Risk Reduction in Excess Contaminated Facilities at the Y-12 National Security Complex and the Oak Ridge National Laboratory

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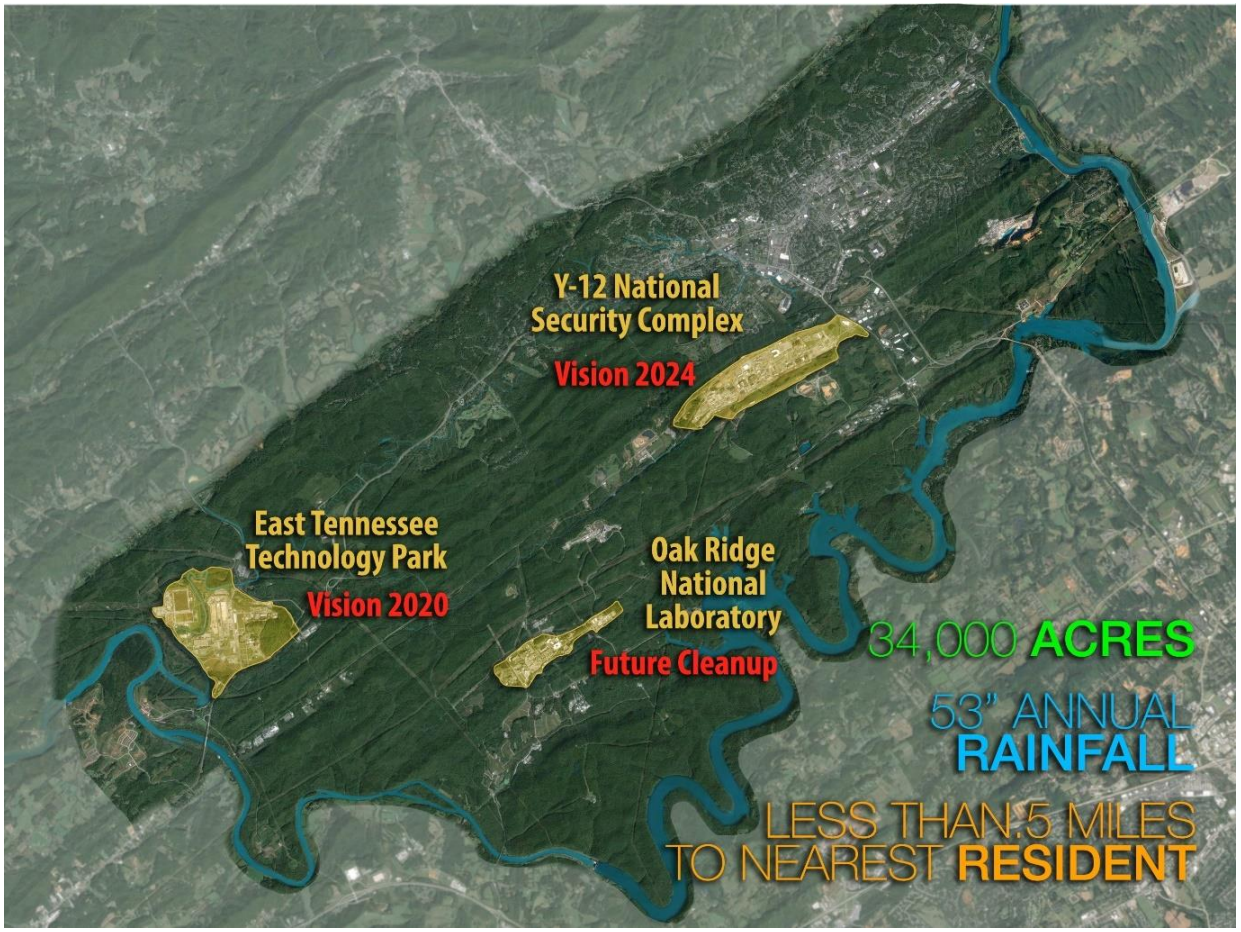
The Oak Ridge Reservation includes three distinct sites with a variety of cleanup challenges

Lifecycle cost
risk at the East Tennessee Technology Park

Environmental
risk at the Y-12 National Security Complex (Y-12)

Radiological
risk at the Oak Ridge National Laboratory (ORNL)



Over $70 million was appropriated in the past two years for Excess Facilities

Fiscal Year 2016 enacted appropriation provided $28 million to begin OREM Risk Reduction work. Objectives were clear in the purpose of the appropriated funds:

- Characterize hazards
- Abate hazards and stabilize buildings to reduce near-term risks

Fiscal Year 2017 enacted appropriation provided $45 million to continue work in excess facilities.

OREM funded risk-reduction work at both ORNL and Y-12.

Biology Complex Buildings 9210, 9207, 9207-A

DOE has over 1,600 excess facilities across the DOE Complex, with more than one-fourth at sites in Oak Ridge

The Excess Contaminated Facilities Working Group (ECFWG) was established in 2015 by the Secretary of Energy.

Rough order of magnitude estimate to D&D 1,600 excess facilities is $6.2 billion, excluding related costs for associated waste treatment and disposal facilities.

In the ECFWG 2017 Annual Report, DOE proposes to address the challenges of managing contaminated excess facilities through the following steps:

- Include $225 million in the President's FY2018 budget request to address certain higher-risk facilities at Y-12 and the Lawrence Livermore National Laboratory
- Continue to improve the data collection used to track and report progress on the D&D of excess facilities
- Evaluate strategies that increase efficiencies for D&D, such as streamlining requirements where appropriate and investing in technology research and development

DOE oversees a large number of excess facilities at Y-12

Alpha 4 (Building 9201-04)

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Constructed: 1945

Use: Initially used for uranium enrichment, but later it used massive amounts of mercury for lithium separation and weapons development.

Last operational: 1993

Current condition: Deteriorated high-risk facility with extensive mercury contamination.

Risk addressed: Repaired the roof to prevent additional water damage, accelerated structural deterioration, and the spread of contamination.

Alpha 4 (COLEX Equipment)

Alpha 4 (COLEX Equipment)

Constructed: 1953

Use: Supported lithium separation for weapons development and used massive amounts of mercury.

Last operational: 1962

Current condition: Deteriorated and extensive rust

Risk addressed: Extracted 4,000 pounds of mercury from equipment on west side before demolition—preventing mercury release into environment. Equipment on south and east sides are being characterized for removal.

Remaining Biology Complex facilities continue to degrade

Biology Complex (9207)
Constructed: 1943
Use: Initially used for uranium recovery/salvage operations, but it later housed ORNL Biology Division Research Operations.
Last operational: 2000
Current condition: Deteriorated high-risk facility with chemical, radiological, physical, and biological hazards.
Risk addressed: Completed hazard investigation and characterization necessary for future demolition.

Biology Complex (9207-A)
Constructed: 1965
Use: Administration offices
Last operational: 2000
Current condition: Deteriorated high-risk facility with chemical, radiological, physical, and biological hazards.
Risk addressed: Completed hazard investigation and characterization necessary for future demolition.

Risk reduction within the Biology Complex facilities is a high priority

Biology Complex (9210)

Constructed: 1945

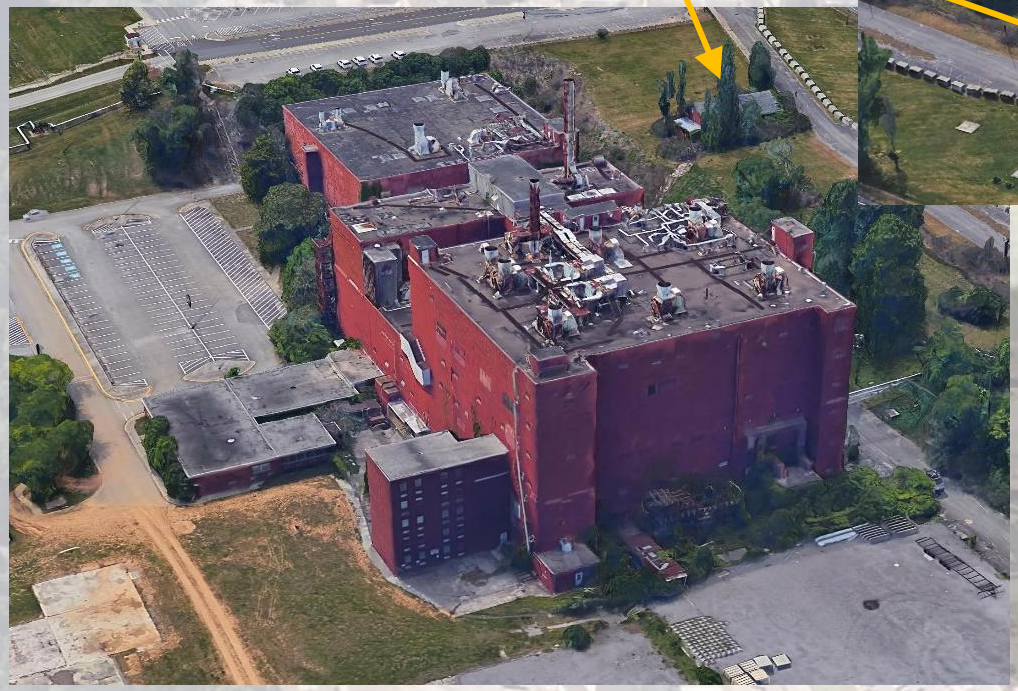
Use: Initially used for uranium recovery and salvage operations. Later, it was used to conduct mammalian genetics research.

Last operational: 2000

Current condition: Deteriorated high-risk facility with chemical, radiological, physical, and biological hazards.

Risk addressed: Completed hazard investigation and characterization necessary for future demolition.

Characterization work was completed in the Biology Complex to support future demolition



Biology Complex (9743-2)

Constructed: 1945

Use: Supported biological research.

Last operational: 2000

Current condition: Collapsing structure, demolition is scheduled in 2018.

Risk addressed: Eliminates a deteriorating high-risk building with failing structural integrity.

Biology Complex Buildings 9767-6 and 9767-7

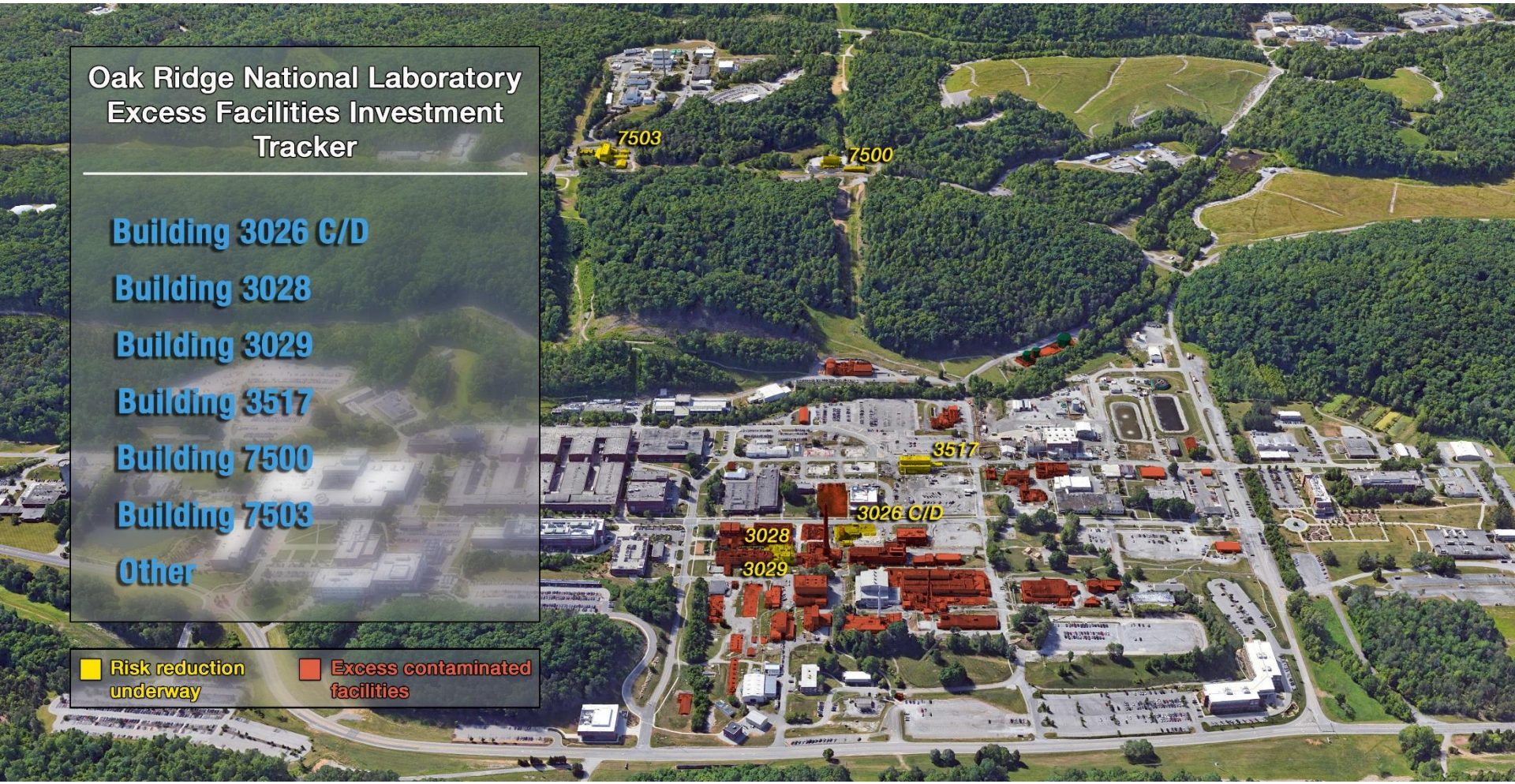
Biology Complex (9767-6)
Constructed: 1967
Use: Housed utilities
Last operational: 2000
Current condition: Deteriorated high-risk facility with chemical, radiological, physical, and biological hazards.
Risk addressed: Completed hazard investigation and characterization necessary for future demolition.

Biology Complex (9767-7)
Constructed: 1968
Use: Housed utilities
Last operational: 2000
Current condition: Deteriorated high-risk facility with chemical, radiological, physical, and biological hazards.
Risk addressed: Completed hazard investigation and characterization necessary for future demolition.

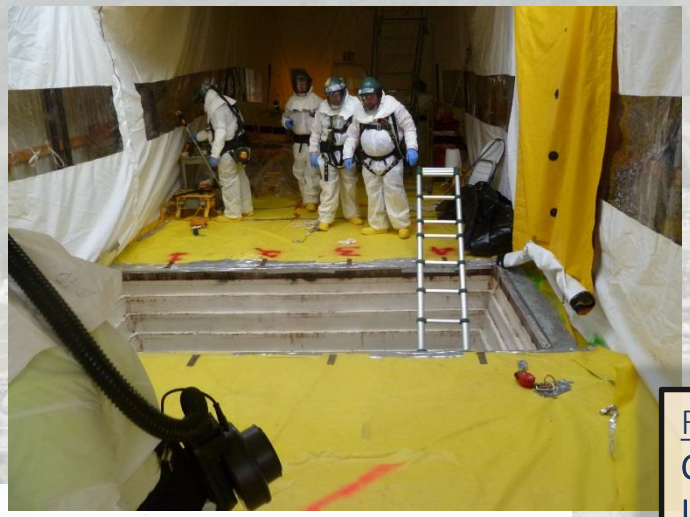
Biology Complex Building 9770-2

Biology Complex (9770-2)
Constructed: 1945
Use: Stored source materials
Last operational: 2000
Current condition: Collapsing structure, demolition is scheduled in 2018.
Risk addressed: Eliminates a deteriorating high risk building with failing structural integrity.

Reducing risk at ORNL protects investments in science and isotope missions



Radioiosotope Development Lab (Building 3026 C/D)



Radioisotope Development Lab (Building 3026 C/D)

Constructed: 1943

Use: Constructed to isolate large quantities of Barium-140 for criticality testing. Also used for segmenting, examining and assembling irradiated metals.

Last operational: 1990

Current condition: EM's work has downgraded facility from a Hazard Category 3 nuclear facility to a radiological facility. Two highly contaminated hot cells remain from the facility.

Risk addressed: Sealed hot cells; characterized, drained, and disposed the water in a connecting tunnel; and sealed radioactively contaminated areas in concrete to prevent contamination migrating to nearby modernized portion of ORNL.

Radioiosotope Development Lab - A (Building 3028)

Radioisotope Production Lab – A (Building 3028)

Constructed: 1950

Use: Initially housed the Iodine-131 processing facility, then the separation facility for Promethium-147.

Last operational: 1985

Current condition: Shutdown pending deactivation and decontamination.

Risk addressed: Fogged hot cells to immobilize contamination. Reduces radiation contamination risk at an aging facility adjacent to modernized portion of ORNL.

Radioiosotope Development Lab - B (Building 3029)

Radioisotope Production Lab – B (Building 3029)
Constructed: 1952
Use: Conducted isotope research.
Last operational: 1989
Current condition: Shutdown pending deactivation and decontamination.
Risk addressed: Fogged hot cells to immobilize contamination. Reduces radiation contamination risk at an aging facility adjacent to modernized portion of ORNL.

Fission Products Development Lab (Building 3517)

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Constructed: 1958

Use: Recovered megacurie quantities of fission products from waste generated in reactor fuel reprocessing operations.

Last operational: 1989

Current condition: A Hazard Category 2 nuclear facility that contains radioactive and hazardous materials and is awaiting deactivation and decontamination.

Risk addressed: Successfully changed the ventilation system HEPA filters to reduce the potential for contaminants to break through the filters and contaminate ORNL.

Building 7500 Homogenous Reactor Experiment risk is driven by worker safety

Homogenous Reactor Experiment Building (Building 7500)
Constructed: 1952
Use: Nuclear safety pilot plant
Last operational: 1961
Current condition: Shutdown pending deactivation and decontamination.
Risk addressed: Removed all of the combustible materials and asbestos from interior of the facility.

Molten Salt Reactor Experiment (Building 7503)

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Constructed: 1951

Use: Graphite-moderated, liquid-fueled reactor that investigated the practicality of the molten salt reactor concept.

Last operational: 1969

Current condition: Currently in the S&M program. Due to the contents of facility, an event could result in a partial or complete facility collapse or release of contamination and hazardous chemicals that impacts workers and the public. Non-EM missions could be impacted.

Risk addressed: Conducting studies and evaluations to identify risks and facilitate near-term risk reduction planning.

Further activities are planned for Excess Facilities

MSRE Lay-up Approach

- Provide electrical power with backup capability for essential equipment and relocates personnel to reduce risk to workers

Liquid/Gaseous Waste Operations Equipment Removal and Moyno Pump replacement

- Removal of surplus equipment required to access pump vault, and replacement of pump required for sludge transfers

Phase 3 Liquid/Gaseous Waste Operations Engineering Evaluation

- Evaluation of above/below ground piping, facility electrical conditions, Liquid Low-Level Waste evaporator feed system, and tritium treatment options

Questions?