Ohio Administrative Code
TBC = to-be-considered (guidance)

In addition to the ARARs identified in Table F.1, the following information provides a broader understanding of the overarching regulatory framework that applies to air emissions. Under the requirements of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS) for criteria pollutants in ambient air considered harmful to public health and the environment. The NAAQS represent guidelines for health protection to be used by states in their evaluation of ambient air conditions to determine whether the standard has been met in all areas of the state. The standards are not designed for direct application to individual operations like PORTS, but the numerical values are useful guides for protecting public health. Pike County is in attainment for each of the NAAQS.

EPA has also identified 187 hazardous air pollutants (HAPs) (air toxics) that can pose health risks. EPA works with state governments to reduce the emissions of HAPs. *Ohio Administrative Code* (*OAC)* Chapter 3745-114, Toxic Air Contaminants, identifies contaminants considered toxic under *OAC* regulations and additional Ohio regulations specify the rules for reviewing new or modified sources with air toxics contaminants, including *Ohio Revised Code* Chapter 3704.03 and associated engineering guides. Public dose limits for radionuclides from DOE facilities have been established under

40 *U.S. Code of Federal Regulations* (*CFR)* 61, *National Emission Standards for Hazardous Air Pollutants* (NESHAP) Subpart H (40 *CFR* 61.92 et seq). NESHAP (Subpart M, 40 *CFR* 61.140 et seq) also establishes acceptable methods for management of asbestos at active waste disposal sites and those methods are incorporated into PORTS procedures.

These federal and state requirements form the basis for evaluating potential emissions from the PORTS activities for specific contaminants and either identify a corresponding compliance criterion or include criteria that may be adopted as relevant.

Evaluation of individual activities for emission levels and subsequent evaluation of the effects of dispersion of the net emissions in the environment is achieved through air modeling. Air sampling and monitoring is the primary means to verify that operational methods and emissions controls are maintaining air emissions within applicable or relevant criteria and demonstrate protectiveness for workers, the public, and the environment. Air monitoring for the X-326 Process Building above-grade demolition project will provide data to characterize emissions and demonstrate that airborne concentrations of contaminants at the project work boundary are consistent with action levels identified to maintain compliance with regulatory requirements, including site boundary pollutant concentration criteria. The data will also provide feedback on the effectiveness of engineering and administrative controls used for mitigation of air emissions.

Air monitoring activities will reflect a zones concept that includes sampling inside the work zone, sampling at the work zone boundary (project perimeter), and sampling in areas beyond the project perimeter. Real-time instruments will measure the level of radiological activity from collected particulate and report the levels of airborne particulate by size categories. Retrospective samplers will collect samples for specific classes of pollutant for laboratory analysis (metals, PCBs, asbestos, and radiological). The air monitoring program will provide data to characterize emissions associated with demolition activities that will also be used by project management to review the effectiveness of engineering and administrative control measures implemented.

Project-specific air monitoring data collected during and following demolition activities will be evaluated by the project and supporting organizations, including Environmental Remediation, Environmental Protection, and Radiation Protection in a timely manner (i.e., at least monthly). The data will be reviewed to:

- Determine compliance with action levels.
- Determine effectiveness of control measures.
- Identify if/where adjustment of controls is needed.

Project-specific air monitoring results will be summarized in the field work completion report for the project.

F.2. AIR EMISSIONS CALCULATIONS AND DISPERSION MODELING

Emissions estimates and dispersion modeling documented in the Multi-Project Air Model was based on key inputs reflecting the work activities and other specific parameters from PORTS, including recent weather data, terrain and topography, and size and placement of buildings. Emissions of pollutants from individual activities were determined based on accepted published emission factors.

Emissions from all pollutant-releasing activities on a project are considered for their respective active periods (e.g., particulate emissions from haul road traffic occur only during transfers). Pollutant emission rates are one of many inputs to the emission dispersion modeling and evaluation. Dispersion modeling evaluates the effects of wind, time, terrain, and other variables on the initial pollutant emissions, providing results that identify concentration of pollutants by location (for radionuclides, radiological dose is also a modeling result). Air modeling involves a large number of input variables. These input variables must be selected from a range of sources including site data (e.g., contaminant concentrations), published industry experience data (e.g., emissions rates, particle size distributions, mixing heights), and statistical meteorological predictions (e.g., wind speed, wind direction). Each input is a best approximation for future events, and therefore modeling results can vary from actual results to be measured later. As such, until actual emissions from a specific activity can be measured, the air dispersion modeling results have limitations in their expected accuracy that should confine their use to prediction of approximate emissions and predicting locations of maximum pollutant concentrations. The models are also useful in evaluation of the effects of variations in input variables, such as evaluating the effect of the number of truck trips used to transport waste. In general, pollutant measurements are still necessary to confirm model predictions and can help refine subsequent modeling efforts, as applicable.

F.2.1 APPROACH TO ESTIMATING AIR EMISSIONS

Demolition activities and temporary storage of debris have the potential to release fugitive dust (including particulate matter 10 microns or less in diameter [PM_{10}]) and pollutants (i.e., radiological constituents, chemicals/metals, asbestos fibers, PCBs) to ambient air and, if not mitigated, could present a risk to human health and the environment. To understand the potential emissions that could result from the demolition and prepare optimal emission control and monitoring strategies in compliance with ARARs, the activities involved in demolition were evaluated individually for their potential to produce emissions.

Estimates of emissions from each source activity were developed based on accepted published calculation methods described further in the Multi-Project Air Model. The Emission Factor and Inventory Group in the EPA Office of Air Quality Planning and Standards produces the AP-42 series of air pollutant emission factors, which is a useful compendium for typical average rates of emission generation. Other sources of emission factors, such as the Western Regional Air Partnership Fugitive Dust Handbook were also used. Emission factors estimate the quantity of a pollutant released to the atmosphere from an activity involving materials containing the pollutant (such as the amount of particulate emission from an unpaved road per truck trip of a given loaded weight). For demolition, particulate emissions were forecast to include pollutants present in the building, such as metals and radiological compounds.

Air emission estimates for all PORTS large open-air projects were generated for the first three years of the projects to account for all the major types of activities being conducted simultaneously (building demolition, OSWDF construction and operations [including waste transfer], soil excavation projects, and water treatment). Potential emissions of HAPs (air toxics), PCBs (a HAP), uranium (a HAP), and PM_{10} were calculated for all source activities (as applicable), including placement of waste in Cells 1, 4, and 5 of the OSWDF; D&D of the X-326 Process Building; and excavation of the X-740 Plume, X-231B Oil Biodegradation Plot, and X-231A Oil Biodegradation Plot. Emissions for volatile soil contaminant emissions (such as from the soil excavation projects) are estimated using Exposure Model for Soil-Organic Fate and Transport, a model developed by EPA for volatile compounds in soil. Emission inputs for particulates sources (such as earth-moving activities and haul road operations) were prepared based on accepted engineering standards and EPA guidance.

Planned demolition emission control measures were considered in preparing emissions estimates.

F.2.2 DISPERSION MODELING APPROACH

Air dispersion modeling of expected emissions was completed using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), a steady-state plume model that incorporates air dispersion based on planetary boundary-layer turbulence concepts, which is used for complex source configurations (emissions subject to exhaust plume downwash and situations where there is potential for exhaust plumes to interact with complex terrain). AERMOD is EPA's preferred regulatory model. AERMOD predicts the behavior of the potential emissions, such as probable dispersion direction and distance following release, using site-specific parameters including meteorology, terrain, position of large buildings, and specific contaminants and materials. Meteorological data for Pike County for the five years 2013-2017 was obtained from the Ohio Environmental Protection Agency (Ohio EPA) for use in the modeling runs. Dispersion of emissions was then calculated to assess the potential concentrations of pollutants at locations both on site and off site. Dispersion modeling was used to evaluate each major project and also to predict the cumulative effects of the entire set of PORTS projects and activities.

Modeling is also used to determine radiological doses from dispersion of radionuclides. Radiological doses are modelled separate from the other airborne hazards, using a model that includes dispersion predictions, but also accounts for expected uptake resulting from the predicted dispersed radiological materials. Potential radiological dose from multiple sources was estimated using the Clean Air Act Assessment Package-1988 (CAP88) model. CAP88 uses a modified Gaussian plume model to estimate the average dispersion of radionuclides released from an emission source. The program computes radionuclide concentrations in air, rates of deposition on ground surfaces and plants, and concentrations in food. It accounts for intake rates for people from ingestion of food produced in the assessment area and inhalation of radionuclides based on concentrations in air. DOE Order 458.1, *Radiation Protection of the Public and the Environment*, requires doses to members of the public from airborne radiological materials emissions to be evaluated with the CAP88 model (or another EPA-approved model) to demonstrate compliance with the requirements of NESHAP.

F.2.3 LIMITING EXPOSURE CRITERIA

Ohio EPA Standards − Ohio EPA regulates air pollution under the air pollution regulations in various portions of *OAC* Chapter 3745. Under Chapter 3745-15-05, *General Provisions on Air Pollution Control*, "De Minimis" air contaminant source exemption, a source may not qualify for an exemption from certain requirements if the source emits radionuclides (in any amount) or more than one ton of HAPs. The PORTS Project has the potential to emit radionuclides, and therefore, would not be exempt from the substantive applicable requirements identified in sections in Chapter 3745.

For Ohio toxic air contaminants identified in the list in *OAC* 3745-114-01, limiting exposure criteria for members of the public located beyond the PORTS site boundary are set based on the Ohio EPA requirements in *Option A – Review of New Sources of Air Toxic Emissions* (issued May 1986 and sometimes known as the Air Toxic Policy). Option A identifies a process to evaluate new air emission sources through modeling and comparison to a calculated guideline for public exposure known as the maximum acceptable ground-level concentration (MAGLC) for contaminants. MAGLCs are calculated from worker exposure limits known as threshold limit values (TLVs). TLV exposure limits, developed for industrial worker exposure scenarios, are set and maintained by the American Conference of Governmental Industrial Hygienists (ACGIH). Through the process prescribed in Option A guidance, a TLV is adjusted from the worker exposure scenario to a public/resident exposure scenario, accounting for the longer duration of exposure and the potential for members of the public to be more susceptible to impacts from contaminants. MAGLC values represent reasonable exposure criteria for air

concentrations of chemical contaminants at off-site receptor locations and provide a basis for comparison to concentrations of contaminants predicted from air modeling. MAGLCs were calculated for all PORTS contaminants listed in *OAC* 3745-114-01, as representative off-site regulatory exposure criteria for comparison to modeled PORTS air emissions. Although not applicable to PORTS, a MAGLC value for uranium has been calculated based on the ACGIH 0.2 mg/m^3 (200 $\mu g/m^3$) TLV for uranium. The MAGLC-like value for uranium (4.76 $\mu g/m^3$) will be used for comparison to the modeled uranium concentration at the site boundary.

Federal Standards − Under the Clean Air Act, a NAAQS for PM_{10} concentration in ambient air has been set at 150 $\mu g/m^3$. As discussed in Section F.1.1, this value is not intended as a limit applicable to individual sites like PORTS; however, it represents a reasonable standard for PORTS to adopt for evaluating modeled air emissions and air sampling results. NESHAP limits exposures to asbestos fibers through mandated procedures and specified packaging criteria for asbestos abatement activities and demolition activities. Additionally, under *OAC* 3745-20-06, *Standard for active asbestos waste disposal sites*, Ohio EPA requires that asbestos emissions "not cause or permit any visible emissions to the outside air." ACGIH has set a TLV at 0.1 fibers/cm^3 and the Occupational Safety and Health Administration uses the same limit for its permissible exposure limit.

F.2.4 RESULTS FROM AIR MODELING

Air modeling was documented in the Multi-Project Air Model. The second year of the combined project activities produced the highest collective emissions rates from the combination of the projects. Hence, the second-year emissions were used in emissions dispersion modeling to provide modeling results representing the highest potential site boundary air pollutant concentrations.

Table F.2 summarizes emissions predicted at the demolition project work boundary from the project activities underway in the vicinity of the X-326 Process Building, including the demolition and debris management activities, the impacted water management activities (including C-Train), nearby excavation activities, and waste hauling activities. Modeled concentrations for the AM3 air monitor location are also presented in the table. AM3 is one of three air monitoring locations sited based on the combined emissions results from the Multi-Project Air Model (see Section F.3.3.1). Table F.2 also includes the criterion applicable or relevant for each contaminant at the site boundary for public health protection.

Modeled emission concentrations for the criteria pollutant PM_{10} are presented for both sides of the demolition project (west and east). The large amount of activity on the haul road on the west side of the building (both for demolition and excavation, which shares the road) and the demolition debris loadout activities on the west side contribute to the higher values for the west side project boundary than the east side. PM_{10} results at the site boundary do not exceed the 150 $\mu g/m^3$ criterion. For other contaminants the modeled project boundary condition presented in Table F.2 represents the maximum concentration for the contaminant type at the X-326 Process Building demolition work boundary.

Annual emission rates for the toxic air contaminant HAPs and PCBs were below the 1-ton-per-year air level used by Ohio for screening emissions for permit exemption. Although the demolition activities are being performed under a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 regulatory framework that exempts the work from the administrative burden of obtaining permits, the small quantities of these pollutants to be released would have fallen within permit exemption criteria.

The effective radionuclide dose equivalent modeled using CAP88 for each year (combination of all projects) was less than 0.1 mrem/yr, well below the NESHAP regulatory limit of 10 mrem/yr. These modeling results are based on the controls that have been previously described. The highest dose results

from modeling the X-326 Process Building above-grade demolition and Water Treatment C-Train emissions were 1.30E-03 mrem/yr and 6.50E-02 mrem/yr, respectively, occurring along the eastern site boundary near the large parking area for the site workforce. The results indicate that these activities will be compliant with regulatory standards and protective of human health and the environment.

Table F.2. X-326 Demolition Modeled Emission Summary

Category	Modeled Project Boundary Concentration (µg/m³)	Modeled AM3 Concentration (µg/m³)	Site Boundary Criterion (µg/m³)
PM_{10}	535 (West) 75 (East)	288	150
HAP Metals			
− Antimony	2.25E-05	4.32E-06	11.9
− Arsenic	5.12E-03	9.84E-04	0.238
− Beryllium	8.71E-06	1.67E-06	1.19E-03
− Cadmium	0.137	2.64E-02	0.0476
− Chromium	0.37	7.07E-02	1.19
− Cobalt	−−	−−	0.476
− Lead	0.138	2.66E-02	1.19
− Manganese	0.305	5.85E-02	0.476
− Mercury	2.88E-05	5.52E-06	0.595
− Nickel	9.00E-03	1.73E-03	2.38
− Selenium	2.79E-04	5.36E-05	4.76
PCBs	4.13E-03	1.80E-04	12
Total Uranium	1.11E-03	3.63E-04	4.76
VOCs	−−	11	1,334

Note:
PM_{10} values shown individually for the west side of the demolition project and the east side.

HAP = hazardous air pollutant
PCBs = polychlorinated biphenyls
PM_{10} = particulate matter 10 microns or less in diameter
VOCs = volatile organic compounds

F.3. AIR MONITORING

The objective of air monitoring is to collect samples and other measurements to provide objective evidence of the airborne concentration of pollutants. Air monitoring will be conducted for the X-326 Process Building above-grade demolition project in addition to the existing PORTS site ambient air monitoring network. The existing PORTS site ambient air monitoring network was established to support annual reporting and verify that overall site emissions are in compliance with applicable criteria. This network will continue to operate to support evaluating the combined effects of PORTS radiological emissions through annual demonstration of compliance with NESHAP Subpart H for DOE facilities as well as providing the air pathway dose for compliance with public dose limits.

F.3.1 PROJECT ZONES FOR AIR MONITORING

Table F.1 above lists the ARARs and TBCs that provide requirements for air and external radiation monitoring. These requirements address the larger perspective associated with demonstrating that overall emissions from the combined effects of PORTS activities are protective of public health and the environment. However, individual activities create air emissions at the interface between work activities and contaminated materials or pollutants.

The creation of emissions from work activities and the subsequent monitoring of the airborne concentration of pollutants can perhaps be best understood by considering each project as the conceptual center of a series of zones surrounding the work, each zone successively larger than the first and farther from the initial activity. Work activities that generate emissions occur in the inner zone and air monitoring approaches are driven by the different requirements that apply in each zone.

Air monitoring for the X-326 Process Building above-grade demolition project will reflect the zones of exposure potential that exist around the actual work activities. Exposure zones are defined as follows:

- Work zone
- Project work boundary zone
- Site zone
- Public zone
- Background zone.

The characteristics of each zone and the general air monitoring approach for each zone are described below. Specific monitoring equipment, operational approach, target analytes, and data management and reporting, based on the zones approach, are addressed in Section F.3.3.

Work Zone – The work zone is the innermost zone and the one where project workers operate. Contaminants are most highly concentrated in this zone and workers have the potential to come into direct contact with contaminants. Airborne contaminants (i.e., particulate, fibers, vapors) in the work zone can potentially be generated or released during the variety of physical activities conducted to demolish the process building and where wind can cause contaminants to be released from waste materials and exposed building surfaces. Airborne contaminant levels would be expected to generally correspond to levels of activity underway (though fixative applications and water misting and other mitigation measures will control emission rates). Since demolition activities are largely machine-based (excavator-mounted shears, grappling effectors, front-end loaders, etc.), the highest potential emission areas are in the vicinity of the working machines, and the highest pollutant concentrations would occur downwind of these activities.

Air monitoring within the work zone will reflect the industrial hygiene and radiological controls necessary for protection of the workers present. Work zone monitoring will be conducted in accordance with the *Worker Safety and Health Program* and is outside the scope of this plan. Work zone monitoring will employ such instruments as breathing zone samplers and passive dosimeters mounted on individual workers (for various contaminants such as radioactive particulate, silica, PCBs, and asbestos), stationary samplers (including radiological continuous air monitors [CAMs]) and dosimeters near the work areas, and some hand-held individual measurements devices (such radiological survey equipment). Measurements collected in the work zone will firstly help determine the need for any personal protective equipment for workers. Data will secondarily provide insights into the levels of contaminants being actually produced within the work zone, information that informs the air monitoring activities to be undertaken in other zones outside of the work zone.

Project Work Boundary Zone − The project boundary at the edge of the work zone represents the transition from where additional controls (such as personal protective equipment) are needed for safety, to a zone where unprotected site workers and visitors can be present. Monitoring at the edge of the work zone will reflect the necessity of demonstrating that contaminant exposure and radiological dose outside the work zone are below limits for industrial worker exposure (i.e., negative confirmation). Air monitoring at the project boundary uses equipment similar to that used in the work zone for industrial

hygiene and radiological protection applications, but generally designed for longer term installation and associated weather protection. The project boundary monitoring will include stationary samplers, passive dosimeters, and radiological CAMs monitoring for contaminant emission generated from within the work zone (including the haul road and water treatment operations). CAMs will provide real-time alpha and beta radiation updates via external communication capabilities.

Site Zone − The site zone lies beyond the project boundary, but within the PORTS site property boundary. As with the project work boundary zone, unprotected general site workers and potential visitors are expected in the site zone, including members of the public making use of site through roads. The site zone includes large areas potentially upwind or downwind of the project activities. Any dispersed airborne contaminants that can be detected in the site zone could logically be expected to also potentially be detectable beyond the PORTS boundary in the public zone, so air monitoring in this zone generally uses equipment designed to collect large air samples to be analyzed for comparison to exposure limits applicable to the public.

A portion of the existing PORTS ambient air monitoring network is located within the site zone. The ambient air monitoring network is discussed in more detail in Section F.3.2. The monitoring locations and equipment associated with the existing PORTS ambient air monitoring network are not operated to meet the specific needs of a single project (e.g., sample collection and analysis timeframes), but rather to reflect overall site emissions. However, data from individual air monitors that are downwind from a project area may provide useful feedback information for a project.

Project-specific air monitoring plans for the demolition project are addressed in the following sections of this air monitoring plan.

Public Zone – The public zone lies beyond the PORTS site boundary and reflects the zone where air emission exposure limits from federal and state regulations and DOE rules apply fully. Air monitoring equipment used in this zone are designed to collect large volumes of samples for chemical and radiological analysis.

Background Zone – An area sufficiently distant and generally upwind from the PORTS site has been identified in the past as a location to use similar air monitoring equipment to gather samples used to define background levels of contaminants in the general area of PORTS. For example, naturally occurring radioactive materials in soils and man-made radiation from weapons testing and nuclear accidents (e.g., Chernobyl and Fukushima Daiichi) are subtracted out of results from the samples collected downwind from PORTS.

F.3.2 EXISTING PORTS AMBIENT AIR MONITORING PROGRAM

The existing PORTS ambient air monitoring network is a separate site air monitoring program used for the collection of radiological and fluoride samples to evaluate overall site impacts from emissions and support preparation of required annual summary reports, such as the Annual NESHAP Radionuclide Emission Report. Air filter samples are collected from ambient air monitors at 18 stations (3 new stations were recently added in 2020) for radionuclides analysis. In addition, the Ohio Department of Health (ODH) has co-located 18 air stations for independent air monitoring and radionuclide analysis. The stations are located on site, at the site perimeter, within the local area outside the site boundary, and one in an area west of PORTS considered unimpacted by PORTS operations (to provide background data). Radiological samples are analyzed for radionuclides that may be associated with PORTS operations. These sampling locations lie beyond the respective project work zones and collectively will continue to represent the site ambient air monitoring program. One other original station located within the PORTS

property boundary is used only for fluoride measurements. In 2020 Ohio EPA also installed five air monitoring stations at PORTS with multiple co-located Ohio EPA and DOE monitoring instruments for independent air monitoring of particulate, metals, VOCs, and asbestos. Figure F.1 identifies the location of the original 16 and the new PORTS ambient air monitors in relation to the PORTS site including Ohio EPA, ODH, and DOE independent and co-located monitors.

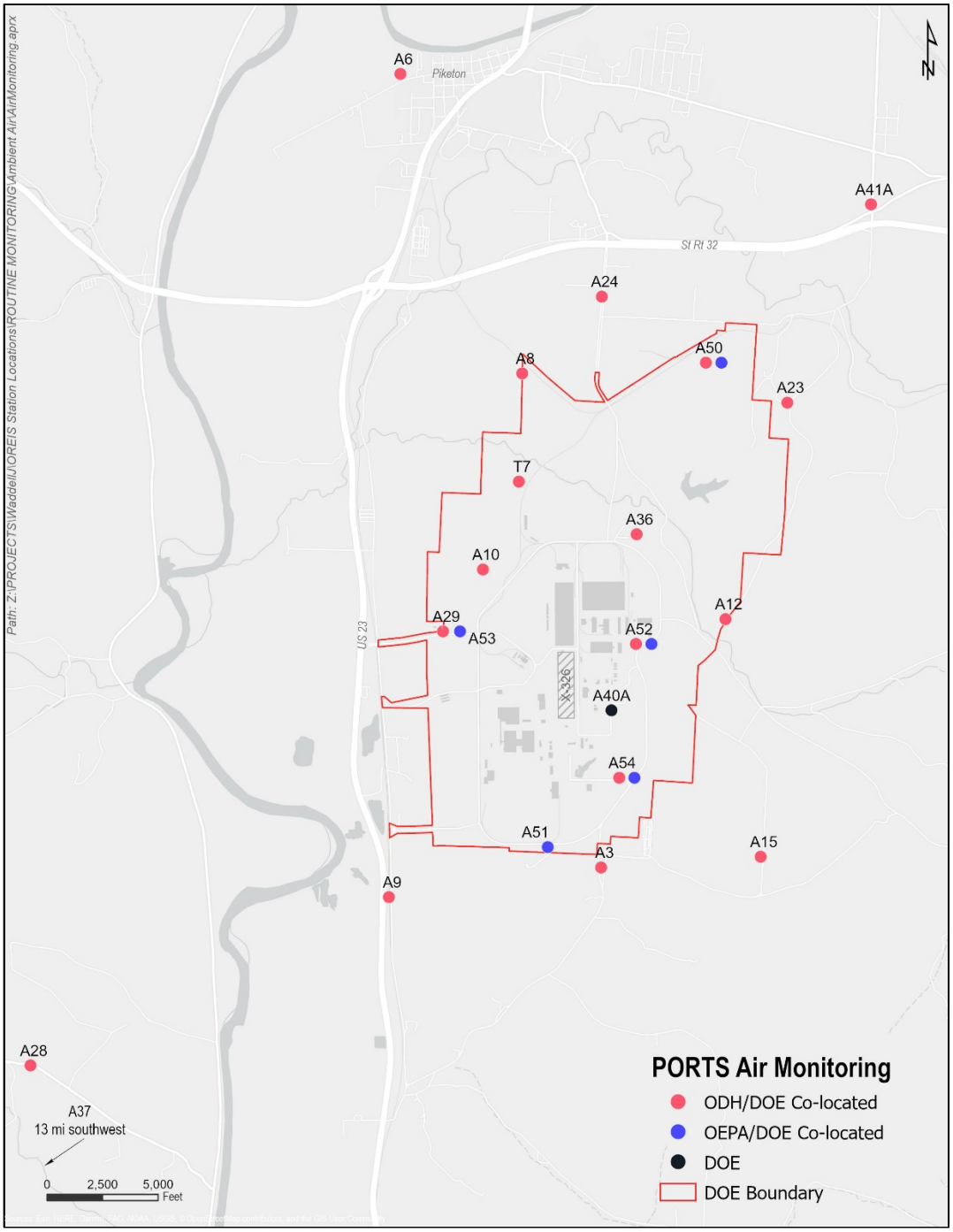

Figure F.1. PORTS Ambient Air and External Radiation Monitoring Location

Under NESHAP Subpart H, radiological doses from airborne releases from DOE facilities must be calculated or modeled. The dose resulting from site radiological air emissions cannot exceed 10 mrem/yr to any member of the public, as demonstrated via an annual evaluation. Radionuclide emission measurements are made at all release points with potential to discharge radionuclides into the air in quantities that result in an effective dose equivalent in excess of 1% of the standard (0.1 mrem/yr). Environmental measurements of actual radionuclide air concentrations at critical receptor locations (i.e., air sampling) may be used as an alternative to air dispersion calculations in demonstrating compliance with the standard, if the environmental measurements meet the criteria in 40 *CFR* 61.93(g). An annual NESHAP report for PORTS is prepared based on measured activity from each air monitoring station, converted to dose, minus background contributions.

The *U.S. Department of Energy Portsmouth Gaseous Diffusion Plant Annual Site Environmental Report – 2017, Piketon, Ohio* (DOE 2019a) identified a modeled annual dose to the hypothetical maximally exposed off-site individual from PORTS site air emissions as 0.12 mrem using the CAP88 model. For comparison, the maximum annual effective dose equivalent identified from the Multi-Project Air Model for each of projects (excavation, OSWDF, and demolition projects) for the first three years was less than 0.1 mrem/yr in the highest year.

PORTS ambient air monitoring data is also used in calculation of the multi-pathway annual radiological dose to maximally exposed members of the public as required under DOE Order 458.1 (where all contributing pathways, not just the contribution from the air pathway, are each evaluated).

External radiation dose is measured with thermoluminescent dosimeters (TLDs) at five locations near the depleted UF_6 cylinder storage yards on site and at 19 on-site and off-site locations (12 of the ambient air monitoring stations and seven additional on-site locations). TLDs are placed at the monitoring locations and changed out for replacements when sent to the laboratory for reading.

The PORTS ambient air monitoring network will continue to perform its existing functions in evaluating the overall effects of PORTS air emissions, while additional data from other site air monitoring will also be available for consideration. Operation of the PORTS ambient air monitoring network is not managed under this air monitoring plan. However, data collected from equipment identified as part of the ambient air monitoring network will be reviewed for potential applicability to project activities, such as the X-326 Process Building demolition. Air monitoring for the X-326 Process Building above-grade demolition project does not rely on the existing PORTS ambient air monitoring network to demonstrate compliance with air monitoring action levels.

F.3.3 DEMOLITION PROJECT-SPECIFIC AIR MONITORING

The project-specific air monitoring network for the X-326 Process Building above-grade demolition project is designed to measure airborne concentrations of the project-specific potential pollutants (such as radionuclides, asbestos, and particulate) in the project area and surrounding areas and provide data necessary to complete required evaluations. Based on the zones concept described above, demolition project-specific air monitoring incorporates relevant sampling and measurement strategies for each zone. Inside the work zone, the areas of the demolition project managed as potentially contaminated (i.e., areas within the bermed impacted water containment and management system), industrial hygiene and radiological protection procedures will govern the application of breathing zone samplers, stationary samplers, and dosimeter devices for contaminants that may be encountered in the wastes being managed.

At the project work zone boundary and beyond, new project-specific air monitoring equipment is being installed to collect additional worker safety and environmental air samples to compare to relevant standards and criteria.

The following sections provide information about planned air monitoring that is considered a substitute for the formal data quality objectives (DQO) and Sampling and Analysis Plan (SAP) processes identified in the *Sample Analysis Data Quality Assurance Project Plan (SADQ) at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (SADQ) (DOE 2019b, under development). Separate DQO and SAP documents are not provided.

F.3.3.1 Demolition Air Monitoring Network

At the project work zone boundary, eight project-specific air monitoring stations will initially be installed as identified in Figure F.2 (environmental air monitoring stations X326-A01 through X326-A06) plus two additional radiological particulate samplers. The air monitoring locations are distributed around the perimeter of the demolition project area to detect airborne contaminant concentrations associated with the demolition, debris management, and debris staging and storage activities. Monitoring locations have been selected based on overall coverage of probable pollutant dispersion directions based on the results from modeling and the directional approach to the demolition plan (where the demolition will begin at the south end of the building and proceed north). Unlike other projects, four of the air monitoring stations for demolition will be moved as the project progresses. This will be performed in order to maintain the position of the monitors relative to the primary work area for the demolition project as it moves northward. Affected monitors are anticipated to be relocated as demolition on each of the 10 sections of the building is completed (i.e., moved north about one section's width after the section is fully removed).

A ninth air monitoring location, identified as A72 in Figure F.2 (referred to as AM3 in the Multi-Project Air Model), has been sited in the north portion of the industrial area within Perimeter Road, along the haul route to the OSWDF. This location was selected to capture the haul route impacts and the dispersion of emissions from both the demolition and excavation projects in the predominant wind directions at PORTS. This location will be used to collect a wide range of contaminant samples, including contaminants in addition to those emission types expected from the X-326 Process Building demolition project (such as volatile organic compounds [VOCs]).

Table F.3 identifies contaminant type(s) to be sampled/monitored at each of nine air monitoring stations addressed by this air monitoring plan (eight project-specific project boundary air monitors plus A72/AM3). The project team has also added a set of "mid-field" radiological monitors at six selected locations beyond the immediate project boundary to provide additional information to the project team. The number and location of the mid-field monitors may vary as the project progresses and data are collected. Section F.3.3.2 identifies typical equipment to be used for sampling/monitoring each contaminant type.

In addition to the air monitoring described in this plan, radiological protection air monitoring within the project, along the project boundary, and beyond the project boundary will also be conducted per internal DOE requirements.

F.3.3.2 Sampling/Monitoring Equipment by Contaminant Type

Specialized air sampling equipment will be deployed around the X-326 Process Building above-grade demolition project for specific contaminant types, as indicated in Table F.3. Both real-time measurements and retrospective air samples (samples that are collected over time and analyzed later in a

laboratory setting to determine air concentrations during the sample collection period) are included. Example equipment types for each contaminant type are described below.

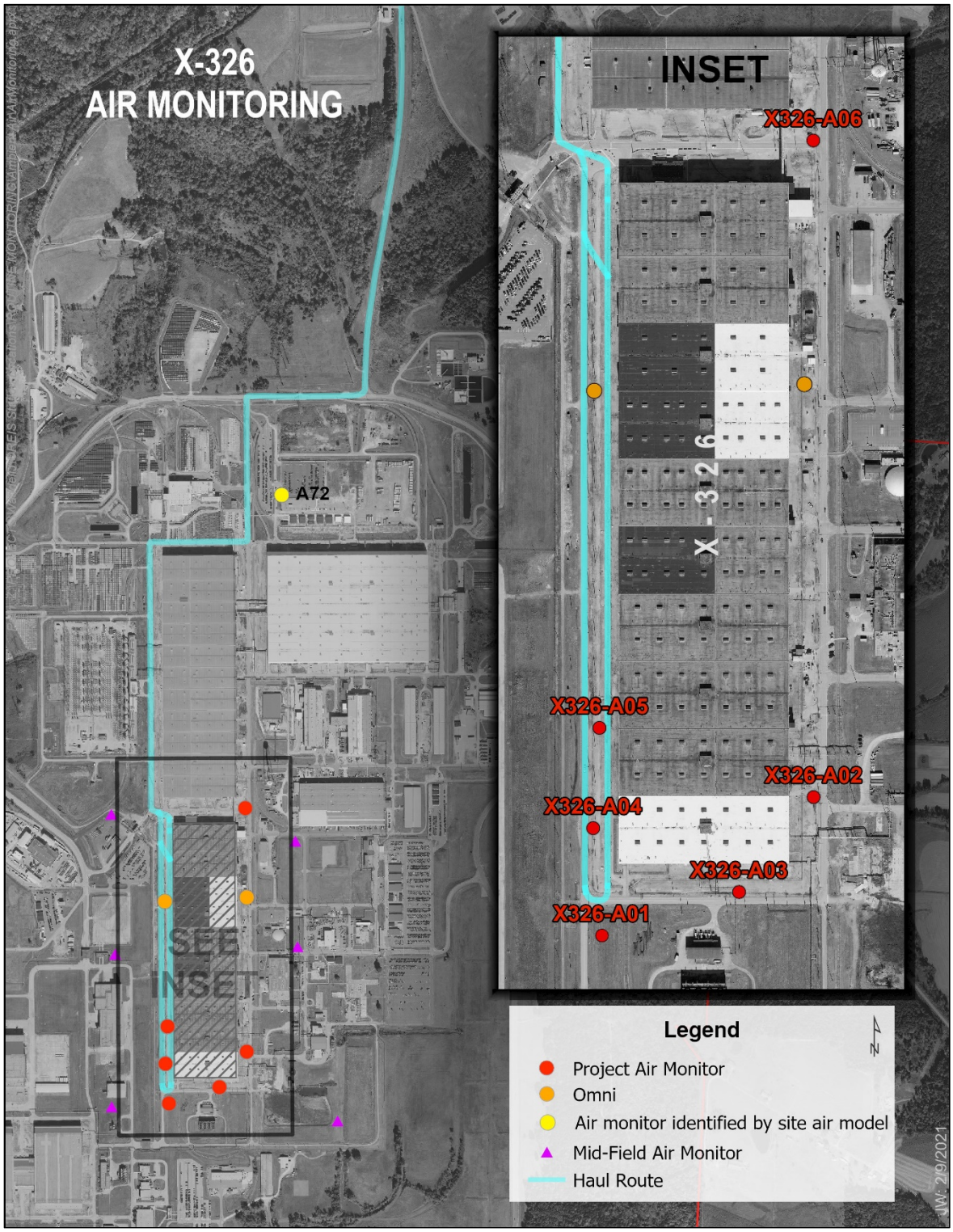

Figure F.2. X-326 Process Building Initial Demolition Air Monitoring Locations

Table F.3. Demolition Project-Specific Air Monitoring Stations

		Contaminant Type						
Location ID	**Location Description**	**Rad. Activity (eCAM)**	**Rad. Part.[3, 6]**	**Metals[3]**	**PCBs**	**VOCs[4]**	**PM_{10}**	**Asbestos**
X326-A01	Southwest corner of X-326		●	●	●		●	●
X326-A02[1]	Southeast side of X-326	●	●	●	●			●
X326-A03[1]	South end of X-326	●	●	●	●			●
X326-A04[1]	Southwest side of X-326	●	●	●	●			●
X326-A05[1]	Southwest side of X-326, north of A04	●	●	●	●			●
X326-A06	Northeast corner of X-326	●	●	●	●		●	●
West Omni	West side of X-326 near sections 7 and 8		●[5]					
East Omni	East side of X-326 near sections 7 and 8		●[5]					
A72 (AM3)[2]	North of the northwest corner of X-333 along haul route		●	●	●	●	●	
Mid-field Omni	3 to the east and 3 to the west of X-326		●[6]					

Notes:
[1]Marked monitoring locations are expected to move northward with the section-by-section demolition activities.
[2]Metals and radiological particulate are planned as separate sampling devices at A72/AM3.
[3]Sampling for radiological particulate and metals may occur in the same sampler units.
[4]Including Total VOCs and VOC HAPs
[5]Additional radiological particulate-only air samplers are stationed along the project boundary near sections 7 and 8 of the X-326 Process Building, about 75% of the distance north from the southern starting point of the demolition.
[6]Additional six mid-field Omni samplers for radiological particulates (number and location may change as project progresses).

eCAM = environmental continuous air monitor
HAPs = hazardous air pollutants
ID = identification
Part. = particulate
PCBs = polychlorinated biphenyls
PM_{10} = particulate matter 10 microns or less in diameter
Rad. = radioactive
VOCs = volatile organic compounds

Real-time Radiation Levels – Environmental continuous air monitors (eCAMs) are intelligent alpha/beta continuous air monitors (iCAMs) designed for continuous outdoor use (i.e., enclosed in weather-resistant metal enclosures with supporting electronics and hardware). An eCAM, such as based on the Canberra iCAM Alpha/Beta Air Monitor will be used as a real-time monitor of radioactivity in the air for the project boundary zone around the demolition. Such equipment collects airborne particulate on a filter for direct radioactivity measurement. The air flow rate is preset, which allows for calculation of activity deposited per air volume sampled. An eCAM uses alpha spectroscopy to differentiate natural species (such as radon and thoron progeny) from alpha-emitting radionuclides of concern (e.g., uranium and transuranic elements) and beta-emitting radionuclides of concern (e.g., technetium-99). The eCAM also provides user-settable alarm levels, data averaging, data archiving, and communication over networks to

provide the information remotely. No remote sample analysis is needed for real-time radiation levels reporting.

Radioactive Particulate – Samples for radioactive particulate will be collected using high-volume particulate air samplers, such as the Tisch Environmental High-Volume Air Sampler and the field portable, battery/solar-operated Mesa Labs BGI Omni FT. Both samplers achieve high-volume air sampling. The Omni units are easily moved to where sampling is desired at any given time. Samples will be analyzed at a laboratory.

PCBs – PCB samples will be collected using a high-volume air sampler, such as the Tisch Environmental TE-1000PUF-BL, which includes a particulate sampler stage and a polyurethane foam element for collecting vapor samples. PCBs have a low vapor pressure at ambient conditions, so only very limited quantities of PCBs are expected to be present in a vapor phase. However, PCBs tightly adsorb onto particulate matter and would be dispersed if the particulate disperses. Both the particle filter and polyurethane foam elements will be analyzed at a laboratory.

PM_{10} – Particulate matter in the 10-micron-diameter range and smaller will be counted using a real-time, continuous particulate matter mass monitor, such as the Teledyne API T640, which uses scattered light spectrometry for measurement. Such an instrument can differentiate among various particle size classes (particulate matter 2.5 microns or less in diameter [$PM_{2.5}$], PM_{10}, and large particulate) and can communicate measured values (and integrated averages) in real time to remote devices or networks. No laboratory sample analysis is needed.

Metals – Particulate matter will be collected for analysis for HAP metals content using a high-volume sampler, such as the Tisch Environmental High-Volume Air Sampler. Sample media will be analyzed at a laboratory.

Volatile Organic Compounds (VOCs) − For collection of volatile organic vapors (e.g., total VOCs and trichloroethylene[TCE]), equipment such as the Entech Instruments Canister Sampler and TM1200 timer unit will be used to collect a whole air sample. This approach uses a timer to automatically start and stop the sampling process at specific times and can be used to create an integrated sample over a period of time, such as a 24-hour period. The timer and inlet system is connected to an evacuated stainless steel sample canister and all materials in the exposure path are designed to be as inert as practical with respect to the target analytes. For example, the internal surfaces of the stainless steel canister are passivated with a coating, such as SUMMA nickel chromium oxide. The pressure differential of the evacuated canister and the ambient air drives the sampled air volume into the canister. Equipment configurations for the planned sampling ensure a constant sampling flow rate across a wide range of pressure differences. The canister is valved-off when sampling is complete and sent to the laboratory for analysis. VOC sampling applies only to air monitor A72/AM3.

Asbestos – Asbestos sampling will be completed using equipment such as the Sensidyne Aircon-2 (801012-100) with an appropriate sample filter cassette based on the laboratory analytical method to be used, which includes consideration for which fiber counting microscopy technique will be used: optical phase contrast microscope or transmission electron microscope. Fiber counting will be conducted at a laboratory.

F.3.3.3 Monitoring Parameters and Sample Collection

Sample collection and real-time air monitoring plans for the X-326 Process Building above-grade demolition project have been determined based on the types of pollutants present in the materials to be

demolished and the results of modeling of contaminant dispersion. During the initial three-year modeled period, active demolition of the above-grade portion of the X-326 Process Building is expected to occur. Demolition debris will include radiological contaminants (primarily uranium and its progeny and trace contaminant radionuclides from recycling of uranium after use in government reactors), fugitive dust, PCBs, asbestos-containing materials, and other particulate contaminants common in building materials, including HAP metals.

Table F.4 provides a summary of the air emission parameters to be determined from air sampling equipment deployed in the project work boundary zone and beyond, including samples collected for retrospective analysis and direct measurements performed in real time, the analytical method(s) to be used, and the frequency of the sampling or measurement.

Table F.4. Monitoring Parameters for Demolition and A72/AM3 Air Samples

Contaminant Type/Parameter		CAS Number	Analytical Method[5]	Frequency[6]
PCBs	PCBs	1336-36-3	EPA Methods TO-4A and 8082A	Monthly
Radionuclides[1]	Americium-241	14596-10-2	Alpha Spectroscopy (EML HASL-300 Method Am-05-RC, GL-RAD-A-032, EML HASL-300 Method Pu-02-RC, EML HASL-300 Method Th-01-RC)	Weekly[2]
	Neptunium-237	13994-20-2		
	Plutonium-238	13981-16-3		
	Plutonium-239/240	N760		
	Thorium-230	14269-63-7		
	Technetium-99	14133-76-7	Beta Liquid Scintillation Counting (EML HASL-300 Method Tc-01-RC)	
	Uranium (total)	7440-61-1	Alpha Spectroscopy (EML HASL-300 Method U-02-RC)	
	Uranium-233/234	NS632		
	Uranium-235/236	N1047		
	Uranium-238	24678-82-8		
Radiation	Total Alpha	––	IEC 61172 and others	Continuous readings and integrated averages
	Total Beta	––		
Particulate	PM_{10}	––	Teledyne Field Instrument; EPA PM_{10} FEM; *FR* Volume 81, p. 45285	Continuous readings and integrated averages
Asbestos[4]	Asbestos	1332-21-4	OSHA Method ID-160	Daily and weekly pending field activities
HAP Metals	Metals	Various	EPA Method IO-3.5 (Inductively Coupled Plasma / Mass Spectrometry)	Weekly[2]
VOCs[3]	Total VOCs	Various	EPA Method TO-15	One daily sample per work week
	VOC HAPs (TCE)	79-01-06		

Notes:
[1]Total uranium will be calculated from isotopic uranium constituents. Due to smaller sample sizes, Omni samplers may not be able to support all desired analyses. Preference will be given to uranium analyses.
[2]Filters from samplers are collected weekly. Analysis frequencies as described in Section F.3.3.4.
[3]Applies only for the A72/AM3 air monitoring station.
[4]Not applicable to the A72/AM3 air monitoring station.
[5]Or equivalent recognized standard/method.
[6]Frequency of sample collection and analysis is subject to change, based on project phase and field experience with sampling equipment and laboratory capabilities.

CAS = Chemical Abstracts Service
EML = Environmental Measurements Laboratory
EPA = U.S. Environmental Protection Agency
FEM = Federal Equivalent Method
FR = Federal Register
HAP = hazardous air pollutant
HASL = Health and Safety Laboratory (currently known as National Urban Security Technology Laboratory)
IEC = International Electrotechnical Commission
OSHA = Occupational Safety and Health Administration
PCBs = polychlorinated biphenyl
PM_{10} = particulate matter 10 microns or less in diameter
TBD = To be determined
VOCs = volatile organic compound

Contaminant types listed in Table F.4 are generally collected by separate sampling/monitoring equipment described in Section F.3.3.2. For each X-326 project boundary zone air monitoring location, up to six types of air monitoring equipment may be present. Metals and radioactive particulate samples are currently planned to be analyzed from the same sampler.

F.3.3.4 Sample Collection Frequency

Both retrospective sampling equipment and real-time measurement/monitoring equipment provide quality information for evaluating performance of the demolition project, but real-time measurement/monitoring information may identify operational issues in minutes rather than weeks, so real-time continuous measurement/monitoring equipment will be deployed at the demolition project for two of the potential airborne contaminants that can be readily reported in real time (PM_{10} and particulate containing radioactive constituents). These types of data will provide the project with the opportunity to quickly evaluate impacts of variations in work practices and weather conditions on environmental contaminant concentrations. Real-time monitoring equipment will also provide a warning to the project team if action levels or other administrative levels are being approached.

Media from retrospective air samplers installed in the project work boundary zone will be collected at defined intervals based on optimizing the collected materials for analysis versus the length of time between analyses. The general sample collection, compositing, and analysis approach is summarized below (and also in Table F.5 in Section F.3.3.6 below). Note that during startup activities and periods where field activities are changing, samples may be collected and analyzed more frequently to support faster data reporting for feedback on the effects of operating conditions. Additionally, changes needed in sample collection frequency to address technical issues, such as higher than expected particulate collection rates that affect pressure drop on filter media, will result in changes, as needed, which will be noted in follow-up correspondence with Ohio EPA.

Filters from high-volume particulate air samplers (reflecting samples for radiological particulate and metals) will be collected weekly. Radiological filter samples will typically be composited into one monthly composite sample per sample location (sampler) and type. Filter samples will be analyzed as follows:

- Weekly metals samples are expected to be analyzed monthly.
- Monthly radiological composites will be analyzed for technetium-99, uranium-233/234, uranium-235/236, and uranium-238.
- Each third monthly composite from high-volume radionuclide/metals particulate samplers (i.e., one composite sample each quarter) will additionally be analyzed for technetium-99, uranium-233/234, uranium-235/236, uranium-238, americium-241, neptunium-237, plutonium-238, plutonium-239/240, and thorium-230.

PCB samples will be collected and analyzed each month.

Asbestos samples will be collected daily during demolition activities that have the potential to generate fibers from remaining non-friable asbestos in the building (such as when work is performed in areas with floor tile). The high-volume samplers will be operated for durations to be determined based on experience on the demolition project related to overall particulate concentration to provide good fiber counting capabilities.

For the A72/AM3 sample collection location, asbestos samples will not be collected, but VOC sampling will occur. VOC samples will be collected on a daily basis, once per work week.

Within the project work zone, job coverage sampling, measurement collection, and monitoring for worker protection will be conducted under the *Worker Safety and Health Program*, which also includes

compliance with 10 *CFR* 835 *Occupational Radiation Protection*. Under these programs, air sampling is conducted as needed to support worker safety, including characterizing areas for radiological activity in accordance with 10 *CFR* 835 and identifying other contaminants (such as asbestos, silica, and PCBs) and contaminant levels in work areas to identify controls and worker respiratory protection requirements. Worker job coverage monitoring is not included in the scope of the air monitoring plan.

F.3.3.5 Sampling and Equipment Quality Assurance

All air monitoring equipment calibration and operation will conform to applicable requirements of the SADQ. Environmental sampling activities are addressed in Section 6.9 of the SADQ. Calibration procedures and frequency are addressed in Section 8.7 of the SADQ. Environmental air monitoring station calibration is addressed in Section 8.7.1 and recognizes manufacturer's instructions as the basis for developing site procedures for calibration of specific equipment. Section 8.7.9 addresses calibration of radiation/contamination detection instrumentation used to obtain environmental data.

Section 6.9 of the SADQ addresses ambient air samples for radiological particulate for compliance with 40 *CFR* 61, NESHAP, Subpart H, *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities*, including high-volume air particulate monitoring, low-volume air particulate monitoring, environmental dosimeters, and monitoring for specific organic and inorganic contaminants while conducting field activities.

Section 6.11.3 of the SADQ addresses radiation monitoring using TLDs. The radiation monitoring program is a safety program designed to measure environmental radiation levels resulting from radioactive materials on site and is used to assess the collective effect of current remediation activities on the air pathway.

Section 8.7.6 of the SADQ addresses photoionization detectors and Section 8.7.7 addresses hand-held radiological survey instruments.

F.3.3.6 Evaluation of Sampling and Measurement Data

Analytical results from retrospective air sampling and field measurements for contaminants are managed under the requirements identified in this plan and the SADQ. Results from air sampling conducted in the project boundary zone and beyond will be evaluated versus pollutant-specific modeling predictions for those locations, based on the initial set of modeled conditions for the projects. Documented background concentrations will be considered when evaluating reported sample results, where applicable (e.g., a PM_{10} background of 27 $\mu g/m^3$ exists in the vicinity of PORTS).

Results from the Multi-Project Air Model were used to establish expected air pollutant concentrations at the project work boundary. For the X-326 Process Building above-grade demolition activities two project boundary locations have been extracted from the model, a west and an east value. These modeled boundary values will be used as the low action level (an administrative level) for the project to evaluate project-specific air monitoring results from the project perimeter. If demolition project-specific air monitors exceed these low action levels, it may indicate that the demolition project operational conditions are inconsistent with the modeled design conditions. In the event that low action levels are exceeded by project air monitoring data, a project-level operational review will be conducted to identify opportunities for improvements. Criteria for inclusion in an operational review may include but are not limited to: meteorological data (e.g., wind, temperature) to determine if weather conditions could have contributed to the exceedance, specific demolition activities to determine whether any incidents or ongoing operations could have contributed to the exceedance, and field logs and other information concerning operation of the air sampler.

Pollutant concentrations below the maximum concentrations obtained through modeling may indicate that the actual conditions emit less than the conservative assumptions used in the model. In this case, operational conditions may be increased or adjusted as long as the monitor data does not exceed the low action levels.

Medium action levels have been set based on the following:

- If the modeled concentration at the project boundary was less than the pollutant-specific criteria applicable at the site boundary (PM_{10} criteria or MAGLC), then a medium action level of 75% pollutant-specific criteria applies.

- If the modeled concentration at the project boundary was greater than the pollutant-specific criteria applicable at the site boundary, then a medium action level of two times the modeled project boundary pollutant-specific concentration applies.

If the sampling results exceed a medium action level, a high probability exists that the project emissions could contribute to an exceedance of standard applied at the site boundary. A full operational review that includes project support from the environmental, safety and quality assurance organizations will be conducted to identify and implement necessary operational improvements in a timely manner. Medium action levels will apply for PM_{10}, HAP metals, PCBs, and total uranium.

High action levels have been set based on the following:

- If the modeled concentration at the project boundary was less than the pollutant-specific criteria applicable at the site boundary (PM_{10} criteria or MAGLC), then a high action level of 100% pollutant-specific criteria applies.

- If the modeled concentration at the project boundary was greater than the pollutant-specific criteria applicable at the site boundary, then a high action level of three times the modeled project boundary pollutant-specific concentration applies.

In the event that project air monitoring data indicates exceedance of a high action level the project will stop work to identify, report, and correct the causes immediately upon receipt of such data results. High action levels will apply to PM_{10}, HAP metals, PCBs, and total uranium. Stop work will apply to work with the potential to generate the types of emissions exceeding high action levels. The action levels that apply to the project are provided in Table F.5.

As identified in more detail in Section F.4, notifications to Ohio EPA will occur soon after any data showing exceedance of an action level is reported to PORTS.

Demolition activities inside the work zone are supported with appropriate levels of air monitoring activities required to maintain the safety of the workforce (under the PORTS *Worker Safety and Health Program*), based on contaminants present. These daily worker safety data collection activities will be additionally monitored by demolition project management as a qualitative indicator of potential emissions from the demolition activity areas (i.e., higher levels of contaminants being experienced in the work zone would suggest potential for higher dispersion into the areas outside the work zone). In combination with real-time measurements from particulate monitors and eCAMs, these data support proactive identification and correction of conditions that could reduce performance versus standards for protectiveness.

Table F.5. Demolition Project and A72/AM3 Air Monitoring Action Levels

Contaminant Type/Parameter		Action Levels[e]		
		Low[a] (µg/m³)	Medium[b] (µg/m³)	High[b] (µg/m³)
Radionuclide Particulate	Total Uranium (Demo)	1.11E-03	3.57	4.76
	Total Uranium (AM3)	3.63E-04		
HAP Metals	Antimony (Demo)	2.25E-05	8.93	11.9
	Antimony (A72/AM3)	4.32E-06		
	Arsenic (Demo)	5.12E-03	0.179	0.238
	Arsenic (A72/AM3)	9.84E-04		
	Beryllium (Demo)	8.71E-06	8.93E-04	1.19E-03
	Beryllium (A72/AM3)	1.67E-06		
	Cadmium (Demo)	0.137	0.274[d]	0.412[d]
	Cadmium (A72/AM3)	2.64E-02	3.57E-02	4.76E-02
	Chromium (Demo)	0.37	0.893	1.19
	Chromium (A72/AM3)	7.07E-02		
	Cobalt	––	0.357	0.476
	Lead (Demo)	0.138	0.893	1.19
	Lead (A72/AM3)	2.66E-02		
	Manganese (Demo)	0.305	0.357	0.476
	Manganese (A72/AM3)	5.85E-02		
	Mercury (Demo)	2.88E-05	0.446	0.595
	Mercury (AM3)	5.52E-06		
	Nickel (Demo)	9.00E-03	1.79	2.38
	Nickel (A72/AM3)	1.73E-03		
	Selenium (Demo)	2.79E-04	3.57	4.76
	Selenium (A72/AM3)	5.36E-05		
PCBs	Total PCBs (Demo)	4.13E-03	9	12
	Total PCBs (A72/AM3)	1.80E-04		
Volatiles	Total VOCs/Volatile HAPs (A72/AM3)	11	1,001	1,334
Particulate	PM_{10} (Demo West)	535	1,070[d]	1,650[d]
	PM_{10} (Demo East)	75	113[c]	150[c]
	PM_{10} (A72/AM3)	288	576[d]	864[d]

Notes:

[a]Based on modeling results for demolition and C-Train.

[b]Based on MAGLC unless otherwise noted.

[c]Based on 150 µg/m³ value for comparison

[d]Based on multiple of modeled value.

[e]Where an action level is less than the laboratory minimum detectable concentration, the minimum detectable concentration will apply.

HAP = hazardous air pollutant
MAGLC = maximum acceptable ground-level concentration
PCBs = polychlorinated biphenyls
PM_{10} = particulate matter 10 microns or less in diameter
VOCs = volatile organic compounds

Results from the Multi-Project Air Model showed PM_{10} to be the pollutant with the highest potential to approach the adopted standard at the site boundary (i.e., 150 µg/m³). The largest contributors to the PM_{10} offsite estimate were waste transfer trucking operations between the demolition and soil excavation projects and OSWDF, construction material (e.g., soil, gravel) hauling for new liner/facility construction at OSWDF, and wind erosion of exposed soil areas. Initial project operational regimens will not exceed the modeled maximum activity levels per day (i.e., those variables used in developing emissions estimates

resulting in the maximum offsite concentrations of PM_{10} when all the expected field activities in all projects are ongoing). These activities and associated variables represent an operational "starting case" but are not intended to be long term limiting criteria for the site project activities. Selecting conservative emission factors from US EPA default values is generally undertaken with a goal to overestimate rather than underestimate emissions in order to ensure compliance, before site-specific actual emission factors can be measured. Actual emission levels are expected to be less than those predicted by the Multi-Project Air Model.

After operations commence, actual project activity levels and PM_{10} monitoring results will be compared to the modeled activity levels and PM_{10} results to determine whether project activity levels can be increased from the "starting case" while maintaining all pollutant concentrations within compliance. Actual activity levels for initial model assumptions having the greatest effect on PM_{10} emissions (e.g., number of waste transfer trips, construction vehicle miles traveled in OSWDF project area, and other operations activities) will be documented and maintained in project records with corresponding air monitoring data. Decisions to increase project activity levels above the "starting case" will be documented with supporting monitoring data.

F.4. RECORDS, REPORTING, AND NOTIFICATIONS

This section addresses records, reporting requirements, and notifications associated with air monitoring for the X-326 Process Building above-grade demolition project.

Records will be generated by air monitoring activities conducted by the X-326 Process Building above-grade demolition project. Original data collected in the field and generated from sampling (e.g., field data sheets, field logbooks, field activity logs, sample collection logs, instrument calibration records, analytical sample data, chain-of-custody records, and Field Change Notices) are considered records. Documentation of calculations, measurements, methods, input parameters, and procedures used to evaluate data collected in accordance with this plan are also records.

All records shall be maintained and controlled in a manner that prevents loss, damage, and deterioration, and will be filed in accordance with the relevant DOE records retention schedule, as applicable.

Records shall be authorized by the signature and date of the originator. Errors shall be corrected by crossing with a single line through the error and entering the correct information. Corrections shall be initialed and dated by the person making the correction. Electronic reports, forms, or other documentation shall have a means of electronically tracking changes and corrections.

Short-term storage of records in the field, which are considered active for operational use, shall follow established site procedures that dictate storage requirements. Long-term storage of records shall be provided at the Records Management Document Control. The PORTS Records Management Program adheres to the requirements in the most current version of DOE Order 243.1B, Records Management Program.

Sample results and real-time measurements electronic data created by air monitoring devices will be managed in site databases for retrieval, evaluation, and reporting.

In accordance with the X-326 DDP, work conducted during the demolition activities will continue to be documented in the progress reports for *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 (DFF&O) (Ohio EPA 2012). DFF&O progress reports provide a summary of the operations, maintenance, and monitoring activities accomplished during the previous period and discuss upcoming activities. Summaries of findings, sampling activities conducted, sampling data, and laboratory/monitoring data will be provided to Ohio EPA via the DFF&O Quarterly Progress Reports or other method agreed upon by DOE and Ohio EPA. A summary and discussion of analytical or field measurements exceeding medium or high action levels identified in Table F.5 will also be included as applicable.

Notification will be made to Ohio EPA within 24 hours in the event that evaluation of project air monitoring data indicates that a high action level identified in Table F.5 has been exceeded. EPA will be notified in accordance with NESHAP regulations if annual dose evaluation of air monitoring data indicates a NESHAP regulatory compliance limit has been exceeded.

As stated in Section F.3.3.6, in the event that project air monitoring results exceed a high action level, the project will promptly stop work to identify, report, and correct the causes upon validation of such data results. Stop work will apply to work with the potential to generate the types and levels of emissions exceeding high action levels. Ohio EPA will be informed regarding causes of the exceedance and plans for restart of field activities.

In the event of exceedance of action levels less than the high action level, the project will identify and implement appropriate actions internally and will document the decisions and resultant response actions via the DFF&O Quarterly Progress Reports. Corrective actions that meet the definition of a major change will require Ohio EPA concurrence prior to implementation.

Table F.6 summarizes reporting and notifications associated with the demolition project.

Table F.6. Demolition Air Monitoring Reporting and Notifications

Type of Data	Reporting	Frequency
Discussion of analytical and field measurement results exceeding Medium Action Levels or High Action Levels identified in Table F.5	DFF&O progress report	Quarterly
Notification of High Action Level exceedance	Direct communication followed by correspondence	Within 24 hours of receipt and evaluation of data

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*

F.5. REFERENCES

DOE 2020, *Air Emissions Modeling Report for the On-site Waste Disposal Facility (OSWDF), Soil Excavation Projects, and X-326 Process Building Demolition at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, DOE/PPPO/03-0924&D1, U.S. Department of Energy, Piketon, Ohio, March.

DOE 2019a, *U.S. Department of Energy Portsmouth Gaseous Diffusion Plant Annual Site Environmental Report – 2017*, Piketon, Ohio, January.

DOE 2019b, *Sample Analysis Data Quality Assurance Project Plan (SADQ) at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (Draft), DOE/PPPO/03-0278&D3, U.S. Department of Energy, Piketon, OH, October.

FBP 2019, *Worker Safety and Health Program*, FBP-OS-PDD-00001, Rev. 11, Fluor-BWXT Portsmouth LLC, Piketon, OH, April.

Ohio EPA 2012, *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*, Ohio Environmental Protection Agency, Columbus, OH, July 16.