Richland Operations Office

K Basin Sludge Retrieval Update

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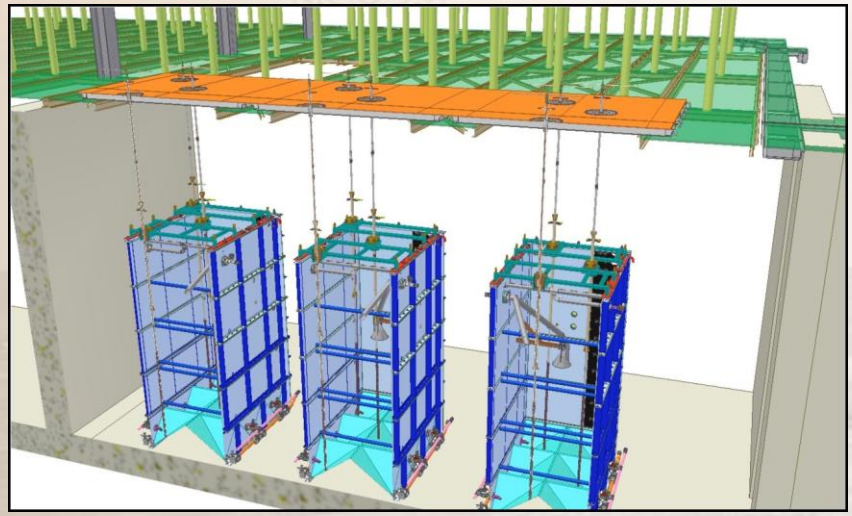
100 K Reactors Area in 2017

Spent Nuclear Fuel / Sludge Project History

- K East and K West Basins operated from 1955 to 1971
- K Basins were later reactivated for storage of N Reactor fuel, prior to fuel processing at the Plutonium Uranium Extraction (PUREX) Plant
- 2,100 metric tons of spent fuel left stored under water in K Basins when PUREX shut down in 1990
- Spent fuel removed from both basins between 2000 and 2004 and transported to Canister Storage Building
- K East Basin sludge transferred to three Engineered Containers (ECs) in the K West Basin in 2007
- K West Basin sludge vacuumed into three ECs between 2006 and 2010

Baskets of spent fuel that were stored in K Basins

Sludge Engineered Containers Containing 27 Cubic Meters of Sludge



Artist's rendering of Engineered Containers under water in K West Basin

Workers on grating above K West Basin

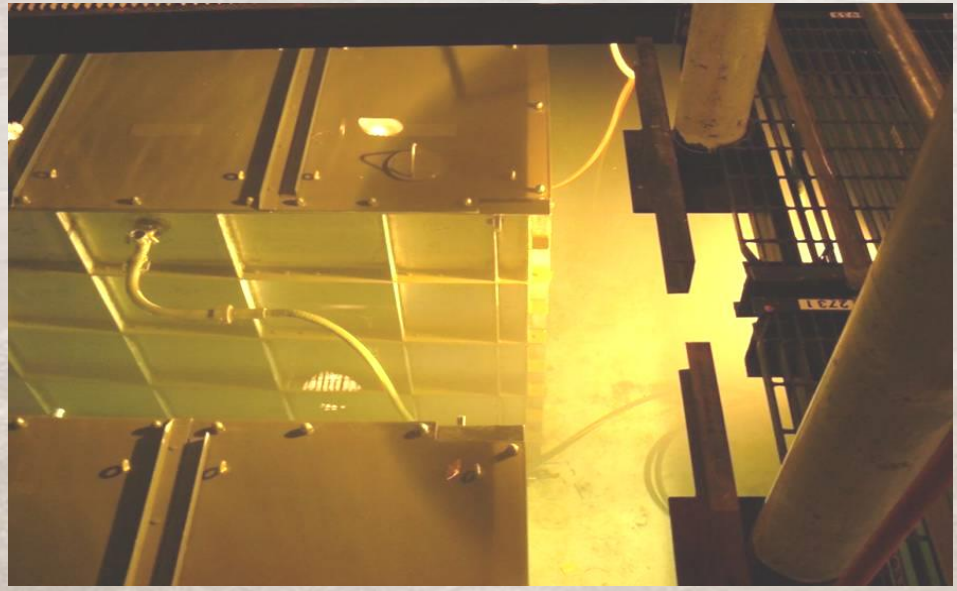


Photo of Engineered Containers in basin

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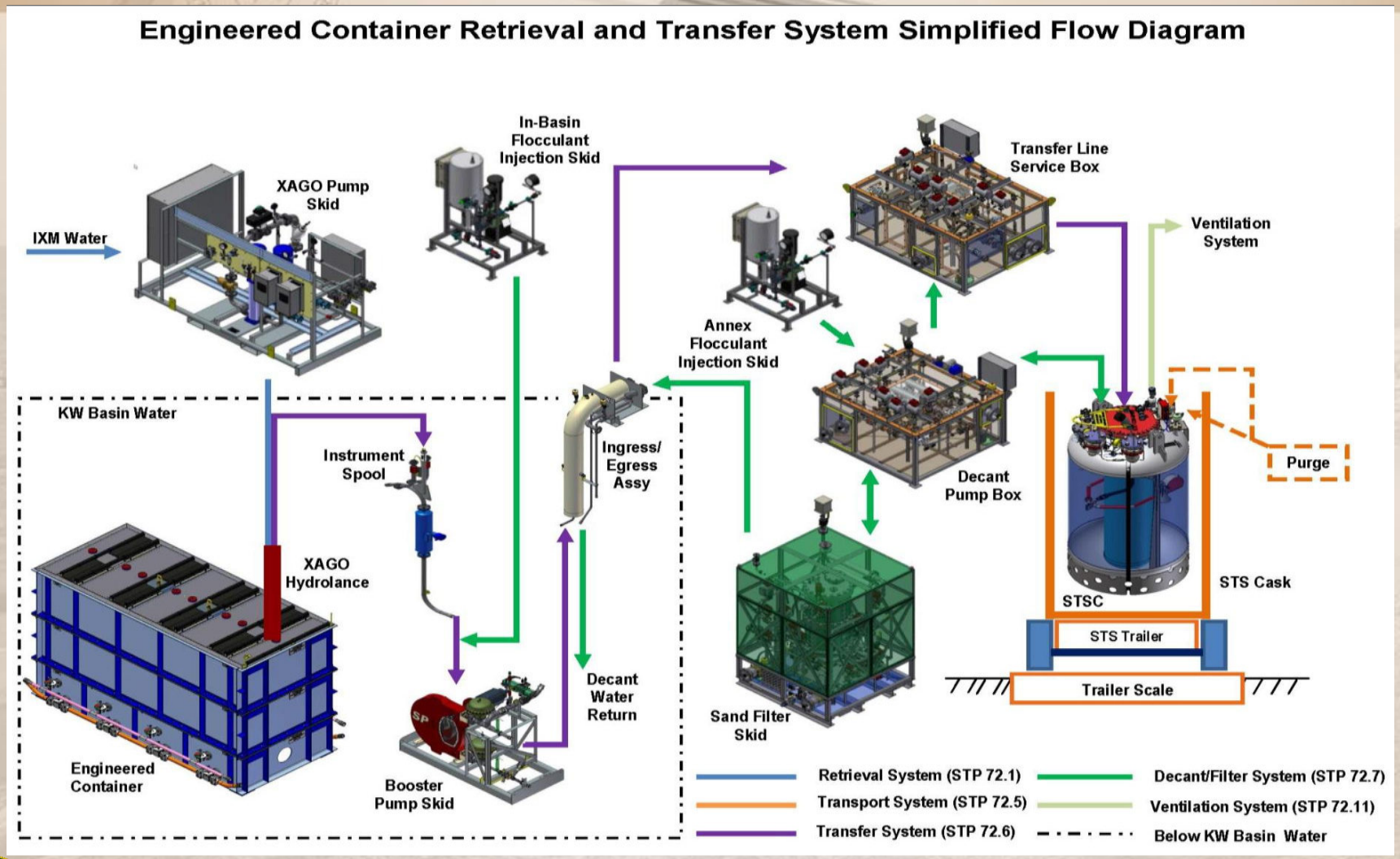
Sludge Characteristics and Removal Challenges

- Approximately 27 cubic meters (35 cubic yards) total volume
- Currently characterized as transuranic waste:
  - Radionuclides: originated from corroded N Reactor fuel
  - Corrosion products: iron, aluminum, uranium hydroxides
  - Environmental particulates: organics, sand, rocks
  - Basin operations: concrete and paint flakes, other debris
- Sludge removal challenges:
  - Dramatic range in densities of sludge constituents
  - Presence of uranium metal (potential for hydrogen gas generation)
  - Potential radiological dose
  - Remote handling (containers are under water) and packaging operation is conducted without personnel in Annex Facility

Sludge Removal Project (SRP) Reviews

- Analysis for sludge removal completed in 2009, with two-phase approach recommended:
  - Remove sludge away from river as soon as possible (Phase 1)
  - Treat and package sludge for disposal at Waste Isolation Pilot Plant (Phase 2)
- External Technical Review, June 2009
- Technology Readiness Assessment (TRL-4), October 2009
- Technical Independent Project Review, June 2010
- Technology Readiness Assessment (TRL-6), July 2012
- Independent Project Review, October 2013

Engineered Container Retrieval and Transfer System (ECRTS) Diagram



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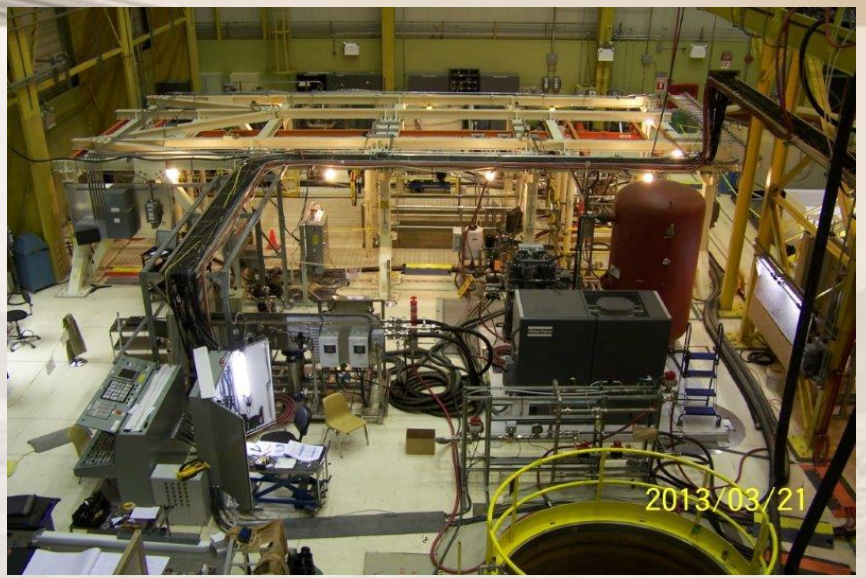
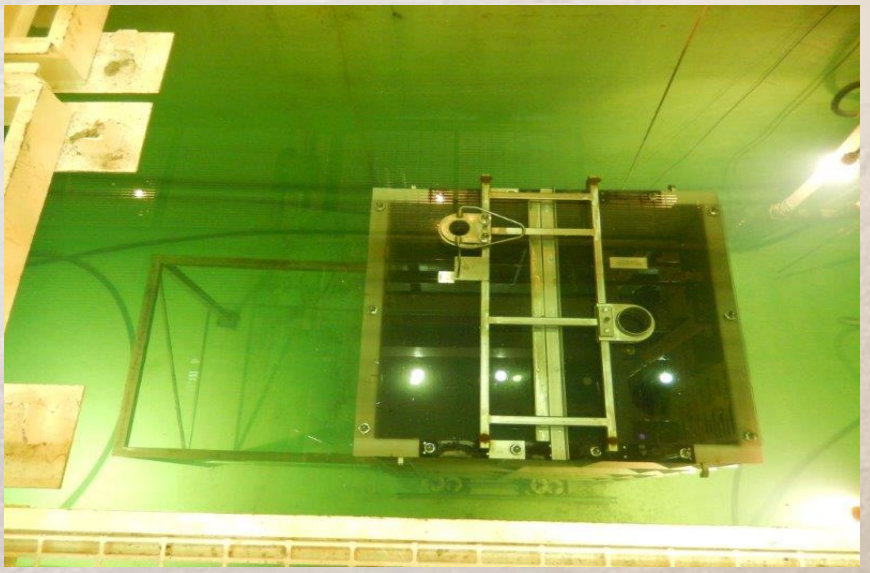
ECRTS Test Facility at Maintenance and Storage Facility

Testing at Maintenance and Storage Facility (MASF) to demonstrate design maturity and evaluate component and process improvements, and utilizing replica of basin where operators train on tools, processes, and troubleshooting





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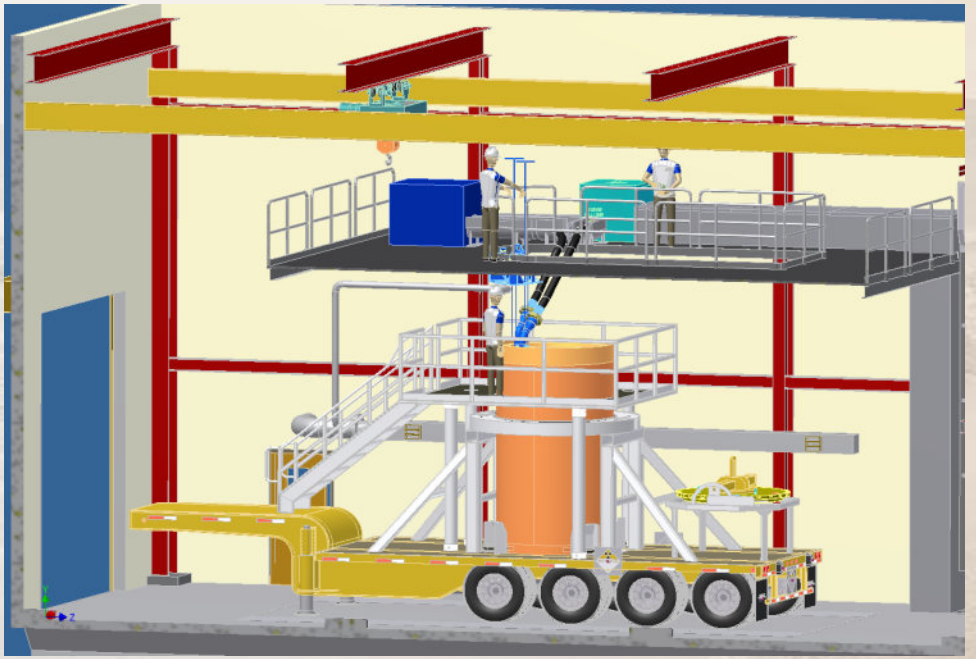
K West Annex

Outside K West Annex

Artist's rendering of Sludge Transport & Storage Container (STSC) within K West Annex



- New facility adjacent to K West Basin
- Hazard Category 2 Nuclear Facility
- Transfer Bay is approx. 30 ft. wide, 50 ft. long, 40 ft. high with mezzanine approx. 20 ft. above floor level
- Supports transfer and packaging of sludge into Sludge Transport and Storage Containers

K West Basin
Pre-operational Acceptance Testing

Crews finished Pre-operational Acceptance Testing for the K West Basin in October 2017, verifying removal equipment capabilities and functionality

SRP Operational Readiness Review

STSC and trailer in the K West Basin Annex during operations demonstrations for the contractor-led ORR

Contractor-led Operational Readiness Review (ORR) consists of observing operations demonstrations, reviewing documents, and interviewing staff

T Plant Ready to Receive Sludge


Aerial photo of T Plant in 2016


Workers delivering STSC to T Plant


Workers handling STSC in T Plant tunnel

SRP Schedule

- Annex construction — Oct. 2012 – Oct. 2015 (COMPLETE)
- In-basin construction — Oct. 2014 – Sept. 2016 (COMPLETE)
- Cold commissioning — Mar. 2016 – Sept. 2016 (COMPLETE)
- Equipment installation — Oct. 2016 – June 2017 (COMPLETE)
- Acceptance testing — Apr. 2017 – Dec. 2017 (COMPLETE)
- Readiness reviews — Jan. 2018 – Apr. 2018
- Start removing sludge — May 2018
- TPA milestone to start removing sludge this fiscal year, by Sept. 30, 2018
- Expect to complete sludge transfer in fiscal year 2019 to meet TPA milestone of Dec. 31, 2019