DOE POLICY AND STRATEGY FOR LOW-LEVEL AND MIXED LOW-LEVEL WASTE DISPOSAL

OFFICE OF ENVIRONMENTAL MANAGEMENT

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Purpose

This paper describes the framework for DOE low-level and mixed low-level waste disposal operations. This includes a description of how DOE could utilize both DOE facilities and commercial facilities.

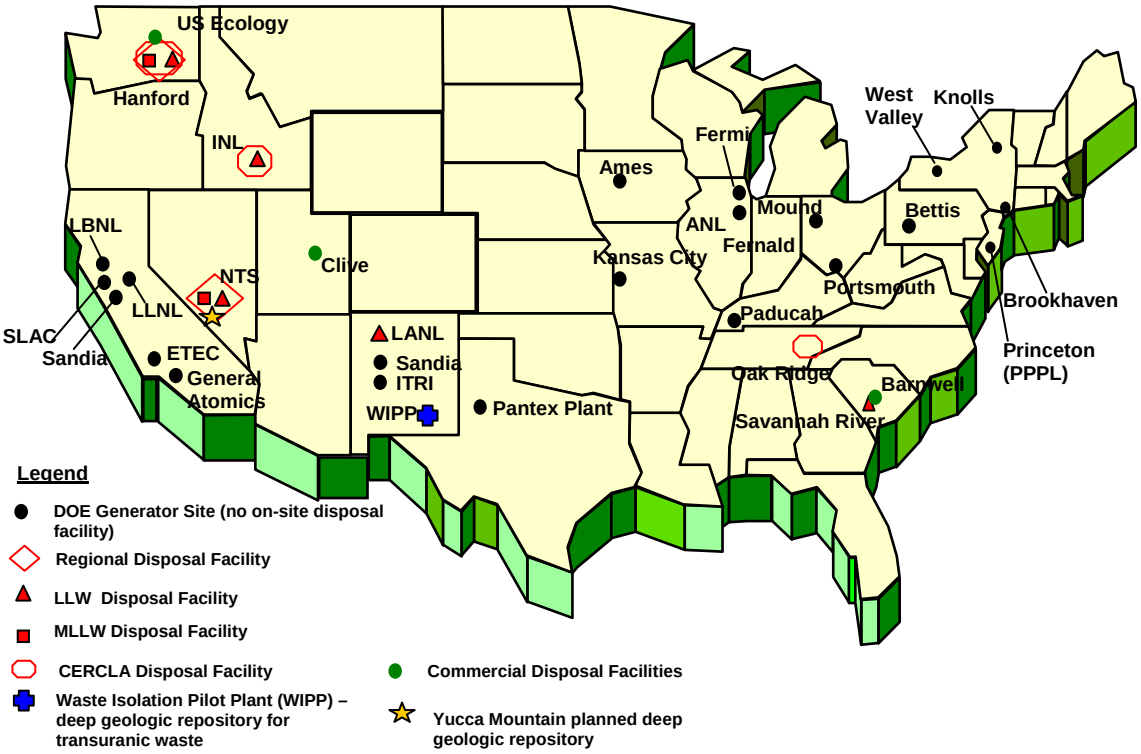
Background

DOE Order 435.1, *Radioactive Waste Management* (and its Manual and Guide) establishes the policy and framework for DOE radioactive waste treatment and disposal activities. DOE's policy is to dispose of low-level waste (LLW) and mixed low-level waste (MLLW) at DOE sites[1]. The first preference is for disposal on the site where it was generated, if practical. When on-site disposal is not practical, disposal at another DOE disposal facility is next considered. However, DOE Order 435.1 provides for an exemption by which LLW and MLLW may be disposed at a compliant commercial facility, if use of the commercial facility is documented to be more cost-effective and in the best interest of the Department. In practice, DOE sites that generate LLW and MLLW, especially the Environmental Management program, rely on a collection of DOE and commercial disposal facilities throughout the nation for its LLW and MLLW (see figure 1).

DOE completed the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Hazardous Waste* in May 1997. It examined the environmental impacts from LLW management (as well as other radioactive and hazardous wastes). Formal, programmatic records of decision (RODs) for treatment and disposal of LLW and MLLW were issued on February 18, 2000. These decisions established regional LLW and MLLW disposal at two DOE sites, the Hanford Site in Washington and the Nevada Test Site. DOE additionally decided to continue, to the extent practicable, disposal of on-site LLW at other DOE sites.

[1] Low-level radioactive waste (LLW) is radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material of uranium enrichment, or naturally occurring radioactive material. Mixed low-level radioactive waste (MLLW) is LLW containing hazardous waste, typically hazardous chemicals. DOE Order 435.1, stemming from the Atomic Energy Act of 1954, as amended, addresses the radioactive components of MLLW. Requirements of the Resource Conservation and Recovery Act (RCRA) cover the hazardous components. These Acts establish a dual regulatory framework.

Figure 1



DOE Disposal Facilities

Idaho National Laboratory (INL) – There are two operating disposal facilities at INL:

- The Subsurface Disposal Area Remote-Handled (RH) LLW Vaults (located in the Radioactive Waste Management Complex) accept RH wastes (waste with radioactive levels high enough to require remote handling, in this case mostly activated metals) generated by DOE programs at INL, including the Naval Reactors Facility.
- The Integrated CERCLA[2] Disposal Facility is an engineered disposal facility for contaminated soil and facility debris generated by the CERCLA-based remediation activities at INL.

Los Alamos National Laboratory (LANL)

- The Technical Area 54 Area G LLW Disposal Facility accepts LLW generated from NNSA mission and site cleanup activities at LANL.

[2] The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is the statutory and regulatory framework under which DOE conducts most of its environmental remediation and site cleanup activities. DOE's operating CERCLA disposal cells are engineered landfills which accept radioactively and chemically contaminated soils and debris (LLW wastes) generated by on-site soil and facility cleanup.

Savannah River Site (SRS) – There are several disposal facilities at SRS:

- Solid Waste Management Facility (E-Area) is comprised of several facilities for disposal of LLW generated on site. In addition, SRS receives a limited volume of offsite LLW from the Naval Reactors program. This facility includes a low activity waste vault, an intermediate-level vault, engineered trenches and slit trenches.
- Saltstone Disposal Facility (Z Area) accepts processed low-activity wastes from the SRS radioactive liquid waste tank farm.

Oak Ridge Reservation, Oak Ridge Reservation, Y-12

- The Environmental Management Waste Management Facility is an engineered disposal cell for contaminated soil and facility debris generated by the CERCLA-based remediation activities at the Oak Ridge Reservation.

Hanford Reservation

- The Environmental Restoration Disposal Facility is an engineered disposal cell for contaminated soil and facility debris generated by the CERCLA-based remediation activities conducted at Hanford.
- The 200 Area Burial Grounds comprise several disposal trenches that accept LLW and/or MLLW generated from on site activities, as well as limited volumes of Naval Reactors wastes.
- The Integrated Disposal Facility has been constructed, but is not currently operational. It is planned for disposal of processed low-activity wastes separated from the Hanford radioactive liquid waste tank farms.
- Although Hanford is designated as one of DOE's two regional disposal facilities, receipt of off-site wastes has been suspended per a legal settlement with the State of Washington (with the exception of certain Naval Reactor wastes), pending completion of additional environmental analyses.

Nevada Test Site (NTS)

- Area 5 Waste Management facility contains LLW disposal trenches, a classified disposal trench and the Mixed Waste Disposal Unit. NTS accepts LLW and MLLW from both on-site and off-site generators.

Commercial Disposal Facilities

Prior analyses and policy evaluations concluded that commercial disposal is cost-effective for certain large volume, lower-activity waste streams. As a result, DOE contracted with Envirocare (now Energy*Solutions)* to utilize the Clive Disposal Facility (UT) for disposal of some DOE LLW and MLLW streams. Clive is licensed by the State of Utah for disposal of Class A[3] LLW and MLLW; Clive cannot accept DOE's LLW and MLLW streams that contain higher concentrations of radioactivity. At the present time, there is no commercial disposal facility for the higher activity waste streams. By Utah state law, Energy*Solutions* is currently prohibited from seeking a license amendment to accept higher activity LLW and MLLW. DOE continues to maintain a complex-wide prime contract

[3] Class A waste is radioactive waste that has the lowest concentration of radioactivity of the three (A, B & C) waste classes as defined by the Nuclear Regulatory Commission. For disposal on DOE sites, DOE defines all low level waste as a single category.

with Energy*Solutions* for Class A LLW/MLLW disposal services at Clive. (Historically, DOE wastes comprised the vast majority of wastes received; more recently, other Federal agencies and commercial generators make up more than 50% of their waste receipts.)

Waste Controls Specialists, LLC (WCS) is actively working to develop several disposal facilities at its Andrews, Texas site. WCS has applied for a license to construct and operate a Federal Waste Disposal Facility, which could accept DOE LLW and MLLW, including higher activity streams. Texas state law requires that DOE, prior to sending waste to the facility, to provide a written agreement that it will accept ownership and ultimate liability for the Federal disposal facility after it is closed.

Uncertainties in Disposal Availability

In general, public acceptance of waste disposal facilities is low, and DOE faces a number of uncertainties related to its disposal facilities that must continually be addressed.

Support for Continued and Future On Site Disposal Facilities – The large scale site cleanup projects at the Portsmouth and Paducah Sites may benefit from development of on site disposal facilities for the large volumes of soil and debris that will be generated. However, some stakeholders and regulators object to development of new facilities. At some sites where disposal currently exist, such as Oak Ridge and LANL, some stakeholders and regulators object to the expansion of these facilities to meet out year disposal needs.

Off-Site LLW and MLLW Disposal at Hanford - As a result of a July 2004, State of Washington challenge to the Hanford Solid Waste Environmental Impact Statement (EIS), DOE voluntarily suspended all waste shipments to Hanford from other sites. This suspension was later formalized by the U.S. District Court, and a Settlement Agreement was reached to resolve this case in January 2006. Under the Settlement Agreement, DOE agreed to not ship off-site LLW and/or MLLW to Hanford until a new EIS containing comprehensive groundwater analysis related to tank closures and waste disposal operations is completed. This EIS is expected to be completed in late 2009/early 2010.

Nevada Test Site (NTS) Land Withdrawal – The Attorney General of the State of Nevada asserts that NTS administrative land withdrawals[4] do not include activities related to disposal of LLW and MLLW from other DOE sites on NTS land. DOE is working with the Department of the Interior to resolve this issue. If not resolved, this issue could halt disposal of higher activity MLLW (including classified waste) at NTS, which is DOE's only current option for disposal of this waste. This would seriously impact ongoing cleanup operations at several sites, as generated waste would have to be stored on-site instead of disposed. Ultimate resolution of this issue, however, will not ensure that the Nevada Attorney General will cease objections to waste disposal operations at NTS, as radioactive waste disposal in Nevada remains a politically charged issue.

[4] The Department of Interior has jurisdiction to withdraw public lands from public use for specific uses by the federal government, in this case, nuclear weapons testing by the Department of Energy and its predecessors.

Limited MLLW Disposal Capacity - DOE has limited disposal capacity for MLLW disposal, due to suspended off-site waste shipments to Hanford, pending resolution of the current legal challenges. Under conditions of the NTS site RCRA permit, the NTS Mixed Waste Disposal Unit must close by December 2010. Currently, there is not a commercial disposal option for DOE's higher activity MLLW.

Greater Than Class C Waste Disposal – EM is the lead DOE office for developing the EIS for Disposal of Greater-Than-Class-C (GTCC) Low level Radioactive Waste. GTCC waste is LLW resulting from activities licensed by the Nuclear Regulatory Commission with radionuclides that would be dangerous to humans beyond 500 years. This waste stream is comprised of materials such as radioactive sources that are commonly used to sterilize medical products, detect flaws and failures in pipelines and metal welds, and other industrial and medical purposes. They were generated, owned, or managed by commercial entities rather than DOE. However, the Low Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government responsibility for the disposal of certain GTCC radioactive waste resulting from U.S. NRC-licensed activities.

GTCC waste is the highest radiological activity waste with no planned disposition path. DOE is preparing an EIS to evaluate disposal options for commercial GTCC LLW as well as LLW similar in character to GTCC generated by DOE. DOE issued a Notice of Intent to prepare the EIS in July 2007 and expects the process to take about 2 years. By law, before DOE makes a final decision on the disposal alternative(s) to be implemented, the agency must submit a report to Congress on the disposal alternatives and await Congressional action before making a final disposal decision.

LLW/MLLW Disposal Strategy

EM plans to continue to utilize existing DOE and commercial disposal facilities to the extent practical. However, to ensure disposal capacity remains available in the future and to mitigate impacts to DOE mission programs and continued site cleanup activities, EM must aggressively pursue establishing new and increased disposal capacity.

In the interim, DOE is working towards resolving the NTS land withdrawal issues and affirming use of the site for disposal activities. Additionally, DOE will pursue design, permitting and construction of a new, RCRA compliant MLLW disposal at the NTS, to be available in 2011. Initial cost and schedule estimates for the facility are under development. Through these efforts, the NTS will continue as a regional disposal facility for DOE's LLW and MLLW streams.

In 2009, DOE EM plans to negotiate and sign the requisite written agreement with WCS to permit DOE LLW and MLLW to be disposed in its planned Federal Waste Disposal Facility. DOE is considering this future disposal site because it would provide disposal for commercial and DOE-generated higher-level MLLW. It is likely that the State of Texas will provide final approval of WCS' license application for the facility in 2009, and WCS' construction of the facility will begin soon after. In addition to the written agreement,

DOE will need to develop and implement an acquisition strategy to obtain a contract with WCS for disposal services. There are several issues associated with the written agreement and the future acquisition that are actively being addressed. One such issue involves the potential impact on other commercial firms.

DOE EM plans to continue to utilize the Energy*Solutions* Clive facility for those waste streams where transport and disposal of Class A LLW and MLLW can be demonstrated to be cost effective. The strength and effectiveness of the nation's radioactive waste management system depends on industry competition, stakeholder acceptance and availability of multiple disposal facilities. DOE EM has completed early planning for a competitive commercial LLW and MLLW disposal contract that will be initiated in 2009 or 2010, depending on market factors.

EM will continue to evaluate the development of new on site disposal facilities at Portsmouth, Ohio and Paducah, Kentucky, as part of the overall planning for the cleanup of the gaseous diffusion facilities at the sites. EM is currently planning for the expansion of the Oak Ridge EM Waste Management Facility to its full design capacity (and possible additional new design expansion) to avail capacity for the future waste volumes that will be generated through the cleanup of the excess facilities at Oak Ridge National Lab and Y-12 sites in Tennessee.

Finally, EM will complete the development of the Hanford Tank Closure and Waste Management EIS, which analyzes the use of the 200 Area Burial Grounds, the Integrated Disposal Facility and possible future facilities for both LLW and MLLW streams generated at Hanford Washington as well as other sites. Pending completion and results of the final EIS, DOE may issue a Record of Decision that reaffirms use of Hanford as a DOE regional LLW/MLLW disposal facility and satisfies the requirements of the Settlement Agreement.