



DHS SCIENCE AND TECHNOLOGY

Large Scale Decontamination and Decommissioning of a Vintage High-Containment Effluent Decontamination System, Planning through Execution

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**Homeland
Security**

Science and Technology

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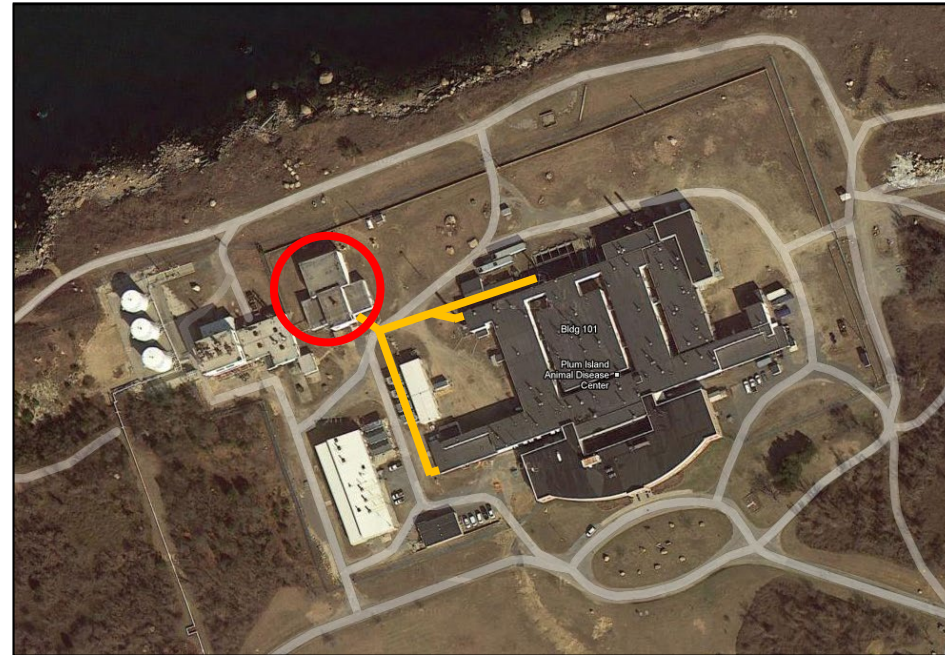
Decontamination and Decommissioning Components of a Vintage EDS

- Background, Scope, End-State and Stakeholders
- Project Plan and a Phased Approach
- Challenges and Mitigation
- Future Work
- Recap



Facility Details

- 60+ year old building and EDS (circa 1954)
- 4 floors
- Footprint: 11,000 ft²
(1,022 m²)
- Volume: 190,000 ft³
(5,380 m³)
- 550 ft of below grade piping between the laboratory building and the EDS building



Pathogen Profile

- Research and diagnostic facility currently works with and/or stores USDA Select Agents
- Agent profile includes non-enveloped and enveloped viruses, *mycoplasmas*, non-spore forming bacteria, and protozoa
- Does NOT work with or store any spore forming bacteria, mycobacterium or prions (except for biological indicator)

Clearly Defining the Scope

- Initial biological risk reduction of all primary containment lines, tanks, and equipment (internal)
- Mobile Autoclave Unit (MAU) design, procurement, installation, and validation
- Asbestos and lead paint abatement
- Removal of legacy waste through the MAU
- End State is to be determined

Who are the Stakeholders?

- Facility owner / operator



- Regulatory agencies

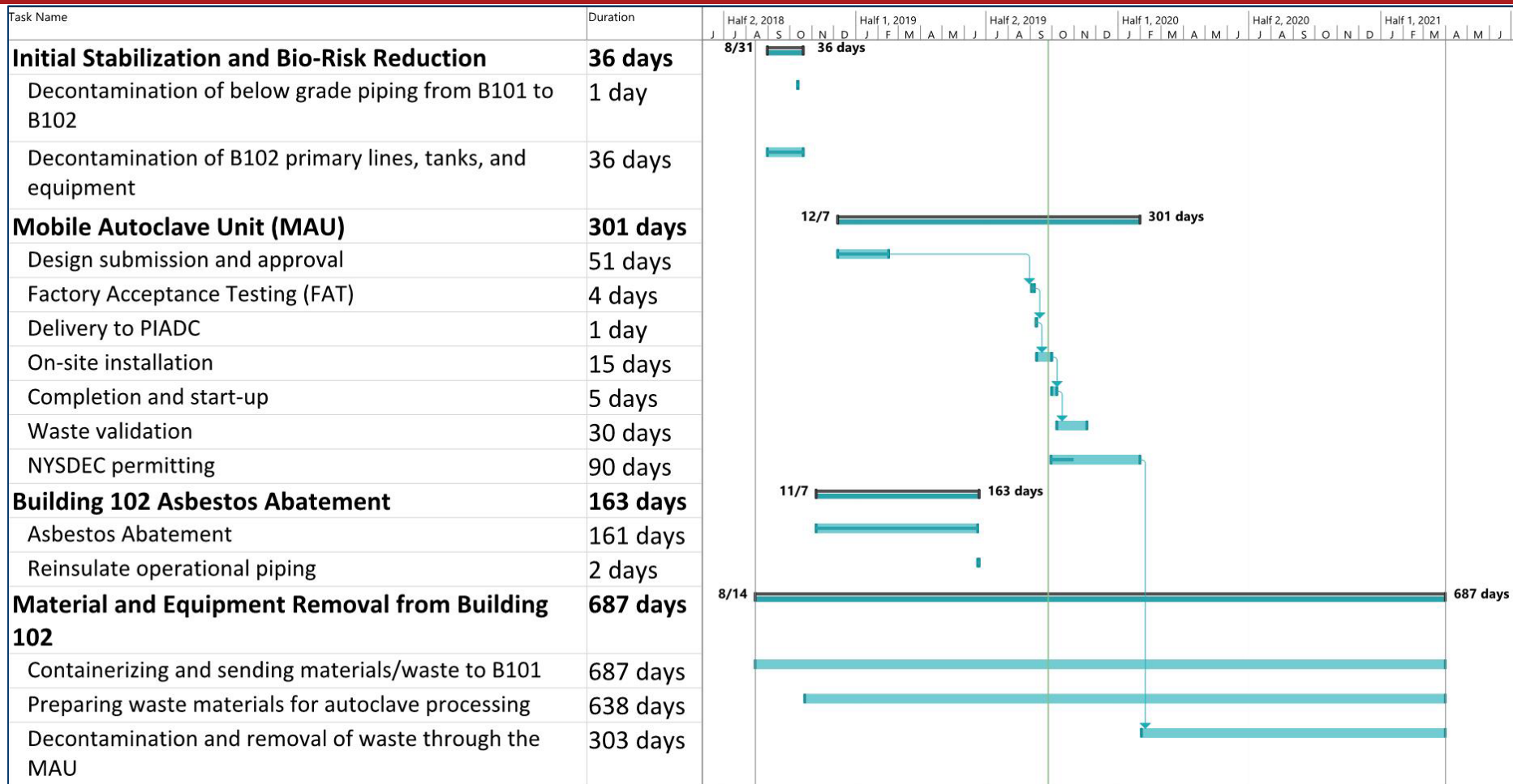


- Other groups



Local, State, or Regional groups /
Public / Community

Phased Approach to Decontamination and Decommissioning



Initial Bio-risk Reduction of Primary Lines, Tanks, and Equipment

Challenges

- All lines and tanks under atmospheric pressure
- Limited access for steam injection
- Limited internal parametric monitoring

Mitigations

- Understand the biological risk and achievable decontamination temperatures
- Use calibrated external temperature probes

Results – Initial Bio-risk Reduction of Primary Lines, Tanks, and Equipment

- Below grade piping exterior reached a minimum of 203.2°F (95.1°C) for 60 minutes
- Building interior piping, tanks, and equipment reached a minimum of 210°F (99°C) for 60 minutes
- Exposure temperatures and times were sufficient to inactivate all agents of concern within the system

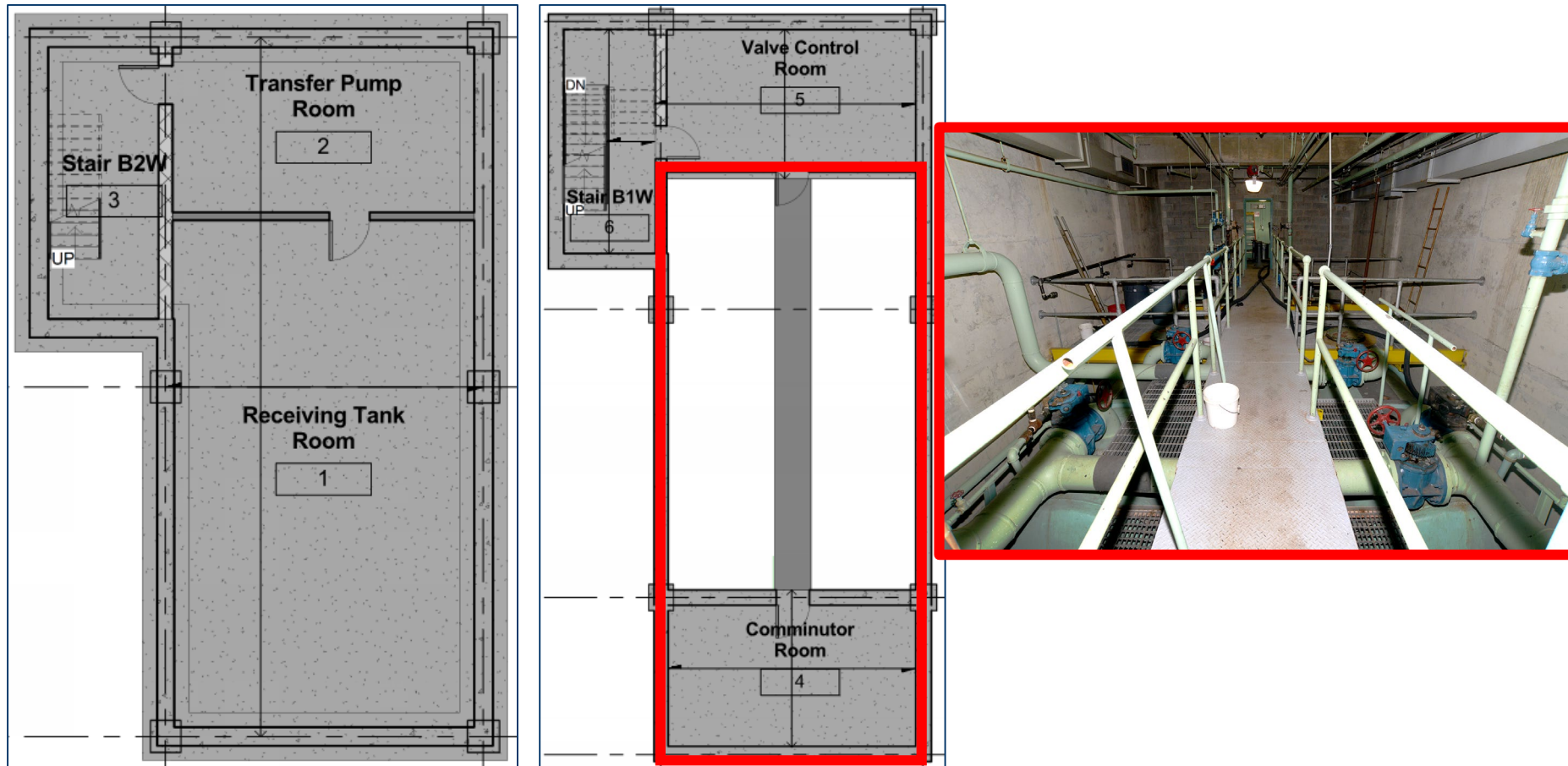
Primary Agent Thermal Inactivation Data

Thermal Inactivation Parameters for Select Agents at PIADC

Select Agent	Temperature	Exposure Time
African swine fever virus ¹	132.8°F (56°C)	70 minutes
	140°F (60°C)	20 minutes
Avian influenza virus*, ¹	132.8-140°F (56-60°C)	60 minutes
Classical swine fever virus ¹	149.9°F (65.5°C)	30 minutes
	159.8°F (71°C)	1 minute
Foot-and-mouth disease virus ¹	158°F (70°C)	30 minutes
Worst Case Parameters: 159.8°F (71°C) for 60 minutes		
* Storage only		
¹ OIE Technical Disease Cards		

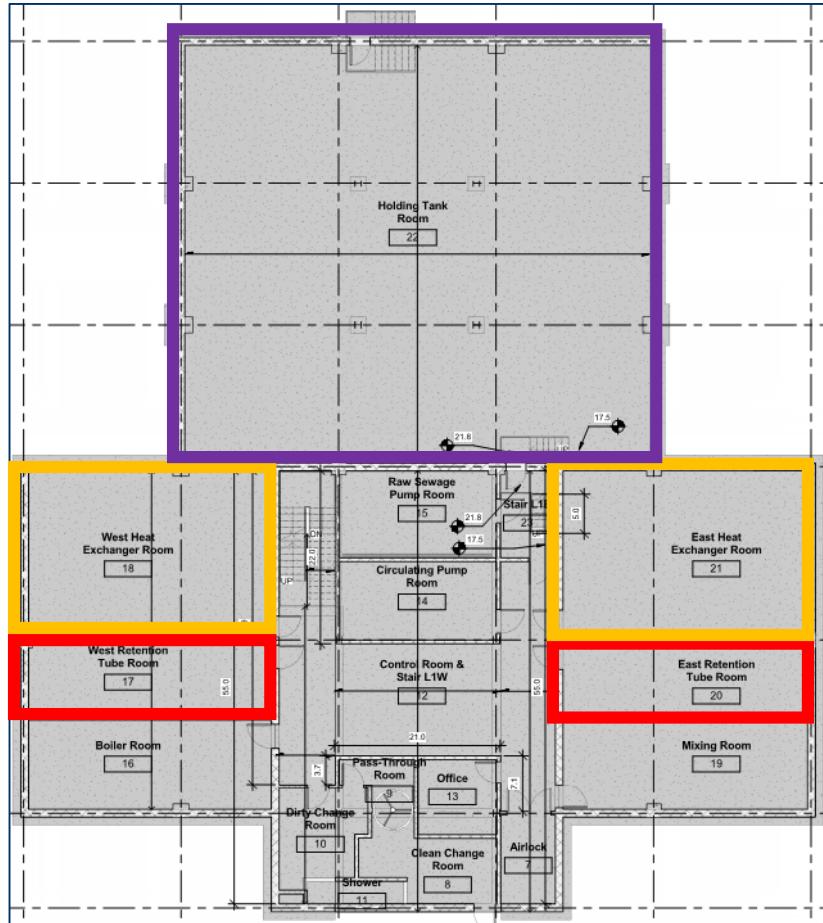
Challenges – Facility Layout

- Sub-Basement and Basement Levels (Receiving)



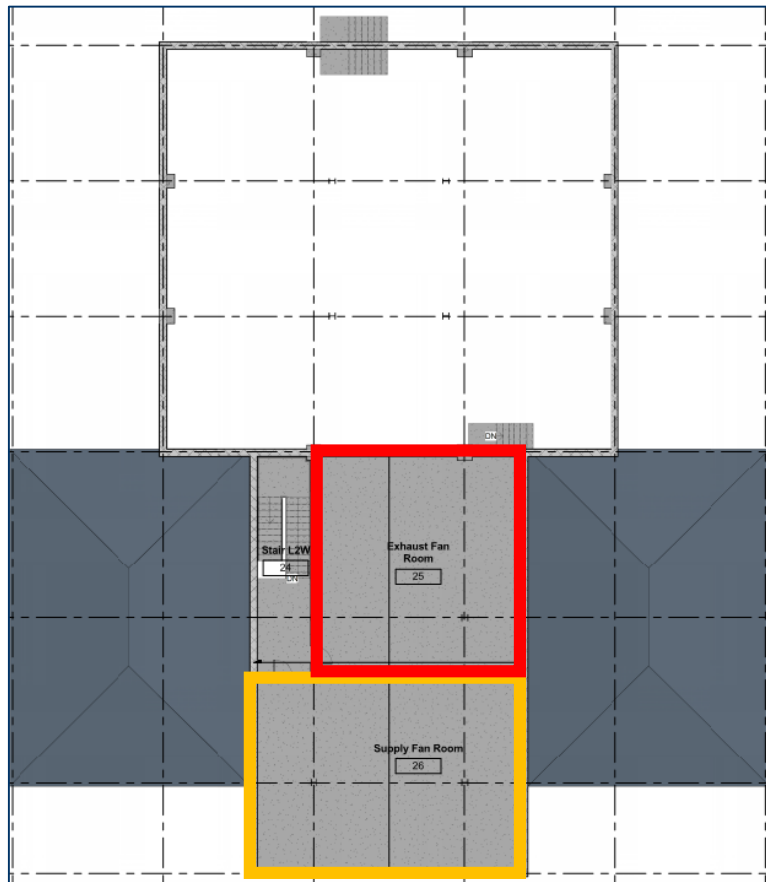
Challenges – Facility Layout

- First Floor (Process)



Challenges – Facility Layout

- Second Floor (HVAC)



Exhaust Fan Room



Supply Fan Room

Mitigations – Facility Layout

- Initial bio-risk reduction of all primary containment lines, tanks, and equipment
- Increased staffing for critical or unique activities
- Dismantling or cutting materials into smaller sizes for transport/disposal

Challenges – Logistics

- Complex project coordination
- Location (Island)



Mitigations – Logistics

Complex project coordination

- Facility security requirements
- Communication with all parties regarding work and schedules for upcoming tasks

Location

- Ferry coordination
- Understating time and load restrictions
- Extra time for weather delays

Challenges – Legacy Items

- 60+ years of materials accumulation



Mitigation – Mobile Autoclave Unit (MAU)

- Customized mobile autoclave unit for waste removal



- Waste validation



Challenges – Asbestos Abatement

- Amount: 8,000 linear ft (2,438 m) + 5,100 ft² (474 m²)
- Waste generated: 7,527 ft³ (214 m³) = 3,000 bags

Before



After



Challenges – Lead Abatement

- Amount: 126 locations, each 4-6 in (10-15 cm) in length
- Waste: 30 ft³ (0.8m³) = 10 bags



Future Work

- Autoclave waste validation and permitting
- Material and waste removal from the biocontainment building
- Preparing the building for terminal decontamination
- Terminal building decontamination

Recap

- Clearly defining scope and stakeholders
- Understanding the biological risks in the facility and how to mitigate them
- Phased approach and interactions between phases (Critical Path)
- Unique challenges of the facility/building and how to best mitigate them
- Preparations for terminal building decontamination

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Questions?



Biocontainment Christmas Tree...For Autoclaving



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DIVERSE PERSPECTIVES + SHARED GOALS = POWERFUL SOLUTIONS