



U.S. DEPARTMENT OF  
**ENERGY**

OFFICE OF  
**ENVIRONMENTAL  
MANAGEMENT**

# WVDP Main Plant Process Building Demolition

**Tom Dogal**

*Facility Disposition Manager*

**Quarterly Public Meeting  
November 18, 2020  
(Virtual)**

# Main Plant Process Building (MPPB)

Front (West )



Right Side (South)



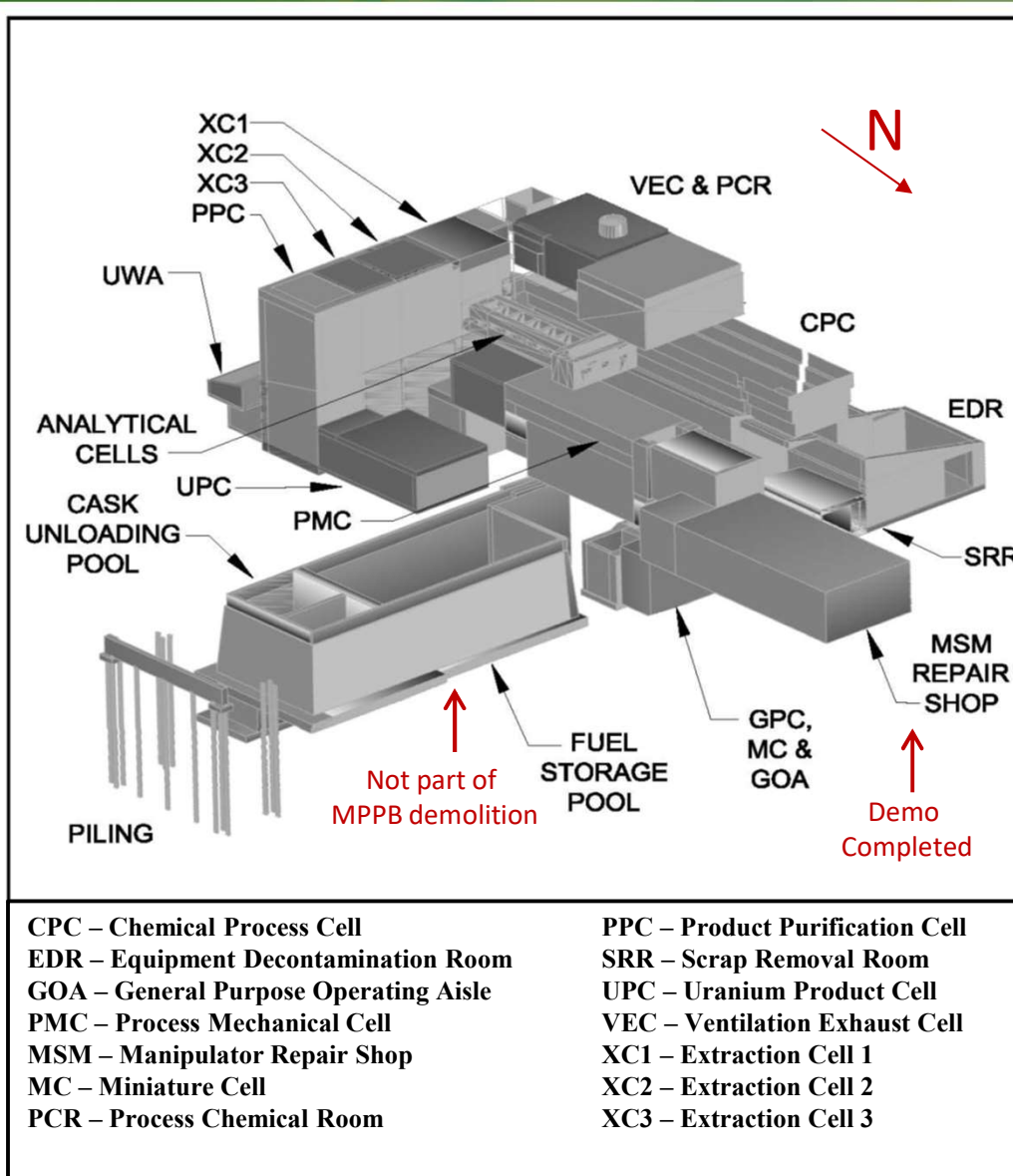
Back (East)



Left Side (North)



# Isometric View of MPPB



# Vitrification Facility Demolition Lessons Learned

Lessons Learned from previous demolition experiences have been applied in the planning process, and include:

- WVDP 01-14 Building demolition
- High-level Waste Vitrification Facility demolition
- Hanford Plutonium Finishing Plant demolition



01-14 Building  
Demolition





Vitrification Facility (VF) Demolition





Bird's Eye View of VF Demo Site

# Lessons Learned/Best Practices Applicable to MPPB Demolition

Demolition Aspect	Lessons Learned
<p><b>Contract Incentives</b></p>	<ul style="list-style-type: none"> <li>• Cost and schedule incentives for the demolition of the MPPB have been removed from the contract</li> <li>• Incentives have been placed upon the safe performance of the work</li> </ul>
<p><b>Demolition Sequencing and Rate</b></p> 	<ul style="list-style-type: none"> <li>• Demolition needs to occur at a “deliberate speed”</li> <li>• Ensure rate and sequence provides for effective management of demolition waters and demolition debris within the building footprint</li> <li>• Sequential demolition to minimize debris handling and stockpiling of debris, and moving from areas of lower contamination to higher contamination risk while maintaining structural integrity</li> </ul>
<p><b>Water Management</b></p> 	<ul style="list-style-type: none"> <li>• Minimize potential creation of contaminated surface water from precipitation</li> <li>• Provide for larger batch storage capacity</li> <li>• Minimize storage needs through routine and effective water processing</li> <li>• Continuously evaluate sampling requirements as demolition progresses</li> <li>• Enhance pre-treatment technology</li> <li>• Enhance winter weather protection</li> </ul>
<p><b>Dust Suppression</b></p>	<ul style="list-style-type: none"> <li>• Use of turbine sprayers</li> <li>• Improve dust suppression capability via additives</li> <li>• Ensure appropriate freeze protection</li> </ul>

# Lessons Learned Applicable to MPPB Demolition (Cont.)

Demolition Aspect	Lessons Learned
<p><b>Radiological Controls/Demolition Area Boundary</b></p> 	<ul style="list-style-type: none"> <li>• Ensure boundary is sufficiently sized to contain contamination inside of boundary</li> <li>• Employ E-CAM monitors with conservative setpoints</li> <li>• Ensure Radiological Control Technicians oversee demolition using a questioning attitude</li> <li>• Ensure processes are in place to monitor and mitigate material migration</li> <li>• Establish processes to address inclement weather/wind influences</li> </ul>
<p><b>Waste/Demolition Waste Pile Management</b></p> 	<ul style="list-style-type: none"> <li>• Provide for efficient waste loading capability, simultaneous with demolition</li> <li>• Minimize pile accumulation, ensure appropriate fixative application</li> <li>• Upfront planning for container preparation and transportation/reuse of intermodals</li> </ul>
<p><b>Work Planning/Procedures</b></p>	<ul style="list-style-type: none"> <li>• Prepare and review work instructions early</li> <li>• Establish appropriate “hold points” and “stop points” in work instructions</li> <li>• Structure work packages to minimize the potential for worker confusion</li> <li>• Ensure rigorous change management process</li> </ul>

# MPPB Demolition Readiness

*Demolition readiness is comprised of both physical condition of the Main Plant Process Building (i.e., deactivated), as well as the preparations undertaken by the site to ensure well-developed systems and processes are in-place to ensure a safe demolition (Readiness Assessments).*



# MPPB Demolition Readiness – Deactivation

**Facility-specific demolition readiness is determined for each area based on deactivation work completed, to include:**

- Characterization complete
- Hazardous materials removed
- Piping removal complete
- Mechanical and electrical isolations performed
- Accessible asbestos-containing material removed
- Penetrations stabilized or fixed
- Area decontaminated

**To date, all areas have reached physical “demolition readiness” status except for:**

- Product Purification Cell-South
- Ventilation Wash Room
- Off-Gas Cell
- Acid Recovery Cell



**Extraction Cell-1 Before Deactivation**



**Extraction Cell-1 After Deactivation**



# MPPB Demolition Readiness – Readiness Assessments

**Readiness to initiate demolition is verified through a deliberate and rigorous readiness review process, to include:**

- Line Management Self-Assessment, performed by CHBWV program and project organizations
- Contractor-led Readiness Assessment
- DOE-led Readiness Assessment

**The above-mentioned actions help to ensure that:**

- Activities can be safely performed within an approved safety basis ensuring there is adequate protection of workers, the public and the environment from adverse consequences;
- Hazards have been identified; appropriate environmental, safety and health requirements have been met; and safety systems and controls are in place and capable of performing their intended function;
- Employees have been adequately trained to perform the work;
- Equipment has been procured and tested to ensure it performs its intended function;
- Processes and procedures (i.e., work instructions) have been developed to safely perform the work; and
- Emergency and off-normal situations have been evaluated, and potential responses have been identified and tested.

# MPPB Demolition



**MPPB proximity to public road and radiological conditions are in the forefront of our planning considerations**

## Work planning instructions under development, which includes:

- Any special precautions or unique demolition techniques per area
- Requirements for waste debris management and removal
- Requirements for dust suppression/misting and fixative application
- Stopping points such as inclement weather, lightning, wind speeds in excess of 15 mph



**Demolition sequence developed in consideration of structural evaluation, experience, demolishing one area at a time, and benchmarking other sites/demolitions**

- Provides for effective management of demolition waters, precipitation, and debris within the building footprint
- Plan demolition in a stepwise/deliberate manner focused on one area at a time
- Plan provides for demolition that:
  - Reduces frequency of equipment relocation
  - Provides for more consistent work flow with water and debris management
  - Provides for consistent logistics with waste container movement
  - Provides a structurally stable demolition



**Vitrification Facility  
Demolition Boundary and E-CAM**

- **Approaching from the South**
  - Solvent Storage Terrace, Upper Warm Aisle, Lower Warm Aisle, South side of Extraction Chemical Room, Extraction Cell 1, Extraction Cell 2, and Extraction Cell 3
- **Coming around the West side**
  - Off-Gas Aisle, Acid Recovery Cell, Acid Recovery Pump Room, Off-Gas Cell, and Chemical Process Cell
- **Moving toward East side until settling in the center footprint**
  - Ram Equipment Room, Equipment Decontamination Room, Load-In, Process Mechanical Cell, and Manipulator Repair Shop area



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# Main Plant Process Building Demolition Animation

# QUESTIONS?



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# WVDP Product Purification Cell (PPC) Enhanced Deactivation

**Tom Dogal**

*Facility Disposition Manager*

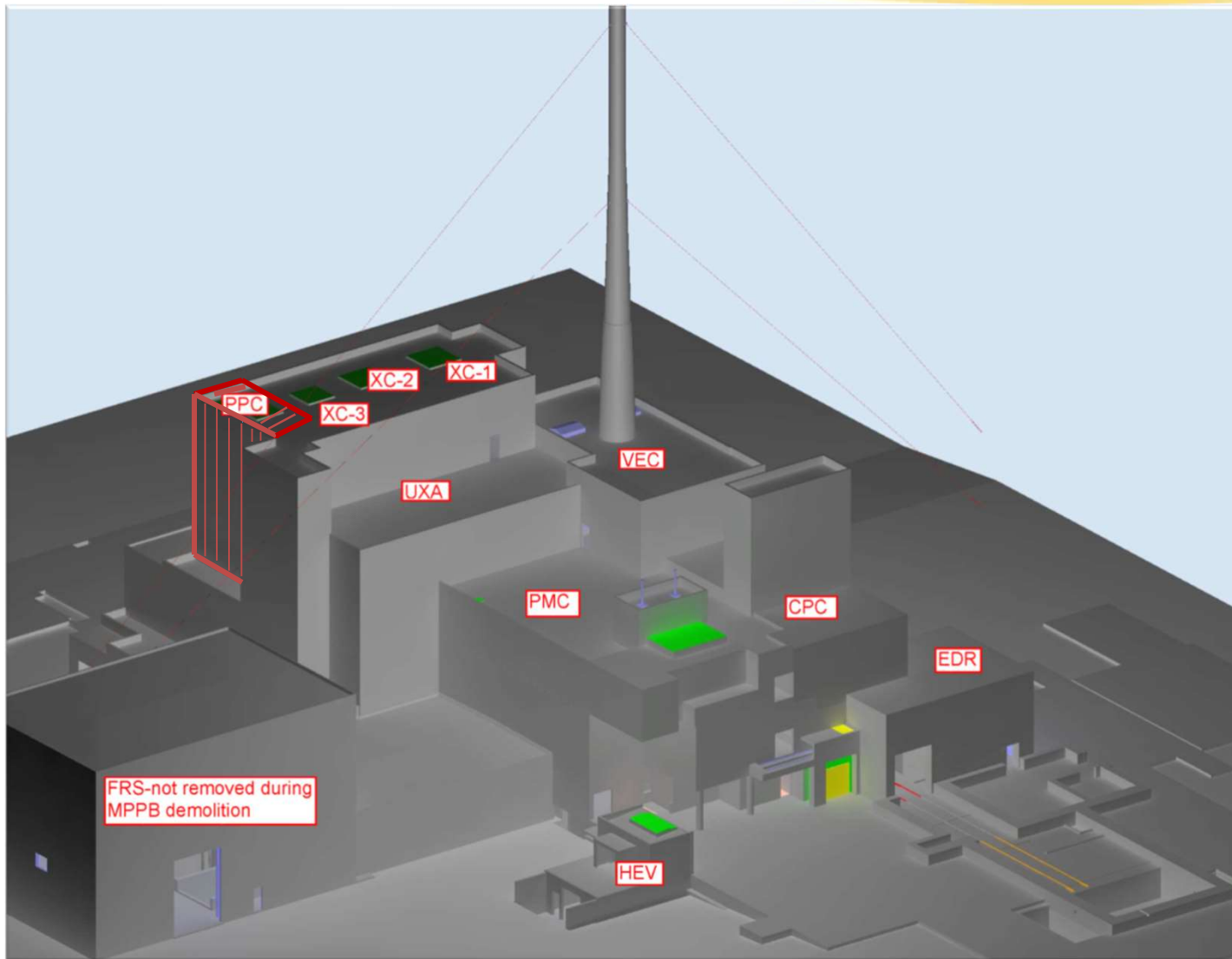
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# Product Purification Cell – South

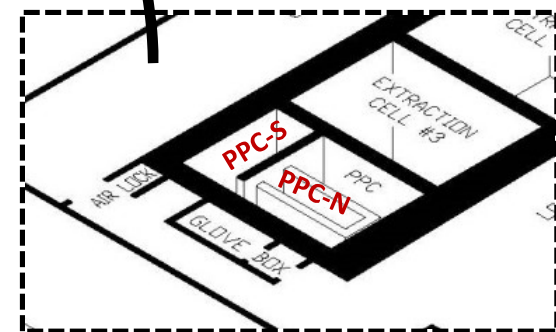
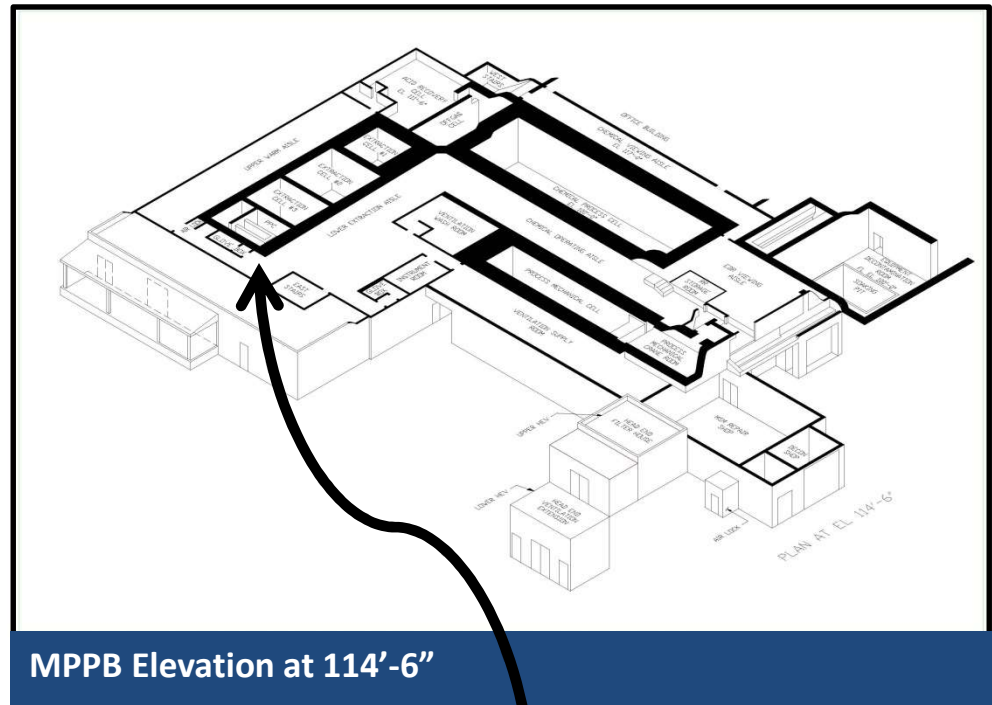


# Prepare PPC-S for Open-Air Demolition

**Objective: Perform advanced deactivation by scabbling wall surfaces using Nitrocision®**

PPC divided into North (N) and South (S) sections

- PPC-S features
  - 57' tall cell, 5' by 16' wide
  - Single access door at grade (45" by 120")
  - Multiple coatings of paint and fixative
  - Cell penetrations sealed
- Analysis and modeling
  - Wall characterized for average dose rates and hot spots
  - Airborne calculated for resuspension due to Nitrocision®



# PPC-S Advanced Deactivation Plan

## Overall Approach

- Mast climber used for personnel movement
- Specialized containment box and Nitrocision® wand secured in place; deployed separately from mast climber
- Separate vacuum system contained within wand and containment box
- Fixative and contaminated concrete to be removed from the wall
- Waste generated from this activity will be disposed off site (LLW) or safely stored onsite (TRU) until a disposal site becomes available

## Mockup

Performed over a several month period for readiness, equipment performance, and safety and radiological control validation

- Identified modifications to wand and containment box
- Improved tool handling
- Modified containment box deployment and management approach
- Added third vacuum
- Added radiological survey capabilities
- Demonstrated capability of well-trained workforce in bubble suits



Regulatory Oversight



“Scabbled” Concrete



Nitrocision® Mockup

# PPC-S Nitrocision® Project Safety

## Equipment

- Nitrocision® equipment mocked up and tested
- Mast climber serviced, inspected and tested
- Deployment approach tested and modified
- Dedicated electric power established for project
- Negative pressure confinement ventilation established as well as backup power for ventilation
- Two separate redundant vacuum systems deployed

## PPE

- Bubble suits with advanced communications capabilities and backup air system
- Triple airlock for entry and exit



PPC-S Manned Entries

# PPC-S Nitrocision® Project Safety (Cont.)

## Personnel

- Trained and qualified crew
  - 8-10 operations personnel
  - 3 Radiological Control Technicians
  - Safety Technician
  - Supervisor
  - Confined Space Rescue Team with self-contained breathing apparatus available (trained specifically for this work activity)



PPC-S Manned Entries

## Confined Space Rescue Training

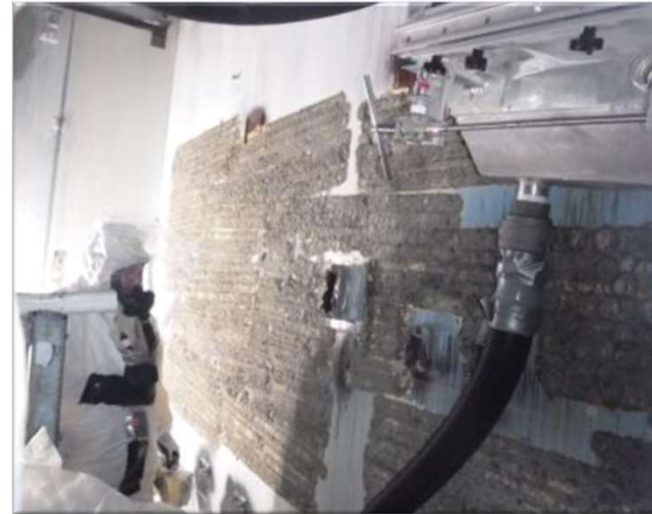


Scabbled wall after Nitrocision®

**Reviewed by:** Criticality, Radiological and Safety Committee,  
ALARA Committee and Hazard Review Board

# Operations (Pre-COVID-19)

- Started advanced deactivation efforts in PPC-S on January 6, 2020.
- Two entries per day
- Continuous improvement to process and equipment from worker feedback
- New radios purchased for improved communication between crew members and support
- Excellent results in reducing contamination levels



Radiological surveys are taken on the south wall of the PPC-S, after performing Nitrocision®

# Operations (Post-COVID-19)

- PPC-S advanced deactivation activities were stopped in March.
  - Nitrocision® equipment and other associated tools placed in safe configuration
- Phase 2 of Work Resumption Plan
  - Maintenance of equipment performed
  - Performed surveys for restart of PPC-S advanced deactivation efforts
  - Fabricating a second box for narrow walls
  - Suit-up mockup (training) conducted on August 19 for new crew personnel



Workers are trained in how to  
suit-up for PPC-S entry

## Current Operations

- Performed several mock-ups and briefings prior to restart
- Resumed operations in October on south wall of PPC-S
- Improvements and adjustments made to the decontamination process
- Two entries per day
- Preparations being made to install a new box, more compact box
- Removing first box of debris



An operator inside PPC-S



# Summary

- PPC-S enhanced deactivation underway – with very good results
- Improvements and adjustments continue to be made based upon worker feedback
- Confinement ventilation working well – no spread of contamination
- Worker protection working well – no worker exposures
  - Engineered controls
  - Administrative controls
  - Person protective equipment



Scabbled wall after Nitrocision®