CHAPTER 1

SUMMARY OF FINDINGS

BACKGROUND

Most commercial low-level radioactive waste (LLW) in the United States is classified as A, B, or C, with Class C being the most radioactive. Universities, hospitals, nuclear utilities, and various industries generate a small amount of LLW that is more radioactive than Class C waste, termed greater-than-Class-C (GTCC) waste. **Several thousand GTCC material users and waste generators, most of which are small, such as academic laboratories and small radiography firms, are currently forced to store this waste on-site because no options are available for off-site storage or disposal.** Many generators argue that their on-site storage capacity is shrinking and that over the next decade or so they will have no capacity remaining. Although no deaths have been reported from accidents involving GTCC waste in this country, the relatively high levels of its radioactivity demand **that management options be made available to ensure that public health and safety are protected.**

In the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA), the Federal Government (presumably the Department of Energy (DOE)) is directed to develop a disposal plan for GTCC waste. No such plan, however, has been developed. In response to this legislative mandate, DOE issued a report in 1987 focusing primarily on GTCC waste characteristics, including present and projected volumes. **DOE** decided to defer proposing a disposal plan until it had completed analyzing various disposal options.

The Office of Technology Assessment (OTA) has evaluated options for managing GTCC waste and concludes that no disposal facility, regardless of the technology **used, is expected to be available for GTCC waste for at least fifteen to twenty years. During this time, problems could arise if an off-site storage option is not made available for some GTCC waste generators that have limited on-site storage capacity.**

In its 1987 report, DOE tentatively committed the Federal Government to accept GTCC waste for storage by 1989, presumably at an existing DOE facility. There are questions, however, about the propriety of storing commercial GTCC waste at an unlicensed DOE facility used primarily for defense waste. With few exceptions, commercial radioactive waste has been stored at facilities that are licensed by the Nuclear Regulatory Commission (NRC) or Agreement States. Legally, commercial GTCC waste must also be disposed of in an NRC-licensed facility. DOE is presently awaiting guidance from Congress on this licensing issue.

Congress has drafted some legislation dealing with the management of GTCC waste, but no hearings have been held. The following 3-step management approach was developed by OTA to supplement these efforts.

STEP 1 - EXTENDED STORAGE

Since a disposal facility for GTCC waste will require at least 15 to 20 years to develop, GTCC waste will have to remain in storage until at least 2010 and potentially much longer. The NRC **may need to update its packaging and storage guidance for GTCC waste considering the likelihood of a few decades of extended storage.**

It is likely that off-site storage capacity will be needed, especially for small and/or financially unstable GTCC waste generators. Given the open-ended period during which GTCC waste will have to be stored, it is unlikely that States (which under the LLRWPAA of 1985 are

not responsible for GTCC waste disposal) or private companies would be anxious to independently accept the liabilities associated with storing this waste. They would have to charge sufficiently high storage fees which may not be affordable to many generators. Therefore, the Federal Government (presumably DOE) will probably need to provide this off-site storage capacity for GTCC waste generators.

During the next three decades, between 10,000 and 20,000 cubic feet of packaged waste -- a volume equivalent to four to eight tractor trailers -- is projected to need off-site storage. OTA estimates that **several years would be required to develop a storage facility for this waste, assuming that it would be NRC-licensed.**

STEP 2-- LIMITED-ACCESS STORAGE

Some generators of GTCC waste, especially small companies, **may need access to a small amount of off-site storage capacity before an extended-storage facility could be available.** Sufficient capacity may need to be only a few thousand cubic feet.

GTCC radioactive sealed sources pose a particular concern. Sealed sources are small radiation sources containing granules of radioactive material that are sealed inside capsules ranging from 0.3 inches to 20 inches long. several thousand GTCC sealed **sources are now being used** in a wide variety of tools (e.g., gauges used to check pipe welds) and machines (e.g., cancer therapy machines) **throughout the United States. Over the last 25 years the theft and improper handling of sealed sources has been responsible for about 15 deaths in foreign countries and several serious radiation burns in the United States.**

Once a sealed source becomes obsolete, a user may try and return it to the manufacturer. The manufacturer will generally refuse to accept the sealed source unless it can be recycled economically. Many sealed source users, however, may not have appropriate facilities for extended, on-site storage. Furthermore, some companies possessing GTCC material and/or waste may go out of business before an extended storage or a disposal facility is available.

To reduce the potential for GTCC accidents in the United States, the Federal Government could provide limited access to existing storage capacity such as an unlicensed, DOE storage facility. Some accidents could also be avoided by adding a deposit-return fee to the price of sealed sources. For example, some portion of this fee would be returned to a user when it returned its obsolete sealed source to the manufacturer. The remainder of the fee would be kept by the manufacturer to fund its recycling or storage and eventual disposal of the sealed source.

Although it is impossible to predict whether a GTCC waste accident might occur in this country, the political repercussions of such an accident for the Federal Government could be especially significant if the accident were linked to the Government's inability to accept GTCC waste for storage or disposal.

STEP 3- DISPOSAL

The longevity of risk and the radioactivity associated with most GTCC waste is similar to that of defense high-level waste (HLW). Furthermore, once utilities begin to refurbish or decommission their nuclear plants, more than half of GTCC wastes' activity will be contributed by radionuclides (primarily nickel-63) with half-lives 100 years or longer. **The Federal Government is currently planning to use a deep-geologic repository for the disposal of defense HLW.**

If a decision about the disposal of GTCC waste were required today, **a conservative approach would be to permanently isolate the** waste **in a deep-geologic repository, as has been**

proposed for commercial spent fuel and defense HLW. It is possible, however, that further research and analysis could demonstrate that other disposal alternatives would be acceptable, such as deep-augered holes or an intermediate-depth repository. Near-surface disposal alternatives, such as buried concrete vaults, would probably provide waste isolation for periods of a few hundred years but probably not for the few thousand years needed for much GTCC waste.

The volume of GTCC waste is probably not large enough to justify the economic or institutional costs associated with developing a separate disposal facility, regardless of the technology used. The projected volume of GTCC waste that will be generated through the year 2020 would probably occupy much less than 1 percent of the proposed repository for commercial spent fuel and defense HLW. Preliminary calculations also indicate that the costs associated with using this large repository for GTCC waste would be comparable to, or perhaps even less than, costs associated with developing a small disposal facility only for GTCC waste.

The proposed repository for commercial spent fuel and defense HLW could be operational in fifteen to twenty years if the site now being investigated at Yucca Mountain, Nevada, is found suitable and no unforeseen legal or procedural delays are encountered. This time estimate could be extended by another two decades if the Yucca Mountain site is found unsuitable and another repository site must be located. Even if another technology were chosen for GTCC waste disposal, history indicates that it would still require about five years to select that technology, and another ten to fifteen years to design, site, and license a separate facility.

Although a decision to use the Yucca Mountain repository for GTCC waste disposal could be made now, DOE must still determine whether such use of the repository would have unacceptable environmental or institutional impacts on the repository's overall operation and performance. DOE could concentrate its efforts on this analysis over the next year or two. If it appears that no such impacts would occur, DOE could decide to use the repository for GTCC waste. In contrast, if it appears that unacceptable impacts would occur or repository disposal would be more expensive than other disposal alternatives, DOE could then evaluate other disposal options for GTCC waste disposal. In weighing the advantages and disadvantages associated with using the **Yucca** Mountain repository, it is important to consider the institutional and political difficulties associated with siting a separate GTCC waste disposal facility, regardless of its size or type.

ISSUES REQUIRING CONGRESSIONAL CONSIDERATION

There are several issues that will need to be addressed by Congress. The first five issues may best be addressed through hearings and oversight the last may require legislation. These issues involve:

- Ensuring institutional control over sealed sources.
- Ensuring the adequacy of packaging and storage guidance for extended storage at GTCC waste generation sites.
- Verifying and reviewing the need for limited access to Federal storage capacity for GTCC waste, and clarifying DOE's role in providing such storage.
- Verifying and reviewing the need for extended Federal storage for GTCC waste, and clarifying DOE's role in providing such storage.
- Developing technical and non-technical criteria and specifications on the use of Federal storage capacity for GTCC waste.
- Determining the need for NRC-licensing of any Federal facilities used to store commercial GTCC waste.

The sequence and possible activities involving GTCC waste management are presented in Appendix D.