

SAFETY EVALUATION REPORT  
INDEPENDENT SPENT FUEL STORAGE INSTALLATION  
MATERIALS LICENSE NO. SNM-2511  
AMENDMENT NO. 5

## 1.0 SUMMARY

This safety evaluation report (SER) documents the review and evaluation of a license amendment request to Special Nuclear Material (SNM) License No. 2511 for the Diablo Canyon (DC) Independent Spent Fuel Storage Installation (ISFSI). By letter dated September 16, 2015 (Agency Document Access Management System (ADAMS) Accession No. ML15259A590), as supplemented January 27, 2016, Pacific Gas and Electric (PG&E or the licensee) submitted a license amendment request to the Nuclear Regulatory Commission (NRC) in accordance with 10 CFR 72.56, to amend the Technical Specifications (TS) of SNM License No. SNM-2511, to remove preferential loading references from the TS and improve the readability and human factors usage of the TS.

The NRC staff (staff) docketed the application and in accordance with 10 CFR 72.46(b)(1), a Notice of Proposed Action and a Notice of Opportunity for Hearing was published in the *Federal Register* on October 30, 2015 (80 FR 66938). No requests for a hearing or leave to intervene were submitted. The staff has reviewed the license amendment request including the justifications for the requested changes. As discussed in further detail below, based on the statements and representations in the application, staff finds that the requested amendment to Materials License No. SNM-2511 for the DC ISFSI may be granted pursuant to 10 CFR 72.46(d) and other applicable requirements in 10 CFR Part 72.

## 2.0 BACKGROUND

The DC ISFSI is co-located with the Diablo Canyon Power Plant on PG&E-owned property along the California coast approximately 10 km [6 mi] northwest of Avila Beach, California. The Diablo Canyon Power Plant consists of two nuclear-generating units, each having a spent fuel pool to store spent nuclear fuel generated from reactor operation. The DC ISFSI has provided additional spent nuclear fuel storage capacity since 2006.

The DC ISFSI is designed to hold up to 140 storage casks. The DC ISFSI consists of a modified Holtec HI-STORM 100 Cask System, a cask transfer facility, an onsite cask transporter, and the cask storage pads. In addition, to accommodate spent nuclear fuel generated during the licensed period of the ISFSI, as well as any damaged fuel assemblies, debris, and nonfuel hardware, license no. SNM-2511 authorizes the use of multi-purpose canister (MPC) designs for the HI-STORM 100 Cask System, including the MPC-32, MPC-24, MPC-24E, and MPC-24EF.

On June 6, 2015, PG&E notified the NRC that two casks had not been loaded in accordance with the preferential loading requirements specified in the DC ISFSI TS 2.1.2, "Uniform and Preferential Fuel Loading." Upon completion of a full extent of condition review, PG&E determined 19 of the 34 loaded casks at the DC ISFSI had not been loaded in accordance with the preferential loading requirements specified in TS 2.1.2. PG&E identified the root cause to be misinterpretation of the TS language and implemented corrective actions. PG&E also determined the 19 casks were in a safe and analyzed condition (ADAMS Accession No. ML15187A239).

### **3.0 REVIEW CRITERIA**

The staff evaluation of the proposed changes is based on ensuring PG&E continues to meet the applicable requirements of 10 CFR Part 72 for independent storage of spent fuel and of 10 CFR Part 20 for radiation protection. The staff used the guidance in NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities" during its evaluation. The staff evaluation focused only on changes to SNM-2511 and associated TS that were requested in the application. The staff did not reassess previously approved areas of the license, TS, and the FSAR not affected by the proposed changes or those areas of the FSAR modified by PG&E as allowed by 10 CFR 72.48. The technical objectives for the following review disciplines are described below for each of the proposed changes.

### **4.0 THERMAL EVALUATION**

The objective of the thermal evaluation was to ascertain if the licensee's requested changes would result in a loaded MPC-32 being within allowable temperatures during normal, off-normal, and accident conditions. The requested change that required thermal evaluation by the staff was removal of preferential fuel loading references from the current version of TS 2.1.2, "Uniform and Preferential Fuel Loading." Currently, TS 2.1.2 requires fuel assemblies with shorter post irradiation cooling times (shorter by more than one year compared to other fuel assemblies) be placed toward the center of the basket. On page 4 of the enclosure to PG&E's September 2015 amendment request, the licensee stated that proprietary Holtec International thermal analyses, previously submitted as part of Amendment 3 to SNM-2511, demonstrated that temperature limits would be met with any combination of fuel assemblies within an MPC-32 up to the individual assembly maximum decay heat value allowed by TS Table 2.1-7. In addition, their analysis indicated that MPC-32 pressures remained below design pressure limits. The applicant's analyses considered normal conditions, off-normal conditions, and accident conditions.

As documented in a February, 2014 SER (ADAMS Accession No. ML14049A476), the NRC staff previously reviewed the licensee's thermal analyses, which demonstrated that all fuel cladding temperature limits are met when any combination of fuel assemblies having up to the allowable individual maximum decay heat value are loaded into an MPC-32 fuel canister basket, and found them acceptable. Therefore, for the current amendment request, the staff finds that removal of the preferential loading option for uniform fuel loading from TS 2.1.2 will not cause fuel cladding temperatures to exceed 400°C under normal operating conditions and 570°C under postulated off-normal and accident conditions. The staff also finds that MPC-32 structures, systems, and components important to safety will remain within their approved operating temperatures. Consequently, the staff finds that LAR 15-06 meets the requirements of 10 CFR 72.122(h)(1).

## 5.0 SHIELDING EVALUATION

The licensee requested removal of preferential loading references from the current version of TS 2.1.2, "Uniform and Preferential Fuel Loading." The licensee referenced Section 5.1.3 of the staff's June 7, 2005 SER (ADAMS Accession No. ML051580522) issued to Holtec International, where the staff had found reasonable assurance that the dose rates for uniform loading patterns bounded the dose rates for preferential (regionalized) loading patterns for various combinations of fuel parameters used in Holtec's HI-STORM 100 Cask System. In addition, the licensee stated that proprietary Holtec International shielding analyses, submitted in 2011 as part of the DC ISFSI Amendment 2 request, demonstrated that, if all fuel cell locations within the MPC-32 contain fuel at the maximum decay heat limit, maximum burnup, and minimum cooling time, the dose limits are met regardless of the fuel cell location into which a fuel assembly is placed. As documented in a January, 2012 SER issued to PG&E, (ADAMS Accession No. ML120260386), the NRC staff previously reviewed both the licensee's shielding and occupational exposure analyses submitted in support of its Amendment 2 request, and found these analyses acceptable. For amendment request LAR 15-06, in addition to reviewing the above historical information, the staff confirmed uniform loading patterns were assumed in PG&E's Amendment 2 analyses, and determined that removal of preferential loading references from TS 2.1.2, "Uniform and Preferential Fuel Loading," will not significantly increase dose rates from a loaded MPC-32.

Based on PG&E's statements and representations, the staff finds that removal of preferential fuel loading references from TS 2.1.2 will neither significantly increase occupational exposure, nor increase dose to the public. Therefore, staff has reasonable assurance that the DC ISFSI will continue to meet the dose requirements in 10 CFR 72.104 and 72.106 as well as 10 CFR 20.1301(a)(1).

## 6.0 TECHNICAL SPECIFICATIONS

LAR 15-06 proposed the following changes to the technical specifications (TS):

1. Revise TS 1.1, "Definitions, NONFUEL HARDWARE," to define RCCAs as rod cluster control assemblies to be consistent with standard Diablo Canyon Power Plant terminology,
2. Revise TS 2.1.2, "Uniform and Preferential Fuel Loading," to remove preferential fuel loading references,
3. Revise TS 2.1.3, "Regionalized Fuel Loading," to remove the last sentence which is redundant to TS 2.1.1.a,
4. Revise TS 2.3, "Alternate MPC-32 Fuel Selection Criteria," to reference Table 2.1-9 in the definition of "q," and make editorial corrections to improve the reading of the TS,
5. Revise TS 3.1.4, "Supplemental Cooling System," to add a missing letter "B" in Condition B,
6. Revise Tables 2.1-6 and 2.1-9 in TS 2.0, "Approved Contents," to remove blank lines in the tables, and

7. Revise Table 2.1-10 in TS 2.0, "Approved Contents," to place NOT AUTHORIZED in the table where presently it states NA.

The licensee requested the removal of references to preferential loading from TS 2.1.2 as discussed in SER sections 4 and 5 above. The licensee also proposed making editorial changes to improve the readability and usage of other TS as detailed in this SER section. The proposed TS changes were reviewed by staff to ensure that they will not adversely impact the ability of the storage casks to safely store irradiated fuel while in use at the DC ISFSI. Staff evaluated the technical and safety aspects of these changes and determined that TS changes 1, and 3 thru 7, are either editorial or administrative in nature. As documented in Sections 4 and 5 above, staff concluded that TS change 2 satisfies the applicable requirements in 10 CFR Part 72. Staff finds that the proposed TS changes provide reasonable assurance that the DC ISFSI (as operated within the conditions) will continue to allow safe storage of spent nuclear fuel in accordance with 10 CFR Part 72.

## **7.0 ENVIRONMENTAL REVIEW**

The licensee stated that the amendment request met the categorical exclusion criteria in 10 CFR 51.22(c)(11). Per 10 CFR 51.22(c)(11), a categorical exclusion for an amendment which is administrative, organizational, or procedural in nature - or which results in a change in process operations or equipment - is allowed provided the amendment: (i) would not produce a significant change in either the type or amount of effluents released to the environment, (ii) would not produce a significant increase in occupational radiation exposure, (iii) would not have significant construction impacts, and (iv) would not produce a significant increase in the potential for or consequences from radiological accidents.

After evaluating the amendment request, staff made the following determinations: (i) the amendment would not produce a significant change in either the type or amount of effluents released to the environment because the requested change neither changed the type or amount of effluents, nor caused the temperature limits for either MPC-32 structures, systems and components or fuel cladding to be exceeded as shown in Section 4, (ii) the amendment would not produce a significant increase in occupational radiation exposure because, as shown in Section 5, the removal of preferential loading references from uniform loading requirements will not increase MPC-32 radiation levels beyond those assumed in the licensee's occupational exposure analyses, (iii) the amendment would not have significant construction impacts because the requested change would only alter procedures for selecting fuel to be loaded into an MPC-32, and (iv) the amendment would not produce a significant increase in the potential for or consequences from radiological accidents because the requested change neither altered the MPC-32 confinement boundary, nor degraded the ability of the fuel cladding to retain fission products due to excessive fuel cladding temperatures as shown in Section 4. Consequently, staff finds the amendment request meets the categorical exclusion criteria in 10 CFR 51.22(c)(11).

Therefore, in accordance with 10 CFR 51.22(b), neither an environmental assessment nor an environmental impact statement is required for this proposed action.

## **8.0 CONCLUSION**

Based on its review of license amendment request 15-06, as revised and supplemented, staff determined there is reasonable assurance that: (i) the activities authorized by the amended license will be conducted without endangering the health and safety of the public, and (ii) these activities will be conducted in compliance with the applicable regulations. Staff further determined that the issuance of the amendment will not be inimical to the common defense and security. Therefore, the amendment should be approved.

Issued with Materials License No. SNM-2511.

Dated: April 7, 2016