Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste

Welcome

The U.S. Department of Energy (DOE) Issued the Draft Environmental Impact Statement (EIS) for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste (LLRW) and GTCC-Like Waste (DOE/EIS-0375-D)

You are invited to submit comments on the Draft GTCC EIS.

Written comments on the Draft EIS may be submitted by U.S. mail to the following address:

Mr. Arnold M. Edelman, EIS Document Manager
U.S. Department of Energy, GTCC EIS, Cloverleaf Building, EM-43
1000 Independence Avenue, SW, Washington, DC 20585

Comments may also be submitted electronically via the GTCC EIS Web site at **http://www.gtcceis.anl.gov**

GTCC EIS Public Hearing Schedule

Date	Place	Time
April 19	North Augusta, SC	5:30-9:30 p.m.
April 26	Carlsbad, NM	5:30-9:30 p.m.
April 27	Albuquerque, NM	5:30-9:30 p.m.
April 28	Santa Fe, NM	5:30-9:30 p.m.
May 9	Las Vegas, NV	5:30-9:30 p.m.
May 11	Idaho Falls, ID	5:30-9:30 p.m.
May 17	Pasco, WA	5:30-9:30 p.m.
May 19	Portland, OR	5:30-9:30 p.m.
May 25	Washington, DC	1:00-5:00 p.m.

For further information contact:
Mr. Arnold Edelman, GTCC EIS Document Manager, Office of Environmental Management
U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585-0119
Telephone: (301) 903-5145, or e-mail to gtcceis@anl.gov

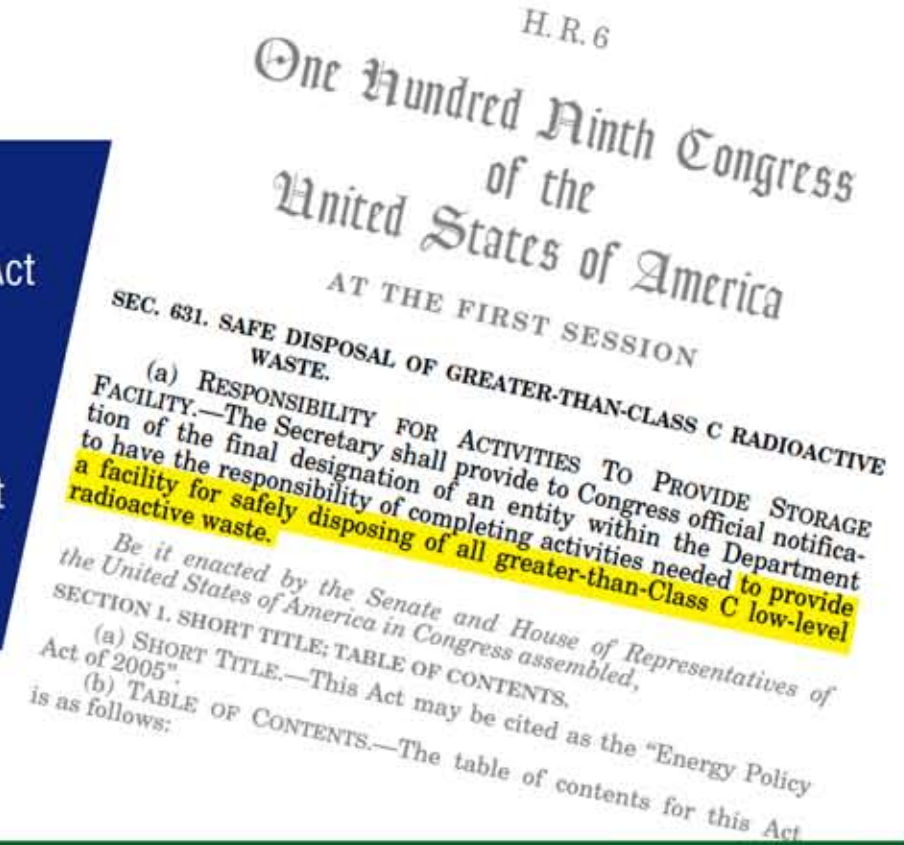
Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste

Purpose and Need for Action

- There is currently no disposal capability for GTCC LLRW.
- A GTCC disposal facility will:

Respond to Congressional Mandate

- Low-Level Radioactive Waste Policy Amendments Act of 1985
- Energy Policy Act of 2005: Requires DOE to submit reports to Congress on the preparation of a EIS—before DOE can select an alternative, it must first submit a Report to Congress on the alternatives under consideration and await Congressional action



H. R. 6

One Hundred Ninth Congress of the United States of America

AT THE FIRST SESSION

SEC. 631. SAFE DISPOSAL OF GREATER-THAN-CLASS C RADIOACTIVE WASTE.

(a) RESPONSIBILITY FOR ACTIVITIES TO PROVIDE STORAGE FACILITY.—The Secretary shall provide to Congress official notification of the final designation of an entity within the Department to have the responsibility of completing activities needed to provide a facility for safely disposing of all greater-than-Class C low-level radioactive waste.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Energy Policy Act of 2005".

(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

Contribute to National Security

- The 2010 Task Force Report on Radiation Source Protection and Security identified the need for a disposal capability for sealed sources as the most significant radiation source protection and security challenge facing the nation.
- Unsecured or abandoned GTCC sealed sources pose a national security concern due to potential for use in "dirty bombs".

Support the Future of Nuclear Medicine

- The U.S. depends on foreign nuclear reactors to produce molybdenum-99 (Mo-99), which is used in many diagnostic medical procedures, but shortages in recent years have highlighted the need to produce this material domestically. Commercial entities in the U.S. plan to develop the capability to produce Mo-99, but will require a safe and secure method to dispose of the GTCC waste resulting from the production of Mo-99.

Implement Environmental Stewardship

- More than half of the estimated GTCC LLRW and GTCC-like waste inventory will be generated from cleanup of DOE and commercial contaminated sites.

Proposed Action

DOE proposes to construct and operate a new facility or facilities or to use an existing facility for the disposal of GTCC LLRW and GTCC-like waste.

DOE would then close the facility or facilities at the end of each facility's operational life. Institutional controls, including monitoring, would be employed for a period of time determined during the implementation phase. A combination of disposal methods and locations might be appropriate, depending on the characteristics of the waste and other factors.

Proposed Disposal Methods and Sites	
Geologic Repository	WIPP
Intermediate-Depth Borehole	Hanford, INL, LANL, NNSS, WIPP Vicinity, and generic commercial sites
Enhanced Near-Surface Trench	Hanford, INL, LANL, NNSS, SRS, WIPP Vicinity, and generic commercial sites
Above-Grade Vault	Hanford, INL, LANL, NNSS, SRS, WIPP Vicinity, and generic commercial sites

DOE does not have, and therefore has not identified, a preferred alternative in the Draft EIS, but will do so in the Final EIS after considering public comments and further analysis, as appropriate. The preferred alternative could be a combination of two or more alternatives, based on the characteristics of the waste, its availability for disposal, and other key factors.

Waste Terminology

What is Greater-Than-Class C Low-Level Radioactive Waste (GTCC LLRW)?

- The Nuclear Regulatory Commission (NRC) has categorized LLRW into four classes (Class A, B, C, and GTCC [10 CFR 61]) based on the concentrations of specific short-lived and long-lived radionuclides.

NRC Category	Summary of Waste Description	Disposal Method
Class A	Least hazardous – short and long-lived waste that will not endanger inadvertent human intruder beyond 100 years	Near-Surface within the upper 30 meters of the earth's surface
Class B	More hazardous – short-lived wastes that will not endanger inadvertent intruder beyond 100 years	Near-Surface with 300 year waste stability
Class C	More hazardous – short and long-lived wastes that will not endanger inadvertent intruder beyond 500 years	Near-Surface with 300 year waste stability, and greater depth or 500 year intruder barrier
Greater-Than-Class C	Most hazardous of LLRW – dangerous to inadvertent intruder beyond 500 years.	To be determined by the Record of Decision for the GTCC LLRW EIS

GTCC LLRW:

- Contains radionuclides at concentrations that exceed the limits for Class C radioactive waste in 10 CFR 61.55
- Generated from NRC or Agreement State licensed activities (e.g., nuclear power plant operations and decommisioning, medical uses, and other commercial activities)
- Consists of activated metals from the decommissioning of nuclear reactors, sealed sources, and other Other Waste resulting from manufacture, research, and industrial activities
- Must be disposed of in geologic repository unless other proposed methods are approved by NRC (10 CFR 61.55)
  - "There may be some instances where waste with concentrations greater than permitted for Class C would be acceptable for near-surface disposal with special processing or design" 10 CFR 61.7

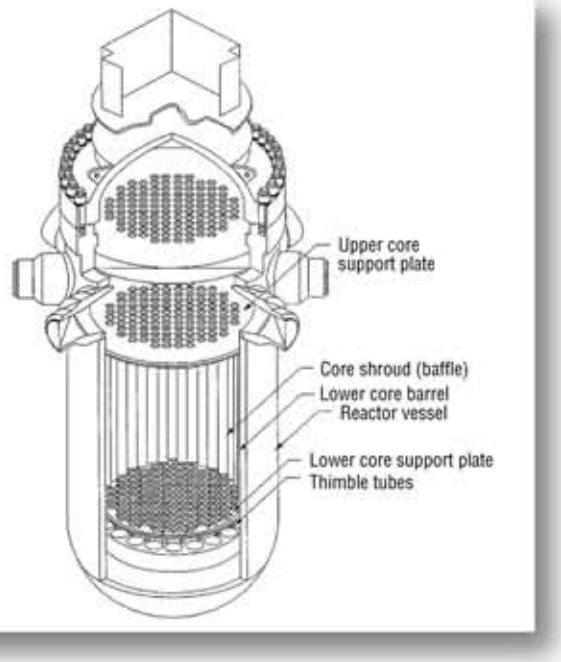
What is DOE GTCC-like Waste?

- DOE LLRW and transuranic waste having characteristics similar to GTCC LLRW and which may not have an identified path to disposal
- Consists of activated metals, sealed sources, and Other Waste owned or generated by DOE activities
- Use of the term DOE GTCC-like waste does not create a new classification of radioactive waste

Waste Types

Activated Metals

Largely generated from the decommissioning of nuclear reactors. Prevalent radionuclides include carbon-14, manganese-54, iron-55, nickel-59, nickel-63, niobium-94, and cobalt-60.



Source capsule used in medical teletherapy units

Blood irradiator

Abandoned Am-241 and Cs-137 gauges and shipping shields

Well logging sources being loaded

Sealed Sources

Widely used in equipment to diagnose and treat illnesses (particularly cancer), sterilize medical devices, irradiate blood for transplant patients, nondestructively test structures and industrial equipment, and explore geologic formations to find oil and gas. Radionuclides commonly used in sealed sources include cesium-137, americium-241, and plutonium-238.

Other Waste

Other Waste primarily includes contaminated equipment, debris, scrap metal, filters, resins, soil, and solidified sludges. These wastes are associated with the production of molybdenum-99, production of radioisotope power systems, and environmental cleanup. Photo shows GTCC contaminated glove boxes. A wide range of radionuclides may be present including technetium-99, iodine-129, cesium-137, and a number of transuranic radionuclides including isotopes of plutonium, americium and curium.

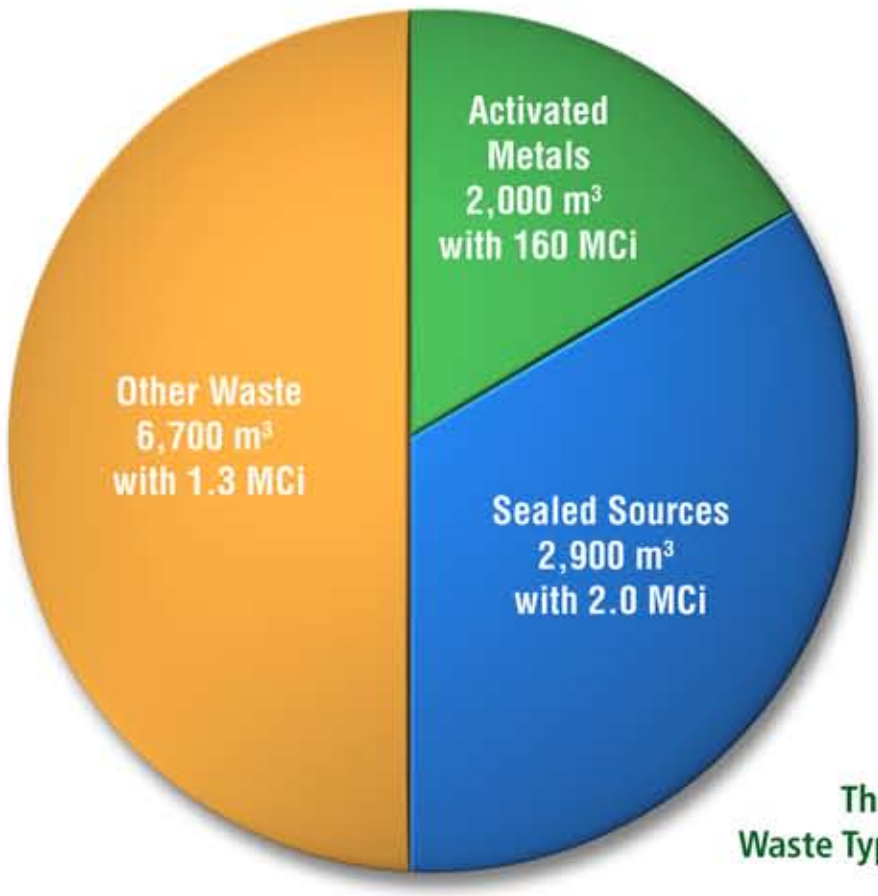
Waste Inventory

GTCC Low-Level Radioactive Waste (LLRW): Most hazardous of the four U.S. Nuclear Regulatory Commission (NRC) classes of commercial LLRW

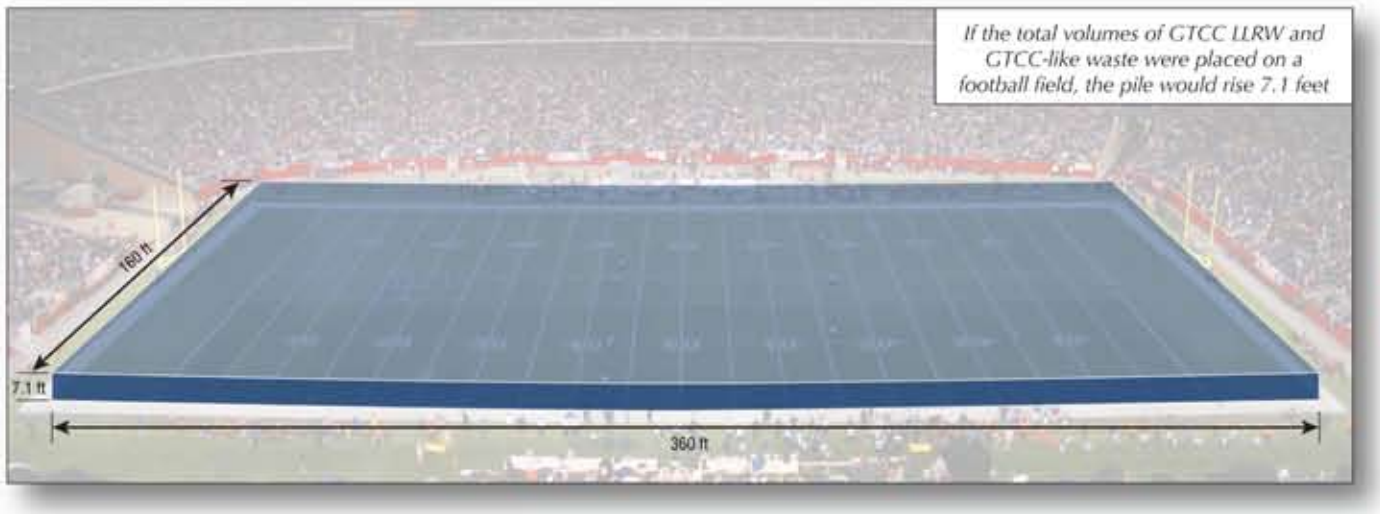
GTCC-like Waste: DOE generated or owned LLRW or transuranic waste with characteristics similar to GTCC LLRW and no identified path for disposal

Approximately 12,000 cubic meters (m^3) with 160 million curies (MCi)

- Relatively small volume but high activity
- Majority of the activity is due to the Activated Metals
- Less than 10 percent of total volume currently in storage; most waste will not be generated for several decades
- Sealed sources present national security concern and therefore have a near-term disposal need (comprise 24 percent of total volume)



Three Waste Types

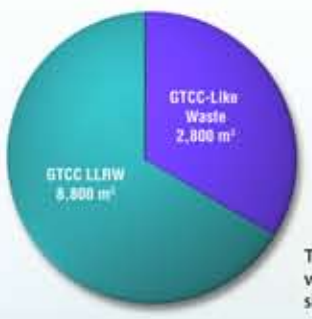


Total Volume of GTCC LLRW and GTCC-Like Waste Addressed in the EIS

Volumes of Stored and Projected Wastes Being Addressed in the EIS

The sum is 12,000 m^3 when rounded to two significant figures.

Volumes of GTCC LLRW and GTCC-Like Wastes

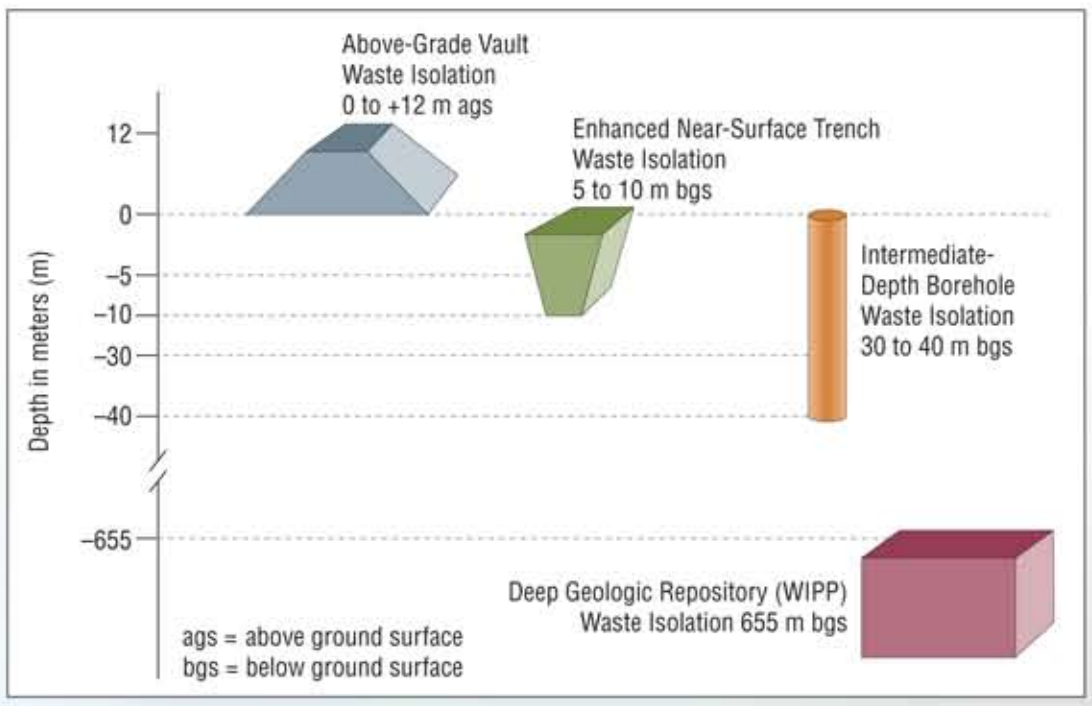


The sum is 12,000 m^3 when rounded to two significant figures.

Alternatives Evaluated

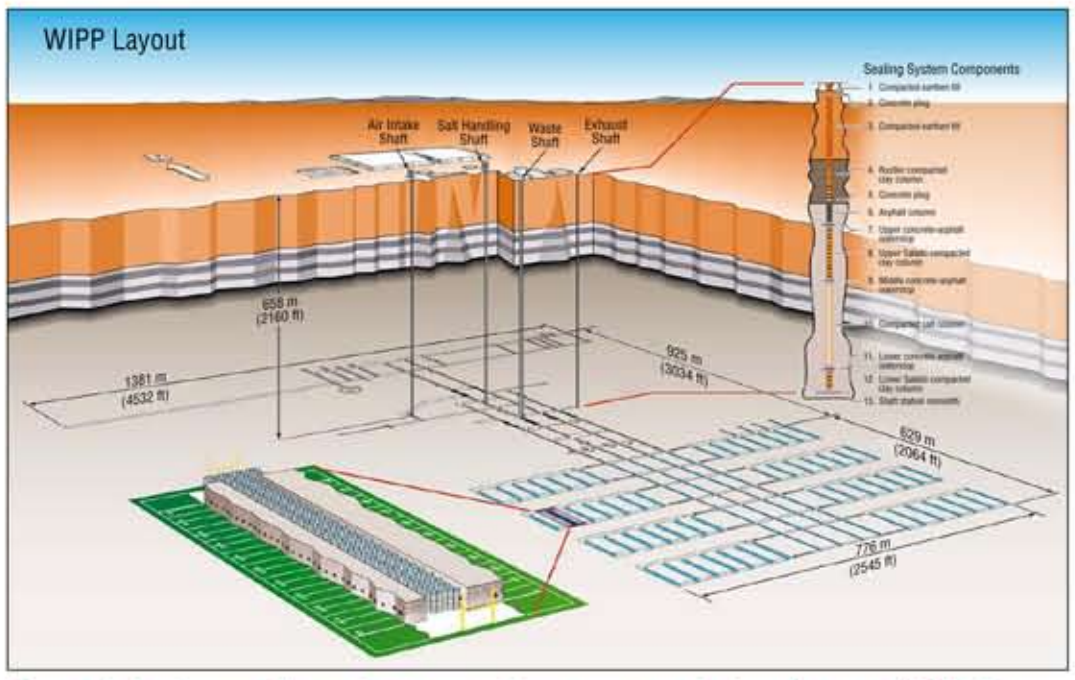
1. No Action (continue current storage practices)
2. Geologic Repository at WIPP
3. Borehole at Hanford, INL, LANL, NNSS, WIPP Vicinity, and generic commercial location in NRC Region IV (West)
4. Trench at Hanford, INL, LANL, NNSS, SRS, WIPP Vicinity and generic commercial locaiton in NRC Regions II (Southeast) and IV (West)
5. Vault at Hanford, INL, LANL, NNSS, SRS, WIPP Vicinity, and generic commercial locations in NRC Regions I (Northeast), II (Southeast), III (Midwest), and IV (West)

Map of sites being considered for disposal of GTCC LLRW and GTCC-Like Waste

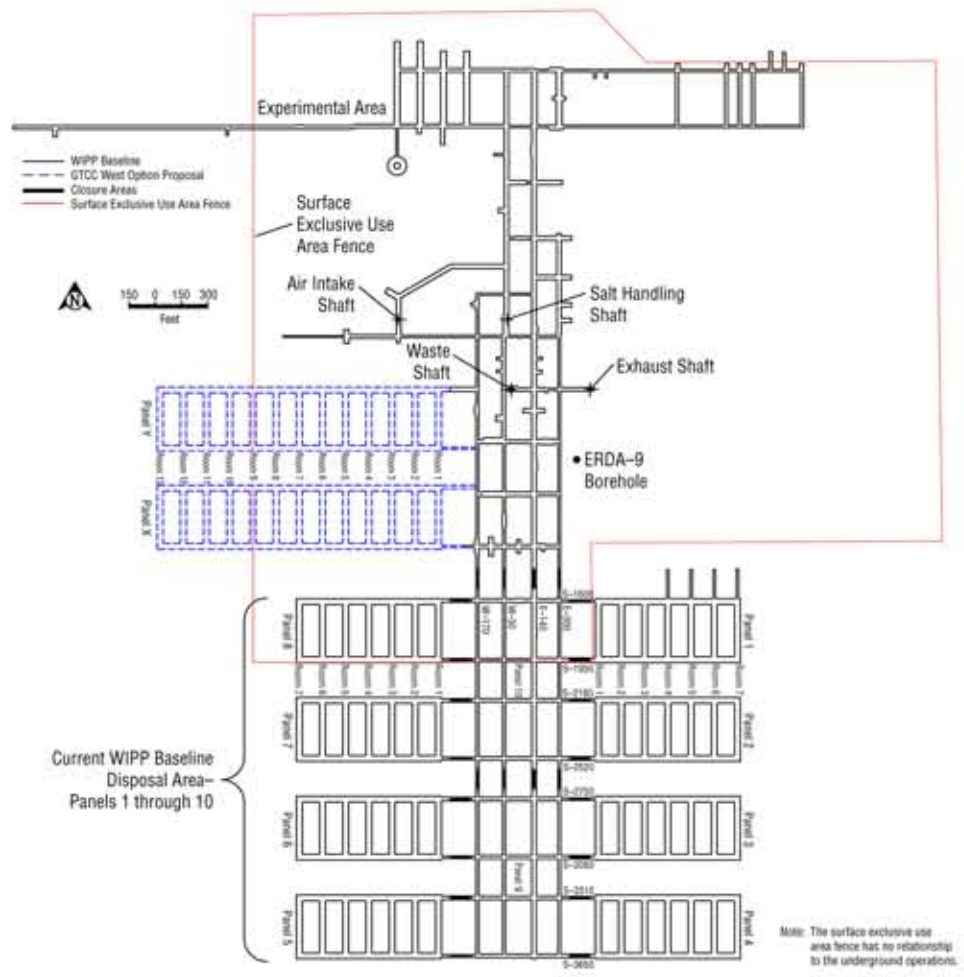


Waste isolation depths for proposed GTCC disposal methods

Disposal Methods Evaluated

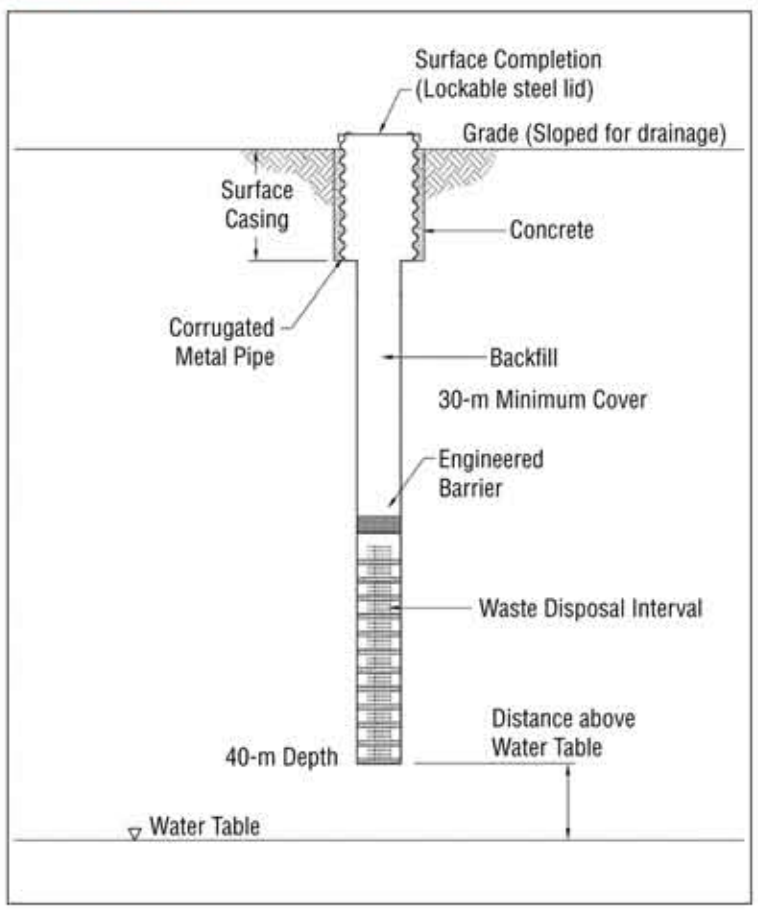


Spatial view showing underground shafts at WIPP

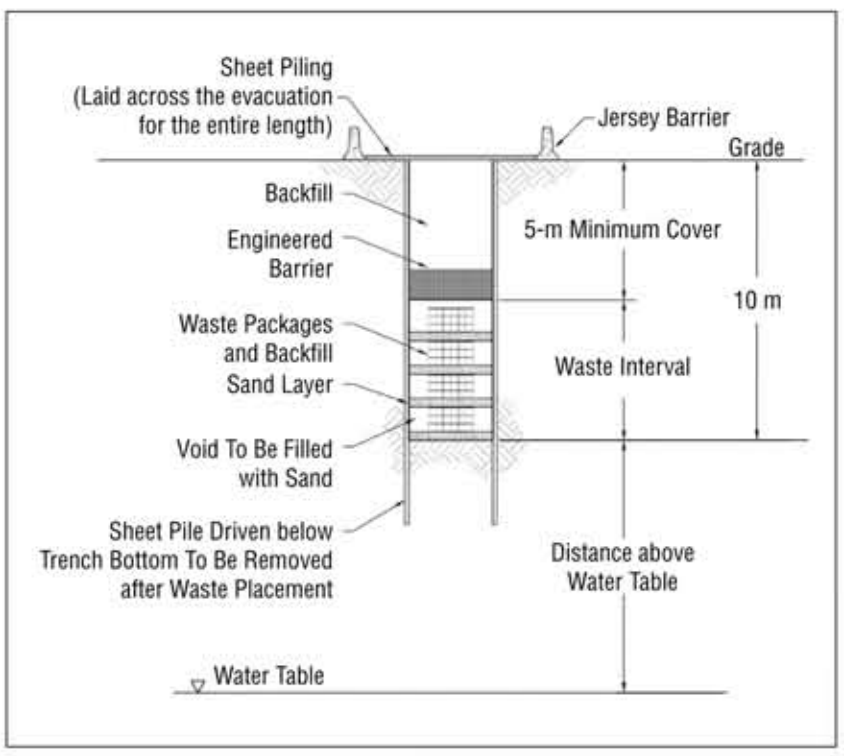


Conceptual locations of 26 additional waste disposal rooms at WIPP

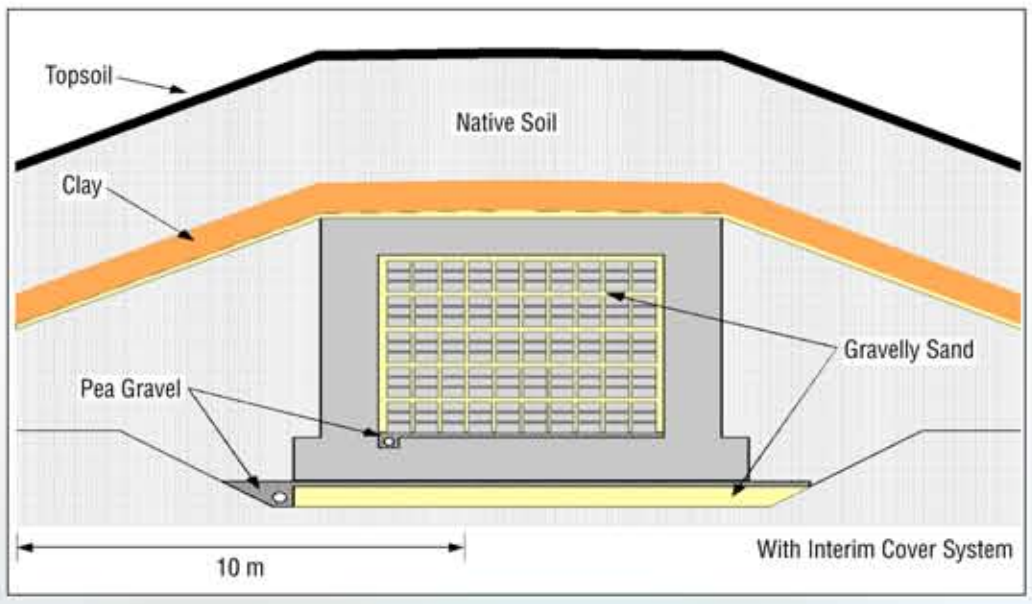
Borehole



Trench



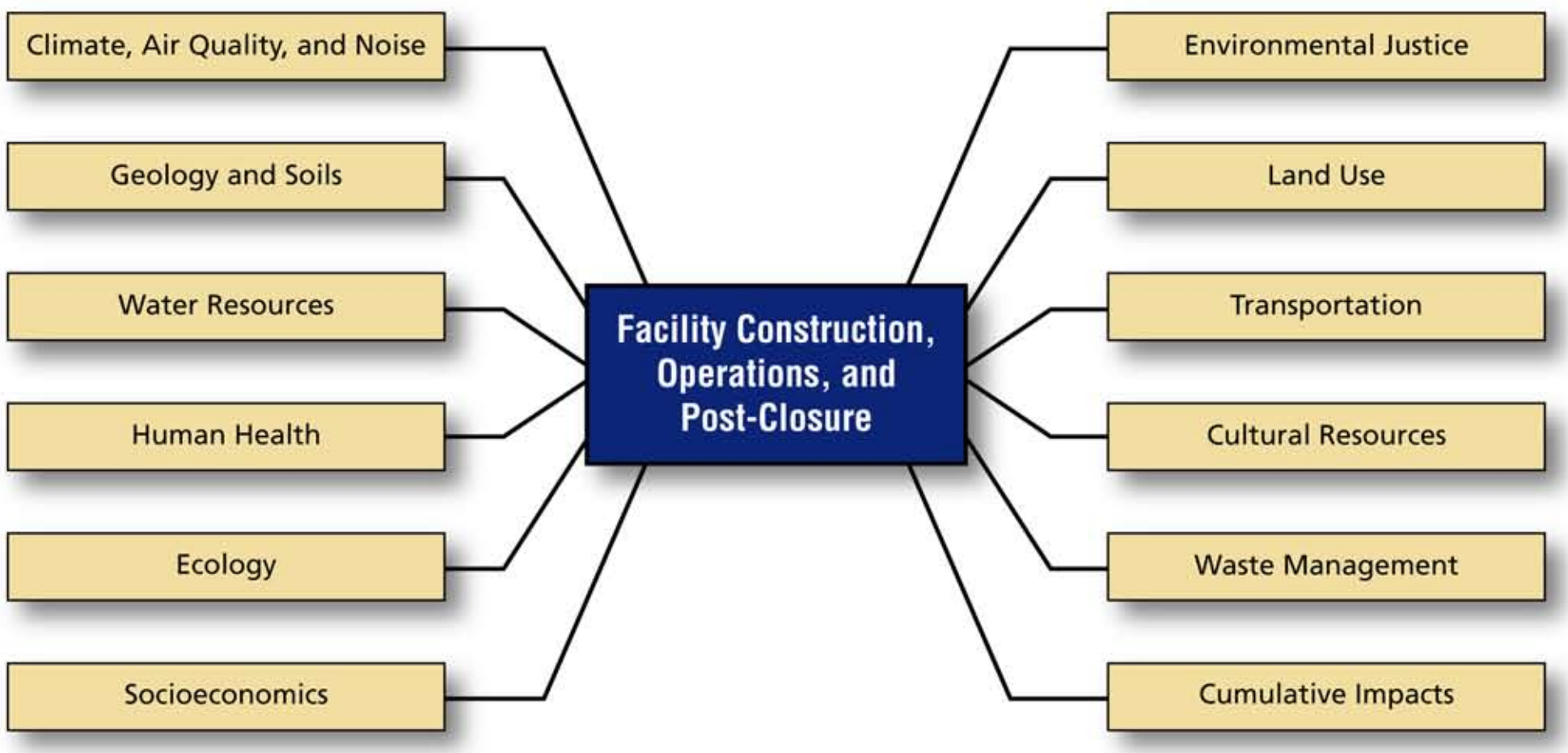
Vault



Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste

Analysis and Potential Impacts

Environmental Resource Areas Evaluated



Potential Impacts

Alternative 1 – No Action (continue current storage/management practices): potential long-term human health impacts; no incremental impact for other resource areas; wastes would not be shipped therefore no transportation was assumed

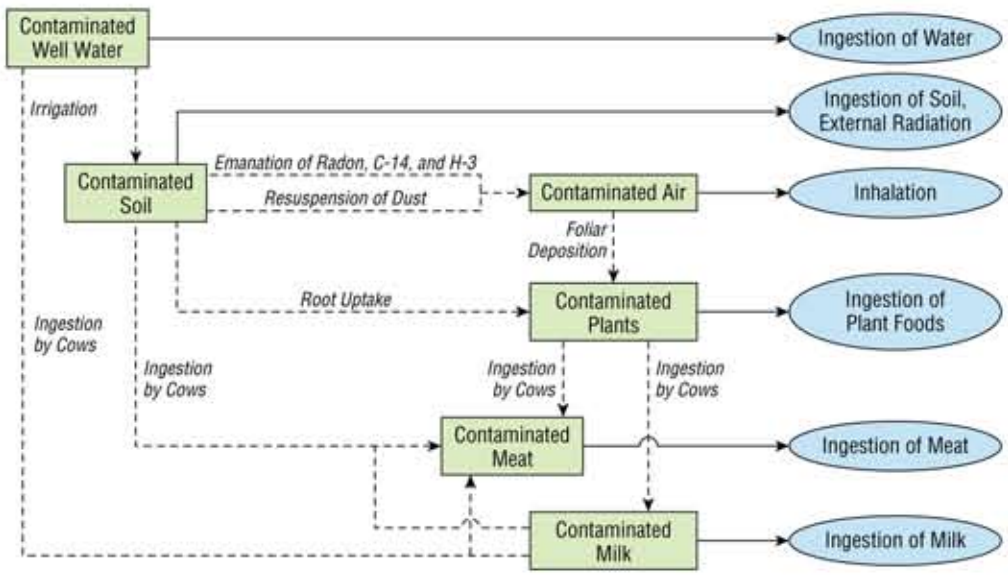
Alternative 2 – WIPP: Impacts would be low for all resource areas

- Transportation: an estimated 11,800 rail shipments or 33,700 truck shipments over approximately 60 years, which could result in one to two non-radiological accident fatalities

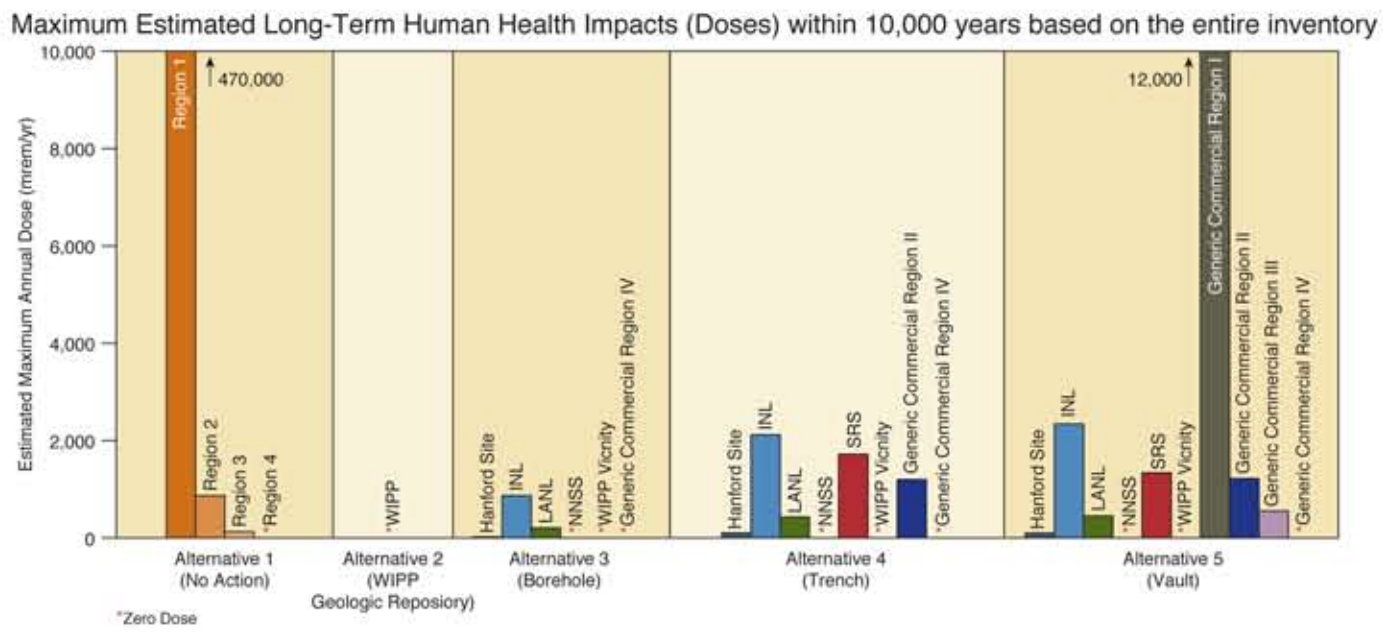
Alternative 3, 4, and 5 (borehole, trench, and vault): Low impacts for all resource areas except potential long-term human health impacts at some sites

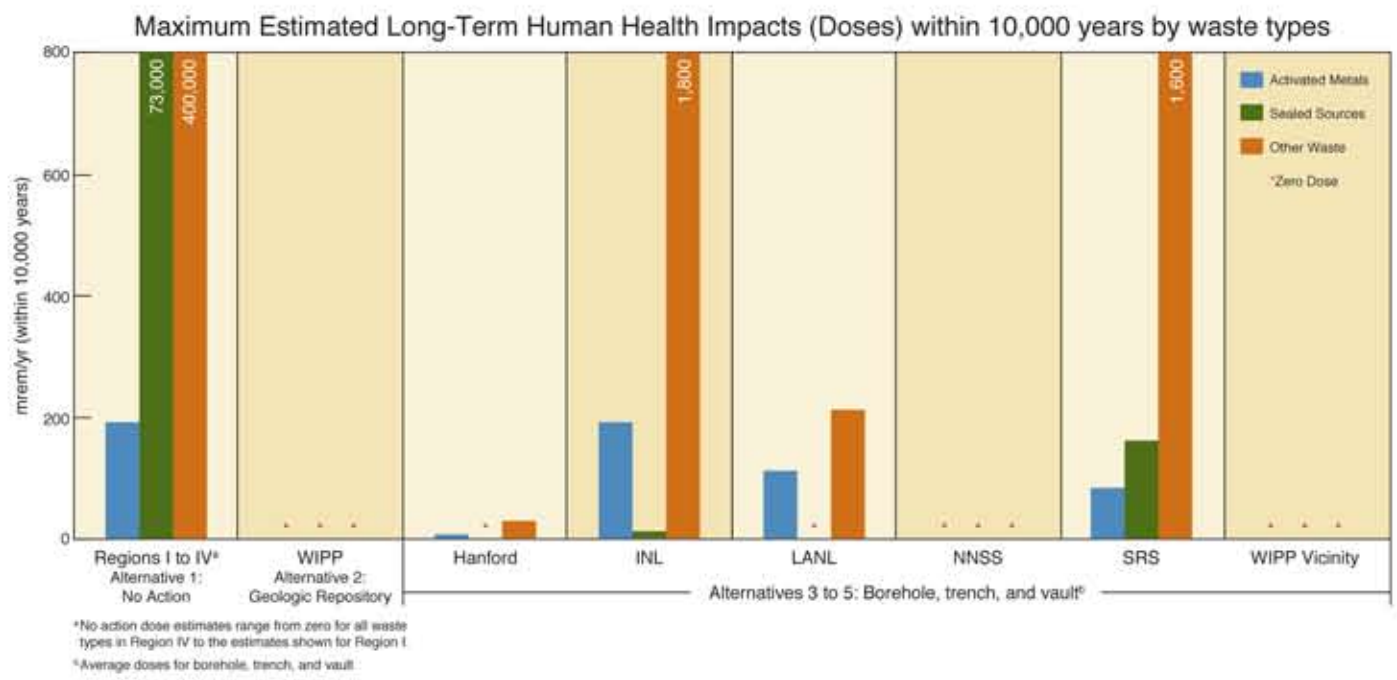
Environmental Justice	Cultural Resources	Cumulative Impacts	Transportation
subsequent NEPA analysis would consider unique exposure pathways to tribal and other sensitive populations	known cultural resources within GTCC reference locations at LANL, NNSS, and SRS	potential cumulative human health impacts at Hanford, INL, LANL, and SRS	an estimated 5,000 rail shipments or 12,600 truck shipments approximately 60 years, which could result in one non-radiological accident fatality

Potential Long-Term Human Health Impact



The use of the same exposure scenario (a hypothetical resident farmer) at all sites provides a common basis for comparison of the results for the sites. A hypothetical resident farmer was selected for the evaluation because this scenario would involve the most intensive use of the land, and this receptor is expected to incur the highest dose of any potential receptor in the future. DOE will consider the result of the hypothetical resident farmer scenario and other factors in developing the preferred alternative.





Critical Radionuclides for Long-Term Human Health Impacts within 10,000 Years			
Site	Activated metal	Sealed sources	Other Waste
WIPP	—	—	—
Hanford	Tc-99	—	I-129, Tc-99
INL	C-14, Tc-99	U-234	I-129, Tc-99, C-14, U-233
LANL	C-14, Tc-99	—	I-129, Tc-99, C-14
NNSS	—	—	—
SRS	C-14, Ni-59, Tc-99	Am-241, Np-237, C-14	C-14, I-129, Tc-99, Ra-226
WIPP Vicinity	—	—	—

- Estimated doses for sites in arid regions are lower than humid regions
- NNSS, WIPP, and WIPP Vicinity have no doses; Hanford has lower dose estimates as compared to LANL, SRS, and INL
- Doses vary by waste type and site such that combinations of alternatives maybe considered
- Other Waste (which is primarily transuranic waste) has significantly higher doses than activated metals and sealed sources where shown

Considerations for Developing A Preferred Alternative(s)

The preferred alternative could be a combination of two or more alternatives, based on the characteristics of the waste, its availability for disposal, and other key factors.

- Public Comments
  - DOE will consider all comments received during the 120-day comment period in identifying a preferred alternative(s)
- Waste Type Characteristics
  - Key factors include: radionuclide inventory, waste form stability, and availability for disposal
- Disposal Method Considerations

Factor	Criterion
Inadvertent human intrusion	Favors methods that minimize the potential for inadvertent human intrusion
Construction and operational experience	Favors methods that have been successfully used in the past to manage similar wastes
Post-closure care	Favors methods that minimize the potential need for long-term maintenance after the facility has closed
Cost	Favors methods that result in cost effective waste disposal

- Disposal Location Considerations

Factor	Criterion
Human health risk	Favors alternatives that reduce human health risk to both workers and the public.
Cultural resources	Favors alternatives that avoid adverse impacts to known cultural sites.
Laws, regulations, and other requirements	Favors alternatives that would not be inconsistent with current laws and other requirements.

Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste

National Environmental Policy Act Environmental Impact Statement (EIS)

NEPA Process for EISs. Under NEPA, the term "environment" encompasses both the physical environment (e.g., air, surface water, groundwater, geology) and the human environment (e.g., health and safety, jobs, transportation, cultural resources, land use).

The Council on Environmental Quality (CEQ) established NEPA requirements for all federal agencies, including procedures for preparing EISs. In turn, individual agencies such as DOE have established their own implementing regulations to meet or exceed these requirements. Related information is available on the DOE NEPA website at **www.eh.doe.gov/nepa**.

DOE is preparing the Greater-Than-Class C Low-Level Radioactive Waste (GTCC LLRW) EIS for the purpose of assessing the range of reasonable alternatives for the disposal of GTCC LLRW.
The U.S. Environmental Protection Agency (EPA) is participating in the EIS as a cooperating agency. The Energy Policy Act of 2005 requires DOE to report to Congress on the Final EIS and await action by Congress before making a final decision.

Next Steps. Consistent with NEPA requirements, DOE is taking the following major steps in preparing the GTCC LLRW EIS: Issue a Notice of Intent (NOI) to begin the EIS process; gather public and other stakeholder input on the scope of the EIS; prepare and issue the Draft EIS; receive public comments on the Draft EIS and respond to those comments in a Final EIS. A combination of disposal methods and locations may be appropriate based on the characteristics of the waste and other factors. Before DOE makes a final decision and issues the Record of Decision, the DOE must first submit a report to Congress that includes a description of the disposal alternatives under consideration and await action by Congress.

For further information contact:
Mr. Arnold Edelman, GTCC EIS Document Manager, Office of Environmental Management
U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585-0119
Telephone: (301) 903-5145, or e-mail to gtcceis@anl.gov