



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Environmental Assessment
for the Replacement Capability for
Disposal of Remote-Handled Low-Level
Radioactive Waste Generated at the
Department of Energy's Idaho Site

(RH-LLW EA)

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RH-LLW EA Purpose and Need

- The current RH-LLW disposal facility on the Idaho Site's Radioactive Waste Management Complex (RWMC) will cease operations and undergo closure as part of the Idaho Cleanup Project
- The DOE must have continuing capability to dispose of RH-LLW generated and stored on the Idaho site to support ongoing Idaho national security, research, and Naval Reactors Facility (NRF) missions and operations
- DOE policy is to ensure disposal capability is available before waste is generated

RH-LLW EA Proposed Action

- The proposed federal action is to site, construct, and operate an onsite disposal facility for RH-LLW generated by Idaho site operations; the facility would be sized for a 20 - 50 year operational period
- The impacts of onsite and offsite disposal of LLW generated at the Idaho site were evaluated in a 1995 programmatic environmental impact statement; onsite disposal was selected in the 1995 Record of Decision
- Siting and construction of a new disposal facility (if needed) was deferred to further project definition and appropriate National Environmental Policy Act (NEPA) review
- On April 26, 2010 an Environmental Assessment determination was signed by the Office Manager

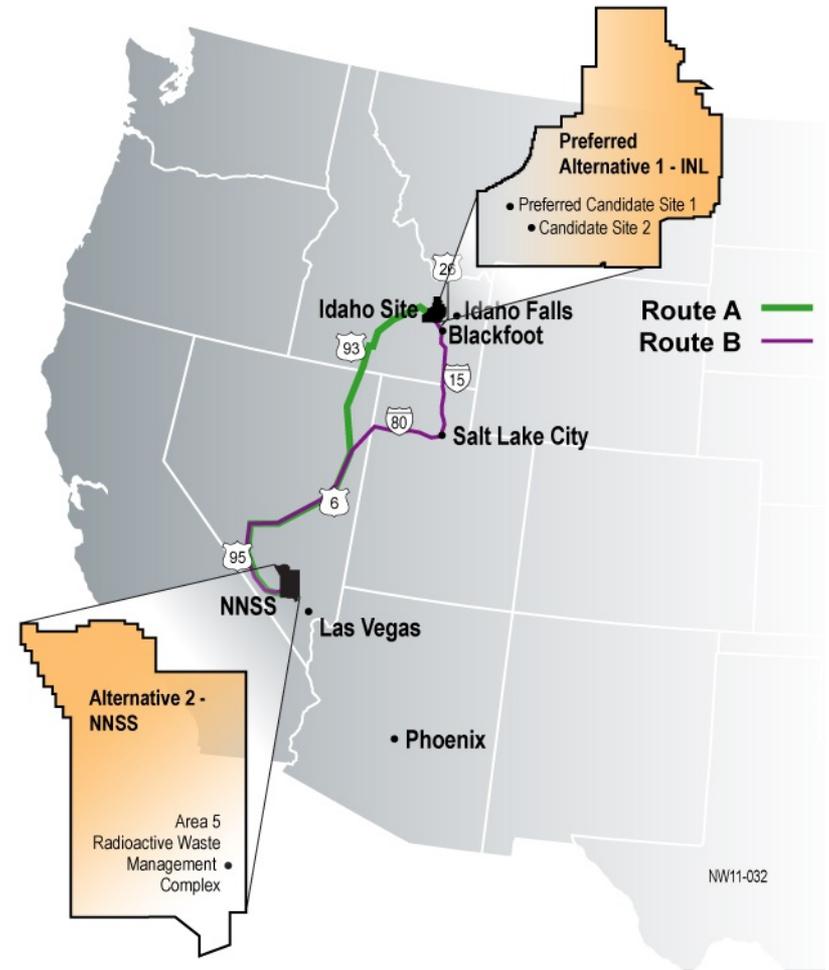
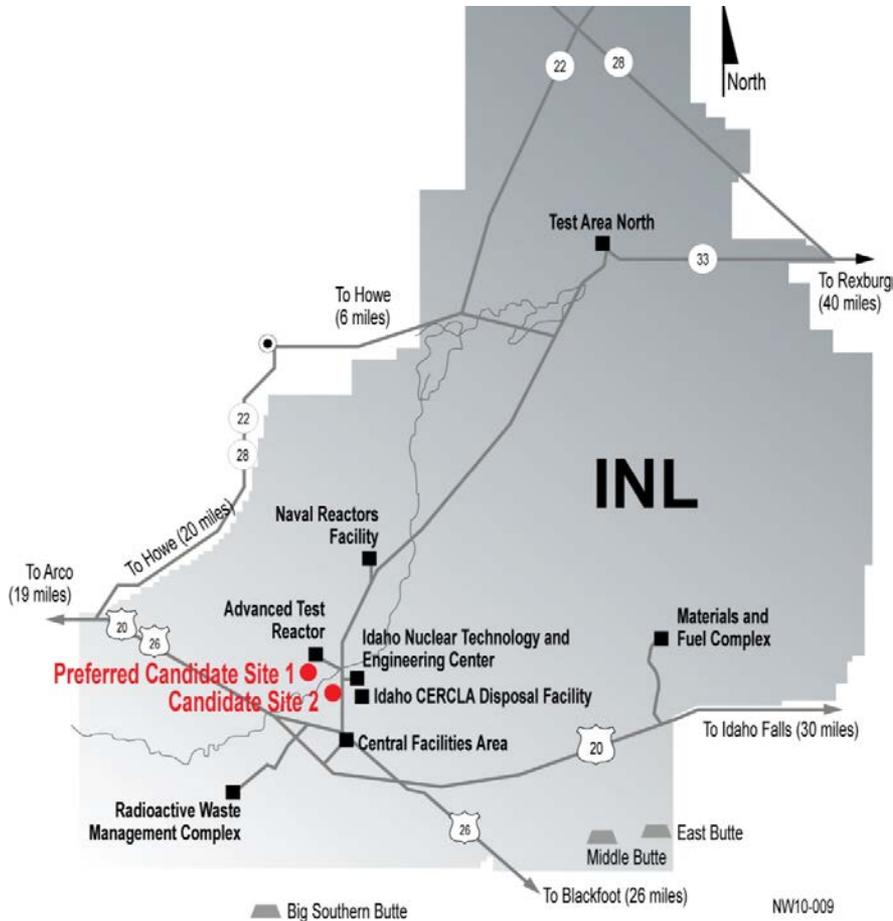


RH-LLW EA Alternatives

- The Alternatives section is the “core” of the EA - DOE Idaho developed criteria to help identify the range of reasonable alternatives to the proposed action that would meet DOE’s purpose and need for replacement disposal capability
- On-site disposal - two candidate locations/sites were evaluated – a location near the ATR complex (preferred site); and a location west of the Idaho Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility (ICDF) near the Idaho Nuclear Technology and Engineering Center (INTEC)
- Offsite disposal at the Nevada National Security Site (NNSS)
- No action; storing RH-LLW at the generator facilities and terminating operations when capacity is reached
- DOE considered six other alternatives but eliminated them from analysis because they did not adequately meet the selection criteria and DOE’s need – reasons include lack of availability, unacceptable risks, regulatory constraints and exorbitant cost



RH-LLW EA Alternatives Location



RH-LLW EA Alternative 1 Analysis

- Develop Onsite Replacement Disposal Capability
 - A new disposal facility on the INL site meets all selection criteria and DOE's purpose and needs
 - Both candidate sites meet the selection criteria, but the site located south of the ATR Complex is more protective of the environment than the location near INTEC
 - Alternative 1 is DOE's preferred alternative. It supports DOE and Naval Nuclear Propulsion Program missions and operations, giving consideration to economic, technical, risk and environmental factors.

RH-LLW EA Alternative 2 Analysis

- Transport Waste to the Nevada National Security Site (NNSS) facility for Disposal
 - Would provide continuity of operations because it is currently an operating facility and would be available for the duration needed of up to 50 years
 - The environmental consequences are comparable with the preferred alternative
 - Current NRF cask systems are too heavy to be used for transport along public highways and are not certified for commercial transportation, smaller capacity shipping casks and trailers, along with transfer systems, would be needed
 - Modifications to infrastructure and operations at all INL site generating facilities, including reconfiguration and refurbishment of storage pools to accommodate increased use, would be needed to accommodate these casks and the increased frequency of shipments
 - Over 100 shipments of remote-handled LLW would take place each year from INL to NNSS; the risks associated with waste shipment and the operational risk of not having control of the disposal operation is not desirable
 - The NNSS is not configured to manage disposal of RH-LLW at this time

RH-LLW EA No Action Alternative Analysis

- No action; storing RH-LLW at the generator facilities and terminating operations when capacity is reached
 - The selection of the No Action Alternative means that the proposed activity would not take place
 - Under the No Action Alternative, no activities would be conducted by DOE to ensure uninterrupted disposal capabilities for remote-handled LLW generated at the INL site
 - RH-LLW from NRF and the INL site would continue to be disposed of in the Subsurface Disposal Area at RWMC until it is full or must be closed in preparation for final CERCLA closure
 - INL missions supporting research, development, and demonstration activities and the activities of the Naval Nuclear Propulsion Program would be seriously impacted by the lack of storage and disposal capacity

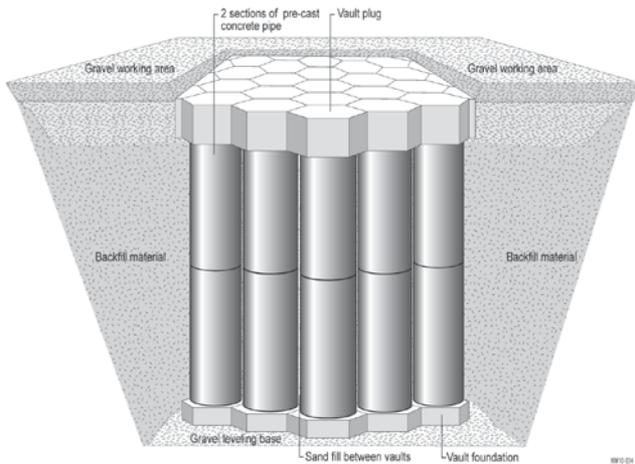
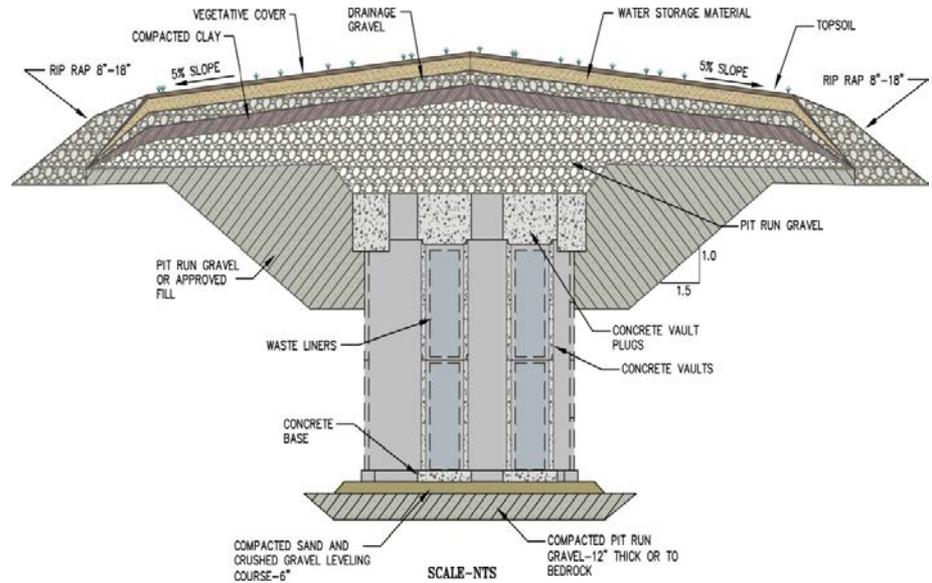


RH-LLW EA Waste Description

- LLW is defined by DOE by what it is “not” – not high-level waste (HLW), not transuranic (TRU) waste; it is also not spent nuclear fuel. The Site’s RH-LLW has greater than 200 mrem/hr dose on contact requiring remote handling and shielding
- RH-LLW is comprised of:
 - Ion-exchange resins which are solid/semi-solid residues from filtration of water in pools and canals at the ATR and NRF;
 - Activated metals from ATR, NRF and MFC – metals, tools, hardware, reactor components that have become radioactive during exposure to radiation;
 - Items associated with the management of RH-LLW such as personnel protective gear, miscellaneous trash/debris;
 - NO liquids, hazardous chemical constituents, TRU waste or HLW
- DOE expects to generate about 150 m³ of RH-LLW per year



RH-LLW EA Projected Facility Design

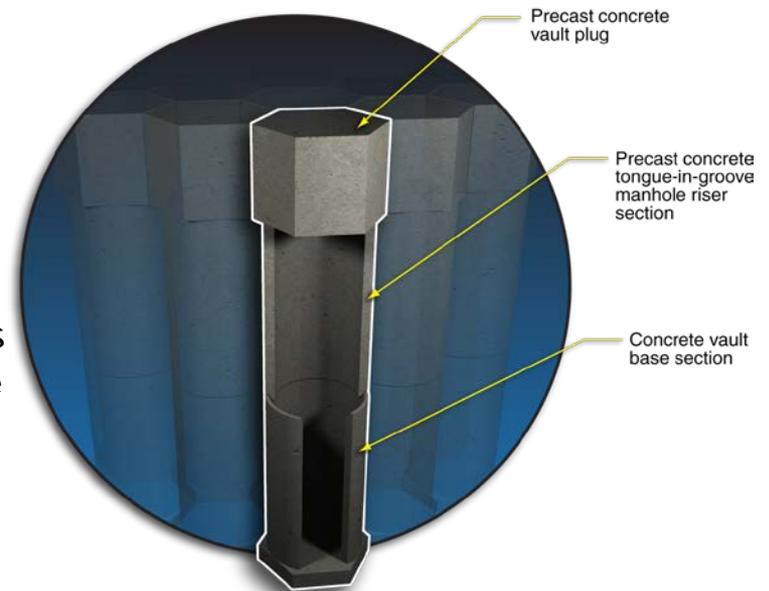




RH-LLW EA Facility Description

- Precast reinforced concrete vault base, riser sections and top plugs - will provide shielding for onsite workers and limit water infiltration
- Waste would be placed into the vaults in steel liners - a steel barrel that "lines" the vault and isolates the waste - prevents water contact with the waste and provides structural integrity for a longer period - this allows for more decay to occur to minimize concentration of potential contaminants
- A 2 ft thick interim cover would be placed over the facility as the vaults are filled - increase vault stability, and provide additional protection against water infiltration. A final engineered cover would be placed over the facility at the end of operations

Vault Details



■ Additional Features

- Groundwater monitoring wells would be installed to allow detection of contaminants in the aquifer
- Air monitoring would be conducted to detect emissions
- A berm would be placed around the facility to control water run-on from offsite
- Security enhancements - intruder detection, fences to monitor access

The proposed facility is designed for shielding, long-term stability and groundwater protection, beyond what is required and generally implemented

RH-LLW EA

Impacts Analysis

Alternative 1- Onsite Disposal

- No significant environmental impacts were identified
 - Cultural resources - few resources were identified in the potentially affected areas; will be administratively protected
 - Ecological resources - affected areas are burned over, little native habitat remains, no impacts to sensitive species
 - Air resources - minor emissions during construction; no radioactive emissions during operations
 - Transportation - the probability of radiological exposure during routine operations is extremely low; essentially no impacts to site workers or the public
 - Accidents - dose-related latent cancer fatalities to on site workers or the public from accidental exposure and additional injuries from vehicular accidents are very unlikely
 - Energy use - minimal greenhouse gas emissions/climate impact

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Alternative 1- Groundwater Impacts

- No radionuclide contaminant releases to groundwater are anticipated from facility operations through the 100 yr institutional control period
- The potential exists for contaminants from either of the two candidate sites to migrate into groundwater after the facility degrades, peaking thousands to tens-of-thousands of years in the future
- Potential contaminant concentrations are predicted to be well-below the state maximum contaminant level (MCL) for all radionuclides
- A cumulative all-pathways dose 100 m from the proposed RH-LLW disposal facility via groundwater ingestion to a maximally exposed member of the public is predicted to be much lower than the DOE regulatory limit of 25 mrem/year - .88 mrem/year in calendar year 5500
- Cumulative impact to the aquifer including existing facilities will be less than 30 mrem/year everywhere in the aquifer

RH-LLW EA Alternative 1 Groundwater Protection

■ Groundwater would be protected by:

- Site selection

- The INL completed an extensive study on flooding and potential impacts on the proposed Sites; under the worst case scenario, onsite water is possible but the likelihood of flooding detrimentally impacting the proposed RH-LLW facility is extremely low
- Depth to groundwater is about 480 ft., with 31- 55 ft of underlying surficial sediments and sediment interbeds in the basalt over the groundwater

- Engineered features

- Cement vaults, steel waste isolation liners, engineered cover, and a berm
- Steel waste liner increases facility performance longevity by up to 1M years; Concrete vault > 2,000 years; Engineered cover >500 years
- Operational Controls – berm and snow removal controls water during operations, cover and berm maintained throughout 100 yr institutional control period

RH-LLW EA

Impacts Analysis

Alternative 2 - Offsite Disposal

- No significant environmental impacts were identified
- As the NNSS is an evaluated, operating facility, no environmental resource consequences were anticipated or analyzed
- The radiological risk associated with routine transportation is negligible for the public and crew members, but greater than that for the onsite alternative
- Considerably more greenhouse gas emissions from the offsite alternative; still less than regulatory threshold

RH-LLW EA Current Status

- The draft EA was released for public review and comment on September 1st, 2011 for a 45 day comment period and extended 30 days until November 21, 2011
- DOE-ID will accept, respond to and resolve public comments
- Revise and issue the EA, with either a “Finding of No Significant Impact” determination or acknowledgement of the need for further analysis and decision making (projected by January 2012)