



U.S. DEPARTMENT OF  
**ENERGY**

OFFICE OF  
**ENVIRONMENTAL  
MANAGEMENT**

# **Main Plant Process Building Demolition Monitoring Approach for Worker, Public, and Environmental Protection**

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## OBJECTIVE

Provide data and analyses to support the safe and compliant demolition of the Main Plant Process Building that is protective of workers, the public, and the environment.

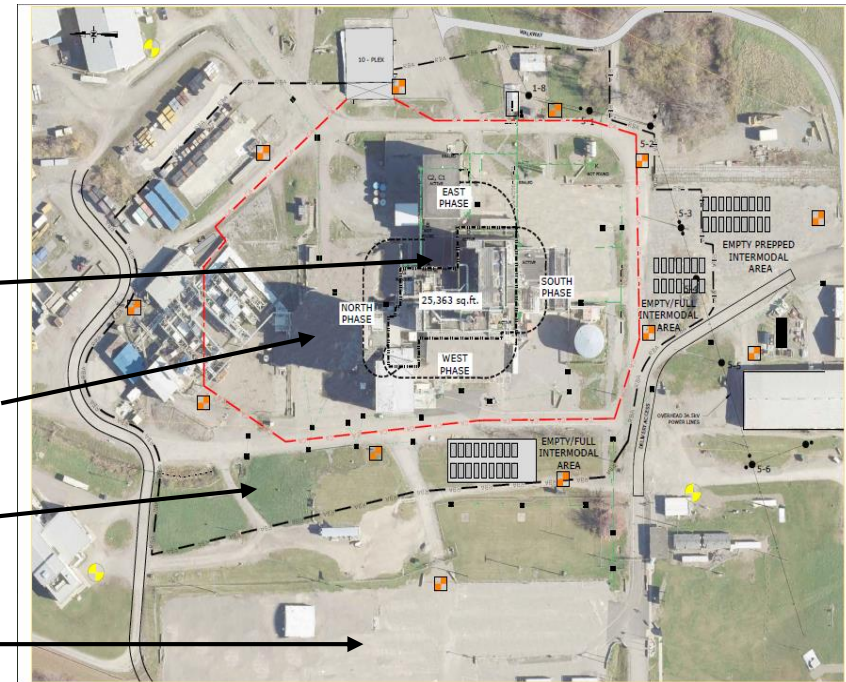
*WVDP has worked closely with the U.S. Environmental Protection Agency and the Nuclear Regulatory Commission, regarding plans and approaches to MPPB demolition to maintain public and environmental protection.*

# Occupational Radiation Protection

- The U.S. Department of Energy (DOE) establishes limits for worker protection
  - 10 CFR 835 *Occupational Radiation Protection*
- 10 CFR 835 requires DOE sites to develop and implement plans and measures to maintain occupational radiation exposures As Low As Reasonably Achievable (ALARA) [10 CFR 835.101 and 835.1001]
- The WVDP has established procedures to implement ALARA requirements, to include an ALARA Committee that reviews proposed work and worker exposure data on a routine basis
  - The WVDP ALARA process creates administrative controls, keeping worker exposures well below the regulatory limit
- The ALARA process is an important element of all WVDP work planning and execution, to include Main Plant Process Building demolition

## Establishment of Radiological Boundaries

- Use characterization and predictive modeling data to establish radiological boundaries with differing levels of control [(e.g., Training, Personal Protective Equipment (PPE)]
  - Contamination Area – highest level of PPE and required training
  - Buffer Area – administrative controls and reduced PPE requirements
  - Control Area – no PPE, training required
  - Unrestricted – public access
- Use radiological monitoring to maintain and confirm established boundaries remain protective





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# Radiological Monitoring Process



## Radiological Monitoring

- Experienced Radiation Control Technicians (RCTs) trained in demolition control techniques
- RCTs provide continuous monitoring and guidance during demolition and waste packaging activities
- RCTs conduct radiological surveys to maintain radiological boundaries and to provide early detection and response to changing radiological conditions during demolition activities



RCT performs monitoring during demolition activities

## Air Monitoring

- Continuous Air Monitors (CAMs)
  - CAMs are strategically positioned and continuously monitor
  - CAMs will provide two alerts before alarming to provide advance notifications of a change in workplace conditions to allow for immediate actions by RCTs.
- Fixed Air Samplers (FASs)
  - FASs are maintained inside weather enclosures to minimize interference from weather and debris
  - Air filters are analyzed daily, compared to administrative limits, and evaluated for trending

CAM

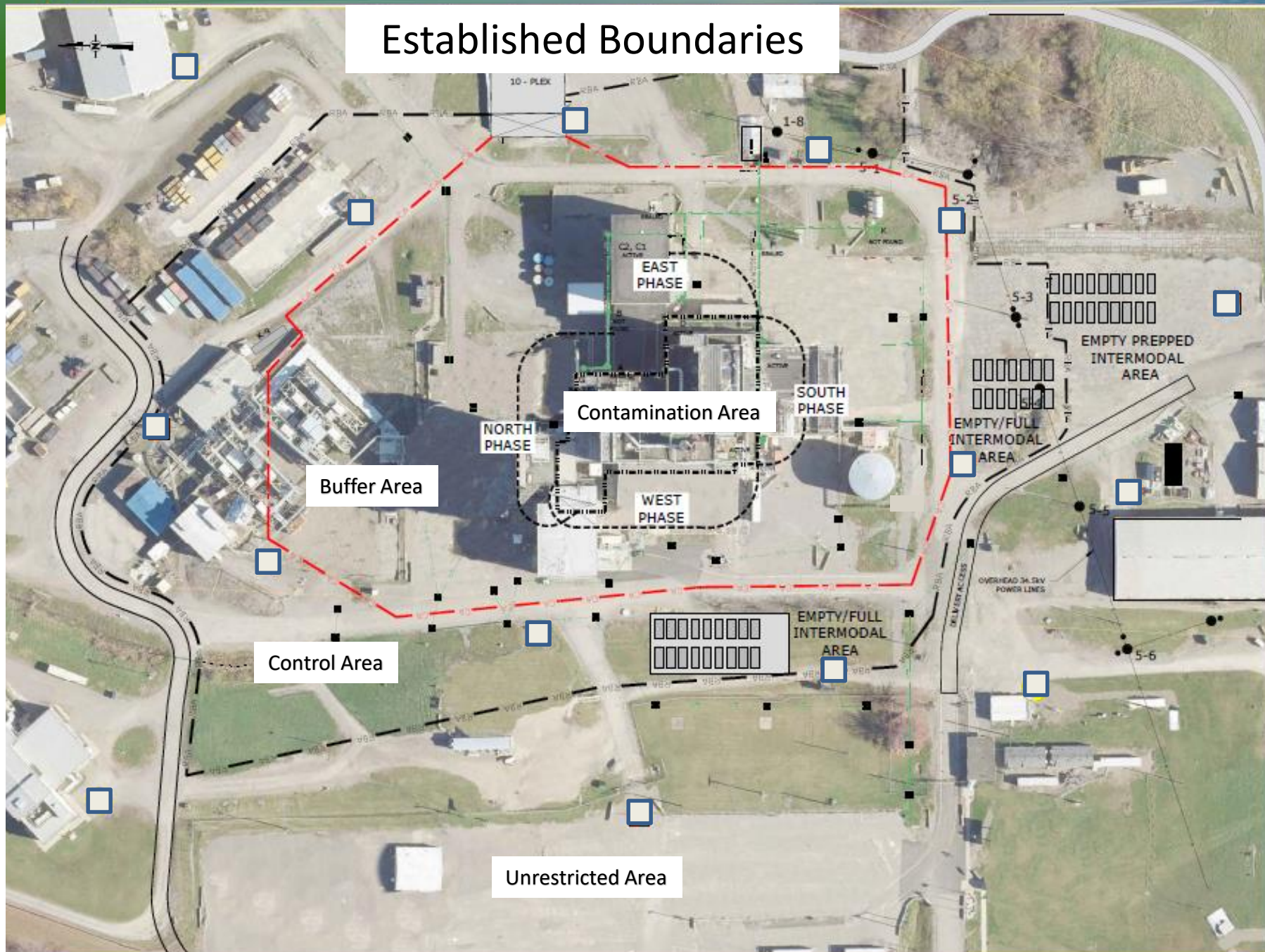


FAS



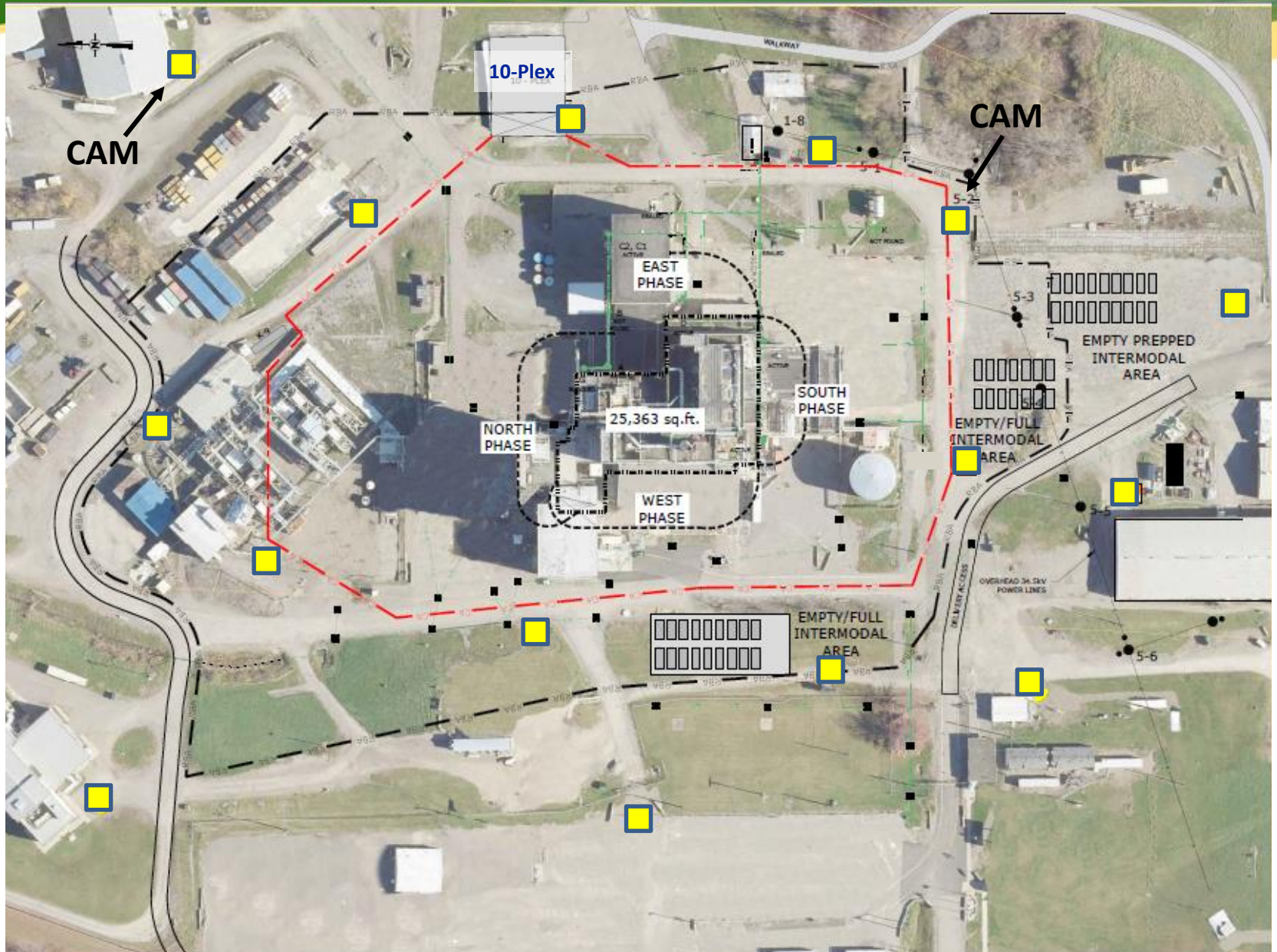


# Established Boundaries





# Continuous Air Monitor (CAM) Locations





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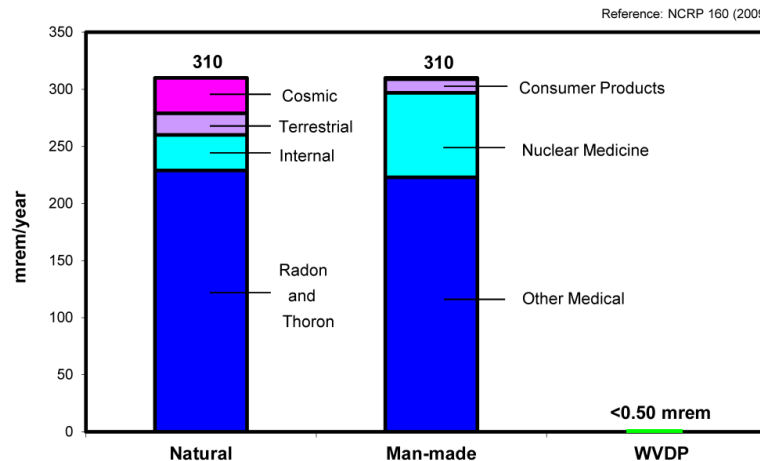
# Monitoring Approach for Public and Environmental Protection

**Alison Steiner**

*Principal Environmental Regulatory Specialist*

## Environmental Regulatory Framework:

- DOE Order 458.1 establishes an annual dose to the public of < 100 mrem/year
  - This is the total potential dose from water effluent and air emissions from a site
  - This dose is reported in the Annual Site Environmental Report (ASER)
- EPA regulations establish an annual dose limit to the Public of < 10 mrem/year from air emissions only
- Typical dose from natural background = 310 mrem/year. Additional dose occurs from other natural and manmade sources.



Comparison of Doses from Natural and Man-Made Sources to the Dose from 2019 WVDP Effluents





The site has been working with EPA for several years on plans to demolish the MPPB in open air in a manner that ensures public protection and meets EPA regulatory requirements

- 2012 – installed Ambient Air Monitoring Network (planning for future demolition)
- 2013 – demolished the 01-14 building (lessons learned)
- September 2017 - September 2018 – demolished the Vitrification Facility

## Predicting Potential Dose to the Public from Air Emissions:

- EPA regulations specify how dose should be estimated and calculated
- WVDP received approval from EPA in May 2016 for the method to be used to predict emissions during Vitrification Facility (VF) demolition.
- EPA required validation of the method as part of VF demolition, before it could be used to predict emissions for other, future WVDP activities
  - Emissions data were collected during VF demolition
  - Actual emissions were compared to predicted
  - EPA reviewed comparison data
  - July 2019 – EPA approved method for MPPB demolition



Vitrification Facility demolition

## Estimated predicted dose from air emissions to the Maximally Exposed Off-Site Individual (MEOSI) from MPPB demolition

- Input curies from MPPB characterization data
- Emissions calculations performed utilizing EPA-approved method
- Total estimated potential dose of 0.043 mrem for entire demolition, as compared to the EPA 10 mrem/year standard.
- Demolition of MPPB expected to take almost 3 years, therefore predicted annual dose is less than 0.2% of the standard.

**Per EPA request, notification of anticipated start of demolition, to include estimated dose, to be provided no less than 90 days prior to demolition start**



## WVDP Ambient Air Monitoring During MPPB Demolition:

- EPA-approved ambient air monitoring system and directed required detection limits
- Network of 16 samplers deployed in 16 compass sectors within 1 mile of the site, in proximity to nearest resident, as appropriate
- Installed in 2012 and operated in conjunction with prior stack monitoring for over a year
- System operates continuously and is used to demonstrate compliance with EPA annual dose standard (10 mrem/year)
- Filter samples are collected, analyzed, compared to standards, and evaluated for trending



Offsite Air Samplers

