SAFETY EVALUATION REPORT

Docket No. 72-11
Sacramento Municipal Utility District
Rancho Seco Independent Spent Fuel Storage Installation
License No. SNM-2510
Amendment No. 2

SUMMARY

This Safety Evaluation Report (SER) documents the review and evaluation of an amendment to Special Nuclear Materials License No. 2510 for the Rancho Seco Independent Spent Fuel Storage Installation (ISFSI). By application dated July 29, 2004, as supplemented December 2, 2004, Sacramento Municipal Utility District (SMUD) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 72.56, "Application for amendment of license," to amend the License to allow for the storage of Greater than Class C (GTCC) waste at the Rancho Seco ISFSI.

The NRC staff has reviewed the application, including the justifications for the proposed changes. Based on the statements and representations in the application, as supplemented, the staff agrees that this change does not have an adverse effect on public health and safety, and the environment and has determined that the proposed changes will not affect the design, operation, maintenance, or surveillance of the ISFSI. The staff agrees with the applicant's assessment that the proposed GTCC canisters are functionally identical to those of the fuel canisters currently being stored at the ISFSI. Once the GTCC waste is loaded into the canister, the operational steps to drain, seal and transfer the GTCC canister to the ISFSI are essentially identical to those of the fuel canister except that the GTCC canister loading and processing operations will be conducted in the Reactor Building as opposed to the Spent Fuel Building. This change is within the scope of 10 CFR Part 72 and will not impact the safety of the ISFSI.

Furthermore, the staff agrees that the GTCC waste packages that SMUD proposes to co-locate at the Rancho Seco ISFSI would not have an adverse effect on the safe storage of spent fuel, the safe operation of the ISFSI, nor affect the ability of the spent fuel package to meet the requirements of 10 CFR Part 72.

1.0 GENERAL INFORMATION

1.1 Contents

SMUD requests approval to store GTCC waste at the Rancho Seco ISFSI. GTCC waste is low-level waste in solid form that exceeds the concentration limits of radionuclides established for Class C waste (10 CFR 61.55(a)(2)). SMUD proposes to temporarily store GTCC waste resulting from plant operations and from decommissioning, such as activated metals in the form of baffles and formers, cut-up sections of in-core instrument tips, and associated surface contamination, in Horizontal Storage Modules (HSMs) within the ISFSI boundaries until there is a permanent repository that will accept the GTCC waste.

Section 7.2.1 of Appendix C of the Rancho Seco Final Safety Analysis Report (FSAR) provides the radionuclide inventory for the GTCC waste. In addition, SMUD provided Table 7-1 that describes the GTCC specified sources. Furthermore, an activation and characterization analysis was performed to determine the payload source term of the baffle plates and formers. The source term for the in-core detector tips was similarly determined from plant decommissioning studies. SMUD states that characterization of reactor vessel and all internals have been accomplished to support the Rancho Seco decommissioning effort. Results of the characterization studies are referenced in Section 3.0 of Appendix C of the Rancho Seco FSAR, which was updated on December 2, 2004.

2.0 STRUCTURAL

As described in Section 1.1, Appendix C of the Rancho Seco ISFSI FSAR, the external characteristics of the GTCC canister are essentially identical to those of the fuel canisters. However, the internal configuration of the GTCC canister has been modified to accommodate storage of the different waste forms and therefore does not contain the spacer discs or guidance sleeves.

As described in Appendix C, Section 3.2.1 of the Rancho Seco ISFSI FSAR, SMUD has analyzed the GTCC canister for seismic loading equal to those ground accelerations described in Volume I, Section 3.2.3. From the analysis, SMUD showed that the resultant stresses on the GTCC canister are bounded by the fuel canister stresses and are therefore acceptable. As summarized in FSAR Section 3.2.2.2, the GTCC waste canister is designed to withstand the effects of the site characteristics and environmental conditions associated with normal operations, maintenance, and testing of the ISFSI and to withstand postulated off-normal and accident conditions.

The staff concludes that the design of the GTCC canister complies with the applicable requirements of 10 CFR 72.122, and that co-locating GTCC waste in the separate GTCC canister will not have an effect on the structural analysis performed for the spent fuel storage system that is used at the Rancho Seco ISFSI.

3.0 THERMAL

SMUD calculated that the GTCC waste proposed to be stored within the boundaries of the Rancho Seco ISFSI has a heat value of approximately 0.725 kW. The Cobalt 60 isotope causes the predominant decay heat load from the GTCC waste. The Rancho Seco activation analysis referenced in Section 3.1.1.2 of Appendix C of the Rancho Seco FSAR provides the total activity as of May 1, 2003. The ISFSI is designed to store the GTCC canister without compromising the heat rejection capacity of the HSM or the adjacent HSMs storing spent fuel. The NRC staff evaluated the above referenced activation analysis and agrees with the licensee that the heat load from the GTCC waste predominately comes from Cobalt 60 and that the total activity from the GTCC waste is such that it will not compromise the heat rejection capacity of the HSM or the adjacent HSMs storing spent fuel.

4.0 CONFINEMENT

As stated in Section 4.2.2.1 of Appendix C of the FSAR, the design of the storage system will ensure that the GTCC waste remains contained within the canister, that it is protected from degradation during storage and that the waste is maintained in a safe condition. The NRC staff evaluated Section 4.2.2.1 of Appendix C of the FSAR and determined that the design of the storage system will ensure that the GTCC waste will remain contained in the canister, that it will be protected from degradation during storage, and that the waste will be maintained in a safe condition.

5.0 SHIELDING

SMUD performed a shielding analysis to determine the dose rates of the canister during operational, transfer, and storage modes. SMUD used the same shielding methodology to analyze the GTCC waste container as that used for the HSM and the spent nuclear fuel canisters. However, SMUD revised the computer model to accurately model the specific GTCC canister and the GTCC waste within the container. The analysis showed that the GTCC canister design is adequate to store the proposed GTCC waste in the existing Rancho Seco ISFSI. The staff noted that the average centerline GTCC dose rates are less than the design basis dose rates of the fuel canisters with one exception: the 10% marginal increase in the HSM back wall dose rate evaluation. The back wall dose rate is a small contributor to the site dose in the design analysis, which is dominated by over 50% by the roof dose rate. SMUD concluded that the significant reduction in roof dose rate (more than a factor of 2 reduction) will compensate for the small increase in the back wall dose rate. The staff agrees with SMUD's conclusion that the dose rate analyses for the existing fuel canister bound the GTCC storage and transfer operations. The GTCC contribution to the dose rates around the transfer cask, HSM, and the site boundary will be typically less than that calculated for the design basis spent fuel under normal and accident conditions.

The staff concludes that the design of the GTCC canister complies with 10 CFR 72.128(a)(2), which requires that such storage system components must be designed to ensure adequate safety under normal and accident conditions, and that these components must be designed with suitable shielding for radioactive protection under normal and accident conditions.

6.0 CRITICALITY

Criticality control is not applicable to the storage of GTCC waste.

7.0 OPERATING PROCEDURES

According to Section 3.1.2 of Appendix C of the Rancho Seco FSAR, once the GTCC waste is loaded into the canister, the operational steps to drain, seal and transfer the GTCC canister to the ISFSI are essentially identical to those for a fuel canister, except that the GTCC canister loading and processing operations will be conducted in the Reactor Building as opposed to the Spent Fuel Building. The NRC staff evaluated Section 3.1.2 of Appendix C of the Rancho Seco FSAR, and agrees that the operational steps to drain, seal and transfer the GTCC canister to the ISFSI are essentially identical to those for a fuel canister. The staff agrees with the licensee that the principal decontamination activity performed in the Reactor Building is the removal of

contamination from the outside surfaces of the cask, lifting yoke, extensions, and upper end of the GTCC shell. The staff also agrees that one of the ways to prevent contamination on the GTCC exterior surface and the cask cavity by pool water, is to fill the annulus between the GTCC canister and cask with clean demineralized water and insert an annulus seal, as discussed in Volumes I and II of the Rancho Seco ISFSI FSAR.

Furthermore, in Section 1.1 of Appendix C of the Rancho Seco ISFSI FSAR, SMUD states that, to the extent possible, the same procedures and individuals with the same training and qualifications as those in spent fuel transfer operations will be used. The organizations, programs, and protective measures in place to ensure the safe storage of the spent nuclear fuel will remain in place to ensure continued safe storage of the fuel and of the GTCC waste. Additionally, in Section 10.3, Operating Control and Limit Specifications, SMUD identifies additional operating controls and limits applicable to GTCC waste and GTCC waste canisters. The NRC staff evaluated Section 1.1 and Section 10.3 of the FSAR and determined that if the same procedures and individuals with the same training and qualifications as those in spent fuel operations are used and if the organizations, programs, and protective measures in place to ensure the safe storage of the fuel and the GTCC waste will remain in place, the GTCC transfer and storage operations will be safely conducted.

8.0 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

GTCC waste acceptance criteria are not applicable because SMUD states that there will be no processed waste stored in the GTCC canister. Section 10.3.1 of Appendix C of the Rancho Seco ISFSI FSAR identifies surveillance requirements that will be used to inspect and monitor the GTCC waste in storage. SMUD states that the waste to be inserted in the GTCC canister is comprised of sections of incore detector tips and activated metal only. Additionally, Section 9.4 of Appendix C of the Rancho Seco ISFSI FSAR clarifies that the GTCC waste will be identified and monitored prior to placement within the canister in accordance with Rancho Seco Procedures. Section 9.4 of Appendix C of the Rancho Seco ISFSI FSAR states that the activated metal contained within the GTCC canister will be maintained in a dry, inert environment and the canister protected from the weather while inside the HSM to assure canister integrity while in storage. Section 9.4 further states that the MP-187 cask remains available for GTCC extraction and inspection should the need arise. The staff agrees with the conclusions drawn in Section 7.6 that effluent monitoring is not required due to lack of gaseous or liquid releases.

No repair operations are anticipated once the GTCC canister is placed in storage. The GTCC canister shell is made of corrosion-resistant stainless steel. SMUD states in Section 4.4.1 of Appendix C of the Rancho Seco FSAR that maintenance of a minor nature can be performed within the ISFSI area, without the need to move the canister.

REQUIREMENTS FOR NOTICING PROPOSED ACTION

The staff considered the amendment's potential impact on the health and safety of the public. The staff finds that this license amendment involves changes in the scope or type of operations presently authorized by the license. Specifically, the licensee would be authorized to store GTCC waste generated at Rancho Seco at the ISFSI under its 10 CFR Part 72 license, in

addition to its existing authority to store the material under its 10 CFR Part 50 license. The staff has determined that the amendment does not present a genuine issue as to whether public health and safety will be significantly affected.

Accordingly, pursuant to 10 CFR 72.46(b)(2), immediate action on this amendment may be taken without notice of the proposed action or a notice of opportunity for hearing.

ENVIRONMENTAL REVIEW

The amount of decay heat generated by the GTCC waste at the Rancho Seco ISFSI will be less than that for similarly aged spent fuel, because of the limited amount of material that will undergo radioactive decay. The total curie content and volume of GTCC waste is significantly less than that of the spent fuel already stored at the ISFSI.

In addition, as reflected in Section 3.3.6.2 of Appendix C of the Rancho Seco FSAR, any secondary waste generated during the cask loading and decontamination operations in the Reactor Building will be disposed of in accordance with existing plant radioactive waste handling procedures under the 10 CFR Part 50 license.

The NRC staff has determined that the proposed action will not have a significant impact on the environment. For this action, an Environmental Assessment and Finding of No Significant Impact was prepared and published in the Federal Register (70 FR 16881, April 1, 2005). The staff has determined that the changes will not result in (1) a significant increase in the amounts of any effluents, (2) a significant increase in individual or cumulative occupational radiation exposure, (3) a significant construction impact, or (4) a significant increase in the potential for or consequences from radiological accidents.

CONCLUSION

The NRC staff concludes that the Rancho Seco ISFSI License (SNM-2510) can be revised to include the co-location and interim storage of GTCC waste within the ISFSI boundaries. This addition to the authorized contents will not affect the ability of the Rancho Seco ISFSI to safely store spent fuel consistent with the requirements of 10 CFR Part 72.

Issued with Materials License No. 2510, Amendment No. 2, on April 18, 2005.