“Why,” said the Professor hotly, “one would say you were already beginning to be afraid.”
—Prof. Von Hardwigg in “Journey to the Center of the Earth” by Jules Verne.
Clive, Utah

The EnergySolutions Clive Facility is the largest (600 acre) [242 ha] commercial disposal site in the U.S.

Located in Utah’s west desert.

Climate: arid, annual precipitation of 8 inches (20.3 cm) per year.

Site geology: layers of silt, gravel, and sand (Pleistocene Lake Bonneville).

Located in the West Desert Hazardous Industry Area.
Clive

The facility has two hazardous wastes incinerators, and a hazardous waste landfill. The site was initially used to dispose of uranium mill tailings in Denver. Now licensed to accept.

Class A LLRW, 11e. (2) material (U milling waste), NORM, and MLLA (mixed hazardous-low level waste).
Clive, UT

http://www.energysolutions.com/

Aerial and side view of the cell at the Clive, Utah, low-level radioactive waste site.
Where LLRW go today?

Prior to 2008 when Barnwell “closed” . . .
Class A wastes–99% of the disposed volume at the three remaining facilities (Barnwell, Clive, Richland).
When sent to commercial disposal, 99% of class B and C wastes were sent to Barnwell.
LLRW from University of Illinois go to Clive

All LLRW wastes processed by Division of Research Safety are Class A wastes. “There are (were) no disposal options for Class B and C.”

Chase Environmental Group, Inc. transports the waste drums, then crushes them to make “pucks” before turning them over to EnergySolutions to transport to Utah.
Drum crusher
Open door to drum crusher
Setting a LLRW drum in place
A “puck.”
Reduced volume = reduced costs
Where will LLRW go in the future?

Barnwell has 2.7 million ft$^3$ (76,500 m$^3$) remaining capacity, but all of it is allocated to the Atlantic compact until 2050.

Clive, Utah. EnergySolutions say that they the capacity until 2038, but they can accept only class A wastes—at present.

Richland has 21 million ft$^3$ (595,000 m$^3$) capacity remaining, and can accept LLRW from 11 states. Expected to close in 2056.
A new LLRW facility!


Most States joined together to form organizations called Compacts.
The LLRW Compacts

Illinois and Kentucky joined together in 1984 to form the Central Midwest Interstate Low-Level Radioactive Waste Compact.

http://www.cmcompact.org/
The LLRW Compacts

The formation of the ten LLRW compacts yielded no new LLRW facilities for many years. Central Midwest Compact tried to locate a new site near Martinsville, Illinois in 1990s (rejected; more about this next week)

Southwest Compact tried locate a new facility in Ward Valley, CA (blocked by State government)

Central Compact, Nebraska (blocked by State Government)

Most Compacts are currently dormant.
The Texas Compact Disposal Facility

Operated by Waste Control Specialists.

Located in an arid climate.

Site geology: 200 feet (61 m) of red clay with layers of sand and siltstone.

Licensed to accept Class A, B, and C wastes!

The Texas House of Representatives voted to allow the facility to accept LLRW from 36 States that were not part of the Texas Compact---which includes Illinois!
No options for Class B and C until now

Prior to event, Illinois had no options for Class B and C wastes.

For example, The Clinton Nuclear Power Station had been storing Class B wastes on-site in a room within the power-plant complex.

They thought that they had a 20-year capacity to store Class B wastes on-site.
The Texas Compact Disposal Facility

LLRW will be placed in 10-foot (3.0 m) tall, 1 foot- (30.5 cm)-thick concrete canisters and buried 30 to 100 feet (9.1 to 30.5 m) below ground surface in disposal cells.

As the cells are filled, they covered with 300 feet (91.4 m) of clay.

http://www.wcstexas.com/
http://www.wcstexas.com/facilities/federal-waste/
Greater than Class C

GTCC wastes are in limbo. Considered by the NRC as not acceptable for shallow-land disposal, and must be disposed in a geological repository or an alternative proposed by DOE and approved by the NRC. There is no disposal site currently available for GTCC LLRW. Many CTCC wastes are currently stored at the site where they were generated. Estimated volume of CTCC LLRW in storage is 1,100 m³.
In 2011, DOE issues a draft Environmental Impact Statement for the disposal of GTCC LLRW, followed by public hearings.

The proposed sites: Hanford Site in Washington, the Idaho National Laboratory, the Los Alamos National Laboratory, the Waste Isolation Pilot Project in New Mexico, the Nevada National Security Site, and the Savannah River Site in South Carolina.
The proposed disposal methods are a deep, geological repository, deep boreholes, near-surface trenches, and above-ground vaults.

See

http://www.gtcceis.anl.gov/guide/sites/index.cfm

No decision has been made public yet.
U.S. DOE also uses shallow land disposal of waste containers.

DOE has more disposal sites than what is available for commercial LLRW. There is “sufficient capacity” to at least 2070. DOE is also sending LLRW to commercial facilities.

The operational history and current status of some disposal sites is complicated by their location on or near larger facilities that were part of the Nuclear Weapons Complex.
# U.S. DOE management of LLRW

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Nevada National Security Site
Area 5 Radioactive Waste Management Site of the Nevada National Security Site