Interim Storage of Greater than Class C Low Level Waste, Rev. 1

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Technical Report

Interim Storage of Greater Than Class C Low Level Waste, Rev. 1

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Final Report, July 2003

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PRODUCT DESCRIPTION

This report serves as a guideline for the safe, interim on site storage of low level radioactive waste (LLW) that exceeds the activity limitations for near-surface disposal set forth in 10 CFR 61.55. The nuclear industry refers to this waste as “greater than Class C (GTTC) waste” as it exceeds the Class C limits in the referenced regulation. At the present time, there is no licensed disposal facility for GTCC waste in the US. This situation forces commercial nuclear reactors to store it on site until a disposal facility is constructed and licensed.

The general license authorization of 10 CFR 50 allows the interim storage of GTTC waste. Prior to 2001, GTCC waste could not be stored under a 10 CFR Part 72 specific license. Effective November 13, 2001, the NRC revised its regulations in Part 72 to accommodate concurrent storage of GTCC waste in an independent spent fuel storage installation (ISFSI) with a specific Part 72 license.

The revised regulations have a broad impact on GTCC waste storage. They represent a substantial change to the guidance provided in TR-1003027, the previous version of this EPRI report on GTCC waste. This revision 1 updates the previous report and incorporates the current regulatory requirements.

Results & Findings

This report achieves the objectives stated below. In addition, it serves as a guidance document for any nuclear plant facing interim on site storage of GTCC waste pending construction and licensing of a final GTCC disposal facility.

There are several other key guidance documents affecting GTCC waste storage included as appendices to this report. Also included in the appendices is a copy of the final rulemaking revising the licensing and storage of GTCC waste under 10 CFR Part 72. The entire report is extensively cross-referenced to these documents, as well as to other documents related to GTCC waste storage.

Challenges & Objectives

- Provide guidance on the management of GTCC waste to both decommissioning and operating nuclear plants, which own or are planning to construct an ISFSI.
- Identify and explain the regulatory and technical issues a utility must address to receive and store GTCC waste in an ISFSI.
- Provide guidance for the overall development of an onsite GTCC waste storage program within an ISFSI, including design criteria, administrative controls, and storage containers.
- Document the existing GTCC waste management and storage experience (i.e., lessons learned) of both decommissioning and operating nuclear plants.
- Incorporate the November 2001 final rulemaking to Part 72, the key change to this report revision.

Applications, Values & Use

This report addresses the current regulatory requirements for interim on-site storage of GTCC waste, as well as the 10 CFR Part 72 final rulemaking by the NRC in November 2001. This will assist nuclear utilities planning or anticipating interim GTCC storage.

EPRI Perspective

At the present time, there is no disposal option for GTCC waste, forcing nuclear plants to store such wastes on site. GTCC waste storage involves technical, licensing, and complex regulatory issues, particularly for those plants who are planning to store using a 10 CFR Part 72 specific license. Using the comprehensive data and guidance in this report, utilities can make informed decisions on the basis of the best available information about licensing issues, facility design, containers, and waste form.

Approach

The project team performed a comprehensive review of the applicable regulations, regulatory guidance documents, and the NRC's final rulemaking to 10 CFR 72. The reviews provided the fundamental guidelines and regulatory change analyses that form the technical basis for this report. In addition, the project team also performed a survey of decommissioning nuclear plants to identify GTCC waste volumes, management practices, storage plans, containerization, and lessons learned. This information serves to balance the technical and regulatory issues with actual field practices.

Keywords

Greater than Class C waste
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EDITORIAL COMMENT

Time Value of the Technical Data

As with all technical information, the regulatory requirements, disposal site criteria, and state-of-the-art practices will change over time. Every effort has been made to ensure that all technical data, regulatory requirements, disposal site criteria, etcetera, are current through March 2003. It is likely that the most dynamic issues will be those involving GTCC waste stabilization and containerization in advance of placing the waste in interim storage. It is, therefore, incumbent upon the user of this report to remain current with advancements in GTCC waste technology and regulatory requirements, particularly with regard to onsite storage requirements and MRS/disposal site waste acceptance criteria.

Recommended Approach to Using This Report

Utility executives, managers and support organizations may wish to focus initially on the material contained in the **Executive Summary** in Section 2. The balance of the report should be referred to on an as-needed basis to expand the understanding of specific regulatory or technical aspects of GTCC waste storage.

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INTRODUCTION

1.1 Background

In 1993, there was approximately 16 cubic meters of greater than Class C (GTCC) waste from nuclear reactors, containing $1.5x10^5$ TeraBecquerels (TBq) (4 million curies) [Reference 1]. By 2055, it is estimated that there will be 1300 cubic meters of GTCC waste containing approximately $3.3x10^6$ TBq (88 million curies). By comparison, it is estimated that there will be approximately 63,000 cubic meters of commercial spent fuel containing over $1.3x10^8$ TBq ($3.5x10^9$ curies) [Reference 2]. Over 90 percent of the 88 million GTCC waste curies are projected to come from activities associated with decommissioning nuclear reactors. In addition, PWRs will produce about ten times the number of curies of GTCC waste that BWRs will produce.

The Low-Level Radioactive Waste Policy Amendments Act of 1985 gave the Department of Energy (DOE) the primary responsibility for developing a national strategy for the disposal of GTCC waste. Given that GTCC waste is projected to represent only about two percent of the total waste disposed in a HLW repository, the DOE intends to dispose of GTCC waste concurrently with spent nuclear fuel and high level waste and in the same disposal facility. However, such a disposal facility does not yet exist. Taking this a step further, the DOE has not yet identified the waste acceptance criteria (including waste packaging) and the technical regulations for a disposal package of GTCC waste.

The Act also gave the NRC the licensing responsibility for a disposal facility for GTCC waste. Such a disposal facility does not yet exist; one must be developed and licensed before GTCC waste can be shipped for disposal. Thus, there exists a need for interim storage for GTCC waste, as well as associated technical and regulatory guidance to ensure safe storage of the waste.

Interim GTCC waste storage is allowed on a nuclear reactor site under the general license authorization of 10 CFR 50. Prior to November of 2001, GTCC waste storage was not allowed under 10 CFR Part 72. This served as a road block for decommissioning plants desiring to terminate their Part 50 license with the intent of storing GTCC waste in an independent spent fuel storage installation (ISFSI) licensed under Part 72. The NRC revised its regulations in Part 72 effective November 13, 2001, to accommodate concurrent storage of GTCC waste in an ISFSI under either a general or a specific Part 72 license.

1.2 Objectives of This Report

This report provides an overview of the current licensing, regulatory, and technical requirements which allow interim storage of GTCC waste at a commercial nuclear reactor site and within an ISFSI. It incorporates the November 2001 final rulemaking to Part 72 by the NRC. It also captures plant experience factors and data, as well as any lessons learned.

Currently, the report has five objectives:

1. Provide guidance on the management of GTCC waste to both decommissioning and operating nuclear plants which own or are planning to construct an ISFSI.

2. Identify and explain the regulatory and technical issues which must be addressed to receive and store GTCC waste in an ISFSI.

3. Provide guidance for the overall development of an onsite GTCC waste storage program within an ISFSI, including design criteria, administrative controls, and storage containers.

4. Document the existing GTCC waste management and storage experience (i.e., lessons learned) of decommissioning nuclear plants.

5. Incorporate the November 2001 final rulemaking to Part 72 (which is the key change to this report revision).

It is anticipated that the user of this report will refer to it routinely throughout the development and implementation of the GTCC waste storage program to ensure that major program components are being addressed and are being performed in a timely manner. It is further anticipated that the user will continue to refer to and utilize this report and the related EPRI storage reports as part of the routine operation of the ISFSI for GTCC waste.

1.3 Key Definitions

The definitions found in Subpart 72.3 were revised in the November 2001 final rulemaking to address storage of GTCC waste in an ISFSI. The NRC added or revised several key definitions which clarify the regulations and assist the licensee to develop and comply with technical specifications and other conditions of the operating license. Those key changes to the definitions in Part 72.3 are as follows:

- **"Greater than Class C waste or GTCC waste"** means low-level radioactive waste that exceeds the concentration limits of radionuclides established for Class C waste in 10 CFR 61.55.
- **"Design capacity"** means the quantity of spent fuel, high-level radioactive waste, or reactor-related GTCC waste, the maximum burn up of the spent fuel in MWD/MTU, the terabecquerel (curie) content of the waste, and the total heat generation in Watts (btu/hour) that the storage installation is designed to accommodate.

- **"Independent spent fuel storage installation or ISFSI"** means a complex designed and constructed for the interim storage of spent nuclear fuel, solid reactor-related GTCC waste, and other radioactive materials associated with spent fuel and reactor-related GTCC waste storage. An ISFSI which is located on the site of another facility licensed under this part or a facility licensed under Part 50 of this chapter and which shares common utilities and services with that facility or is physically connected with that other facility may still be considered independent.

- **"Spent fuel storage cask or cask"** means all the components and systems associated with the container in which spent fuel or other radioactive materials associated with spent fuel are stored in an ISFSI.

  [Note: This definition was changed from the proposed rulemaking, which included the phrase "or reactor-related GTCC waste." This change was made to eliminate any suggestion that this was a storage requirement for all GTCC waste.]

- **"Spent nuclear fuel"** or **"spent fuel"** means fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies.

- **"Structures, systems, and components important to safety"** means those features of the ISFSI, MRS, and spent fuel storage cask whose functions are:

  (1) To maintain the conditions required to store spent fuel, high- level radioactive waste, or reactor-related GTCC waste safely;

  (2) To prevent damage to the spent fuel, the high-level radioactive waste, or reactor-related GTCC waste container during handling and storage; or

  (3) To provide reasonable assurance that spent fuel, high-level radioactive waste, or reactor-related GTCC waste can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public.

1.4 Revision Annotations

There are more than one hundred minor changes to this report. Significant changes are annotated with a vertical bar at the left of the paragraph, such as the one shown at left.

2
EXECUTIVE SUMMARY

2.1 Overview

Table 2-1 summarizes the licensing authorizations for the various types of radioactive waste which may be stored at an interim spent fuel storage installation (ISFSI).

Table 2-1
Summary of Licensing Authorizations for Radioactive Waste Storage

Waste Types Stored at ISFSI	Part 50	Part 30 (1)	Part 70 (2)	Current Part 72
Spent fuel aged >1 year	✓			✓
Other materials associated with spent fuel storage (including secondary LLW)	✓	✓	✓	✓
Solid GTCC waste	✓	✓	✓	✓
Liquid GTCC waste	✓	✓	✓	(3)
Other LLW (Class A, B or C)	✓	✓	✓	(4)

(1) Byproduct material

(2) Special nuclear material

(3) A survey of decommissioning plants suggests that there is little, if any, liquid GTCC waste which will require on site storage.

(4) Other LLW (Class A, B, or C) cannot be stored in an ISFSI that is specifically licensed under Part 72. An exception applies to such waste which is generated as part of routine ISFSI storage activities, such as inspection and maintenance. However, such excepted waste must be removed and dispositioned in a reasonable period of time. (See Section 3.2.2.)

Table 2-1 makes it clear that the licensee has broad storage options under a Part 50 license. It is also clear that the licensee has multiple options if it desires to terminate its Part 50 license. Note that a specific license obtained under Part 72 intentionally has a much narrower focus.

Nuclear plants undergoing decommissioning currently have options for permanent disposition of their LLW which is determined to be Class A, B or C. LLW which exceeds the Class C limit for shallow land disposal (GTCC waste) has no current dispositioning option, so it must be stored on site. This waste will eventually be disposed in a national spent fuel repository managed by the DOE.

After completion of decommissioning, the only waste likely to remain on site is spent fuel, GTCC waste, and other materials associated with spent fuel storage. As indicated in Table 2-1, termination of the Part 50 license previously required two and possibly three licenses: Part 30, 70 and 72. This condition represented an onerous burden on the site operator, which was alleviated via the November 2001 revisions to the regulations in Part 72. Now a licensee has the option of terminating a Part 50 license and storing GTCC in the ISFSI under a single Part 72 specific license.

For those readers not familiar with what an ISFSI looks like, Figure 2-1 was extracted from NUREG/BR-0216, *Radioactive Waste: Production, Storage, Disposal,* July 1996. The NUREG includes a discussion of spent fuel storage in an ISFSI and includes the two example illustrations.

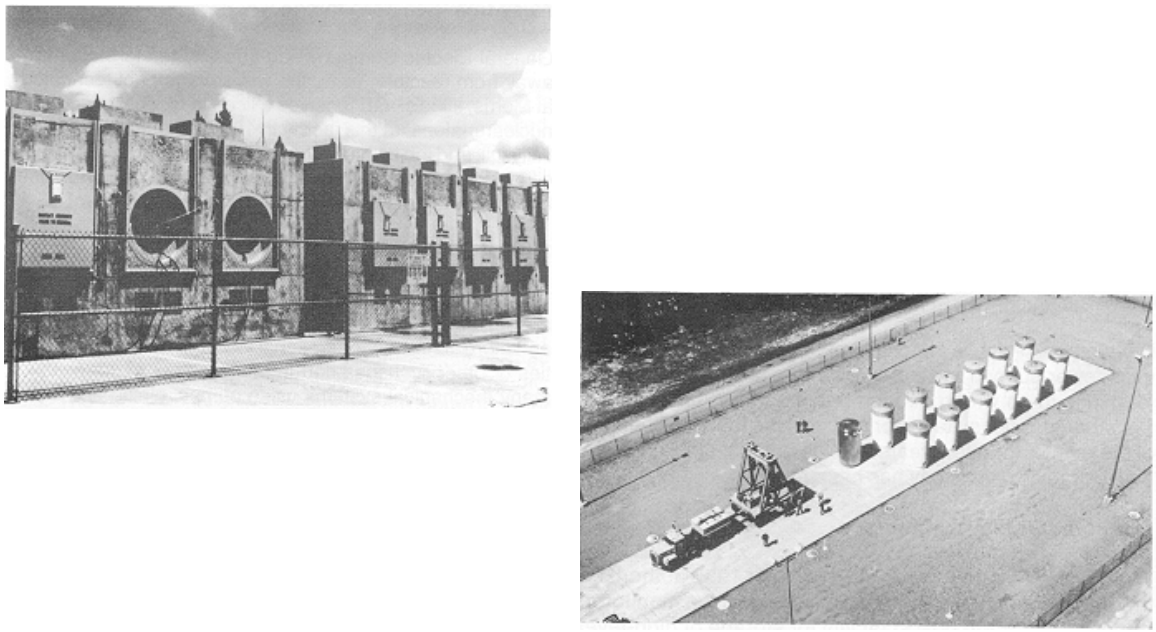

Figure 2-1
Typical Horizontal and Vertical ISFSI

Regardless of the license authorization used for the interim storage of GTCC waste, safe storage is bounded by multiple technical considerations and underscored by numerous experience factors (lessons learned). This report serves as a comprehensive review of the licensing, regulatory and technical considerations for safe storage of GTCC waste, as well as documenting important lessons learned.

2.2 Summary and Conclusions

The remainder of this chapter briefly summarizes the key concepts regarding safe storage of GTCC waste. It also includes references to the appropriate section of this report containing detailed information and discussion.

2.2.1 Summary of Licensing Considerations (See Sections 3.2 and 3.3)

- The November 2001 final rulemaking to Part 72 allows storage of GTCC waste within the ISFSI, but the rulemaking did not change the storage limitations in effect for any other type of LLW.
- Spent fuel can be stored in an ISFSI under a Part 72 license. Spent fuel is defined to include "other radioactive materials associated with fuel assemblies." This was clarified in the final rulemaking so as to be consistent with the language for the Standard Contract (10 CFR Part 961) for disposal of spent fuel and associated non-fuel components.
- Under the revised regulations, and following termination of a Part 50 license, GTCC waste stored in an ISFSI located in an Agreement State will not require a separate license issued by the Agreement State. In this situation, all GTCC waste stored in an ISFSI will be stored under an NRC-issued Part 72 specific license.

2.2.2 Safety Analysis Report Inclusion Requirements (See Section 4.1)

- Prior to receiving GTCC waste, the licensee must include in its Safety Analysis Report (SAR) how the GTCC waste will be stored to prevent any potential adverse reactions. The SAR should include equipment and facility design, description of planned operations, and other information important to safe receipt, handling, packaging, storage and transfer of GTCC waste.

2.2.3 Design, Monitoring and Inspection Criteria (See Sections 4.2 through 4.5)

- The general design criteria for an ISFSI must be reviewed and satisfied for safe storage of GTCC waste prior to receiving GTCC waste. This applies for both a Part 50 and Part 72 license.
- The regulations and current guidance documents do not provide any separate design criteria for containers used to store spent fuel or GTCC waste. It is incumbent upon the user to ensure that the GTCC waste does not adversely impact on the container, the storage cask, or anything else stored in the ISFSI.
- A survey of decommissioning plants indicates that most are proceeding with the design review for GTCC waste containers using the same criteria applicable to spent fuel storage with additional consideration given to chemical, galvanic, organic or other reactions.
- A "72.48 review" should be accomplished to identify any potential unreviewed safety questions prior to making any changes, tests or experiments at an ISFSI. This should be accomplished using the same level of careful discipline applied to "50.59 reviews" for an operating nuclear plant.
- Routine monitoring and inspection requirements and associated equipment are needed for ensuring the integrity of waste containers, minimizing occupational exposures, and avoiding uncontrolled releases from an ISFSI.

2.2.4 Administrative, Reporting and Training Requirements (See Sections 5.1 through 5.3)

- Multiple reports and reporting requirements exist relative to waste storage in an ISFSI, and the final rulemaking to Part 72 extends those reporting requirements to GTCC waste.
- Written accounting procedures must be established for material control and accounting (mathematical accounting) sufficient to maintain an accurate accounting of all special nuclear material (SNM) received, stored and transferred from storage. Accordingly, a physical inventory of spent fuel and GTCC waste containing SNM and stored at the ISFSI must be performed at least once every 12 months. This inventory must be documented, available for inspection, and maintained in duplicate with the duplicate records stored in a separate, remote location. The records must show the receipt, inventory (including location), disposal, acquisition and transfer of all spent fuel and GTCC waste containing SNM in storage at the ISFSI.
- A Quality Assurance program must be in place prior to receipt of spent fuel or GTCC waste at an ISFSI, and the program shall apply to both spent fuel and GTCC waste, as well as any other radioactive materials or waste stored at the ISFSI.
- A program for training, proficiency testing and certification of equipment and control operators is required prior to the receipt of spent fuel or GTCC waste at an ISFSI which is being operated under a specific Part 72 license. This same program is required for supervisors of the equipment and control operators.

2.2.5 Acceptance and Licensing Criteria for Stored Waste Containers (See Sections 6.2 and 6.3)

- The DOE has responsibility for providing acceptance criteria for containers used to transfer GTCC waste to an MRS and for disposal of GTCC waste. The availability of written guidance providing this waste acceptance criteria is not known. The DOE has already developed several containers which could be used for this purpose and, subsequently, could be used to store GTCC waste in an ISFSI with a reduced likelihood of repackaging at the end of the storage period. However, planning needs to consider the possibility of repackaging the GTCC waste for final disposal. Such repackaging may occur at the ISFSI or at the final repository, and these considerations should be addressed as part of the long range planning.

2.2.6 Waste Forms for Interim Storage (See Sections 7.1 and 7.2)

- The final rulemaking to Part 72 allows for storage at an ISFSI of solid GTCC waste only (including dewatered resin). It prohibits storage of liquid GTCC waste within an ISFSI. The NRC may review and approve exceptions to this restriction on a case-by-case basis.
- Other restrictions would be imposed on stored waste to minimize the potential for chemical, galvanic or other reactions arising from the stored GTCC waste.

3
LICENSING AND REGULATORY ISSUES

This chapter provides a review of the primary NRC regulations and guidance documents related to interim onsite storage of greater than Class C (GTCC) waste in an interim spent fuel storage installation (ISFSI). Although this report was developed primarily to support decommissioning of commercial nuclear reactors, it is recognized that both operating and decommissioning plants will seek to use their ISFSI for GTCC waste storage. Since the applicable regulations and regulatory guidance are very similar for both operating and decommissioning plants, and since plants currently storing GTCC waste under a 10 CFR Part 50 license may eventually seek to terminate their license and store GTCC waste under a Part 72 license, this report addresses both situations.

3.1 Development of Regulations and Regulatory Guidance for Onsite Storage

Before discussing specific licensing and regulatory considerations, some background should be provided on the policy and bases underlying applicable NRC requirements and guidance. The primary purpose of those requirements and guidance is to ensure that waste is stored in facilities that are designed and operated safely. This requires that each facility provides reasonable assurance that public health and safety is adequately protected and that the environment also is adequately protected. Regulations directed toward that objective can be found in:

1. 10 CFR Part 20 (e.g., regulations governing ALARA and permissible doses and concentrations in radioactive emissions and effluents; Subpart G governing signs, labels and controls; and Subpart I governing storage and control of licensed material);

2. 10 CFR Part 50 (e.g., Sections 50.34a, 50.36a and Appendix I governing design objectives and limiting conditions for operation of equipment to keep radioactive effluents ALARA; and Appendix A General Design Criteria 60, 63 and 64 governing control of releases of radioactivity to the environment and inspection, testing and monitoring of systems and release); and

3. 10 CFR Part 72 (e.g., Subpart E governing siting evaluation factors, including criteria and control of radioactive material in effluents and direct radiation from an ISFSI; Subpart F governing general storage facility design criteria; and Subpart G governing quality assurance, including inspections, measurements and testing, handling, storage and shipping controls).

These regulatory requirements are implemented and interpreted in a series of NRC Regulatory Guides, Branch Technical Positions, Generic Letters, and Standard Review Plan sections, as well as Information Notices, Bulletins and Circulars. The primary NRC guidance documents governing onsite storage of GTCC are:

1. Regulatory Guide 1.143 (Rev.1, October 1979) *Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water-Cooled Nuclear Power Plants*;

2. Standard Review Plan (SRP) Section 11.4, *Solid Waste Management Systems* (Rev. 2, July 1981), including:

   a) Branch Technical Position ETSB 11-3, *Design Guidance for Solid Radioactive Waste Management Systems Installed in Light-Water-Cooled Nuclear Power Reactor Plants*; and

   b) SRP Section 11-4, Appendix A, *Design Guidance for Temporary Onsite Storage of Low Level Radioactive Waste*;

3. SECY 97-056, *Interim Storage for Greater Than Class C Waste, Changes to 10 CFR Part 72* (March 5, 1997). This document was a precursor to the final rulemaking of June 16, 2000, *Interim Storage of Greater Than Class C Waste*, which replaces SECY 97-056 in its entirety.

4. SECY 94-198, *Review of Existing Guidance Concerning the Extended Storage of Low-Level Radioactive Waste* (August 1, 1994). This document consolidates, clarifies, and updates all of the previous guidance relative to LLW onsite storage into a single document addressing different aspects of managing LLW after access to a licensed disposal facility is denied (or, in the case of GTCC waste, where no disposal facility exists). The original applicable guidance documents are listed below; however, the licensee should refer to SECY 94-198 to ensure that any applicable discussion and updates are understood and addressed:

   a) Generic Letter 81-38, *Storage of Low-Level Radioactive Wastes at Power Reactor Sites* (November 10, 1981), including its enclosed "Radiological Safety Guidance for Onsite Contingency Storage Capacity." (The guidance contained in this document is similar to that contained in SRP Section 11-4, Appendix A mentioned above.)

   b) Information Notice 89-13, *Alternative Waste Management Procedures In Case of Denial of Access to Low-Level Waste Disposal Sites*, (February 8, 1989).

   c) Information Notice 90-09, *Extended Interim Storage of Low-Level Radioactive Waste By Fuel Cycle and Materials Licensees* (February 5, 1990); and

   d) IE Circular 80-18, *10 CFR 50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems* (August 22, 1980).

As discussed earlier, the NRC has revised 10 CFR Part 72 to provide for storage of GTCC waste at an ISFSI as part of either a general or specific Part 72 license. The final rulemaking is set forth in the Federal Register dated October 11, 2001, and is entitled *Interim Storage of Greater Than Class C Waste* (effective date November 13, 2001). In conjunction with the revision to Part 72, the NRC issued concurrent revisions to related sections of 10 CFR Parts 30, 70 and 150.

The preceding documents describe those factors which the NRC Staff believes should be considered in evaluating the safety and environmental impacts of onsite LLW storage, including GTCC waste storage.

Note: Some administrative controls and regulations apply to all GTCC waste, whereas others apply only to GTCC waste which contains special nuclear material (SNM). Those considerations in this report which are applicable only to GTCC waste containing SNM are clearly identified within the related discussion. Otherwise, the requirements apply to all GTCC waste stored in an ISFSI. This is discussed further in Chapter 5.

3.2 Waste Licensed for Storage in an ISFSI

3.2.1 Storage of GTCC Waste Under a Part 50 General License

Commercial nuclear reactors with an existing Part 50 license may store GTCC waste at the site of generation under the general license provisions of the Part 50 license. This includes storage of GTCC waste on the storage pads of an ISFSI. The GTCC waste must be stored in containers separate from the spent fuel storage casks.

It should be noted that, in its final rulemaking, the NRC revised section 72.2(a) to "clarify that GTCC waste does not have to be stored in a complex that is designed and constructed specifically for storage of spent fuel." This resolves some minor ambiguity in the original proposed rulemaking and allows Part 50 license holders to store GTCC waste in other safe storage areas. It also allows a licensee to obtain a Part 30 or Part 70 license for GTCC storage in another facility.

3.2.2 ISFSI Waste Type Storage Limitations Under a Part 72 License

The regulations in effect as of November 2001 limit the storage of waste in an ISFSI *under a specific Part 72 license* to three types of waste in accordance with 10 CFR Part 72.2:

1. Power reactor spent fuel aged for at least one year;
2. Reactor-related GTCC waste; and
3. Other radioactive materials associated with spent fuel storage.

Note that the key phrase in the third waste type limits non-fuel waste and radioactive materials to those which are associated with spent fuel storage. Examples might include radioactive materials used for packaging and processing, transport, inspection, measurement and testing. It would also include "secondary LLW" generated as a part of the operation of the ISFSI or as a result of any reprocessing or repackaging operations, such as smears, samples, plastic waste collection bags, and other LLW. Each of these situations links the non-fuel radioactive materials and radioactive waste to the ISFSI operation.

The regulations do not intend that secondary LLW generated as part of the operation of the ISFSI will be stored indefinitely at the ISFSI pending shipment of all fuel and final decommissioning of the ISFSI. (Reference 10 CFR Part 72.128.) Although such wastes may be staged and stored in a safe manner pending characterization and accumulation of reasonable quantities to support a normal waste shipment, once these conditions have been met, the LLW should be shipped for volume reduction and/or disposal, assuming the waste generator has a LLW disposal option.

Reference: 10 CFR 72.2; 72,128

3.2.3 Limitations on Physical and Chemical Form of Waste

Spent fuel is stored in a physical form which is reasonably well defined and for which each applicable ISFSI has been or will be designed. The storage of GTCC waste cannot be considered without recognizing alternative waste forms, specifically solid wastes, solidified wastes, and wet wastes (including dewatered resin and filters). Some organic GTCC wastes may generate or release gases, whereas other GTCC wastes may be explosive, pyrophoric, combustible, corrosive, or otherwise chemically reactive.

Thus, the revised regulations in Part 72 which embrace the storage of GTCC wastes in an ISFSI take into consideration these potential physical and chemical impacts. Specifically, commingling of GTCC wastes and spent fuel within the same container is prohibited so as to maintain an adequate margin of safety. Exceptions may be applied for on a case-by-case basis.

In the final rulemaking, the NRC also limited storage of GTCC waste in an ISFSI to solid materials, thereby prohibiting the receipt or storage of liquid wastes. The new regulations further restrict storage of waste where a potential exists for chemical, galvanic, or other reactions associated with GTCC wastes.

Although “dewatered wastes” are not specifically identified in Part 72, the NRC made clear in the supporting documentation for the final rulemaking that it would be unacceptable to receive or store dewatered wastes at an ISFSI operated under a specific Part 72 license. The NRC concluded that solid GTCC waste that contained free liquids (e.g., resin, filter media) should be treated to remove excess free liquids prior to storage at an ISFSI. Additional language in the documentation indicates that the NRC anticipates that this will result in a “solidified material.”

It is certainly possible for an innovative waste generator to determine that they have an alternative technical solution which does not require solidification. This will need to be submitted to the NRC as part of the safety analysis prior to receiving such waste. Here is the critical aspect that the generator will need to demonstrate: the analyses must show that the material can be safely stored for the full period of the ISFSI license (not just the expected storage period of the waste). Experience with stored dewatered resin and filters demonstrates that rehydration can occur and that the amount of free-standing liquid increases over time, thereby making them unsuitable for storage in an ISFSI.

Reference: 10 CFR 72.120

3.2.4 Clarification of the Term "Spent Fuel"

Under authority of the Nuclear Waste Policy Act of 1982, the regulations in Part 72.3 define "spent fuel" to include:

> "the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies."

This is a key consideration of the regulations, since it impacts on the storage of highly radioactive materials which do not exceed Class C waste but which may be exposure-intensive and inordinately expensive to separate and ship for disposal in a licensed Class A, B or C disposal facility. The Nuclear Energy Institute (NEI) requested clarification in the final rulemaking for Part 72 to ensure a consistent language between the regulations in Part 72 and the regulations in 10 CFR Part 961, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste" (Standard Contract). According to the Standard Contract, non-fuel components include, but are not limited to: control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, primary and secondary neutron sources, BWR channels, etc. In effect, this definition assigns responsibility to the Federal government for disposal of these materials even if the materials were to be separated from the fuel for interim storage.

Explicit inclusion of these non-fuel components in the spent fuel storage definition is also supported by practical considerations. Non-fuel components are in close association with the fuel assembly in operation. These components remain with the fuel in water-type pool storage or dry cask storage. These same non-fuel components will ultimately be disposed of in the Federal repository in accordance with the Nuclear Waste Policy Act as implemented in 10 CFR Part 961. Thus, clarification of the definition of Spent Fuel with regard to "other radioactive materials associated with fuel assemblies" was needed to minimize confusion, radiation exposures, and unnecessary expenditures. The NRC agreed with this position and clarified the definition and associated language in the final regulations accordingly.

The NRC also issued Interim Staff Guidance (ISG) 9 which addresses in greater detail the question of storing "other radioactive materials associated with fuel assemblies" in an ISFSI and the licensing considerations for doing so. A copy of ISG-9 is included in this report as Appendix D.

Reference: 10 CFR 72.3 and 10 CFR 961, NRC ISG-9

SUMMARY

Under the current regulations, waste stored in an ISFSI under a specific Part 72 license must either be spent fuel, reactor-related GTCC waste, or other radioactive materials associated with spent fuel storage. This generally excludes most other LLW, aside from LLW generated during the routine operation of the ISFSI.

The revisions to Part 72 also limit the physical form of GTCC waste to solid waste only, with liquid wastes being specifically excluded. Other restrictions are imposed to minimize the potential for chemical, galvanic, or other reactions arising from the stored GTCC waste.

Spent fuel is defined to include "other radioactive materials associated with fuel assemblies." This was clarified in the revised regulations so as to be consistent with the language for the Standard Contract (10 CFR Part 961) for disposal of spent fuel and associated non-fuel components.

3.3 Types of Licenses Authorizing Interim Storage of GTCC Waste

3.3.1 Specific and General Licenses for Interim Storage of GTCC Waste

GTCC waste can be stored in an onsite interim storage facility under a license obtained in accordance with one of the following regulations in 10 CFR:

1. Part 50 License – Storage of GTCC as part of the normal plant operating license, including GTCC waste stored within an ISFSI in containers separate from the spent fuel storage casks.

2. Part 30 License – Storage of GTCC that is byproduct material as defined in 10 CFR 30.3, but not special nuclear material.

3. Part 70 License – Storage of GTCC that is special nuclear material, as defined in 10 CFR 70.4.

4. Part 72 License – Storage of GTCC in an ISFSI.

In addition to the types of licenses obtainable under the various parts of 10 CFR, licenses for interim storage of GTCC waste may be either a general license or a specific license. For example, a licensee who has a 10 CFR Part 50 license can store reactor-related GTCC waste within the licensed area; this is accomplished under the Parts 30 and 70 general license authority included in the Part 50 license. In other words, interim storage of GTCC waste has long been authorized for a commercial nuclear reactor licensee within its licensed area and without having to apply for or obtain a separate Part 30 or 70 license.

However, if the licensee desires to terminate its Part 50 license, it necessary to obtain:

1. A Part 72 specific license; or

2. A Part 30 and/or a Part 70 license for the interim storage of GTCC byproduct material or GTCC special nuclear material, respectively.

At the present time, terminating a Part 50 license will require a Part 72 license for storage of spent fuel. Accordingly, amending the Part 72 license to include GTCC waste storage simplifies the process.

Special Note Regarding Class B/C Waste Storage

Existing state legislation governing operation of the Barnwell, SC, LLW disposal facility specifies that Barnwell will close to waste generated outside of the Mid-Atlantic LLW Compact after June 30, 2008. After that date, most of the operating nuclear power plants will move to an interim storage mode for Class B and Class C LLW. Such waste cannot be stored in an ISFSI under a specific Part 72 license. Therefore, for decommissioning plants, it may be necessary to establish a separate Class B/C storage facility and either shrink the size of the Part 50 licensed area or obtain separate Part 30/70 license(s) to store this waste. Clearly this is a fluid situation, but it should be factored into the decommissioning plans for plants which are in an active dismantlement phase.

Reference: 10 CFR 20/30/50/70; 10 CFR 72.6 and 72.210

3.3.2 Agreement State Licensing of GTCC Waste Storage

Under previous regulations, GTCC waste stored under a Part 30 or Part 70 license may have fallen under the jurisdiction of an Agreement State. Under the November 2001 final rulemaking to Part 72, the storage of GTCC waste is always covered under a license issued by the NRC. Specifically, the revision to Part 72.8 states:

> "Agreement States may not issue licenses covering the storage of spent fuel and reactor-related GTCC waste in an ISFSI…"

This revision resolves any potential confusion, minimizes licensing actions, eliminates the need for multiple licenses, and avoids any potential for dual regulation. 10 CFR Parts 30 and 70 were revised concurrently with Part 72 to assert the same NRC-licensing authority and responsibility.

Reference: 10 CFR 72.8 and 10 CFR 150.15(a)(7) and (8); 10 CFR 30; 10 CFR 70.1(c)

SUMMARY

- The revised regulations allow storage of GTCC waste in an ISFSI using either a general Part 72 license (applicable while the Part 50 license is in effect) or under a specific Part 72 license (applicable while or after the Part 50 license is in effect). The licensee also retains the option of obtaining a separate Part 30 or Part 70 license for GTCC waste storage.
- Following termination of a Part 50 license, all GTCC waste stored in an ISFSI would be stored under an NRC-issued license (as opposed to a license issued by an Agreement State). This rule applies regardless of whether the GTCC waste is stored under a Part 72 specific license or a license issued under Part 30 or Part 70.

3.4 Term of GTCC Storage License

The regulations in Part 72.42 limit the duration of a specific license for storing spent fuel or GTCC waste in an ISFSI to 20 years. Applications for renewal may be submitted in a timely manner to extend the storage period.

By contrast, the general license authorization for storage of spent fuel in an ISFSI is linked to the Part 50 license. Thus, spent fuel or GTCC waste storage in an ISFSI operated under the general license may continue concurrently with the Part 50 license and terminates only when the Part 50 license is terminated.

Reference: 10 CFR 72.42

SUMMARY

Under final rulemaking for Part 72, GTCC waste can be stored in an ISFSI up to a maximum of 20 years plus any subsequent renewal periods.

4
STORAGE FACILITY DESIGN AND OPERATION RELATIVE TO GTCC WASTE

It cannot be assumed that an existing ISFSI is adequately designed to accommodate storage of GTCC waste. As discussed in section 3.2.2 of this report, significant issues exist relative to the potential for adverse impact from chemical, galvanic (corrosive), organic (gaseous) and other interactions among the GTCC waste, spent fuel, and the ISFSI. Prior to storing GTCC waste in an ISFSI, a review of the general design criteria as it might apply to GTCC waste should be performed. This applies regardless of whether the ISFSI is being operated under a general Part 50 license authorization or a specific Part 72 license.

4.1 Safety Analysis Report

Prior to receiving GTCC waste, the licensee must include in its Safety Analysis Report (SAR) how the GTCC waste will be stored to prevent any potential adverse reactions:

- If the ISFSI is being operated under a general license (i.e., a Part 50 license), then a review of the existing SAR is necessary to ensure that the GTCC waste can be safely stored in the ISFSI without adverse impact to the spent fuel, ISFSI or environment. This would include a 10 CFR 50.59 review.
- If the ISFSI is being operated under an existing specific Part 72 license amended to allow storage of GTCC waste, then a review of the existing SAR is necessary to ensure that the GTCC waste can be safely stored in the ISFSI without adverse impact to the spent fuel, ISFSI or environment.
- If the ISFSI is not yet licensed, then the SAR submitted with the license application must include sufficient information to demonstrate that the GTCC waste can be safely stored in the ISFSI without adverse impact to the spent fuel, ISFSI or environment. A final SAR must be submitted to the NRC at least 90 days prior to receiving any spent fuel or GTCC waste for storage.

SUMMARY

Prior to receiving GTCC waste, the licensee must include in its Safety Analysis Report (SAR) how the GTCC waste will be stored to prevent any potential adverse reactions. The SAR should include the design, description of planned operations, and other information important to safe receipt, handling, packaging, storage and transfer of GTCC waste.

Reference: 10 CFR 72.70

4.2 General Design Criteria

In its final rulemaking to Part 72, the NRC expressed reasonable concerns over potential adverse interactions between some types of GTCC waste and other materials stored in the ISFSI or with the ISFSI itself. Accordingly, the NRC has limited GTCC waste stored in an ISFSI to solid waste only. Liquid GTCC wastes may not be received or stored in an ISFSI. (Exceptions may be applied for on a case-by-case basis.) If the ISFSI is a water-pool type facility, the GTCC waste must be in a durable solid form with demonstrable leach resistance. Each of these considerations must be addressed in the licensee's SAR.

Extending the above requirements to specific design criteria for the ISFSI, the regulations in Part 72.120(d) require that the ISFSI:

> "…be designed, made of materials, and constructed to ensure that there will be no significant chemical, galvanic, or other reactions between or among the storage system components, spent fuel, [and] reactor-related GTCC waste."

The regulations also require that the behavior of materials under irradiation and thermal conditions must be taken into account. This includes not only heat generation due to any stored spent fuel, but also thermal cycling from ambient temperatures and environmental conditions.

The regulations require that instrumentation and control systems for GTCC waste storage be provided to monitor systems that are important to safety. This becomes increasingly important for wastes which are potentially corrosive (i.e., may leak), organic (may overpressurize or explode), or otherwise chemically reactive.

With regard to storing GTCC waste in an ISFSI, the term "solid waste" does not include dewatered resin, as discussed in Sections 3.2.3 an 7.2 of this report. Dewatered resin theoretically contains no free-standing liquids. However, environmental and storage conditions may impact the resin sufficient to release water of hydration or take on water through condensation due to thermal cycling, thereby offering a potential for corrosion and leakage.

The licensee is required in Subpart 72.126 to provide effluent monitoring capabilities, if not otherwise provided for spent fuel storage. This must also be addressed in the SAR.

Subpart 72.128 requires that radioactive waste treatment facilities be provided for packaging of LLW generated during normal operation of the ISFSI (i.e., secondary waste). LLW includes GTCC waste. Although it is unlikely that secondary waste would exceed Class C, this potential must be evaluated in the SAR and accommodated if applicable.

Note: Sealed sources which are GTCC waste may be stored in an ISFSI under the final rulemaking for Part 72. Such sources should be stored in accordance with the guidance in NRC Information Notice 93-50, *Extended Storage of Sealed Sources.* A copy of this Information Notice is included in the Appendices to this report.

SUMMARY

The general design criteria for an ISFSI must be reviewed and satisfied for safe storage of GTCC waste prior to receiving GTCC waste. This applies for both a Part 50 and Part 72 license.

Reference: 10 CFR 72.120, 72.122, 72.126, 72.128

4.3 Container Design for GTCC Waste Storage

The regulations and current guidance documents related to storing radioactive materials in an ISFSI do not provide any separate design criteria for containers used to store spent fuel or GTCC waste at an ISFSI. It is incumbent upon the user to ensure that the GTCC waste does not adversely impact on the container, the storage cask, or anything else stored in the ISFSI.

One specific requirement included in the revised regulations related to waste packaging involves handling and retrievability. GTCC waste must be packaged in a manner that allows handling and retrievability without the release of radioactive materials to the environment or radiation exposures in excess of Part 20 limits. This is included in 72.122(h)(5). One aspect of potential confusion exists in the last sentence of that paragraph, which states:

> "The package must be designed to confine the high-level radioactive waste for the duration of the license."

It is important to note that this last sentence applies to the "high-level radioactive waste" which is stored in a Monitored Retrievable Storage (MRS) facility and not an ISFSI. It is not specifically applied to GTCC waste. GTCC waste may be stored in the facility in one container, removed, repackaged into another container, then placed in storage again. Although this situation is less than ideal, it may become necessary depending upon the waste acceptance criteria and technical regulations established by the DOE for final acceptance and disposition of the waste.

Note: Chapter 6 provides additional guidance and links to other guidance on waste containers for GTCC waste stored in an ISFSI. That information should be reviewed and considered as part of the review for the general design criteria.

SUMMARY

The regulations and current guidance documents related to storing radioactive materials in an ISFSI do not provide any separate design criteria for containers used to store spent fuel or GTCC waste at an ISFSI. It is incumbent upon the user to ensure that the GTCC waste does not adversely impact on the container, the storage cask, or anything else stored in the ISFSI.

Reference: 10 CFR 72..122

4.4 Changes, Tests and Experiments

Operators of commercial nuclear power plants are well-versed in the requirements of 10 CFR 50.59. As it relates to the operation of an ISFSI under the general license authorization of Subpart 72.6, "any changes in the ISFSI or the procedures described in the Safety Analysis Report, or to conduct tests or experiments not described in the SAR, that involve an unreviewed safety question, a significant increase in occupational exposure, or significant unreviewed environmental impact," will require a license amendment.

This same review and evaluation requirement applies to specific licenses issued under Part 72. In this case, the nearly identical regulations governing changes, tests, and experiments are incorporated in Subpart 72.48. It is important for the licensee to recognize this requirement during its review of the ISFSI design criteria as they apply to GTCC waste. A "72.48 review" to identify any potential unreviewed safety questions should be accomplished prior to making any changes, tests or experiments at an ISFSI licensed under Part 72 and using the same level of careful discipline applied to "50.59 reviews" for an operating nuclear plant.

Note: The NRC may publish a notice in the Federal Register of proposed actions for a license amendment. The licensee is referred to 10 CFR Parts 50.90, 50.91, and 50.92.

SUMMARY

A "72.48 review" should be accomplished to identify any potential unreviewed safety questions prior to making any changes, tests or experiments at an ISFSI licensed under Part 72 and using the same level of careful discipline applied to "50.59 reviews" for an operating nuclear plant. Note that a "50.59 review" is required for an ISFSI being operated under a Part 50 license.

Reference: 10 CFR 50.59, 50.90, 50.91, 50.92; 10 CFR 72.48

4.5 Monitoring and Inspection

GTCC waste in storage must be monitored to ensure integrity of the waste container, and minimize occupational radiation exposures and uncontrolled releases. In developing the design criteria for the ISFSI, each licensee must develop specific functional and operating limits, identify necessary and appropriate monitoring instruments, and establish limiting control settings for those monitoring instruments. These limits and instruments are addressed in the SAR, and they also are converted to specific technical specifications included in the ISFSI license conditions for safe operation.

These conditions and limits apply to waste handling and storage conditions, including waste handling and storage of GTCC waste. However, they are applied only to those instruments and limiting control settings "related to fuel or waste handling and storage conditions having significant safety functions."

In addition to the above monitoring requirements, the regulations in Part 72.44 establish surveillance requirements for spent fuel and GTCC waste in storage. These requirements include:

- Inspection and monitoring of spent fuel and GTCC waste.
- Inspection, test and calibration activities to ensure integrity of systems and components.
- Confirmation that the operation of the ISFSI is within the required functional and operating limits.
- Confirmation that the limiting conditions required for safe storage are being met.

Monitoring and inspection of GTCC waste is significantly different from spent fuel by virtue of the type of waste, activity, potential for significant exposure, potential for chemical, galvanic or other degradation of the storage container, and general flexibility of the storage container design for GTCC waste as opposed to spent fuel. Monitoring and inspection applicable to GTCC waste is addressed in a separate EPRI report which should be obtained and reviewed by each ISFSI licensee or applicant planning to store GTCC waste in their ISFSI:

EPRI Report TR-105785, *Monitoring and Inspection of Low-Level Radioactive Waste Stored at Nuclear Power Plants*, December 1995.

SUMMARY

In addition to the basic facility design considerations applicable to GTCC waste stored in an ISFSI, routine monitoring and inspection requirements and associated equipment are needed for ensuring the integrity of waste containers, minimizing occupational exposures, and avoiding uncontrolled releases.

Reference: 10 CFR 72.44(c); EPRI TR-105785

5
ADMINISTRATIVE CONTROLS

Various subparts of the regulations in 10 CFR Part 72 and the associated guidance documents for storage of LLW address specific administrative controls for the management of waste-related data and for the projection and tracking of stored waste volumes. A Part 50 license includes technical specifications addressing any NRC concerns over safe storage of waste within an ISFSI. For an ISFSI operated under a specific Part 72 license, Subpart 72.44(c) establishes requirements for technical specifications to be included also in the license for an ISFSI. The November 2001 revisions to Part 72 extend these same requirements to the storage of GTCC waste in an ISFSI.

The technical specifications address limiting conditions for operation, surveillance requirements, specific design features having a safety significance, etc. Also included are certain "administrative controls" which include:

- Organization and management procedures.
- Recordkeeping.
- Review and audit.
- Reporting necessary to assure that the storage operations are performed in a safe manner.

This chapter summarizes the significant administrative controls for the storage of GTCC waste within an ISFSI. Before proceeding, it should be noted that some administrative controls and regulations apply to all GTCC waste, whereas others apply only to GTCC waste which contains special nuclear material (SNM). Where applicable only to GTCC waste containing SNM, this is clearly identified within the related discussion. Otherwise, the requirements apply to all GTCC waste stored in an ISFSI.

Reference: 10 CFR 72.44(c)

5.1 Reporting Requirements

5.1.1 Safety Analysis Report (SAR)

The SAR covering nuclear plant operations pursuant to a Part 50 license will address all safety-related considerations for storage of GTCC waste within a generally licensed ISFSI. For an ISFSI operated under a specific Part 72 license, the regulations in Part 72.24 require that a SAR be developed and maintained covering the receipt, handling, packaging and storage of spent fuel. The regulations in Part 72 extend these same requirements to GTCC waste "as appropriate."

Note: In this case, "as appropriate" recognizes that some aspects of the safety analysis report do not apply to GTCC waste. It is not intended to suggest that packaging need not be addressed because the waste will not be packaged at the ISFSI (i.e., arrives pre-packaged). In this case, the term "packaging" is defined in Subpart 71.4, "the assembly of components necessary to ensure compliance with the packaging requirements of this part. In other words, it is an assembly of one or more physical components and not the "act of placing materials in a package."

The final rulemaking for Part 72 goes beyond the previous regulations with a new paragraph, 72.24(r). It requires that the SAR include:

> "A description of the compatibility and suitability of the reactor-related GTCC waste with the ISFSI."

This requirement recognizes the potential for GTCC waste to contain liquids, chemicals, organic matter, corrosive materials, or other materials which could adversely affect or be affected by the ISFSI structural materials or other wastes or materials stored at the ISFSI. This concern was addressed in detail in Section 3.2.2 of this report. In its final rulemaking, the NRC limited storage of GTCC waste in an ISFSI to solid materials, thereby prohibiting the storage of liquids and wet wastes. The regulations further restrict storage of waste where a potential exists for chemical, galvanic or other reactions associated with GTCC wastes.

Note that such restrictions may not be specifically stated within the regulations for an ISFSI operated under a Part 50 license. However, the NRC requires that the GTCC waste must be stored in containers separate from the spent fuel storage casks, and the storage of GTCC waste must pose no safety problems for licensed activities under Part 50. Therefore, it is incumbent upon a utility storing GTCC waste within the ISFSI to ensure compliance with the technical considerations of the preceding paragraph.

It is always possible for the licensee to request an exemption allowing for storage of liquid or wet GTCC waste within an ISFSI. Before the NRC would approve such an exemption, the licensee would need to demonstrate that all GTCC waste intended for storage in the ISFSI would be compatible with and suitable for storage in the ISFSI.

Other paragraphs within Subpart 72.24 bear directly upon the storage of GTCC waste and the development of the SAR. These include:

- ALARA considerations, including minimizing exposure arising from reprocessing or repackaging activities.
- Features of the ISFSI design and operating modes to reduce secondary waste generation.
- A description of the equipment to maintain control over GTCC waste in gaseous and liquid effluents (as may arise from storage of corrosive waste or waste containing organic matter).
- An estimate of the quantity of each of the principal nuclides expected to be released annually in liquid and gaseous effluents.

- A general description of the provisions for packaging, storage and disposal of solid wastes containing radioactive materials resulting from treatment of gaseous and liquid effluents and from other sources.

  Note: Some GTCC waste containers may have gas permeable vents installed to prevent overpressurization resulting from stored organics. This should be addressed in the SAR, along with any associated consideration for gaseous effluents.

For a specific licensee, a final SAR (or FSAR) must be submitted to the NRC at least 90 days prior to receipt of spent fuel or GTCC waste. Thereafter, following the first receipt of spent fuel or GTCC waste, the SAR must be updated and submitted to the NRC annually, including any changes to the program for receipt, handling, packaging or storage of GTCC waste.

Reference: 10 CFR 72.24, 72.70

5.1.2 Annual Radioactive Effluent Release Report (ARERR)

5.1.2.1 Annual Effluent Reporting

The technical specifications for an ISFSI must state the limits on effluent releases of radioactive materials for compliance with the ALARA regulations in 10 CFR Part 20. Pursuant to this effluent release limitation, the technical specifications must require that an annual report be submitted to the NRC in accordance with Subpart 72.4. This annual report must the quantity of each of the principal radionuclides released to the environment in liquid and in gaseous effluents during the previous calendar year, along with any other information which would allow the NRC to estimate the maximum potential radiation dose commitment to the public resulting from effluent releases. This data must be provided even if you have no effluent releases for a given year (i.e., a zero value report).

For operators of commercial nuclear plants, this is an extension of the requirements for the Annual Radioactive Effluent Release Report (AREER) already being submitted every year. Under a Part 50 license, the AREER will encompass this Part 72 requirement, assuming the ISFSI is being operated under the general license authorization of Part 72.6. However, if the ISFSI is being operated under a separate specific license – regardless of whether the licensee retains or has terminated its Part 50 license – either a separate or concurrent submittal will be required.

It should be noted that the revised regulations in Part 72 extend the annual reporting requirement to include effluents arising from the receipt, handling and storage of GTCC waste. The current AREER required under a Part 50 license typically identifies liquid and airborne effluents by nuclide and total effluent activity for each of the principle nuclides. Solid effluents (waste shipments) also are reported by specifying the total activity of each of the principal nuclides and according to the waste class (i.e., principal nuclide activity is reported for Class A, B, C, and GTCC wastes separately). When reporting the storage of waste in an ISFSI – whether under a general or specific Part 72 license – the same approach should be applied.

Note: Class A, B and C wastes are not allowed to be stored in an ISFSI. However, routine operation of an ISFSI will produce secondary wastes which will most likely be Class A, B and C wastes. This secondary waste must be shipped either for disposal or to a separate facility licensed for storage of such waste classes. (See Section 3.2.2 for a discussion on the limitations on secondary waste storage.)

5.1.2.2 ALARA Considerations

As indicated above, the annual report to the NRC must also provide information which allows the NRC to estimate the maximum potential radiation dose commitment to the public. During normal operations and anticipated occurrences, the annual dose equivalent to any real individual who is located beyond the controlled area must not exceed 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid and 0.25 mSv (25 mrem) to any other critical organ as a result of exposure to:

(1) Planned discharges of radioactive materials, radon and its decay products excepted, to the general environment,

(2) Direct radiation from ISFSI operations, and

(3) Any other radiation from uranium fuel cycle operations within the region.

Accordingly, operational restrictions must be established to meet as low as is reasonably achievable (ALARA) objectives for radioactive materials in effluents and direct radiation levels associated with ISFSI operations. Operational limits must be established for radioactive materials in effluents and direct radiation levels associated with ISFSI operations to meet the above annual dose equivalent limits. Although this is accomplished on a routine basis for operating reactors and nuclear plants with a Part 50 license, it is important to note that this same reporting requirement will apply to an ISFSI operated under a specific Part 72 license.

Reference: 10 CFR 72.4, 72.44(d)(3), 72.104

5.1.3 Material Status Reports

Part 72.76 requires licensees to submit to the NRC a "material status report." The report provides information concerning the special nuclear material contained in the spent fuel possessed, received, transferred, disposed, or lost by the licensee during storage within an ISFSI. The revisions to Part 72 extend this requirement to GTCC waste containing special nuclear material (SNM) and stored in an ISFSI. The specifics of this reporting requirement are as follows:

1. Each material status report must be in a computer-readable format.

2. A new material status report must be completed as of March 31 and September 30 of each year (i.e., generated **semi-annually**), and submitted to the NRC within 30 days thereafter.

Note how this differs from the Annual Effluent Release Report, which is submitted only once per year, covers a calendar year rather than overlapping years, and is due within 60 days of the end of the calendar year (or March 1).

3. Detailed instructions for completion and submittal of the material status report are found in NUREG/BR-0007 and NMMSS Report D-24, "Personal Computer Data Input for NRC Licensees."

If the licensee has no GTCC waste containing SNM, the material status report will still be submitted but will address only the SNM contained within the spent fuel. No specific reference is required for GTCC waste containing only byproduct material and stored in the ISFSI.

Reference: 10 CFR 72.76(a); NUREG/BR-0007

5.1.4 Nuclear Material Transaction (Transfer) Reports

Under current regulations in 10 CFR 72.78, whenever a licensee transfers or receives spent fuel, the licensee needs to complete a Nuclear Material Transaction Report. Under the revised regulations in Part 72, the NRC extended the reporting requirement to GTCC waste that contains special nuclear material.

If the licensee has no GTCC waste containing SNM, the Nuclear Material Transaction Report will still be prepared but will address only the SNM contained within the spent fuel. No specific reference is required for GTCC waste containing only byproduct material and stored in the ISFSI.

Although the regulations do not specifically state that the licensee needs to submit these reports to the NRC, the general language suggests that submittal is in order. (Submittal is required for participants in the US/IAEA Safeguards Agreement program, and such submittal is in accordance with 10 CFR 75.34.)

Reports must be prepared in computer-readable format. Detailed instructions for completion and submittal of the Nuclear Material Transaction Report are found in NUREG/BR-0006 and NMMSS Report D-24, "Personal Computer Data Input for NRC Licensees."

Reference: 10 CFR 72.78 and 10 CFR 75.34; NUREG/BR-0006

5.1.5 Emergency Reporting Requirements

In its revisions to Part 72, the NRC extended its emergency reporting requirements to include GTCC waste. However, this applies only to non-emergency reporting under paragraphs 72.75(b) and (c) for four-hour and twenty-four reporting, as well as the applicable follow-up written reports within 30 days as required by 72.75(d).

Reference: 10 CFR 72.24, 72.75(b), (c), and (d)

SUMMARY

Multiple reports and reporting requirements exist relative to waste storage in an ISFSI, and the November 2001 final rulemaking to Part 72 extend those reporting requirements to GTCC waste. These reporting requirements are summarized in Table 5-1.

Table 5-1
Summary of ISFSI Stored Material Reporting Requirements

Report Type	Frequency	Period Covered & Due Date
Final Safety Analysis Report	One time report	At least 90 days prior to receipt of spent fuel or GTCC waste
Safety Analysis Report Update	Annual	Yearly following first receipt of spent fuel or GTCC waste
Annual Effluent Release Report	Annual	Calendar Year; Due March 1
Material Status Report (For spent fuel or GTCC containing SNM)	Semi-Annual (twice a year)	Prepared Mar 31 and Sep 30; Due April 30 and Oct 30
Nuclear Waste Transaction Report (For spent fuel or GTCC containing SNM)	Upon each transfer or receipt of spent fuel or GTCC containing SNM	Upon each transfer or receipt of spent fuel or GTCC containing SNM
Emergency Notifications	Non-emergency events	4-hour and 24-hour requirements; written follow-up report within 30 days.

5.2 Material Balance, Inventory and Records

Current regulations in Part 72 require that each licensee maintain records showing the receipt, inventory (including location), disposal, acquisition and transfer of all spent fuel in storage. Although not specifically stated in the regulations, the intent behind the extensive recordkeeping requirements of 72.72 is the tracking and accountability of special nuclear material. This understanding is significant to the changes to 72.72 incorporated into the final rulemaking for part 72. The same recordkeeping requirements now apply to GTCC waste, but only for that GTCC waste which contains special nuclear material.

It is anticipated that the licensee will maintain records governing all GTCC waste in storage, but the recordkeeping requirements for special nuclear material (SNM) are more extensive than for GTCC waste containing only byproduct material. This is not immediately obvious from the language of 72.72. By contrast, if GTCC waste containing SNM is stored under a Part 70 license, the requirements for "material balance" are detailed in 70.51. The regulations in Part 72.72 include the term "Material balance" in the subpart title, but the term is not further delineated nor defined elsewhere within Part 72. Material balance means:

A determination of material unaccounted for (MUF) by subtracting ending inventory (EI) plus removals (R) from beginning inventory (BI) plus any additions to inventory (A). Mathematically:

$$MUF = BI + A - EI - R$$

$$= (BI + A) - (EI + R)$$

The regulations require that an inventory of the affected material be performed at least once every 12 months. (Note that this is not the same as annually.) Assuming that the inventory is performed every January, and applying the above formula, then the beginning inventory (BI) is the quantity of SNM present during last January's inspection. The additions to inventory (A) are the total quantity added since last January; the ending inventory is the quantity physically determined to be present during the current month's inspection; and the removals (R) are the SNM removed from storage for any purpose, including transfer to another licensee or shipment for disposal.

Using this approach, the objective is to demonstrate that the sum of the beginning inventory and any additions (BI + A) will be equal to the sum of the ending inventory plus any removals (EI – R). Thus,

$$MUF = BI + A - (EI + R) = 0$$

If MUF does not equal zero, then any difference must be appropriately reconciled.

It is important to recognize that the regulations addressing material balance of SNM in Part 70 tend to focus on radioactive materials in which SNM are the primary constituents of the material present. Although GTCC waste containing SNM can be stored under a Part 70 license, the SNM would typically represent a very small portion of the radioactivity present.

Thus, for Part 72 storage, it becomes incumbent upon the waste generator to consider the types and forms of the GTCC waste generated and to establish written procedures which will provide a reasonable accountability of any SNM present. For example, if GTCC waste containing SNM has been encapsulated in a cement monolith within a high integrity container and placed within a dry storage cask, then it is likely that verification of the presence of the container within the cask would adequately demonstrate that MUF = 0.

Recognizing this situation, Part 72 requires that, for GTCC waste containing SNM:

1. Records will be maintained showing the receipt, inventory (including location), disposal, acquisition and transfer of all GTCC waste containing SNM in storage.

2. A physical inventory of all GTCC waste containing SNM will be conducted at intervals not exceeding 12 months.

3. Written procedures shall be established for material control and accounting (i.e., mathematical accounting) sufficient to account for all SNM in storage.

4. Records of GTCC waste containing SNM will be maintained in duplicate, with the duplicate records maintained in a separate, remote location.

5. Records of GTCC waste containing SNM transferred out of an ISFSI (e.g., waste shipments to an MRS or for disposal) will be maintained for five years following transfer.

Reference: 10 CFR 72.72; 10 CFR 70.51

SUMMARY

Written accounting procedures must be established for material control and accounting (mathematical accounting) sufficient to maintain an accurate accounting of all SNM received, stored and transferred from storage. A physical inventory of spent fuel and GTCC waste containing special nuclear material and stored at the ISFSI must be performed at least once every 12 months. This inventory must be documented, available for inspection, and maintained in duplicate with the duplicate records stored in a separate, remote location. The records must show the receipt, inventory (including location), disposal, acquisition and transfer of all spent fuel and GTCC waste containing SNM in storage at the ISFSI.

5.3 Quality Assurance

Each licensee's Quality Assurance program for storing GTCC waste in an ISFSI must be approved by the NRC prior to receiving GTCC waste at the ISFSI. Quality assurance records related to any waste stored in an ISFSI are required in accordance with 10 CFR 72.174.

As a brief review, QA records must include:

- Design records (including packaging and container testing records)
- Records of use and the results of reviews
- Inspections
- Tests
- Audits, Monitoring of work performance
- Material analyses

Reference: 10 CFR 72.140, 72.174

SUMMARY

A Quality Assurance program must be in place prior to receipt of spent fuel or GTCC waste at an ISFSI, and the program shall apply to both spent fuel and GTCC waste, as well as any other radioactive materials or waste stored at the ISFSI.

5.4 Training and Certification of Personnel

The training and certification of ISFSI personnel is required in Part 72. It applies to personnel who operate equipment and controls that have been identified as important to safety in the Safety Analysis Report. The operation of such equipment and controls must be:

> "…limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation."

In addition, supervisory personnel who personally direct the operation of equipment and controls important to safety must also be trained and certified in such operations, even if the actual operator is trained and certified. Consistent with these requirements, the licensee is also required to establish a training, proficiency testing, and certification program for ISFSI personnel. This training program is required to be submitted to the NRC along with the license application. This training is required to be completed prior to receipt of spent fuel.

The November 2001 revisions to Part 72 extend the training and certification requirement to include personnel operating equipment or controls important to safety as they affect the receipt, handling, packaging and storage of GTCC waste, as appropriate. This training and certification must be completed prior to receiving any affected GTCC waste.

Reference: 10 CFR 72.28, 72.190, 72.192

SUMMARY

A program for training, proficiency testing and certification of equipment and control operators is required prior to the receipt of spent fuel or GTCC waste at an ISFSI. This same program is required for supervisors of the equipment and control operators.

6
WASTE CONTAINERS FOR GTCC INTERIM STORAGE

6.1 Available EPRI Reports on LLW Containers for Extended Storage

At the time of developing this report (April 2003), there is limited guidance available related specifically to containers for the storage of GTCC waste in an ISFSI. However, the NRC provides guidance on containers for spent fuel and associated materials stored in dry cask storage systems, and there is extensive guidance on waste containers for the extended storage for LLW in general. Most of this information is applicable to GTCC waste regardless of whether it is stored in an ISFSI or other interim onsite storage facility.

EPRI's report series addressing *Interim On Site Storage of Low Level Waste* provides detailed information and requirements applicable to waste containers for extended storage, container monitoring and inspection, and container closures, seals and gas vents. These are available as the following EPRI reports:

- Electric Power Research Institute. TR-1007863, *Waste Containers for Extended Storage, Revision 1*, September 2003.
- Electric Power Research Institute. TR-100298, V4, P3, *Interim Onsite Storage of Low Level Waste, Volume 4, Part 3: Waste Container Closures, Seals and Gas Vents*, September 1993.
- Electric Power Research Institute. TR-105785, *Monitoring and Inspection of Low-Level Radioactive Waste Stored at Nuclear Power Plants*, December 1995.

The user of this report should consider the recommendations included in the above reports when considering the selection of waste containers for storage in an ISFSI. Special attention should be given to the first report, which includes a comprehensive discussion of many of the available containers and packages for storing and transportation of LLW. It provides a methodology for LLW container selection and includes detailed analyses of container materials, linings, and coatings over the extended storage period, as well as the impact of various waste types and waste forms on such containers.

6.2 DOE Activities in Support of GTCC Waste Containers

Current DOE efforts are focussed primarily on disposal container designs for canistered spent fuel, uncanistered spent fuel, high-level waste, high level-waste co-disposed with DOE spent fuel, and immobilized plutonium canistered with high-level waste. Once the disposal container is loaded and sealed, it is referred to as a waste package. Waste packaging for GTCC waste is a relatively new concept for the DOE, but considerable progress has been made.

The design of spent fuel and GTCC waste containers is based on a defense-in-depth philosophy of using multiple barriers. Two different barrier materials support the design approach and have different failure mechanisms to protect against the release of radioactive materials. The outer barrier is a "corrosion-allowance" material that provides mechanical strength early in the life of the container. It also protects the inner barrier by allowing, but limiting, corrosion to a slow predictable rate. The inner barrier is a "corrosion-resistant" material that has a very long life.

The functions of the disposal container are to provide a waste containment barrier, act as a structural member to protect the waste from mishandling or impact damage, and assist in conducting heat away from the waste. The waste is sealed with an inner barrier lid and an outer barrier lid. The disposal container for spent fuel includes a basket for holding the fuel assemblies, which also provides the capability for additional criticality control, if required. These baskets can be removed if storing GTCC waste, thereby allowing for larger pieces of material and less cutting.

Because of weight and handling limitations, the disposal containers are not designed to provide shielding against radiation from the contained waste. Consequently, workers need to be protected by other means during canister loading, handling, and shipping.

In addition to the information available through EPRI, the DOE has been developing a report describing its experience with the design and testing of a series of containers which will accommodate both spent fuel and GTCC waste. This is significant, since the container designs are intended to be consistent with the container handling equipment to be used at the future MRS and disposal facility, thereby minimizing radiation exposure during handling and minimizing the potential need for repackaging.

These containers were developed by the National Spent Nuclear Fuel Program which has responsibility for "DOE-owned issues" relative to GTCC waste management pursuant to the LLW Policy Amendments Act of 1985. The canisters were designed for spent nuclear fuel generated by the DOE and for other associated materials. As such, they can be used for some GTCC wastes. (Limitations apply to wastes containing organics which could generate gases, thereby requiring gas permeable vents. Limitations also apply to chemical wastes, corrosive wastes, explosive wastes, etc.)

The following four container configurations have been developed as part of this DOE program:

Table 6-1
Container Configurations for DOE Spent Fuel and GTCC Waste

External Diameter	External Length	Disposal Volume	Internal (Useable) Diameter	Internal (Useable) Length	Internal Volume	Maximum Weight
18 in 46 cm	10 ft 3 m	17.7 Ft^3 0.5 m^3	17 in 43 cm	100 in 254 cm	13.1 Ft^3 0.4 m^3	5000 lbs 2268 kg
18 in 46 cm	15 ft 4.6 m	26.5 Ft^3 0.8 m^3	17 in 43 cm	162 in 411 cm	21.3 Ft^3 0.6 m^3	6000 lbs 2722 kg
24 in 61 cm	10 ft 3 m	31.4Ft^3 0.9 m^3	23 in 58 cm	97 in 246 cm	23.3 Ft^3 0.7 m^3	9000 lbs 4082 kg
24 in 61 cm	15 ft 4.6 m	47.2 Ft^3 1.3 m^3	23 in 58 cm	159 in 404 cm	38.2 Ft^3 1.1 m^3	10,000 lbs 4536 kg

Note: Descriptions and technical specifications on other containers commonly being procured for spent fuel and GTCC waste storage by commercial nuclear plants being decommissioned are provided in Appendix E.

These containers are significantly larger than other containers currently used by waste generators for storage of GTCC within an ISFSI. The larger containers translates to less cutting, less handling, lower radiation exposures, and lower overall cost. Within each of the above containers, the fuel support (lattice) structure can be removed, thereby increasing the available space for GTCC waste.

It is important to note that these containers have already been developed, tested, and approved for DOE use. This is a significant step forward both for storage and for eventual disposal of GTCC waste. The DOE has been developing a draft report offering guidance on GTCC waste packaging, but there is no schedule for release to the commercial nuclear industry.

SUMMARY

The DOE has responsibility for providing criteria for containers used to transfer GTCC waste to an MRS and for disposal of GTCC waste. The availability of written guidance providing this waste acceptance criteria is not known. The DOE has already developed several containers which could be used for this purpose and, subsequently, could be used to store GTCC waste in an ISFSI with a reduced likelihood of repackaging at the end of the storage period.

However, the DOE has stepped away from providing detailed guidance on most GTCC waste issues. It is recommended that each licensee pursuing storage of GTCC waste in an ISFSI seek out and remain current with the latest information on DOE container licensing, availability and usability, as well as similar information on containers offered by other suppliers.

Reference: Proceedings of NEI/EPRI Decommissioning/Dry Storage Planning and Technology Forum, Paper presented by Robert Hansson of INEEL on "GTCC Management," July 2000.

6.3 NRC Licensing Criteria for GTCC Stored Waste Containers

6.3.1 Overview

The general design criteria for an ISFSI includes certain requirements related to spent fuel storage which were extended to GTCC waste by the November 2001 revisions to Part 72. Central to these design considerations and the applicability to GTCC waste is the focus on structures, systems and equipment important to safety (as defined in Subpart 72.3).

The storage of GTCC waste at an ISFSI presents safety and technical issues that differ from those previously addressed by the NRC for storage of spent fuel. For example, some forms of GTCC waste may be susceptible to radiolytic or thermal decomposition. Consequently, the design of a container for the storage of GTCC waste would need to consider the generation of gas or other products. Furthermore, given the potential mix of waste types within a container of stored GTCC waste, chemical, galvanic, or thermal interactions may occur between the GTCC waste and the ISFSI, or among the GTCC waste, the spent fuel, and the cask internals if stored in the same cask (i.e., commingled).

The key question here is how the stored GTCC waste may affect their storage containers and, directly or indirectly, affect the dry cask storage system. The potential for adverse impact is addressed and mitigated in Subpart 72.120(b), which require that only solid GTCC waste may be stored in an ISFSI. Moreover, liquid GTCC wastes are specifically prohibited from being received or stored in an ISFSI. (Exceptions may be applied for on a case-by-case basis.) This applies to both a specific licensee and a general licensee (e.g., a plant with a Part 50 license which is operating an ISFSI under the general license authorization of Subpart 72.6).

In addition, the concern for potential reactions among commingled GTCC waste, spent fuel and the cask internals resulted in a Part 72 prohibition against commingling GTCC waste and spent fuel within the same cask. An exception is applied for specific components associated with, and integral to, the spent fuel.

The regulations further require in Subpart 72.120(d) that the ISFSI:

> "…must be designed, made of materials, and constructed to ensure that there will be no significant chemical, galvanic, or other reactions between or among the storage system components, spent fuel, and/or GTCC waste…including possible reaction with water during wet loading and unloading operations or during storage in a water-pool type ISFSI. [Moreover,] the behavior of materials under irradiation and thermal conditions must be taken into account."

6.3.2 NRC Design Guidance

Section 3.2.2 of this report discusses the concerns of significant chemical, galvanic or other reactions associated with storage of GTCC waste in and ISFSI. For those plants which already have an ISFSI which was designed specifically for storing spent fuel and without consideration for stored GTCC waste, additional reviews and analyses are indicated. Typically, such reviews

are conducted in accordance with Subpart F of Part 72 (General Design Criteria), but also in accordance with 72.48 (which is nearly identical to the 10 CFR 50.59 review process).

Due in part to a number of material-related issues identified during dry cask storage system (DCSS) and transportation package application reviews and the associated field implementation, the NRC recognized the need for specific guidance for the review of materials selected by the applicant for its DCSS or transportation package. Interim Staff Guidance (ISG) 15, *Materials Evaluation*, was issued to meet this need. This ISG does not specifically address storage of GTCC waste, but the guidance encompasses material evaluation issues which must be addressed by any licensee seeking to store GTCC waste in containers located within the DCSS or commingled in the same container with spent fuel assemblies. The key guidance related to this section of the report is as follows:

Chemical and Galvanic Reactions

- The DCSS should prevent the spread of radioactive material and maintain safety control functions using, as appropriate, noncombustible and heat resistant materials.
- A review of the DCSS, its components, and operating environments (wet or dry) should confirm that no operation (e.g., short-term loading/unloading or long-term storage) will produce adverse chemical and/or galvanic reactions which could impact the safe use of the storage cask.
- Components of the DCSS should not react with one another, or with the cover gas or spent fuel, in a manner that may adversely affect safety. Additionally, corrosion of components inside the containment vessel should be effectively prevented.
- The operating procedures should ensure that no ignition of hydrogen gas should occur during cask loading or unloading.
- Potential problems from uniform corrosion, pitting, stress corrosion cracking, or other types of corrosion, should be evaluated for the environmental conditions and dynamic loading effects that are specific to the component.

6.3.3 NRC Limitations on Authorized Contents of Spent Fuel Casks

In October 1999, the NRC issued Information Notice 99-29, Authorized Contents of Spent Fuel Casks. This Notice alerts licensees to pay close attention to the authorized contents loaded into spent fuel casks in dry cask storage. The specified contents authorized for each approved spent fuel cask are listed in the Certificate of Compliance (CoC), for the casks or in the specific Part 72 license. Specific Part 72 licenses specify the types of materials authorized to be loaded into the casks; for general licenses, the cask's CoC states the authorized cask contents.

6.3.4 Safety Analysis Report Considerations

Within the Safety Analysis Report covering the ISFSI, the licensee (or applicant for a license) is required to describe how the GTCC waste is stored. The SAR must describe how those structures, systems and components that are important to safety are properly designed to allow

the storage of GTCC waste within the ISFSI. The regulations and current guidance documents do not provide any separate design criteria for GTCC waste storage containers. Final disposal containers (and containers for waste transferred to the MRS) will be defined by the DOE in accordance with the Low Level Waste Policy Amendments Act of 1985. Safe storage is governed by the provisions of 10 CFR 20 and 72. Thus, it is incumbent upon the licensee to ensure that the co-location of GTCC waste does not have an adverse effect on the safe storage of spent fuel and the operations of the ISFSI.

6.3.5 Inspection of Stored Containers

As a final consideration, the regulations in Subpart 72.168 require that the licensee provide measures to indicate the inspection status of containers in storage, which applies to GTCC waste. The requirement states in part:

> "The licensee shall establish measures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the ISFSI."

The intent of this requirement is to provide for easy identification of items which have passed required inspections and tests. This will preclude any inadvertent bypassing of the inspections and tests. Licensees should keep this requirement in mind when selecting a container for storage to ensure that the required markings can be attached to the container or otherwise accommodated.

SUMMARY

The regulations and current guidance documents do not provide any separate design criteria for containers used to store spent fuel or GTCC waste at an ISFSI. It is incumbent upon the user to ensure that the GTCC waste does not adversely impact on the container, the storage cask, or anything else stored in the ISFSI. Prior to receiving GTCC waste, the licensee must include in the Safety Analysis Report how the GTCC waste will be stored to prevent any potential adverse reactions.

Reference: 10 CFR 50.59; 10 CFR 72.48, 72.120, 72.122, 72.168, NRC IE Notice 99-29

7
WASTE FORMS FOR INTERIM STORAGE

7.1 Solid Waste vs Liquid Waste Storage

In its November 2001 final rulemaking to Part 72, the NRC expressed reasonable concerns over potential adverse interactions between some types of GTCC waste and other materials stored in the ISFSI or with the ISFSI itself. Accordingly, the NRC chose to limit GTCC waste stored in an ISFSI to solid waste only.

Thus, at the present time and for the foreseeable future, liquid GTCC wastes may not be received or stored in an ISFSI. (Exceptions may be applied for on a case-by-case basis.) If the ISFSI is a water-pool type facility, the GTCC waste must be in a durable solid form with demonstrable leach resistance. Each of these considerations must be addressed in the licensee's SAR.

Nuclear plants which currently store or plan to store GTCC waste at an ISFSI operated under a Part 50 license should review the applicable SAR to verify that their interim storage practices and procedures reflect this waste form restriction.

It should be recognized that there are alternatives for a Part 50 licensee which desires to terminate its license yet still possesses liquid GTCC waste. These alternatives include the licensee's submission of an application for a Part 30 or 70 license specifying the appropriate conditions for storage of liquid GTCC waste. The licensee may also request an exception from the requirements of Part 72 restricting the storage of liquid GTCC waste.

7.2 Dewatered Wastes

For the purposes of storing GTCC waste in an ISFSI, it should be noted that the term "solid waste" does not include dewatered resin or other dewatered wastes. Although "dewatered wastes" are not specifically identified in Part 72, the NRC made clear in the supporting documentation for the final rulemaking that it would be unacceptable to receive or store dewatered wastes at an ISFSI operated under a specific Part 72 license. The NRC concluded that solid GTCC waste that contained free liquids (e.g., resin, filter media) should be treated to remove excess free liquids prior to storage at an ISFSI. Additional language in the documentation indicates that the NRC anticipates that this will result in storing a "solidified material."

It is certainly possible for an innovative waste generator to determine that they have an alternative technical solution which does not require solidification. This will need to be submitted to the NRC as part of the safety analysis prior to receiving such waste. Here is the

critical aspect that the generator will need to demonstrate: the analyses must show that the material can be safely stored for the full period of the ISFSI license (not just the expected storage period of the waste). Experience with stored dewatered resin and filters demonstrates that rehydration can occur and that the amount of free-standing liquid increases over time, thereby making them unsuitable for storage in an ISFSI.

SUMMARY

The final rulemaking to Part 72 would allow for storage at an ISFSI of solid GTCC waste only.

Reference: 10 CFR 72.70, 72.120

8
INDUSTRY EXPERIENCE WITH GTCC WASTE STORAGE AND LESSONS LEARNED

It is an objective of this report to capture existing GTCC waste management and storage experience (i.e., lessons learned) from decommissioning nuclear plants. An abbreviated telephone survey was conducted of most of the nuclear plants actively involved in decommissioning to accomplish this objective. Their responses are summarized in this chapter.

8.1 Lessons Learned

Table 8-1
Summary of GTCC Wastes at Decommissioning Commercial Nuclear Plants (Based on Actual or Projected Data)

Typical Generation Volumes	**200 to 400 Ft3**
Typical Disposal Volume Projection (Usually not tracked this way yet)	One to Four Canisters (350 to 1400 Ft3)
Current GTCC Waste Storage Authority	10 CFR Part 50 License
Long Term GTCC Waste Storage Authority	10 CFR Part 72 License or Undecided
Amount of GTCC Waste Exceeding Class C Limit by < 10% of Limit	< 2% (See lesson #1 below)
Anticipated Repackaging of GTCC Waste Prior to Disposal	(See lesson #2 below)
Identified GTCC Waste Materials (Listed in descending order of frequency)	• Reactor internals (e.g., shroud, support plate, grid bars) • Control rods and control element assemblies (complete or partial) • Cutting dross/swarf • Incore detectors • Neutron windows • Excore detectors • Filter liner • Part of HPSI nozzle

1. A reasonable question to explore was whether a minor increase (10%) in the current Class C upper limit would have a significant impact on GTCC waste volumes. This limited survey suggests that less than 2% of the GTCC waste would be affected if the upper Class C limit was increased by a factor of 1.10 (a 10% increase) over its current value.

2. Currently, there is no waste acceptance criteria for disposal of GTCC waste. This is the responsibility of the DOE and may not be forthcoming for several years. Most plants are proceeding planning to package and store GTCC waste in the same type of canisters used for spent fuel assemblies. As such, they do not anticipate having to repackage that waste. However, provisions should be made in the GTCC storage plan for future repackaging if necessary. Such repackaging may occur either at the ISFSI or at the waste repository.

   An open issue is whether GTCC waste can be placed in canisters and stored inside the dry cask storage system. Current guidance indicates that GTCC waste can be stored on the cask storage pad(s) of an ISFSI under a Part 50 license, but it must be stored in containers separate from the spent fuel storage casks. This may delay packaging pending a revised final rulemaking by the NRC on Part 72 licensing. (See lesson #3 for related information.)

3. In a closely related issue, several licensees are evaluating storage of some GTCC waste within the same canisters where fuel assemblies are being stored. This makes sense for some items, such as incore detectors and control rods. Plants are advised to obtain a formal determination from the NRC as to whether this is permissible or not.

   Currently, most decommissioning plants store GTCC waste under the general license provisions of the Part 50 license. Current regulations and the available guidance documents allow GTCC waste to be "stored at a reactor site, including the cask storage pad(s) of an ISFSI, under a 10 CFR Part 50 license. The GTCC waste must be stored in containers separate from the spent fuel storage casks." (This guidance is contained in a letter dated September 27, 1999, from E. William Brach, Director, Spent Fuel Project Office, NRC, to Dr. Andrew Kadak, President, American Nuclear Society. A copy of this guidance document is included in Appendix F of this report.)

   The above guidance indicates that commingling GTCC waste with spent fuel in the same canisters or casks is not acceptable in most cases. This has forced some plants to delay packaging of their GTCC pending final rulemaking to Part 72 or the pursuit of a license amendment. Additional guidance is provided in NRC Interim Staff Guidance 9, (ISG-9), *Issue: Storage of Pressurized Water Reactor (PWR) Fuel Assembly Integral Components* available over the Internet. (See the Bibliography for internet address/URL.)

4. In October 1999, the NRC issued Information Notice 99-29, Authorized Contents of Spent Fuel Casks. This Notice alerts licensees to pay close attention to the authorized contents loaded into spent fuel casks in dry cask storage. The specified contents authorized for each approved spent fuel cask are listed in the Certificate of Compliance (CoC), for the casks or in the specific Part 72 license. Specific Part 72 licenses specify the types of materials authorized to be loaded into the casks; for general licenses, the cask's CoC states the authorized cask contents.

The NRC identified two instances where licensees loaded storage casks with spent fuel containing burnable poison rod assemblies (BPRAs) and thimble plugging devices (TPDs). These items were not authorized in either the specific license or the cask CoC. Therefore, the licensees violated the terms of their NRC license specifications for the materials that are permitted for storage in dry casks. Although the safety significance associated with these specific instances is low, in each case the licensee was required to take immediate action to either correct the cask loading or to justify the continued safety of the as-loaded cask conditions. In the two known instances where BPRAs and/or TPDs were loaded in dry casks without NRC authorization, five violations were identified.

5. A common form of GTCC waste is termed either "dross" or "swarf." This is the residue and slag which is produced during underwater cutting processes typically used for cutting reactor internals. At one plant, careful collection and combining of all dross/swarf from a cutting project resulted in sufficient dross and abrasive material for concentration averaging to allow most of it to be disposed as Class C waste. In this particular case, the plant used ultra-high pressure water jetting with an abrasive additive to cut the internals. Large pieces were removed and stored as GTCC waste, but the bulk of the material remained as Class C waste.

6. Planning for the maximum size of any material loaded into a storage canister will minimize the total number of cuts. This, in turn, will reduce the project duration, the total exposure, the project cost, and the total volume of dross/swarf generated.

   This seemingly minor point is very possibly one of the most important decisions made by a decommissioning nuclear plant, and it applies to all waste removed from the plant (i.e., cut the waste to fit the shipping container). When applied to GTCC waste, the number of cuts can have a very substantial impact on project exposure, duration and cost.

   Not all plants take the same approach with the segmenting of GTCC waste. For example, some cut the waste into fuel element sizes, thereby allowing them to handle and load the GTCC into fuel canisters (separately from spent fuel) using similar techniques. By contrast, other plants cut the waste in pieces which are as large as can possibly fit into the storage canisters, thereby reducing the number of cuts, the volume of dross/swarf generated, the associated exposure, and the project duration and cost.

7. Plants commented that the use of ultra-high pressure (UHP) water cutting for high activity materials worked well. Competing experiences also pointed out that vendor experience was a key factor in the success of UHP cutting. If the cutting process is not carefully controlled, significant contamination control problems arise, including discrete radioactive particles. In addition, poor control of the process can result in a substantial increase in total project dose. Prior to using UHP cutting for reactor internals, plants should evaluate the experiences and lessons learned by other plants. (See also section 8.2.7 for additional discussion on significant challenges experienced during equipment cutting.)

8. Most, but not all, plants were able to dispose of excore detectors as Class C waste. Incore detectors may go either way. Perhaps the most significant deciding factor is whether the tips are cut away from the whips, thereby reducing the area for concentration averaging.

9. Trojan nuclear plant was able to package waste which would otherwise have been classified as GTCC waste within the reactor pressure vessel. Concentration averaging across the entire package (the pressure vessel was the disposal package) reduced the activity to Class C waste allowing for shallow land disposal.

   In a survey of decommissioning plants, all agreed that this was a highly desirable option, but it is not available to most nuclear plants. Trojan's unique location near a major waterway and relatively close to a disposal site made this an option which most plants cannot duplicate. However, the option is such an attractive solution that all plants should at least explore its potential.

10. One plant obtained a special amendment to the Certificate of Compliance for a storage canister to allow containerization of control element assemblies and the associate fingertips. These items were placed in a sleeve which was then placed in a spent fuel canister which has no spent fuel.

11. One plant noted a special concern in performing the safety analysis for its GTCC waste canisters which may be stored under a Part 50 license within the ISFSI but separate from the spent fuel storage casks. It was necessary in the performance of the 10 CFR 50.59 review to demonstrate that the canister could not tip over. In similar circumstances when storing under a Part 72 license (if authorized to do so), this same demonstration would be part of the 10 CFR 72.48 review.

12. As part of an EPRI conference discussion on GTCC waste, one utility inquired as to whether the fuel channel can be considered as a part of the spent fuel even though it was actually a part of the reactor and not physically attached to the fuel assembly. The answer to this question is NO; fuel channels should not be packaged with the fuel.

13. One utility pointed out that some of the GTCC waste removed from the reactor can exceed the general radiation field criteria envelope established by the DOE for fuel canister packages. For those cases where the utility is planning to use a fuel canister for storage of GTCC waste, the utility strongly recommended that the waste generator provide enough internal shielding for the canister to ensure that the canister package is within the general radiation field criteria.

14. Three Mile Island had extensive experience dealing with GTCC waste, although at the time it was termed as "abnormal waste" (i.e., special case waste generated prior to implementation of 10 CFR 61). This category included very high activity wet wastes (resin and filters) which were subsequently stabilized and/or stored. Some of the resin liners at TMI contained over 100,000 curies of activity, with most liners containing several thousand. The most significant challenges with such wastes fell into the arena of dewatering and combustible gas generation.

    For generators faced with special case GTCC filter or resin waste with unusually high activity, additional guidance may be obtained from the original GEND documentation (a series of documents issued under the auspices of GPU, EPRI, NRC and DOE) covering packaging, shipping, stabilization, storage and disposal. The appropriate contact is EPRI.

8.2 Most Significant Challenges in Working with GTCC Waste

1. For Trojan, the greatest challenge was in shipping the reactor pressure vessel.

2. Uncertainty in regulatory changes slows or delays the process of packaging GTCC waste.

3. Absence of disposal waste acceptance criteria inhibits GTCC waste packaging and may result in repackaging of some or all GTCC waste. This appears to be a growing challenge and concern for nuclear utilities as the DOE has slowed the pace of information transfer to the commercial sector. This is, in part, a response to litigation against the DOE on spent fuel acceptance issues and has subsequently been passed along to GTCC waste considerations.

4. It is often difficult to match canister design with segmentation and cutting so as to optimize the size and shape of waste material. This is particularly challenging if the waste is to be loaded in relatively small spent fuel baskets in canisters designed for spent fuel assemblies and can result in low packaging efficiencies.

5. Characterization of reactor internals is an area of limited experience.

6. There is a steep learning curve for evaluating the nonradiological hazards associated with storage of GTCC waste in an ISFSI. These hazards include galvanic corrosion, gas generation, etc.

7. Segmentation and cutting of GTCC waste materials (reactor internals, core shroud, etc.) is particularly challenging from a scheduling standpoint and from a dose control (ALARA) standpoint. Equipment reliability in segmentation and cutting processes can lead to significant scheduling delays and substantial radiological exposures. Because this is such an important challenge faced by all nuclear facilities during the decommissioning process, the following additional detail is provided based on one utility's extensive experience:

    a) During cutting operations, discrete radioactive particles (hot particles) become a very significant control challenge. The need for extensive ALARA pre-planning is easily underestimated, as demonstrated in the following paragraphs.

    b) The garnet waste (abrasive cutting material) collection system must be carefully designed to handle the very large quantities of garnet and the velocities of the garnet as close to the point of generation as possible. Maintaining positive, tight control over the garnet waste requires close capture. However, garnet is, after all, an abrasive cutting material. Close capture exposes the garnet collection system to abrasive cutting and can lead to early and frequent equipment failure if not properly designed for the large volume and velocities of the garnet. If improperly designed, the dross/swarf – all of which is likely to be GTCC waste – will migrate around the reactor cavity and core. This in turn will translate to a labor intensive and dose intensive clean-up process.

c) The filtration system must be designed for easy flushing and cleaning while still ***underwater***. Otherwise, the dose and time delays will get out of hand. It must be recognized that the dose rates on these underwater filters are typically on the order of 100 R/hr to 300 R/hr.

d) It is essential that an ALARA evaluation be performed on each component of the collection and filtration systems as far in advance as possible. ***This review should include contingency planning for the failure of each component and the associated dose impact to replace or repair each component***.

e) The application of ultra-high pressure (UHP) abrasive water jetting/cutting and plasma cutting are new technologies to most nuclear plants. Local inexperience with exceptionally radioactive jobs over a 6 to 12 month cutting project can increase a 50 to 70 person-rem job by as much of 20% to 100%. Thus, it is recommended that the plant seek to augment its staff with outside assistance and experience for these high-dose projects.

f) The initial project ALARA planning should include transportation, shielding and disposal, including ensuring that the size of each cut is linked to a waste package which will accommodate each piece of waste without unnecessary cuts. Otherwise, extra cuts, multiple handling, and repackaging will significantly impact dose and time projections.

g) When shipping spent abrasive media (garnet), hoses, and other support equipment used in GTCC cutting operations, it is essential to consider waste characterization issues from a transportation and disposal perspective (i.e., it is easy to exceed 10 mR/hr at 2 meters). This potential dose impact and the associated shielding and repackaging exposure should be anticipated and planned for up front.

h) The above experiential lessons demonstrate the importance of planning the entire cutting operation from a cradle-to-grave perspective, with the plan beginning before the equipment and support crews arrive and ending after everything is packaged, shipped and stored or disposed.

A
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B
FINAL RULEMAKING FOR 10 CFR PART 72, OCTOBER 11, 2001

[Federal Register: October 11, 2001 (Volume 66, Number 197)]
[Rules and Regulations]
[Page 51823-51843]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr11oc01-3]

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NUCLEAR REGULATORY COMMISSION

10 CFR Parts 30, 70, 72, and 150

[Docket No. PRM-72-2]
RIN 3150-AG33

Interim Storage for Greater Than Class C Waste

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its regulations to allow licensing for the interim storage of Greater than Class C (GTCC) waste in a manner that is consistent with current licensing for the interim storage of spent fuel and will maintain Federal jurisdiction for storage of reactor-related GTCC waste. The final rule will only apply to the interim storage of GTCC waste generated or used by commercial nuclear power plants. These amendments will also simplify and clarify the licensing process.

EFFECTIVE DATE: November 13, 2001.

FOR FURTHER INFORMATION CONTACT: Mark Haisfield [telephone (301) 415-6196, e-mail MFH@nrc.gov] of the Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

Background

The Petition for Rulemaking

The Nuclear Regulatory Commission received a petition for rulemaking dated November 2, 1995, submitted by Portland General Electric Company. The petition was docketed as PRM-72-2 and published in the Federal Register, with a 75-day comment period, on February 1, 1996 (61 FR 3619).

The petitioner requested that the NRC amend 10 CFR part 72 to add the authority to store radioactive waste that exceeds the concentration limits of radionuclides established for Class C waste in 10 CFR 61.55.\1\ This radioactive material is commonly referred to as ``Greater than Class C'' waste or GTCC waste. GTCC waste is generally unsuitable for near-surface disposal as low-level waste (LLW), even though it is considered as LLW. Section 61.55(a)(2)(iv) requires that this type of waste be disposed of in a geologic repository unless approved for an alternative disposal method on a case-specific basis by the NRC.

\1\ In 10 CFR 61.55, ``Waste Classification,'' the NRC codifies disposal requirements for three classes of low-level waste which are considered generally suitable for near-surface disposal. These are Class A, B, and C. Class C waste is required to meet the most rigorous disposal requirements.

The petitioner is an NRC-licensed utility responsible for the Trojan Nuclear Plant (Trojan). In the petition, the petitioner anticipated that it would need to dispose of GTCC waste during decommissioning. The decommissioning plan discussed the transfer of spent reactor fuel being stored in the spent fuel pool, to an onsite Independent Spent Fuel Storage Installation (ISFSI) licensed under 10 CFR part 72. The petitioner requested that 10 CFR part 72 be revised to permit GTCC waste to be stored at the ISFSI pending transfer to a permanent disposal facility. The petitioner suggested that because the need to provide interim storage for GTCC waste is not specific to Trojan, but is generic, the regulations in 10 CFR part 72 should be amended to explicitly provide for storage of GTCC waste in a licensed ISFSI.\2\

\2\ Granting the petition in this rulemaking is no longer needed for Trojan since its reactor vessel with internals (package) was shipped to the Hanford LLW site after the State of Washington defined this package as Class C waste. The NRC has concluded that this rulemaking will be useful for other reactor operators that need to store their GTCC waste.

The petitioner stated that storage of GTCC waste under 10 CFR part 72 would ensure safe interim storage. This storage would provide for public health and safety and environmental protection as required for spent fuel located at an ISFSI or spent fuel and high-level waste stored at a Monitored Retrievable Storage Installation (MRS).

The specific changes proposed in the petition would explicitly include interim storage of GTCC waste within the Purpose, Scope, and Definitions sections of 10 CFR part 72, thereby enabling licensees to manage GTCC waste generated or used by commercial nuclear power plants in a manner similar to that for spent nuclear fuel. The revised definitions would only apply to the interim storage of GTCC waste under the authority of 10 CFR part 72.

With this final rule, the petition is granted in part and denied in part. This rule will grant the petitioner's request to authorize GTCC waste storage under a 10 CFR part 72 license, but as discussed later, uses a different approach.

Public Comments on the Petition

The notice of receipt of the petition for rulemaking invited interested persons to submit written comments concerning the petition. The NRC received six comment letters. Five comment letters were received from nuclear facilities and one from the Nuclear Energy Institute (NEI). NEI provided another letter on this subject directly to the NRC Chairman on February 2, 1999, and the NRC responded on March 25, 1999. The comments were reviewed and considered in the development of NRC's decision on this petition. These comments are available in the NRC Public Document Room.

All six commenters supported the petition. Two of the commenters (Sacramento Municipal Utility District and Yankee Atomic Electric Company) are currently decommissioning their reactors.

Draft Rulemaking Plan

As a result of the petition and the comment letters, the NRC developed a draft rulemaking plan to further consider the development of a rule that would meet the intent of the petition. In SECY-97-056, dated March 5, 1997, the NRC staff provided a draft rulemaking plan to the Commission outlining a rule that would modify 10 CFR part 72 to allow storage of material, which when disposed of would be classified as GTCC waste, under the authority of 10 CFR part 72 using the performance criteria of this part. As discussed in this draft rulemaking plan, licensees are currently authorized to store GTCC waste under the regulations in 10 CFR part 30 and/or part 70. Therefore, the draft rulemaking plan discussed adding an option to store GTCC waste under 10 CFR part 72 while maintaining the existing option to store this waste using the authority of 10 CFR parts 30 and 70. This plan was sent to the Agreement States for their comments on April 18, 1997. Five States provided comments--Illinois, Maine, New York, Texas, and Utah.

The draft rulemaking plan described how an ISFSI or an MRS might be regulated by both the NRC and an Agreement State (this is discussed in more detail in the Discussion section). The draft rulemaking plan did not require that the licensing jurisdiction for GTCC waste remain with NRC, but did suggest that Agreement States could voluntarily relinquish their licensing authority for GTCC waste stored at an ISFSI. The draft rulemaking plan specifically requested Agreement State input relative to their likelihood of voluntarily relinquishing their authority for licensing when an ISFSI or an MRS is used for storing GTCC waste.

One State supported the concept. Three States indicated that they were opposed to voluntarily relinquishing their authority and preferred to maintain their licensing authority for GTCC waste. One doubted that inefficiencies would result from Agreement State jurisdiction over GTCC waste at a reactor site concurrent with NRC regulation of spent fuel remaining at the site. The commenter noted that similar situations already exist when LLW is stored at the site. A second noted that there ``* * * have been many instances where an agreement state and NRC have effectively collaborated in the regulation of a single facility.'' A third noted that the NRC recently informed the States that they could voluntarily relinquish their authority for sealed sources and devices and that it was ``* * * vehemently opposed to any rule that automatically usurps a State's licensing authority without the State's consent.''

Proposed Rule

The NRC published the proposed rule, ``Interim Storage for Greater than Class C Waste'' in the Federal Register on June 16, 2000 (65 FR 37712). The NRC received 18 comment letters on the proposed rule. These comments and responses are discussed in the ``Comments on the Proposed Rule'' section.

Discussion

Current NRC regulations are silent on the acceptability of storing reactor-related GTCC waste co-located at an ISFSI or an MRS. Co-location is the storage of spent fuel with other radioactive material in their respective separate containers. This situation has created confusion and uncertainty on the part of decommissioning reactor licensees and may create inefficiency and inconsistency in the way the NRC handles GTCC waste licensing matters.

The NRC believes that decommissioning activities at commercial nuclear power plants will generate small volumes of GTCC waste relative to the amount of spent fuel that exists at these sites. GTCC waste exceeds the concentration limits of radionuclides established for Class C in Secs. 61.55(a)(3)(ii), 61.55(a)(4)(iii), or Sec. 61.55(a)(5)(ii). GTCC waste is not generally acceptable for near-surface disposal at licensed low-level radioactive waste disposal facilities. Currently there are no routine disposal options for GTCC waste.

In general, reactor-related GTCC wastes can be grouped into two categories. The first, which is the more typical form, is activated metals components from nuclear reactors such as core shrouds, support plates, nozzles, core barrels, and in-core instrumentation. The second is process wastes such as filters and resins resulting from the operation and decommissioning of reactors. In addition, there may be a small amount of GTCC waste generated from other activities associated with the reactor's operation (e.g., reactor start-up sources). GTCC waste may consist of either byproduct material or special nuclear material.

The Low-Level Radioactive Waste Policy Amendments Act of 1985 gave the Federal Government (U.S. Department of Energy (DOE)) the primary responsibility for developing a national strategy for disposal of GTCC waste. The Act also gave the NRC the licensing responsibility for a disposal facility for GTCC waste. Until a disposal facility is licensed, there is a need for interim storage of GTCC waste.

Currently, 10 CFR part 50 licensees (Domestic Licensing of Production and Utilization Facilities) are authorized to store all types of reactor-related radioactive materials, including material that, when disposed of, would be classified as GTCC waste. The GTCC waste portion is currently being stored either within the reactor vessel, in the spent fuel pool, or in a radioactive material storage area, pending development of a suitable permanent disposal facility.

The authority to license the possession and storage of GTCC waste is contained within 10 CFR part 30 for byproduct material and in 10 CFR part 70 for special nuclear material. Under 10 CFR 50.52, the Commission may combine multiple licensable activities of an applicant that would otherwise be licensed individually in single licenses. Thus, the 10 CFR part 50 license authorizing operation of production and utilization facilities currently includes, within it, the authorization to possess byproduct and special nuclear material that would otherwise need to be separately licensed under 10 CFR parts 30 or 70.

Under the current regulations, before the 10 CFR part 50 licensee can terminate its 10 CFR part 50 license, the licensee must transfer all of its spent fuel to another licensed facility; typically an ISFSI for storage or to a geologic repository for disposal. The ISFSI can be either at the reactor site under a specific 10 CFR part 72 license, or at an away-from-reactor site. The general license issued under 10 CFR 72.210 would terminate when the 10 CFR part 50 license is terminated. Because the 10 CFR part 72 general license would be terminated coincident with the termination of the 10 CFR part 50 reactor license, the licensee must have a 10 CFR part 72 specific license in order to continue to store spent fuel in an ISFSI located at the reactor site. Under a 10 CFR part 50 license, a reactor licensee undergoing decommissioning can store GTCC waste at its site based on the authority of the 10 CFR parts 30 and 70 license conferred to reactor licensees. However, the 10 CFR parts 30 and 70 licenses incorporated within the 10 CFR part 50 license are also terminated when the 10 CFR part 50 license is terminated. Consequently, termination of the 10 CFR part 50 license would require the licensee to either obtain a 10 CFR part 30 or 70 license to store any reactor-related GTCC waste, or transfer the GTCC waste to a geologic repository for disposal.

The NRC's current understanding of industry's approach to reactor decommissioning indicates that many reactor licensees currently undergoing decommissioning, as well as those considering future plans for decommissioning, may or may not pursue early termination of their 10 CFR part 50 license, for a variety of reasons. Consequently, with retention of the 10 CFR part 50 license, licensees also will retain the 10 CFR part 72 general license and their incorporated 10 CFR parts 30 and 70 licenses (i.e., the authority to store reactor-related GTCC waste under the 10 CFR part 50 license). However, the NRC believes that some licensees may wish to have the option of early termination of their 10 CFR part 50 license (and thus the 10 CFR part 72 general license). In that case, the issue of storage of reactor-related GTCC waste under a 10 CFR part 72 specific license which was identified in the proposed rule is still valid. The NRC continues to believe that storing reactor related GTCC waste either under a 10 CFR part 50 license or under a 10 CFR part 72 specific license provides an adequate level of protection of public health and safety. Accordingly, the NRC is issuing this final rule to provide reactor licensees with flexibility in selecting a regulatory approach to storing reactor-related GTCC waste. This final rule maintains Federal jurisdiction over reactor-related GTCC waste under either approach.

The changes in this rulemaking will allow 10 CFR part 72 specific licensees to co-locate reactor-related GTCC waste within an ISFSI or an MRS. Applicants for a specific license to store reactor-related GTCC waste will be required to provide a Safety Analysis Report (SAR) describing their programs that will (1) ensure that adequate protective measures are in place to ensure safe storage within the ISFSI or MRS, and (2) ensure that the co-location of this radioactive material will not have an adverse effect on the safe storage of spent fuel and the operation of the ISFSI or MRS. Safe storage of GTCC waste will be governed by the provisions of 10 CFR parts 20 and 72 and applicable guidance that is being developed in conjunction with this rule. Based on an acceptable review of the SAR, the NRC would issue a 10 CFR part 72 specific license. Current 10 CFR part 72 specific license holders would be required to submit a similar application to amend their 10 CFR part 72 licenses if they desire to store GTCC waste at their ISFSIs.

In developing the rule, the NRC was cognizant of both potential DOE disposal criteria for GTCC waste (to preclude allowing a storage option that is unacceptable for disposal) and potential adverse interactions between spent fuel and various types of GTCC waste. The NRC believes that properly addressing potential adverse conditions from commingling spent fuel with certain types of GTCC waste presents significant safety and technical issues. In addition, because the DOE has not yet identified criteria for a disposal package, the NRC is concerned that storage of GTCC waste and spent fuel in the same container may be unacceptable for placement in the geologic repository. Therefore, the rule precludes the commingling of GTCC waste and spent fuel, except on a case-by-case basis, because the NRC desires to formulate regulations that both reduce radiological exposure and costs associated with repackaging the spent fuel and GTCC waste into two separate containers for disposal. Note that this in no way

changes the current NRC and industry practice of allowing the commingling of spent fuel and certain specific components associated with, and integral to, spent fuel (e.g., burnable poison rod assemblies, control rod elements, and thimble plugs). See the responses to comments 3 and 10 in the Comments on the Proposed Rule section for more specific information. In support of this rulemaking, the NRC is developing Interim Staff Guidance for NRC staff and licensee use in utilizing 10 CFR part 72 storage criteria for various GTCC waste types.

This rule also precludes storage of liquid GTCC waste under 10 CFR part 72. However, there are alternatives for a 10 CFR part 50 licensee that desires to terminate its license yet still possesses liquid GTCC waste. These alternatives include the licensee's submission of an application for a 10 CFR part 30 or 70 license, with the appropriate conditions for storage of liquid GTCC waste.

Request for Public Input on Specific Issues

The Commission sought input from stakeholders on various technical topics associated with the storage of GTCC waste. The stakeholders input and NRC's responses are contained in the Comments on the Proposed Rule section. The Commission considered these comments in the development of the final rule.

Regulatory Action

The NRC is amending 10 CFR parts 30, 70, 72, and 150. The changes to these parts are necessary to allow the interim storage of NRC-licensed reactor-related GTCC waste within an ISFSI or an MRS and to require that the licensing responsibility for this waste remain under Federal jurisdiction. This action addresses only GTCC waste used or generated by a commercial power reactor licensed under 10 CFR part 50 (i.e., not a research reactor) and does not include any other sources of GTCC waste, nor does it include other forms of LLW generated under a 10 CFR part 50 license. Because reactor-related GTCC waste is initially under Federal jurisdiction while the reactor facility is operated and the ultimate disposal of GTCC waste also is under Federal jurisdiction, the NRC believes that the interim period between termination of a reactor license and ultimate disposal also should remain under Federal jurisdiction. GTCC waste could become eligible for disposal in a geologic repository in the future. Spent fuel can be stored in an ISFSI or an MRS pending ultimate disposal. This Federal jurisdiction is unlike the Federal or Agreement State jurisdiction for the storage of Class A, B, and C reactor-related LLW that are currently being disposed in LLW disposal sites regulated by Agreement States. In addition, the storage time for Class A, B, and C LLW is expected to be short in comparison to the relatively long-term interim storage of GTCC waste. Therefore, for efficiency and consistency of licensing, the NRC concludes that 10 CFR part 72 should also be modified to allow the storage of GTCC waste within these facilities under exclusive NRC jurisdiction. A regulatory scheme which would allow for Federal jurisdiction over the generation of the GTCC waste, followed by State jurisdiction for interim storage, followed again by Federal jurisdiction over the disposal of GTCC waste, is an inefficient approach, that could lead to inconsistent regulation. Moreover, it is inefficient for NRC to spend scarce resources to license and inspect an ISFSI that stores spent fuel and for a State to spend scarce resources to license and inspect the same ISFSI for co-located GTCC waste. The NRC requested Agreement State input on ways in which Agreement States, if permitted to take jurisdiction over reactor-related GTCC waste, would ensure consistency with a national regulatory scheme. Only two States responded to this request. Though both States asserted that their programs would be compatible with Federal regulations, neither said that their programs would be identical. Indeed, one State argued that each State program should be evaluated on its own. The States have rightly pointed out that States have already developed regulatory programs for Class A, B, C, and non-reactor GTCC waste that adequately protect health and safety. The issue, however, is whether a regulatory scheme that would call for back and forth federal jurisdiction over reactor-related GTCC waste, and multiple States' jurisdiction over the same waste in between, promotes a reasonably predictable and stable regulatory environment. In NRC's view, the better reading of the applicable statutes is that reactor-related GTCC waste deserves special treatment, especially because of Federal responsibility for disposal of such waste, and it should be set apart from other waste and be subject to exclusive Federal jurisdiction over the storage of reactor-related GTCC waste. 10 CFR parts 30, 70, and 150 require conforming changes.

In the section, ``NRC to Maintain Authority for Reactor-Related GTCC Waste,'' the Commission provides the regulatory basis upon which the NRC has determined that jurisdiction for storage of reactor-related GTCC waste will remain with the NRC. (Also see comment number 15.)

This final rule will allow storage of reactor-related GTCC waste under a 10 CFR part 72 specific license. The changes will modify 10 CFR part 72 to allow storage of GTCC waste under this part using the appropriate criteria of 10 CFR part 72. This will provide a more efficient means of implementing what is essentially already permitted by the regulations (storage of GTCC waste co-located at an ISFSI or an MRS). When storing GTCC waste within an ISFSI or MRS, the licensee or applicant must provide a description of its program that ensures the storage of the GTCC waste will not have an adverse effect on the ISFSI or MRS or on public health and safety and the environment.

The rule will not eliminate the current availability of storing GTCC waste under the authority of a 10 CFR part 30 or 70 license. However, neither 10 CFR parts 30 nor 70 include explicit criteria for storage of GTCC waste. Therefore, a licensing process conducted under 10 CFR parts 30 or 70 regulations would be more resource intensive because the licensee would need to develop new proposed storage criteria. If the licensee decides to obtain a 10 CFR part 30 or 70 license, the NRC will still maintain Federal jurisdiction over the reactor-related GTCC waste stored under 10 CFR parts 30 and 70.

Comparing these two approaches, the NRC recognizes that the licensing process will be simpler with less regulatory burden if all the radioactive waste to be stored at an ISFSI or MRS is stored under the authority of one 10 CFR part 72 license. The regulations in 10 CFR part 72 were developed specifically for storage of spent fuel at an ISFSI and spent fuel and high-level waste at an MRS. Appropriate 10 CFR part 72 criteria will be applied to GTCC waste storage. Under 10 CFR parts 30 and 70, GTCC waste criteria would need to be developed on a case-by-case basis to support licensing under these parts. Also, using 10 CFR part 72 to store reactor-related GTCC waste would eliminate the need for multiple licenses for the storage of spent fuel and GTCC waste.

The NRC has evaluated the technical issues arising from the commingling of spent fuel and reactor-related GTCC waste in the same storage container, and issues arising from the storage of reactor-related liquid GTCC waste, under a 10 CFR part 72 specific license. This final rule will permit the co-locating of spent fuel and solid reactor-related GTCC waste in different casks and containers within an ISFSI or MRS. However, the rule will not permit the commingling of spent fuel and GTCC waste in the same storage cask except on a case by case basis. The rule does not change the current practice of storing specific components associated with, and integral to, the spent fuel with spent fuel. Additionally, the rule will not permit the storage of liquid reactor-related GTCC waste.

Without this change, prior to termination of the 10 CFR part 50 license, a licensee would need to obtain multiple licenses to continue to store spent fuel and GTCC waste--10 CFR part 72 for spent fuel and 10 CFR part 30 or 70 (or both) for GTCC waste. Having one license for the ISFSI (or MRS) under 10 CFR part 72 will be simpler for both licensees and the NRC.

The NRC believes that the concept proposed in the petition of storing GTCC waste under the provisions of 10 CFR part 72 is valid. However, the NRC also concludes that the method proposed by the petitioner, that is modifying the definition of spent fuel to include GTCC waste, could lead to confusion and inefficiency. If GTCC waste is defined as spent fuel, DOE would be required to dispose of this waste in a deep geologic repository and would not have the flexibility to explore potentially more efficient disposal plans. The proposal could also require that GTCC waste use limited disposal space meant for wastes that require more stringent confinement.

Therefore, the NRC is adding a definition of GTCC waste within Sec. 72.3 that will be consistent with 10 CFR 61.55. The NRC has evaluated 10 CFR part 72 to determine which sections need to be modified to accommodate storage of separate containers of solid GTCC waste co-located with spent fuel within an ISFSI or an MRS. The majority of the changes to 10 CFR part 72 will simply add the term ``GTCC waste'' to the appropriate sections and paragraphs (typically immediately after the terms ``spent fuel'' or ``high-level waste''). In support of this rulemaking, the NRC is developing Interim Staff Guidance for NRC staff and licensee use in applying 10 CFR part 72 storage criteria for various GTCC waste types.

The regulations in 10 CFR part 150 are being modified to be consistent with the changes in 10 CFR part 72. The change to 10 CFR part 150 (Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters Under Section 274) will specify that any GTCC waste stored in an ISFSI or an MRS is under NRC jurisdiction. 10 CFR part 150 also is being modified to indicate that licensing the storage of any GTCC waste that originates in, or is used by, a facility licensed under 10 CFR part 50 (a production or utilization facility) is the responsibility of the NRC.

The NRC has made changes to the final rule based on public comments (see the Response to Public Comments section) and has also determined (not based on public comments) that additional sections within 10 CFR part 72 needed to be removed or modified.

A public comment resulted in the recognition of the need to modify 10 CFR parts 30 and 70 to provide exceptions to the requirements in these parts when the GTCC waste is being stored under the provisions of 10 CFR part 72. Without these changes, licensees would need 10 CFR part(s) 30 and/or 70 licenses in addition to the 10 CFR part 72 license. Other comments resulted in clarification of the preamble and Sec. 72.120 with regard to the commingling of material that is associated with spent fuel assemblies.

In addition, during the review of comments, NRC staff identified the need for several clarifications in the final rule that are not specifically based on public comments. The clarifying changes that NRC made are: Sec. 72.2(a) regarding power reactor-related GTCC waste is being modified to clarify that GTCC waste does not have to be stored in a complex that is designed and constructed specifically for storage of spent fuel; the definition in Sec. 72.3 of ``spent fuel cask or cask'' in the proposed rule is being withdrawn to eliminate an unnecessary storage requirement; Sec. 72.6 is being revised to indicate clearly that reactor-related GTCC waste, if stored under 10 CFR part 72, can only be stored under the provisions of a 10 CFR part 72 specific license; Sec. 72.24(r) in the proposed rule is being removed for consistency with 10 CFR part 50's handling of radioactive material; Sec. 72.40(b) in the proposed rule is being revised to correct an error (the proposed rule inadvertently removed existing text instead of adding a new introductory sentence) and to remove reference to the Atomic Safety and Licensing Appeal Board, which no longer exists; and Secs. 72.72, 72.76, and 72.78 are being modified to clarify the reporting requirements for special nuclear material as specified in 10 CFR 74.13(a)(1).

In a previous final rulemaking, ``Clarification and Addition of Flexibility'' (65 FR 50606; August 21, 2000), changes were made to 10 CFR part 72. Section 72.140(c)(2) is the only section that is changed in both the previous and current rulemaking. The changes to this section in the current rulemaking are consistent with the ``Clarification'' rulemaking changes.

The NRC will continue to recover costs for generic activities related to the storage of GTCC waste under 10 CFR part 72 by means of annual fees assessed to the spent fuel storage/reactor decommissioning class of licensees under 10 CFR part 171. Subsequent to issuing the final revision to 10 CFR part 72, 10 CFR part 170 will be amended to clarify that full cost fees will be assessed for amendments and inspections related to the storage of GTCC waste under 10 CFR part 72.

NRC to Maintain Authority for Reactor-Related GTCC Waste

Under section 274 of the Atomic Energy Act of 1954 (AEA), Agreement States possess regulatory authority over radioactive waste only where the Commission has relinquished its pre-existing authority. Section 274 agreements cannot be understood as a general matter to relinquish Commission authority over reactor-related GTCC waste. These wastes are integrally related to the operation of reactors, because these wastes consist for the most part of activated metal reactor components such as core shrouds, support plates, nozzles, core barrels, and in-core instrumentation. When, under the section 274 program, the Commission reaches agreements with States and relinquishes regulatory jurisdiction to them, the Commission specifically retains authority over the ``operation'' of reactors, as required by an NRC rule promulgated nearly 40 years ago. See 10 CFR 150.15(a)(1). That rule defines ``operation'' as follows:

As used in this subparagraph, operation of a facility includes, but is not limited to (i) the storage and handling of radioactive wastes at the facility site by the person licensed to operate the facility; and (ii) the discharge of radioactive effluents from the facility site. Id. (Emphasis added).

In short, NRC concludes that a State entering a section 274 Agreement with the NRC does not (and cannot) acquire regulatory authority over reactor-related GTCC waste. Contrary to the view of a commenting State, issuance of a final rule asserting ongoing NRC jurisdiction over reactor-related GTCC waste does not take back previously-granted State authority or terminate an NRC-State agreement without abiding by the process set out in section 274(j) of the AEA. Nothing in the AEA, in NRC rules, or in NRC agreements with any of the commenting States even mentions reactor-related GTCC waste, let alone discontinues NRC jurisdiction over it. Hence, the Commission's decision in this rulemaking to exercise ongoing jurisdiction over this form of waste does not violate any provision of law.

Specifically, with regard to the storage of reactor-related GTCC waste, the NRC will continue Federal authority over the GTCC waste after termination of the 10 CFR part 50 license. Thus, under the option of obtaining 10 CFR part 30 and/or 70 licenses, the GTCC waste will remain under Federal authority. If the option of obtaining a specific license under 10 CFR part 72 is chosen, the GTCC waste will also remain under Federal authority. This licensing authority will be irrespective of the physical location of the storage facility (either on or off the originating reactor site).

However, this rule does not affect the States' long-standing practice of exercising regulatory jurisdiction over non-GTCC low-level radioactive waste originally generated at reactors, or over GTCC waste generated by materials licensees regulated by Agreement States. However, under 10 CFR 72.128(b), any LLW generated by the ISFSI (or an MRS) must be treated and stored onsite awaiting transfer to a disposal site. The licensing authority for treatment and storage of ISFSI or MRS generated LLW would be under 10 CFR part 72, and therefore, reserved to the NRC.

For a more detailed discussion of jurisdictional issues, please see the responses to comments 15, 16, and 17.

Comments on the Proposed Rule

This analysis presents a summary of the comments received on the proposed rule, the NRC's response to the comments, and changes made to the final rule as a result of these comments.

The NRC received 18 comment letters. Five were from Agreement States (South Carolina, Illinois, Utah, New York, and Maine), ten from industry (including the Portland General Electric Company, the petitioner, and the Nuclear Energy Institute), one from the Department of Energy (DOE), one from a private citizen, and one from a consulting firm.

In general, none of the commenters were opposed to the idea of storing reactor-related GTCC waste in an Independent Spent Fuel Storage Installation licensed under the provisions of 10 CFR part 72. However, four of the Agreement State commenters were opposed to restricting the licensing authority solely to the NRC and believe that NRC is not correctly interpreting the Atomic Energy Act. Utah is opposed to applying NRC sole jurisdiction to ``away-from-reactor ISFSIs'' because the State believes it could likely end up with GTCC waste indefinitely stored within its borders with no disposal option. South Carolina and New York believe the NRC and the State can effectively collaborate in the regulation of a single facility. Maine believes the rulemaking should be reconsidered because it is not advisable to allow the commingling of spent fuel and GTCC waste. The industry, DOE, the private citizen, and the consulting firm all generally supported the rulemaking and some provided specific recommendations to improve the final rule.

The NRC, in the proposed rule, invited comments on (1) six specific topics dealing with safety, technical or licensing issues for the storage of GTCC waste and (2) three specific questions for Agreement State consideration. The comments on the proposed rule are generally contained within four categories. The first category contains general comments, followed by comments on commingling GTCC waste and spent fuel (these are mostly the comments identified in number 1 above), followed by State issues (these are mostly the comments identified in number 2 above), and then other comments.

A. General Comments on the Proposed Rule:

1. Support of the proposed rule (or support of the comments submitted by the Nuclear Energy Institute (NEI)).

Comment: Thirteen of the 18 commenters provided specific comments in support of the concept of the proposed rule to store GTCC waste in an ISFSI. One of the supportive commenters was NEI, representing the industry, and three commenters also endorsed NEI's comments. As an example, one commenter noted that it had been actively involved with NEI on this issue and fully endorsed NEI's comments on behalf of the industry. The commenter specifically agreed with NRC's proposal to retain regulatory authority over GTCC waste during the interim period between reactor shutdown and prior to disposal. The commenter noted that there is no benefit to public safety and there is only a burden placed upon public resources to have regulatory authority shift to State authorities during this time.

Another industry commenter stated that it supports NRC's proposed rulemaking and encouraged the NRC to continue the development of a rule which is prudent, practical, reasonable and consistent to ensure that the interim storage for GTCC waste is fair and equitable to all involved stakeholders. The commenter noted that the proposed rulemaking will: (1) Clarify NRC's handling of GTCC licensing, (2) be simpler, (3) result in less regulatory burden on licensees, (4) continue to consider the need to protect public health and safety, and (5) allow these waste streams to be stored in an ISFSI or an MRS under the authority of one 10 CFR part 72 license.

Response: Since these comments support the rulemaking, no response is necessary.

2. Flexibility.

Comment: An industry commenter believes that flexibility to manage GTCC waste using other methods than 10 CFR part 72 is in the best interest of public safety. The commenter noted that GTCC waste has been approved, on a case-by-case basis, for disposal at licensed LLW disposal facilities and believes this practice should be allowed to continue.

Response: This rulemaking concerns only the storage of GTCC waste. However, see the response to comment numbers 15 and 17 for additional information regarding GTCC waste disposal.

3. Definition of spent fuel and GTCC waste.

Comment: Two industry commenters believe the definition of GTCC waste should be changed. One commenter believes it should be defined as spent fuel, as recommended in the petition, and the other believes it should be defined as high-level waste. In either case, the commenters believe this change would simplify disposal.

Three commenters, including DOE and NEI, note that the definition of spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies (i.e., the non-fuel components associated with those fuel assemblies). See 10 CFR 72.3. Non-fuel components may be included as part of the spent fuel delivered for disposal under the ``Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste." See 10 CFR 961.11, Appendix E, B.2. The Standard Contract includes as non-fuel components, but is not limited to: control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, primary and secondary neutron sources that are contained within the fuel assembly, and BWR channels that are an integral part of the fuel assembly. These same non-fuel components will ultimately be disposed of in the Federal repository in accordance with the Standard Contract. The commenters believe that the definition of reactor-related GTCC waste is unclear in that it might be seen to include those non-fuel components. The commenters believe that reactor-related GTCC waste should be limited to items such as reactor internals, filters, and resins.

The commenters further state that the rule should clearly state that a licensing basis is being proposed for storage of both categories of material, spent fuel associated material and reactor-related GTCC waste in an ISFSI or an MRS under Federal jurisdiction. The commenters believe that without this clarification the rule could be misinterpreted to impose new requirements for licensees to demonstrate that non-fuel components also meet the radiological classification of GTCC waste as a condition of storage.

Response: The NRC believes, at this time, that defining all GTCC waste as spent fuel or high-level waste for use in 10 CFR part 72 could lead to confusion and inefficiency. If GTCC waste is defined as spent fuel or high-level waste, DOE would be required to dispose of this waste in a deep geologic repository (e.g., Yucca Mountain) and would not have the flexibility to explore potentially more efficient disposal plans. This definition could also require that GTCC waste use limited disposal space meant for wastes that require more stringent confinement.

The commenters noting that the definition of spent fuel in 10 CFR 72.3 includes associated materials are correct. The NRC never intended to classify such material as GTCC waste. The proposed rule did not make it clear that, if this material were separated from the spent fuel, some of it might be GTCC waste. However, it is not deemed to be GTCC waste when it is placed within a spent fuel cask with the associated fuel assemblies. The NRC currently allows the storage of this material with spent fuel and this rulemaking will not make any change to this practice.

Accordingly, the final rule is modified as follows: The NRC has clarified that the material associated with spent fuel assemblies is not GTCC waste and currently can and will continue to be allowed to be stored with spent fuel. The clarifications are being made within the preamble and Secs. 72.120(b), (c), and (e) have been modified to clarify what can and cannot be stored with spent fuel. In addition, the NRC is developing Interim Staff Guidance that will provide additional information for the NRC staff and licensees in determining which materials are associated with spent fuel.

4. Proposed rule is premature.

Comment: A State commenter believes that the rulemaking is premature and not within the spirit or letter of the Administrative Procedure Act because the proposed rule contains no separate design criteria for GTCC waste storage containers and reflects an expectation that the applicant will ensure that the co-location of GTCC waste does not adversely affect the safe storage of spent fuel and the operation of the ISFSI. The proposed rule solicited input on a number of issues, such as commingling, performance criteria, and the scope of material subject to the rule. Therefore, the commenter believes that the proposed rule is still in the beginning stages as there are significant decisions relating to technical, safety, and performance criteria yet to be made. In the commenter's view, the NRC should be soliciting comments on an explicit proposal. The commenter also believes that the NRC is seeking a way to make it financially more attractive for utilities to store GTCC waste after decommissioning and, in part, to solicit information from DOE on its GTCC disposal policies.

Response: The Commission does not agree that this rulemaking is ``premature and not within the spirit or the letter of the Administrative Procedure Act.'' In addition, this rulemaking responds to a petition for rulemaking submitted by Portland General Electric Company (PRM-72-2). The proposed rule provided a complete regulatory proposal and a set of questions for the purpose of soliciting additional information that would help form the basis for the final rule. We have received and reviewed all comments and thus have gained the additional information needed to finalize the Statement of Considerations and rule. Through this process, the public has had an adequate opportunity to respond.

Based on public comments, the Commission has developed a final rule which is quite similar to the proposed rule. Changes made within the final rule clarify and correct inadvertent errors within the proposed rule, but do not make any fundamental changes in how the NRC proposed to license the storage of reactor-related GTCC waste in the proposed rule. The final rule addresses and responds to the issues raised by the commenters. The Commission does not anticipate any further rulemaking on the storage of reactor-related GTCC waste unless; (1) based on discussions with DOE and others, changes to the definition of GTCC waste are made, or (2) DOE develops disposal criteria for GTCC waste that would require corresponding changes.

5. General license versus specific license.

Comment: An industry commenter believes the wording in 10 CFR 72.40(b) must be revised. As written, the application to convert a general license to a specific license for an existing ISFSI would be denied. As proposed, it would deny a license if construction on the facility begins before a finding approving issuance of the license with any appropriate conditions to protect environmental values. The ISFSI licensed under 10 CFR 72.210, a general license, is very likely to have been designed, constructed, and operated for years prior to the need to apply for a specific license. The commenter also believes the rule should clearly indicate which sections apply to a general license and which do not. The rule should provide for the storage of GTCC waste at an ISFSI for both general and specific licenses until the 10 CFR part 50 license terminates.

Response: This rulemaking relates to authorizing a 10 CFR part 72 specific license holder, or applicant for a license, to store reactor-related GTCC waste in an ISFSI or an MRS. The comments on transitioning from a 10 CFR part 72 general license to a 10 CFR part 72 specific license are beyond the scope of this rulemaking. With regard to the commenter's request to indicate clearly which sections of 10 CFR part 72 apply to general licensees and which apply to specific licensees, the NRC previously addressed this issue by adding a new Sec. 72.13 to 10 CFR part 72, in a final rule titled ``Clarification and Addition of Flexibility'' (65 FR 50606; August 21, 2000).

The NRC disagrees with the commenter's suggestion to provide for the storage of GTCC waste under both 10 CFR part 72 general and specific licenses. As indicated in the proposed rule, because a 10 CFR part 72 general license is granted to a person holding a 10 CFR part 50 license to possess or operate a power reactor and a 10 CFR part 50 licensee would already be authorized (see Sec. 50.52) to possess radioactive material (including GTCC waste), there is no need for additional authority to possess and store reactor-related GTCC waste under the general license provisions of 10 CFR part 72. (See also response below).

Note: In evaluating this comment, the NRC determined that portions of Sec. 72.40(b) were inadvertently omitted from the proposed rule. The text contained in the proposed rule was intended to be added to Sec. 72.40(b) instead of to replace this paragraph. Accordingly, the final rule is modified to contain the existing text with the modification from the proposed rule.

6. General license.

Comment: A consulting firm commented that the changes to 10 CFR 72.6 extend the general license authorization for spent fuel in an ISFSI to include reactor-related GTCC waste. For clarity the proposed rule should include: (1) GTCC waste in the title of Subpart K, (2) the authorization for reactor-related GTCC waste in 10 CFR 72.210, (3) reactor-related GTCC waste in 10 CFR 72.212(a)(1) and (a)(2), (4) reactor-related GTCC waste in 10 CFR 72.212(b)(5)(ii), and (5) the authorization for reactor-related GTCC waste in 10 CFR 72.230(b).

Response: The NRC agrees with the commenter that Sec. 72.6 of the proposed rule could be read as allowing the storage of reactor-related GTCC waste at an ISFSI under a general license. This was done inadvertently and was inconsistent with the overall intent of the proposed rule. Therefore, the NRC has revised Sec. 72.6 to indicate clearly that reactor-related GTCC waste only can be stored under the provisions of a specific license.\3\

\3\ Not impacted by this rulemaking--10 CFR parts 30 and 70 do permit the storage of reactor-related GTCC waste.

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7. Question from the proposed rule: If reactor licensees, after termination of their 10 CFR part 50 license, elect to store reactor-related GTCC waste under the provisions of 10 CFR parts 30 and 70, is additional guidance needed to provide a more efficient licensing process?

Comment: One State commenter believes that the same technical criteria should be developed and applied to storage of GTCC waste regardless of which licensing option a licensee selects.

Of six industry commenters, some believe that additional guidance is needed while others do not believe additional guidance is needed. One commenter believes the NRC should spend its resources on legislative and regulatory changes that eliminate dual regulation and set one standard protecting public health and safety. Another commenter believes additional guidance should be provided regarding the steps to obtain a 10 CFR parts 30 and 70 license prior to termination of a 10 CFR part 50 license. The guidance should be simple and include consideration of facility history, design, experience, and backfit costs of upgrading to newer regulations as a result of transfer to 10 CFR parts 30 and 70 licenses.

Response: The NRC does not believe that additional guidance specifically for 10 CFR parts 30 and 70 licenses is needed. However, if the NRC were to develop guidance for storage of reactor-related GTCC waste under a 10 CFR part 30 or 70 license, such guidance would be consistent with 10 CFR part 72. The NRC prefers that reactor-related GTCC waste be stored under the provisions of 10 CFR part 72. Therefore, to promote effectiveness and efficiency, the NRC is deferring development of any guidance for 10 CFR parts 30 and 70. However, any application for a 10 CFR part 30 or 70 license may use, to the extent appropriate (considering the case-by-case criteria the application would be proposing), the guidance developed for 10 CFR part 72 in submission of an application. In conjunction with this rule NRC staff is developing Interim Staff Guidance for storage of reactor-related GTCC waste under a 10 CFR part 72 specific license.

8. Standard Review Plan revisions.

Comment: An industry commenter believes that associated changes to the Standard Review Plan to clarify the regulations after their issuance should be given high priority.

Response: In support of this rulemaking, the NRC is developing Interim Staff Guidance for NRC staff and licensee use in utilizing 10 CFR part 72 storage criteria for various GTCC waste types. This guidance will be incorporated into the next revision of the Spent Fuel Project Office Standard Review Plans.

9. Necessary changes to other 10 CFR Parts.

Comment: An industry commenter believes additional changes are necessary to 10 CFR parts 30 and 70, (and 10 CFR part 40 for completeness) for licensees to take full advantage of the proposed changes to 10 CFR part 72. The regulations in 10 CFR parts 30 and 70 need to identify exceptions in order to identify that 10 CFR part 72 would address possession of GTCC waste for those licensees who utilize an ISFSI following termination of their 10 CFR part 50 licenses. The exception in 10 CFR 70.1(c) needs to be expanded to include GTCC waste. Similar changes to 10 CFR 30.1 (and 10 CFR 40.1 for completeness), which do not currently include exception language similar to 10 CFR 70.1(c), also need to be made. The commenter believes that without these changes to 10 CFR part 30 and 70, specific licenses would continue to be required under these parts, as appropriate.

Response: The NRC agrees in part with the commenter. Changes to 10 CFR 30.11(b) and 10 CFR 70.1(c) are made to identify that 10 CFR part 72 specific licensees who possess power reactor-related GTCC waste within an ISFSI will be exempt from the requirements in 10 CFR parts 30 and 70, to the extent that its activities are licensed under the requirements of 10 CFR part 72. However, the NRC does not believe that changes are necessary to 10 CFR part 40 because there should be no need for a source material license at an ISFSI or an MRS.

Accordingly, the final rule will revise 10 CFR 30.11 (b) and 10 CFR 70.1(c) as follows:

30.11(b) Any licensee's activities are exempt from the requirements of this part to the extent that its activities are licensed under the requirements of part 72 of this chapter.

70.1(c) The regulations in part 72 of this chapter establish requirements, procedures, and criteria for the issuance of licenses to possess:

(1) Spent fuel, power reactor-related Greater than Class C (GTCC) waste, and other radioactive materials associated with spent fuel storage in an independent spent fuel storage installation (ISFSI), or

(2) Spent fuel, high-level radioactive waste, power reactor-related GTCC waste, and other radioactive materials associated with the storage in a monitored retrievable storage installation (MRS), and the terms and conditions under which the Commission will issue such licenses.

B. Commingling of GTCC Waste and Spent Fuel

10. Question from the proposed rule: Should the storage of certain forms of GTCC waste and spent fuel in the same cask be prohibited? Or, should storage be permitted if performance criteria can be established? If so, what criteria should be used?

Comment: A State commenter believes that commingling should be prohibited without firm criteria for each chemical type of GTCC waste and the particular cask design. Assurance of chemical compatibility and ultimate cask structural integrity must be established. Without DOE disposal criteria for multi-purpose casks, spent fuel may have to be handled more than once prior to disposal, and commingling will just complicate matters even more. The commenter believes that DOE should promptly promulgate disposal criteria. Another State commenter opposes any commingling of spent fuel and GTCC waste that contain resins which are composed of water and plastic because the high heat in spent fuel canisters can evaporate and build up pressure within a canister. A third State commenter urges the NRC to reconsider the proposed rulemaking as it believes that it is not advisable to allow commingling of spent fuel and GTCC waste at this time. The commenter noted that the incremental cost of additional GTCC waste canisters would be small relative to the total ISFSI costs and there would be a substantial risk by a licensee given the

absence of criteria governing what constitutes an acceptable disposal package. Precluding commingling would also avoid technical issues when either moving the canisters or if re-licensing becomes necessary for spent fuel storage containers at the end of a 20-year license.

DOE supports the position that storage of commingled non-fuel bearing GTCC waste with spent fuel is acceptable under certain conditions. However, the DOE shares NRC's concern that commingled canisters may need to be opened and the GTCC waste separated prior to disposal. Therefore, any commingling decision needs to consider potential additional costs and radiological exposures associated with reopening a canister and removing the GTCC waste prior to acceptance by DOE of the spent fuel.

All six industry commenters on this topic support commingling when justified through a safety analysis. For example, one commenter believes that commingling has significant advantages and noted that many decommissioning reactors will only have about 15 cubic feet of GTCC waste. The advantages are reduced costs and reduced waste volume due to the more efficient utilization of canister volume. However, the commenter noted that, without a clear and defined position from DOE that it will accept commingled canisters, the utilities would take significant risks to commingle because the casks may need to be opened and the waste separated. This could be a tremendous burden for decommissioned reactor licensees because they would no longer have the necessary facilities and personnel to reopen the cask and repackage the waste. However, one commenter noted that in DOE's, ``Viability Assessment of a Repository at Yucca Mountain, Volume 2,'' dated December 1998, that it is DOE's design intention to open packages of commercial spent fuel received at Yucca Mountain. Therefore, DOE clearly has the opportunity to segregate the GTCC waste with little impact upon operations. The commenter also noted that commingling allows safer and more efficient management of GTCC waste. In some cases, during the first 20 years or more after reactor shutdown, GTCC waste, on a weight basis, can produce higher radiation doses than a spent fuel assembly. The GTCC waste could be placed in the center of a container and surrounded by spent fuel bundles to provide additional shielding.

Response: In 10 CFR 72.3, other radioactive materials associated with fuel assemblies are defined as spent fuel and storage of such materials within an ISFSI is the industry standard practice. These non-fuel components associated with fuel assemblies were designed for use inside the operating plant's reactor vessel with no risk to plant safety. The rule is not intended to change the previous guidance given on the storage of non-fuel components such as control rod elements, burnable poison rod assemblies, and thimble plugs. The NRC expectation is that these types of components will be stored and disposed of as part of the spent fuel assembly packages. The NRC recognizes that some of these components, if removed from fuel assemblies, could be classified as GTCC waste. The NRC's approach is to consider these non-fuel components as spent fuel and not as GTCC waste if they are stored with the associated spent fuel. The NRC believes that appropriate interim storage for these non-fuel components should be with the associated spent fuel.

However, with respect to GTCC waste which is not integral to spent fuel assemblies, the NRC has concluded that, in general, GTCC waste should not be stored in the same cask with spent fuel. The NRC believes that properly addressing potential adverse conditions from commingling spent fuel with certain types of GTCC waste presents significant safety and technical issues. In addition, because the DOE has not yet identified criteria for a disposal package, the NRC is concerned that storage of GTCC waste and spent fuel in the same container may be unacceptable for placement in the geologic repository. Therefore, the rule precludes the commingling of GTCC waste and spent fuel, except on a case-by-case basis, because the NRC desires to formulate regulations that both reduce radiological exposure and costs associated with repackaging the spent fuel and GTCC waste into two separate containers for disposal.

The NRC would review and approve certain commingling on a case-by-case basis for GTCC waste composed of solid metal components. This storage arrangement would be undertaken at the licensee's risk that segregation of this material may be required prior to transporting the spent fuel for final disposal. The NRC would expect that a licensee's decision to commingle solid metal components with spent fuel would consider economic factors regarding the possibility that future segregation may be required for transportation and final disposal within a high-level waste repository or at a separate GTCC waste disposal facility. The incremental cost of storing separate GTCC waste canisters might be a relatively small increase in the total ISFSI costs. However, when DOE does provide disposal criteria, the NRC expects to revise the regulations for storage of GTCC waste to be consistent with DOE disposal requirements, if necessary.

The NRC agrees that resin and plastic material should not be commingled with spent fuel. Resins and plastic materials may contain organic compounds that may degrade under the thermal and radiolytic conditions present inside a spent fuel storage cask. The products of this decomposition may be corrosive and/or flammable

(both solids and gases). As a result, these decomposition products might adversely affect the integrity of the spent fuel cladding. The NRC concludes, however, that resins and plastics that may be classified as GTCC waste can be safely stored at an ISFSI in a separate container as long as the material has been solidified.

With respect to the comment that DOE intends to open packages at Yucca Mountain, the NRC specifically requested additional information from DOE on its current intentions with regard to disposal of GTCC waste. In response to the proposed rule, DOE did not provide information that causes the NRC to conclude that GTCC waste will be accepted for disposal at Yucca Mountain if this site should be selected as a repository. Therefore, after disposal criteria have been established by DOE, the NRC can revise its regulations and guidance, if necessary.

11. Question from the proposed rule: Should the storage of explosive, pyrophoric, combustible, or chemically reactive GTCC waste be prohibited in either commingled or separate GTCC casks? Or should storage be permitted if performance criteria can be established? If so, what criteria should be used?

Comment: The one State commenter believes its comment to question 10 applies to questions 11 through 14; that is, to prohibit commingling. Also, if the waste is explosive, pyrophoric, combustible, or chemically reactive, it should not be stored, or stored in its own specially designed cask.

Five industry commenters believe that with the proper conditions (e.g., limited capacity, relief devices, neutron absorbers, and the introduction of a moderator) these waste types can be safely stored but, as noted by one commenter, storage with these waste characteristics should only be allowed after appropriate conditioning to eliminate such characteristics. Also, storage should be allowed only if under worst-case conditions, an accident would not endanger public health and safety. Another commenter noted that it is highly unlikely that such material would be in reactor decommissioning GTCC waste.

Response: The NRC has concluded that GTCC waste that is explosive, pyrophoric, combustible or chemically reactive should only be stored at an ISFSI or an MRS if this material is solidified and stabilized. For these types of materials, the licensee programs must ensure that an analysis is conducted to show that these materials can be safely stored for the full period of the ISFSI or MRS license. The NRC concludes that this type of material, once stabilized and solidified, should be stored within a separate container as noted in response to question 9. The expectation is that the licensee's programs would ensure the design criteria address accident conditions, pressure buildup, and special shielding requirements, and that released gases meet off-site radiological limits.

12. Question from the proposed rule: Should the storage of GTCC that may generate or release gases via radiolytic or thermal decomposition, including flammable gases, be prohibited in either commingled or separate GTCC casks? Or should storage be permitted if performance criteria can be established? If so, what criteria should be used?

Comment: One State commenter believes its comment to question 10 applies to questions 11 through 14; that is, to prohibit commingling. The other State commenter opposes any commingling of spent fuel and GTCC waste that contain resins which are composed of water and plastic because the high heat in spent fuel canisters can cause evaporation and the build up of pressure within a canister. The commenter opposes any mixture of gas-generating materials within a storage container.

Five industry commenters believe that with the proper conditions (e.g., quantities of gas released will not exceed safe limits) this waste type can be safely stored. Also, storage should be allowed only, if under worst-case conditions, an accident would not endanger public health and safety. Another commenter noted that it is highly unlikely that such material would be in reactor decommissioning GTCC waste.

Response: The NRC has concluded that GTCC waste that may release gases via radiolytic or thermal decomposition, including flammable gases, should only be stored at an ISFSI if this material is solidified and stabilized to minimize these characteristics. For these types of materials, the licensee programs must ensure that an analysis is conducted to show that these materials can be safely stored for the full period of the ISFSI or MRS license. The NRC concludes that this type of material, once stabilized and solidified, should be stored within a separate container as noted in response to question 9. The expectation is that the licensee's programs would ensure the design criteria address accident conditions, pressure buildup, and that released gases meet off-site radiological limits.

13. Question from the proposed rule: Should the storage of solid GTCC waste that may contain free liquid (e.g., dewatered resin) be prohibited in either commingled or separate GTCC casks? Or should storage be permitted if performance criteria can be established? If so, what criteria should be used?

Comment: The one State commenter believes its comment to question 10 applies to questions 11 through 14; that is, to prohibit commingling.

Five industry commenters provided differing views: some believe that GTCC waste that may contain free liquids should not be commingled with spent fuel, while others believe that it should be allowed if supported by a Safety Analysis Report. One commenter noted that it is highly unlikely that such material would be in reactor decommissioning GTCC waste (i.e., dewatered resins from reactor plants are not GTCC waste).

Response: The NRC has concluded that solid GTCC waste that contains free liquids should be treated to remove excess free liquids prior to storage at an ISFSI or an MRS. For this solidified material, the licensee's programs must ensure that an analysis is conducted to show that these materials can be safely stored for the full period of the ISFSI or MRS license. The NRC concludes that this type of material, once solidified, should be stored within a separate container as noted in response to question 9. The expectation is that the licensee's programs would ensure the design criteria address accident conditions, pressure buildup, and that released gases meet off-site radiological limits.

14. Question from the proposed rule: Should the storage of liquid GTCC waste be prohibited in either commingled or separate GTCC casks? Or should storage be permitted if performance criteria can be established? If so, what criteria should be used?

Comment: The one State commenter believes its comment to question 10 applies to questions 11 through 14; that is, to prohibit commingling.

Five industry commenters provided differing views: some believe that liquid GTCC waste should not be commingled with spent fuel, while others believe that it should be allowed if supported by a Safety Analysis Report. One commenter noted that it is highly unlikely that such material would be in reactor decommissioning GTCC waste.

Response: The NRC has concluded that liquid GTCC waste should be solidified prior to storage at an ISFSI or an MRS. For this solidified material, the licensee's programs must ensure that an analysis is conducted to show that these materials can be safely stored for the full period of the ISFSI or MRS license. The NRC concludes that this type of material, once solidified, should be stored within a separate container as noted in response to question 9. The expectation is that the licensee's programs would ensure the design criteria address accident conditions, pressure buildup, and that release gases meet off-site radiological limits.

C. Agreement State Issues (Including Specific Questions for Agreement States in the Proposed Rule):

15. From the proposed rule: What is the position of the Agreement States on NRC assuming jurisdiction of storage of GTCC waste generated during the operation of a 10 CFR part 50 license after termination of the 10 CFR part 50 license?

Comment: Only four of the 32 Agreement States responded to this question, but none supported the NRC's exercise of jurisdiction. The four States' reasons varied. The first State commenter, South Carolina, does not view favorably relinquishing what it regards as its jurisdiction over reactor-related GTCC waste because, in South Carolina's view, the waste is composed of radioactive materials which Agreement States can be authorized to regulate under the AEA. South Carolina also noted that, although the Low Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) clearly makes the Federal government responsible for the disposal of GTCC waste, it is silent on the responsibility for the interim storage of this waste. Therefore, South Carolina believes that the States can have some jurisdiction over the management and storage of these wastes and other low-level waste at decommissioned 10 CFR part 50 facilities. South Carolina says that it may also want to have all GTCC waste stored at a central location rather than at numerous sites throughout the State. South Carolina also

believes that the NRC and an Agreement State could effectively collaborate in the regulation of a single facility to avoid duplication of efforts and dual regulation. South Carolina believes that any GTCC waste storage facility constructed outside the restricted exclusion area of a reactor would be clearly subject to State jurisdiction. Further, South Carolina reports that, on a case-by-case basis, it allows temporary storage of selected GTCC waste (less than one percent above Class C limits) from 10 CFR part 50 licensees at its Barnwell low-level waste disposal facility prior to disposing of this waste and wants to maintain licensing authority for reactor-related GTCC waste in order to continue this practice.

The second State commenter, Illinois, objects to what it sees as the NRC's disregard of the AEA of 1954, as amended, and of the Agreement between the NRC and the State of Illinois under section 274b of the AEA. Illinois noted that section 274b authorizes the NRC to discontinue, and an Agreement State to assume, regulatory authority over radioactive material, including byproduct material, source material, and special nuclear material in quantities not sufficient to form a critical mass, and Illinois believes that the NRC has relinquished its authority over these materials in its Agreement with Illinois. Further, section 274j of the AEA specifies the conditions under which the NRC can terminate or suspend all or part of an Agreement and reassert authority. Illinois also argues that neither of the two reasons the AEA gives for termination of an Agreement with an Agreement State--that the Agreement State has either failed to protect the public health and safety or failed to comply with requirements in section 274 of the AEA--is applicable to licensing the storage of GTCC waste, and neither reason is asserted in the proposed rule. Illinois says that the AEA provides the NRC with no authority to unilaterally modify Agreements with Agreement States, either by administrative fiat or by rule. Illinois disputes that the requirement, in section 274c of the AEA, that forbids NRC discontinuance of its authority to license the construction and operation of production and utilization facilities provides NRC with the authority ``to dictate that Agreement States no longer have authority to license storage of GTCC waste at a facility that is no longer licensed as a production or utilization facility."

The third State commenter, Utah, does not believe that the NRC should ``usurp" State authority for licensing GTCC waste under 10 CFR parts 30, 70, or 72, once a reactor is decommissioned. The State says there are other areas in which jurisdiction over AEA materials may be either State or Federal. The State believes that, after decommissioning, and especially where spent fuel is shipped offsite, the State should have a significant regulatory presence. (The commenter also believes that only the NRC should license GTCC waste storage casks.)

The fourth State commenter, New York, does not support what it calls the ``carte blanche" relinquishment of its regulatory authority. New York believes that it has effectively collaborated with the NRC in the regulation of single facilities and is not aware of any problems. New York believes that cooperative effort can minimize duplication and maximize the value of limited resources while still allowing both regulatory entities to retain their current regulatory authority. New York believes relinquishment could be considered on a case-by-case basis where regulatory duplication could not be minimized or a Memorandum of Understanding could not be developed to resolve problematic issues.

Response: Until this rulemaking, which opens a clear path to storage of reactor-related GTCC waste co-located with spent fuel in an ISFSI or an MRS after termination of a 10 CFR part 50 license, the Commission has not had occasion to examine systematically the interplay between NRC and Agreement State jurisdiction over reactor-related GTCC waste. The LLRWPAA assigns to the Federal government the ultimate responsibility for disposal of GTCC waste, but no statute or regulation has explicitly addressed the storage of such waste. After considering all comments received during the rulemaking, and after examining carefully the underlying regulatory and statutory scheme, the Commission concludes that the NRC should retain regulatory jurisdiction over reactor-related GTCC waste after termination of a reactor's 10 CFR part 50 license.

The Commission's position follows directly from the existing Agreements the NRC and the States have entered into under section 274 of the AEA, and it is consistent with other law and with sound policy. Under section 274, Agreement States possess regulatory authority over radioactive waste only where the Commission has relinquished its preexisting authority. No Agreement explicitly mentions reactor-related GTCC waste, and though some Agreement States have programs for storage and disposal of non-reactor-related GTCC waste--programs that have been found compatible with the NRC's own program for regulating such wastes--section 274 Agreements cannot be understood as a general matter to relinquish Commission authority over reactor-related GTCC waste. These wastes are integrally related to the operation of reactors because these wastes consist for the most part of activated metal reactor components such as core shrouds, support plates, nozzles, core barrels, and in-core instrumentation. The Commission has reserved to itself matters integral to the operation of reactors. Thus, when, under the section 274 program, the Commission reaches Agreements with States and relinquishes regulatory

jurisdiction to them, the Commission specifically retains authority over the ``operation'' of reactors, as required by an NRC rule promulgated nearly 40 years ago. Section 150.15(a)(1) of 10 CFR defines ``operation'' as follows:

As used in this subparagraph, operation of a facility includes, but is not limited to (i) the storage and handling of radioactive wastes at the facility site by the person licensed to operate the facility; and (ii) the discharge of radioactive effluents from the facility site. Id. (Emphasis added.)

In short, a State entering a section 274 Agreement with the NRC does not, and cannot, acquire regulatory authority over reactor-related GTCC waste. Thus, the Commission's assertion of ongoing NRC jurisdiction over reactor-related GTCC waste does not take back previously-granted State authority or terminate an NRC-State Agreement.\4\

\4\ The Commission's action today serves to preserve NRC jurisdiction over reactor-related GTCC waste both at the facility site, which is where most such waste now resides, and at other locations. Although Sec. 150.15(a)(1)(i) refers only to waste ``at the facility site,'' that language is not confining because of the ``is-not-limited-to'' preamble. Our conclusion that such waste should be subject to exclusive NRC jurisdiction is reinforced by considering Sections 274(c)(1) and (4) of the AEA and by Sections 3(b)(1)(d) and 3(b)(2) of the Low Level Radioactive Waste Policy Amendments Act, discussed subsequently.

The approach just outlined is consistent with the AEA. Section 274 itself requires continued Commission authority over basic reactor operation even after entry of Agreements. See AEA, section 274(c)(1). Section 274 also contemplates continued Commission authority over ``disposal'' of certain types of waste material ``because of the hazards or potential hazards thereof.'' See AEA, section 274(c)(4). The final rule the Commission issues today is consistent with these statutory provisions, because the GTCC waste over which the rule retains Commission jurisdiction was used by or generated at operating reactors and can reasonably be regarded as waste whose ``potential hazards'' warrant ultimate disposal under NRC supervision.

This conclusion is strongly reinforced by more recent statutory enactments specifically dealing with the handling of radioactive wastes. The Low Level Radioactive Waste Policy Amendments Act assigns to the Federal government the ultimate responsibility for disposal of GTCC waste, and to the NRC the responsibility for regulating the disposal of GTCC waste generated by NRC licensees. See sections 3(b)(1)(D) and 3(b)(2) of the LLRWPAA.\5\ The two principal facts behind these sections were that most States did not want to be ultimately responsible for the disposal of GTCC waste, and that the States did not want the GTCC waste buried in DOE's existing unlicensed low-level waste burial sites. Nonetheless, these sections have been read broadly enough to permit disposal of GTCC waste in facilities run by States or private entities--as long as the Federal government was satisfied that the disposal provided adequate protection of public health and safety--and to permit compatible Agreement State regulation of some GTCC waste stored and disposed of in a State or private facility. See, e.g., 54 FR 22578, 22579 (May 25, 1989).

\5\ Section 3(b)(1)(D) says, ``The Federal Government shall be responsible for the disposal of * * * any * * * low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the Commission for class C radioactive waste * * *.'' Section 3(b)(2) says, ``All radioactive waste designated a Federal responsibility pursuant to subparagraph (b)(1)(D) that results from activities licensed by the Nuclear Regulatory Commission * * * shall be disposed of in a facility licensed by the * * * Commission * * *.''

However, the same statutory language cannot be read so broadly as to empower States to regulate storage and disposal of any and all GTCC waste. That is clearly the case with disposal. Indeed, the language of these two sections could more reasonably be read to prohibit the States from any regulation of disposal of reactor-related GTCC waste whatsoever. As for storage, these sections cannot be interpreted as allowing to Agreement States blanket and unlimited authority over storage of GTCC waste. Because the NRC indisputably has jurisdiction over GTCC waste while a reactor licensed under 10 CFR Part 50 is being operated and similarly has jurisdiction over its disposal, it is reasonable for the NRC to retain regulatory authority over GTCC waste during the interim period--i.e., between the time when the reactor is shut down and the time the GTCC waste goes to disposal. This is especially the case when, as many reactor owners contemplate, the GTCC waste could be stored along with NRC-regulated spent fuel in an NRC-regulated ISFSI or MRS. Low-level radioactive waste not exceeding the Class C limits is different,

because no statute assigns the Federal government ultimate responsibility for disposal, or the NRC explicit responsibility for regulating disposal of such waste. Thus, issuance of this final rule does not affect the States' long-standing practice of exercising regulatory jurisdiction over non-GTCC low-level radioactive waste originally generated at reactors, or over GTCC waste generated by materials licensees regulated by Agreement States.

The alternative to NRC jurisdiction over reactor-related GTCC waste stored onsite or in an ISFSI or MRS is a regulatory scheme that calls for not one shift of regulatory authority, as in the case of Class A, B, or C low-level reactor waste, but two shifts of regulatory authority, one at plant shutdown, and the other at disposal. It is difficult to see the practical sense in this, let alone a practical necessity.

The NRC agrees that States can work well with the NRC, and although the NRC is retaining regulatory authority over the storage and disposal of reactor-related GTCC waste, there are a number of ways States may participate in NRC regulation, as the States know from experience. For example, the Commission will continue to adhere to its Policy Statement, ``Cooperation with States at Commercial Nuclear Power Plant and Other Nuclear Production or Utilization Facilities'' (57 FR 6462; February 25, 1992), which allows States to develop specific arrangements, such as exchange of information, State observation of NRC inspection activities, and placement of State resident engineers at nuclear power plants. Nonetheless, that the NRC and an Agreement State can work well together does not prove that they both should have regulatory authority at an NRC-regulated ISFSI that contains a cask with spent fuel, regulated by the NRC, co-located with reactor-related GTCC waste.

16. From the proposed rule: What controls and regulatory frameworks would the Agreement States envision, assuming they have jurisdiction over GTCC waste generated during the operation under a 10 CFR Part 50 license after termination of the 10 CFR part 50 license? How would the Agreement States plan to ensure consistency with a national regulatory scheme?

Comment: Only two States responded. The first said that it cannot say what other Agreement States could do, and that each State should be evaluated on its own. But this State nevertheless claimed that GTCC waste is similar to Class B and C waste, which States have regulated for years. The State believes it has the experience and capability needed to establish the controls and regulatory framework comparable to NRC standards. It therefore believes that it is capable of administering 10 CFR part 72 standards. The second State argued that consistency with a national regulatory scheme for storage of GTCC waste would be ensured in the same manner in which the consistency of other Agreement State regulation in other areas is ensured. The second State envisions establishing controls and a regulatory framework that are compatible with the NRC's for this type of waste storage.

Response: With so few responses, the NRC cannot form a clear picture of how the Agreement States would regulate storage of reactor-related GTCC waste so as to ensure consistency with a national program for regulating such waste. As we note in the response to the next question, some State regulation of the storage and disposal of some marginally reactor-related GTCC waste has already occurred in a way that is consistent with a coherent national program that protects public health and safety. But the question here is whether such a program can be established that would permit State regulation of all GTCC waste as a general matter, no matter what the activity level, no matter how integrally related to reactor operation, and no matter whether stored with spent fuel or not. It is certainly true, as one of the States said, that the NRC has authority under section 274 of the AEA to take steps that help assure that State programs are ``compatible'' with the NRC's own programs. Indeed, it is the NRC's responsibility to work to ensure such compatibility. Nonetheless, only the Agreement States can establish and maintain compatible programs. The NRC can only assess the degree of compatibility and protection of health and safety, through the Integrated Materials Performance Evaluation Program, and take the steps necessary to seek to ensure compatibility and protection of health and safety where it is missing. Under circumstances in which the NRC must exercise jurisdiction of GTCC waste during reactor operations and at the time of disposal, the NRC does not have a strong practical justification for allowing States to exercise jurisdiction over storage in the interim period before disposal. At this time, it is unclear whether a consistent national regulatory scheme could be established and maintained if States exercised jurisdiction over storage of all such wastes.

17. From the proposed rule: The NRC staff is not aware of any current Agreement State license for the storage of reactor-related GTCC waste. Are there any such licenses within your State or are you aware of any such Agreement State licenses?

Comment: Two States commented. Illinois reports that it does not have any reactor-related GTCC waste under license. South Carolina reports that it allows temporary storage of some approved GTCC waste from 10 CFR part 50 licensees (less than 1 percent above Class C limits) while awaiting disposal at its licensed Barnwell low-level waste facility. South Carolina also licenses the partially decommissioned Carolinas-Virginia Nuclear Power Associates (CVNPA) reactor, a commercial test reactor sponsored by a consortium of power companies. This reactor was formerly licensed by the Atomic Energy Commission (AEC), but its AEC 10 CFR part 50 license was terminated after the reactor was shut down and placed in a SAFSTOR decommissioned status. Concurrent with the termination of the facility license, the AEC issued a Byproduct Material License which authorized CVNPA to possess and store the byproduct material in the remaining structures and dismantled parts. In 1969, the AEC transferred this Byproduct Material License to South Carolina. The site is currently undergoing complete decommissioning and dismantlement. South Carolina states that ``(a)lthough waste classification of the irradiated reactor components (is) not complete, it is likely there will be some GTCC waste that may require licensure by the State for interim storage, or may be transferred to one of their parent 10 CFR part 50 licensees for storage."

Response: We note that South Carolina currently regulates storage and disposal of some reactor-related GTCC waste at its Barnwell low-level waste disposal facility. It is South Carolina's practice, as noted in its comment, to accept for storage and disposal at Barnwell only reactor-related waste that is less than 1 percent above the NRC's limits for Class C low-level waste on a case-by-case basis. There is no significant difference between the way such waste should be handled and the way South Carolina handles Class C low-level waste. Thus the Commission does not seek any change in South Carolina's practice. Moreover, there is no question that the States will continue to exercise their current jurisdiction over low-level waste other than GTCC waste, and over GTCC waste that is not reactor-related. With respect to the CVNPA site, if it turns out that some reactor-related GTCC waste results from the further characterization and decommissioning work planned for this site, South Carolina will need to consult with the NRC as to the appropriate management of this waste.

D. Other Comments

18. Blending GTCC waste within the reactor vessel.

Comment: The private citizen commenter believes that the NRC is not following ALARA principles by requiring that small quantities of GTCC waste be segregated from other low-level waste within the reactor vessel. If GTCC waste were left within the reactor vessel and blended with the lower activity material within the vessel, it could be safely disposed of as low level waste. The collective dose to segregate the GTCC waste versus burial of the reactor vessel, averaged to be below Class C, would be significantly less. Therefore, the NRC should develop additional rulemaking and/or guidance on the blending of reactor internals to reduce worker dose.

Response: This rulemaking is designed to add flexibility for the storage of GTCC waste and has not eliminated any current option that licensees may wish to use to store GTCC waste. If the licensee desires to dispose of the reactor vessel, the NRC and appropriate Agreement States will review this on a case-by-case basis. The regulatory process and review could be similar to that used by the NRC and Washington State in approving Portland General Electric Company's (i.e., the Trojan nuclear facility) transportation and disposal of its reactor vessel at a LLW facility. The NRC expects the licensee will consider ALARA principles in determining the best disposal option.

19. Away from reactor storage.

Comment: The State of Utah is greatly concerned, and adamantly opposes, the storage of GTCC waste at away-from-reactor ISFSIs, including something such as the proposed Private Fuel Storage facility for spent fuel. The commenter believes that there is the potential that most of the nation's spent nuclear fuel and GTCC waste could be shipped to Utah and that, once there, it will never leave the State. The commenter noted that there are no long term GTCC waste disposal plans. The commenter believes that the NRC must restrict storage to at-reactor ISFSIs and not allow GTCC waste to be shipped across the country unless, and until, decisive plans have been made for the permanent disposition of GTCC waste. The commenter noted from DOE documents that DOE anticipates that

GTCC waste will remain at the reactor site until a disposal option becomes available, and that currently the disposal option is not known. The proposed rule does not address the disposition of the waste at the end of a 10 CFR Part 72 ISFSI license. The commenter believes there is a significant volume of GTCC waste that could be shipped away from the reactor site and the NRC is silent on the transportation of GTCC waste. There is no discussion about transportation containers or the exposure level and the population at risk from transportation.

The commenter believes that NRC needs to prepare a programmatic or generic environmental impact statement (EIS) for the transportation of GTCC waste since this could be a significant departure from the current regulatory scheme and a significant federal action affecting the quality of the human environment. If the proposed Private Fuel Storage ISFSI on the Skull Valley Goshute Indian reservation in Utah becomes the prime location for GTCC waste storage, the proposed rule would permit the mass movement of GTCC waste across the country. In this respect, the NRC cannot rely on its ``waste confidence rule'' because the waste confidence rule only applies to spent fuel. The NRC does not address the final disposition of GTCC waste. In fact, the NRC decommissioning rule under 10 CFR part 72 only requires the applicant to propose and fund a decommissioning plan after removal of GTCC waste which may never occur. The commenter noted that no EIS had ever been prepared on the transportation of GTCC waste which may be long-lived and can contain millions of curies of radioactivity. The commenter believes particular attention is needed for GTCC waste resins and an evaluation of the hazard of an accident involving a long-duration fire. Resins contain water and plastic which would evaporate and melt unlike activated metals. The commenter believes NRC cannot rely on RADTRAN, a transportation model, because GTCC waste resins are composed of elements that RADTRAN does not address (e.g., ion exchange resins). Moreover, the NRC cannot rely on an EIS conducted for a site specific ISFSI that only addresses storage of spent fuel.

The State of Utah also believes that NRC has not thought through issues related to insurance requirements, liability for harm resulting from GTCC waste, and complexities of waste ownership. Utah maintains that a void will occur in insurance coverage for GTCC waste at an away-from-reactor ISFSI; the generating facility would no longer cover that waste, and the Price-Anderson Act would not cover transportation incidents to and from the ISFSI because GTCC waste is not high level waste. Utah also noted as negatives that 10 CFR part 72 fails to require on-site property insurance; multiple owners of the mix of GTCC waste at an away-from-reactor ISFSI will complicate assigning liability and after decommissioning of a reactor site, the ``deep-pocket'' utility ceases to be an ``owner,'' thus shedding responsibility for the GTCC waste. Also, the State expresses concern that after an accident, it may need to take action in order to protect public health and safety, even though it lacks regulatory authority.

Response: The NRC finds that most of these comments are not germane to this rulemaking, which provides general standards for the storage of reactor-related GTCC wastes. Issues associated with an away-from-reactor ISFSI can appropriately be addressed in a specific licensing action concerning such a facility. In any event, the NRC disagrees with the comments. The comments generally stated that GTCC waste should not be shipped to an away-from-reactor ISFSI site due to lack of analysis regarding transportation containers or the exposure level and the population at risk from transportation. The transportation of radioactive material, which includes GTCC waste, was previously analyzed by the NRC in NUREG 0170, ``Final Environmental Statement on the Transportation of Radioactive Materials by Air and Other Modes.'' This EIS covered the transport of all types of radioactive material by all transport modes (including GTCC waste). Transportation of GTCC waste and other Type B quantities of radioactive material (i.e., spent fuel) is governed by the NRC regulations in 10 CFR part 71 and the Department of Transportation (DOT) regulations in 49 CFR part 173. The NRC believes that NUREG-0170 bounds the environmental impact from the shipment of GTCC waste and this waste can be safely shipped in compliance with these regulations.

With respect to the comment on insurance and liability, under existing law, there is no cause for a void in insurance coverage for GTCC waste at an away-from-reactor ISFSI even though 10 CFR part 72 does not provide specific insurance or indemnity requirements for an away-from-reactor facility. Licensing actions to permit away-from-reactor storage may be made subject to license conditions requiring the maintenance of appropriate amounts of liability insurance up to $200 million. ($200 million is the maximum insurance currently commercially available to cover offsite public liability and is the amount required for large power reactors.) In addition, there may be appropriate commitments, confirmed by license conditions, for insurance to cover onsite damages.

The Price-Anderson Act (Atomic Energy Act section 170, 42 U.S.C. 2210 & 2014 (related definitions)) requires indemnification for 10 CFR Part 50 facilities. The Act also gives the Commission discretionary authority to extend indemnity coverage to activities undertaken by three types of materials licensees. See 42 U.S.C. and 42 U.S.C. 2210 a. Thus, the Commission can indemnify away-from-reactor ISFSIs in the event the Commission were to find that the risks of offsite damage are so large as to be uninsurable or that the public interest requires it. Moreover,

the Price-Anderson Act does not restrict its coverage of reactor waste to spent fuel. Thus, were the Commission to use its discretion to cover away-from-reactor ISFSIs, all transportation to and from them would be covered. However, even lacking such a discretionary designation, transportation of GTCC waste to the ISFSI would, in any event, be covered by the generator's Price-Anderson coverage. Likewise, if the final transportation were to be to an indemnified facility, such as a DOE facility, that transportation would be covered by Price-Anderson. See e.g. Atomic Energy Act, section 170n(1)(B) and 42 U.S.C. 2210n(1)(B).

In addition, to address any perceived problem from the multiplicity of customers, 10 CFR part 72 license conditions can require terms in service agreements by which allocation of liability might be made among customers. Where needed, additional financial assurances could be provided. Also, Sec. 72.30's provisions for ``Financial assurance and recordkeeping for decommissioning'' includes a requirement that the decommissioning plan have a funding plan that contains information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS.

Finally, the State's possible need in an emergency ``to take action even though it is not the regulator of the GTCC waste'' is no different from the circumstance in an emergency resulting from a nuclear power plant or other federally regulated facility that uses radioactive materials. There are like requirements imposed on the 10 CFR part 72 licensee for notification and requests for offsite assistance. See Sec. 72.32. The Commission is confident that a partnership of Federal, State, local, and Tribal governments will act to protect the public health and safety and the environment in the event of an emergency.

20. The definition of the term ``cask.''

Comment: One commenter believes that the NRC needs to be clearer when using the term cask as it is defined and used in 10 CFR 72.121(a)(2) and 72.230(b). Reference is made to ``casks that have been certified * * * under part 71,'' but cask is not defined in either 10 CFR part 71 or the transportation regulations in Title 49. The term cask is commonly used throughout the nuclear power industry to refer to one or more types of transport packaging, but it is also generally accepted that the correct term is ``packaging'' rather than ``cask.'' Spent fuel dry storage has extended the application of the term cask, yet it is not formally defined in either Title 10 or Title 49. The commenter noted that the proposed rule included a definition for the terms ``spent fuel storage cask or cask,'' but believes that the definition may raise more questions than it resolves because it focuses on a container and not a package. The term container is not defined in either Title 10 or Title 49, resulting in a new definition which is based on an undefined term. Does cask refer to (1) a package, (2) packaging, or (3) something else? This is particularly important when referring to ``casks that have been certified * * * under part 71,'' which would suggest a specific package or packaging. The commenter believes that Title 10 should avoid any term related to transportation which would create an inconsistency with Title 49. The commenter proposes several alternative solutions based on the intended meaning of cask to maintain consistency with Title 49 and believes the term should be reviewed by the Department of Transportation and incorporated into 49 CFR 171.8 during the next revision.

Response: The commenter requested that the NRC modify the definition of the term ``cask'' as used in 10 CFR 72.121(a)(2) to better correlate this term to the term packaging and packages used in 10 CFR part 71. The NRC believes the commenter's reference should have been to 10 CFR 72.212(a)(2) which discusses the use of casks certified under 10 CFR part 72. The NRC concludes, however, that the definition of the term cask should not be changed. The general term cask as used in 10 CFR part 72 is intended to speak to the cask design characteristics, such as criticality, shielding, thermal loading, and structural integrity and not all the components of a typical transportation packaging, such as an impact limiter. Because there is not a good correlation between the 10 CFR part 72 cask definition and 10 CFR part 71 packaging and packages, an attempt to relate the terms might cause confusion. As indicated by the commenter, it is very important that terms used in 10 CFR part 71 and DOT regulations are consistent. In the proposed rule the only change intended for the term spent fuel storage cask or cask was to allow the storage of reactor-related GTCC waste within a cask. Attempting to change these terms within NRC regulations would require corresponding changes in DOT regulations, which is beyond the scope of this rulemaking.

However, in evaluating this comment, the NRC believes that changing the definition of ``spent fuel storage cask or cask'' to include GTCC waste was unintended. Adding GTCC waste to this definition would require that this waste type be stored in a ``spent fuel storage cask.'' The NRC did not intend for the requirements in 10 CFR part 72 to be as prescriptive as could be implied in the proposed rule.

Accordingly, the final rule removes the change in the proposed rule to Sec. 72.3 dealing with the definition of ``spent fuel storage cask or cask.''

Section-by-Section Analysis

The following section is provided to assist the reader in understanding the specific changes made to each section or paragraph in 10 CFR parts 30, 70, 72, and 150. For clarity of content in reading a section, much of that particular section may be repeated, although only a minor change is being made. This section should allow the reader to effectively review the specific changes without reviewing existing material that has been included for content, but has not been significantly changed.

Section 30.11(b) is a new paragraph (in the existing CFR it is noted as reserved) to exempt a licensee from the requirements of 10 CFR part 30, to the extent that its activities are licensed under the requirements of 10 CFR part 72.

Section 70.1(c) is being revised to exempt a licensee from the requirements of 10 CFR part 70 when power reactor-related GTCC waste is being stored under the requirements of 10 CFR part 72.

The title to 10 CFR part 72 is being revised to include GTCC waste.

The following sections or paragraphs are being revised to specify the inclusion of GTCC waste, for clarity, or for completeness: Secs. 72.1, 72.2(a) and (c), 72.8, 72.16(d), 72.22(e)(3), 72.24 introductory text and (i), 72.28(d), 72.30(a), 72.44(b)(4), (c)(3)(i), (c)(5), (d) and (g)(2), 72.52(b)(2), (c), and (e), 72.54(c)(1), 72.60(c), 72.72(a), (b), and (d), 72.75(b), (c), (d)(1)(iv), and (d)(2)(ii)(L), 72.80(g), 72.82(a) and (b), 72.106(b), 72.108 title and text, 72.122(b)(2), (h)(2), (h)(5), (i), and (l), 72.128 title and (a), and 72.140(c)(2). Also, Secs. 72.72, 72.76, and 72.78 have been modified to clarify the reporting requirements for special nuclear material as specified in 10 CFR 74.13(a)(1).

Section 72.3: The definition for GTCC waste is being added to 10 CFR part 72 and the definitions of Design capacity, Independent spent fuel storage installation or ISFSI, Monitored Retrievable Storage Installation or MRS, and Structures, systems, and components important to safety, are being revised to specify the inclusion of GTCC waste.

Section 72.6: This section has been revised to clearly indicate that reactor-related GTCC waste only can be stored under the provisions of a 10 CFR part 72 specific license.

Section 72.40(b): This section has been modified for clarity and by adding a new introductory sentence that would include reactor-related GTCC waste. Also, reference to the Atomic Safety and Licensing Appeal Board has been removed since this board no longer exists.

Sections 72.72(a), 72.76(a), and 72.78(a): These sections have been modified to clarify the reporting requirements for special nuclear material as specified in 10 CFR 74.13(a)(1).

Section 72.120: This section has been modified for clarity and to provide some general considerations for the storage of GTCC waste within an ISFSI or an MRS.

Section 150.15(a)(7)(i) and (ii): Essentially repeats the text of the existing paragraphs with amendments for consistency with the new Sec. 150.15(a)(7)(iii).

Section 150.15(a)(7)(iii): This new paragraph will specify that the storage of reactor-related GTCC waste within an ISFSI or an MRS licensed pursuant to 10 CFR part 50 and/or part 72 is exempt from Agreement State authority.

Paragraph 150.15(a)(8): This new paragraph will specify that the storage of reactor-related GTCC waste licensed under 10 CFR part 30 and/or part 70 is exempt from Agreement State authority.

In the NRC's final rule, ``Clarification and Addition of Flexibility'' (65 FR 50606; August 21, 2000), changes have been made to 10 CFR part 72. Section 72.140(c)(2) is the only section that is being changed in both rules and this rulemaking is consistent with the ``Clarification'' rulemaking changes.

Compatibility of Agreement State Regulations

Under the ``Policy Statement on Adequacy and Compatibility of Agreement State Programs'' approved by the Commission on June 30, 1997, and published in the Federal Register on September 3, 1997 (62 FR 46517), Sec. 70.1(c), 10 CFR part 72 and Sec. 150.15 continue to be classified as compatibility Category ``NRC.'' Section

30.11(b) is also classified as Category ``NRC.'' Previously, this subsection was reserved and classified as Category ``D,'' not required for purposes of compatibility. The NRC program elements in Category ``NRC'' are those that relate directly to areas of regulation reserved to the NRC by the Atomic Energy Act of 1954, as amended, or provisions of Title 10 of the Code of Federal Regulations.

Because the Commission was particularly interested in the position of the Agreement States on certain issues, three questions were identified in the proposed rule for Agreement State input. Five of the 32 Agreement States commented on the proposed rule (four on the three questions). The comments and responses on the specific Agreement State questions are found on the Comments in the Proposed Rule section, comment numbers 15, 16, and 17.

Voluntary Consensus Standards

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that agencies use technical standards that are developed or adopted by voluntary consensus standard bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. In this rule, the NRC is presenting amendments to its regulations that would allow the licensing of interim storage of GTCC waste. This action does not constitute the establishment of a standard that establishes generally-applicable requirements and the use of a voluntary consensus standard is not applicable.

Finding of No Significant Environmental Impact: Availability

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in subpart A of 10 CFR part 51, that this rule is not a major Federal action significantly affecting the quality of the human environment, and therefore, an environmental impact statement is not required. The rule will provide reactor licensees an additional option of storing GTCC waste under a 10 CFR part 72 license using spent fuel storage criteria of that part. Storage of GTCC waste at an ISFSI or an MRS would be in a passive mode with no human intervention needed for safe storage. The Environmental Assessment determined that there is no significant environmental impact as a result of these changes.

The Environmental Assessment and finding of no significant impact on which this determination is based are available for inspection at the NRC Public Document Room, 11555 Rockville Pike, Rockville, MD. Single copies of the Environmental Assessment and the finding of no significant impact are available from Mark Haisfield, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-6196.

Paperwork Reduction Act Statement

This final rule amends information collection requirements contained in 10 CFR part 72 that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These requirements were approved by the Office of Management and Budget, approval number 3150-0132. The proposed changes to 10 CFR part(s) 30, 70, and 150 do not contain a new or amended information collection requirement. Existing requirements were approved by the Office of Management and Budget, approval number(s) 3150-0017, 3150-0009, and 3150-0032.

The burden to the public for this information collection is estimated to average 120 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments on any aspect of this information collection, including suggestions for reducing the burden, to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington DC 20555-0001, or by Internet electronic mail at BJS1@NRC.GOV; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0132), Office of Management and Budget, Washington DC 20503.

Public Protection Notification

If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

Regulatory Analysis

The Commission has prepared a final Regulatory Analysis on this regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The analysis is available for inspection at the NRC Public Document Room, 11555 Rockville Pike, Rockville, MD. Single copies of the Regulatory Analysis are available from Mark Haisfield, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-6196.

Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)), the Commission certifies that this rule will not have a significant economic impact upon a substantial number of small entities. The amendments will apply to reactor licensees, ISFSI licensees, certificate holders, applicants for a Certificate of Compliance, and DOE. The majority, if not all, of these licensees would not qualify as small entities under the NRC's size standards (10 CFR 2.810).

Small Business Regulatory Enforcement Fairness Act

In accordance with the Small Business Regulatory Enforcement Fairness Act of 1996, the NRC has determined that this action is not a major rule and has verified this determination with the Office of Information and Regulatory Affairs, Office of Management and Budget.

Backfit Analysis

The NRC has determined that the backfit requirements, 10 CFR 50.109 and 72.62, do not apply to this rule, and therefore, a backfit analysis is not required because these amendments do not involve any provisions that would impose backfits as defined in 10 CFR 50.109(a)(1) or 72.62(a). This rule will not require licensees to use 10 CFR part 72 to store GTCC waste. It provides a practical option with criteria that licensees may use. It does not preclude, or change, use of 10 CFR parts 30 and 70 as a licensing mechanism to store GTCC waste. The NRC anticipates that storage of GTCC waste licensed under 10 CFR part 72 can simplify the licensing process, for both licensees and the NRC, with no significant impact to public health and safety or the environment.

List of Subjects

10 CFR Part 30

Byproduct material, Criminal penalties, Government contracts, Intergovernmental relations, Isotopes, Nuclear materials, Radiation protection, Reporting and recordkeeping requirements.

10 CFR Part 70

Criminal penalties, Hazardous materials transportation, Material control and accounting, Nuclear materials, Packaging and containers, Radiation protection, Reporting and recordkeeping requirements, Scientific equipment, Security measures, Special nuclear material.

10 CFR Part 72

Criminal penalties, Manpower training programs, Nuclear materials, Occupational safety and health, Reporting and recordkeeping requirements, Security measures, Spent fuel.

10 CFR Part 150

Criminal penalties, Hazardous materials transportation, Intergovernmental relations, Nuclear materials, Reporting and recordkeeping requirements, Security measures, Source material, Special nuclear material.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 553, the NRC is adopting the following amendments to 10 CFR parts 30, 70, 72 and 150.

PART 30--RULES OF GENERAL APPLICABILITY TO DOMESTIC LICENSING OF BYPRODUCT MATERIAL

1. The authority citation for part 30 continues to read as follows:

Authority: Secs. 81, 82, 161, 182, 183, 186, 68 Stat. 935, 948, 953, 954, 955, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2111, 2112, 2201, 2232, 2233, 2236, 2282); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846).

Section 30.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 as amended by Pub. L. 102-486, sec. 2902, 106 Stat. 3123, (42 U.S.C. 5851). Section 30.34(b) also issued under sec.184, 68 Stat. 954, as amended (42 U.S.C. 2234). Section 30.61 also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

2. In Sec. 30.11 a new paragraph (b) is added to read as follows:

Sec. 30.11 Specific exemptions.

* * * * *

(b) Any licensee's activities are exempt from the requirements of this part to the extent that its activities are licensed under the requirements of part 72 of this chapter.

* * * * *

PART 70--DOMESTIC LICENSING OF SPECIAL NUCLEAR MATERIAL

3. The authority citation for part 70 continues to read as follows:

Authority: Secs. 51, 53, 161, 182, 183, 68 Stat. 929, 930, 948, 953, 954, as amended, sec. 234, 83 Stat. 444, as amended, (42 U.S.C. 2071, 2073, 2201, 2232, 2233, 2282, 2297f); secs. 201, as amended, 202, 204, 206, 88 Stat. 1242, as amended, 1244, 1245, 1246 (42 U.S.C. 5841, 5842, 5845, 5846). Sec. 193, 104 Stat. 2835 as amended by Pub. L. 104-134, 110 Stat. 1321, 1321-49 (42 U.S.C. 2243).

Sections 70.1(c) and 70.20a(b) also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241 (42 U.S.C. 10155, 10161). Section 70.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851). Section 70.21(g) also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Section 70.31 also issued under sec. 57d, Pub. L. 93-377, 88 Stat. 475 (42 U.S.C. 2077). Sections 70.36 and 70.44 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Section 70.81 also issued under secs. 186, 187, 68 Stat. 955 (42 U.S.C. 2236, 2237). Section 70.82 also issued under sec. 108, 68 Stat. 939, as amended (42 U.S.C. 2138).

4. In Sec. 70.1 paragraphs (c)(1) and (2) are revised to read as follows:

Sec. 70.1 Purpose.

* * * * *

(c) * * *

(1) Spent fuel, power reactor-related Greater than Class C (GTCC) waste, and other radioactive materials associated with spent fuel storage in an independent spent fuel storage installation (ISFSI), or

(2) Spent fuel, high-level radioactive waste, power reactor-related GTCC waste, and other radioactive materials associated with the storage in a monitored retrievable storage installation (MRS), and the terms and conditions under which the Commission will issue such licenses.

* * * * *

5. The heading of part 72 is revised to read as follows:

PART 72--LICENSING REQUIREMENTS FOR THE INDEPENDENT STORAGE OF SPENT NUCLEAR FUEL, HIGH-LEVEL RADIOACTIVE WASTE, AND REACTOR-RELATED GREATER THAN CLASS C WASTE

6. The authority citation for Part 72 continues to read as follows:

Authority: Secs. 51, 53, 57, 62, 63, 65, 69, 81, 161, 182, 183, 184, 186, 187, 189, 68 Stat. 929, 930, 932, 933, 934, 935, 948, 953, 954, 955, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2071, 2073, 2077, 2092, 2093, 2095, 2099, 2111, 2201, 2232, 2233, 2234, 2236, 2237, 2238, 2282); sec. 274, Pub. L. 86-373, 73 Stat. 688, as amended (42 U.S.C. 2021); sec. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846); Pub. L. 95-601, sec. 10, 92 Stat. 295 as amended by Pub. L. 102-486, sec 7902, 106 Stat. 3123 (42 U.S.C. 5851); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332); secs. 131, 132, 133, 135, 137, 141, Pub. L. 97-425, 96 Stat. 2229, 2230, 2232, 2241, sec. 148, Pub. L. 100-203, 101 Stat. 1330-235 (42 U.S.C. 10151, 10152, 10153, 10155, 10157, 10161, 10168).

Section 72.44(g) also issued under secs. 142(b) and 148(c), (d), Pub. L. 100-203, 101 Stat. 1330-232, 1330-236 (42 U.S.C. 10162(b), 10168(c), (d)). Section 72.46 also issued under sec. 189, 68 Stat. 955 (42 U.S.C. 2239); sec. 134, Pub. L. 97-425, 96 Stat. 2230 (42 U.S.C. 10154). Section 72.96(d) also issued under sec. 145(g), Pub. L. 100-203; 101 Stat. 1330-235 (42 U.S.C. 10165(g)). Subpart J also issued under secs. 2(2), 2(15), 2(19), 117(a), 141(h), Pub. L. 97-425, 96 Stat. 2202, 2203, 2204, 2222, 2224 (42 U.S.C. 10101, 10137(a), 10161(h)). Subparts K and L are also issued under sec. 133, 98 Stat. 2230 (42 U.S.C. 10153) and sec. 218(a), 96 Stat. 2252 (42 U.S.C. 10198).

7. Section 72.1 is revised to read as follows:

Sec. 72.1 Purpose.

The regulations in this part establish requirements, procedures, and criteria for the issuance of licenses to receive, transfer, and possess power reactor spent fuel, power reactor-related Greater than Class C (GTCC) waste, and other radioactive materials associated with spent fuel storage in an independent spent fuel storage installation (ISFSI) and the terms and conditions under which the Commission will issue these licenses. The regulations in this part also establish requirements, procedures, and criteria for the issuance of licenses to the Department of Energy (DOE) to receive, transfer, package, and possess power reactor spent fuel, high-level radioactive waste, power reactor-related GTCC waste, and other radioactive materials associated with the storage of these materials in a monitored retrievable storage installation (MRS). The term Monitored Retrievable Storage Installation or MRS, as defined in Sec. 72.3, is derived from the Nuclear Waste Policy Act (NWPA) and includes any installation that meets this definition. The regulations in this part also establish requirements, procedures, and criteria for the issuance of Certificates of Compliance approving spent fuel storage cask designs.

8 In Sec. 72.2 paragraphs (a) and (c) are revised to read as follows:

Sec. 72.2 Scope.

(a) Except as provided in Sec. 72.6(b), licenses issued under this part are limited to the receipt, transfer, packaging, and possession of:

(1) Power reactor spent fuel to be stored in a complex that is designed and constructed specifically for storage of power reactor spent fuel aged for at least one year, other radioactive materials associated with spent fuel storage, and power reactor-related GTCC waste in a solid form in an independent spent fuel storage installation (ISFSI); or

(2) Power reactor spent fuel to be stored in a monitored retrievable storage installation (MRS) owned by DOE that is designed and constructed specifically for the storage of spent fuel aged for at least one year, high-level radioactive waste that is in a solid form, other radioactive materials associated with storage of these materials, and power reactor-related GTCC waste that is in a solid form.

* * * * *

(c) The requirements of this regulation are applicable, as appropriate, to both wet and dry modes of storage of—

(1) Spent fuel and solid reactor-related GTCC waste in an independent spent fuel storage installation (ISFSI); and

(2) Spent fuel, solid high-level radioactive waste, and solid reactor-related GTCC waste in a monitored retrievable storage installation (MRS).

* * * * *

9. Section 72.3 is amended by adding a definition, in its proper alphabetic order, of the term Greater than Class C waste, and revising the definitions of Design capacity, Independent spent fuel storage installation or ISFSI, Monitored Retrievable Storage Installation or MRS, and Structures, systems, and components important to safety, to read as follows:

Sec. 72.3 Definitions.

* * * * *

Design capacity means the quantity of spent fuel, high-level radioactive waste, or reactor-related GTCC waste, the maximum burn up of the spent fuel in MWD/MTU, the terabequerel (curie) content of the waste, and the total heat generation in Watts (btu/hour) that the storage installation is designed to accommodate.

* * * * *

Greater than Class C waste or GTCC waste means low-level radioactive waste that exceeds the concentration limits of radionuclides established for Class C waste in Sec. 61.55 of this chapter.

* * * * *

Independent spent fuel storage installation or ISFSI means a complex designed and constructed for the interim storage of spent nuclear fuel, solid reactor-related GTCC waste, and other radioactive materials associated with spent fuel and reactor-related GTCC waste storage. An ISFSI which is located on the site of another facility licensed under this part or a facility licensed under part 50 of this chapter and which shares common utilities and services with that facility or is physically connected with that other facility may still be considered independent.

* * * * *

Monitored Retrievable Storage Installation or MRS means a complex designed, constructed, and operated by DOE for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel aged for at least one year, solidified high-level radioactive waste resulting from civilian nuclear activities, and solid reactor-related GTCC waste, pending shipment to a HLW repository or other disposal.

* * * * *

Structures, systems, and components important to safety means those features of the ISFSI, MRS, and spent fuel storage cask whose functions are—

(1) To maintain the conditions required to store spent fuel, high-level radioactive waste, or reactor-related GTCC waste safely;

(2) To prevent damage to the spent fuel, the high-level radioactive waste, or reactor-related GTCC waste container during handling and storage; or

(3) To provide reasonable assurance that spent fuel, high-level radioactive waste, or reactor-related GTCC waste can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public.

* * * * *

10. Section 72.6 is revised to read as follows:

Sec. 72.6 License required; types of licenses.

(a) Licenses for the receipt, handling, storage, and transfer of spent fuel or high-level radioactive waste are of two types: general and specific. Licenses for the receipt, handling, storage, and transfer of reactor-related GTCC are specific licenses. Any general license provided in this part is effective without the filing of an application with the Commission or the issuance of a licensing document to a particular person. A specific license is issued to a named person upon application filed pursuant to regulations in this part.

(b) A general license is hereby issued to receive title to and own spent fuel, high-level radioactive waste, or reactor-related GTCC waste without regard to quantity. Notwithstanding any other provision of this chapter, a general licensee under this paragraph is not authorized to acquire, deliver, receive, possess, use, or transfer spent fuel, high-level radioactive waste, or reactor-related GTCC waste except as authorized in a specific license.

(c) Except as authorized in a specific license and in a general license under subpart K of this part issued by the Commission in accordance with the regulations in this part, no person may acquire, receive, or possess--

(1) Spent fuel for the purpose of storage in an ISFSI; or

(2) Spent fuel, high-level radioactive waste, or radioactive material associated with high-level radioactive waste for the purpose of storage in an MRS.

11. Section 72.8 is revised to read as follows:

Sec. 72.8 Denial of licensing by Agreement States.

Agreement States may not issue licenses covering the storage of spent fuel and reactor-related GTCC waste in an ISFSI or the storage of spent fuel, high-level radioactive waste, and reactor-related GTCC waste in an MRS.

12. Section 72.16 is amended by revising paragraph (d) to read as follows:

Sec. 72.16 Filing of application for specific license.

* * * * *

(d) Fees. The application, amendment, and renewal fees applicable to a license covering an ISFSI are those shown in Sec. 170.31 of this chapter.

* * * * *

13. Section 72.22 is amended by revising paragraph (e)(3) to read as follows:

Sec. 72.22 Contents of application: General and financial information.

* * * * *

(e) * * *

(3) Estimated decommissioning costs, and the necessary financial arrangements to provide reasonable assurance before licensing, that decommissioning will be carried out after the removal of spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste from storage.

14. Section 72.24 is amended by revising the introductory text and paragraph (i) to read as follows:

Sec. 72.24 Contents of application: Technical information.

Each application for a license under this part must include a Safety Analysis Report describing the proposed ISFSI or MRS for the receipt, handling, packaging, and storage of spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste as appropriate, including how the ISFSI or MRS will be operated. The minimum information to be included in this report must consist of the following:

* * * * *

(i) If the proposed ISFSI or MRS incorporates structures, systems, or components important to safety whose functional adequacy or reliability have not been demonstrated by prior use for that purpose or cannot be demonstrated by reference to performance data in related applications or to widely accepted engineering principles, an identification of these structures, systems, or components along with a schedule showing how safety questions will be resolved prior to the initial receipt of spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste as appropriate for storage at the ISFSI or MRS.

* * * * *

15. Section 72.28 is amended by revising paragraph (d) to read as follows:

Sec. 72.28 Contents of application: Applicant's technical qualifications.

* * * * *

(d) A commitment by the applicant to have and maintain an adequate complement of trained and certified installation personnel prior to the receipt of spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste as appropriate for storage.

16. Section 72.30 is amended by revising paragraph (a) to read as follows:

Sec. 72.30 Financial assurance and recordkeeping for decommissioning.

(a) Each application under this part must include a proposed decommissioning plan that contains sufficient information on proposed practices and procedures for the decontamination of the site and facilities and for disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed, in order to provide reasonable assurance that the decontamination and decommissioning of the ISFSI or MRS at the end of its useful life will provide adequate protection to the health and safety of the public. This plan must identify and discuss those design features of the ISFSI or MRS that facilitate its decontamination and decommissioning at the end of its useful life.

* * * * *

17. Section 72.40 is amended by revising paragraph (b) to read as follows:

Sec. 72.40 Issuance of license.

* * * * *

(b) A license to store spent fuel and reactor-related GTCC waste in the proposed ISFSI or to store spent fuel, high-level radioactive waste, and reactor-related GTCC waste in the proposed MRS may be denied if construction on the proposed facility begins before a finding approving issuance of the proposed license with any appropriate conditions to protect environmental values. Grounds for denial may be the commencement of construction prior to a finding by the Director, Office of Nuclear Materials Safety and Safeguards or designee or a finding after a public hearing by the presiding officer, Atomic Safety and Licensing Board, or the Commission acting as a collegial body, as appropriate, that the action called for is the issuance of the proposed license with any appropriate conditions to protect environmental values. This finding is to be made on the basis of information filed and evaluations made pursuant to subpart A of part 51 of this chapter or in the case of an MRS on the basis of evaluations made pursuant to sections 141(c) and (d) or 148(a) and (c) of NWPA (96 Stat. 2242, 2243, 42 U.S.C. 10161(c), (d); 101 Stat. 1330-235, 1330-236, 42 U.S.C. 10168(a), (c)), as appropriate, and after weighing the environmental, economic, technical and other benefits against environmental costs and considering available alternatives.

* * * * *

18. Section 72.44 is amended by revising paragraphs (b)(4), (c)(3)(i), (c)(5), the introductory text of paragraph (d), and (g)(2) to read as follows:

Sec. 72.44 License conditions.

* * * * *

(b) * * *

(4) The licensee shall have an NRC-approved program in effect that covers the training and certification of personnel that meets the requirements of subpart I before the licensee may receive spent fuel and/or reactor-related GTCC waste for storage at an ISFSI or the receipt of spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste for storage at an MRS.

* * * * *

(c) * * *

(3) * * *

(i) Inspection and monitoring of spent fuel, high-level radioactive waste, or reactor-related GTCC waste in storage;

* * * * *

(5) Administrative controls. Administrative controls include the organization and management procedures, recordkeeping, review and audit, and reporting requirements necessary to assure that the operations involved in the storage of spent fuel and reactor-related GTCC waste in an ISFSI and the storage of spent fuel, high-level radioactive waste, and reactor-related GTCC waste in an MRS are performed in a safe manner.

(d) Each license authorizing the receipt, handling, and storage of spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste under this part must include technical specifications that, in addition to stating the limits on the release of radioactive materials for compliance with limits of part 20 of this chapter and the ``as low as is reasonably achievable'' objectives for effluents, require that:

* * * * *

(g) * * *

(2) Construction of the MRS or acceptance of spent nuclear fuel, high-level radioactive waste, and/or reactor-related GTCC waste at the MRS is prohibited during such time as the repository license is revoked by the Commission or construction of the repository ceases.

* * * * *

19. Section 72.52 is amended by revising paragraphs (b)(2), (c), and (e) to read as follows:

Sec. 72.52 Creditor regulations.

* * * * *

(b) * * *

(2) That no creditor so secured may take possession of the spent fuel and/or reactor-related GTCC waste under the provisions of this section before—

(i) The Commission issues a license authorizing possession; or

(ii) The license is transferred.

(c) Any creditor so secured may apply for transfer of the license covering spent fuel and/or reactor-related GTCC waste by filing an application for transfer of the license under Sec. 72.50(b). The Commission will act upon the application under Sec. 72.50(c).

* * * * *

(e) As used in this section, ``creditor'' includes, without implied limitation—

(1) The trustee under any mortgage, pledge, or lien on spent fuel and/or reactor-related GTCC waste in storage made to secure any creditor;

(2) Any trustee or receiver of spent fuel and/or reactor-related GTCC waste appointed by a court of competent jurisdiction in any action brought for the benefit of any creditor secured by a mortgage, pledge, or lien;

(3) Any purchaser of the spent fuel and/or reactor-related GTCC waste at the sale thereof upon foreclosure of the mortgage, pledge, or lien or upon exercise of any power of sale contained therein; or

(4) Any assignee of any such purchaser.

20. Section 72.54 is amended by revising paragraph (c)(1) to read as follows:

Sec. 72.54 Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas.

* * * * *

(c) * * *

(1) Limit actions involving spent fuel, reactor-related GTCC waste, or other licensed material to those related to decommissioning; and

* * * * *

21. Section 72.60 is amended by revising paragraph (c) to read as follows:

Sec. 72.60 Modification, revocation, and suspension of license.

* * * * *

(c) Upon revocation of a license, the Commission may immediately cause the retaking of possession of all special nuclear material contained in spent fuel and/or reactor-related GTCC waste held by the licensee. In cases found by the Commission to be of extreme importance to the national defense and security or to the health and safety of the public, the Commission may cause the taking of possession of any special nuclear material contained in spent fuel and/or reactor-related GTCC waste held by the licensee before following any of the procedures provided under sections 551-558 of title 5 of the United States Code.

22. Section 72.72 is amended by revising paragraphs (a), (b), and (d) to read as follows:

Sec. 72.72 Material balance, inventory, and records requirements for stored materials.

(a) Each licensee shall keep records showing the receipt, inventory (including location), disposal, acquisition, and transfer of all special nuclear material with quantities as specified in Sec. 74.13(a)(1). The records must include as a minimum the name of shipper of the material to the ISFSI or MRS, the estimated quantity of radioactive material per item (including special nuclear material in spent fuel and reactor-related GTCC waste), item identification and seal number, storage location, onsite movements of each fuel assembly or storage canister, and ultimate disposal. These records for spent fuel and reactor-related GTCC waste at an ISFSI or for spent fuel, high-level radioactive waste, and reactor-related GTCC waste at an MRS must be retained for as long as the material is stored and for a period of five years after the material is disposed of or transferred out of the ISFSI or MRS.

(b) Each licensee shall conduct a physical inventory of all spent fuel, high-level radioactive waste, and reactor-related GTCC waste containing special nuclear material meeting the requirements in paragraph (a) of this section at intervals not to exceed 12 months unless otherwise directed by the Commission. The licensee shall retain a copy of the current inventory as a record until the Commission terminates the license.

* * * * *

(d) Records of spent fuel, high-level radioactive waste, and reactor-related GTCC waste containing special nuclear material meeting the requirements in paragraph (a) of this section must be kept in duplicate. The duplicate set of records must be kept at a separate location sufficiently remote from the original records that a single event would not destroy both sets of records. Records of spent fuel or reactor-related GTCC waste containing special nuclear material transferred out of an ISFSI or of spent fuel, high-level radioactive waste, or reactor-related GTCC waste containing special nuclear material transferred out of an MRS must be preserved for a period of five years after the date of transfer.

23. Section 72.75 is amended by revising the introductory text of paragraphs (b) and (c), paragraphs (b)(2), (b)(3), (b)(6), (d)(1)(iv), and (d)(2)(ii)(L) to read as follows:

Sec. 72.75 Reporting requirements for specific events and conditions.

* * * * *

(b) Non-emergency notifications: Four-hour reports. Each licensee shall notify the NRC as soon as possible but not later than 4 hours after the discovery of any of the following events or conditions involving spent fuel, HLW, or reactor-related GTCC waste:

* * * * *

(2) A defect in any storage structure, system, or component which is important to safety.

(3) A significant reduction in the effectiveness of any storage confinement system during use.

* * * * *

(6) An unplanned fire or explosion damaging any spent fuel, HLW, and/or reactor-related GTCC waste, or any device, container, or equipment containing spent fuel, HLW, and/or reactor-related GTCC waste when the damage affects the integrity of the material or its container.

(c) Non-emergency notifications: Twenty-four hour reports. Each licensee shall notify the NRC within 24 hours after the discovery of any of the following events involving spent fuel, HLW, or reactor-related GTCC waste:
* * * * *

(d) * * *

(1) * * *

(iv) The quantities, and chemical and physical forms of the spent fuel, HLW, or reactor-related GTCC waste involved; and
* * * * *

(2) * * *

(ii) * * *

(L) The quantities, and chemical and physical forms of the spent fuel, HLW, or reactor-related GTCC waste involved;
* * * * *

24. Section 72.76 is amended by revising paragraph (a) to read as follows:

Sec. 72.76 Material status reports.

(a) Except as provided in paragraph (b) of this section, each licensee shall complete, in computer-readable format, and submit to the Commission a material status report in accordance with instructions (NUREG/BR-0007 and NMMSS Report D-24 ``Personal Computer Data Input for NRC Licensees''). Copies of these instructions may be obtained from the U.S. Nuclear Regulatory Commission, Division of Fuel Cycle Safety and Safeguards, Washington, DC 20555-0001. These reports provide information concerning the special nuclear material possessed, received, transferred, disposed of, or lost by the licensee. Material status reports must be made as of March 31 and September 30 of each year and filed within 30 days after the end of the period covered by the report. The Commission may, when good cause is shown, permit a licensee to submit material status reports at other times. The Commission's copy of this report must be submitted to the address specified in the instructions. These prescribed computer-readable forms replace the DOE/NRC Form 742 which has been previously submitted in paper form.
* * * * *

25. Section 72.78 is amended by revising paragraph (a) to read as follows:

Sec. 72.78 Nuclear material transfer reports.

(a) Except as provided in paragraph (b) of this section, whenever the licensee transfers or receives special nuclear material, the licensee shall complete in computer-readable format a Nuclear Material Transaction Report in accordance with instructions (NUREG/BR-0006 and NMMSS Report D-24, ``Personal Computer Data Input for NRC Licensees''). Copies of these instructions may be obtained from the U.S. Nuclear Regulatory Commission, Division of Fuel Cycle Safety and Safeguards, Washington, DC 20555-0001. Each ISFSI licensee who receives spent fuel from a foreign source shall complete both the supplier's and receiver's portion of the Nuclear Material Transaction Report, verify the identity of the spent fuel, and indicate the results on the receiver's portion of the form. These prescribed computer-readable forms replace the DOE/NRC Form 741 which has been previously submitted in paper form.
* * * * *

26. Section 72.80 is amended by revising paragraph (g) to read as follows:

Sec. 72.80 Other records and reports.

* * * * *

(g) Each specific licensee shall notify the Commission, in accordance with Sec. 72.4, of its readiness to begin operation at least 90 days prior to the first storage of spent fuel, high-level waste, or reactor-related GTCC waste in an ISFSI or an MRS.

27. Section 72.82 is amended by revising paragraphs (a) and (b) to read as follows:

Sec. 72.82 Inspections and tests.

(a) Each licensee under this part shall permit duly authorized representatives of the Commission to inspect its records, premises, and activities and of spent fuel, high-level radioactive waste, or reactor-related GTCC waste in its possession related to the specific license as may be necessary to meet the objectives of the Act, including section 105 of the Act.

(b) Each licensee under this part shall make available to the Commission for inspection, upon reasonable notice, records kept by the licensee pertaining to its receipt, possession, packaging, or transfer of spent fuel, high-level radioactive waste, or reactor-related GTCC

waste.

* * * * *

28. Section 72.106 is amended by revising paragraph (b) to read as follows:

Sec. 72.106 Controlled area of an ISFSI or an MRS.

* * * * *

(b) Any individual located on or beyond the nearest boundary of the controlled area may not receive from any design basis accident the more limiting of a total effective dose equivalent of 0.05 Sv (5 rem), or the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv (50 rem). The lens dose equivalent may not exceed 0.15 Sv (15 rem) and the shallow dose equivalent to skin or any extremity may not exceed 0.5 Sv (50 rem). The minimum distance from the spent fuel, high-level radioactive waste, or reactor-related GTCC waste handling and storage facilities to the nearest boundary of the controlled area must be at least 100 meters.

* * * * *

29. Section 72.108 is revised to read as follows:

Sec. 72.108 Spent fuel, high-level radioactive waste, or reactor-related Greater than Class C waste transportation.

The proposed ISFSI or MRS must be evaluated with respect to the potential impact on the environment of the transportation of spent fuel, high-level radioactive waste, or reactor-related GTCC waste within the region.

30. Section 72.120 is revised to read as follows:

Sec. 72.120 General considerations.

(a) As required by Sec. 72.24, an application to store spent fuel or reactor-related GTCC waste in an ISFSI or to store spent fuel, high-level radioactive waste, or reactor-related GTCC waste in an MRS must include the design criteria for the proposed storage installation. These design criteria establish the design, fabrication, construction, testing, maintenance and performance requirements for structures, systems, and components important to safety as defined in Sec. 72.3. The general design criteria identified in this subpart establish minimum requirements for the design criteria for an ISFSI or an MRS. Any omissions in these general design criteria do not relieve the applicant from the requirement of providing the necessary safety features in the design of the ISFSI or MRS.

(b) The ISFSI must be designed to store spent fuel and/or solid reactor-related GTCC waste.

(1) Reactor-related GTCC waste may not be stored in a cask that also contains spent fuel. This restriction does not include radioactive materials that are associated with fuel assemblies (e.g., control rod blades or assemblies, thimble plugs, burnable poison rod assemblies, or fuel channels);

(2) Liquid reactor-related GTCC wastes may not be received or stored in an ISFSI; and

(3) If the ISFSI is a water-pool type facility, the reactor-related GTCC waste must be in a durable solid form with demonstrable leach resistance.

(c) The MRS must be designed to store spent fuel, solid high-level radioactive waste, and/or solid reactor-related GTCC waste.

(1) Reactor-related GTCC waste may not be stored in a cask that also contains spent fuel. This restriction does not include radioactive materials associated with fuel assemblies (e.g., control rod blades or assemblies, thimble plugs, burnable poison rod assemblies, or fuel channels);

(2) Liquid high-level radioactive wastes or liquid reactor-related GTCC wastes may not be received or stored in an MRS; and

(3) If the MRS is a water-pool type facility, the high-level waste and reactor-related GTCC waste must be in a durable solid form with demonstrable leach resistance.

(d) The ISFSI or MRS must be designed, made of materials, and constructed to ensure that there will be no significant chemical, galvanic, or other reactions between or among the storage system components, spent fuel, reactor-related GTCC waste, and/or high level waste including possible reaction with water during wet loading and unloading operations or during storage in a water-pool type ISFSI or MRS. The behavior of materials under irradiation and thermal conditions must be taken into account.

(e) The NRC may authorize exceptions, on a case-by-case basis, to the restrictions in paragraphs (b) and (c) of this section regarding the commingling of spent fuel and reactor-related GTCC waste in the same cask.

31. Section 72.122 is amended by revising paragraphs (b)(2), (h)(2), (h)(5), (i) and (l) to read as follows:

Sec. 72.122 Overall requirements.

* * * * *

(b) * * *

(2)(i) Structures, systems, and components important to safety must be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, lightning, hurricanes, floods, tsunami, and seiches, without impairing their capability to perform their intended design functions. The design bases for these structures, systems, and components must reflect:

(A) Appropriate consideration of the most severe of the natural phenomena reported for the site and surrounding area, with appropriate margins to take into account the limitations of the data and the period of time in which the data have accumulated, and

(B) Appropriate combinations of the effects of normal and accident conditions and the effects of natural phenomena.

(ii) The ISFSI or MRS also should be designed to prevent massive collapse of building structures or the dropping of heavy objects as a result of building structural failure on the spent fuel, high-level radioactive waste, or reactor-related GTCC waste or on to structures, systems, and components important to safety.

* * * * *

(h) * * *

(2) For underwater storage of spent fuel, high-level radioactive waste, or reactor-related GTCC waste in which the pool water serves as a shield and a confinement medium for radioactive materials, systems for maintaining water purity and the pool water level must be designed so that any abnormal operations or failure in those systems from any cause will not cause the water level to fall below safe limits. The design must preclude installations of drains, permanently connected systems, and other features that could, by abnormal operations or failure, cause a significant loss of water. Pool water level equipment must be provided to alarm in a continuously manned location if the water level in the storage pools falls below a predetermined level.

* * * * *

(5) The high-level radioactive waste and reactor-related GTCC waste must be packaged in a manner that allows handling and retrievability without the release of radioactive materials to the environment or radiation exposures in excess of part 20 limits. The package must be designed to confine the high-level radioactive waste for the duration of the license.

(i) Instrumentation and control systems. Instrumentation and control systems for wet spent fuel and reactor-related GTCC waste storage must be provided to monitor systems that are important to safety over anticipated ranges for normal operation and off-normal operation. Those instruments and control systems that must remain operational under accident conditions must be identified in the Safety Analysis Report. Instrumentation systems for dry storage casks must be provided in accordance with cask design requirements to monitor conditions that are important to safety over anticipated ranges for normal conditions and off-normal conditions. Systems that are required under accident conditions must be identified in the Safety Analysis Report.

* * * * *

(l) Retrievability. Storage systems must be designed to allow ready retrieval of spent fuel, high-level radioactive waste, and reactor-related GTCC waste for further processing or disposal.

32. Section 72.128 is amended by revising the heading and the introductory text of paragraph (a) to read as follows:

Sec. 72.128 Criteria for spent fuel, high-level radioactive waste, reactor-related Greater than Class C waste, and other radioactive waste storage and handling.

(a) Spent fuel, high-level radioactive waste, and reactor-related GTCC waste storage and handling systems. Spent fuel storage, high-level radioactive waste storage, reactor-related GTCC waste storage and other systems that might contain or handle radioactive materials associated with spent fuel, high-level radioactive waste, or reactor-related GTCC waste, must be designed to ensure adequate safety under normal and accident conditions. These systems must be designed with--

* * * * *

33. Section 72.140 is amended by revising paragraph (c)(2) to read as follows:

Sec. 72.140 Quality assurance requirements.

* * * * *

(c) * * *

(2) Each licensee shall obtain Commission approval of its quality assurance program prior to receipt of spent fuel and/or reactor-related GTCC waste at the ISFSI or spent fuel, high-level radioactive waste, and/or reactor-related GTCC waste at the MRS. Each licensee or applicant for a specific license shall obtain Commission approval of its quality assurance program before commencing fabrication or testing of a spent fuel storage cask.

* * * * *

PART 150--EXEMPTIONS AND CONTINUED REGULATORY AUTHORITY IN AGREEMENT STATES AND IN OFFSHORE WATERS UNDER SECTION 274

34. The authority citation for part 150 continues to read as follows:

Authority: Sec. 161, 68 Stat. 948, as amended, sec. 274, 73 Stat. 688 (42 U.S.C. 2201, 2021); sec. 201, 88 Stat. 1242, as amended (42 U.S.C. 5841).

Sections 150.3, 150.15, 150.15a, 150.31, 150.32 also issued under secs. 11e(2), 81, 68 Stat. 923, 935, as amended, secs. 83, 84, 92 Stat. 3033, 3039 (42 U.S.C. 2014e(2), 2111, 2113, 2114). Section 150.14 also issued under sec. 53, 68 Stat. 930, as amended (42 U.S.C. 2073). Section 150.15 also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241 (42 U.S.C. 10155, 10161). Section 150.17a also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Section 150.30 also issued under sec. 234, 83 Stat. 444 (42 U.S.C. 2282).

35. Section 150.15 is amended by revising paragraph (a)(7) and adding a new paragraph (a)(8) to read as follows:

Sec. 150.15 Persons not exempt.

(a) * * *

(7) The storage of:

(i) Spent fuel in an independent spent fuel storage installation (ISFSI) licensed under part 72 of this chapter,

(ii) Spent fuel and high-level radioactive waste in a monitored retrievable storage installation (MRS) licensed under part 72 of this chapter, or

(iii) Greater than Class C waste, as defined in part 72 of this chapter, in an ISFSI or an MRS licensed under part 72 of this chapter; the GTCC waste must originate in, or be used by, a facility licensed under part 50 of this chapter.

(8) Greater than Class C waste, as defined in part 72 of this chapter, that originates in, or is used by, a facility licensed under part 50 of this chapter and is licensed under part 30 and/or part 70 of this chapter.

* * * * *

Dated at Rockville, Maryland, this 3rd day of October, 2001.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,

Secretary of the Commission.

[FR Doc. 01-25416 Filed 10-10-01; 8:45 am]

BILLING CODE 7590-01-P

C
NAC-MPC CONTAINER SYSTEM FOR SPENT FUEL AND GTCC WASTE STORED IN AN ISFSI

A canister designed and certified for transportation, storage and disposal is known as a "multi-purpose canisters (MPC)." This Appendix includes an illustration and the design specifications for one such MPC: the NAC Multi-Purpose Canister (NAC-MPC) system, which was procured by several commercial nuclear facilities being decommissioned.

Design specifications also are included for the associated NAC-MPC vertical dry storage casks. These specifications are included here to assist nuclear stations in planning for GTCC storage within an ISFSI by understanding the typical dimensions and construction materials used for a dry storage system.

NOTE: The appearance in this documentation of the NAC-MPC container system should NOT be construed as a recommendation for this specific system. The container system included herein is simply a typical example of a storage canister with readily available technical information and drawings submitted by a participating decommissioning plant.

For example, this report discusses the DOE GTCC waste canisters. One participating utility mentioned that they are using the more advanced NAC Universal Multi-Purpose Canister System (NAC-UMS) design for storage of GTCC waste and spent fuel with great success. The NAC-UMS canister is fundamentally different from the NAC-MPC system, but both are NRC-approved designs. At the time of publication of this report, the NRC had also approved canister and cask designs by General Nuclear Systems, Transnuclear, BNFL, Holtec, Pacific Sierra Nuclear Associates, and Westinghouse.

In an effort to be fair to as many canister manufacturers as reasonably possible, a listing of the available NRC-approved and certified canisters is included at the end of this Appendix. It is recommended that the user of this report refer to 10 CFR 72.214 for the most current listing of NRC-approved storage casks and canisters.

C.1 NAC-MPC Spent Fuel and GTCC Waste Storage Canister

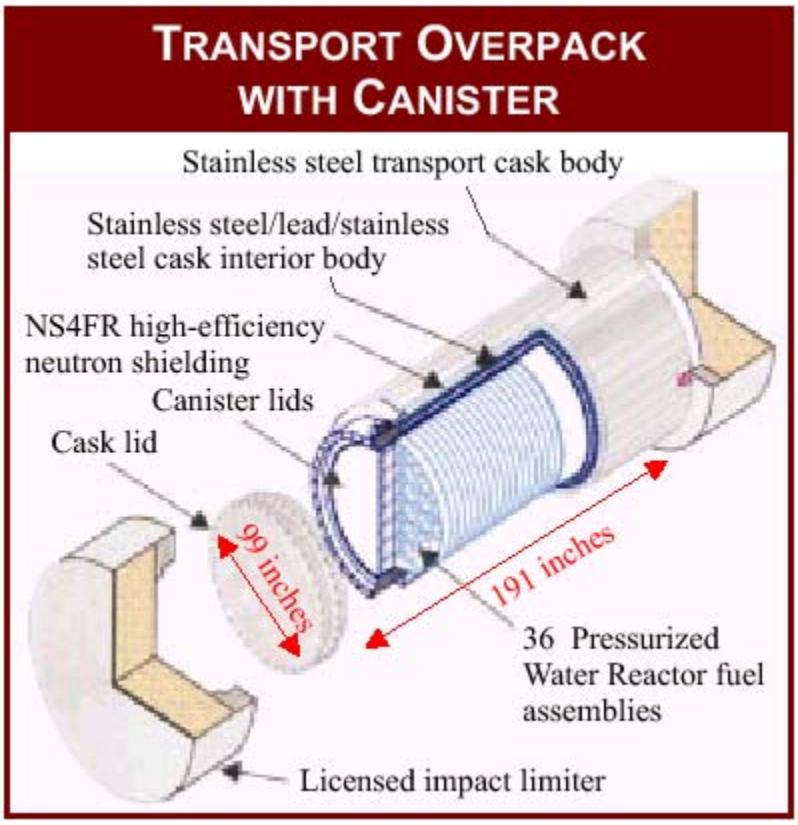

Figure C-1
Transportable NAC-MPC Storage Canister Showing the Spent Fuel Basket

Table C-1
Design Characteristics of the NAC-MPC System Canisters and Fuel Baskets

Design Characteristic	Dimensions *	Materials
Yankee -- MPC Canister		
-Shell	0.625 thick Plate	Type 304L Stainless Steel
-Bottom	1.0 thick Plate	Type 304L Stainless Steel
-Shield Lid	5.0 thick Plate	Type 304L Stainless Steel
-Structural Lid	3.0 thick Plate	Type 304L Stainless Steel
CY -- MPC Canister		
-Shell	0.625 thick Plate	Type 304L Stainless Steel
-Bottom	1.75 thick Plate	Type 304L Stainless Steel
-Shield Lid	5.0 thick Plate	Type 304L Stainless Steel
-Structural Lid	3.0 thick Plate	Type 304L Stainless Steel
Yankee -- MPC Fuel Basket		
-End Weldments	0.5 x 68.98 dia	Type 304L Stainless Steel
-Support Disks	0.5 x 69.15 dia	Type 17-4 PH Stainless Steel
-Heat Transfer Disks	0.5 x 68.70 dia	Type 6061-T651 Aluminum Alloy
-Fuel Tube	7.80 x 7.80 x 0.048	Type 304L Stainless Steel encasing BORAL
-Spacers	2.5 dia	Type 304L Stainless Steel
-Tie Rods (8)	1.125 dia	Type 304L Stainless Steel
CY -- MPC Fuel Basket		
-End Weldments	0.5 x 68.98 dia	Type 304L Stainless Steel
-Support Disks	0.5 x 69.15 dia	Type 17-4 PH Stainless Steel
-Heat Transfer Disks	0.5 x 68.70 dia	Type 6061-T651 Aluminum Alloy
-Fuel Tube	8.72 x 8.72 x 0.048	Type 304L Stainless Steel encasing BORAL
-Oversize Fuel Tube	9.12 x 9.12 x 0.048	Type 304L Stainless Steel encasing BORAL
-Spacers	2.5 dia	Type 304L Stainless Steel
-Tie Rods (8)	1.125 dia	Type 304L Stainless Steel

* All dimensions are in inches.

Table C-2
Design Characteristics of the NAC-MPC System Vertical Dry Storage Casks

Design Characteristic	Dimensions *	Materials
Yankee--MPC Concrete Cask		
Weldment Structure		
-Shell	3.5 thick x 86.0 dia	ASTM A36 Carbon Steel
-Top Flange	2.0 thick x 97.9 dia	ASTM A36 Carbon Steel
-Support ring	2.5 thick x 79.0 dia	ASTM A36 Carbon Steel
-Base Plate	2.0 thick x 72.0 dia	ASTM A36 Carbon Steel
Concrete Cask		
-Concrete Shell	21.0 thick x 128.0 dia	Type II Portland Cement
-Shield Plug	5.13 x 78.5 dia	ASTM A36 Carbon Steel and NS-4-FR
-Lid	1.5 thick x 92.1 dia	ASTM A36 Carbon Steel
-Rebar	Various	ASTM 615, GR 60, Carbon Steel
CY--MPC Concrete Cask		
Weldment Structure		
-Shell	3.5 thick x 86.0 dia	ASTM A36 Carbon Steel
-Top Flange	2.0 thick x 97.9 dia	ASTM A36 Carbon Steel
-Support ring	2.5 thick x 79.0 dia	ASTM A36 Carbon Steel
-Base Plate	2.0 thick x 72.0 dia	ASTM A36 Carbon Steel
-Baffle	17.0 x 30.0 dia	ASTM A36 Carbon Steel
Concrete Cask		
-Concrete Shell	21.0 thick x 128.0 dia	Type II Portland Cement
-Shield Plug	3.75 x 78.5 dia	ASTM A36 Carbon Steel and NS-4-FR or NS-3
-Lid	2.88 thick x 92.1 dia	ASTM A36 Carbon Steel
-Rebar	Various	ASTM 615, GR 60, Carbon Steel

* All dimensions are in inches.

C.2 NRC Approved Spent Fuel Storage Casks (from 10 CFR 72.214)

Table C-3 was extracted from the DOE report *Civilian Radioactive Waste Management System*. It is intended to demonstrate the wide range of dry spent fuel storage options available to the nuclear industry and without giving preference to any individual system or manufacturer.

Table C-3
Dry Storage Technologies Being Used or Available for Use at Independent Spent Fuel Storage Installations as of October 1998

Technology	Description	Vendor	Capacity
CASTOR V/21	Metal Storage Cask	General Nuclear Systems, Inc	21 PWR
CASTOR X/33	Metal Storage Cask	General Nuclear Systems, Inc	33 PWR
CASTOR X/74	Metal Storage Cask	General Nuclear Systems, Inc	74 BWR
MC-10	Metal Storage Cask	Westinghouse	49 BWR/24 PWR
MVDS	Modular Vault Dry Storage	Foster Wheeler Environmental	Varies
NAC-128 S/T	Metal Storage/ Transport Cask	NAC International	28 PWR
TN-32	Metal Storage Cask	Transnuclear, Inc	32 PWR
TN-40	Metal Storage Cask	Transnuclear, Inc	40 PWR
NUHOMS-7P	Concrete Storage Module	Transnuclear, Inc	7 PWR
NUHOMS-24P	Concrete Storage Module	Transnuclear, Inc	24 PWR
NUHOMS-52B	Concrete Storage Module	Transnuclear, Inc	52 BWR
VSC-24	Concrete Storage Cask	Sierra Nuclear Corporation	61 BWR/24 PWR

It should be noted that Table C-3 includes dry storage modules and casks, as well as transportation casks. The available, approved and certified canister systems represents a dynamic listing. The interested utility should refer to the NRC's listing of approved and certified casks and canisters, which documents the Certificate of Compliance number, model number, and intended purpose (e.g., MPC, dry storage, transportation, disposal). The following casks/canisters are approved for storage of spent fuel under the conditions specified in their Certificates of Compliance.

Certificate Number: 1000.

- SAR Submitted by: General Nuclear Systems, Inc.
- SAR Title: Topical Safety Analysis Report for the Castor V/21 Cask Independent Spent Fuel Storage Installation (Dry Storage)

- Docket Number: 72 - 1000
- Certification Expiration Date: August 17, 2010
- Model Number: CASTOR V/21

Certificate Number: 1001.

- SAR Submitted by: Westinghouse Electric Corporation
- SAR Title: Topical Safety Analysis Report for the Westinghouse MC - 10 Cask for an Independent Spent Fuel Storage Installation (Dry Storage)
- Docket Number: 72 - 1001
- Certification Expiration Date: August 17, 2010
- Model Number: MC - 10

Certificate Number: 1002.

- SAR Submitted by: Nuclear Assurance Corporation
- SAR Title: Topical Safety Analysis Report for the NAC Storage/Transport Cask for Use at an Independent Spent Fuel Storage
- Installation
- Docket Number: 72 - 1002
- Certification Expiration Date: August 17, 2010
- Model Number: NAC S/T

Certificate Number: 1003.

- SAR Submitted by: Nuclear Assurance Corporation
- SAR Title: Topical Safety Analysis Report for the NAC Storage/Transport Cask Containing Consolidated Fuel for Use at an Independent
- Spent Fuel Storage Installation
- Docket Number: 72 - 1003
- Certification Expiration Date: August 17, 2010
- Model Number: NAC - C28 S/T

Certificate Number: 1004.

- Initial Certificate Effective Date: January 23, 1995.
- Amendment No. 1 Effective Date: April 27, 2000.
- Amendment No. 2 Effective Date: September 5, 2000.
- SAR Submitted by: Transnuclear West, Inc.

- SAR Title: Transnuclear West, Inc., ``Final Safety Analysis Report for the Standardized NUHOMS® Horizontal Modular Storage
- System for Irradiated Nuclear Fuel".
- Docket Number: 72-1004.
- Certificate Expiration Date: January 23, 2015.
- Model Number: Standardized NUHOMS®-24P and NUHOMS®-52B.

Certificate Number: 1005.

- SAR Submitted by: Transnuclear, Inc.
- SAR Title: TN - 24 Dry Storage Cask Topical Report.
- Docket Number: 72 - 1005.
- Certification Expiration Date: November 4, 2013.
- Model Number: TN - 24.

Certificate Number: 1007.

- Initial Certificate Effective Date: May 7, 1993.
- Amendment Number 1 Effective Date: May 30, 2000.
- Amendment Number 2 Effective Date: September 5, 2000.
- Amendment Number 3 Effective Date: May 21, 2001.
- SAR Submitted by: Pacific Sierra Nuclear Associates.
- SAR Title: Final Safety Analysis Report for the Ventilated Storage Cask System.
- Docket Number: 72-1007.
- Certificate Expiration Date: May 7, 2013.
- Model Number: VSC-24.

Certificate Number: 1008.

- Initial Certificate Effective Date: October 4, 1999.
- Amendment Number 1 Effective Date: December 26, 2000.
- SAR Submitted by: Holtec International.
- SAR Title: Final Safety Analysis Report for the HI-STAR 100 Cask System.
- Docket Number: 72-1008.
- Certificate Expiration Date: October 4, 2019.
- Model Number: HI-STAR 100.

Certificate Number: 1014.

- SAR Submitted by: Holtec International.
- SAR Title: Final Safety Analysis Report for the HI-STORM 100 Cask System.
- Docket Number: 72-1014.
- Certificate Expiration Date: June 1, 2020.
- Model Number: HI-STORM 100.

Certificate Number: 1015.

- Initial Certificate Effective Date: November 20, 2000.
- Amendment No. 1 Effective Date: February 20, 2001.
- SAR Submitted by: NAC International, Inc.
- SAR Title: Final Safety Analysis Report for the NAC-UMS Universal Storage System.
- Docket Number: 72-1015.
- Certificate Expiration Date: November 20, 2020.
- Model Number: NAC-UMS.

Certificate Number: 1021

- Initial Certificate Effective Date: April 19, 2000
- Amendment Number 1 Effective Date: February 20, 2001
- SAR Submitted by: Transnuclear, Inc.
- SAR Title: Final Safety Analysis Report for the TN-32 Dry Storage Cask
- Docket Number: 72-1021
- Certificate Expiration Date: April 19, 2020
- Model Number: TN-32, TN-32A, TN-32B

Certificate Number: 1025.

- SAR Submitted by: NAC International.
- SAR Title: Final Safety Analysis Report for the NAC Multi-Purpose Canister System (NAC-MPC System).
- Docket Number: 72-1025
- Certificate Expiration Date: April 10, 2020.
- Model Number: NAC-MPC.

Certificate Number: 1026.

- Initial Certificate Effective Date: February 15, 2001
- Amendment Number 1 Effective Date: May 14, 2001
- SAR Submitted by: BFNL Fuel Solutions.
- SAR Title: Final Safety Analysis Report for the Fuel Solutions™ Spent Fuel Management System.
- Docket Number: 72-1026
- Certificate Expiration Date: February 15, 2021.
- Model Number: WSNF-200, WSNF-201, and WSNF-203 systems; W-150 storage cask; W-100 transfer cask; and the W-21 and W-74 canisters

Certificate Number: 1027.

- SAR Submitted by: Transnuclear, Inc.
- SAR Title: Final Safety Analysis Report for the TN-68 Dry Storage Cask.
- Docket Number: 72-1027.
- Certificate Expiration Date: May 28, 2020.
- Model Number: TN-68.

D
NRC GUIDANCE ON STORAGE OF FUEL ASSEMBLY INTEGRAL COMPONENTS IN AN ISFSI

Spent Fuel Project Office
NRC Office of Nuclear Material Safety and Safeguards

Interim Staff Guidance - 9

Issue: Storage of Pressurized Water Reactor (PWR) Fuel Assembly Integral Components

Discussion:

The Standard Review Plan does not provide explicit guidance on the storage of rod cluster control assemblies, burnable poison (rod) assemblies, thimble plugging assemblies, and primary and secondary source assemblies as materials associated with the storage of spent fuel assemblies. While control rods are mentioned in the Standard Review Plan as possible contents, specific information and guidance is lacking.

Regulatory Basis:

Title 10, Code of Federal Regulations (10 CFR), Section 72.3, "Definitions," states, "Spent Nuclear Fuel or Spent Fuel means fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies."

Technical Review Guidance:

Standard Review Plan for Dry Cask Storage Systems, NUREG-1536, Chapter 2, "Principal Design Criteria," Section IV.2.a, states, "The applicant should define the range and types of spent fuel or other radioactive materials that the DCSS [dry cask storage system] is designed to store... For DCSSs that will be used to store radioactive materials other than spent fuel, that is, activated components associated with a spent fuel assembly (e.g., control rods, BWR fuel channels), the applicant should specify the types and amounts of radionuclides, heat generation, and the relevant source strengths and radiation energy spectra permitted for storage in the DCSS" [page 2-4].

Recommendation:

Rod cluster control assemblies are materials that may be associated with the storage of spent fuel. When used, burnable poison (rod) assemblies, thimble plugging assemblies, and neutron source assemblies, are integral components of a PWR fuel assembly and are also associated with the storage of spent fuel. These components may be approved for storage in a DCSS if the applicant submits information and the safety/technical justification for the proposed DCSS contents for staff review and approval. The staff should incorporate this information as proposed contents in the license, certificate of compliance, or technical specification.(1)

Specifically, the technical review staff should consider the following in its review:

- The design bases source term (radiological and thermal) should be based on a saturation value for activation of cobalt impurities or on cobalt activation from a specified maximum burn-up and minimum cool time. The reviewer should consider other activation products, as appropriate.
- The effects of gas generation must be considered in the design pressure for the cask, including (1) the release of gas from additional components and (2) the volume occupied by additional components on the cask internal pressure.
- Additional weight and length of the proposed material must be considered in the structural and stability analyses.
- The thermal analysis must consider (1) the added heat from these components and (2) the effects of heat transfer within and to/from the fuel assembly by the addition or absence of these components. This would ultimately affect the maximum predicted cladding temperature.
- In terms of a criticality evaluation, absent direct physical measurements, no credit should be assumed for any negative reactivity from residual neutron absorbing material remaining in the control components. A bounding analysis would assume that no control components are present. Credit for water displacement may be taken provided adequate structural integrity and placement under accident conditions is demonstrated. Also, the reviewer may need to consider the effects of displacing borated water, if applicable.

To the degree that comparable reactor technologies have similar attributes (burnable poisons, bypass flow restricting devices, and sources), the reviewer should similarly accept that the material may be stored in a DCSS as noted above.

The Standard Review Plans (NUREG-1536 at citation noted above, and NUREG-1567, at Section 4.4.1.1) should be revised to clearly state those rod cluster control assemblies, burnable poison (rod) assemblies, thimble plugging assemblies and primary and secondary source assemblies may be stored in a DCSS, evaluated appropriately, and the proposed contents included in the license, certificate of compliance, or technical specification.

Approved

E. William Brach
Date (posted on web site June 18. 1999)

1. It should be noted that if a license, certificate of compliance, or technical specification has already been issued and does not specifically allow storage of these components, there is no other regulatory relief to allow new contents other than an amendment. Therefore, the applicant should seek to amend its license, certificate of compliance, or technical specification.

Note to reader of this EPRI report: Please read the easily overlooked comment which appears after the signature line, as it bears directly on the storage of certain GTCC components.

E
EXTENDED STORAGE OF SEALED SOURCES

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555

July 8, 1993

NRC INFORMATION NOTICE 93-50: EXTENDED STORAGE OF SEALED SOURCES

Addressees

All licensees authorized to possess sealed sources.

Purpose

The U.S. Nuclear Regulatory Commission is issuing this information notice to inform addressees of what information NRC considers necessary for placing a license into a possession-only status, if extended storage of sealed sources is necessary. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to provide all necessary information when requesting possession-only licenses. However, suggestions contained in this information notice are not new NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

A number of licensees who possess sealed sources have gone out of business or allowed their licenses to expire for various reasons. These licensees are finding it difficult, and sometimes impossible, to dispose of their radioactive sources. There have been several incidents where licensees having financial difficulty have abandoned their sources in violation of NRC regulations.

Disposal is especially difficult for greater-than-Class-C (GTCC) sealed sources. The requirements for classifying waste for near-surface disposal are provided in 10 CFR 61.55. This regulation states that GTCC waste is generally not acceptable for near-surface disposal and must be disposed of in a geologic repository, pursuant to Part 60, unless another disposal method is approved by NRC. Many sealed source users have discovered that they have no place to ship their GTCC sources for disposal, because no geologic repository is currently available.

The Low-Level Radioactive Waste Policy Amendments Act of 1985 designates the Federal Government as responsible for disposal of GTCC wastes. Congress has designated the Department of Energy (DOE) as the responsible agency for disposal of GTCC waste. NRC has been working with DOE to establish an interim storage facility for GTCC waste, until a geologic repository is available. DOE estimates that a storage facility may be available by the end of 1997. However, further delays in meeting this schedule may occur.

Discussion

If a licensee with sealed sources wishes to terminate its license, but cannot find any way to dispose of its sources, the licensee can request an amendment to restrict its license to possession-only, incident to license termination. Under current annual fee regulations, this will exempt the licensee from the requirement to pay an annual fee under 10 CFR Part 171 for the fiscal year following issuance of the license amendment authorizing possession only, and each year thereafter. (Each fiscal year begins on October 1.) The licensee will continue to be subject to licensing and inspection fees under 10 CFR Part 170. The inspection frequency for possession-only licenses is once every 3 years under current NRC inspection procedures.

Extended Storage of Sealed Sources

The annual fee waiver is intended for licensees who have permanently ceased licensed operations. The annual fee will not be waived for licensees who wish to put their licenses, certificates, approvals, or registrations in an inactive status, on a temporary basis, with the intent of reactivating them as needed. The following information is needed to process requests for possession-only licenses:

1. Identification of each sealed source to be placed in storage, including the manufacturer's name, model number, serial number, isotope, and activity.

2. A detailed description of efforts made to dispose of the sources, including telephone calls, letters, facsimiles, personal contacts, etc.

3. A statement that the licensee has permanently ceased licensed operations and a commitment not to use the sources for any purpose pending disposition and license termination.

4. A physical description of the facilities where the sealed sources will be stored, if it is different from storage facilities already approved in the license. Identify any facility changes that are planned after the sources are placed in storage and provisions to maintain exposure to radiation as low as reasonably achievable (ALARA).

5. Identification of the individual who will be responsible for maintaining control of the stored sources. Provide a resume of training and experience, if this information has not already been provided.

6. A description of the accountability program to be implemented by the licensee to ensure that its sources remain in secure storage and are not used. The program should provide reasonable assurance that the licensee can maintain security and account for the sources (inventory at least annually).

7. A description of planned changes to the licensee's radiation safety program as a result of placing the sources in storage. These changes may include, but are not limited to, the following:

   a. dosimetry services b. worker training programs c. instrument calibration services d. quarterly inventories e. internal audits f. maintenance and visual inspection of equipment and storage facilities g. maintenance of utilization logs

8. A commitment to leak-test the sources at least once every 3 years and immediately before transfer to an authorized recipient.

9. A commitment to maintain the license in an active state. (Note that amendment, renewal, and inspection fees will continue to apply.)

When a storage/disposal facility becomes available, it is expected that licensees with possession-only licenses will transfer their sealed sources and request license termination.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the contacts listed below or the appropriate regional office.

/s/'d by Carl J. Paperiello

Richard E. Cunningham, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical contacts:	Jack Whitten, RIV	(817) 860-8197
	Kevin Ramsey, NMSS	(301) 504-2534
Fee contact:	Doug Weiss, OC	(301) 492-7225

Program:
Nuclear

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