



ORNL - Extending Operational Life and Reducing Surveillance & Maintenance Requirements

Bill McMillan, ORNL Portfolio Federal Project Director
Oak Ridge Office of Environmental Management

April 10, 2019

OREM manages both Operational Waste Systems and Excess Contaminated Facilities at ORNL

ORNL Liquid and Gaseous Waste Operations (LGWO)

- Provides treatment of radioactive and non-radioactive wastewater and gaseous wastes from multiple users at ORNL

Various excess production facilities historically used for isotopic research

- Research Reactors
- Isotope Production Facilities
- Associated Support Facilities

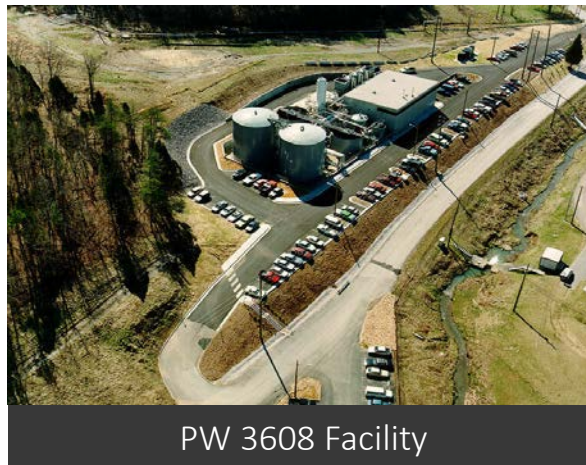


LGWO operates continuously to treat actively generated wastes

Three waste treatment systems are comprised of 64 facilities, and over 20 miles of underground piping and ductwork located at the Oak Ridge National Laboratory

- Liquid Low-Level Waste (LLLW) System
- Process Waste (PW) System
- Gaseous Waste (GW) System

LGWO systems are important to missions of ORNL, and operate in compliance with regulatory permits and DOE standards.





LGWO maintenance needs have been increasing

Although operated safely, many LGWO systems are:

- Operating past their design life
- Experiencing increasingly frequent and significant non-routine maintenance
- Experiencing obsolescence in replacement parts

LGWO costs have increased due to additional corrective maintenance needs.

With rising corrective maintenance needs at LGWO facilities, a two-phased Engineering Evaluation has been completed:

- Phase 1 completed in 2016 and evaluated the infrastructure of the current conditions of three LGWO systems, as well as made recommendations for future operations
- Phase 2 completed early 2019 and evaluated piping and electrical systems associated with PWTC
- Key Summary Document and Long Term Strategic Plan completed in March 2019 to identify upgrade and maintenance items to be achieved over the next four years

LGWO initiatives address corrective maintenance and system upgrades



Initiatives are intended to right-size facilities and systems with more reliable and efficiently operated components.

- Completed:
 - **Heat Trace Control Panel Replacements** – Addressed obsolete equipment
 - **Remove Unrequired Air Stripper** – makes room for new equipment
 - **Evaporator Cooling Tower Piping Replacement** – addressed leaks in system
- Underway:
 - **Motor Control Center Replacements** – Addresses obsolete equipment
 - **Replacement of GAC Columns, Dual Media Filters, and Associated Piping** – provides operational longevity and addresses failed equipment
 - **Concrete Dike Repairs** – Addresses potential release to the environment
 - **Relocate/Replace Zeolite System** – Provides operational longevity and consolidates operations which allows for shutdown of older portion of the PWTC
- Planned:
 - **Pretreatment of Feeds to Liquid Low-Level Wastewater System** – Reduces wastewater which currently requires treatment in the LLLW Evaporator, and extends storage capacity for sludge until processing is available
 - **Distributed Control System Replacement** – Addresses obsolete equipment

Corrective Maintenance



LGWO Pipe Replacement



7961 Dike Repairs



Granular Activated Carbon Columns



Motor Control Center



Central Off Gas



Molten Salt Reactor Experiment

The Molten Salt Reactor Experiment (MSRE), shut down in 1969, contains residual fuel salt contaminated with fission products. Salts produce hydrogen fluoride gases which must be treated.

Current S&M activities focus on:

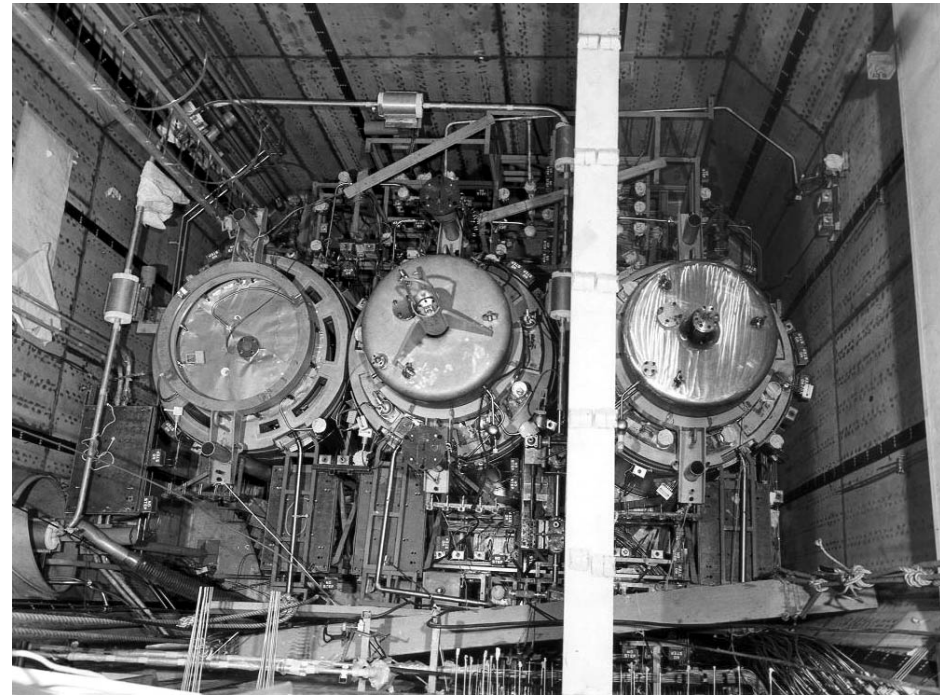
- Periodic pump-down of gases from fuel salt tanks
- Reliability of electrical systems for critical components



OREM is making improvements at MSRE to simplify S&M activities

Actions reduce mortgage costs of the facility, improve reliability of systems important to safety, and releases people and funds for use on other D&D activities at ORNL.

- Replacing aging electrical systems for critical components
- Improve sump pump systems to eliminate flooding concerns
- Continuous treatment and ventilation of fuel salt drain and flush tanks
- Reduce facility infrastructure
- Remote monitoring system



OREM is initiating deactivation of reactor facilities in ORNL central campus

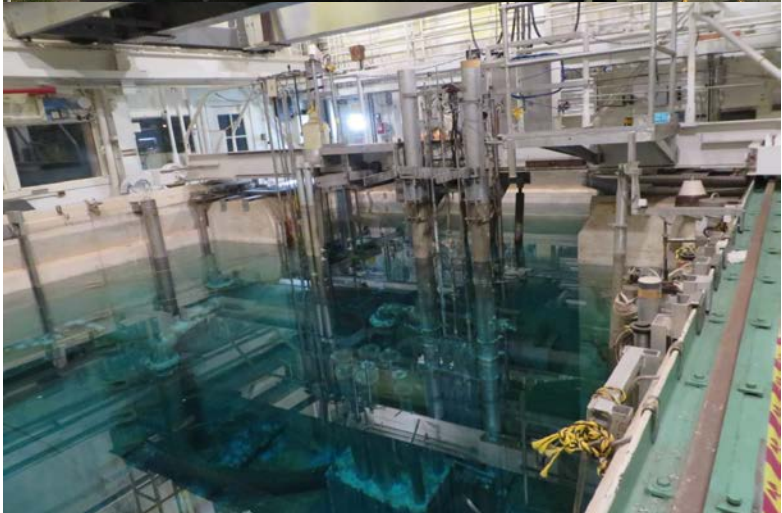
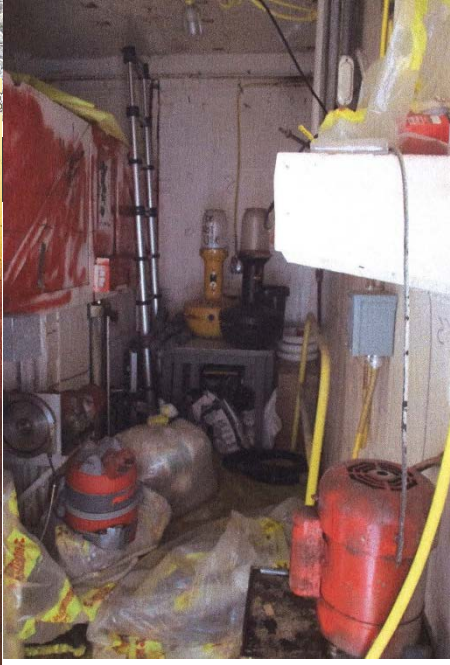


Using funds appropriated for Excess Facilities, OREM has begun deactivation work in central campus.

- 3010 Bulk Shielding Reactor
 - Combustible Material Removal
 - Asbestos Abatement
 - Pool Characterization and Cleanout
- 3026 Hot Cell Footprint
 - Legacy Material Removal
 - Characterization/Deactivation of Tunnel, Storage Cell, and Hot Cell
 - Demolition Planned

Deactivation activities are also planned in the Low-Intensity Test Reactor (Building 3005) and the Oak Ridge Research Reactor (Building 3042).

Deactivation of Buildings 3010 and 3026 is a top priority



3010 Reactor Pool

OREM is laying the foundation for cleanup at ORNL

