Current as of March 30, 2022

X-326 Demolition Project
Data Quality Objectives for Project Specific Air Monitoring

The X-326 Air Monitoring Plan constitutes a project-specific air-monitoring plan. By design, the X-326 Air Monitoring Plan incorporates elements of Data Quality Objectives (DQOs) and sampling and analysis plans. The following provide an overview of the DQO process:

Statement of the problem:
Section F.1. and F.2 of Appendix F 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 DDP) include descriptions of the potential for historical contaminants in the building to become airborne emissions during demolition activities, recaps the emissions modeling performed 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), and provides criteria to be met at the Portsmouth Gaseous Diffusion Plant (PORTS) site boundary.

Table. F.2 recaps model values from the Multi-Project Air Model and boundary criterion. Model results predict that none of the contaminants would exceed criteria at the site boundary.

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

Category	Modeled X-326 Project Specific Boundary Concentration ($\mu g/m^3$)	ModeledA72/AM3 Air Modeling Station Concentration ($\mu g/m^3$)	DOE Portsmouth Site Boundary Criterion ($\mu g/m^3$)
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

Air emissions monitoring is needed at the demolition project boundary and select locations for the building contaminants to permit verification of the modeling as well as provide feedback for contaminant mitigation activities at the project. The data will be used by the X-326 Demolition Projects Team as well as members of DOE, Environmental Remediation, and Environmental Protection

Objectives from the Sampling:
From Section F.3.3, "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." From Section F.3.3.6, "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. Results from the Multi-Project Air Model were used to establish expected air pollutant concentrations at the project work boundary."

Inputs to the Decision:
Results from the Multi-Project Air Model provide the majority of the inputs to the decisions for what, where, and how to sample.

From F.3.3.3, "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. 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 hazardous air pollutant (HAP) metals." Table F.4 in that same section of the document goes on to identify the contaminants and the type of analysis that will be performed.

From Section F.3.3.1, the placement of air monitors is described; "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)." Note that the dominant site air flows influence the modeling results and hence the placement of air monitors.

Study Boundaries:
The contaminants to be monitored are limited to those found in the building.

Monitoring activities by the project (at the project boundary) plus three new site representative locations will be in addition to existing site air monitoring programs and additional monitoring at other contemporary site projects (OSWDF and soil excavation work) that will also contribute to overall demonstration of contaminant levels in site air.

Monitoring for key contaminants in real-time is practical and can provide near-term performance information for use in managing project activities; real-time monitoring is incorporated to the extent practical.

The demolition of the X-326 Process Building will start on the southern end of the building and then will move towards the northern end of the building, ultimately covering a distance of approximately one half mile. Consequently, "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)" (from Section F.3.3.1).

Analytical Approach:
Each of the analyzed contaminant parameters is addressed in Table F.4 under a standard U.S. Environmental Protection Agency (EPA) protocol or method. These methods prescribe analytical approaches or required quality considerations.

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

Section F.3.3.4 of the attached X-326 Air Monitoring Plan addresses sample collection frequency in additional detail.

Decision Rule - Performance/Acceptance Criteria:
Full data packages are delivered for each laboratory analysis, to support data verification and validation. From Section F.3.3.6, "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)." This same section continues on to explain how action levels will be used in evaluation of data including notification requirements, as applicable.

Design for Obtaining Data:
This concept is addressed through information provided in Table F.4 in combination with the identification of air monitors and locations described in Section F.3.3.2 (including Table F.3).