Overview of the Demolition and Disposal of the X-326 Former Gaseous Diffusion Process Building

U.S. Department of Energy Portsmouth Site



Preparing the Portsmouth Site for Future Reuse

The U.S. Department of Energy (DOE) and its contractors are safely deactivating and demolishing the original uranium enrichment buildings, disposing of the demolition debris and waste and remediating the environment at the Portsmouth site for future redevelopment and reindustrialization.

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BACKGROUND

The Portsmouth Gaseous Diffusion Plant was constructed in rural Pike County, Ohio in the 1950's by the U.S. Atomic Energy Commission as part of a nationwide industrial complex for the research and development of atomic energy in support of national defense during the Cold War.

The Portsmouth site featured three massive process buildings, some of the largest in the world, with the sole purpose of enriching uranium of its U-235 isotope. The three buildings, X-333, X-330 and X-326, were designed to work together in a cascade configuration.

The X-326 building was considered the "highend" of the cascade where highly enriched uranium product could be extracted up to an assay of nearly 97% U-235.





DEMOLITION, DISPOSAL, & SOIL CONSOLIDATION

Safe Demolition and Disposal of the X-326 Former Gaseous Diffusion Building

In its current state, following a lengthy deactivation process, from 2011-2020, the X-326 building contains low levels of chemical and radiological contamination and protections are in place to ensure the environment on-site and off-site is not harmed during demolition and disposal.

DOE is committed to the safe and controlled demolition and disposal of the X-326 former process building to protect the environment, the workers, our neighbors and the public.

This is accomplished through years of planning and preparation, adhering to Ohio and Federal environmental laws with oversight from the Ohio Environmental Protection Agency (Ohio EPA) and the Ohio Department of Health (ODH), as well as the U.S. Department of Energy.

X-326 Facility Information

- Approx. 552 feet wide, 2,280 feet long and 62 ft high
 - 58 acres of floor space (2.5M sq. ft.)



Approach

Deactivation



Demolition



Plume and Landfill Soil Excavation





Experienced Team

DOE's D&D Contractor (Decontamination and Decommissioning) at the site, Fluor-BWXT Portsmouth (FBP), brings decades of experience managing complex demolition and waste disposal projects throughout the U.S. and world. FBP has been at Portsmouth since 2011 and has safely completed demolition of 23 support facilities on site to date. The workforce involved with the demolition and disposal of the X-326 building includes represented employees from the United Steelworkers and Tri-State Building Trades Union.





Demolition

Prior to structural demolition, transite siding is removed from the exterior of the facility. The transite panels contain asbestos and approximately 13,000 of them covered the 4 sides of X-326 building. To minimize disturbance of the asbestos particulates they are removed by hand, intact, one-by-one. The transite panels are wrapped and then placed in the OSWDF (On Site Waste Disposal Facility) for final disposal.



Structural demolition of the X-326 began on Monday, May 17, 2021. The process involves the use of high reach excavators with specialized attachments to pull the building apart piece by piece in a methodical and controlled manor. During demolition, a comprehensive network of safety systems is in place, outlined in section 3, to protect the air, water, environment, workers and the public.

Four to five large excavators will be used to cut through steel columns and crush concrete on the second (cell) floor, all while keeping any debris within the original footprint of the building. In addition, a material handler with a clam-shell attachment will be used to load demolition debris into tarped dump trucks with sealed end gates for transportation to OSWDF for final disposition.

On Site Waste Disposal Facility (OSWDF)

OSWDF Information

- Designed to safely consolidate low-level contaminated debris and waste from site demolition
- Meets strict environmental laws regulated by Ohio Environmental Protection Agency
- Maximum volume 5M Cubic Yards of material
- Size 100 Acres

Disposal Cell COVER

egetative Soil Layer

The OSWDF is a specially engineered disposal facility with a multi-layer liner and cap system on competent bedrock designed to consolidate and contain demolition debris and soil into one centralized disposal area that protects public health and the environment.

The OSWDF can accommodate more than 5M cubic yards of waste and engineered fill from building demolition, soil remediation, and consolidation of the existing on-site landfills and groundwater plumes.



The OSWDF graphic cross-section

The final impacted material disposal area footprint will occupy about 100 acres in the northeast portion of the DOE reservation. This area of the DOE reservation also offers geological conditions that will provide the most protection to human health and the environment.

The OSWDF will be constructed to meet strict environmental laws that are regulated by the Ohio Environmental Protection Agency (OEPA) as well as DOE's own orders to protect human health and the environment. The design is proven safe from similar successful operating or closed on-site disposal facilities at other DOE sites in the United States.





Disposal Cell LINER

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S Drainage Lav

Waste Acceptance Criteria

All demolition debris and waste materials must meet the strict requirements of Ohio and U.S. environmental laws before it can be placed into the On Site Waste Disposal Facility (OSWDF). This set of requirements is called the Waste Acceptance Criteria (WAC). The WAC is a strict and systematic approach for choosing the right types of waste and right disposal methods to protect the public, environment and wildlife.



What does the WAC Do?

- Sets limits Based on environmental laws and OSWDF design and geological conditions
- Sets Waste Evaluation and Characterization Standards
- Defines Prohibitions Based on environmental laws and by choice
- Defines Path Forward WAC Implementation Plan

What may be placed in the OSWDF?

- ☑ Building debris, including piping, wiring, structural steel
- Portions of segmented process gas equipment from lower enriched operations
- Soil from old groundwater plumes and landfills
- ☑ Acceptable debris from landfills

What is Prohibited from the OSWDF?

- Waste generated off site
- Liquids, oils, refrigerants from equipment
- Ø Bulk liquid hazardous waste
- Hazardous waste above treatment standards
- Explosive or reactive wastes
- O Transuranic and high level wastes
- Ø Pyrophoric waste
- Building X-326 converters, compressors and coolers
- Containerizednuclear compounds greater than 20% enrichment
- OUF₆ material
- **Ø** Barrier materials



X-740 Plume Excavation

X-740 Plume Information

- Plume soil volume: Approx. 25,000 cu. yds.
- Main contaminant: Trichloroethylene (TCE), an industrial solvent, is the contaminant of concern

Work is underway at Portsmouth on the first of five legacy groundwater plumes which will be excavated to obtain soil for use in the newly constructed On Site Waste Disposal Facility (OSWDF) as engineered fill during demolition debris placement.

The 5M cubic yard OSWDF requires a 2.4:1 ratio of fill material to waste. Using soil from legacy groundwater plumes and old landfills on site avoids buying clean fill for the OSWDF, expedites the environmental cleanup of the site and provides more land for future reuse.

Since the 1990's plume contaminants, mainly industrial solvent trichloroethylene (TCE) used

during the plant operations, have been extracted from the ground with traditional groundwater pump-and-treat operations. However, it's a slow process that can be costly over time. By digging up the remaining contaminant sources and contaminated soils, the cleanup of the groundwater plumes is significantly accelerated.

Removal and consolidation of legacy environmental concerns including groundwater plumes and old landfills also makes more land available for future community reuse / reindustrialization – a benefit for stakeholders who want to build a sustainable economic future at the site post-cleanup. DOE has already begun the process of transferring clean parcels of land to the designated Community Reuse Organization, the Southern Ohio Diversification Initiative (SODI). The first parcel, 80 acres, was transferred to SODI in 2018 and another 220 acres is scheduled to be transferred this year.

The work is performed with regulatory approval under a Natural Resources Damage Act settlement and DFF&O (Director's Final Finding and Order) authorizing excavation of five existing groundwater plumes as well as five closed waste units (e.g., landfills). Each individual waste unit or plume



then needs an approved Excavation Work Plan before excavation can be initiated - ensuring that excavation can be done safely, protectively, and compliant with all ARARs (Applicable or Relevant and Appropriate Requirements). The excavated materials will then be used as engineered fill in the OSWDF according to the approved Waste Acceptance Criteria.

X-231B and X-231A Landfills will also be excavated in the next two years to place X-326 debris in the OSWDF.



On May 25, 2021, crews at the X-740 Plume Excavation Project unearthed and loaded the first batch of impacted soil for placement in the OSWDF. A dewatering trench is being constructed to lower the water table within the excavation, so crews can safely dig deeper to the target depth.



The first load of impacted soil from the X-740 Plume Excavation Project is being placed into Cell 1 at the OSWDF on May 26, 2021.

PROTECTIONS, CONTROLS, & SAFETY

Hazards Removed from X-326 through Lengthy Deactivation Process

From 2011 to 2020, DOE conducted a lengthy and thorough deactivation process of the X-326 to identify, characterize and remove the majority of the radiological and chemical hazards prior to demolition.

This process included more than 1,000,000 Non-Destructive Assay (NDA) measurements on the process piping and components to determine if levels of material would exceed the Waste Acceptance Criteria (WAC) for the On Site Waste Disposal Facility (OSWDF). If located, the contaminated items were carefully removed from the X-326 and staged for further evaluation or decontamination.

Deactivation also included the removal of more than 7,000 process components, safely shipped off site for disposal.

What remains in the building has been determined to be safe for demolition and disposal in the OSWDF if it meets the Ohio EPA-approved WAC.



Protecting the Air

During demolition, the potential spread of airborne contamination is controlled through a number of methods, including the following:

- Adhesive fixative has been applied to the exterior and interior of the building. This substance, which is blue in color, 'locks down' potential loose contamination that could be disturbed during demolition.
- A turbine high lift dust suppression system with water mister attachment, hose streams and water truck will be used to spray water on the building and the surrounding roadway to control dust.



- Fixative will also be applied to piles of demolition debris on the ground.
- Demolition activities will pause if the wind speed reaches a sustained velocity of 15 miles per hour at 10 meters height.



Best Practices from DOE Complex

The DOE has safely and compliantly decommissioned hundreds of radiologically contaminated facilities across the country over the past 30 years. The Oak Ridge East Tennessee Technology Park (ETTP) project recently completed the successful decommissioning of five uranium enrichment process buildings similar to the Portsmouth X-326 building.



Monitoring the Air

To ensure the air quality for workers and the public remains safe during demolition, a comprehensive network of air monitors and alarms have been put in place at Portsmouth to detect if levels of radiological or chemical particulates exceed Ohio EPA or ODH safety levels.

Real-time air monitors collect data and have alarms to provide a warning if elevated particulate or radiation levels are detected. Other monitors collect air filter samples on a daily or weekly basis for laboratory analyses

Oak Ridge K-25 Building



Independent Verification of Data

As part of their independent oversight of the demolition, excavation, and waste placement operations, Ohio EPA and the Ohio Department of Health have set up 23 new air monitoring stations or co-located air monitors on and around PORTS to provide verification of DOE air monitoring data.





to detect specific particulate contamination in the air.

Monitors are located in various directions and distances from the X-326 building in order to provide sufficient coverage under a wide range of wind conditions during demolition.

Self-contained air monitors have been staged around the building to monitor background radiation levels during demolition activities to transmit Alpha/Beta radiation results to a remote manned monitoring station through a wireless network. This station also monitors wind speed and direction to ensure set wind limits are not exceeded. By utilizing the monitors, the results will be documented and help ensure air emissions for employees, the public, and the environment are not exceeded. In addition, work boundary air sampling is conducted to verify that control measures taken during the demolition process are effective.



Ohio Department of Health and DOE co-located monitors

Air Monitor Locations



Air Monitoring Network

Ambient Air Monitoring Network Site-wide. Project-specific, and Independent Monitoring Systems										
			She mac, Project	pecific, and macpene	iene monitoring 5	ystems			2/22/2021	
Proje	ct/Scope	Locations	COC	Frequency	Equipment	Driver	Reporting	Project Status	Duration	
DOE/ODH Co-located (18) DOE Only (1)		On-site Off-site T7 A8 A3 A23 A10 A6 A24 A29 A8 A36 A24 A29 A9 A28 A36 A12 A37 A50 A15 A15 A41A	RAD DOE/ODH Fluoride (15 total, all except T7, A50, A52, A54) DOE only	Weekly continuous for lab analysis Weekly continuous for lab analysis	Hi-Q Low-vol	ODH Independent Oversight (DOE Requested) EMP	PEGASIS (DOE/ODH) ASER (DOE only)	Operational (As of October 2020)	Permanent	
		A54 A40A	Fluoride	Weekly continuous for lab analysis	Low-vol	(DOL ONLY)				
DOE/OEP	A Co-located (5)	A50 A53 A51 A54 A52 A54	PM2.5/PM10/PM10C (5) VOC (5) Metals (5) Asbestos (5)	Continuous real-time 1:6-day 24-hr 1:6-day 24-hr 1:6-day 24-hr 1:6-day 10-hr	Teledyne T640X Entech 1900 Tisch TE-5170 Sensidyne AirCon-2	OEPA Independent Oversight (DOE requested)	PEGASIS (DOE/OEPA)	Operational (As of November 2020)	Permanent	
OSWDF (7)		X780-A01 X780-A04 X780-A02 X780-A05 X780-A03 X780-A06 & A70 (Air Model/Permanent)	PM2.5/PM10/PM10C (A04 + A70) VOC (A01-A06 + A70) Metals (A01-A06 + A70) PCB (A01-A06 + A70) RAD (A01-A06 + A70)	Continuous real-time Weekly 24-hr Weekly 24-hr Monthly 24-hr Weekly continuous	Teledyne T640X Entech TM1200 Tisch TE-5170 Tisch TE-1000PUF Hi-Q	PSVP	OSWDF Annual Report	Under Construction Projected February 2021 (2 of 7 construction complete)	Permanent	
X-326 Demolition	Environ- mental (7)	X326-A01 X326-A04 X326-A02 X326-A05 X326-A03 X326-A06 • A72 (Air Model/Permanent)	PM2.5/PM10/PM10C (A01, A06, A72) Metals (A01-A06+A72) PCB (A01-A06+A72) Asbestos (A01-A06) RAD (A01-A06) RAD (A72) VOC (A72 only)	Continuous real-time Weekly 24-hr Monthly 24-hr Daily ^a , as required Weekly 24-hr Weekly 24-hr Weekly 24-hr	Teledyne T640X Tisch TE-5170 Tisch TE-1000PUF Sensidyne AirCon-2 Tisch TE-5170 Hi-Q Entech TM1200	X-326 DDP	DFF&O Quarterly Report (Exceedances of action levels only)	Baseline Operational (As of January 2021)	Beyond End of Extension Period, ~Spring 2023	
	Radiation Protection (8)	Mid-Field Monitors MF-01 MF-05 MF-02 MF-06 MF-03 MF-07 MF-04 MF-08	Radiological	As determined by Radiation Protection	Omni					
Soil Excavation	X-740 (9)	X740-A01 X740-A05 X740-A02 X740-A06 X740-A03 X740-A07 X740-A04 X740-A08 X740-A04 X740-A08	PM2.5/PM10/PM10C (A02 + A71) VOC (A01-A08 + A71) Metals (A71 only) PCB (A71 only) RAD (A71 only)	Continuous real-time Weekly 24-hr Weekly 24-hr Monthly 24-hr Weekly continuous for lab analysis	Teledyne T640X Entech TM1200 Tisch TE-5170 Tisch TE-1000PUF Hi-Q	X-740 Excavation Work Plan	DFF&O Quarterly Report (Exceedances of action levels only)	Under Construction Projected Spring 2021	~September 2021	
	5-Unit (7)	5UA-A01 5UA-A03 5UA-A02 5UA-A04 5UA-A02 5UA-A04 5UA-A07	PM2.5/PM10/PM10C (A06 + A71) VOC (A01-A07 + A71) RAD (A01,A02,A04,A06 +A71) Metals (A71 only) PCB (A71 only)	Continuous real-time Weekly 24-hr Weekly continuous for lab analysis Weekly 24-hr Monthly 24-hr	Teledyne T640X Entech TM1200 Hi-Q Tisch TE-5170 Tisch TE-1000PUF	5UA Excavation Work Plan	DFF&O Quarterly Report (Exceedances of action levels only)	Projected Fall 2021 Subsequent to X-740 (equipment moved to 5U)	Beyond End of Extension Period	
	Oper	ational	Under Construction	Equipment to be moved from X-740 project						

Protecting the Water During X-326 Demolition and Disposal

DOE is meeting its commitment of protecting the water on and around the site through Ohio EPA-approved engineered controls at the X-326 demolition site as well as the On Site Waste Disposal Facility (OSWDF). The three main sources of water treated are:

- 1. Rainwater runoff from the X-326 Demolition site as well as the OSWDF
- 2. Dust suppression activities at the X-326 Demolition site (i.e. water misting)
- 3. Leachate from the OSWDF



X-326 Water Treatment System

A water retention system, surrounding the entire X-326 was built to collect water from rain runoff and misting operations during demolition. The system includes a lined trench directing water to the newly constructed X-622-I Water Treatment Facility, just south of the X-326 demolition site. The facility will be used to treat the water from X-326 demolition,



X-740 and 5-Unit (including X-231B and X-231A) plume excavation activities.

Each of the five equalization tanks inside the facility can hold approximately 18,000 gallons of water. The tanks are basically holding tanks for the water before it heads to the pre-treatment clarifier and then on to the treatment plant where potential contaminants (e.g. metals, solids, volatile organic compounds, uranium and thorium) are removed so the water meets Ohio EPA standards before it is discharged through a permitted outfall.

OSWDF Water Treatment/ Leachate System

The Modular Leachate Treatment System (MLTS) is situated near the corner of North Access and Perimeter roads, south of the OSWDF. It serves as a water treatment facility for the Onsite Waste Disposal Facility (OSWDF) and to treat Leachate – water that will leach from the OSWDF over time as part of its designed safety.

The facility includes several support structures such as the storage, equalization and clarifier tanks, an air vapor treatment building and a temporary fabric-



tension structure. The MLTS consists of several components to treat water, such as ion-exchange vessels, activated carbon vessels and a filter-press to remove contaminants so the water meets Ohio EPA standards before it is discharged through a permitted outfall.

FREQUENTLY ASKED QUESTIONS

Q: What precautions are setup to prevent airborne contamination during the X-326 demolition?

A: During demolition, air protections will be achieved through administrative and engineered controls as well as air monitoring at various distances from X-326, on and off the site with independent verification of monitoring data from the Ohio Environmental Protection Agency and the Ohio Department of Health.

Q: This demolition is similar to the failed demolition in Hanford. How is PORTS Site ensuring that this will be successful?

A: DOE is using best practices and lessons learned from the safe and compliant demolition of hundreds of radiologically contaminated facilities across the country in the past 30 years. This includes the recent safe demolition of buildings at the K-25 Plant in Oak Ridge, Tennessee, involving five uranium enrichment process buildings similar to the ones at the Portsmouth site.

Decommissioning of the Portsmouth site is more similar to the K-25 Plant than what occurred during demolition of a plutonium finishing plant at the Hanford site in Washington. Portsmouth processed uranium, not plutonium and is not located in a much drier and windier location like Hanford. In the 2017 Hanford incident, airborne radioactive contamination spread beyond the demolition zone where it was supposed to be contained. An investigation into the incident identified a number of failed engineered controls including inadequate application of fixative and nonfunctioning air monitors. Lessons learned from the Hanford incident have been fully evaluated and considered in the demolition plan and associated air monitoring plan of the X-326.

Q: How will PORTS Site monitor radiation from the demo to ensure the public is safe?

A: A series of new air monitors and alarms have been put in place in multiple on-site and offsite locations to detect radiological or chemical contaminants that may become airborne during demolition of the X-326 building. Some of the monitors collect real time data and have alarms to provide warning if elevated particulate or radiation levels are detected. Other monitors collect air filter samples on daily or weekly basis for laboratory analyses to detect specific contaminations in the air.

DOE has conducted extensive air modeling to simulate potential conditions during the planned X-326 demolition activities and identify the positioning of air monitors on and around the site. Additional "mid-field" monitoring has also been established to address the Hanford scenario directly. Daily demolition cannot proceed without sufficient air monitors being fully functional prior to daily work start. Real time monitoring will be utilized throughout the day to ensure work activities are not exceeding established boundary limits. The work package has conservative action levels that require work pause or stoppage depending on action level reached. Before work can resume the project team must evaluate air monitoring data, activities being executed and mitigation methods. Changes will need to be implemented before restart.

A total of 23 additional independent air monitors have been installed for Ohio EPA (5) and ODH (18) on and around the site to verify DOE air monitoring data.

Q: How fast will the public know the information from the air monitors after demolition?

A: Air monitoring data will be made available to the public in varying intervals on-line and in print. The Ohio Department of Health and the Ohio Environmental Protection Agency will post data on a monthly or quarterly basis on their websites. A join posting of monitoring data from Ohio EPA, ODH and DOE will also take place quarterly on DOE's PEGASIS system (https://pegasis.ports.pppo.gov/Pegasis/ Default.aspx). Annually, the data will be published in the Annual Site Environmental Report. Real-time monitors will alert if radiation or chemical levels reach an actionable level. If that level means that the public nearby the site should be notified, the site will work with the Pike County Sheriff through emergency communications methods (pole-mounted sirens, local media, one-call to neighbors, etc.) for neighbors within the established Emergency Planning Zone (within approx. 2) miles of the site).

Q: Will all of the debris from the demolition be placed into the Onsite Waste Disposal Facility?

A: All demolition debris from the X-326 that meets the Waste Acceptance Criteria (WAC) will be placed into the On Site Waste Disposal Facility (OSWDF). The WAC is a strict and systematic approach for choosing the right types of waste and right disposal methods to protect the public, environment and wildlife. All demolition debris and waste materials must meet the requirements of Ohio and US environmental laws before it can be placed into the OSWDF. A full list of items prohibited and permitted for the OSWDF can be found on page 7.

- Q: In regards to the removal of the transite panels in advance of demolition, will there be monitors operational & collecting samples before, during, and after the removal of the transite panels and a plan in place to deal with any inadvertent pathways created that might accelerate airborne contamination?
- A. Yes. Air monitors are in place, operational, and collecting samples. Air monitoring will continue during and after removal of the transite panels from the building. Air monitoring data will be reviewed and compared against predetermined action levels to confirm the effectiveness of ongoing emission controls and implement additional controls, if necessary. The project-specific monitoring plans were developed as part of the design of demolition, excavation, and OSWDF operation. These plans include steps for air monitoring, data evaluation, work suspension/stop, and timely mitigation if any unexpected exceedances of the pre-determined action levels are identified.

In order to minimize potential particulate emissions during transite panel removal, the following measures are being taken and/or are available to mitigate any pathways created that may cause exceedance of the action levels:

- The interior and exterior of the transite panels have had a fixative applied prior to removal.
- The removed transite panels will be double

wrapped with plastic and placed in the staging area awaiting final disposition.

- As transite panels are removed, a construction debris net with a mesh size of ¼" will be installed covering the opened portion of the building structure to capture airborne small debris from the building and reduce inadvertent pathways for contaminated small debris to escape from the opened structure before demolition start.
- The project team has previously applied fixative in targeted areas within the building to lock down contamination and minimize dust generation during demolition.
 Additional fixatives will also be applied to the exposed building interior surfaces during transite removal operations.

Dust suppression such as water misting at the demolition face and fixative on debris piles will also be implemented during structure demolition.

- Q. When will the monitors be operational? Will the monitors be operating continuously? When and how will samples be collected? Who is collecting the samples? Can you please provide the Sampling and Analysis Plan, the operating schedule, and the sampling schedule?
- A. The overall air monitoring network to support transite removal includes multiple layers of monitors at various distances from the X-326 Process Building including near-field, mid-field, and far-field locations. This network provides a 'defense-in-depth' monitoring approach to allow detection of airborne contamination early and near the source so appropriate actions can be taken to mitigate the emission source and

minimize potential impacts further downwind. Specific details of the near-field environmental air monitoring system for X-326 Process Building are included in the attached X-326 Process Building Above-Grade Demolition Air Monitoring Plan (X-326 Air Monitoring Plan). All new air monitors associated with the X-326 demolition activity as well as the original site wide ambient air monitors have been operating since mid-January 2021. As of February 8, 2021, additional new air monitors associated with the X-740 Soilj Project and the On-site Waste Disposal Facility (OSWDF) are under construction oroperating as noted in Table 1.

Various types of additional air monitors are and will be operational around and away from the X-326 Process Building before, during, and after removal of the transite panels. Monitors are located in various directions and distances from the building in order to provide sufficient coverage under a wide range of wind conditions during transite panel removal and subsequentdemolition. Based on the available technologies and regulatory guidance for specific constituents of concern (COCs) to be monitored, some of these monitors (i.e., radiation and particulate monitors) will operate and provide readout continuously and others operate/sample at prescribed intervals including daily, weekly, and monthly as further explained below. The attached X-326 Air Monitoring Plan provides details regarding the real-time and retrospective air sampling in Section F.1.1.

Figure 1 shows the above listed operational environmental air monitors as well as additional air monitors currently being installed around the OSWDF and Soil Excavation Project areas. Monitor locations have been determined based on meteorological data, the air modeling

results, and joint OEPA/DOE observations at the site. Monitors are placed in position to surround the work areas providing feedback to the operations team as work progresses independent of the prevailing wind. Table 1 provides technical information including monitoring instruments, monitored COCs, and operating and sampling frequencies of the Independent Air Monitoring Systems (i.e., Ohio Environmental Protection Agency [Ohio EPA] and Ohio Department of Health [ODH] operated), the Site-wide Ambient Air Monitoring System, and the project-specific air monitoring systems (i.e., X-326 Demolition Project, Soil Excavation Project, and OSWDF Project). The Frequency column in Table 1 presents a range of sampling approaches for various COCs based on the available monitoring instruments and regulatory guidance. These sampling approaches are further explained in the following bullets:

- Continuous: Continuous sampling and realtime read out
- Weekly continuous: Continuous sampling with the filter collected/replaced once per week and compositing 4 weekly filters into one monthly sample for analysis
- Daily: Sampling daily during active work hours (continuous for 8 to 10 hours with one daily sample)
- 1:6 day 24-hr: One 24-hour sample is taken every 6 days1:6 day 10-hr: One 10-hour sample is taken every 6 days
- Weekly 24-hr: One 24-hour sample is taken every week
- Monthly 24-hr: One 24-hour sample is taken every month

In summary, a network of air monitors are in place and currently operating to establish a baseline prior to, during transite removal, and during subsequent X-326 Process Building demolition:

- Seven environmental air monitoring stations with multiple monitoring instruments around the X-326 Process Building, operated by Fluor-BWXT Portsmouth LLC (FBP) Environmental Program for the U.S. Department of Energy (DOE), monitoring for radionuclides, metals, asbestos, polychlorinated biphenyls (PCBs), and/or PM2.5/10 (particulates in air with diameter less than 2.5 micrometers or less than 10 micrometers, respectively);
- Eight additional radiological particulate monitors and five real-time radiation monitors around the X-326 Process Building, operated by FBP Radiation Protection Program for DOE;
- 18 ambient air monitors onsite and offsite, operated by FBP Environmental Program for DOE, monitoring for radiological COCs;
- 18 ambient air monitors co-located with DOE monitors onsite and offsite, operated by ODH independently for radiological COCs; and
- Five ambient air monitoring stations onsite, each containing co-located Ohio EPA and DOE monitoring instruments, operated by Ohio EPA and DOE independently for volatile organic compounds (VOCs), metals, asbestos, and PM2.5/10.

- Q: If contaminants of concern are detected, what is the plan to prevent contamination from migrating off site? Who will be notified and when? Will work stop if contaminants are detected? Who has Stop Work authority?
- A. The Conservative multi-tiered action levels (or concentrations up to the regulatory limits) have been established through air modeling (Multi-Project Air Model) of the planned and controlled field activities for comparisons to the actual monitoring data.

If any action level is exceeded, field work will be slowed down or suspended by the Demolition Project Manager, depending on the action level exceeded. DOE and contractor's independent oversight functions will always have the authority to stop work. Action levels are discussed in the Section F.3.3.6 of the attached X-326 Air Monitoring Plan. Evaluation of the monitoring data trending and effectiveness of emission controls will then be conducted by the project and support organizations to identify the causes and implement appropriate mitigations and/or improvements before the work can be resumed. This approach ensures early detection and correction of impacts due to potential airborne contaminants during transite removal and subsequent building demolition. Timely notification to Ohio EPA and ODH, as noted in Table F.6 of the attached X-326 Air Monitoring Plan, will also be provided as part of the required action.

In case of an actual emergency situation, notifications will be made to the Emergency Management Organization starting with Plant Shift Supervisor Office. Depending on detected concentration levels and classification of the event, further notifications may be initiated in accordance with established emergency plans including local county officials and emergency management authorities.

While the X-326 Demolition Project Manager, independent oversight functions, and DOE all have Stop Work Authority, if contaminants are detected above an actionable level during transite removal and subsequent demolition, every worker has Stop Work authority for safety issues. Similarly, every worker is expected to report any non-compliant conditions if observed in the field during transite removal or demolition. Proper actions will be taken to correct confirmed non-compliant conditions prior to resuming normal operations.

Q: Will the air monitors be used to monitor all airborne uranium isotopes, neptunium, plutonium, americium, and TC-99?

A. Yes. The air monitors are configured to detect and measure airborne radionuclides as noted in Table F.4. The specific radionuclides include uranium isotopes, neptunium, plutonium isotopes, americium, thorium, and technetium.

The site-wide ambient air monitors and ODH independent air monitors are also configured to detect and measure these radionuclides.

Monitoring Parameters for Demolition

Table F.4. Monitoring Parameters for Demolition and A72/AM3 Air Samples										
Contaminant	t Type/Parameter	CAS Number	Analytical Method ⁵	Frequency ⁶						
PCBs	PCBs	1336-36-3	EPA Methods TO-4A and 8082A	Monthly						
	Americium-241	14596-10-2	Alpha Spectroscopy							
	Neptunium-237	13994-20-2	(EML HASL-300 Method Am-05-RC,	Weekly²						
	Plutonium-238	13981-16-3	GL-RAD-A-032,							
	Plutonium-239/240	N760	EML HASL-300 Method Pu-02-RC,							
	Thorium-230	14269-63-7	EML HASL-300 Method Th-01-RC)							
Radionuclides ¹	Technetium-99	14133-76-7	Beta Liquid Scintillation Counting (EML HASL-300 Method Tc-01-RC)							
	Uranium (total)	7440-61-1		-						
	Uranium-233/234	NS632	Alpha Spectroscopy (EML HASL-300							
	Uranium-235/236	N1047	Method Am-05-RC)							
	Uranium-238	24678-82-8								
Padiation	Total Alpha		IEC 61172 and others	Continuous readings and integrated averages						
Radiation	Total Beta		lec of 172 and others							
Particulate	PM ₁₀		Teledyne Field Instrument; EPA PM10 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						
	Total VOCs	Various		One daily sample per work week						
VUCS	VOC HAPs (TCE)	79-01-06	EPA Method 10-15							

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
- PM10 = particulate matter 10 microns or less in diameter
- TBD = To be determined
- VOCs = volatile organic compound

ADDITIONAL RESOURCES

• DOE Portsmouth Paducah Project Office

 <u>https://www.energy.gov/pppo/</u> portsmouthpaducah-project-office

• Portsmouth Site Prime Contractors

• Fluor-BWXT Portsmouth

http://www.fbportsmouth.com

• Portsmouth Mission Alliance

https://pma-iss.com/

Mid America Conversion Services

http://www.duf6-mcs.com

Portsmouth Site Environmental Information Center

• <u>https://eic.ports.pppo.gov/</u>

PEGASIS System

 <u>https://pegasis.ports.pppo.gov/Pegasis/</u> <u>Default.aspx</u>

• Portsmouth Site Specific Advisory Board

 <u>https://www.energy.gov/pppo/ports-ssab/</u> portsmouth-site-specific-advisory-board

Southern Ohio Diversification Initiative

<u>http://www.sodidevelopment.org/</u>

• PORTS Future study

• http://www.portsfuture.com

Portsmouth Site Virtual Museum

<u>http://www.portsvirtualmuseum.org</u>