SAFETY EVALUATION REPORT

Docket No. 72-27
Pacific Gas and Electric Company
Humboldt Bay Independent Spent Fuel Storage Installation
Materials License No. SNM-2514
Amendment No. 1

Summary

This Safety Evaluation Report (SER) documents the review and evaluation of an amendment request for Special Nuclear Materials License No. SNM-2514 for the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI). By application dated March 5, 2008, the Pacific Gas and Electric Company (PG&E) 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." PG&E requested an amendment to the license to correct the minimum initial fuel enrichment identified in the Humboldt Bay ISFSI Technical Specifications (TS) Table 2.1-1, "MPC-HB-HB Fuel Assembly Limits," from 2.09 wt-percent ^{235}U to 2.08 wt-percent ^{235}U. A minor editorial change, to remove the second hyphen in the Table's title, was also included in the request.

The NRC staff has reviewed the application, including the justifications for the proposed changes. As discussed below, based on the statements and representations in the application, the staff agrees that the proposed changes will not have an adverse effect on public health and safety, or the environment, and finds that the proposed changes are acceptable.

Background

On November 17, 2005, the NRC issued a site-specific license for the Humboldt Bay Independent Spent Fuel Storage Installation to PG&E, in accordance with 10 CFR Part 72. The ISFSI Technical Specifications were included as an appendix to the license. The staff's evaluation of the application was documented in an SER that was issued along with the ISFSI license. The license authorizes, and the staff's original SER supports, the interim storage of all 390 remaining Humboldt Bay Power Plant (HBPP) fuel assemblies in the ISFSI. While conducting reviews in preparation for the initial transfer of spent fuel, PG&E discovered an error in the Technical Specifications as originally issued that could preclude the storage of certain fuel assemblies. TS Table 2.1-1, "MPC-HB-HB Fuel Assembly Limits," specifies that the Planar-Average Initial enrichment (for each fuel assembly) must be less than or equal to 2.60 wt-percent ^{235}U and greater than or equal to 2.09 wt-percent ^{235}U. However, forty-four of the total 390 fuel assemblies to be stored in the Humboldt Bay ISFSI have an initial average enrichment of 2.08 wt-percent ^{235}U, and could be considered to be outside the allowable range. The proposed amendment would correct the TS to allow all of the remaining Humboldt Bay fuel to be stored in the ISFSI.

Shielding Review

In its application, PG&E stated that there are four different types of fuel remaining at HBPP. PG&E chose most of the design characteristics of the GE Type III fuel assembly as design inputs for the shielding analysis because that fuel type has the highest uranium mass loading, and therefore, will have a higher source term for the same burnup and cooling time than the other HB fuel designs. In addition, the GE Type III fuel assembly comprises the largest fraction of the HBPP spent fuel inventory. Of the four fuel types remaining at Humboldt Bay, the GE Type II, "C" series, fuel has the lowest enrichment, which varies between 2.08 wt-percent ^{235}U and 2.1 wt-percent ^{235}U. This lower enrichment value (an initial average enrichment value of 2.09 wt-percent ^{235}U), was combined with the other fuel characteristic from the GE Type III fuel to develop a conservative model for a “design-basis” fuel assembly, in performing the shielding analysis.

PG&E’s shielding analysis assumed that the HB ISFSI facility is filled to its maximum capacity with 6 HI-STAR HB casks loaded with 80 fuel assemblies having 23,000 MWd/MTU burnup, 2.09 wt-percent ^{235}U initial average enrichment, and 29-year cooling time at the time of loading. This modeling method was used to provide extra conservatism, and to minimize the need to prescribe specific cask loading patterns. The actual average value for burnup is 14,772 MWd/MTU, and the average enrichment is 2.35 wt-percent ^{235}U, for the entire 390 assemblies to be loaded. In addition, HBPP Unit 3 was shut down in July 1976; thus, the actual minimum cooling time for any assembly will be approximately 32 years by the time cask loading commences. All of these significant conservatisms ensure that actual doses to workers and members of the public will be substantially less than those calculated using the design basis assumptions.

PG&E provided the following details to demonstrate that the previous shielding analysis remains applicable, even though some fuel assemblies have an initial average enrichment marginally below 2.09 wt-percent ^{235}U. There are 88 assemblies of GE Type II fuel with an average minimum enrichment of 2.11 wt-percent ^{235}U. Forty-four of these 88 assemblies have a minimum enrichment of 2.08 wt-percent ^{235}U. By loading all 44 of the 2.08 wt-percent ^{235}U into a single MPC-HB canister with any combination of the remaining fuel assemblies having higher enrichments, the resulting initial average enrichment for all assemblies in any single cask would be at least 2.09 wt-percent ^{235}U. PG&E stated that the shielding calculation selected a conservative set of assumptions for a group of fuel assemblies on a "per cask" basis and that the average minimum enrichment value of 2.09 wt-percent ^{235}U was therefore used in the analysis. Therefore, this assumption in PG&E’s previous shielding analysis remains bounding for any possible loading of Humboldt Bay fuel assemblies. As a result, PG&E stated that the proposed TS change does not impact ISFSI design and previous calculations, and will have no impact on the health and safety of workers or the public.

The staff reviewed the information PG&E provided for the GE Type II assemblies in the Humboldt Bay spent fuel inventory; this information includes the analysis submitted with the amendment request as well as data contained in PG&E’s letter to the NRC dated April 24, 2008. Staff also reviewed the applicant’s safety analysis and its own SER for the initial license. Based upon this review, the staff finds that the shielding analysis is bounding for these GE Type II assemblies with a minimum enrichment of 2.08 wt-percent ^{235}U. This finding takes into account that the actual maximum burnup for this group of assemblies is 20,770 MWd/MTU and the actual minimum cooling time will be approximately 32 years. Therefore, the staff finds the proposed TS change to be acceptable to allow loading of these GE Type II assemblies.

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 does not involve any changes in the scope or type of operations presently authorized by the 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, and a notice of the proposed action or a notice of opportunity for hearing is not warranted.

Environmental Review

The staff has determined that the subject amendment does not involve any physical changes to the facility or its operation as previously evaluated, and that the criteria for categorical exclusion of 10 CFR 51.22(c)(11) have been met for this amendment. Therefore, preparation of an environmental assessment is not required.

Conclusion

The NRC staff concludes that the proposed change to the Humboldt Bay ISFSI License Technical Specifications does not alter the prior staff conclusions and findings made in support of the granting of the license, and will not impact the public health and safety. Based on the information provided in the application, the staff concludes that SNM-2514, as amended, meets the requirements of 10 CFR Part 72.

Issued with Materials License No. SNM-2514, Amendment No. 1, on August 6, 2008.