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LONG-TERM STORAGE OF GREATER-THAN-CLASS C LOW-LEVEL WASTE[a]

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ABSTRACT

Under Federal law, the Department of Energy (DOE) is responsible for safe disposal of Greater-Than-Class C Low-Level Waste (GTCC LLW) generated by licensees of the Nuclear Regulatory Commission (NRC) or Agreement States. Such waste must be disposed of in a facility licensed by the NRC. It is unlikely that licensed disposal of GTCC LLW will be available prior to the year 2010. Pending availability of disposal capacity, DOE is assessing the need for collective, long-term storage of GTCC LLW. Potential risks to public health and safety caused by long-term storage of GTCC LLW at the place of generation will be evaluated to determine if alternative facilities are warranted. If warranted, several options will be investigated to determine the preferred alternative for long-term storage. These options include modification of an existing DOE facility, development of a new DOE facility, or development of a facility by the private sector with or without DOE support. Reasonable costs for long-term storage would be borne by the waste generators.

INTRODUCTION

The Low-Level Radioactive Waste Policy Amendments Act of 1985[1] (the Act) assigned the responsibility for ensuring the safe disposal of GTCC LLW to the Federal government. The three steps that are being pursued to safely manage GTCC LLW include a) interim storage of limited quantities of GTCC LLW, b) routine acceptance of GTCC LLW for long-term storage, and c) disposal of GTCC LLW. Reasonable costs for long-term storage and disposal would be borne by the waste generator. The objective of this paper is to discuss the potential need for a collective storage facility for long-term storage of GTCC LLW and to describe options for development of such a facility.

It is likely that GTCC LLW disposal facilities will not be available prior to 2010. Therefore, GTCC LLW must be stored for potentially extended time periods until disposal is available. DOE plans to implement a program in 1990 for acceptance of limited quantities of GTCC LLW based on immediate health and safety concerns. This program, designated interim storage, will only accept waste when the licensee is unable to continue storing the waste safely and there are no other practical alternatives. The majority of GTCC LLW would, therefore, not be accepted for interim storage at the DOE facility. Existing capacity and resources for long-term storage of GTCC LLW are limited. Consequently, there may be a need for a collective storage facility for GTCC LLW.

POTENTIAL NEED FOR COLLECTIVE STORAGE

The type and size of businesses that generate GTCC LLW differ greatly. Large waste generators with more resources, such as nuclear utilities, may be in a position to store GTCC LLW onsite for extended time periods if necessary. However, long-term onsite storage of GTCC LLW may have a greater impact on the operations of some small generators, such as sealed source users.

Existing Storage Constraints

Many waste generators currently have storage problems. Some of the specific storage deficiencies, which were identified by GTCC LLW generators during site visits or in telephone communications, include the following:

- Many sealed source users, such as oil well loggers and/or drillers, do not have adequate storage facilities or the capacity to store their sealed sources during long periods of inactivity. They pay high storage fees for storage services.
- Some sealed source manufacturers are storing decayed or otherwise unwanted sealed source devices. Storage space is limited, and in some cases is approaching the NRC curie limitation for onsite storage.
- Nuclear utilities have limited fuel-storage pool capacity. The need for fuel assembly storage limits the space available for storage of irradiated reactor-core components (activated metal GTCC LLW). In a survey conducted in 1986 by the Energy Information Agency (EIA), six utilities reported that they would be out of storage pool space by 1995; another three reported that they would exhaust their storage space between 1990 and 2010. More recently, 27 plants reported that they would fill their onsite storage capacity by 1998.[2]

Regulatory Issues

Specific regulatory requirements have not been established for long-term storage of GTCC LLW. If the regulatory view on long-term storage of GTCC LLW is consistent with that for LLW,[3] storage licenses will be granted for time periods not greater than five years. Storage is not a substitute for disposal, which is preferred. The NRC notes that LLW should be processed before storage, and packaged in a form ready for transport and disposal. Because waste acceptance criteria and packaging requirements have not been determined yet for disposal of GTCC LLW, any processing or packaging completed in the near future may not meet the requirements of an eventual disposal facility. Because GTCC LLW cannot be disposed of for many years, regulatory management of the waste storage facilities would be required.

In a recent letter to the DOE,[b] the NRC estimated that "a total of about 25,000 general and specific licensees currently possess about 100,000 GTCC sealed sources. Of these sources, about 9,000 are estimated to be in storage rather than in use. Extrapolating from responses of NRC and Agreement State specific licensees who indicated a desire to promptly dispose of GTCC sealed sources, the (NRC) staff estimates that 5,000 GTCC sealed sources are being stored because of the lack of disposal methods or affordable commercial storage facilities." The NRC also states in this letter that "Many of the licensees possessing GTCC sealed sources are small entities. A significant number will likely cease to exist or will otherwise need to terminate their activities using GTCC sealed sources before the issue of ultimate disposal is resolved. In the past, vendors were often willing to take sealed sources back from customers who wished to terminate licensed activities. Vendors are no longer willing to do this because the ultimate cost of disposal is unknown."

Sealed source holders are believed to greatly outnumber other generators of small amounts of GTCC LLW. A large number of GTCC LLW generators, potentially thousands, may have GTCC LLW in onsite storage prior to 2010. GTCC LLW generators are distributed throughout the United States, making regulatory management of thousands of dispersed storage facilities difficult. The NRC has identified several concerns regarding LLW storage: a) ensuring the integrity of the packaging and waste form, b) providing for

a. Work funded by the U.S. Department of Energy under DOE Contract No. DE-AC07-76ID01570.

b. Letter from Mr. Robert M. Bernero, Director, Office of Nuclear Material Safety and Safeguards, Nuclear Regulatory Commission, to Mr. Leo Duffy, Director, Office of Environmental Restorations and Waste Management, U.S. Department of Energy, June 4, 1990.

ready periodic visual inspection, c) adequate shielding, and d) access control. Additional areas of concern are the adequacy of personnel training, and financial assurance for decommissioning. These LLW storage concerns most likely will also apply to GTCC LLW.

Advantages of Collective Storage

Development of a collective storage facility would reduce the need for continued onsite storage of GTCC LLW by numerous generators. DOE currently is evaluating if development of collective storage for GTCC LLW will reduce the probability of incidents that could effect the public's health and safety. Logically, the likelihood of incidents would increase with the expansion of long-term, onsite storage activities involving many small waste generators who are unlikely to have the necessary experience, expertise, and resources to adequately conduct these storage activities. DOE is qualitatively assessing which scenario poses more threat to public health and safety—numerous dispersed storage facilities, or one larger collective storage facility. If it is determined that a collective storage facility may reduce this threat, then DOE will proceed with development of such a facility.

GTCC LLW POTENTIALLY REQUIRING COLLECTIVE STORAGE

GTCC LLW is waste that contains radionuclide concentrations greater than the NRC limits stated in 10 CFR 61[4] for Class C LLW. GTCC LLW excludes high-level waste, as defined by the Nuclear Waste Policy Act of 1982.[5] GTCC LLW may be either contact- or remote-handled.

Many uncertainties exist in projecting future volumes and activities of GTCC LLW. Shipment of GTCC LLW to a collective storage facility will be optional. Predicting future generation of GTCC LLW is highly theoretical; determining the volume, activity, and timing of GTCC LLW receipts at a collective storage facility is even more speculative. In addition, assumptions regarding the volume and timing of GTCC LLW that generators may *want* to ship to collective storage also must be applied to GTCC LLW generation projections.

COLLECTIVE STORAGE EVALUATION PROCESS

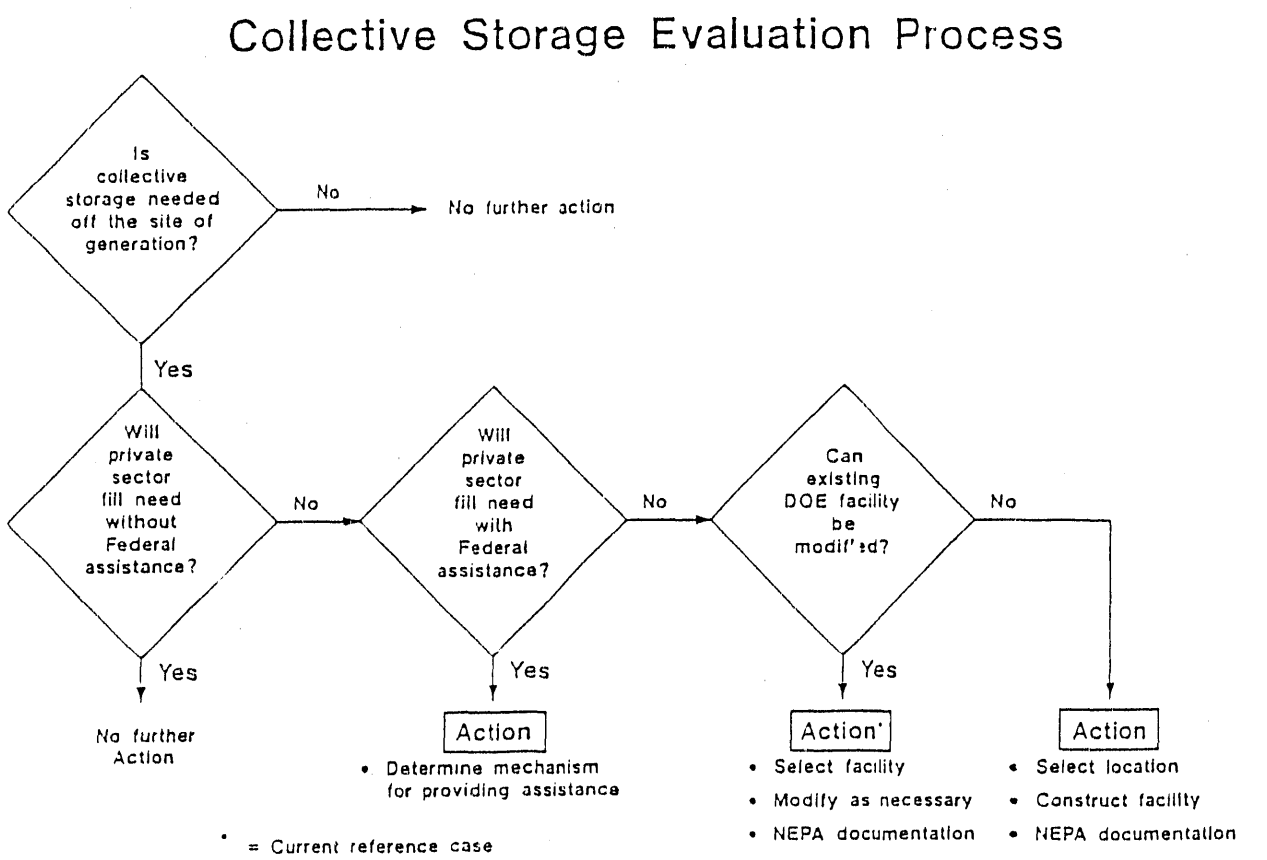
Determining whether a need for collective storage exists, and how to best implement collective storage if warranted, is a multi-step process. The following flow chart shows the major decision points in this process.

1. DOE's criteria for determining if collective storage is needed is based on reducing risk to the public. Therefore, the first question is if continued onsite storage of GTCC LLW poses a significantly higher risk to public health and safety than collective storage. If the answer is yes, then the need for collective storage exists; DOE would determine the most appropriate method for developing collective storage. If the answer is no, then no further work toward collective storage would be needed. It is possible that, even if collective storage is not necessary at this time, future conditions could warrant re-evaluation.

2. If the potential risk to public health and safety could be reduced by developing collective storage, the second question is whether the private sector would be willing to develop collective storage without involvement of the DOE. If so, DOE would track progress by the private facility to ensure that the government's obligations under the Act are fulfilled.

3. If it is determined that the private sector will not develop collective storage without Federal involvement, then the extent and type of involvement must be determined. Options might include methods to reduce potential private sector liability, or allowing private development on Federal lands.

4. Finally, if private sector development is unfeasible, then DOE will pursue development of a Federal collective storage facility for GTCC LLW.



COLLECTIVE STORAGE OPTIONS

Several options have been identified for collective storage of GTCC LLW. Variations of many of these options may also be feasible. Two main categories exist: a) options for private development, and b) options for DOE development.

Options for Private Development

Options for private development include a) private development with no involvement by the Federal government, b) private development with Federal support or incentive, or c) private development on Federal property.

Certain factors may impede private development of collective storage of GTCC LLW. Without information on eventual DOE charges for disposal of GTCC LLW, determining the fee to accept waste would be difficult. Because of the potential extended time period for storage, it may not be practical to assume the waste generator would be in a position in the future to pay an additional fee to cover increased disposal costs.

Uncertainty as to the amount of GTCC LLW that would be accepted for collective storage would increase the business risk. In certain instances, especially for small waste generators, long-term onsite storage of GTCC LLW may not be feasible. This waste could be assumed to be available for collective storage. However, many generators may be able to continue to store GTCC LLW onsite, either in existing storage facilities or by expanding their storage capacity. For these generators, the decision of whether or not to send the GTCC LLW to collective storage would be based on economic and liability considerations. Since the storage fee and the included disposal fee have not yet been determined, a complete economic evaluation cannot be made at this time. Consequently, without regulatory pressure to minimize onsite storage, the amount of waste that would be available for collective storage is uncertain.

Finally, locating a site for a new storage facility may prove difficult. Unless the collective storage facility could be combined with an existing facility, costs for siting alone could make private development unrealistic.

If these factors eliminate private interest in the development of collective storage, DOE may need to evaluate options to overcome these impediments. Some method for sharing the risks, such as a cap on disposal fees or underwriting costs or liabilities, may be needed. The DOE may also evaluate whether locating a privately developed collective storage facility on Federal lands would be feasible, potentially reducing some of the siting concerns.

Options for DOE Development

Two main options exist for development of a collective storage facility by DOE. These include a) modification or expansion of an existing DOE facility, and b) construction of a new facility at an existing DOE site.

Collective storage of GTCC LLW could be located at an existing DOE facility with the required capabilities. A facility for collective storage need not be co-located with GTCC LLW interim storage. Modification or expansion of an existing facility could reduce the costs required to construct the storage facility. If the chosen DOE facility is currently operating, manpower requirements for the collective storage facility may be shared with the existing facility, reducing operating costs.

Alternately, a new collective storage facility could be developed at an existing DOE site. Although construction costs likely would be higher for this option, location on an existing DOE site should reduce site characterization and similar expenses. Support facilities may also be located nearby.

Difficulties in siting a collective storage facility separate from an existing site would be minimized by these options. However, concerns regarding acceptance of new waste for storage or disposal exist at most, if not all, existing DOE sites.

SCHEDULED ACTIVITIES

Evaluation of the need for collective storage is currently under way by DOE, and is scheduled to be completed during 1990. Dependent upon the results of this assessment, work will progress along the flow path described earlier.

Collective storage, if viable, is scheduled to be operational by 1996. To expedite development of collective storage, preliminary work toward development of a Federal facility may proceed in parallel. This work would begin with an evaluation of the existing facilities within the DOE system to determine their appropriateness for long-term storage of GTCC LLW. If an appropriate facility is not available, development of a new facility at an existing DOE site would be pursued.

CONCLUSION

Disposal capacity for GTCC LLW generated by licensees of the NRC or Agreement States may not be available for many years. Many waste generators, both large and small, may desire to store their GTCC LLW offsite at a collective storage facility. Some small generators may lack the facilities, resources, and expertise to continue to store their GTCC LLW onsite for extended time periods. Large generators, although more likely to be in a position to safely store their GTCC LLW onsite, may desire to ship their waste offsite if a collective storage facility is available. By significantly reducing the number of sites where GTCC LLW is stored, a collective storage facility could reduce the potential for incidents that could pose a threat to public health and safety. The task of regulating long-term GTCC LLW storage could also be simplified greatly. The need for a collective storage facility and methods to implement such a facility, if warranted, are currently being evaluated.

1. Public Law 99-240, "Low-Level Radioactive Waste Policy Amendments Act of 1985," January 15, 1986.

2. Theckla R. Fabian, ed., "Storage Capacity Will Run Out by 1998," *Nuclear Waste News*, March 8, 1990, p. 94.

3. Nuclear Regulatory Commission, "Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Material Licensees," Information Notice No. 90-09, February 5, 1990.

4. Code of Federal Regulations, 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Wastes," Office of the Federal Register, December 1982.

5. Public Law 97-425, "Nuclear Waste Policy Act of 1982," 96 Stat. 2201, 42 U.S.C. 10101 et seq., January 7, 1983.

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