Welcome

Tonight's Agenda

- Air Monitoring & Managing Risk
- Portsmouth Site Update
- Co-located Air Monitoring Data
- Public Comments/Questions

Public Engagement

How to have your voice heard

- Email: ports-demo-questions@pppo.gov
- Add a question via the chat on YouTube
- Add a question via the chat on Microsoft Teams
- Participate in the public comment session

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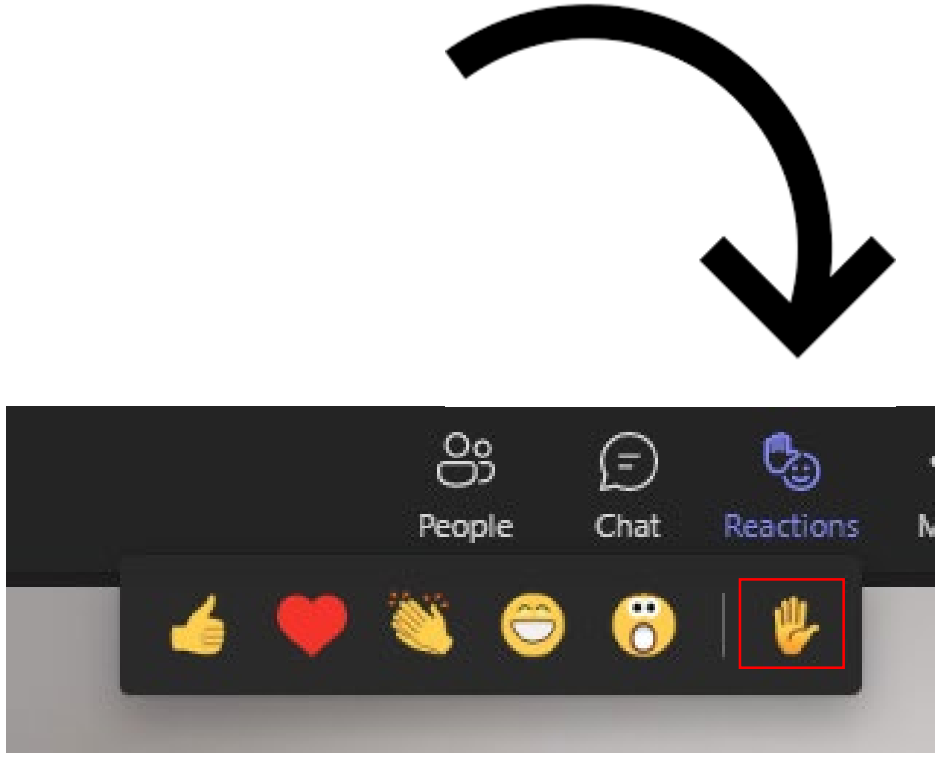
Public Comment Protocols

- Raise your hand to be identified
- Be courteous and respectful
- Keep comments to 3-4 minutes to allow all participants a chance to speak. Comments can also be submitted in writing
- To reduce background noise, speakers will be unmuted during their public comment and then returned to mute afterwards



Air Monitoring & Managing Risk

Kathryn Higley, PhD, CHP, HPS Fellow

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 is the Interim Director of the Center for Quantitative Life Sciences. 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. 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.

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Employment

Home Life

Risk Varies

Recreation

Safety regulations vary, based on type of activity

Close-in *and* distant monitoring are used, for radioactivity and airborne releases

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

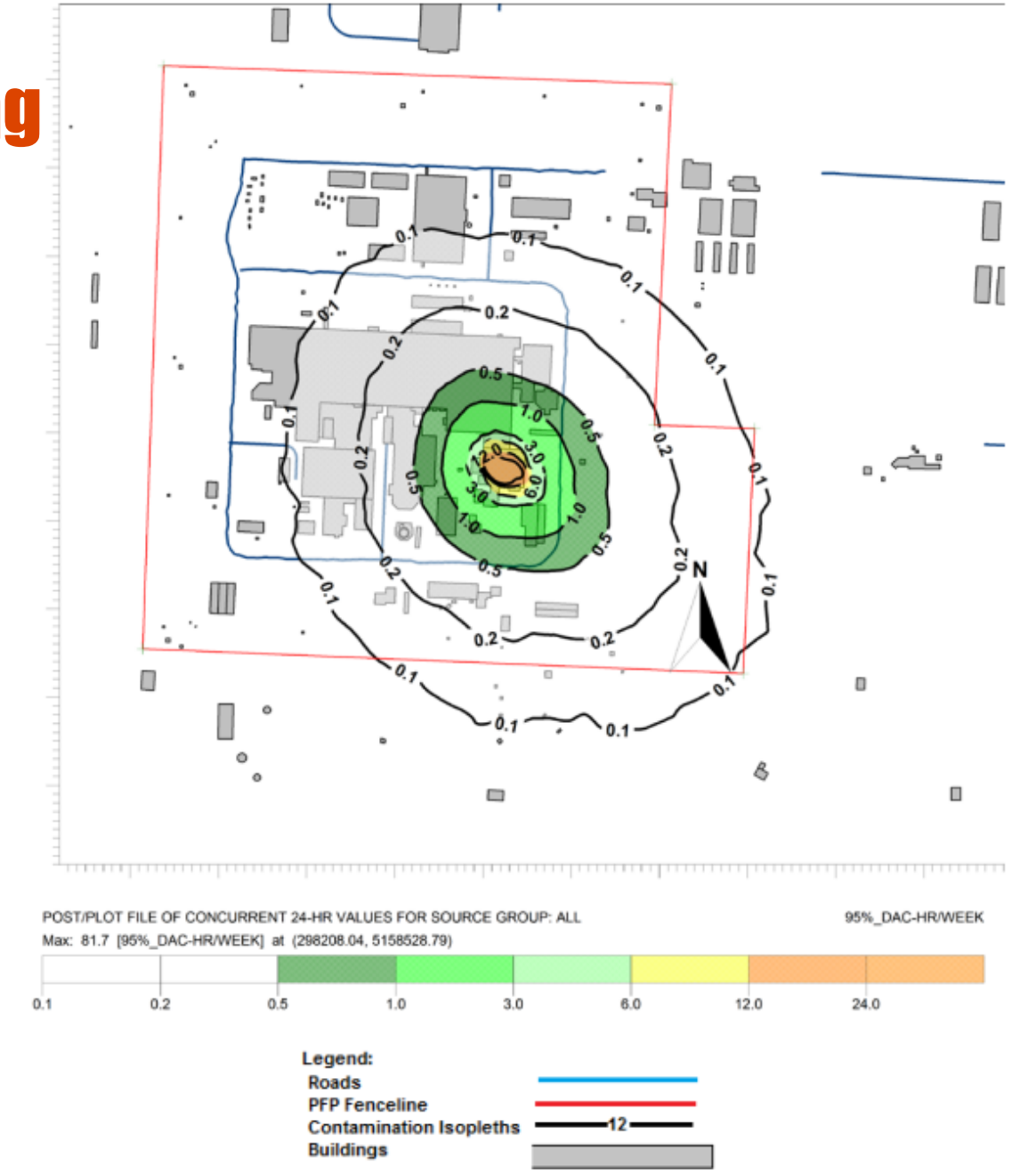

Figure S.2. Predicted Weekly Air Exposure (DAC-hr/week) 95th Percentile Values for 236Z Rubble Pile Removal for the 60-day Removal Option

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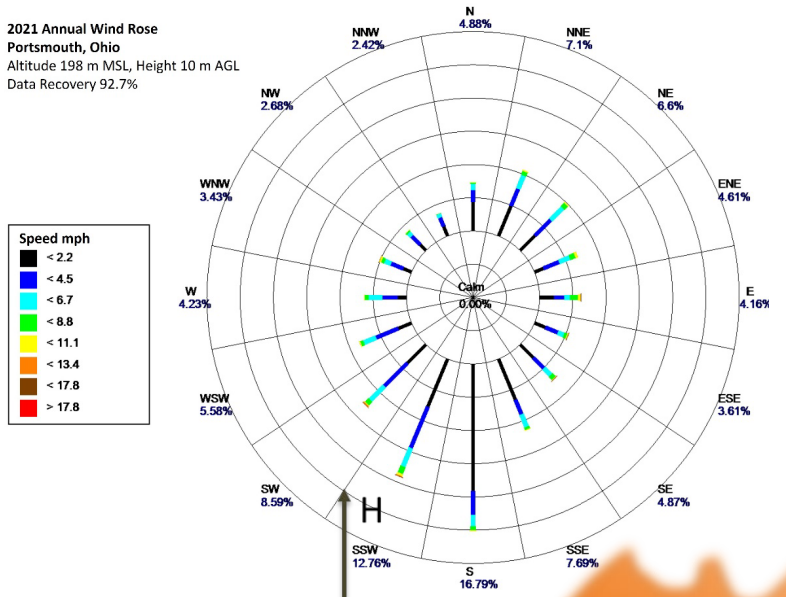
Placing air monitors

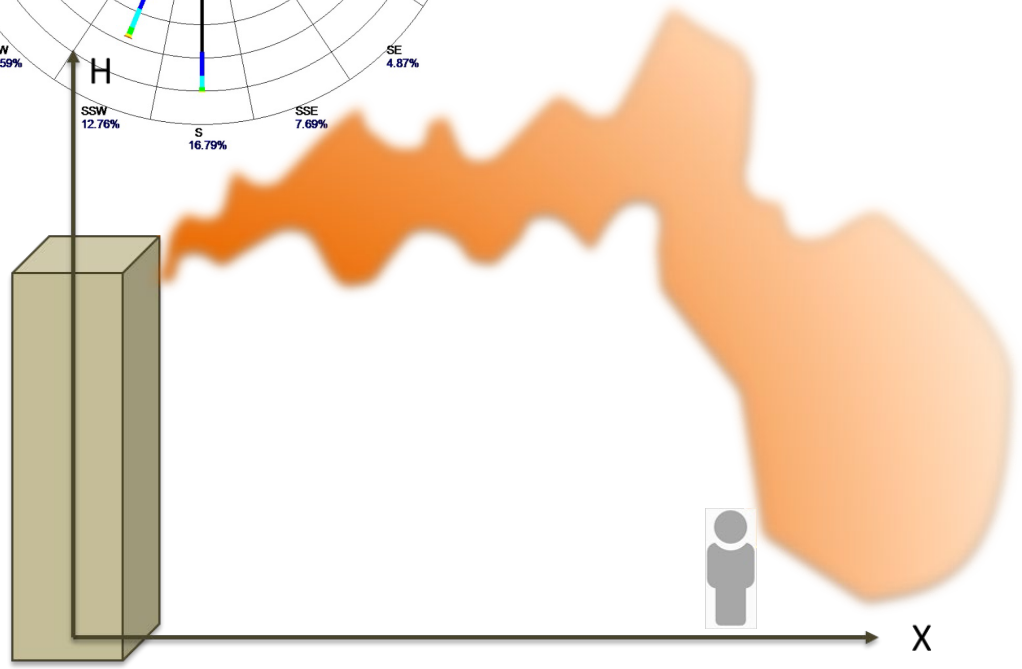
→ Windrose shows most common directions and wind speeds

→ How far from the release should monitors be located?

– Computer models predict locations

– Sampling locations assess and confirm





Ground level concentration at point x

Exposure Times & Limits

- Occupational:
  - 40+ hour per week exposure
  - Age ~ 18 – 70 years
- Public:
  - Assume up to 24-hour continuous exposure
  - All ages and includes at risk or sensitive groups (very young or very old)
- Result:
  - Different exposure limits for each group
  - Public limits lower (10% to 0.2%)

What's being sampled

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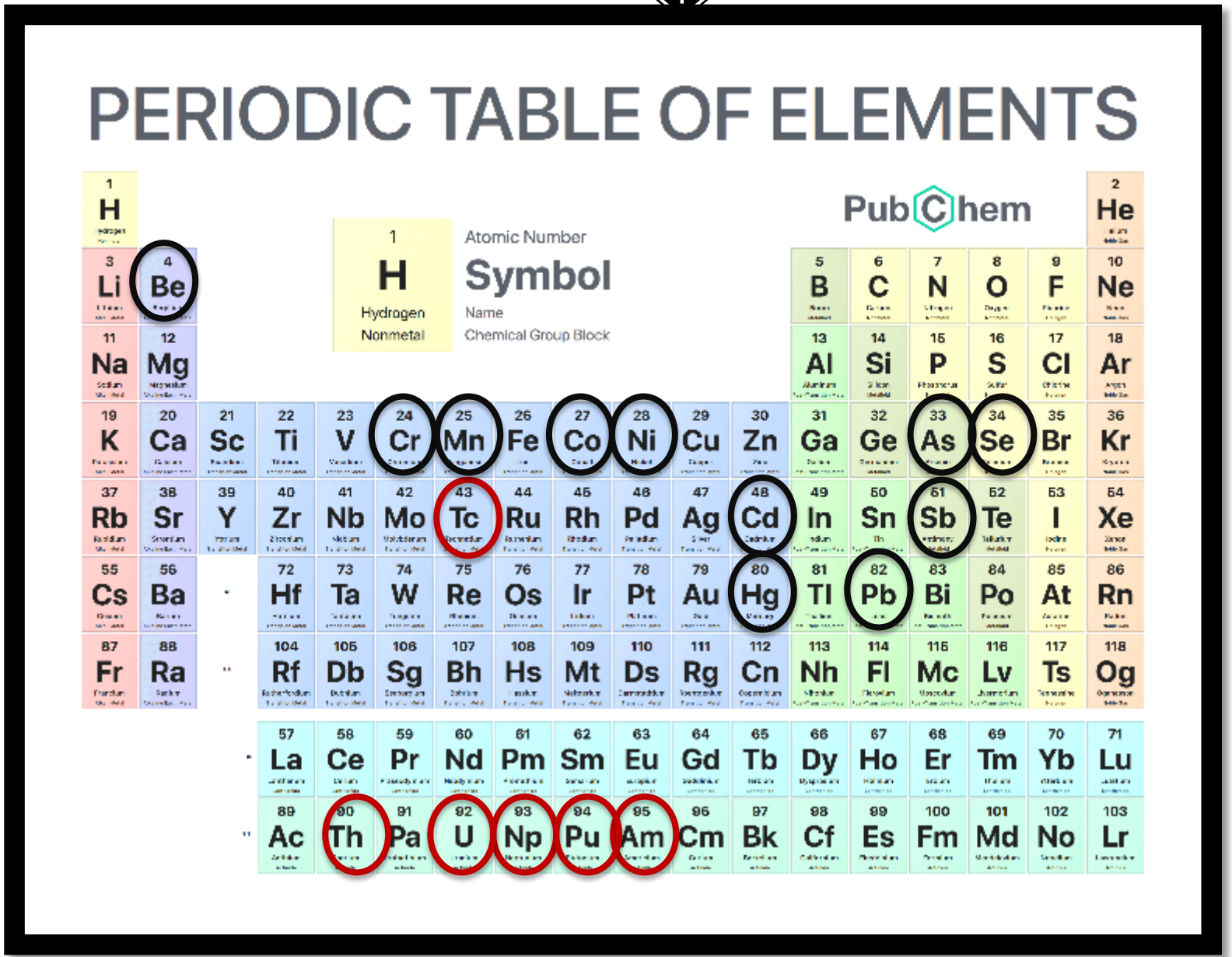
Metals	Radionuclides
Antimony	Americium-241
Arsenic	Neptunium-237
Beryllium	Plutonium-238
Cadmium	Plutonium-239/240
Chromium	Thorium-228
Cobalt	Thorium-230
Lead	Thorium-232
Manganese	Total Uranium
Mercury	Uranium-233/234
Nickel	Uranium-235/236
Selenium	Uranium-238
	Technetium-99

Asbestos

Volatile organic compounds



Potential Sources

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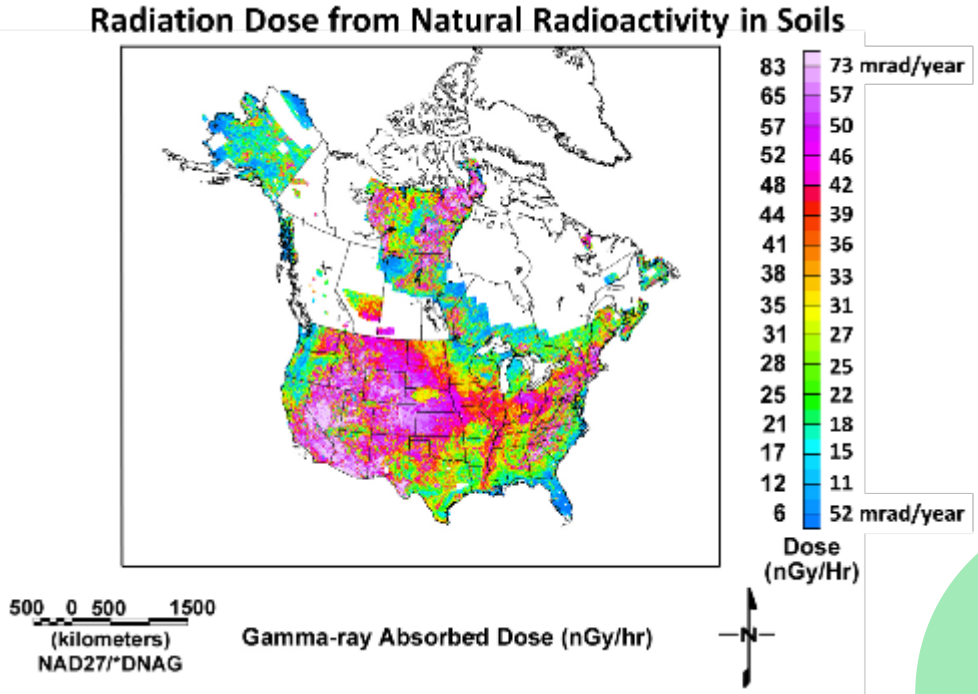
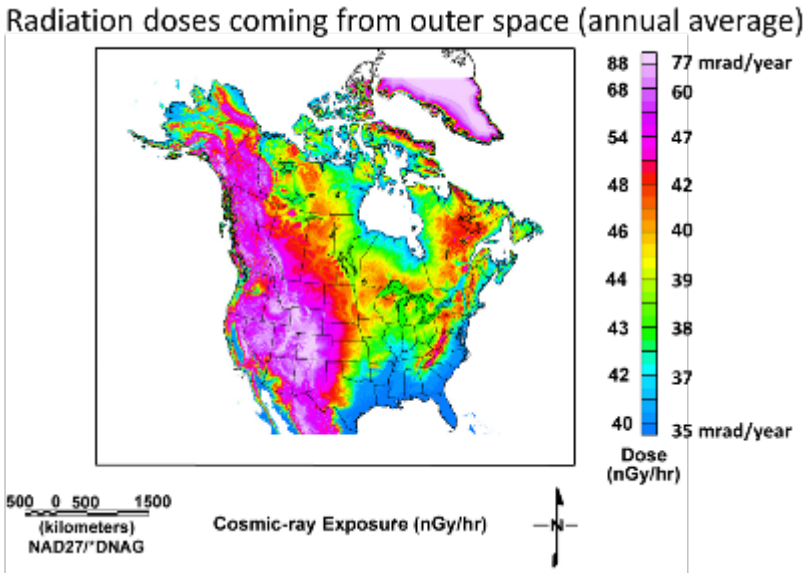
- Metals
  - Geochemical (natural)
  - Human caused: electronics, coal plants, vehicle exhaust
- Radionuclides
  - Uranium (natural, mining, fertilizers, nuclear…)
  - Technetium (fallout, nuclear)
- Other
  - Asbestos (natural and technology)
  - Volatile organics (autos, factories, fires..)

Radiation Sources & Doses for the Public



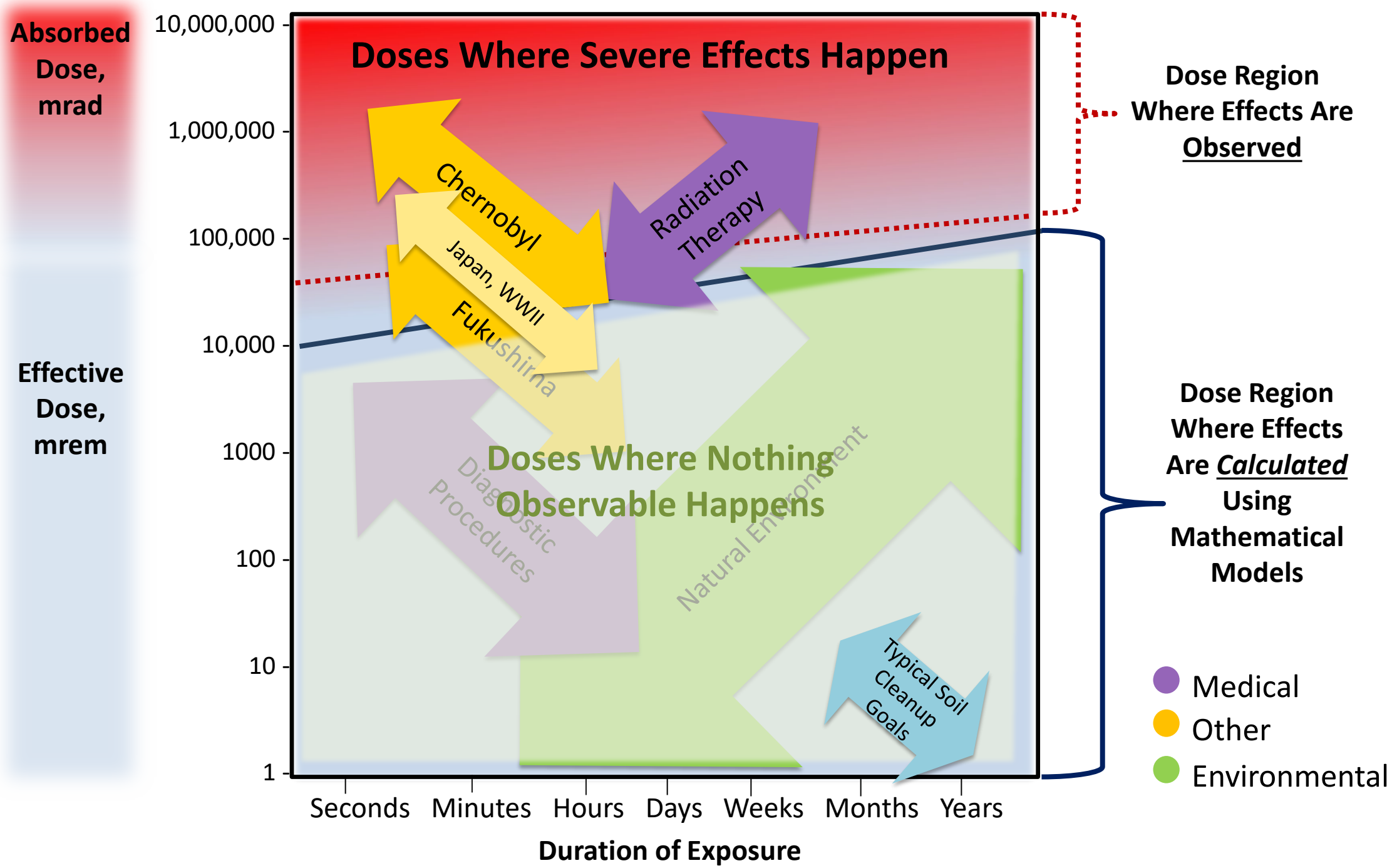


Natural ~ 300 mrem/yr

Background: ~ 600 mrem/yr

Medical ~ 300 mrem/yr

PORTS public dose ~ 1 mrem/yr


Absorbed Dose, mrad
Effective Dose, mrem
10,000,000
1,000,000
100,000
10,000
1000
100
10
1
Doses Where Severe Effects Happen
Chernobyl
Japan, WWII
Fukushima
Radiation Therapy
Doses Where Nothing Observable Happens
Diagnostic Procedures
Natural Environment
Typical Soil Cleanup Goals
Dose Region Where Effects Are Observed
Dose Region Where Effects Are Calculated Using Mathematical Models
Medical
Other
Environmental
Seconds
Minutes
Hours
Days
Weeks
Months
Years
Duration of Exposure

How to Achieve this Endpoint

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The requirements

- Protect workers
- Protect the public
- Protect the environment

The process

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

Summary

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- Acceptable / regulated 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

- Thank you!

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Portsmouth Site Update

Jeremy Davis, Acting Portsmouth Site Lead

- 20 years of experience in the nuclear industry
- Life-long resident of Pike County
- B.S. Natural Sciences of Biology, Chemistry and Geology
- Experience:
  - Project Management
  - Environmental Compliance
  - Hazardous Waste Management
  - Environmental Program Integration and Facility Oversight
- Certified Hazardous Material Manager and Project Management Professional

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Portsmouth Site History

- 3,700-acre federal site
- Uranium enrichment operations started in 1954
- DOE cleanup mission began in 1989
- Full-scale D&D began in 2010

COLD WAR
1954-1989

- Nuclear Defense

POST COLD WAR
1989-2001

- Commercial Nuclear Power
- Environmental Cleanup

CLEANUP
2001-Current

- Environmental Cleanup
- Decontamination & Decommissioning
- Property Transfer & Reuse

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Portsmouth Ten Year Deactivation, Demolition and Cleanup Focus

- Complete deactivation and demolition of X-326, X-333 and X-330 Process Buildings
- Complete construction of On Site Waste Disposal Facility (OSWDF) cells to support disposal of demolition debris
- Excavate landfills and plumes within Perimeter Road for OSWDF fill and provide contiguous land for future economic development
- Transfer land to the Southern Ohio Diversification Initiative (SODI) for reuse

Demolition Safety Planning

- A safe and methodical demolition plan, approved by Ohio EPA
- 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
- Protective measures to minimize disturbance of any residual radiological or chemical contaminants during demolition
- Robust environmental monitoring program

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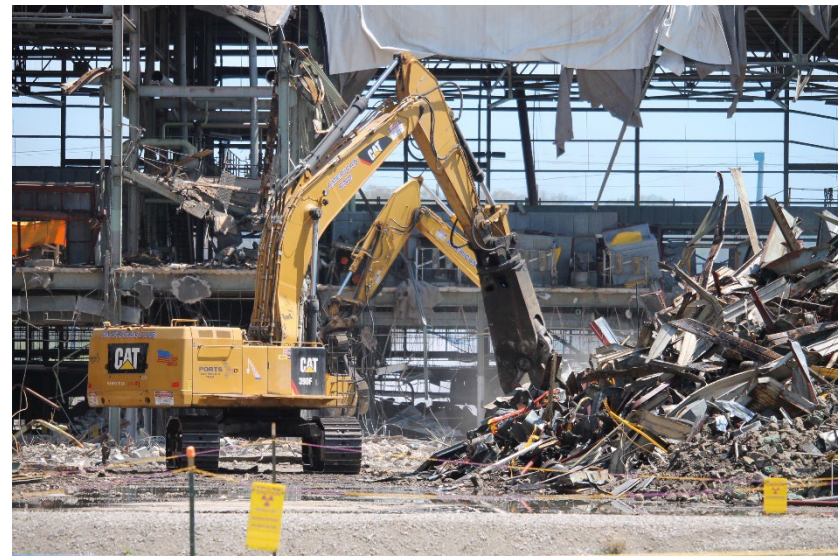
X-326 Process Building Demolition and Cleanup

- Demolition began in May 2021
- Structural demolition completed June 10, 2022
- Debris generated ~135,000 cubic yards of debris, which is being size reduced and sent to the OSWDF for disposal



Contaminated Plume Excavation

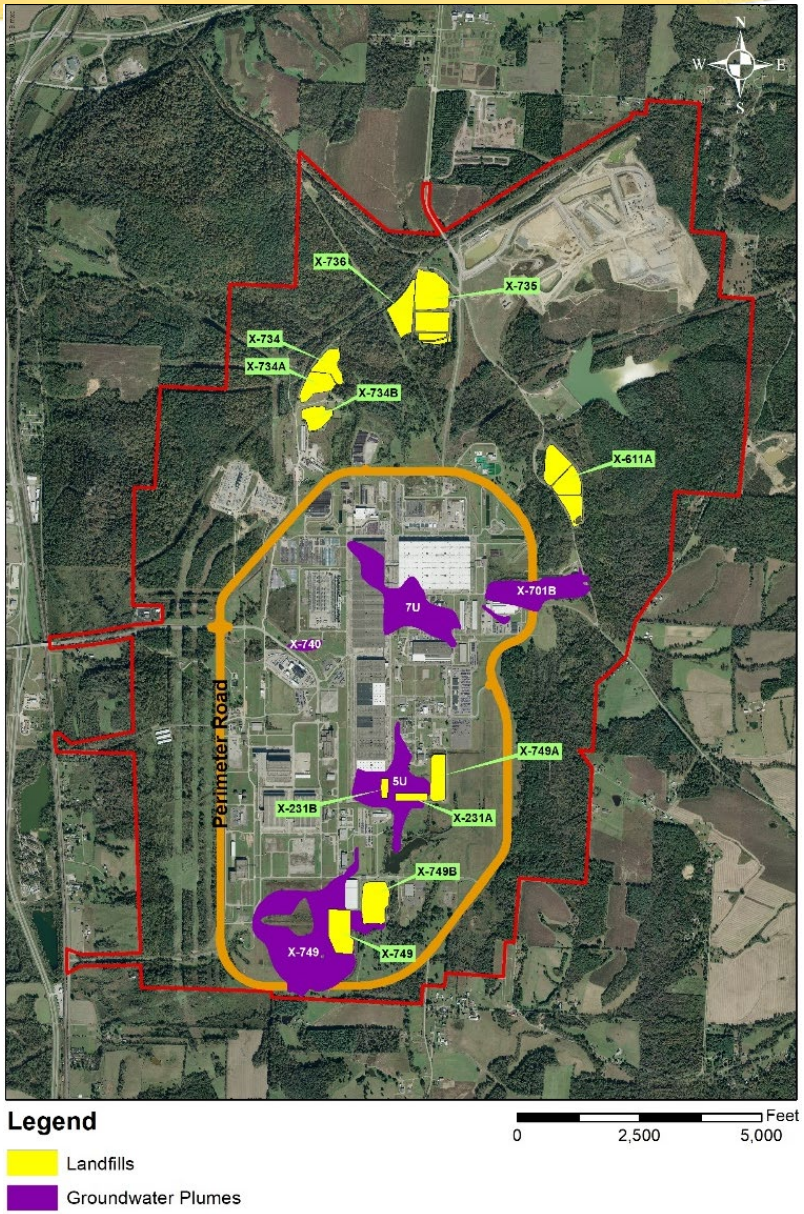
- Provides compaction fill for debris disposal at OSWDF
- Leaves behind more acreage for site redevelopment

X-740 Plume Excavation

- Excavation complete
- Delivered 40,000 cubic yards of soil/fill to the OSWDF

X-231B Plume Excavation

- In progress
- Excavation anticipated to be complete Summer 2022



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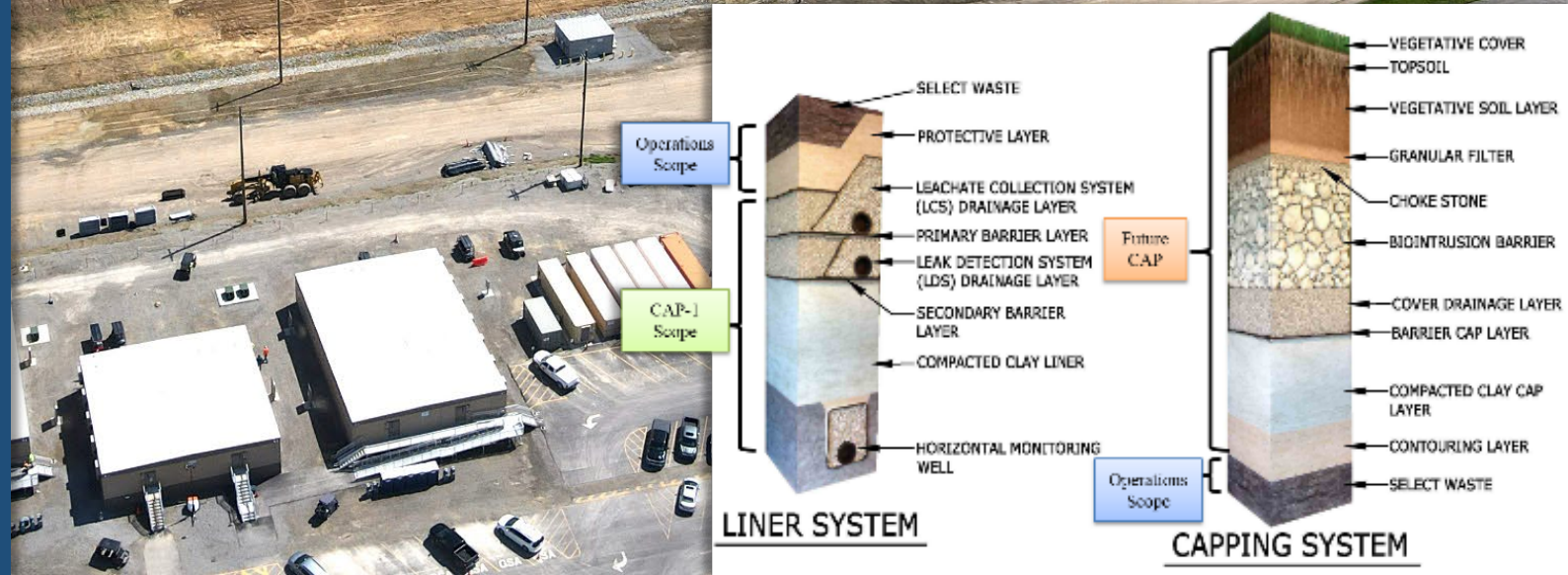
On-Site Waste Disposal Facility

- The **OSWDF** is a specially engineered disposal site with a multi-layer liner and cap system designed to consolidate demolition debris and rubble into one centralized confined space that protects public health and the environment
- Accommodates more than 5M cubic yards of waste and engineered fill
- Divided into individual cells (12). One process building takes up approximately 3 cells



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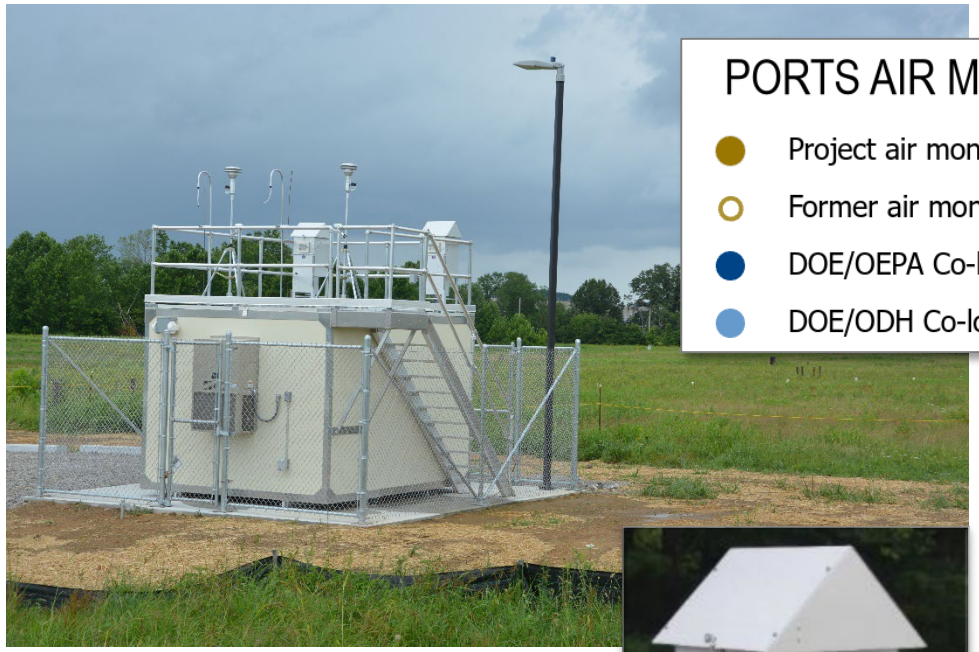
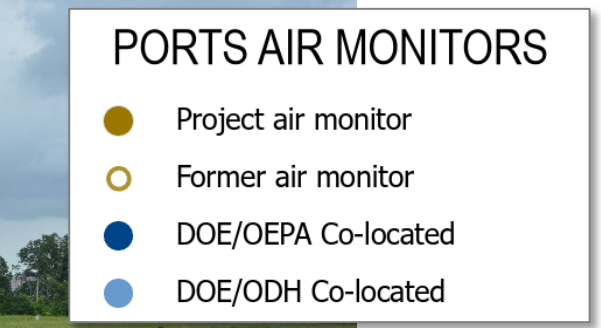
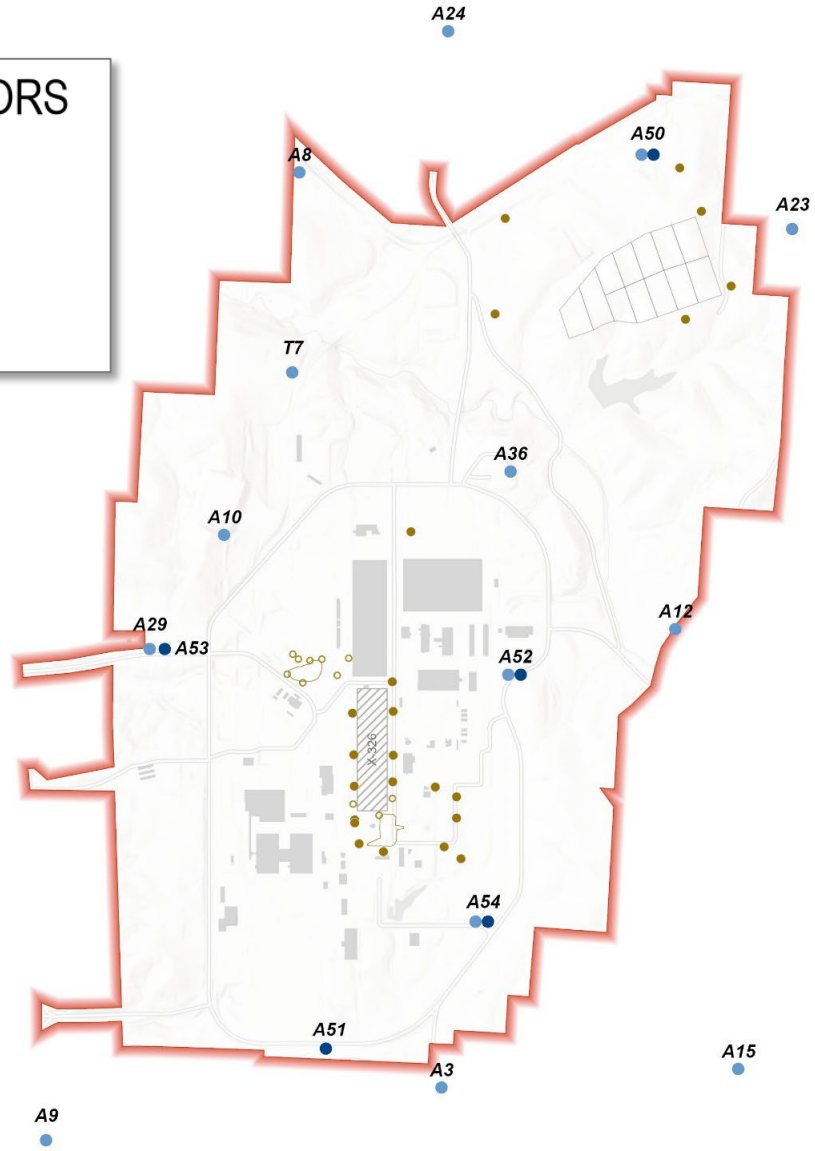
Real-Time Air Monitoring

- 180 air monitors located on and off site to ensure that the project maintains control of dust generated during demolition and disposal activities





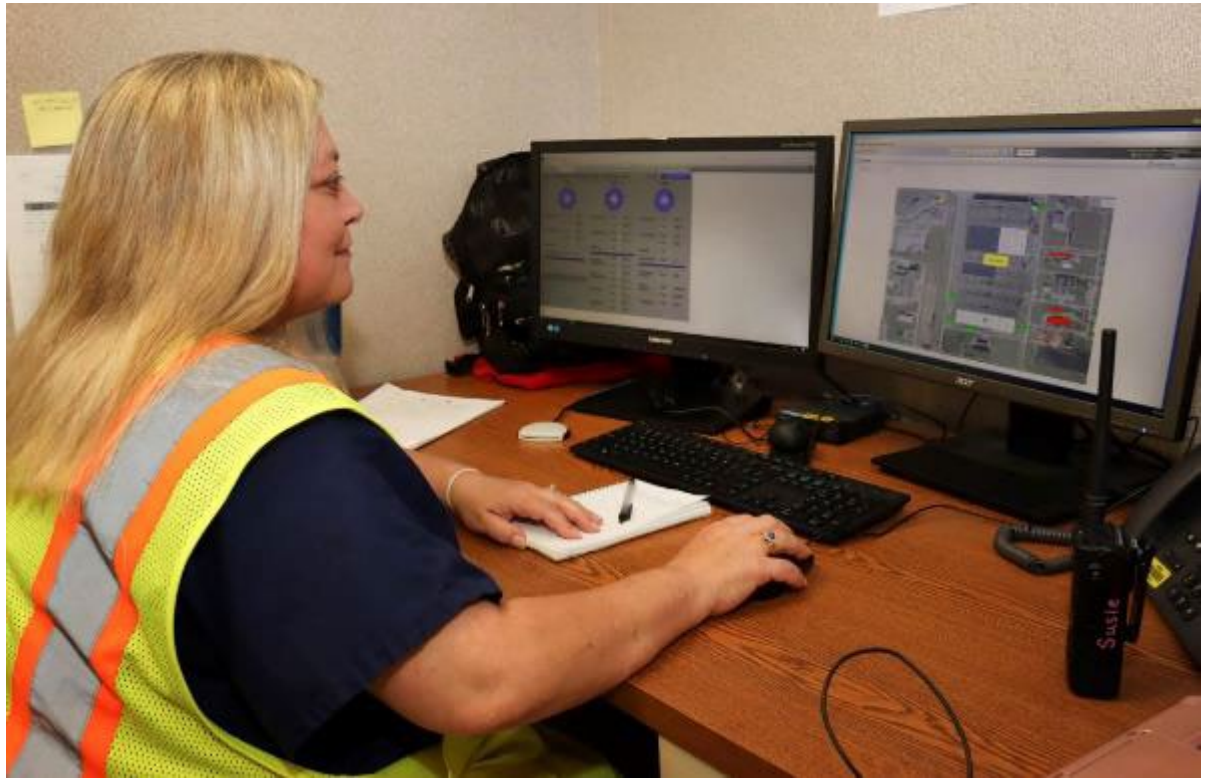


- Monitors measure radiological and non-radiological particulates

- Results are measured at varying intervals, including real-time

Real-Time Air Monitoring Approach

- Real-Time Monitoring provides the first line of defense
- Thresholds are established so emissions at the project boundary meet established limits, these thresholds provide assurance that limits at the property boundary will be safe and compliant
- This 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



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X-326 Process Building Real-Time Monitoring Trends to Date

- Results shared with the public:
  - Weekly, Monthly, Quarterly - www.portsdemo.com
  - Annually with the Site Environment Report – http://eic.ports.pppo.gov
- Independent verification of data from Ohio EPA and Ohio Department of Health

Data recorded to-date indicate safe control of fugitive dust and other contaminants of concern

Ohio Environmental Protection Agency

Ohio Department of Health

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X-333 Process Building Deactivation

- The next building to be demolished, it is the largest of the three process buildings (66 acres of floor space)
- The material sizing area is performing steady-state operations of large component disassembly for safe placement in the OSWDF

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Depleted Uranium Hexafluoride Conversion

DUF6 Mission

Convert DOE's inventory of DUF6, produced during uranium enrichment, into a more stable uranium oxide for:

- Reuse
- Storage
- Transportation
- Disposition

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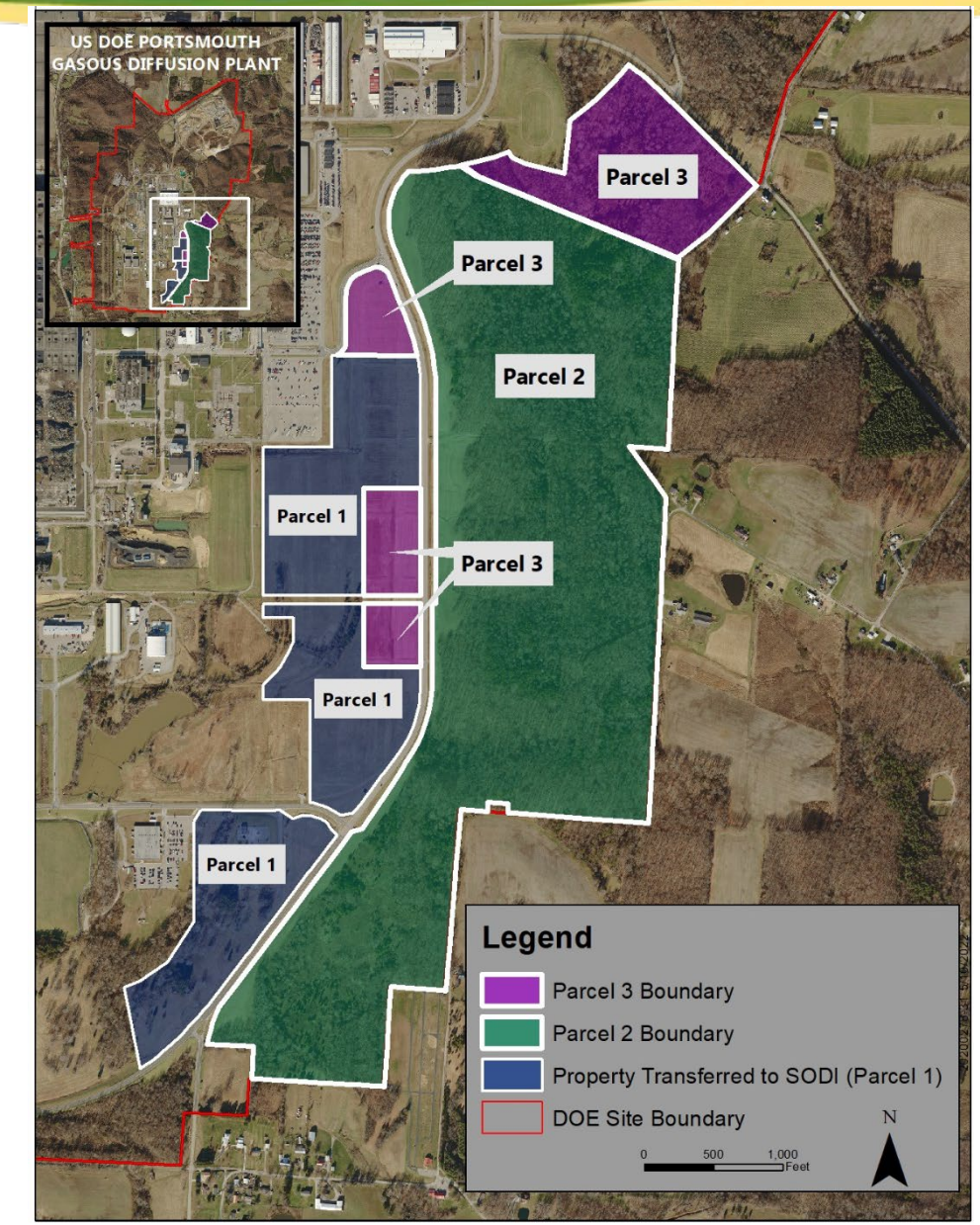
Future of Portsmouth Site

Site Reuse

- DOE is implementing a systematic approach to turn over parcels of land from the Portsmouth Site for potential reuse by private industry
- The parcels are transferred to the Southern Ohio Diversification Initiative (SODI), the recognized Community Reuse Organization
  - Parcel 1 – 80 acres
  - Parcel 2 – 227 acres
  - Parcel 3 – 48 acres
- SODI is working to find industries/companies interested



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Community Commitment Plan

- The Community Commitment Plan (CCP) is part of Fluor-BWXT's D&D contract at Portsmouth.
- Focus on four main areas:
  - Educational Outreach
  - Regional Purchasing
  - Community Giving
  - Economic Development

CCP Impact*

- **16,000** students have participated in educational outreach programs.
- **$550M** has been committed to local companies for goods and services.
- **$2.9M** has been donated by Fluor-BWXT and employees to local charitable organizations.
- **$4.9M** has been invested to create or retain jobs.

*Since 2011

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X-326 Process Building Demolition
Air Monitoring Data Results

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

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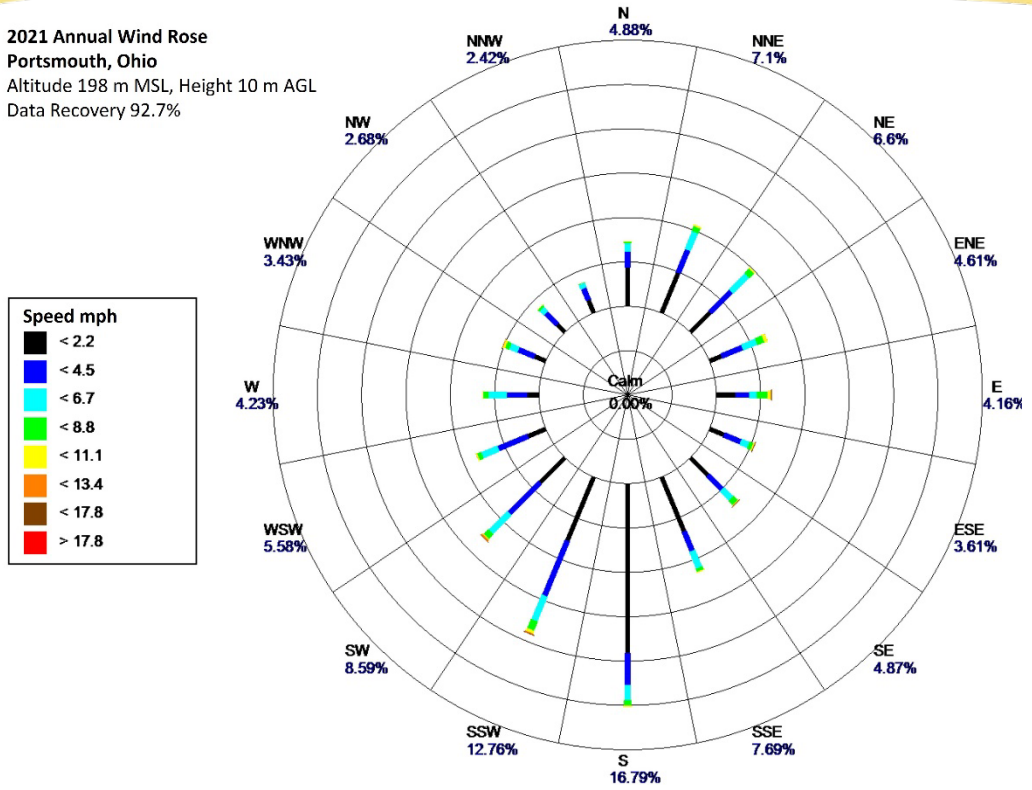
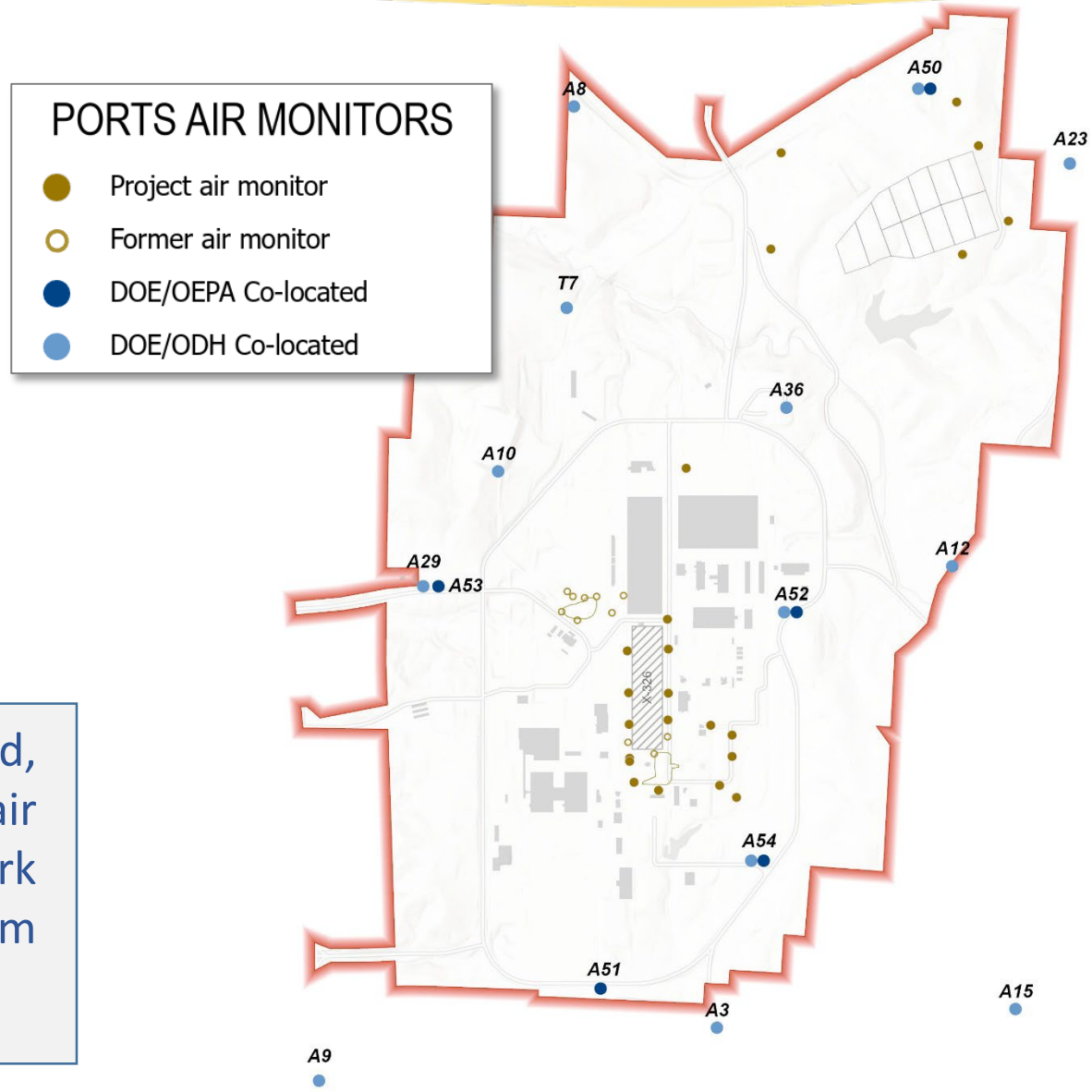
X-326 Process Building Air Monitoring

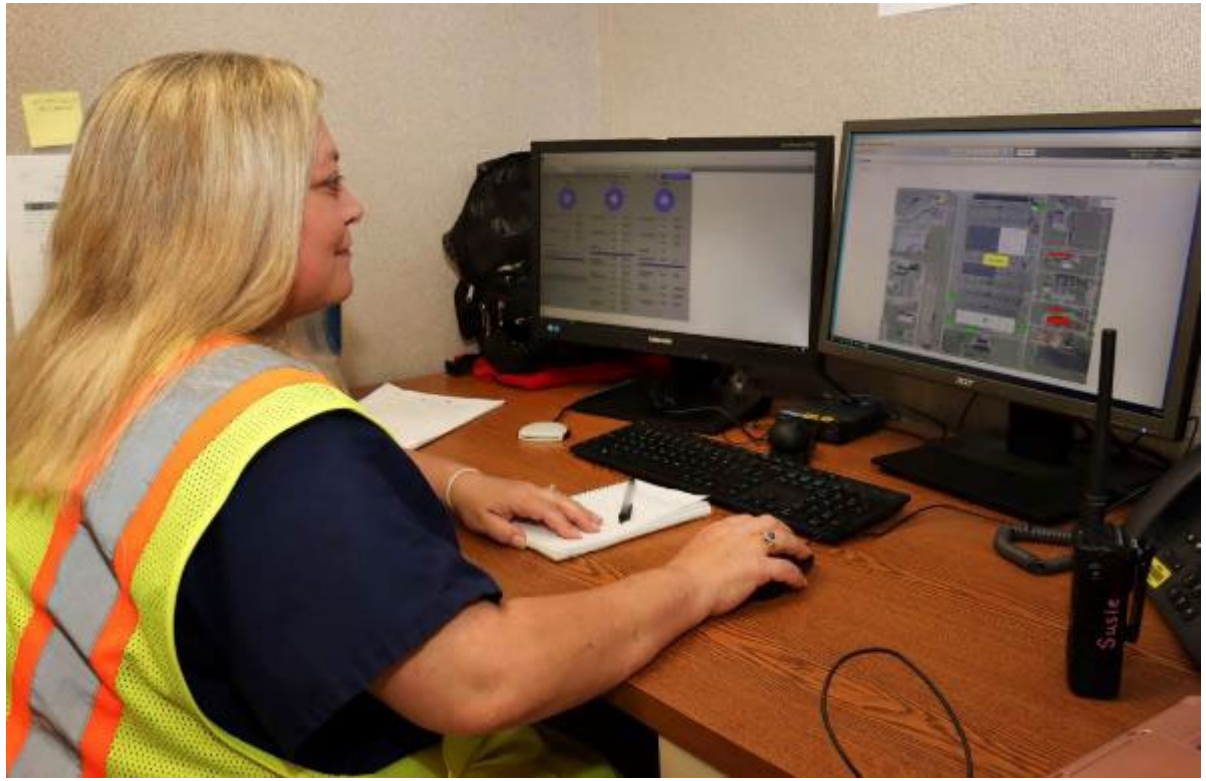




Using input from the community, DOE lessons learned, industry best practices, meteorological data, and air modeling, the Portsmouth site Air Monitoring Network provides a layering of air monitoring equipment from the project boundary to off-site locations.

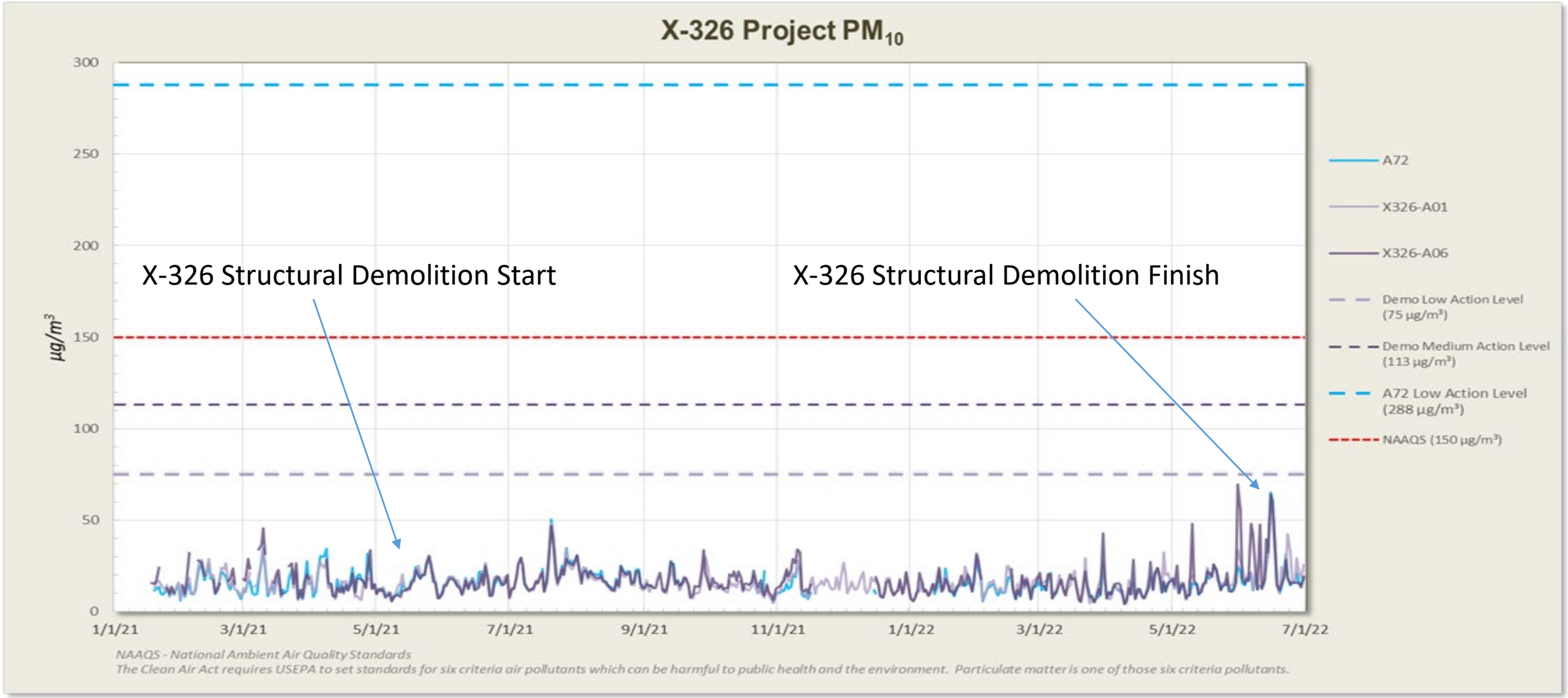
Real Time Air Monitoring Approach

- Real Time Monitoring provides the first line of defense.
- Thresholds are established so emissions at the project boundary meet established limits then assurance is provided that limits at the property boundary will be safe and compliant.
- This 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



UPDATE – Real Time Particulate Matter

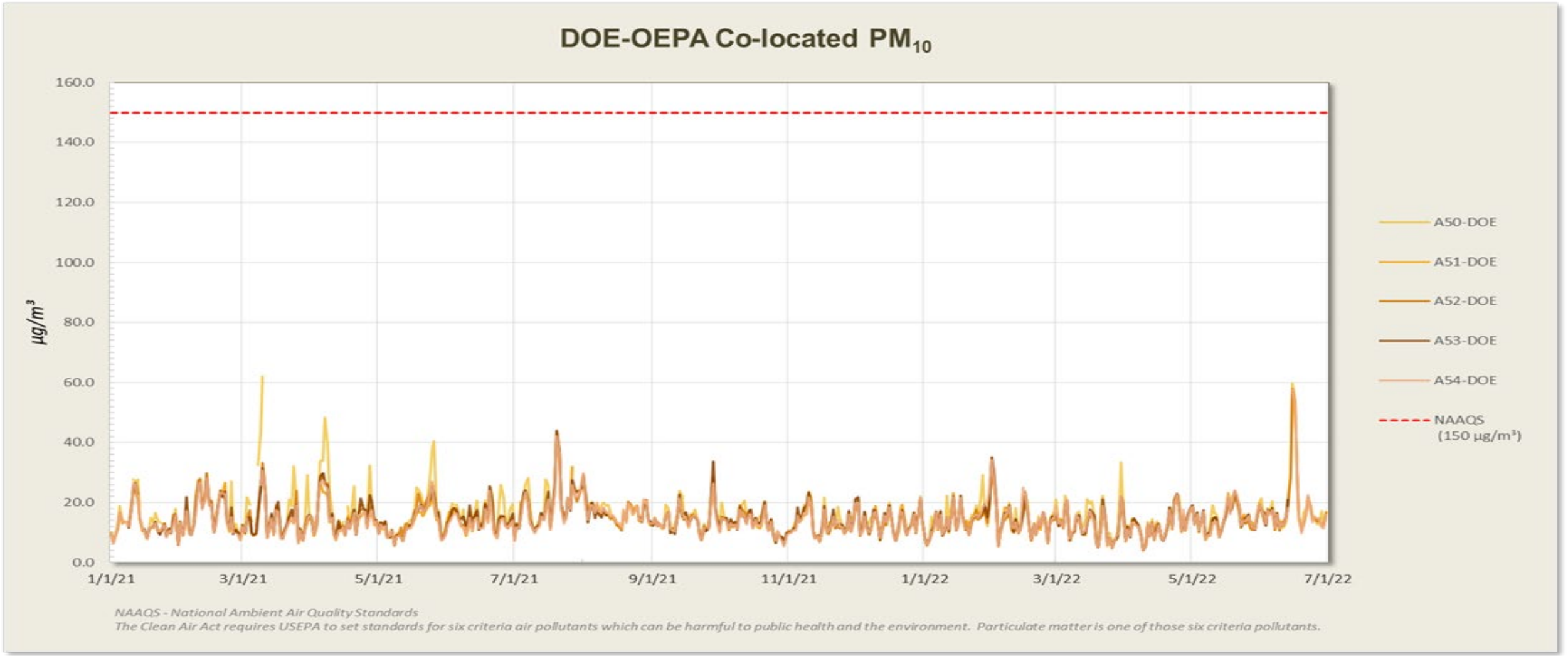
X-326 Demolition: Real Time Particulate Matter Air Monitors



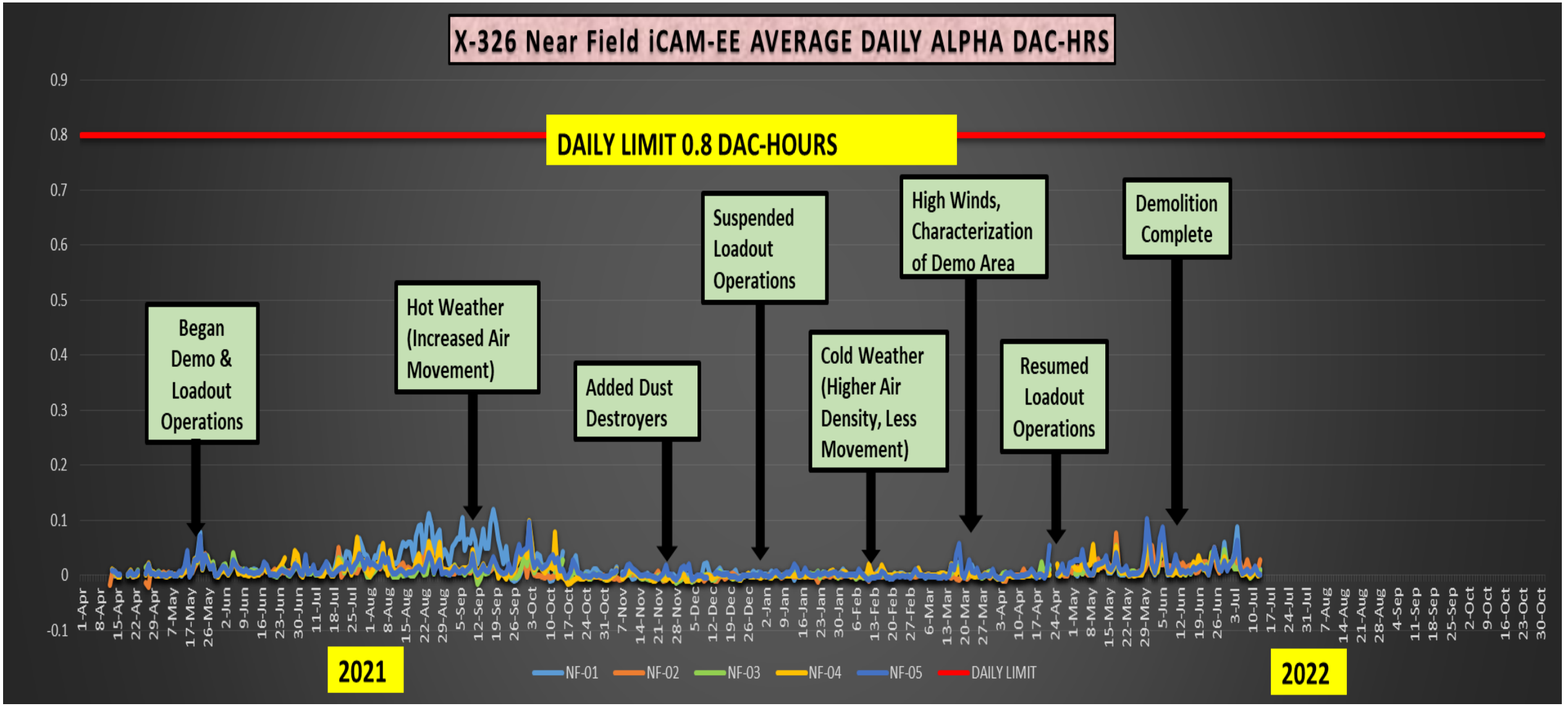
NAAQS - National Ambient Air Quality Standards
The Clean Air Act requires USEPA to set standards for six criteria air pollutants which can be harmful to public health and the environment. Particulate matter is one of those six criteria pollutants.

UPDATE – Real Time Particulate Matter

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



UPDATE - Real Time Radiological Measurements



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X-326 Process Building Real-Time Monitoring Trends to Date

- ✓ PM data recorded to date indicate good control of fugitive dust
- ✓ Application of water misting and fixative application are proving to be effective
- ✓ Real-time alpha/beta measurements indicate the controls instituted are protective of workers and the public

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Identifying Contaminants of Concern for Air Modeling/Monitoring

- The majority of the chemical and radiological hazards were removed during the 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

- The “Contaminants of Concern” were selected based on the operational history and materials of construction of the X-326 Process Building

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

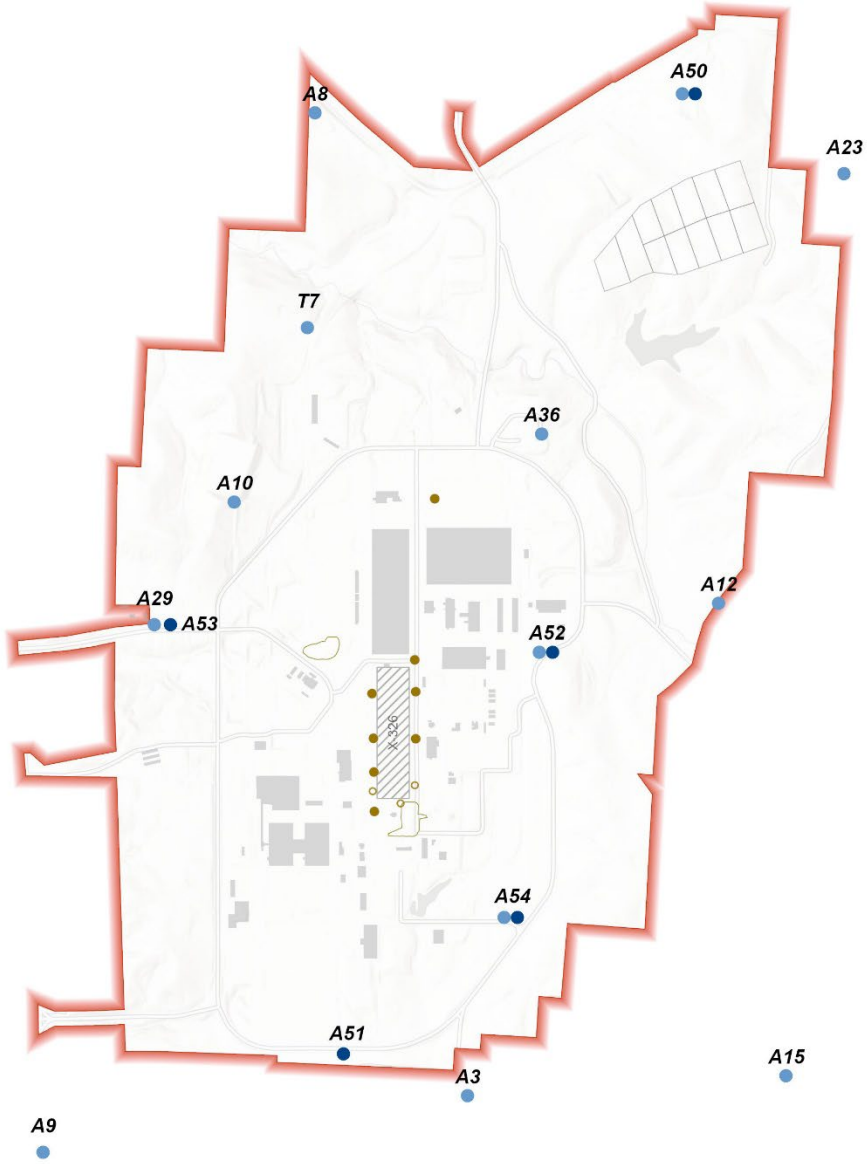
Air Modeling Drives the Air Monitoring Program

- 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
- Air emissions calculations and air dispersion modeling assessments evaluate source-specific and cumulative impacts from activities planned
- D&D and all other site activities can be completed in compliance with Clean Air Act requirements and established emissions standards
- 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.

UPDATE – Air Monitoring Locations

- **X-326 Demolition**
  - 8 locations
- **DOE/ODH Co-located**
  - 18 locations
- **DOE/OEPA Co-located**
  - 5 locations



Co-located Monitoring

- Provides a redundancy in air sampling to help confirm air emission impacts from on and off-site activities are consistently measured
- Regulators and the public have an independent mechanism to evaluate air emission data thus increasing confidence in the data collected
- Provides an increased level of transparency with state regulatory agencies

Co-located Air Monitoring Types

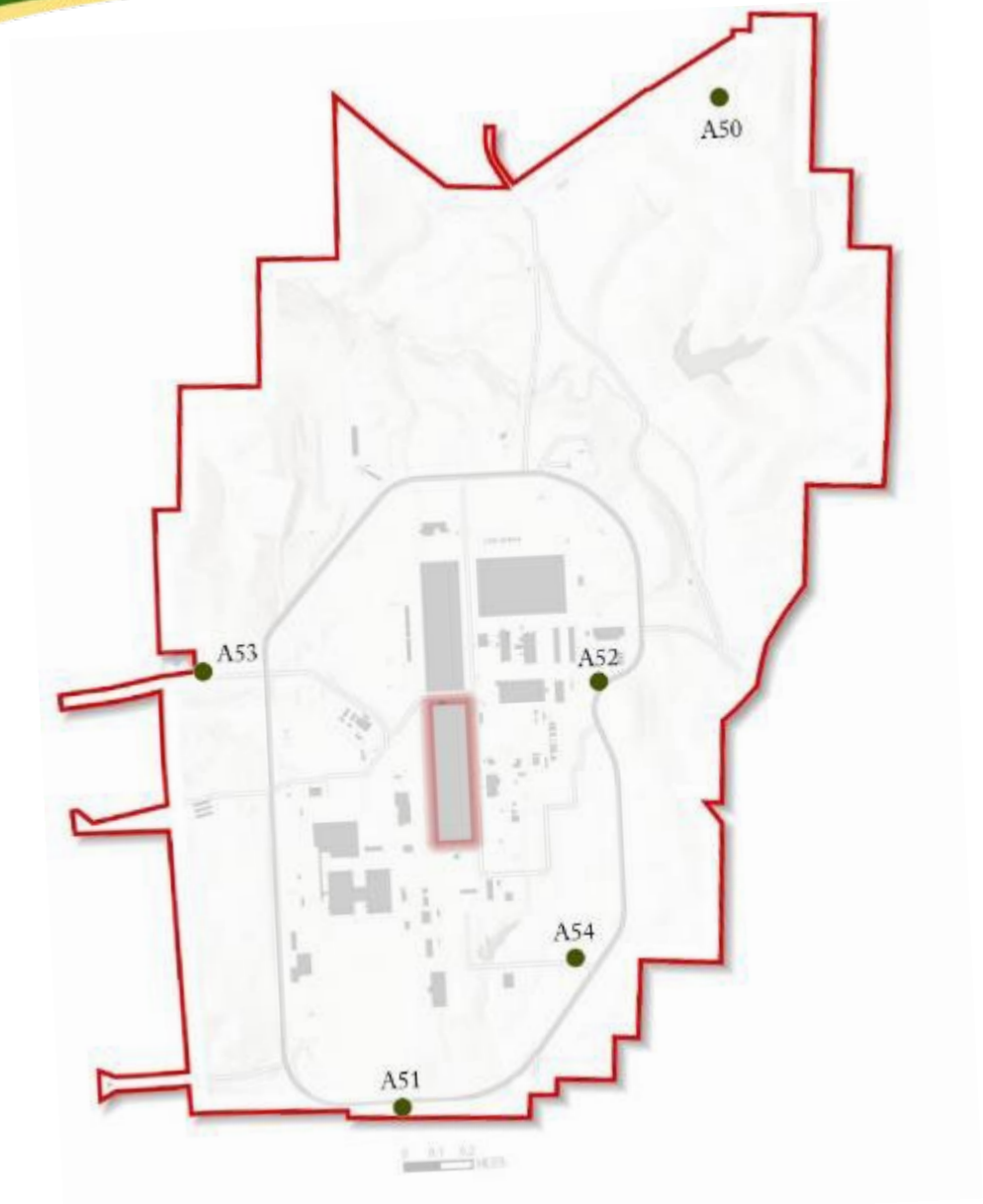
Ohio EPA/DOE Co-Located

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

ODH/DOE Co-Located

- 18 locations on site and off site
- Monitoring for:
  - RADs (radiological)
  - Fluoride*
- Data is gathered, analyzed and validated independent of DOE
- Data published quarterly

DOE/Ohio EPA Non-Radiological Sampling



- Metals: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, and Selenium are sampled weekly
- Volatile Organic Compounds (VOCs) (Trichloroethene and others) are sampled weekly
- Fibers/Asbestos fibers is sampled weekly

Non – Radiological Monitoring Limits

- Per Ohio EPA Technical Guidance, the Maximum Acceptable Ground-Level Concentration (MAGLC) is used as the basis for comparison of our air monitoring data.
- The MAGLC is a calculated value based on exposure and operational assumptions.
- The MAGLC is established for non-radiological parameters at the property boundary. Analytical data are then compared to the corresponding MAGLC.
- The use of the MAGLC and the associated calculations were presented in the Air Modeling Report approved by Ohio EPA

Threshold limit values come from OSHA and the American Conference of Governmental Industrial Hygienists

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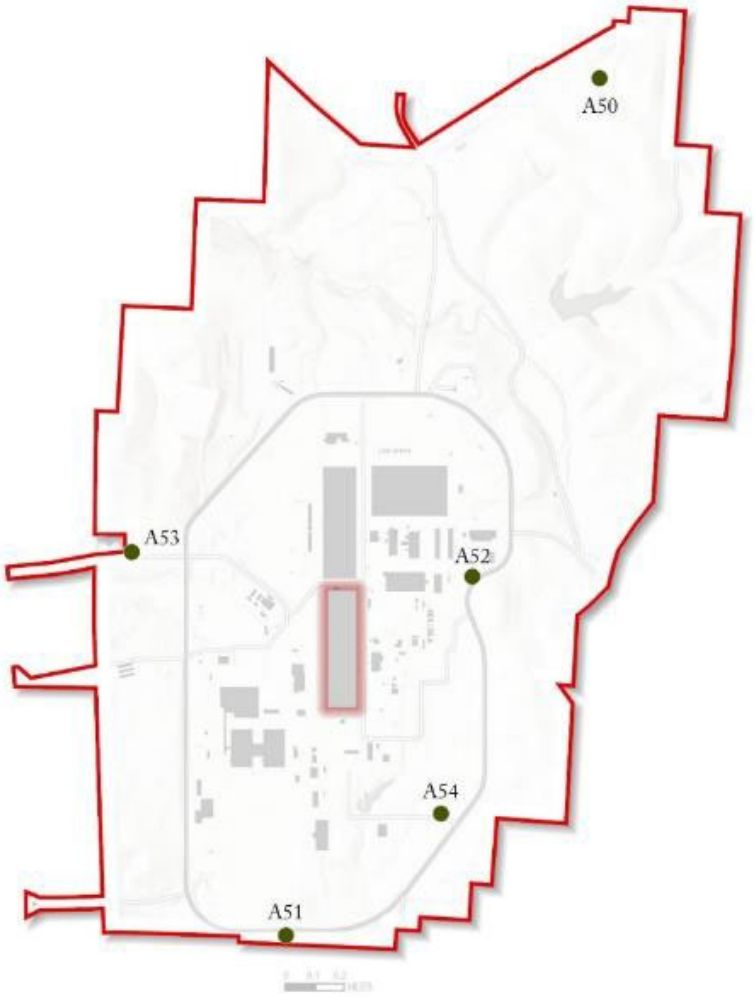
DOE Data at DOE/Ohio EPA Co-Located Stations



Max Detects as Percent of MAGLC

MAGLC in µg/m³	Antimony 11.9	Arsenic 0.238	Beryllium 0.00119	Cadmium 0.0476	Chromium 1.19	Cobalt 0.476	Lead 1.19	Manganese 0.476	Mercury 0.595	Nickel 2.38	Selenium 4.76	TCE 1334
A50	0.1%	0.4%	12.9%	4.4%	7.0%	0.7%	5.0%	7.3%	0.04%	1.0%	0.1%	0.08%
A51	0.1%	2.0%	17.7%	3.7%	1.1%	0.4%	4.2%	4.1%	0.04%	1.9%	0.1%	0.10%
A52	0.1%	0.6%	None	5.9%	3.3%	0.5%	3.5%	2.2%	0.04%	0.8%	0.2%	0.1%
A53	0.1%	1.1%	3.0%	7.2%	0.3%	0.5%	4.9%	15.2%	0.04%	6.3%	0.1%	0.2%
A54	0.2%	1.0%	21.6%	4.0%	2.7%	0.4%	3.2%	19.7%	0.03%	0.5%	0.1%	0.05%

*Available data, Dec 2020 to Mar 2022, data not final.

Metal and VOC detects significantly below MAGLC values

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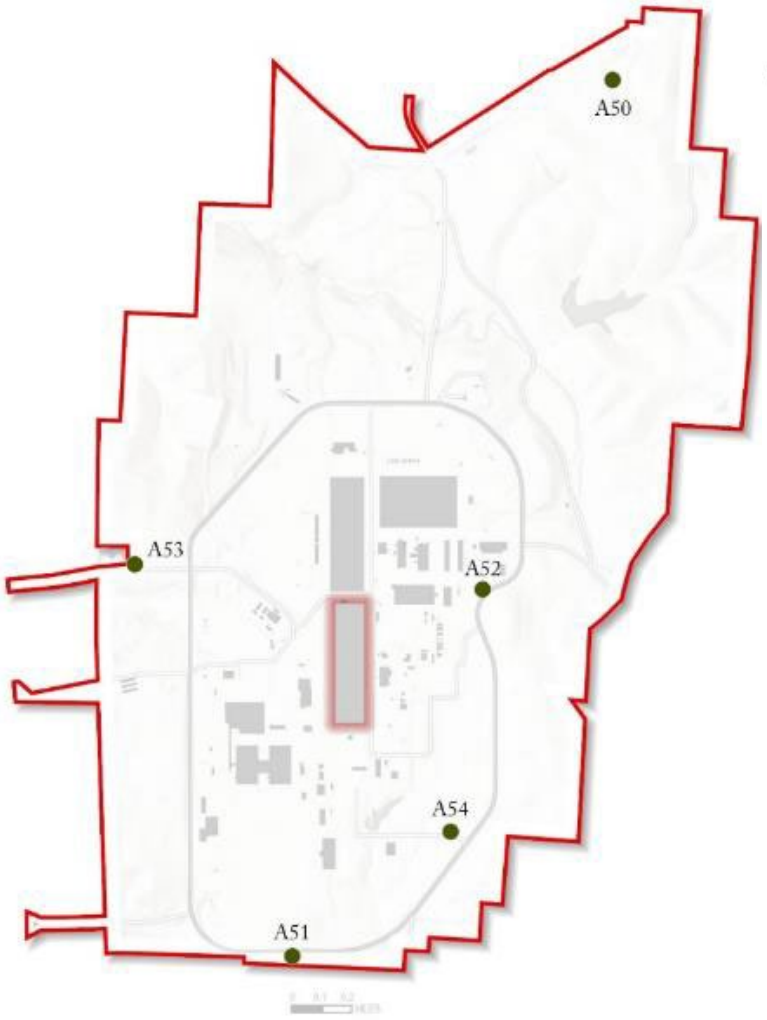
DOE Data at DOE/Ohio EPA Co-Located Stations



Average Detects as Percent of MAGLC

	MAGLC in µg/m³	Antimony 11.9	Arsenic 0.238	Beryllium 0.00119	Cadmium 0.0476	Chromium 1.19	Cobalt 0.476	Lead 1.19	Manganese 0.476	Mercury 0.595	Nickel 2.38	Selenium 4.76	TCE 1334
A50		0.01%	0.3%	12.1%	0.8%	1.8%	0.1%	0.8%	3.2%	0.01%	0.3%	0.06%	0.02%
A51		0.02%	0.4%	17.7%	0.9%	0.4%	0.1%	0.6%	2.5%	0.008%	0.4%	0.04%	0.04%
A52		0.01%	0.2%	None	1.2%	0.9%	0.1%	0.3%	1.5%	0.01%	0.3%	0.03%	0.02%
A53		0.01%	0.3%	3.0%	0.9%	0.3%	0.1%	0.7%	6.3%	0.01%	0.9%	0.04%	0.03%
A54		0.02%	0.3%	9.0%	0.8%	0.6%	0.07%	0.5%	7.1%	0.007%	0.1%	0.03%	0.02%
		Antimony	*Arsenic*	*Beryllium*	*Cadmium*	*Chromium*	*Cobalt*	*Lead*	*Manganese*	*Mercury*	*Nickel*	*Selenium*	*TCE*

*Available data, Dec 2020 to Mar 2022, data not final.

Metal and VOC detects significantly below MAGLC values

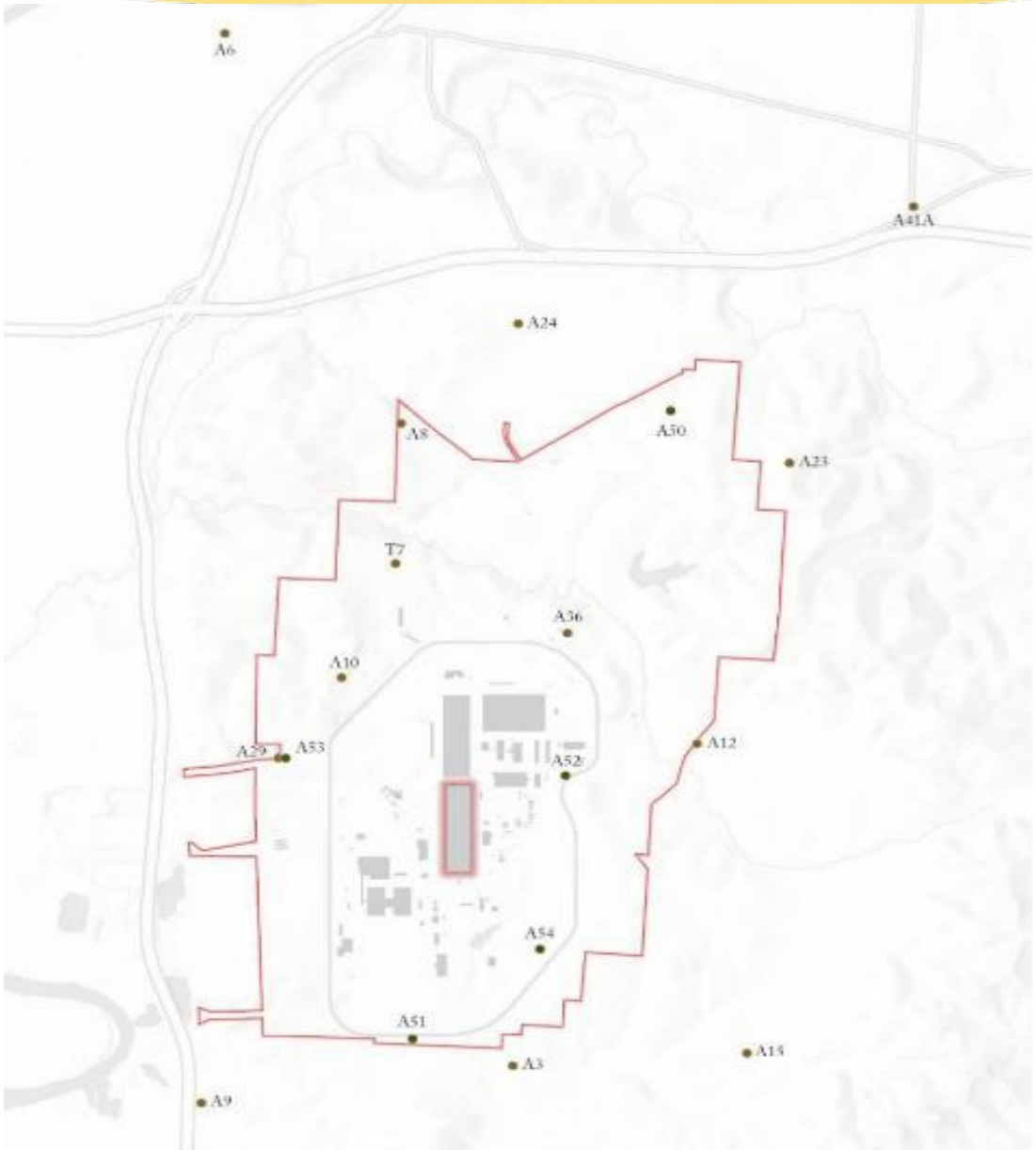
Airborne Asbestos Sampling

- Airborne asbestos sampling is taken on a weekly frequency
  - Sampling collects all fibers
  - Asbestos monitoring is also conducted Industrial Hygiene technicians for worker protection
- DOE uses National Institute for Occupational Safety and Health (NIOSH) approved methods
  - NIOSH methods for sampling and analysis are nationally recognized and standard industry practice
- Samples are sent to an independent laboratory for analysis

No indication of asbestos fibers at the DOE/Ohio EPA co-located air

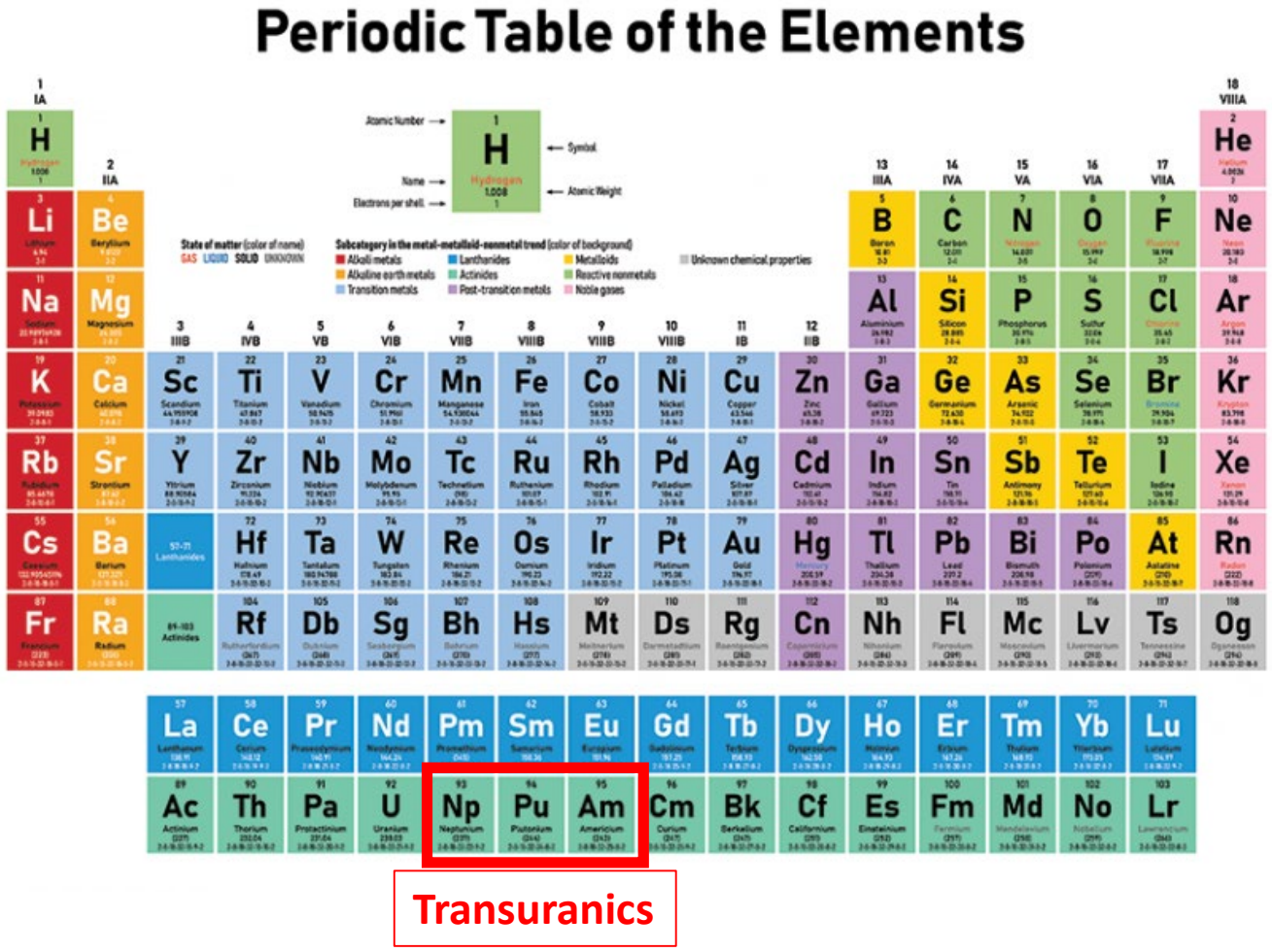
DOE/ODH Co-Located Radiological Sampling

- Transuranics: Americium-241, Neptunium-237, Plutonium-238, Plutonium-239/240 (sampled quarterly)
- Thorium Isotopes: Thorium-228, Thorium-230, Thorium-232 (sampled quarterly)
- Total Uranium (sampled monthly)
  - Uranium Isotopes: Uranium-233/234, Uranium-235/236, Uranium-238
- Technetium-99 (sampled monthly)



Transuranics at Portsmouth

- Transuranic elements (e.g., Np, Pu, Am) are heavier than uranium and listed after uranium on the Periodic Table of the Elements
- Isotopes of Np, Pu, and Am have been continuously monitored at the ambient air monitors in and around PORTS since the mid-90s
- Transuranic isotopes have been occasionally detected in ambient air samples at concentrations well below the regulatory limits through the last two plus decades



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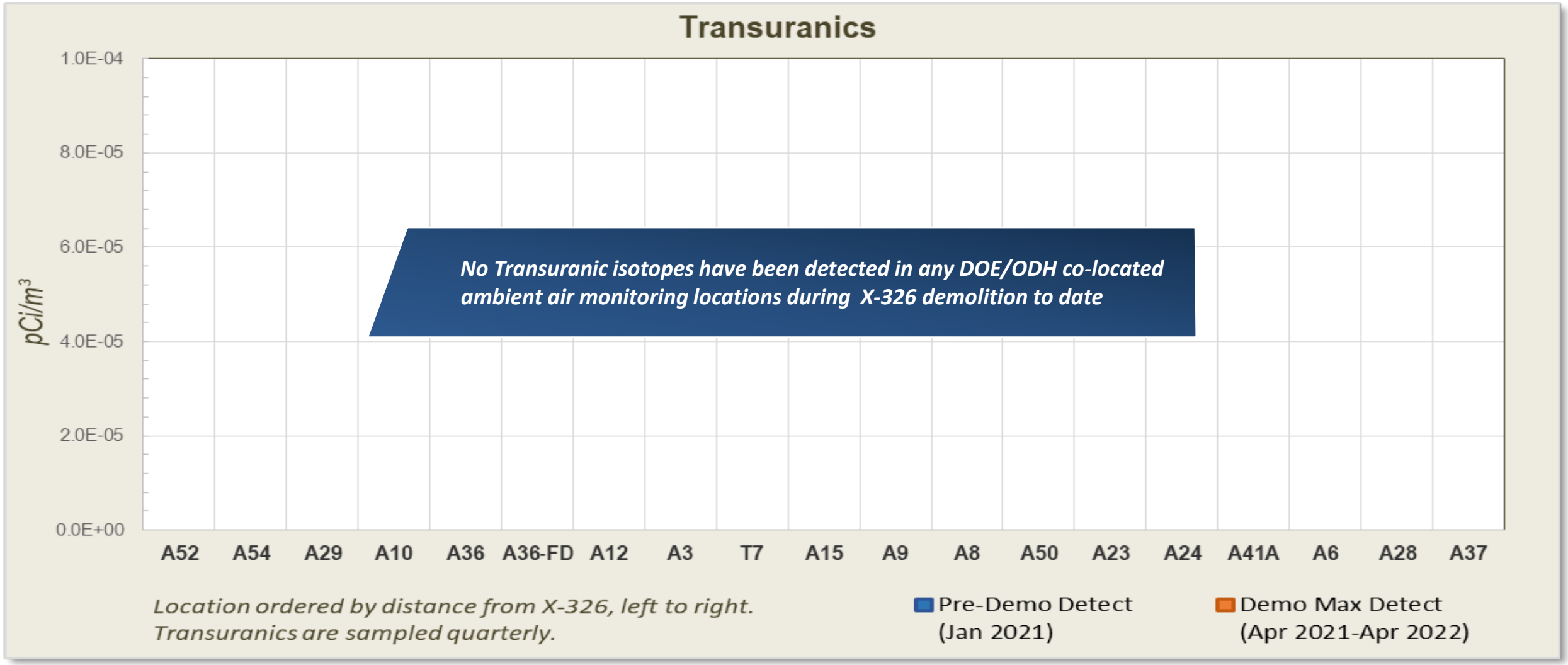
DOE Data at DOE/Ohio Department of Health Co-Located Stations



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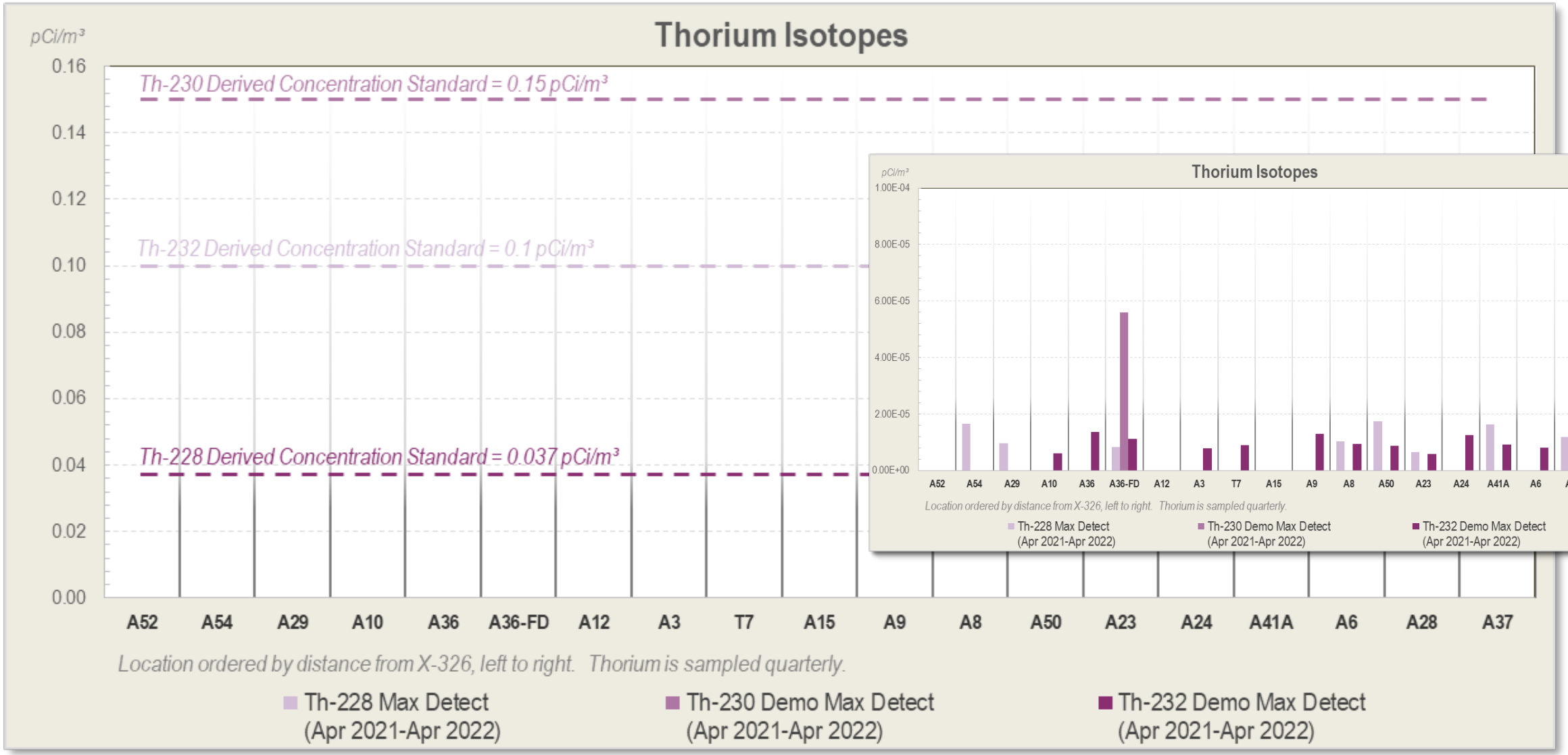
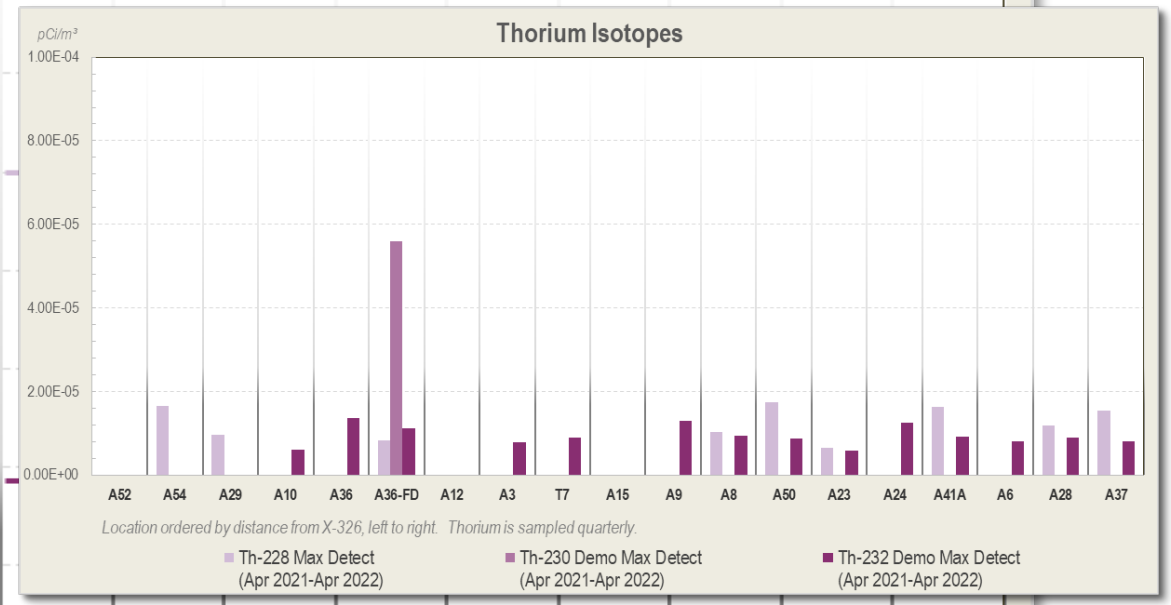
DOE Data at DOE/Ohio Department of Health Co-Located Stations





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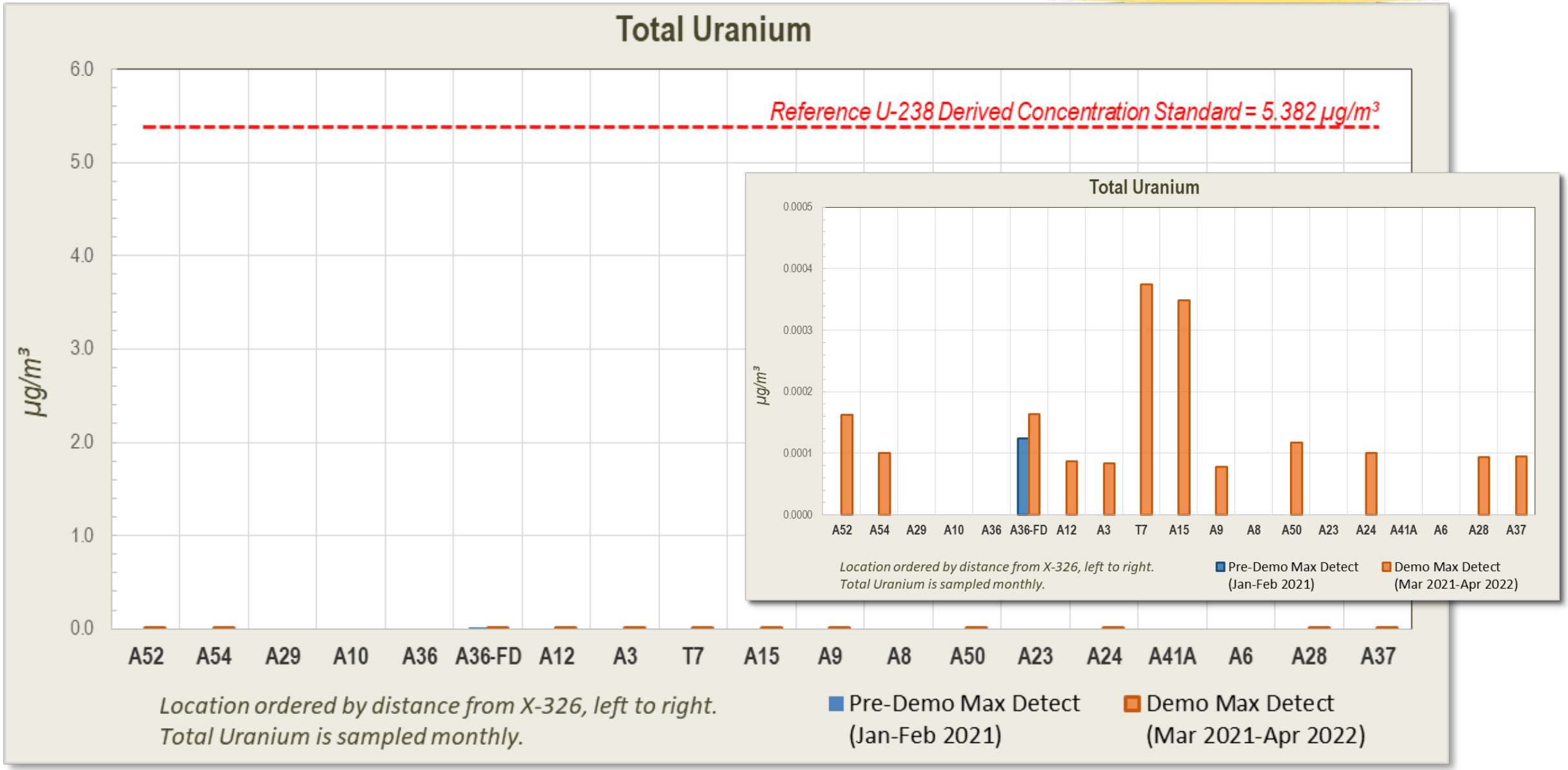
DOE Data at DOE/Ohio Department of Health Co-Located Stations



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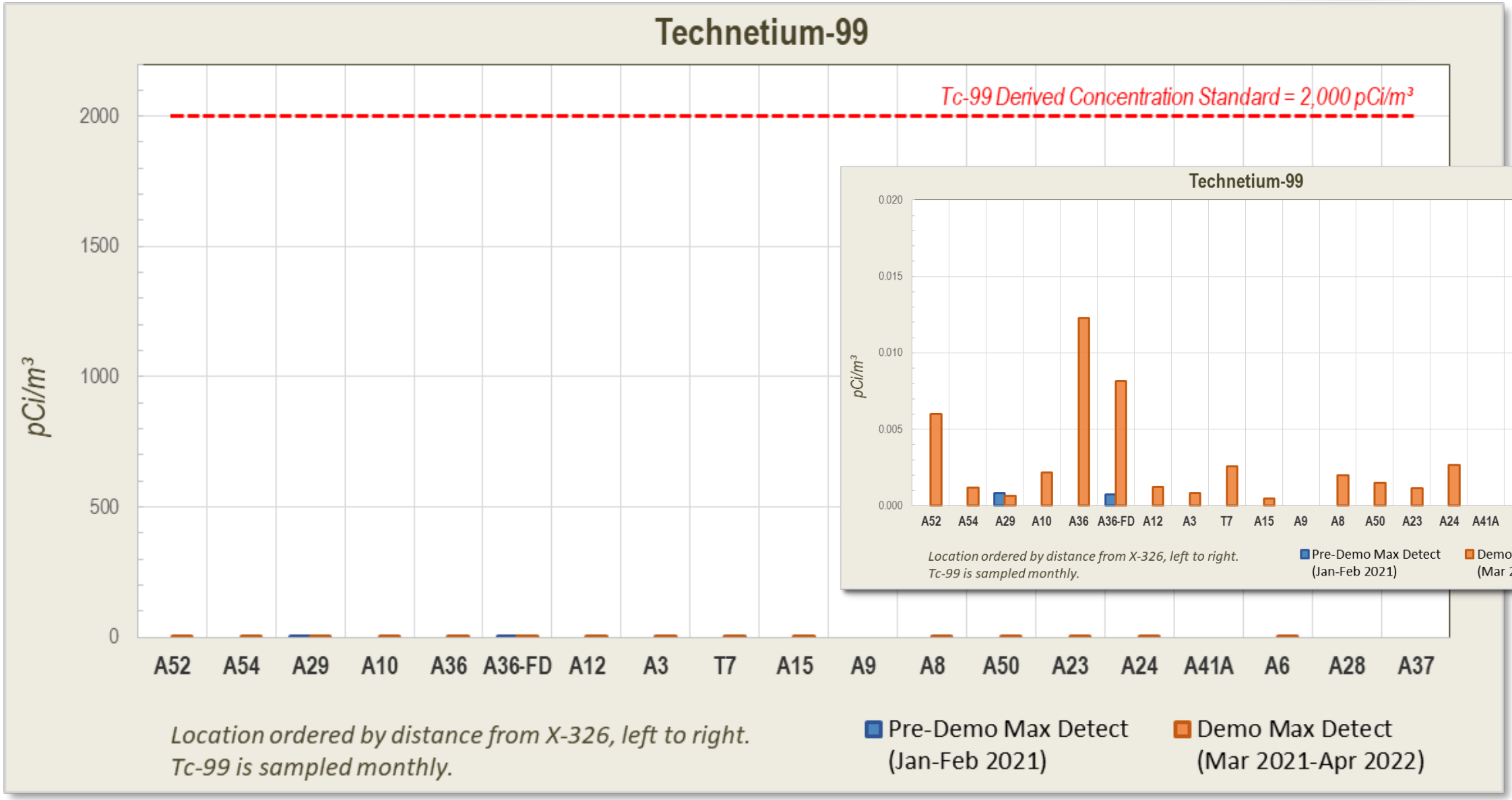
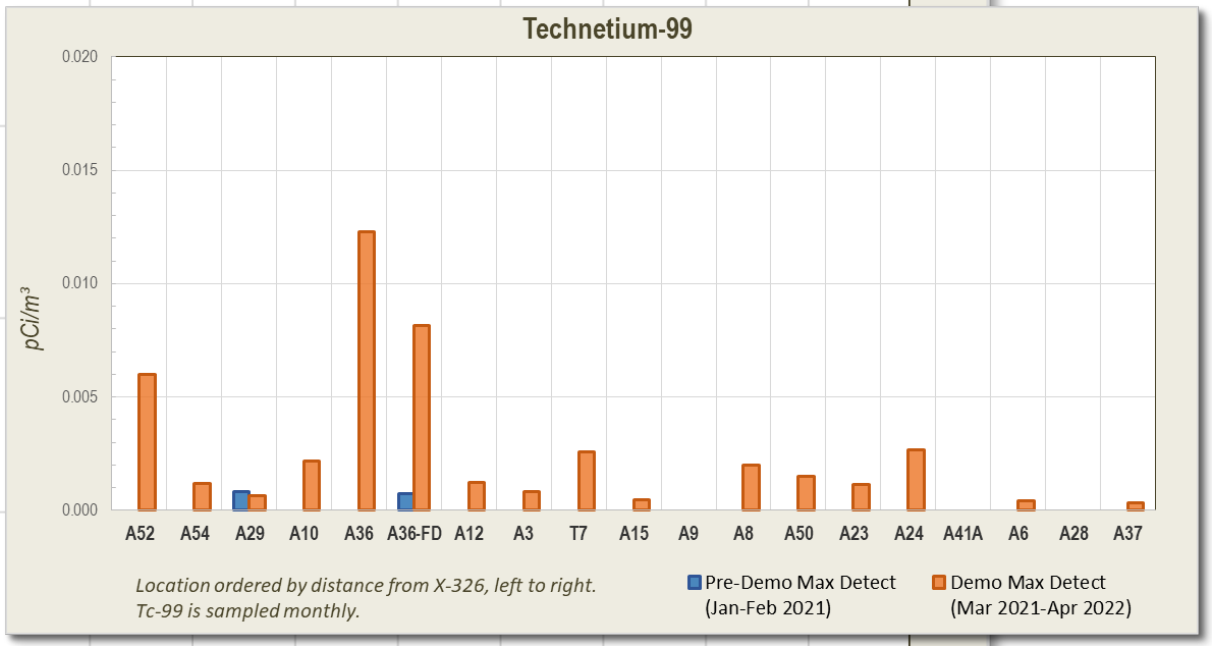
DOE Data at DOE/Ohio Department of Health Co-Located Stations





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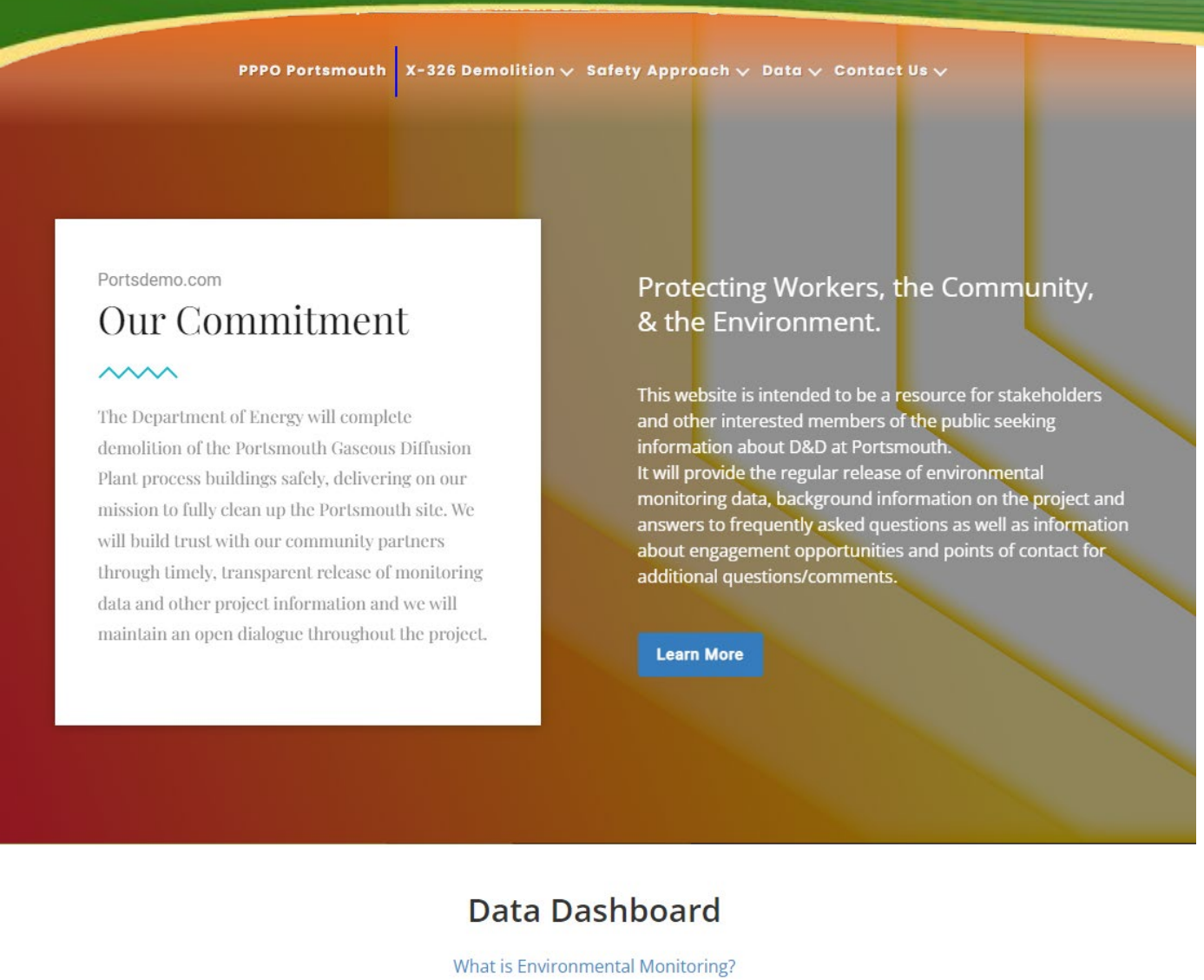
X-326 Co-Located Air Monitoring Summary

- Results from DOE co-located air monitors are consistent with Ohio EPA and ODH independent monitoring data.
- The current results from all monitors including DOE and State of Ohio indicate no detects have been found above regulatory limits
- Monitoring data posting websites:
  - **DOE** –https://pegasis.ports.pppo.gov
  - **Ohio EPA** – https://epa.ohio.gov/dapc/ams/amsmain/AMSSpecSam-DOE
  - **ODH** – https://data.ohio.gov/wps/portal/gov/data/view/doe-portsmouth-facility_-radiological-air-sampling-results

X-326 Demolition Data Website



- www.portsdemo.com is a 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

Public Engagement

How to have your voice heard

- Email: ports-demo-questions@pppo.gov
- Add a question via the chat on YouTube
- Add a question via the chat on Microsoft Teams
- 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.