Challenges Achieved By Innovative Technologies at the Hanford Site

Our Link to a Safer, Cleaner, Healthier Tomorrow

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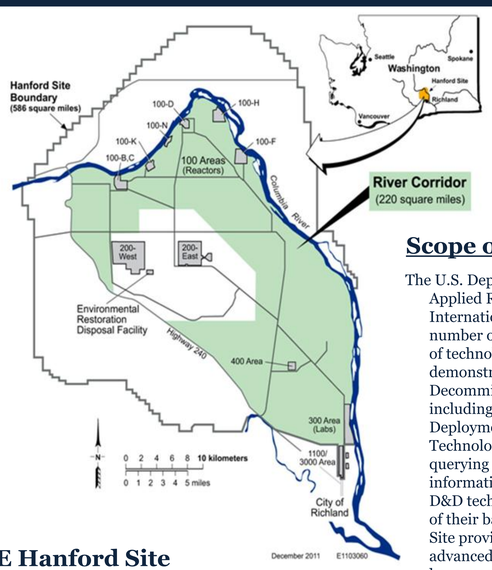

DOE Hanford Site

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Scope of Work

The U.S. Department of Energy tasked the Applied Research Center at Florida International University to investigate the number of subsequent successful deployments of technologies and methodologies that were demonstrated under the Deactivation and Decommissioning Focus Area programs, including the Large-Scale Demonstration and Deployment Program and the Accelerated Site Technology Deployment Program. While querying the sites across the DOE Complex for information about previously demonstrated D&D technologies that have since become part of their baseline technologies, the Hanford Site provided additional information on the advanced innovative technologies that they have recently used at their site. These technologies allow for the clean-up to be done safely, efficiently, and cost-effectively to meet their on-site needs. They are our link to a safer, cleaner, healthier tomorrow.

RIVER CORRIDOR CLOSURE PROJECT

The nation's largest environmental cleanup closure project where innovative technologies are being utilized to overcome DOE's environmental clean-up challenges.

LOCATIONS OF WORK

100 Area
Plutonium produced in 9 nuclear reactors

400 Area
Fast Flux Test Facility and support facilities

300 Area
Uranium fabrication, manufacturing and waste disposal

600 Area
2 challenging and highly radioactive burial grounds, 618-10 and 618-11

PROJECTS

D4 Project
DDD&D of retired nuclear and support facilities; encompasses the 100 Area (9 nuclear reactors) and 300 Area.

Waste Operations Project
Transports, treats, and disposes of low-level radioactive, hazardous and mixed waste and manages the ERDF.

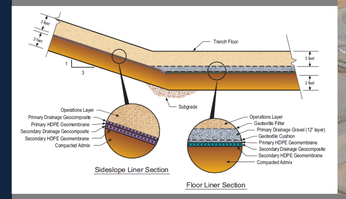
Field Remediation Project
Cleans up and removes materials from 118-K-1, 618-1, 618-7, 618-10 burial grounds and N Area.

Technology Needs
DOE executes the RCCP by deploying technologies in the field that prove to be safe, efficient and cost-effective.

Environmental Protection
Protects workers and the environment by ensuring the cleanup work is performed within applicable state and federal environmental laws and guidelines

Environmental Restoration Disposal Facility

The ERDF is designed to dispose of low-level radioactive and mixed waste. Hanford welcomes the addition of 2 super cells. Super cells eliminate the need for 12" of drainage gravel and requires fewer pumps, motors, manholes, etc. The reduction has save DOE $1.5M per cell due to the enhanced design and decrease in labor.



Sediment Removal Filtration System

River Structures' Sediment Removal Filtration System

The 100-N river structures were utilized in the cooling of the N-Reactor and HGP operations and were abandoned in place for decades. Heavy metals were found present in soil samples near the Columbia River where the 100-N river structures, 181-N and 181-NE pump-houses, and the 1908-NE outfall structure, reside.

Challenge: Removal of contaminated sediments

Technology

Benefit: Most safe, timely, and cost effective method of removing sediments

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Hot Cell Disposition ALARA

327 Building Hot Cell Disposition

The 327 Building was designed to contain specially equipped laboratories (termed hot cells) for the examination and testing of irradiated fuels, concentrated fission products, and structural materials in support of operational efforts.

Challenge: Physically separating the hot cells weighing 75 and 230 tons from the facility structure and transporting them to the ERDF

Technology: They were separated from the building using a uniquely designed gantry system.

Benefit: Safer and more cost efficient than conventional demolition

Radiation Screening Tool ALARA

618-10 Burial Ground Drum Radiation Screening Tool

Historically, wastes from the 300 Area were sent to the 618-10 burial ground for disposal. There is no documentation of the type of waste in the containers. There was a need for non-destructive instrumentation that would assist in the characterization of the waste.

Challenge: Assay waste containers and decipher between LLW and TRU waste.

Technology: 2 neutron slab counters employing total neutron counting technology

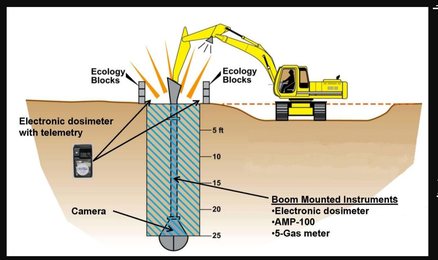
Benefit: Project schedule and budget were decreased significantly

Modified Clamshell Boom Excavator ALARA

118-K-1 Modified Clamshell Boom Excavator

105-KE and 105-KW reactors were placed in the 118-K-1 burial grounds. The burial grounds contain radioactively and chemically contaminated soil, buried waste, demolition debris, and activated reactor components. Materials were found deep within 6 of the 11 underground vertical silos (10' Dia. 25' Long) that contained extremely high levels of Co-60.

Challenge: Exposure control during the removal of the 6 silos



Technology: Utilized a combination of

- Engineered clamshell boom modification to traditional excavator
- High resolution cameras
- Nuclear instrumentation with telemetry capabilities
- Ecology blocks used as shield barriers

Benefits: The waste was properly identified prior to extraction. Limited exposure to the workers and the environment.

The technologies will be made available to the D&D community via the D&D KM-IT website.