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September 16, 2015

PG&E Letter DIL-15-018

U.S. Nuclear Regulatory Commission

10 CFR 72.56 and 72.7

ATTN: Document Control Desk
Director, Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards
11555 Rockville Pike
Rockville, MD 20852

Materials License No. SNM-2511, Docket No. 72-26
Diablo Canyon Independent Spent Fuel Storage Installation
License Amendment Request 15-06
Revision to Technical Specifications 1.1, 2.1.2, 2.1.3, 2.3, 3.1.4, and Technical Specification 2.0 Tables

Dear Commissioners and Staff:

On July 6, 2015, Pacific Gas and Electric Company (PG&E) provided the required 30-day report describing that 19 casks loaded at the Diablo Canyon Independent Spent Fuel Storage Installation (DC ISFSI) did not meet the preferential loading requirements during uniform loading as required by DC ISFSI Technical Specification (TS) 2.1.2, "Uniform and Preferential Fuel Loading." The action to restore compliance is to revise the DC ISFSI TS to be consistent with Holtec HI-STORM 100 Standard TS, which no longer includes preferential loading provisions. In addition, several other areas are noted where administrative corrections are desired to improve the readability and human factors usage of the TS.

Pursuant to 10 CFR 72.56, PG&E hereby requests an amendment to Materials License No. SNM-2511, Docket No. 72-26, for the DC ISFSI, to revise the TS as follows:

1) TS 1.1, "Definitions, NONFUEL HARDWARE," is revised to define RCCAs as rod cluster control assemblies to be consistent with standard Diablo Canyon Power Plant terminology.

2) TS 2.1.2, "Uniform and Preferential Fuel Loading," is revised to remove preferential fuel loading.

3) TS 2.1.3, "Regionalized Fuel Loading," is revised to remove the last sentence which is redundant to TS 2.1.1.a.

4) TS 2.3, "Alternate MPC-32 Fuel Selection Criteria," is revised to add reference to Table 2.1-9 in the definition of "q." In addition, editorial corrections are made to improve the reading of the TS.

5) TS 3.1.4, "Supplemental Cooling System," is revised to correct a missing letter "B" in Condition B.

6) Tables 2.1-6 and 2.1-9 in TS 2.0, "Approved Contents," are revised to remove the blank lines in the tables.

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

The changes in this license amendment request (LAR) are required to allow the continued storage of casks loaded under uniform, but not preferential loading. The changes in this LAR are not required to address an immediate safety concern. PG&E requests a medium priority for review and approval of this LAR be assigned, and requests that the amendment be issued no later than March 1, 2016, to enable a cask loading campaign scheduled to begin by August 1, 2016. PG&E requests the License Amendment be made effective upon NRC issuance, to be implemented within 60 days of issuance.

PG&E has determined that this LAR is consistent with the considerations governing issuance of the initial license per 10 CFR 72.58. Pursuant to 10 CFR 51.22(b), an environmental assessment or environmental impact statement is not required in connection with issuance of this proposed amendment.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

In accordance with site administrative procedures and the Quality Assurance Program, the proposed amendment has been reviewed by the Plant Staff Review Committee.

If you have any questions regarding this response, please contact Mr. Lawrence Pulley at (805) 545-6165.

I state under penalty of perjury that the foregoing is true and correct.

Executed on September 16, 2015.

Sincerely,

Barry S. Allen

Barry S. Allen
Vice President – Nuclear Services

mjrm/4557/50500439
Enclosure
cc: Diablo Distribution
cc/enc: Marc L. Dapas, NRC Region IV
John M. Goshen, P.E., NMSS Project Manager
Thomas R. Hipschman, NRC Senior Resident Inspector
Gonzalo L. Perez, Branch Chief, California Department of Public Health

Evaluation of the Proposed Change

License Amendment Request 15-06
Revision to Technical Specifications 1.1, 2.1.2, 2.1.3, 2.3, 3.1.4, and Technical Specification 2.0 Tables

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ATTACHMENTS:

1. Technical Specification Pages (Markups)
2. Technical Specification Pages (Retyped pages)
3. Proposed Updated Final Safety Analysis Report (UFSAR) Changes

Evaluation of the Proposed Change

1. SUMMARY DESCRIPTION

This letter is a request to amend Materials License SNM-2511 (Reference 4) for the Diablo Canyon Independent Spent Fuel Storage Installation (DC ISFSI).

The DC ISFSI Materials License, SNM-2511, License Amendment (LA) 3 (Reference 4), established a Multi-Purpose Canister (MPC) MPC-32 thermal limitation on loading of high burnup fuel (HBF) to a maximum heat load limit of 28.74 kilowatts (kW) using uniformly or regionalized loading configurations. This license amendment request (LAR) proposes to eliminate the preferential loading portion of the uniform loading section, and make administrative changes to other sections.

2. DETAILED DESCRIPTION

Proposed Amendment

The proposed change would modify Technical Specification (TS) 2.0, "Approved Contents," by revising TS 2.1.2 to eliminate the preferential loading portion from the uniform loading description. The proposed change also makes administrative changes to TS 2.3 to clearly describe that there is no upper limit to the cooling time, and to make it clear the definition of "q" in the subject equation utilizes allowable decay heat values from either Table 2.1.7 or 2.1.9, depending on whether the loading pattern is uniform or regionalized.

The following changes are considered editorial and are not discussed in the technical evaluation below:

- An editorial correction to TS 3.1.4 adds the letter "B" missing in Condition B.
- An editorial correction to TS 2.1.3 removes the last sentence which is redundant to TS 2.1.1.a.
- Editorial corrections for human performance enhancement are proposed for Tables 2.1.6, 2.1.9, and 2.1.10.
- A change to TS 1.1 in the definition of RCCA under NONFUEL HARDWARE is proposed for consistency with Diablo Canyon Power Plant (DCPP) terminology.

Attachments 1 and 2 contain markup and revised TS pages, respectively. Attachment 3 contains changes to the Updated Final Safety Analysis Report in support of this LAR, included for information only.

Purpose for Proposed Amendment

On March 22, 2004, the NRC issued Materials License No. SNM-2511 to PG&E to allow PG&E to receive, possess, store, and transfer spent fuel and associated radioactive materials resulting from operation of DCPP in an ISFSI (Reference 1). The DC ISFSI uses the HI-STORM 100 system, which includes the HI-STORM 100SA Overpack, the HI-TRAC 125D Transfer Cask, and a MPC. The DC ISFSI operation uses the transfer cask to transport a loaded MPC from the spent fuel pool to a cask transfer facility (CTF) located in the vicinity of the ISFSI storage area entrance. At the CTF, the MPC is transferred from the transfer cask to the overpack for storage in the ISFSI.

PG&E requested, and the NRC issued LA 1 to SNM-2511 on February10, 2010 (Reference 2), which added Metamic as an alternate neutron absorber in the MPC, and made other changes based on selected HI-STORM 100 System updates and NRC guidance, since the original license development.

The NRC issued LA 2 to SNM-2511 on January 19, 2012 (Reference 3), which revised the licensing basis to: (1) allow only uniform loading of HBF with a maximum heat load of 24 kW in the MPC-32, (2) support the addition of neutron source assemblies and instrument tube tie rods as approved contents, (3) add an alternative calculation methodology from the Holtec HI-STORM 100 Certificate of Compliance No. 1014 Amendment 3 for burnup limits for fuel assemblies in a MPC-32, (4) eliminate the vacuum drying option, (5) add a reference temperature of 70°F for the MPC Helium backfill pressure range, (6) allow the HI-STORM to be considered operable with up to 50 percent vent blockage, (7) add TS supplemental cooling capability in support of HBF loading operations, (8) change the B4C content in METAMIC to less than or equal to 33.0 wt percent, and (9) delete the requirement for maintaining the annulus full during MPC drying and to restore the requirement for maintaining the annulus full during reflood (unloading).

The NRC issued LA 3 to SNM-2511 on February 11, 2014 (Reference 4), which revised the licensing basis to: (1) allow both uniform loading and regionalized loading of HBF with a maximum heat load of 28.74 kW in the MPC-32, and (2) revise TS supplemental cooling capability in support of HBF loading operations.

On July 6, 2015, PG&E Letter DIL-15-015 provided a 30-day report for 19 casks, where preferential loading requirements were not met during uniform loading as required by ISFSI TS 2.1.2, "Uniform and Preferential Fuel Loading." This LAR proposes to revise TS 2.1.2 to remove the preferential loading portion from the uniform loading description, consistent with the Holtec HI-STORM 100 Standard TS.

3. TECHNICAL EVALUATION

Background

TS 2.1.2 Approved Contents – Removal of preferential loading from the uniform loading section is consistent with the TS utilized in Holtec International HI-STORM 100 Certificate of Compliance No. 1014, Amendment 2 (Reference 5). The Safety Evaluation Report issued in support of the amendment noted that there was no technical requirement for requiring preferential loading.

In support of this revision of the TS, DCPP provides the following evaluation:

- Holtec International Report HI-2125191, "Three Dimensional Thermal-Hydraulic Analyses for Diablo Canyon Site-Specific HI-STORM System with up to 28.74 kW Decay Heat," Revision 5, submitted as part of the supporting documentation for SNM-2511, Amendment 3 (Reference 4) demonstrates that all fuel design temperature limits are met with any combination of fuel assemblies within a fuel canister basket up to the individual maximum decay heat value allowed.

- Holtec International Report HI-2002563, "Dose Evaluation for the ISFSI at Diablo Canyon Power Station," Revision 8, submitted as part of the supporting documentation for SNM-2511, Amendment 2 (Reference 3) demonstrates that with all fuel canister cells containing fuel at the maximum decay heat limit, maximum burnup, and minimum cooling time that the dose limits are met with no consideration of individual fuel assembly cell locations.

TS 2.3, "Alternate MPC-32 Fuel Selection Criteria" – TS 2.3 is revised to add reference to Table 2.1.9 in the definition of "q." This is considered administrative and requires no technical discussion.

4. ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.41, PG&E has reviewed the environmental impact of the proposed amendment. The proposed changes do not significantly change the type or significantly increase in the amounts of any effluents that may be released offsite. In addition, there is no significant increase in individual or cumulative occupational radiation exposure. The proposed changes do not involve construction of any kind. Therefore, there is no significant construction impact. The proposed changes do not involve an increase in the potential for consequences from radiological accidents. The total offsite doses remains below the 10 CFR 72.104 limits and are considered acceptable. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(11). Therefore, pursuant to 10 CFR 51.22(b), no

environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

5. PRECEDENT

On June 7, 2005, the NRC issued, "Amendment No. 2 to Certificate of Compliance No. 1014 for the Holtec International Hi-Storm 100 Cask System," which eliminated the requirements for preferential cask loading (Reference 5).

6. REFERENCES

1. Materials License No. SNM-2511 for the Diablo Canyon Independent Spent Fuel Storage Installation dated March 22, 2004
2. Amendment 1 to Materials License No. SNM-2511 for the Diablo Canyon Independent Spent Fuel Storage Installation dated February 10, 2010
3. Amendment 2 to Materials License No. SNM-2511 for the Diablo Canyon Independent Spent Fuel Storage Installation dated January 19, 2012
4. Amendment 3 to Materials License No. SNM-2511 for the Diablo Canyon Independent Spent Fuel Storage Installation dated February 11, 2014
5. Holtec International HI-STORM 100 Certificate of Compliance No. 1014, Amendment 2, dated June 7, 2005

Technical Specification Page (Markups)

1.1 Definitions (continued)

INTACT FUEL ASSEMBLY	INTACT FUEL ASSEMBLY is a fuel assembly without known or suspected cladding defects greater than pinhole leaks or hairline cracks and which can be handled by normal means. A fuel assembly shall not be classified as INTACT FUEL ASSEMBLY unless solid Zircaloy or stainless steel rods are used to replace missing fuel rods and which displace an amount of water equal to that displaced by the original fuel rod(s).
LOADING OPERATIONS	LOADING OPERATIONS include all licensed activities on a TRANSFER CASK while its contained MPC is being loaded with its approved contents. LOADING OPERATIONS begin when the first fuel assembly is placed in the MPC and end when the TRANSFER CASK is suspended from or secured on the transporter. LOADING OPERATIONS does not include MPC transfer between the TRANSFER CASK and the OVERPACK.
MINIMUM ENRICHMENT	MINIMUM ENRICHMENT is the minimum assembly average enrichment. Natural uranium blankets are not considered in determining minimum enrichment.
MULTI-PURPOSE CANISTER (MPC)	MPC is a sealed SPENT NUCLEAR FUEL container that consists of a honeycombed fuel basket contained in a cylindrical canister shell which is welded to a baseplate, lid with welded port cover plates, and closure ring. The MPC provides the confinement boundary for the contained radioactive materials.
NONFUEL HARDWARE	NONFUEL HARDWARE is defined as burnable poison rod assemblies (BPRAs), thimble plug devices (TPDs), rod ~~control~~ cluster control assemblies (RCCAs), wet annular burnable absorbers (WABAs), neutron source assemblies (NSAs), instrument tube tie rods (ITTRs), and components of these devices such as individual rods.
OPERABLE/OPERABILITY	A system, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instruments, controls, normal or emergency electrical power, and other auxiliary equipment that are required for the system, component, or device to perform its specific safety function(s) are also capable of performing their related support function(s).

(continued)

2.0 APPROVED CONTENTS

2.1 Functional and Operating Limits

2.1.1 Contents To Be Stored

a. INTACT FUEL ASSEMBLIES, DAMAGED FUEL ASSEMBLIES, FUEL DEBRIS, and NONFUEL HARDWARE meeting the limits specified in Tables 2.1-1 through 2.1-10 may be stored in the SFSC System.

b. For MPCs partially loaded with DAMAGED FUEL ASSEMBLIES or FUEL DEBRIS, all remaining INTACT FUEL ASSEMBLIES in the MPC shall meet the decay heat generation limits for the DAMAGED FUEL ASSEMBLIES. This requirement applies only to uniform fuel loading.

2.1.2 Uniform ~~and Preferential~~ Fuel Loading

Fuel assemblies used in uniform ~~or preferential~~ fuel loading shall meet all applicable limits specified in Tables 2.1-1 through 2.1-5. Fuel assembly burnup, decay heat, and cooling time limits for uniform loading are specified in Tables 2.1-6 and 2.1-7. ~~Preferential fuel loading shall be used during uniform loading (i.e., any authorized fuel assembly in any fuel storage location) whenever fuel assemblies with significantly different post-irradiation cooling times (≥ 1 year) are to be loaded in the same MPC. Fuel assemblies with the longest post-irradiation cooling times shall be loaded into fuel storage locations at the periphery of the basket. Fuel assemblies with shorter post-irradiation cooling times shall be placed toward the center of the basket. Regionalized fuel loading as described in Technical Specification 2.1.3 below meets the intent of preferential fuel loading.~~

2.1.3 Regionalized Fuel Loading

Fuel may be stored using regionalized loading in lieu of uniform loading to allow higher heat emitting fuel assemblies to be stored than would otherwise be able to be stored using uniform loading. Figures 2.1-1 through 2.1-3 define the regions for the MPC-24; MPC-24E/MPC-24EF; and MPC-32 models, respectively. Fuel assembly burnup, decay heat, and cooling time limits for regionalized loading are specified in Tables 2.1-8 and 2.1-9. In addition, fuel assemblies used in regionalized loading shall meet all other applicable limits specified in Tables 2.1-1 through 2.1-5. ~~Limitations on NONFUEL HARDWARE to be stored with their associated fuel assemblies are provided in Table 2.1-10.~~

2.2 Functional and Operating Limits Violations

If any Fuel Specifications or Loading Conditions of 2.1 are violated, the following ACTIONS shall be completed:

a. The affected fuel assemblies shall be placed in a safe condition.

b. Within 24 hours, notify the NRC Operations Center.

c. Within 30 days, submit a special report which describes the cause of the violation, and ACTIONS taken to restore compliance and prevent recurrence.

2.0 APPROVED CONTENTS (continued)

2.3 Alternate MPC-32 Fuel Selection Criteria

The maximum allowable fuel assembly average burnup for a given MINIMUM ENRICHMENT is calculated as described below for a minimum cooling time~~s~~ ~~between~~ of 5 ~~and 20~~ years using the maximum permissible decay heat determined in Table 2.1-7 ~~and~~ or 2.1-9 as appropriate for uniform and regionalized loadings. Different fuel assembly average burnup limits may be calculated for different minimum enrichments (by individual fuel assembly) for use in choosing the fuel assemblies to be loaded into a given MPC.

a. Choose a fuel assembly minimum enrichment E_{235}.

b. Calculate the maximum allowable fuel assembly average burnup for a minimum cooling time ~~between~~ of 5 ~~and 20~~ years using the following equation below:

$$Bu = (A \times q) + (B \times q^2) + (C \times q^3) + [D \times (E_{235})^2] + (E \times q \times E_{235}) + (F \times q^2 \times E_{235}) + G$$

Where:

Bu = Maximum allowable average burnup per fuel assembly (MWD/MTU)

q = Maximum allowable decay heat per storage location, in kilowatts, determined from Table 2.1-7 or 2.1-9 (e.g. 898 watts, use 0.898)

E_{235} = Minimum fuel assembly average enrichment (wt% ^{235}U) (e.g., for 4.05 wt%, use 4.05)

A through G = Coefficients from Table 2.3-1.

c. Calculated burnup limits shall be rounded down to the nearest integer.

d. Calculated burnup limits greater than 68,200 MWD/MTU must be reduced to be equal to this value.

e. Linear interpolation of calculated burnups between cooling times for a given fuel assembly maximum decay heat and minimum enrichment is permitted. For example, the allowable burnup for a cooling time of 5.5 years may be interpolated between those burnups calculated for 5 year and 6 years.

f. Each ZR-clad fuel assembly to be stored must have a MINIMUM ENRICHMENT greater than or equal to the value used in Step 2.3.a.

g. When complying with the maximum fuel storage location decay heat limits, users must account for the decay heat from both the fuel assembly and any NON-FUEL HARDWARE, as applicable for the particular fuel storage location, to ensure the decay heat emitted by all contents in a storage location does not exceed the limit.

TABLE 2.1-6

FUEL ASSEMBLY COOLING AND MAXIMUM AVERAGE BURNUP
(UNIFORM FUEL LOADING)

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Burnup (INTACT FUEL ASSEMBLIES) (MWD/MTU)	MPC-24E/24EF Assembly Burnup (INTACT FUEL ASSEMBLIES) (MWD/MTU)	MPC-24E/24EF Assembly Burnup (DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS) (MWD/MTU)	MPC-32 Assembly Burnup (INTACT FUEL ASSEMBLIES) (MWD/MTU) (Note 2)
≥ 5	40,600	41,100	39,200	32,200
≥ 6	45,000	45,000	43,700	36,500
≥ 7	-	-	44,500	37,500
≥ 8	-	-	45,000	39,900
≥ 9	-	-	-	41,500
≥ 10	-	-	-	42,900
≥ 11	-	-	-	44,100
≥ 12	-	-	-	45,000
~~≥ 13~~	~~-~~	~~-~~	~~-~~	~~-~~
~~≥ 14~~	~~-~~	~~-~~	~~-~~	~~-~~
~~≥ 15~~	~~-~~	~~-~~	~~-~~	~~-~~

NOTE 1: Linear interpolation between points is permitted.
NOTE 2: Burnup limits for fuel assemblies in an MPC-32 may alternatively be calculated using Section 2.3.

TABLE 2.1-9

FUEL ASSEMBLY COOLING AND MAXIMUM DECAY HEAT
(REGIONALIZED FUEL LOADING)

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Decay Heat for Region 1 (Watts)	MPC-24 Assembly Decay Heat for Region 2 (Watts)	MPC-24E/24EF Assembly Decay Heat for Region 1 (Watts)	MPC-24E/24EF Assembly Decay Heat for Region 2 (Watts)	MPC-32 Assembly Decay Heat for Region 1 (Watts)	MPC-32 Assembly Decay Heat for Region 2 (Watts)
≥ 5	1470	900	1540	900	1131	600
≥ 6	1470	900	1540	900	1131	600
≥ 7	1335	900	1395	900	1131	600
≥ 8	1301	900	1360	900	1131	600
≥ 9	1268	900	1325	900	1131	600
≥ 10	1235	900	1290	900	1131	600
≥ 11	1221	900	1275	900	1131	600
≥ 12	1207	900	1260	900	1131	600
≥ 13	1193	900	1245	900	1131	600
≥ 14	1179	900	1230	900	1131	600
≥ 15	1165	900	1215	900	1131	600
≥ 16	-	-	-	-	-	-
≥ 17	-	-	-	-	-	-
≥ 18	-	-	-	-	-	-
≥ 19	-	-	-	-	-	-
≥ 20	-	-	-	-	-	-

NOTE 1: Linear interpolation between points is permitted.

NOTE 2: Includes all sources of decay heat (i.e., fuel and NONFUEL HARDWARE).

NOTE 3: These limits apply to INTACT FUEL ASSEMBLIES, DAMAGED FUEL ASSEMBLIES, and FUEL DEBRIS.

TABLE 2.1-10

NONFUEL HARDWARE COOLING AND AVERAGE ACTIVATION

Post-Irradiation Cooling Time (years)	BPRA and WABA Burnup (MWD/MTU)	TPD and NSA Burnup (MWD/MTU)	RCCA Burnup (MWD/MTU)
≥3	≤ 20,000	Not Authorized	Not Authorized
≥4	≤ 25,000	≤ 20,000	Not Authorized
≥ 5	≤ 30,000	≤ 25,000	≤ 630,000
≥ 6	≤ 40,000	≤ 30,000	-
≥ 7	≤ 45,000	≤ 40,000	-
≥ 8	≤ 50,000	≤ 45,000	-
≥ 9	≤ 60,000	≤ 50,000	-
≥10	-	≤ 60,000	-
≥ 11	-	≤ 75,000	-
≥ 12	-	≤ 90,000	-
≥ 13	-	≤ 180,000	-
≥ 14	-	≤ 630,000	-

NOTE 1: Linear interpolation between points is permitted, except that TPD and NSA burnups > 180,000 MWD/MTU and ≤ 630,000 MWD/MTU must be cooled ≥ 14 years.

NOTE 2: Applicable to uniform loading and regionalized loading.

NOTE 3: ~~NA means not authorized for loading~~Deleted.

NOTE 4: Non-fuel hardware burnup and cooling times are not applicable to ITTRs since they are installed post-irradiation.

NOTE 5: Only one NSA is authorized for loading in any MPC.

3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

3.1.4 Supplemental Cooling System

LCO 3.1.4 The Supplemental Cooling System (SCS) shall be operable.

---NOTE---

Upon reaching steady state operation, the SCS may be temporarily disabled for a short duration (≤ 7 hours) to facilitate necessary operational evolutions, such as movement of the TRANSFER CASK through a doorway, or other similar operations.

APPLICABILITY: When a loaded MPC-32, containing one or more fuel assemblies with an average burnup of > 45,000 MWD/MTU, is in the TRANSFER CASK, and:

a.1 Bulk water has been removed from the MPC.

AND

a.2 Forced helium dehydration has been secured for greater than 4 hours.

AND

a.3 The TRANSFER CASK containing the MPC has temporary shielding installed during cask processing operations within the fuel handling building.

OR

b.1 The MPC to be unloaded has been transferred into the TRANSFER CASK for greater than 4 hours.

AND

b.2 The MPC was originally loaded with a helium backfill pressure of ≥29.3 psig and ≤33.3 psig at a reference temperature of 70° F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Supplemental Cooling System inoperable	A.1 Restore Supplemental Cooling System to operable status.	7 days
B. Required Action A.1 and associated Completion Time not met.	B.1 Remove all fuel assemblies from the MPC.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.4.1 Verify Supplemental Cooling System is operable	2 hours

Technical Specification (Retyped page)

Remove Page	Insert Page
1.1-2	**1.1-2**
2.0-1	**2.0-1**
2.0-1a	**2.0-1a**
2.0-9	**2.0-9**
2.0-12	**2.0-12**
2.0-13	**2.0-13**
3.1-5	**3.1-5**

1.1 Definitions (continued)

INTACT FUEL ASSEMBLY	INTACT FUEL ASSEMBLY is a fuel assembly without known or suspected cladding defects greater than pinhole leaks or hairline cracks and which can be handled by normal means. A fuel assembly shall not be classified as INTACT FUEL ASSEMBLY unless solid Zircaloy or stainless steel rods are used to replace missing fuel rods and which displace an amount of water equal to that displaced by the original fuel rod(s).
LOADING OPERATIONS	LOADING OPERATIONS include all licensed activities on a TRANSFER CASK while its contained MPC is being loaded with its approved contents. LOADING OPERATIONS begin when the first fuel assembly is placed in the MPC and end when the TRANSFER CASK is suspended from or secured on the transporter. LOADING OPERATIONS does not include MPC transfer between the TRANSFER CASK and the OVERPACK.
MINIMUM ENRICHMENT	MINIMUM ENRICHMENT is the minimum assembly average enrichment. Natural uranium blankets are not considered in determining minimum enrichment.
MULTI-PURPOSE CANISTER (MPC)	MPC is a sealed SPENT NUCLEAR FUEL container that consists of a honeycombed fuel basket contained in a cylindrical canister shell which is welded to a baseplate, lid with welded port cover plates, and closure ring. The MPC provides the confinement boundary for the contained radioactive materials.
NONFUEL HARDWARE	NONFUEL HARDWARE is defined as burnable poison rod assemblies (BPRAs), thimble plug devices (TPDs), rod cluster control assemblies (RCCAs), wet annular burnable absorbers (WABAs), neutron source assemblies (NSAs), instrument tube tie rods (ITTRs), and components of these devices such as individual rods.
OPERABLE/OPERABILITY	A system, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instruments, controls, normal or emergency electrical power, and other auxiliary equipment that are required for the system, component, or device to perform its specific safety function(s) are also capable of performing their related support function(s).

(continued)

2.0 APPROVED CONTENTS

2.1 Functional and Operating Limits

2.1.1 Contents To Be Stored

a. INTACT FUEL ASSEMBLIES, DAMAGED FUEL ASSEMBLIES, FUEL DEBRIS, and NONFUEL HARDWARE meeting the limits specified in Tables 2.1-1 through 2.1-10 may be stored in the SFSC System.

b. For MPCs partially loaded with DAMAGED FUEL ASSEMBLIES or FUEL DEBRIS, all remaining INTACT FUEL ASSEMBLIES in the MPC shall meet the decay heat generation limits for the DAMAGED FUEL ASSEMBLIES. This requirement applies only to uniform fuel loading.

2.1.2 Uniform Fuel Loading

Fuel assemblies used in uniform fuel loading shall meet all applicable limits specified in Tables 2.1-1 through 2.1-5. Fuel assembly burnup, decay heat, and cooling time limits for uniform loading are specified in Tables 2.1-6 and 2.1-7.

2.1.3 Regionalized Fuel Loading

Fuel may be stored using regionalized loading in lieu of uniform loading to allow higher heat emitting fuel assemblies to be stored than would otherwise be able to be stored using uniform loading. Figures 2.1-1 through 2.1-3 define the regions for the MPC-24; MPC-24E/MPC-24EF; and MPC-32 models, respectively. Fuel assembly burnup, decay heat, and cooling time limits for regionalized loading are specified in Tables 2.1-8 and 2.1-9. In addition, fuel assemblies used in regionalized loading shall meet all other applicable limits specified in Tables 2.1-1 through 2.1-5.

2.2 Functional and Operating Limits Violations

If any Fuel Specifications or Loading Conditions of 2.1 are violated, the following ACTIONS shall be completed:

a. The affected fuel assemblies shall be placed in a safe condition.

b. Within 24 hours, notify the NRC Operations Center.

c. Within 30 days, submit a special report which describes the cause of the violation, and ACTIONS taken to restore compliance and prevent recurrence.

2.0 APPROVED CONTENTS (continued)

2.3 Alternate MPC-32 Fuel Selection Criteria

The maximum allowable fuel assembly average burnup for a given MINIMUM ENRICHMENT is calculated as described below for a minimum cooling time of 5 years using the maximum permissible decay heat determined in Table 2.1-7 or 2.1-9 as appropriate for uniform and regionalized loadings. Different fuel assembly average burnup limits may be calculated for different minimum enrichments (by individual fuel assembly) for use in choosing the fuel assemblies to be loaded into a given MPC.

a. Choose a fuel assembly minimum enrichment E_{235}.

b. Calculate the maximum allowable fuel assembly average burnup for a minimum cooling time of 5 years using the following equation below:

$$Bu = (A \times q) + (B \times q^2) + (C \times q^3) + [D \times (E_{235})^2] + (E \times q \times E_{235}) + (F \times q^2 \times E_{235}) + G$$

Where:

Bu = Maximum allowable average burnup per fuel assembly (MWD/MTU)

q = Maximum allowable decay heat per storage location, in kilowatts, determined from Table 2.1-7 or 2.1-9 (e.g. 898 watts, use 0.898)

E_{235} = Minimum fuel assembly average enrichment (wt% ^{235}U) (e.g., for 4.05 wt%, use 4.05)

A through G = Coefficients from Table 2.3-1.

c. Calculated burnup limits shall be rounded down to the nearest integer.

d. Calculated burnup limits greater than 68,200 MWD/MTU must be reduced to be equal to this value.

e. Linear interpolation of calculated burnups between cooling times for a given fuel assembly maximum decay heat and minimum enrichment is permitted. For example, the allowable burnup for a cooling time of 5.5 years may be interpolated between those burnups calculated for 5 year and 6 years.

f. Each ZR-clad fuel assembly to be stored must have a MINIMUM ENRICHMENT greater than or equal to the value used in Step 2.3.a.

g. When complying with the maximum fuel storage location decay heat limits, users must account for the decay heat from both the fuel assembly and any NON-FUEL HARDWARE, as applicable for the particular fuel storage location, to ensure the decay heat emitted by all contents in a storage location does not exceed the limit.

TABLE 2.1-6

FUEL ASSEMBLY COOLING AND MAXIMUM AVERAGE BURNUP
(UNIFORM FUEL LOADING)

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Burnup (INTACT FUEL ASSEMBLIES) (MWD/MTU)	MPC-24E/24EF Assembly Burnup (INTACT FUEL ASSEMBLIES) (MWD/MTU)	MPC-24E/24EF Assembly Burnup (DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS) (MWD/MTU)	MPC-32 Assembly Burnup (INTACT FUEL ASSEMBLIES) (MWD/MTU) (Note 2)
≥ 5	40,600	41,100	39,200	32,200
≥ 6	45,000	45,000	43,700	36,500
≥ 7	-	-	44,500	37,500
≥ 8	-	-	45,000	39,900
≥ 9	-	-	-	41,500
≥ 10	-	-	-	42,900
≥ 11	-	-	-	44,100
≥ 12	-	-	-	45,000

NOTE 1: Linear interpolation between points is permitted.
NOTE 2: Burnup limits for fuel assemblies in an MPC-32 may alternatively be calculated using Section 2.3.

TABLE 2.1-9

FUEL ASSEMBLY COOLING AND MAXIMUM DECAY HEAT
(REGIONALIZED FUEL LOADING)

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Decay Heat for Region 1 (Watts)	MPC-24 Assembly Decay Heat for Region 2 (Watts)	MPC-24E/24EF Assembly Decay Heat for Region 1 (Watts)	MPC-24E/24EF Assembly Decay Heat for Region 2 (Watts)	MPC-32 Assembly Decay Heat for Region 1 (Watts)	MPC-32 Assembly Decay Heat for Region 2 (Watts)
≥ 5	1470	900	1540	900	1131	600
≥ 6	1470	900	1540	900	1131	600
≥ 7	1335	900	1395	900	1131	600
≥ 8	1301	900	1360	900	1131	600
≥ 9	1268	900	1325	900	1131	600
≥ 10	1235	900	1290	900	1131	600
≥ 11	1221	900	1275	900	1131	600
≥ 12	1207	900	1260	900	1131	600
≥ 13	1193	900	1245	900	1131	600
≥ 14	1179	900	1230	900	1131	600
≥ 15	1165	900	1215	900	1131	600

NOTE 1: Linear interpolation between points is permitted.

NOTE 2: Includes all sources of decay heat (i.e., fuel and NONFUEL HARDWARE).

NOTE 3: These limits apply to INTACT FUEL ASSEMBLIES, DAMAGED FUEL ASSEMBLIES, and FUEL DEBRIS.

TABLE 2.1-10

NONFUEL HARDWARE COOLING AND AVERAGE ACTIVATION

Post-Irradiation Cooling Time (years)	BPRA and WABA Burnup (MWD/MTU)	TPD and NSA Burnup (MWD/MTU)	RCCA Burnup (MWD/MTU)
≥3	≤ 20,000	Not Authorized	Not Authorized
≥4	≤ 25,000	≤ 20,000	Not Authorized
≥ 5	≤ 30,000	≤ 25,000	≤ 630,000
≥ 6	≤ 40,000	≤ 30,000	-
≥ 7	≤ 45,000	≤ 40,000	-
≥ 8	≤ 50,000	≤ 45,000	-
≥ 9	≤ 60,000	≤ 50,000	-
≥10	-	≤ 60,000	-
≥ 11	-	≤ 75,000	-
≥ 12	-	≤ 90,000	-
≥ 13	-	≤ 180,000	-
≥ 14	-	≤ 630,000	-

NOTE 1: Linear interpolation between points is permitted, except that TPD and NSA burnups > 180,000 MWD/MTU and ≤ 630,000 MWD/MTU must be cooled ≥ 14 years.

NOTE 2: Applicable to uniform loading and regionalized loading.

NOTE 3: Deleted.

NOTE 4: Non-fuel hardware burnup and cooling times are not applicable to ITTRs since they are installed post-irradiation.

NOTE 5: Only one NSA is authorized for loading in any MPC.

3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

3.1.4 Supplemental Cooling System

LCO 3.1.4 The Supplemental Cooling System (SCS) shall be operable.

--NOTE--

Upon reaching steady state operation, the SCS may be temporarily disabled for a short duration (≤ 7 hours) to facilitate necessary operational evolutions, such as movement of the TRANSFER CASK through a doorway, or other similar operations.

APPLICABILITY: When a loaded MPC-32, containing one or more fuel assemblies with an average burnup of > 45,000 MWD/MTU, is in the TRANSFER CASK, and:

a.1 Bulk water has been removed from the MPC.

<u>AND</u>

a.2 Forced helium dehydration has been secured for greater than 4 hours.

<u>AND</u>

a.3 The TRANSFER CASK containing the MPC has temporary shielding installed during cask processing operations within the fuel handling building.

<u>OR</u>

b.1 The MPC to be unloaded has been transferred into the TRANSFER CASK for greater than 4 hours.

<u>AND</u>

b.2 The MPC was originally loaded with a helium backfill pressure of ≥29.3 psig and ≤33.3 psig at a reference temperature of 70° F.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Supplemental Cooling System inoperable	A.1	Restore Supplemental Cooling System to operable status.	7 days
B. Required Action A.1 and associated Completion Time not met.	B.1	Remove all fuel assemblies from the MPC.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	Verify Supplemental Cooling System is operable	2 hours

Proposed Diablo Canyon ISFSI FSAR Update

(For information only)

GLOSSARY

Neutron Shielding means a material used to thermalize and capture neutrons emanating from the radioactive spent nuclear fuel.
NFPA means National Fire Protection Association.

Nonfuel Hardware is defined as burnable poison rod assemblies (BPRAs), thimble plug devices (TPDs), control rod assemblies (CRAs), and other similarly designed devices with different names.

NRC means the US Nuclear Regulatory Commission.

NSOC means the DCPP Nuclear Safety Oversight Committee.

Nuisance Fence means the fence located outside the security fence, and is primarily intended to deter personnel from entering. This fence is capable of being utilized as a restricted area fence.

NWPA means the Nuclear Waste Policy Act of 1982 and any amendments thereto.

OBE means operating basis earthquake.

PMF means probable maximum flood.

Post-Core Decay Time (PCDT) is synonymous with cooling time.

~~**Preferential Fuel Loading** is a requirement in the Diablo Canyon ISFSI Technical Specifications applicable to uniform fuel loading whenever fuel assemblies with significantly different post-irradiation cooling times ($\geq$ 1 year) are to be loaded in the same MPC. Fuel assemblies with the longest post-irradiation cooling time are loaded into fuel storage locations at the periphery of the basket. Fuel assemblies with shorter post-irradiation cooling times are placed toward the center of the basket. Regionalized fuel loading meets the intent of preferential fuel loading. The preferential fuel loading requirement is in addition to other fuel loading restrictions in the Diablo Canyon ISFSI Technical Specifications, such as those for nonfuel hardware and damaged fuel containers.~~

Protected Area (or ISFSI Protected Area) means the area within the security fence that circumscribes the storage pads.

Protected Area Boundary means the security fence that circumscribes the storage pads.

PSRC means the DCPP Plant Staff Review Committee.

PWR means pressurized water reactor.

GLOSSARY

RCCA means rod cluster control assembly.

Reactivity is used synonymously with effective neutron multiplication factor or k-effective.

Regionalized Fuel Loading is a term used to describe an optional fuel loading strategy used in lieu of uniform fuel loading. Regionalized fuel loading allows high-heat-emitting fuel assemblies to be stored in fuel storage locations in the center of the fuel basket provided lower-heat-emitting fuel assemblies are stored in the peripheral fuel storage locations. When choosing regionalized fuel loading, other restrictions in the Diablo Canyon ISFSI Technical Specifications must be considered also, such as those for nonfuel hardware and damaged fuel containers. ~~Regionalized fuel loading meets the intent of preferential fuel loading.~~

Restricted Area means the Radiological Controls Area (RCA) within the fence circumscribing the storage pads, access to which is limited by PG&E for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.

Restricted Area Fence means the fence posted with RCA signage that circumscribes the storage pads. It is located to ensure the dose rate at this boundary will be less than 2 mrem/hr in compliance with 10 CFR 20 requirements for a restricted area boundary. This fence may be the same as the security fence.

SAT means systematic approach to training.

Security Fence is the first fence circumscribing the storage pads.

SDE means shallow dose equivalent.

Service Life means the duration for which the component is reasonably expected to perform its intended function, if operated and maintained in accordance with the provisions of the CoC. Service life may be much longer than the design life because of the conservatism inherent in the codes, standards, and procedures used to design, fabricate, operate, and maintain the component.

SFP means spent fuel pool.

Single Failure Proof Handling System means that the handling system is designed so that all directly-loaded tension and compression members are engineered to satisfy the enhanced safety criteria of paragraphs 5.1.6(1)(a) and (b) of NUREG-0612.

SNF means spent nuclear fuel.

GLOSSARY

SR means surveillance requirement.

SSC means structures, systems, and components.

SSE means safe shutdown earthquake.

STP means standard temperature and pressure conditions.

TEDE means total effective dose equivalent.

Thermosiphon is the term used to describe the buoyancy-driven natural convection circulation of helium within the MPC.

TLD means thermoluminescent dosimeter.

TODE means total organ dose equivalent.

TPD means thimble plug device.

Transport Route means the route used by the transporter for onsite movement of the loaded transfer cask from the FHB/AB to the CTF and from the CTF to the ISFSI pad.

Uniform Fuel Loading is a fuel loading strategy where any authorized fuel assembly may be stored in any fuel storage location, subject to other restrictions in the Diablo Canyon ISFSI Technical Specifications, such as ~~preferential fuel loading, and~~ those restrictions applicable to nonfuel hardware and damaged fuel containers.

USGS means the US Geological Survey.

UTM means Universal Transverse Mecator and is used to define topographic locations in metric coordinates.

Westinghouse LOPAR fuel assemblies have been used at DCPP and are one of the types of spent fuel assemblies that will be stored at the ISFSI.

Westinghouse VANTAGE 5 fuel assemblies have been used at DCPP and are one of the types of spent fuel assemblies that will be stored at the ISFSI.

χ/Q means site-specific atmospheric dispersion factors used in radiological dose calculations for routine and accidental releases.

ZPA means zero period acceleration.

Zr means fuel cladding material with the trade names Zircaloy-2, Zircaloy-4, or ZIRLO, unless otherwise specified. Any discussion of Zircaloy fuel cladding material in this

The cask-loading plan provides a loading sequence based on the various characteristics of the fuel assemblies being loaded. There are two main fuel-loading strategies used: uniform fuel loading and regionalized fuel loading. ~~In addition, there is a fuel loading sub-strategy called preferential fuel loading.~~ ~~All~~ Both of these loading strategies are designed to ensure that the design bases of the fuel, MPCs, and overpacks are maintained.

Uniform fuel loading is used when the fuel assemblies being loaded are all of similar burnup rates, decay heat levels, and post-irradiation cooling times. In this case the actual location of each assembly is less critical and assemblies can be placed at any location in the MPC. ~~However, if the post-irradiation cooling times for any of the assemblies are different by ≥ 1 year, preferential fuel loading is required to be considered.~~

~~Preferential fuel loading requires that the fuel assemblies with the longest post-irradiation cooling times be located at the periphery of the MPC basket. Fuel assemblies with shorter post-irradiation cooling times are placed toward the center of the basket. Preferential fuel loading is a requirement in addition to other MPC loading restrictions such as those for nonfuel hardware and damaged fuel containers.~~

Regionalized fuel loading is used when high heat emitting fuel assemblies are to be stored in an MPC. This loading strategy allows these specific assemblies to be stored in locations in the center of the MPC basket provided lower heat emitting fuel assemblies are stored in the peripheral storage locations. Use of regionalized fuel loading must consider other restrictions on loading such as those for nonfuel hardware and damaged fuel containers. ~~Regionalized fuel loading meets the intent of preferential fuel loading.~~

The following controls ensure that each fuel assembly is loaded into a known cell location within a qualified MPC:

- A cask-loading plan is independently verified and approved.

- A fuel movement sequence is based upon the written loading plan. All fuel movements from any rack location are performed under controls that ensure strict, verbatim compliance with the fuel movement sequence.

- Prior to placement of the MPC lid, all fuel assemblies and associated nonfuel hardware, if included, is either video taped or visually documented by other means, and independently verified, by ID number, to match the fuel movement sequence.

A cognizant engineer is responsible for performing a third independent verification to ensure that the fuel in the MPCs is placed in accordance with the original cask-loading plan.

Based on the qualification process of the spent fuel and the administrative controls used to ensure that each fuel assembly is loaded into the correct location within an MPC, incorrect loading of an MPC is not considered to be a credible event.

10.2.1.2 Fuel Characteristics (Allowable Content)

The characteristics of the fuel that are allowable for storage in the MPCs are as follows:

- Intact fuel assemblies, damaged fuel assemblies, fuel debris, and nonfuel hardware meeting the limits specified in Tables 10.2-1, 10.2-2, 10.2-3, and 10.2-4 and other referenced tables may be stored in the SFSC system. These FSAR tables and specifications are duplicated in Tables 2.2-1 through 2.2-10 of the Diablo Canyon ISFSI TS.

- For MPCs partially loaded with damaged fuel assemblies or fuel debris, all remaining intact fuel assemblies in the MPC shall meet the decay heat generation limits for the damaged fuel assemblies. This requirement applies only to uniform fuel loading.

Fuel proposed for storage at the Diablo Canyon ISFSI is bounded by the thermal analyses described in References 1 and 2. The thermal design is also summarized in Section 4.2.3.3.3 of this FSAR. Off-normal and accident conditions are addressed in Sections 11.1 and 11.2, respectively, of Reference 1.

10.2.1.2.1 Alternate MPC-32 Fuel Selection Criteria

To allow loading of high burnup fuel assemblies in the Diablo Canyon ISFSI site specific MPC-32, without changing the allowed heat load or helium fill pressure, the fuel loading selection criteria of HI-STORM CoC Amendment 3 (Reference 4) were added:

The maximum allowable fuel assembly average burnup for a given MINIMUM ENRICHMENT is calculated as described below for minimum cooling times ~~between~~ 5 ~~and 20~~ years and greater using the maximum permissible decay heat determined in Table 10.2-7 or 10.2-9 as appropriate for uniform and regionalized loadings. Different fuel assembly average burnup limits may be calculated for different minimum enrichments (by individual fuel assembly) for use in choosing the fuel assemblies to be loaded into a given MPC.

1. Choose a fuel assembly minimum enrichment E_{235}.

2. Calculate the maximum allowable fuel assembly average burnup for a minimum cooling time ~~between~~ of 5 ~~and 20~~ years using the following equation:

$$Bu = (A \times q) + (B \times q^2) + (C \times q^3) + [D \times (E_{235})^2] + (E \times q \times E_{235}) + (F \times q^2 \times E_{235}) + G$$

Where:

Bu = Maximum allowable average burnup per fuel assembly (MWD/MTU)

q = Maximum allowable decay heat per storage location, in kilowatts (e.g. for ~~750~~ 898 watts, use 0.898~~750~~), determined from Table 10.2-7 or
10.2-9

E_{235} = Minimum fuel assembly average enrichment (wt% ^{235}U). For example, for 4.05 wt%, use 4.05.

A through G = Coefficients from Table 10.2-11.

3. Calculated burnup limits shall be rounded down to the nearest integer.

4. Calculated burnup limits greater than 68,200 MWD/MTU must be reduced to be equal to this value.

5. Linear interpolation of calculated burnups between cooling times for a given fuel assembly maximum decay heat and minimum enrichment is permitted. For example, the allowable burnup for a cooling time of 5.5 years may be interpolated between those burnups calculated for 5 years and 6 years.

6. Each ZR-clad fuel assembly to be stored must have a MINIMUM ENRICHMENT greater than or equal to the value used in Step 1.

7. When complying with the maximum fuel storage location decay heat limits, users must account for the decay heat from both the fuel assembly and any NON-FUEL HARDWARE, as applicable for the particular fuel storage location, to ensure the decay heat emitted by all contents in a storage location does not exceed the limit.

10.2.1.3 Uniform ~~and Preferential~~ Fuel Loading

Fuel assemblies used in uniform ~~or preferential~~ fuel loading shall meet all applicable limits specified in Tables 10.2-1, 10.2-2, 10.2-3, 10.2-4, and 10.2-5. Fuel assembly burnup, decay heat, and cooling time limits for uniform loading are specified in Tables 10.2-6 and 10.2-7 and Section 10.2.1.2.1. ~~Preferential fuel loading shall be used during uniform loading (that is, any authorized fuel assembly in any fuel storage location) whenever fuel assemblies with significantly different post-irradiation cooling times (≥ 1 year) are to be loaded in the same MPC. Fuel assemblies with the longest post-irradiation cooling times shall be loaded into fuel storage locations at the periphery of the basket. Fuel assemblies with shorter post-irradiation cooling times shall be placed toward the center of the basket. Regionalized fuel loading as described in~~

~~Section 10.2.1.4 below meets the intent of preferential fuel loading.~~

10.2.1.4 Regionalized Fuel Loading

Fuel may be stored using regionalized loading in lieu of uniform loading to allow higher heat emitting fuel assemblies to be stored than would otherwise be able to be stored using uniform loading. Figures 10.2-1 through 10.2-3 (these figures are duplicated in the Diablo Canyon ISFSI TS as Figures 2.1-1 through 2.1-3), define the regions for the MPC-24; MPC-24E/MPC-24EF; and MPC-32 models, respectively. Fuel assembly burnup, decay heat, and cooling time limits for regionalized loading are specified in Tables 10.2-8 and 10.2-9, or Section 10.2.1.2.1. In addition, fuel assemblies used in regionalized loading shall meet all other applicable limits specified in Tables 10.2-1, 10.2-2, 10.2-3, 10.2-4, and 10.2-5. ~~Limitations on nonfuel hardware to be stored with their associated fuel assemblies are provided in Table 10.2-10.~~ |

10.2.1.5 For Allowable Content - Functional and Operating Limits Violations

If any fuel specifications or loading conditions above are violated, the following Diablo Canyon ISFSI TS actions shall be completed:

- The affected fuel assemblies shall be placed in a safe condition.
- Within 24 hours, notify the NRC Operations Center.
- Within 30 days, submit a special report that describes the cause of the violation, and actions taken to restore compliance and prevent recurrence.

10.2.2 MPC LOADING CHARACTERISTICS

The confinement of radioactivity during the storage of spent fuel and associated nonfuel hardware in the MPC is ensured by the structural integrity of the strength-welded MPC. However, long-term integrity of the fuel and cladding depends on storage in an inert heat removal environment inside the MPC. This environment is established by removing water from the MPC and backfilling the cavity with an inert gas.

The loading process of an MPC involves placing a transfer cask with an empty MPC in the SFP and loading it with fuel assemblies (intact or damaged that meet the specifications for allowable content discussed above), fuel debris, and/or nonfuel hardware allowed per the type of MPC. Once this is complete a lid is then placed on the MPC. The transfer cask and MPC are raised to the SFP surface. The transfer cask and MPC are then moved into the cask washdown area where dose rates are measured and the MPC lid is welded to the MPC shell and the welds are inspected and tested. The water is drained from the MPC cavity and moisture removal is performed. The MPC cavity is backfilled with helium. Additional dose rates are measured and the MPC vent and drain cover plates and closure ring are installed and welded. Nondestructive examination (NDE) inspections are performed on the welds.

TABLE 10.2-6

FUEL ASSEMBLY COOLING AND MAXIMUM AVERAGE BURNUP
(UNIFORM FUEL LOADING)

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Burnup (Intact Fuel Assemblies) (MWD/MTU)	MPC-24E/24EF Assembly Burnup (Intact Fuel Assemblies) (MWD/MTU)	MPC-24E/24EF Assembly Burnup (Damaged Fuel Assemblies and Fuel Debris) (MWD/MTU)	MPC-32 Assembly Burnup (Intact Fuel Assemblies) (MWD/MTU) (Note 2)
≥ 5	40,600	41,100	39,200	32,200
≥ 6	45,000	45,000	43,700	36,500
≥ 7	-	-	44,500	37,500
≥ 8	-	-	-	39,900
≥ 9	-	-	-	41,500
≥ 10	-	-	-	42,900
≥ 11	-	-	-	44,100
≥ 12	-	-	-	45,000
≥ 13	-	-	-	-
≥ 14	-	-	-	-
≥ 15	-	-	-	-

Note 1: Linear interpolation between points is permitted.

Note 2: Burnup limits for fuel assemblies in an MPC-32 may alternatively be calculated using 10.2.1.2.1.

KEEP LA #3 CHANGES

TABLE 10.2-9

FUEL ASSEMBLY COOLING AND MAXIMUM DECAY HEAT
(REGIONALIZED FUEL LOADING)

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Decay Heat for Region 1 (Watts)	MPC-24 Assembly Decay Heat for Region 2 (Watts)	MPC-24E/24EF Assembly Decay Heat for Region 1 (Watts)	MPC-24E/24EF Assembly Decay Heat for Region 2 (Watts)	MPC-32 Assembly Decay Heat for Region 1 (Watts)	MPC-32 Assembly Decay Heat for Region 2 (Watts)
≥ 5	1470	900	1540	900	1131	600
≥ 6	1470	900	1540	900	1131 ~~1072~~	600
≥ 7	1335	900	1395	900	1131 ~~993~~	600
≥ 8	1301	900	1360	900	1131 ~~978~~	600
≥ 9	1268	900	1325	900	1131 ~~964~~	600
≥ 10	1235	900	1290	900	1131 ~~950~~	600
≥ 11	1221	900	1275	900	1131 ~~943~~	600
≥ 12	1207	900	1260	900	1131 ~~937~~	600
≥ 13	1193	900	1245	900	1131 ~~931~~	600
≥ 14	1179	900	1230	900	1131 ~~924~~	600
≥ 15	1165	900	1215	900	1131 ~~918~~	600
~~≥ 16~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
~~≥ 17~~						
~~≥ 18~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
~~≥ 19~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~
~~≥ 20~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~

Note 1: Linear interpolation between points is permitted.
Note 2: Includes all sources of decay heat (i.e., fuel and nonfuel hardware).
Note 3: These limits apply to intact fuel assemblies, damaged fuel assemblies, and fuel debris.

TABLE 10.2-10

NONFUEL HARDWARE COOLING AND AVERAGE ACTIVATION

Not Authorized

Post-Irradiation Cooling Time (years)	BPRA and WABA Burnup (MWD/MTU)	TPD and NSA Burnup (MWD/MTU)	RCCA Burnup (MWD/MTU)
≥3	≤20,000	~~NA~~	~~NA~~
≥4	≤25,000	≤20,000	~~NA~~
≥5	≤30,000	≤25,000	≤630,000
≥6	≤40,000	≤30,000	
≥7	≤45,000	≤40,000	
≥8	≤50,000	≤45,000	
≥9	≤60,000	≤50,000	
≥10		≤60,000	
≥11		≤75,000	
≥12		≤90,000	
≥13		≤180,000	
≥14		≤630,000	

Note 1: Linear interpolation between points is permitted, except that TPD and NSA burnups > 180,000 MWD/MTU and ≤630,000 MWD/MTU must be cooled ≥ 14 years.

Note 2: Applicable to uniform loading and regionalized loading.

Note 3: ~~NA means not authorized for loading.~~ Deleted.

Note 4: Non-fuel hardware burnup and cooling times are not applicable to ITTRs because they are installed post-irradiation.

Note 5: Only one NSA is authorized for loading in any MPC.