



**VIRTUAL
Public Meeting**



A-Plant Demolition Air Quality
X-326 Demolition Air Monitoring Results

Tonight's Agenda

- Portsmouth Site Update
- Air Monitoring & Managing Risk
- X-326 Air Monitoring Data
- Public Comments / Questions



How to have your voice heard

Email: ports-demo-questions@pppo.gov



Add a question via the chat on YouTube



WebEx



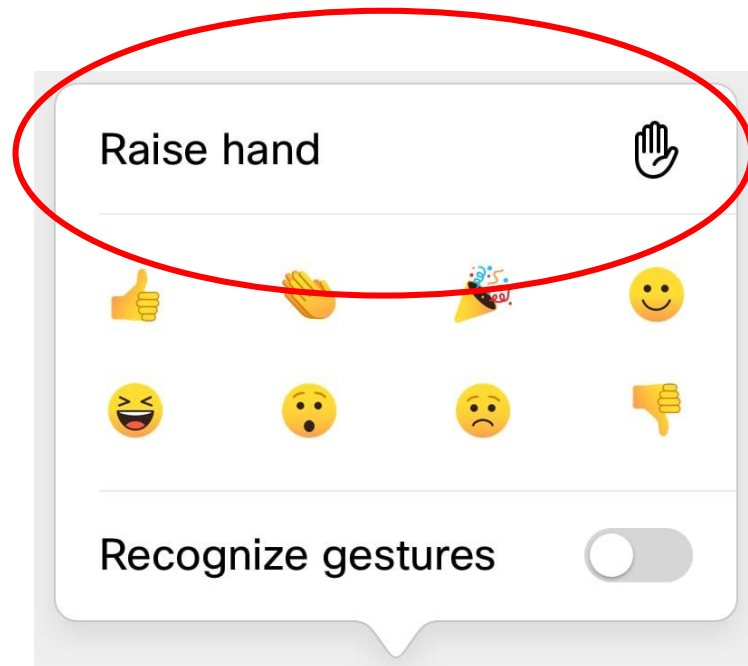
Add a question via the Chat on WebEx



Participate in the Public Comment Session

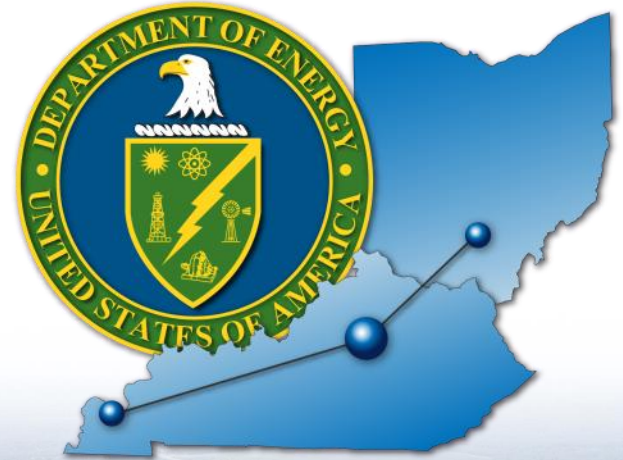
Public Comment Protocols

- Raise your hand to be identified
- Be courteous and treat everyone with respect.
- We ask that you keep comments within a 3-4 minute timeframe to allow for all interested parties to speak. Additional or lengthy comments can be submitted in writing.
- In order to reduce background noise, speakers will be unmuted during their public comment and then will return to mute afterwards.



Portsmouth Site Update

Jeff Bettinger
Portsmouth Site Lead, DOE



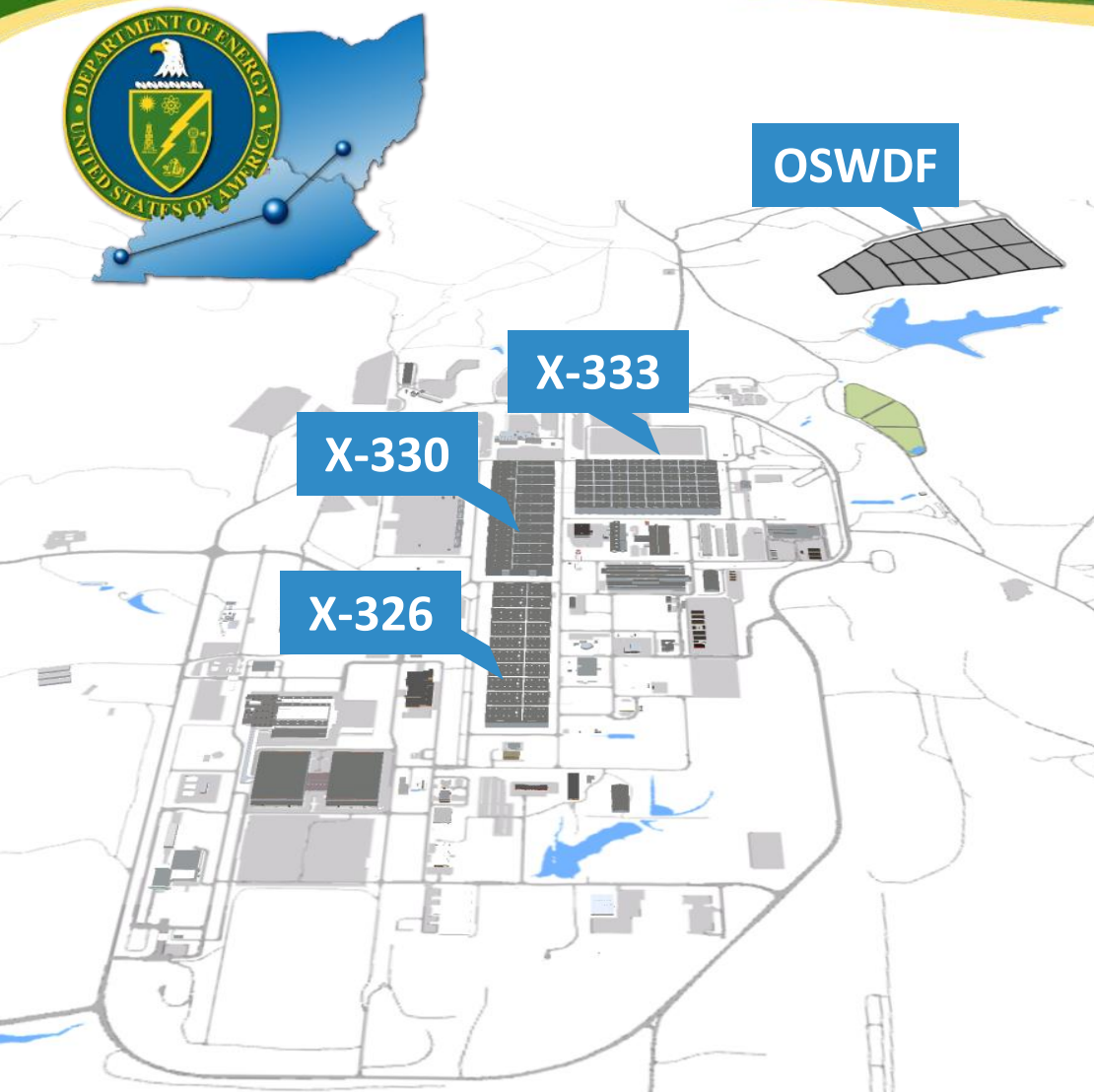
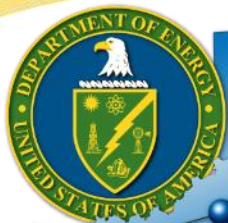


- 45 years of experience
- Demonstrated safe deactivation and demolition of:
 - Land-based nuclear operating and research facilities
 - Shipboard nuclear reactor systems
 - Chemical Weapons production facilities
- Experience in the design, startup and operation of:
 - Chemical weapon materiel destruction facilities
 - Medical waste processing facilities
 - Hazardous material processing facilities
- B.S. Chemical Engineering
- Professional Engineer



- Located in south central Ohio
- Plant occupies approx. 1,200 acres of a 3,777-acre federal site
- Uranium enrichment operations started in 1952
- DOE EM cleanup mission began in 1989
- Full scale D&D began in 2010 with return of over 400 structures / facilities

Portsmouth Ten Year Deactivation, Demolition and Cleanup Focus



- Deactivation & Demolition
 - Complete process building demolition and cleanup in succession, then move to balance of plant
 - Complete X-326 demolition in FY23
 - Complete X-333 demolition in FY27
 - Complete X-330 deactivation in FY29
- On Site Waste Disposal Facility
 - Construct liners to contain debris as demolition and cleanup progresses
 - Turn facility over the Legacy Management for operation

X-326 Process Building Deactivation, Demolition and Cleanup

Project Status

- ✓ Deactivation Complete
September 2020
- ✓ Demolition Design Plan
Approved February 2021

Transite removal began
February 24, 2021

- ✓ Demolition started May 17,
2021

Four of 10 building sections
to be demolished in 2021

Demolition complete 2023



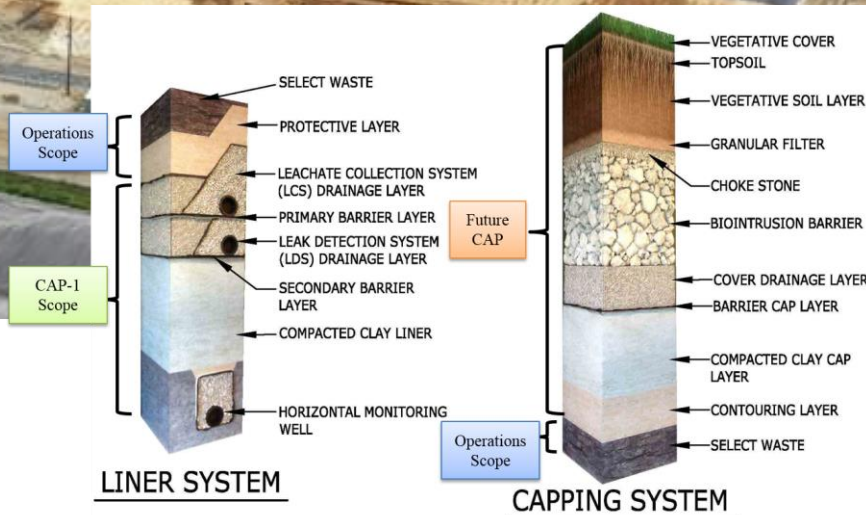
Contaminated Plume Excavation



- 5 landfills and plumes closed within Perimeter Road
- Fill for OSWDF
- Based on community input
- Offers large contiguous site for reuse

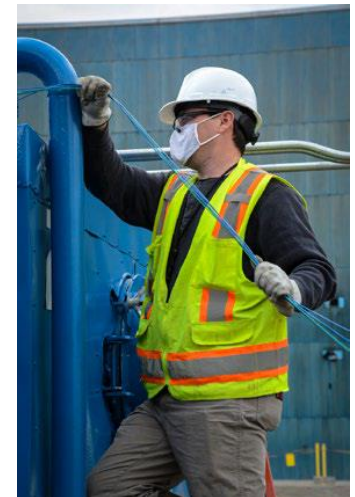
- Construction Complete
 - Accepting Waste

- Liner Construction Underway



Planning for Safe Demolition and Cleanup

- Demolition Design Plan approved by Ohio EPA in February 2021
- Incorporating lessons learned from decommissioning experience at DOE projects across the country
- Hazards removed from the building to make it safe for demolition
- Trained, experienced and capable workforce
- Industry proven protective measures to minimize disturbance of any residual radiological or chemical contaminants during demolition



Enhanced Controls for Demolition and Cleanup

- Based on lessons learned
- Water
 - Water retention and treatment system
 - Water-based dust suppression
- Air
 - Wind speed is constantly monitored
 - A network of air monitors and alarms in place to ensure that air quality remains safe for workers and the public



- Real time project monitors surrounding the X-326 project will provide immediate feedback on demo operations
- DOE worked with OEPA and ODH to co-locate a total of 23 air monitors
- In addition to DOE's data, OEPA and ODH air monitors will provide independent confirmation of air quality data during demolition work





Oregon State
University

COLLEGE OF ENGINEERING | School of Nuclear Science
and Engineering

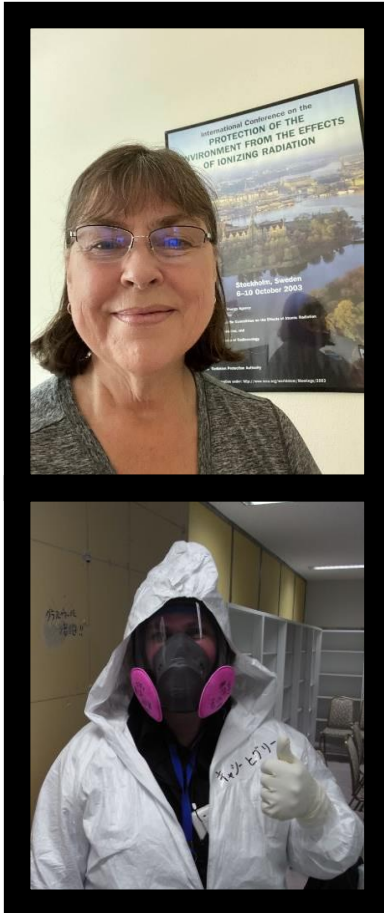
Air Monitoring & Managing Risk

Kathryn Higley, PhD, CHP

Professor



Oregon State University
College of Engineering



Kathryn A. Higley is a Professor, and former Head of the School of Nuclear Science and Engineering in the College of Engineering at Oregon State University. She has managed OSU's Radiation Health Physics program, including developing its online graduate degree, into the largest in the country. Dr. Higley has been at Oregon State University since 1994 teaching undergraduate and graduate classes on radioecology, dosimetry, radiation protection, radiochemistry, and radiation biology. She is also a council member of the National Council on Radiation Protection and. She is a board member and fellow of the Health Physics Society and a Certified Health Physicist. Dr. Higley and her students have done research in radiologically contaminated environments around the globe.



Employment

**Acceptable
Risk Varies**

Home Life



Recreation





Oregon State University
College of Engineering

Portsmouth





Oregon State University
College of Engineering

Future vision of the Portsmouth site after GDP demolition is complete



Achieving this
endpoint requires
building
decontamination,
demolition and
removal

<https://www.energy.gov/pppo/portsmouth-site/portsmouth-future-use>



How to Achieve this Endpoint

The requirements

- Protect workers
- Protect the public
- Protect the environment

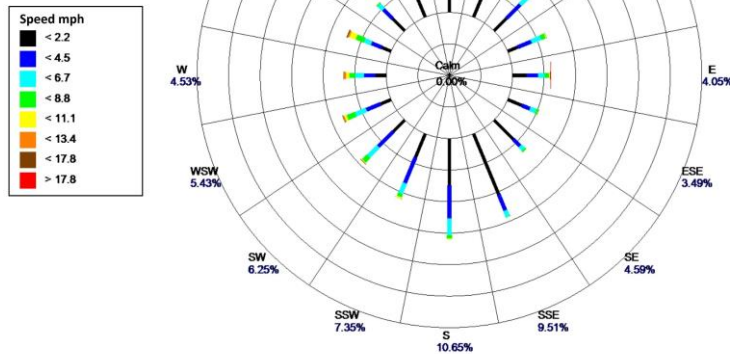
The process

- Review, analyze, plan
- Pick monitoring locations for safety
- Decontaminate & decommission & deconstruct
- Release for redevelopment

Monitoring Air for Safety & Compliance

The wind rose shows the % of time the wind blows from a particular direction & the wind speed

2020 Annual Wind Rose
Portsmouth, Ohio
Altitude 198 m MSL, Height 10 m AGL
Data Recovery 86.3%

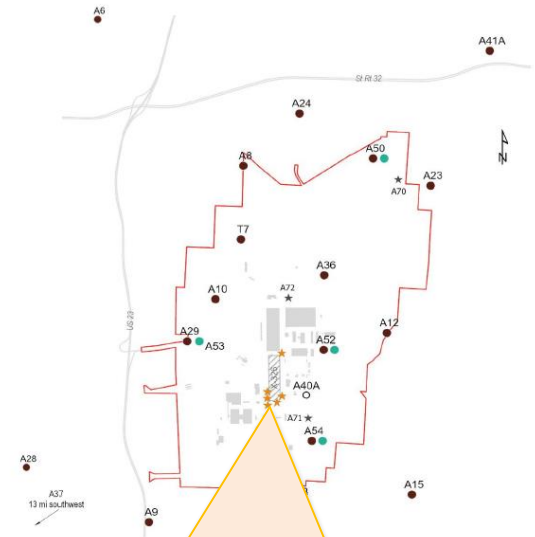


OFFICE OF
ENVIRONMENTAL
MANAGEMENT

X-326 Air Monitoring

Using input from the community, complex wide lessons learned and industry best practices, the Portsmouth site Air Monitoring Network represents a defense in depth approach to the protection of our workforce, our neighbors, and the environment

This approach provides a layering of air monitoring equipment from the project boundary to off-site locations



safety • performance • cleanup • closure

www.energy.gov/EM

Monitors are placed based on type of work, major wind directions, and worker health & safety



Airborne Radiation Monitors

- Looks for radiation(s) that are used at PORTS
 - “Intelligent continuous air monitor” (ICAM) →
 - Alpha particles
 - Beta particles
- Monitors airborne radioactivity
- Has alarm set points
- Tracks air concentrations over time

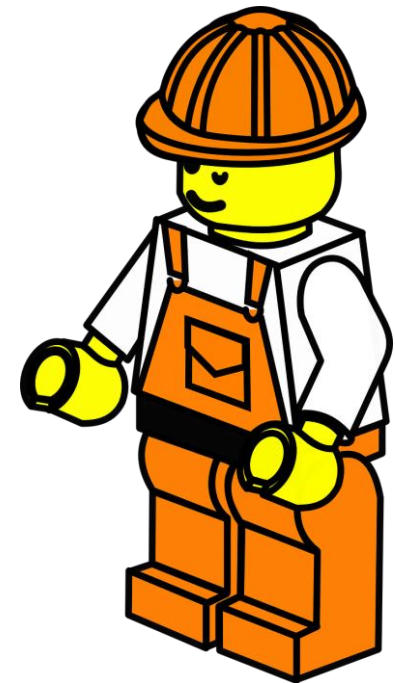


ICAM



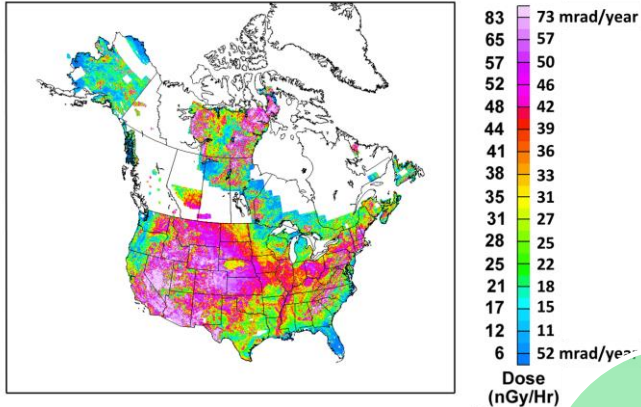
Radiation Doses from Air

- Monitored using 'DAC and DAC-hr'
 - DAC: derived air concentration (pCi/m^3)
 - **Worker-focused** measurement
 - Set to protect close-in workers
- DAC is a **dose-rate**
 - $0.8 \text{ DAC} \sim 2 \text{ mrem/hr}$
- DAC-hr \rightarrow **DOSE**
 - $2000 \text{ DAC-hr} \rightarrow 5000 \text{ rem (w/o masks)}$
 - $1 \text{ DAC-hr} \rightarrow 2.5 \text{ mrem}$



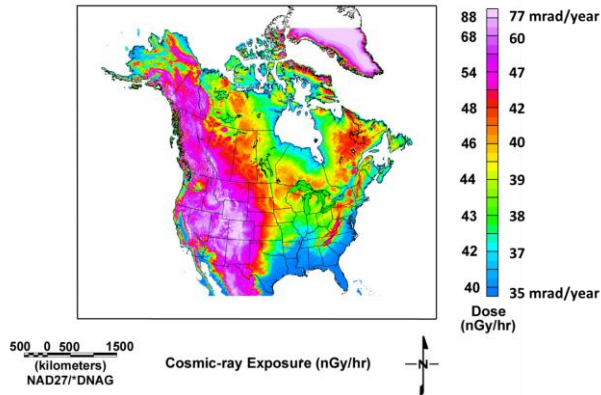
Why 2000: $40 \text{ hrs/wk} \times 50 \text{ weeks/yr} = 2000 \text{ hrs/yr}$

Radiation Dose from Natural Radioactivity in Soils



Gamma-ray Absorbed Dose (nGy/hr)

Radiation doses coming from outer space (annual average)



Cosmic-ray Exposure (nGy/hr)

Radiation Sources & Doses for the Public

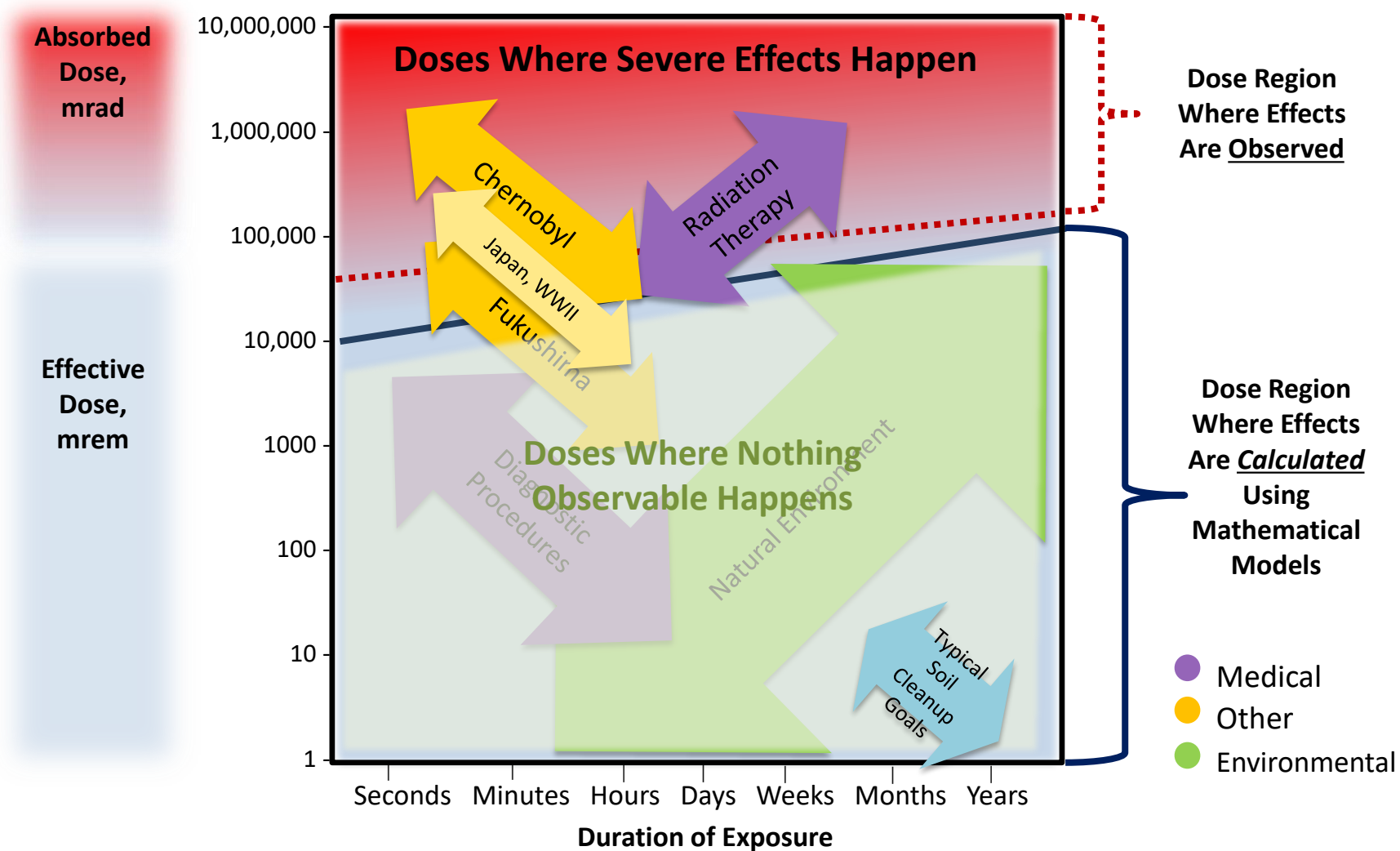
Natural ~
300
mrem/yr

Background:
~ 600
mrem/yr

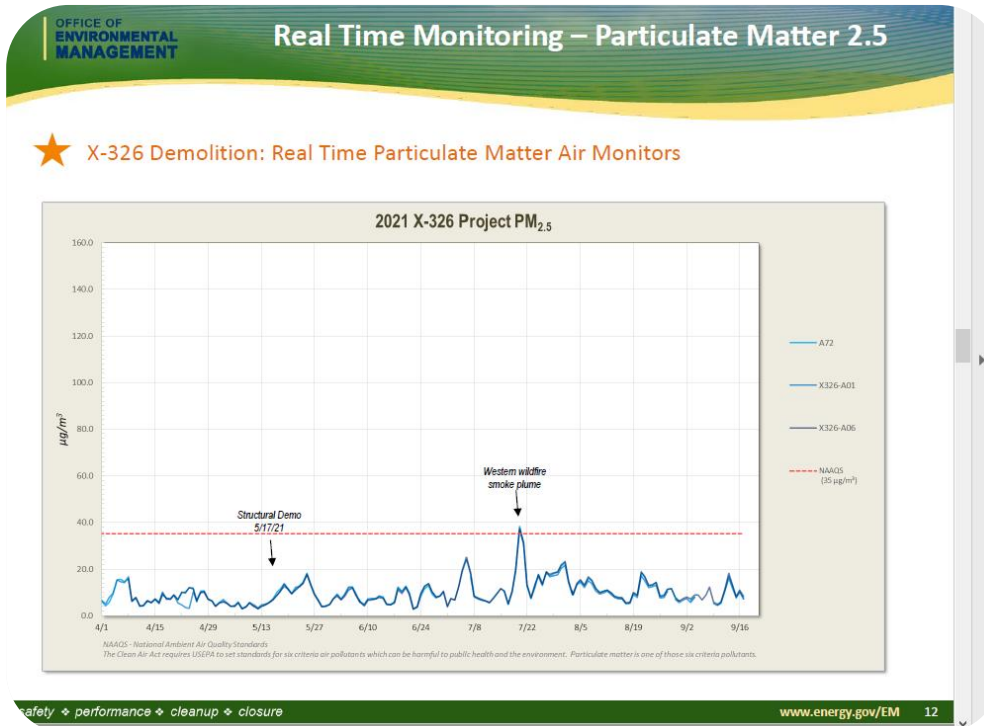
Medical
~ 300
mrem/yr

PORTS
~ 1
mrem/yr





Monitoring Airborne *Particulates* for Safety & Compliance

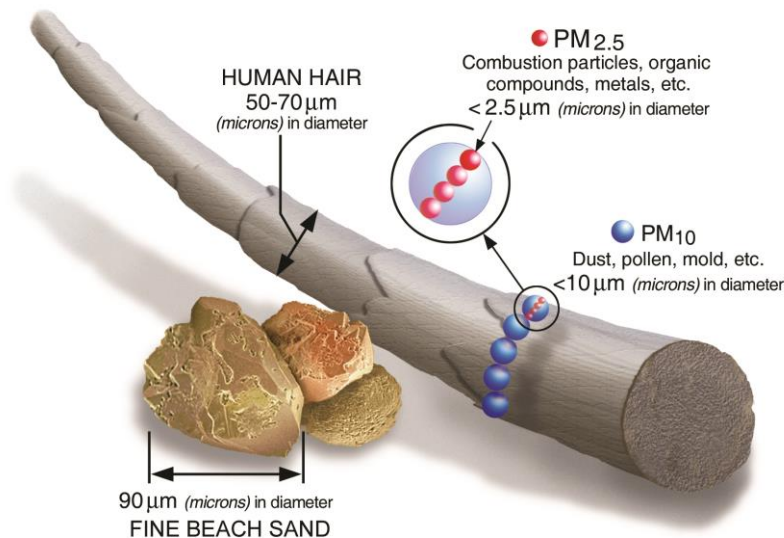


| | PM2.5 | | PM10 | |
|--------------------|----------------------|----------------------|----------------|-------------------------|
| | Annual Average | 24-Hour Average | Annual Average | 24-Hour Average* |
| NAAQS* | 12 µg/m ³ | 35 µg/m ³ | None | 150 µg/m ³ * |
| PORTS - additional | | | | 113 (Medium) |
| PORTS - additional | | | | 75 (Low) |

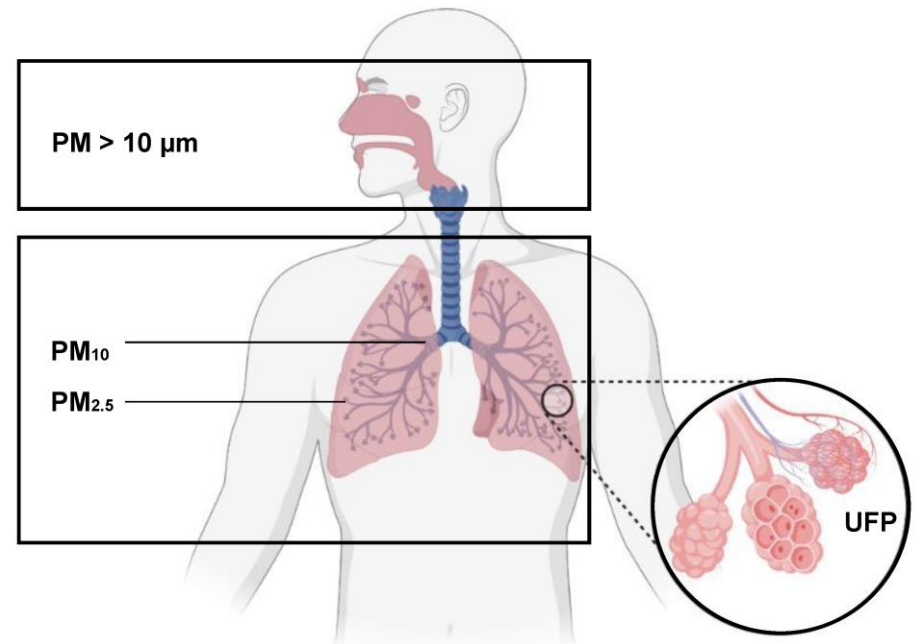
* **National Ambient Air Quality Standards**

** *An area meets the 24-hour PM10 standard if it does not exceed the 150 µg/m³ level more than once per year on average over a three-year period.*

Particle size explanation



Smaller particles can penetrate deeper into the lungs – these are focus of monitoring



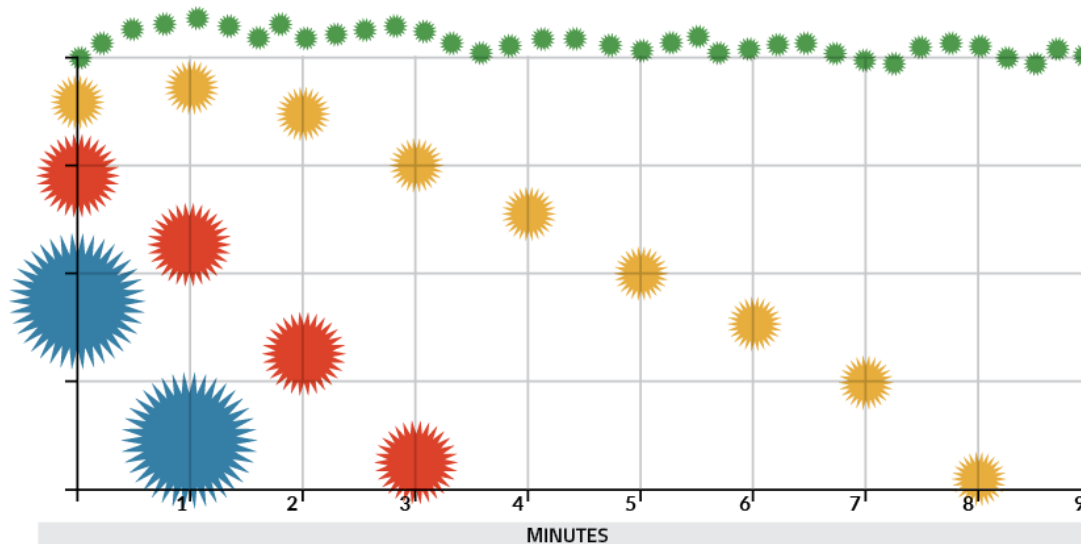


PORTS Particulate Monitoring

- NAAQS allows for short-term elevated air concentrations
- Maintains safety, allows necessary work to occur.

WHEN THE DUST SETTLES

Decommissioning
generates a range
of particle sizes



- $\leq 1 \mu\text{m}$ settles slowly, transports farther
- $< 5 \mu\text{m}$ settles in a few minutes
- $< 10 \mu\text{m}$ and
- $15 - 100 \mu\text{m}$ settle quickly

<https://www.proremodeler.com/dirt-dust-part-i>

Close-in and distant monitoring are used, for radioactivity and particulates

- Example from decommissioning at another DOE site→
- “Bullseye” pattern
 - Highest concentrations close-in to work
- At PORTS multiple movable monitors follow work activity
- Protecting public and environment (lower concentrations), may require longer sampling time and use of fixed monitor locations

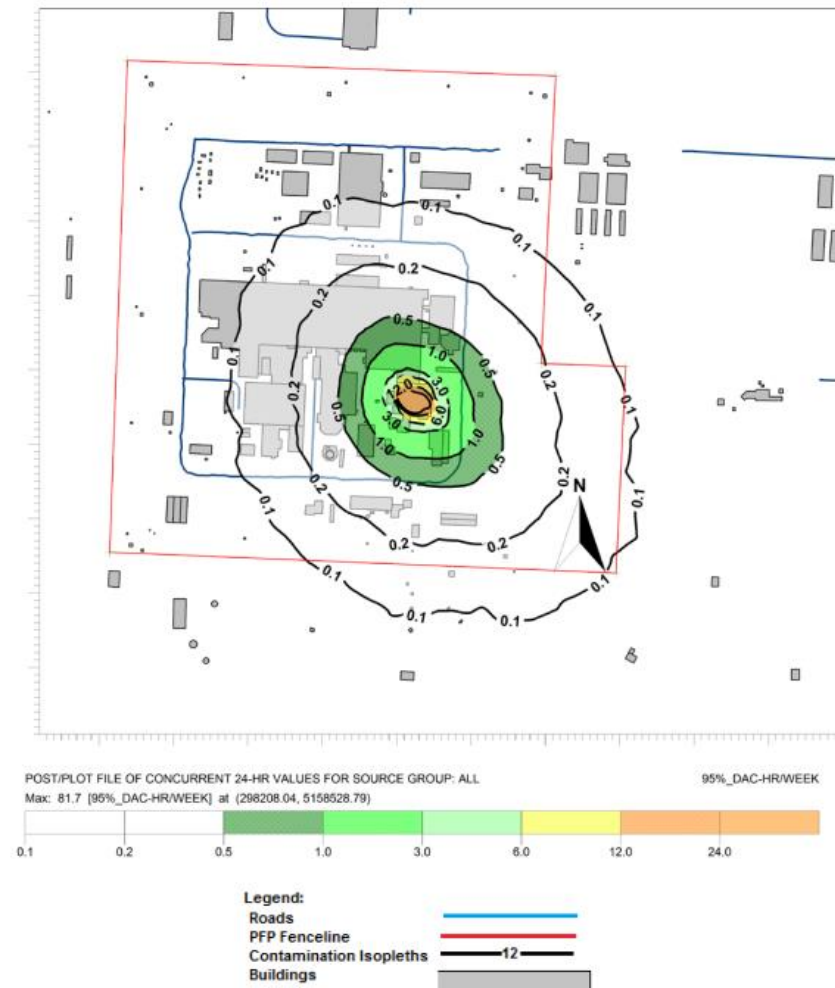


Figure S.2. Predicted Weekly Air Exposure (DAC-hr/week) 95th Percentile Values for 236Z Rubble Pile Removal for the 60-day Removal Option



Airborne Measurements

- Protect workers
- Monitors safety & compliance of demolition activities
- Protects the public and the environment
- Ensure decommissioning activities meet applicable standards (both on and offsite)
- Monitor
 - Airborne radioactivity for alpha and beta radiation, reported in DAC-hrs
 - Particulate matter reported for sizes PM10 and PM2.5



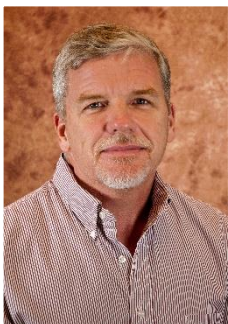
Summary

- Acceptable risk varies
 - Work
 - Play
 - General living
- The goal of remediation
 - Not to eliminate all risk from site
 - Reduces risk to acceptable level for workers, public and environment
 - Safety is always part of the consideration



X-326 Process Building Air Monitoring Data

October 2021



Frank Johnston

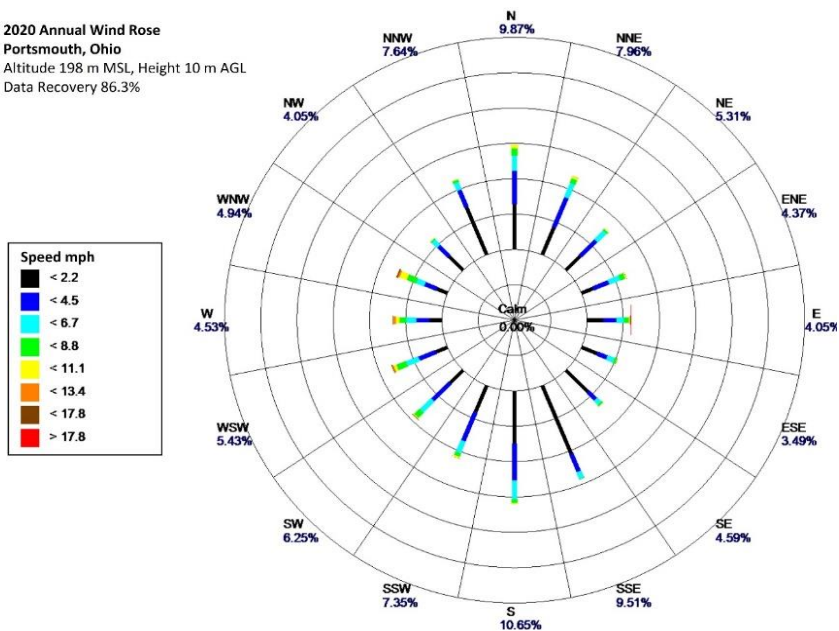
Director of Environmental Protection
Fluor-BWXT Portsmouth

Frank Johnston, Director of Environmental Protection, Fluor-BWXT Portsmouth



- 37 years experience
- Experienced in Environmental Management and Compliance:
 - Remedial Design/Remedial Action Implementation and Compliance
 - Environmental Management Systems
 - Environmental Permitting
- Experienced in the design, startup and operation of:
 - Remedial Response Actions
 - Air Emission Control Systems
 - Industrial and Municipal Wastewater Treatment Facilities
- B.S. Chemical Engineering
- Masters Business Administration

2020 Annual Wind Rose
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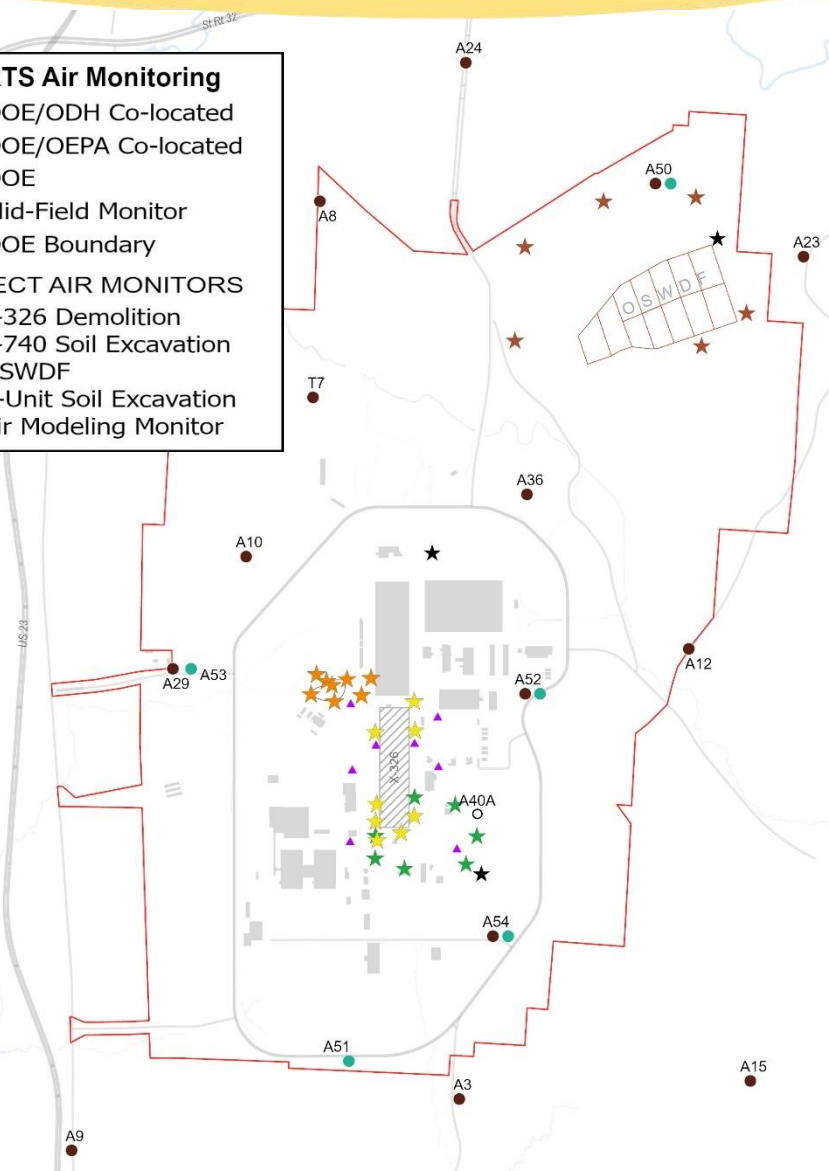
Using input from the community, DOE lessons learned, industry best practices, meteorological data, and air modeling, the Portsmouth site Air Monitoring Network represents a defense-in-depth approach to the protection of our workforce, our neighbors, and the environment. This approach provides a layering of air monitoring equipment from the project boundary to off-site locations.

PORTS Air Monitoring

- DOE/ODH Co-located
- DOE/OEPA Co-located
- DOE
- Mid-Field Monitor
- DOE Boundary

PROJECT AIR MONITORS

- X-326 Demolition
- X-740 Soil Excavation
- OSWDF
- 5-Unit Soil Excavation
- Air Modeling Monitor

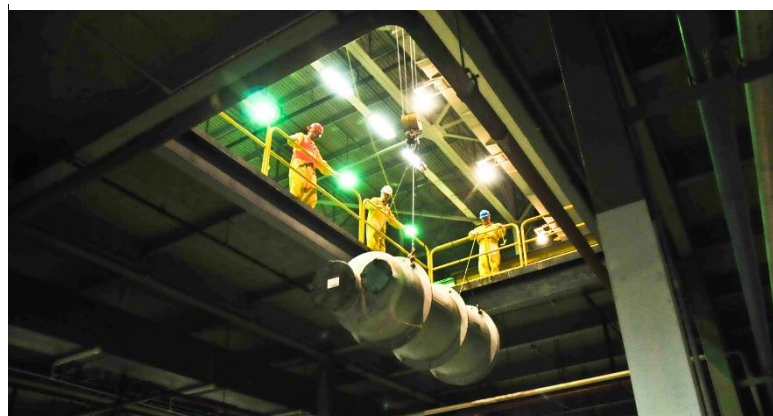


Identifying Contaminants of Concern for Air Modeling/Monitoring

The majority of the chemical and radiological hazards were removed during deactivation of the X-326 from 2011 – 2020. Some contaminants remain due to residual chemical contamination, residual radiological contamination, and contaminants associated with the building materials themselves.

The “Contaminants of Concern” were selected based on the operational history and materials of construction of the X-326 Process Building. The contaminants of concern being monitored include:

- Radiological contaminants (e.g. Uranium; Technetium)
- Non-Radiological contaminants (e.g. Metals, Asbestos, VOCs, PCBs)



Air Modeling Drives the Air Monitoring Program

- ✓ A comprehensive X-326 demolition air modeling effort was conducted during the demolition design process.
- ✓ The report was peer reviewed by an independent expert retained by FBP and by a separate independent expert retained by DOE.

Provides air emissions calculations and air dispersion modeling assessments to evaluate source-specific and cumulative impacts from activities planned

Demonstrating that D&D and all other site activities can be completed in compliance with Clean Air Act requirements and established emissions standards

Provided to Ohio EPA for their review and concurrence. Ohio EPA concurred with the modeling report on May 20, 2020.

This air modeling effort was used to establish appropriate locations for the Portsmouth Air Monitoring Network, parameters to be analyzed, and action levels employed during work.



X-326 Project Monitors

- 8 locations surrounding the X-326
- Monitoring for:
 - Real Time Alpha
 - Particulates
 - Metals
 - Poly Chlorinated Biphenyls (PCBs)
 - Asbestos
 - Radiological isotopes (RADs)
 - Volatile Organic Chemicals (VOCs)



Ohio EPA/DOE Co-Located

- 5 locations on site
- Monitoring for:
 - Particulate matter
 - VOCs
 - Metals
 - Asbestos
- Data is gathered, analyzed and validated independent of DOE



ODH/DOE Co-Located

- 18 locations on site and off site
- Monitoring for:
 - RADs
 - Fluoride
- Data is gathered, analyzed and validated independent of DOE





A daily “Go/No-Go” determination is made to ensure that there are always sufficient air monitors operational prior to work beginning.



Five radiological alpha/beta contamination monitoring at the project boundary (near-field locations)

- The real-time readings are monitored continuously by a radiological technician
- Visual and audible alarms if settings are exceeded

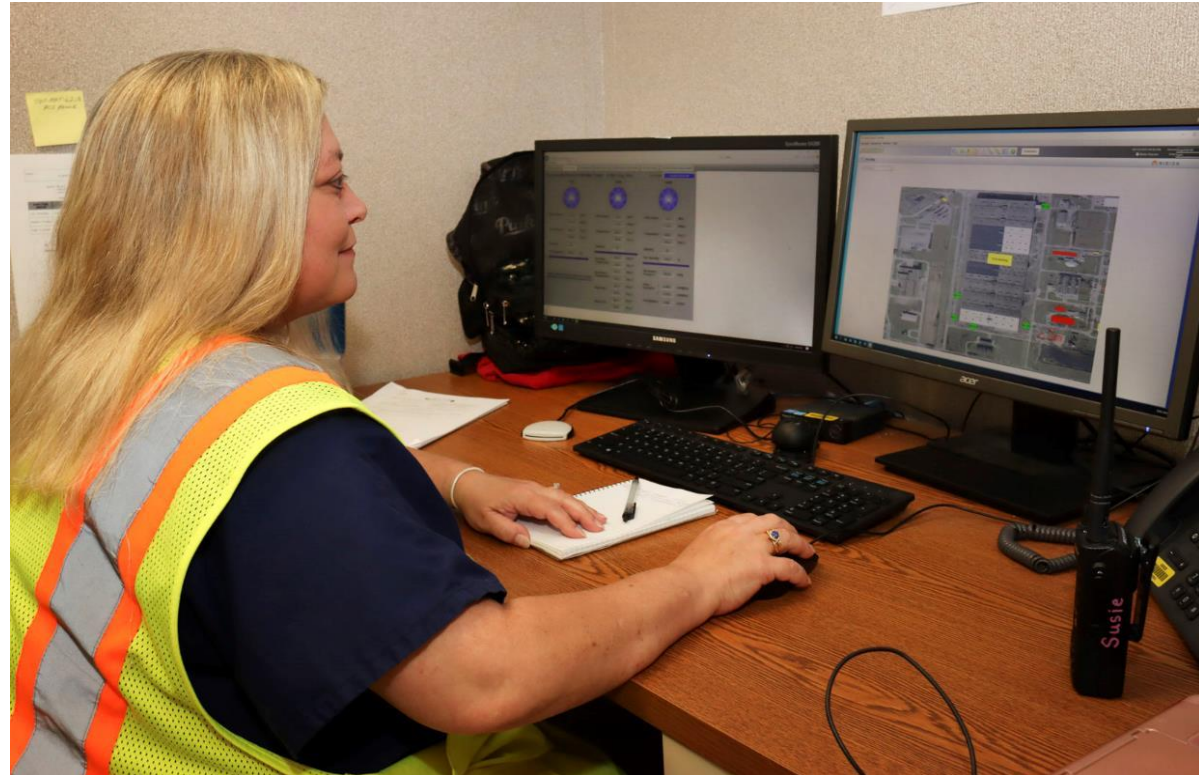


Particulate Matter (PM10 and PM2.5) at three project locations as well as all five of the DOE/Ohio EPA co-located monitoring stations

- Results reviewed daily by Project Management, Environmental Remediation and Environmental Protection
- Automatic e-mail alerts sent when thresholds are exceeded



- Real Time Monitoring provides the first line of defense.
- Thresholds are established such that if emissions at the project boundary meet established limits then assurance is provided that limits at the property boundary will be safe and compliant.
- Provides the ability to immediately react to field activity to adjust operations or apply additional controls.
- Weather conditions are also monitored real-time to ensure activities are conducted within acceptable conditions.



The air modeling was used to establish ***action levels*** at project locations to ensure the emission controls used are effective, help identify when additional controls are needed.

Action levels are applied at the **project boundary** to ensure that any emissions at the **property boundary** are safe.

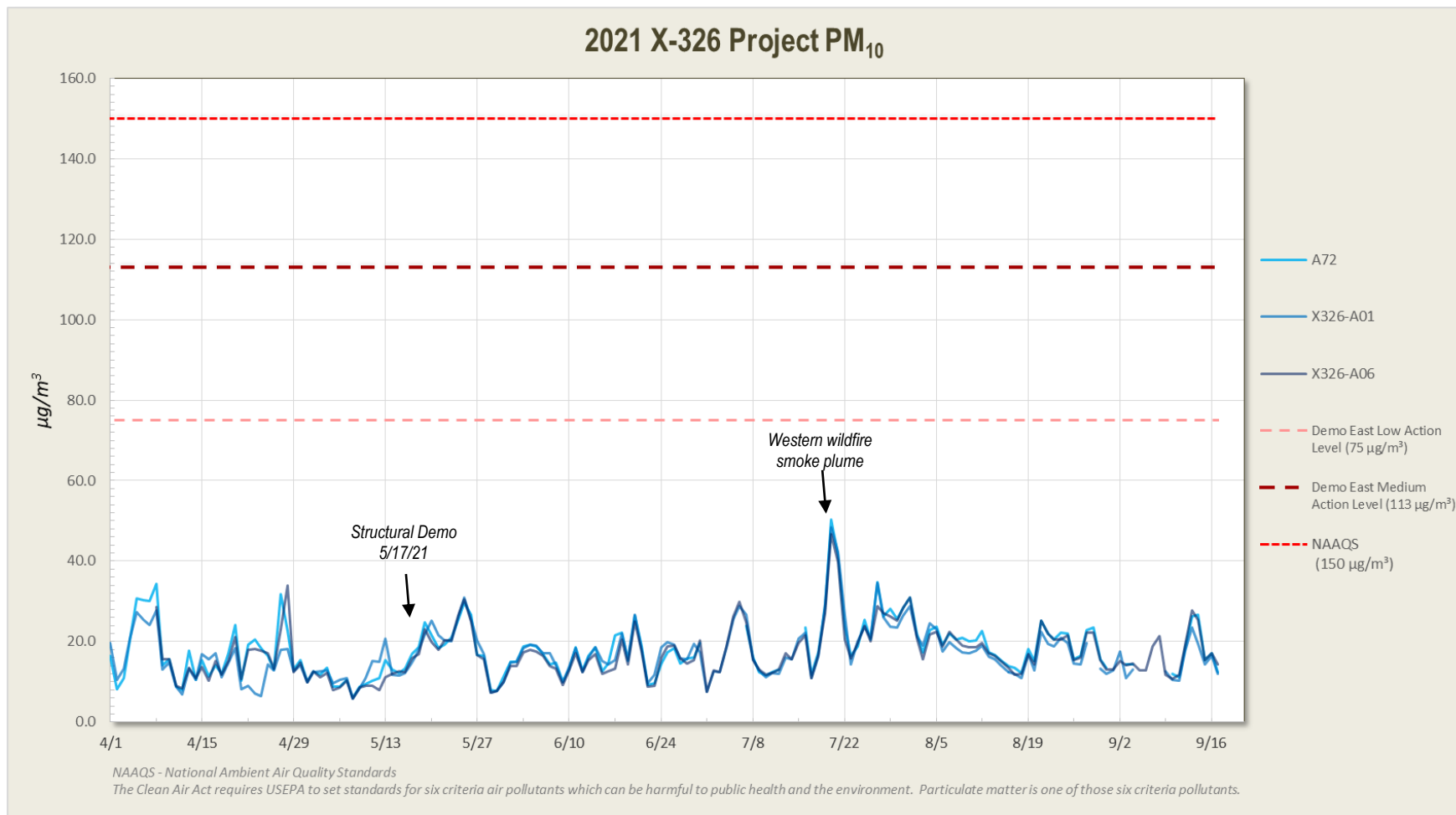
If a *low action level* is exceeded **Then** a project-level operational review will be conducted to identify opportunities for improvements.

If a *medium action level* is exceeded (75% of a regulatory standard) **Then** an operational review that includes project management, environmental protection, safety and quality assurance organizations will be conducted to identify and implement necessary operational improvements.

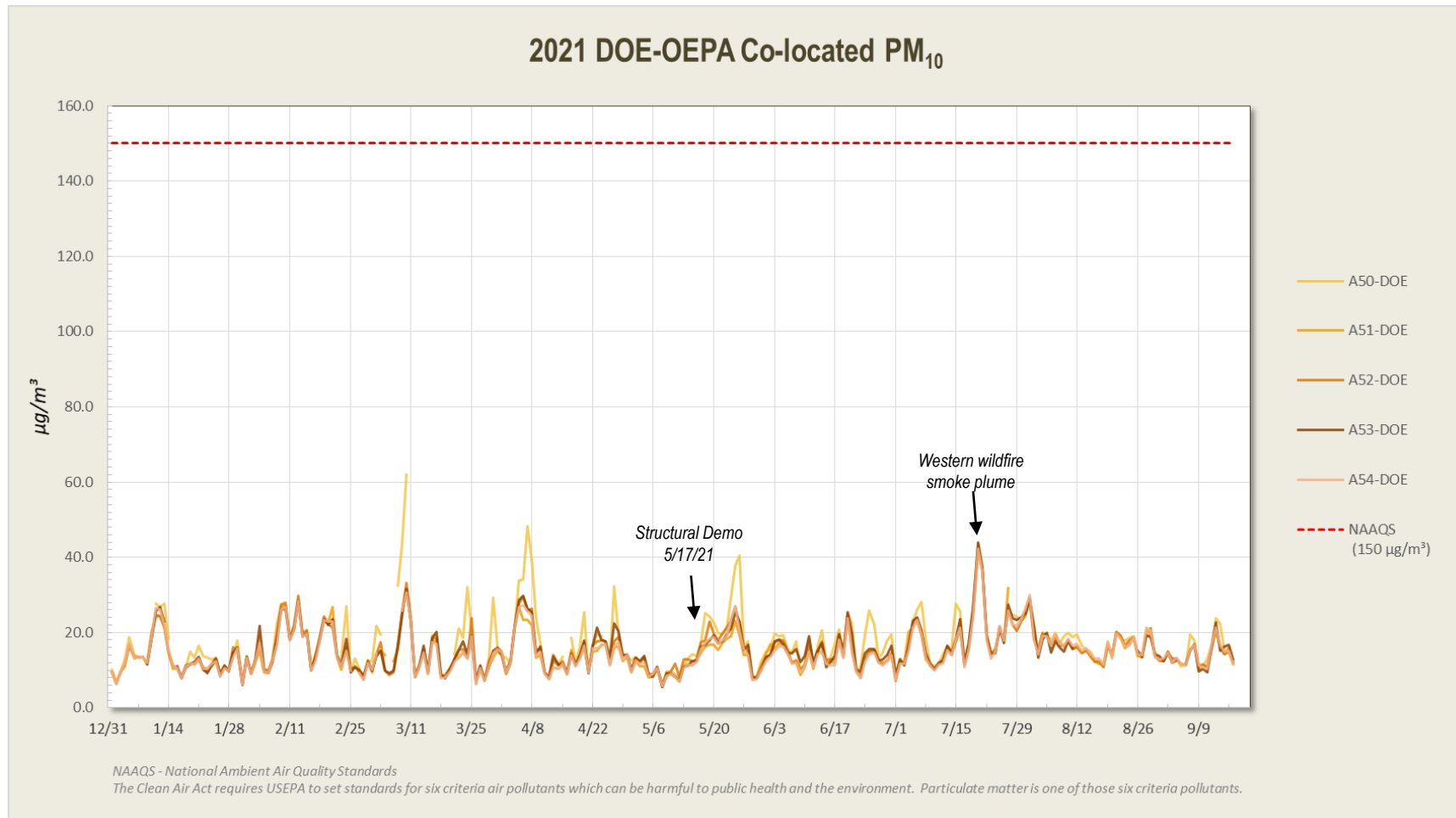
If a *high action level* is exceeded (100% of a regulatory standard) **Then** the project will **stop work** to identify, report*, and correct the causes immediately upon receipt of such data results

**Notification will be made to Ohio EPA and the community within 24 hours in the event that evaluation of project air monitoring data indicates that a high action level has been exceeded*

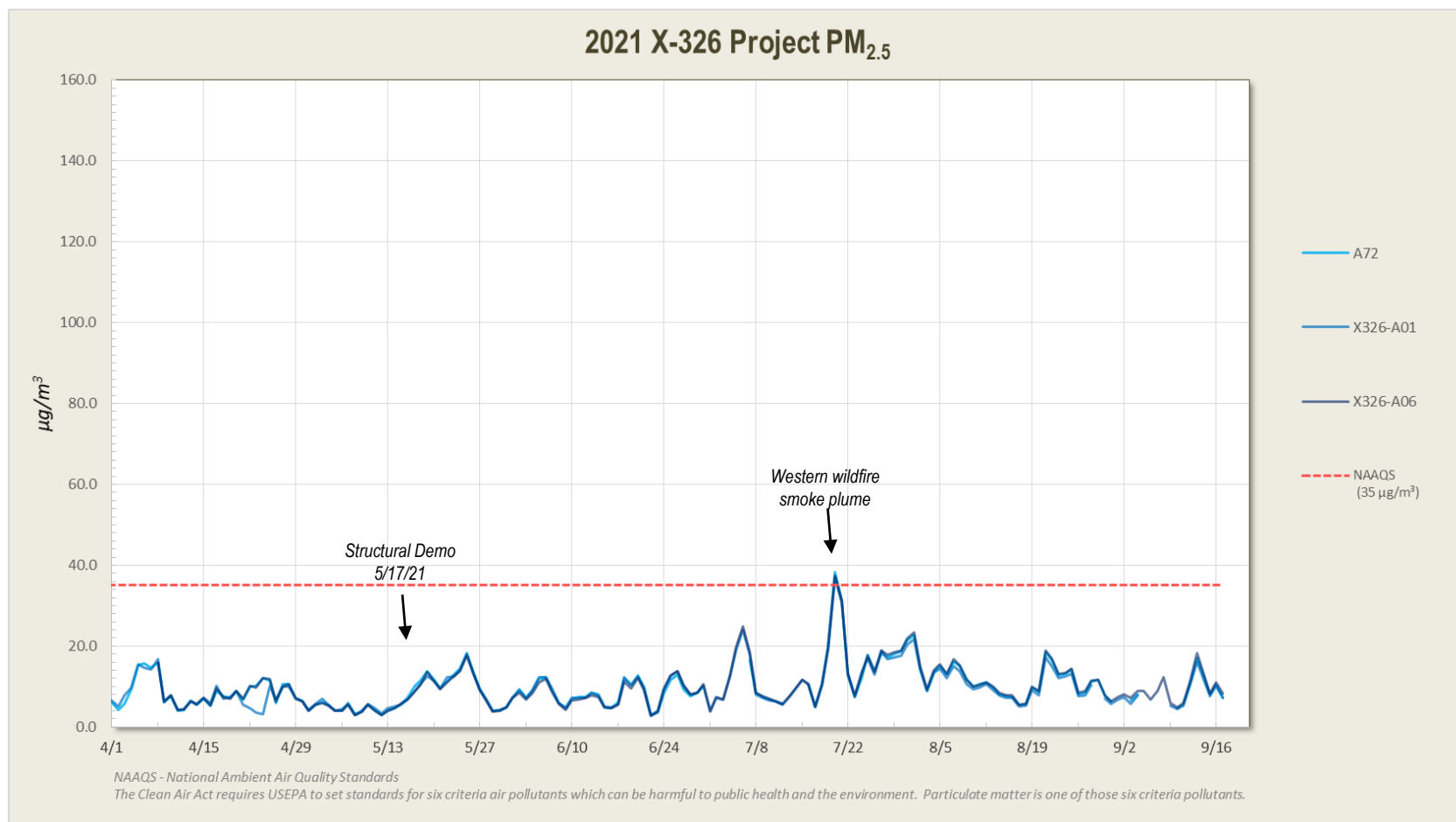
★ X-326 Demolition: Real Time Particulate Matter Air Monitors



DOE/OEPA Co-located: Real-Time Particulate Matter Air Monitors

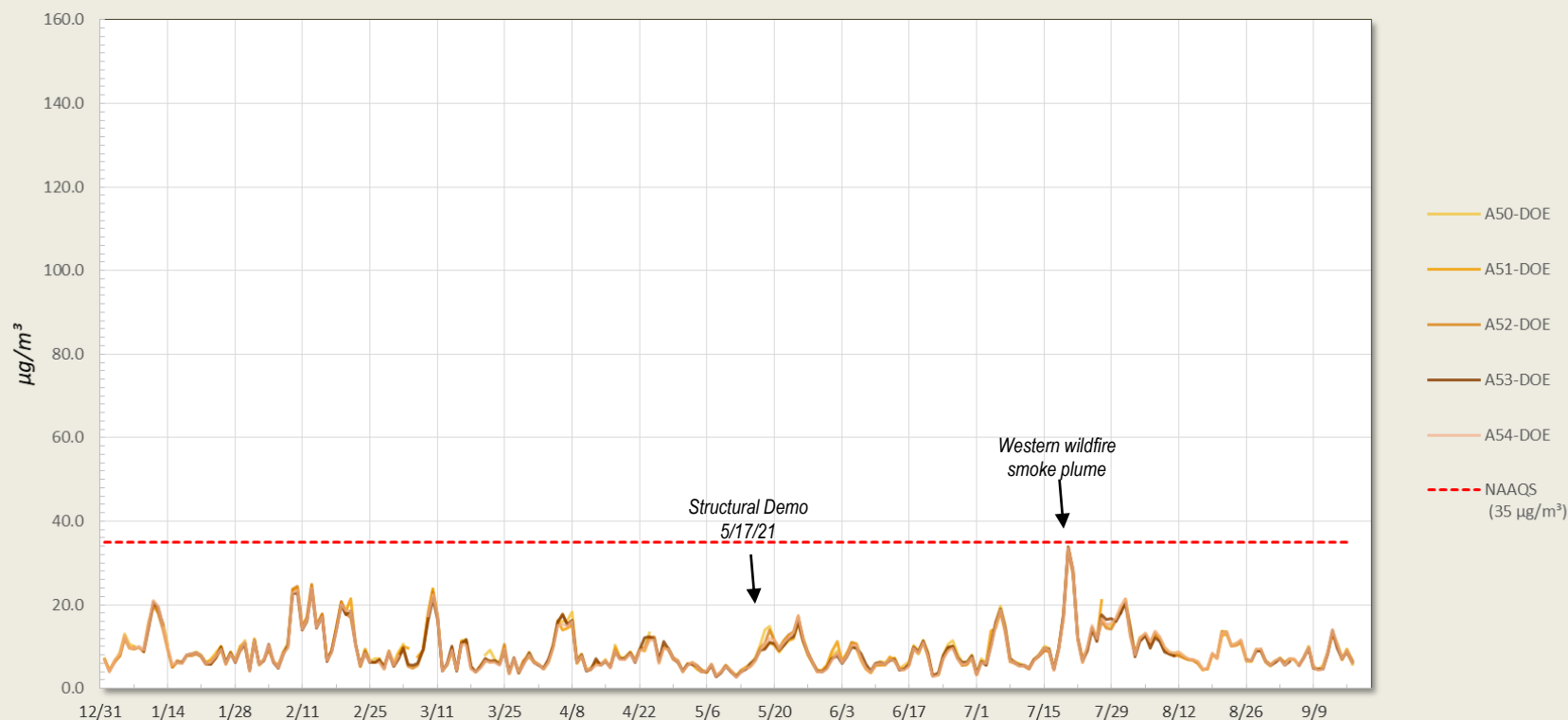


★ X-326 Demolition: Real Time Particulate Matter Air Monitors



DOE/OEPA Co-located: Real-Time Particulate Matter Air Monitors

2021 DOE-OEPA Co-located PM_{2.5}

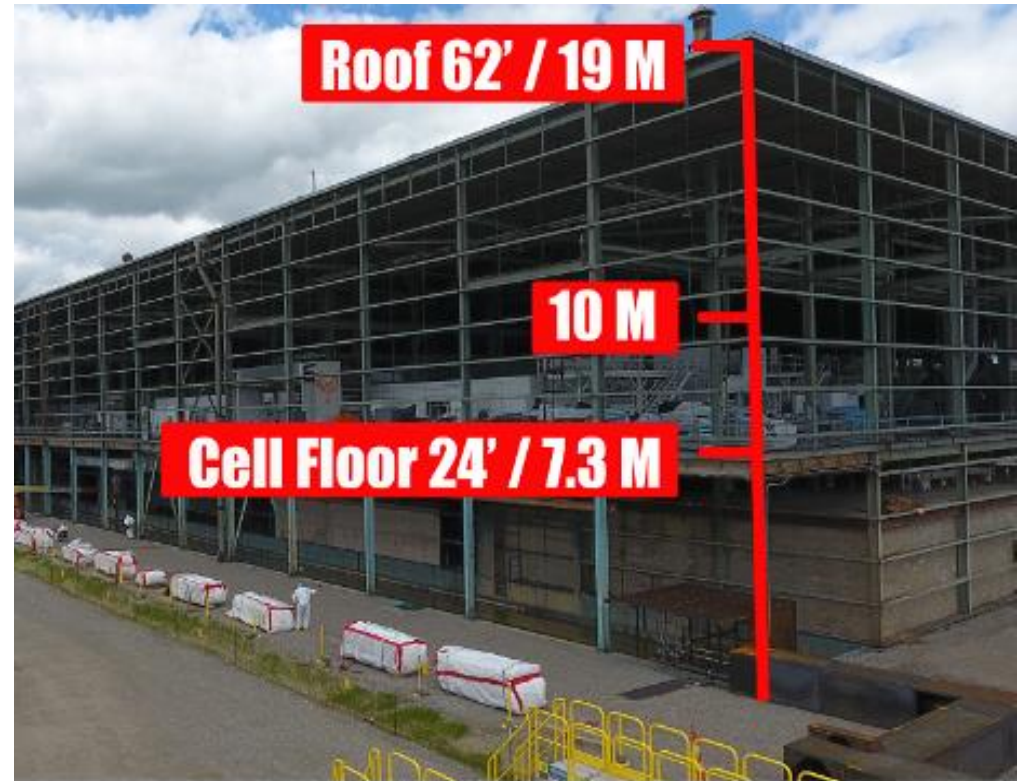


NAAQS - National Ambient Air Quality Standards

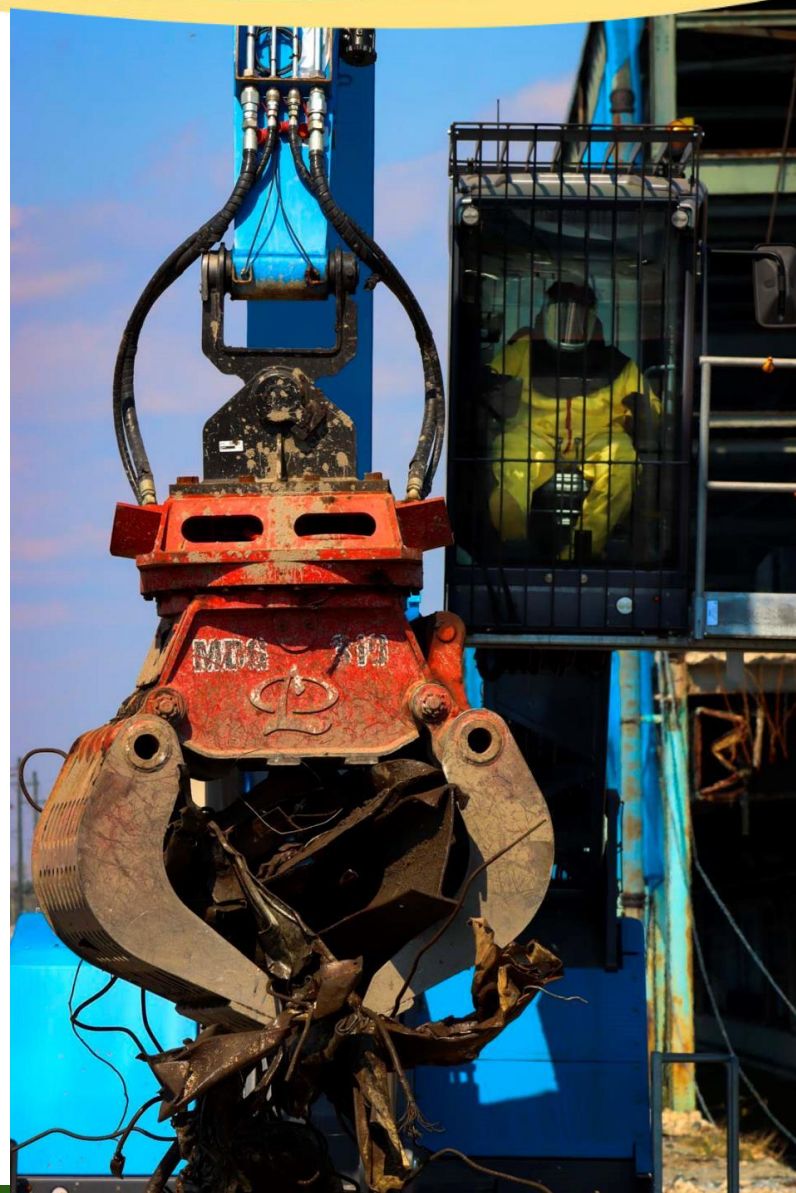
The Clean Air Act requires USEPA to set standards for six criteria air pollutants which can be harmful to public health and the environment. Particulate matter is one of those six criteria pollutants.

The iCAM alarm set point is set such that even if workers continued to work at that level their annual exposure would still be compliant.

- **If 0.8 DAC-hr is exceeded then** Project Management and Radiation Protection Supervisors are contacted for information/direction.
- **If 2.0 DAC-hr is exceeded then** work is stopped.
- **In addition, if** sustained winds above 15 miles per hour at a height of 10 meters **then** work is stopped.

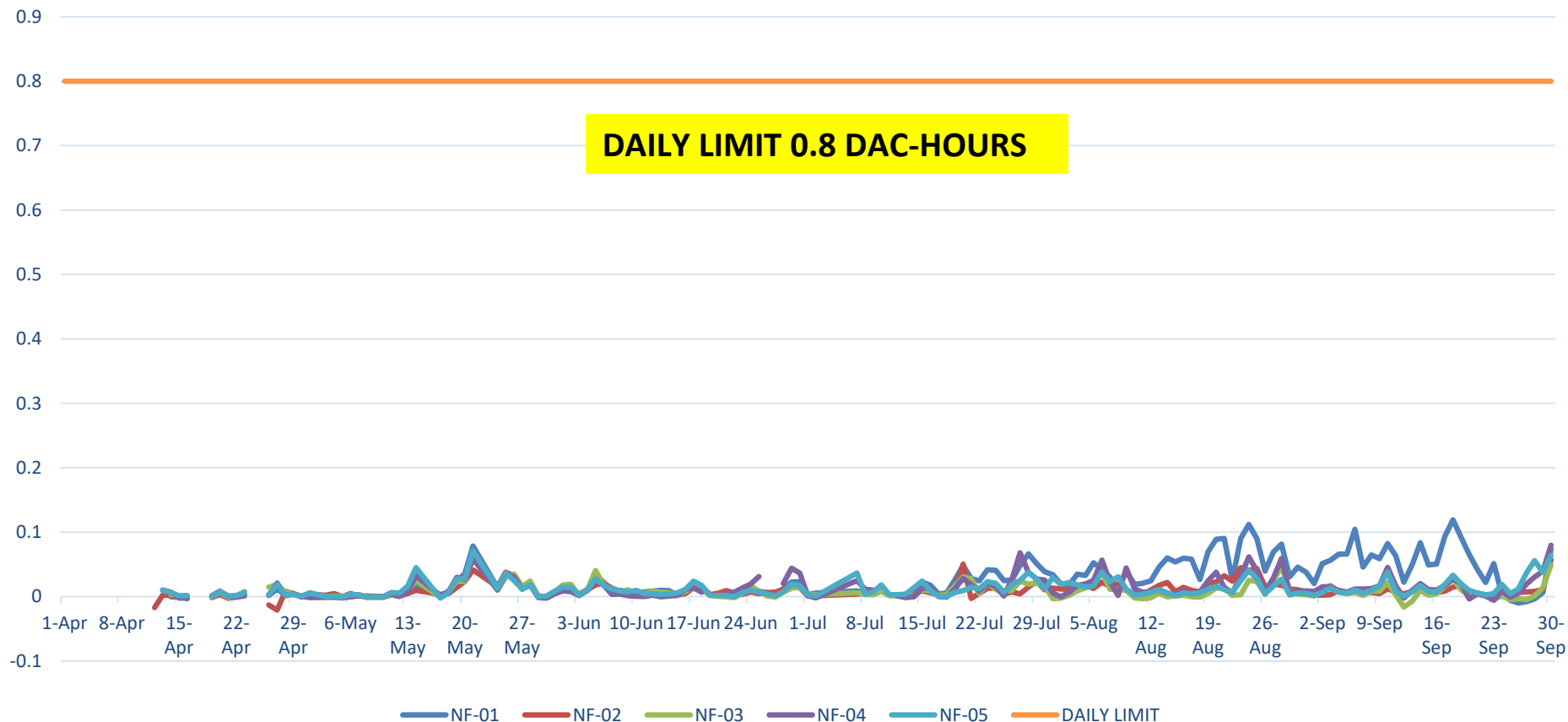


- The actual measurements of alpha contamination have been far below this standard and represent an exceedingly small impact at the property boundary recognizing emissions will diminish from the project boundary to the property boundary.
- These real-time data are supplemented with specific sampling (retrospective) for individual radiological isotopes.





X-326 Demolition: Real Time iCAM Average Daily Alpha DAC-HRS



- ✓ PM data recorded to date indicate good control of fugitive dust; Application of water misting and fixative application are proving to be effective.
- ✓ Radiological releases as measured by real-time alpha/beta measurements indicate the controls instituted are protective of workers and the public.



PPPO Portsmouth | X-326 Demolition ▾ Safety Approach ▾ Data ▾ Contact Us ▾

Data Education

The safety of our workers, our community and the environment is DOE's top priority. DOE and contractors work hard to make sure communities near our facilities maintain a safe and healthy environment. To do this, the Department has a robust environmental monitoring program that meets or exceeds state and national regulatory standards.

WHAT IS ENVIRONMENTAL MONITORING?

Environmental monitoring is a system of monitors that sample at regular times. The samples are then analyzed at a laboratory and assessed to see if site activities have any impact on the public or the environment.

Environmental Monitoring at the Portsmouth site

At DOE's Portsmouth site, years of environmental studies conducted on and around the site revealed what type of contaminants were associated with uranium enrichment operations. Scientists, health officials, and risk professionals created a plan to monitor for those contaminants to maintain the safety of workers, the public and the environment.

At Portsmouth, DOE has installed an extensive monitoring program that samples for radiological and chemical contaminants in air, water, soil, sediment, and biota (animals, vegetation, crops) on and near the plant site. Each year, DOE collects, reviews and reports on more than 10,000 environmental samples. The Annual Site Environmental Report (ASER) is published each year to report the results of these monitoring efforts. Copies of the ASER are available [here](#).

- www.portsdemo.com is a new DOE website focusing on X-326 project air monitoring data
- Website will include:
 - Updated real time and co-located monitoring data
 - Project updates
 - Frequently Asked Questions



How to have your voice heard

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WebEx



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