Pacific Gas and
Electric Company

Lawrence F. Womack
Vice President
Nuclear Services

Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

805.545.4600
Fax: 805.545.4234

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Docket No. 72-26
Diablo Canyon Independent Spent Fuel Storage Installation
Amendment 2 to Proposed Technical Specifications and Technical Specification Bases for Diablo Canyon Independent Spent Fuel Storage Installation
(TAC No. L23399)

Dear Commissioners and Staff:

On December 21, 2001, the Pacific Gas and Electric Company (PG&E) submitted an application to the U. S. Nuclear Regulatory Commission (NRC) for a 10 CFR 72 site-specific license to build and operate an independent spent fuel storage installation at the Diablo Canyon Power Plant site (DIL-01-002). The application included a Safety Analysis Report, Environmental Report, and other required documents in accordance with 10 CFR 72.

In response to NRC comments, PG&E is submitting Amendment 2 to the Proposed Technical Specifications and Technical Specification Bases and has enclosed the revised documents in Enclosures 1 and 2, respectively.

Enclosure 3 describes the changes to the Proposed Technical Specifications and Bases.

If you have any questions regarding this response, please contact Mr. Terence Grebel at (805) 545-4160.

Sincerely,

Lawrence F. Womack

NMSS01

pns/4998
Enclosures

cc: Diablo Distribution
Thomas D. Green, Esq
Darcie L. Houck
Christopher Helenius
Sheldon L. Trubatch

cc/enc: Diane Curran, Esq.
Brian Gutherman
James R. Hall (10)
David A. Repka, Esq.
John Stamatakos (2)
Robert K. Temple, Esq.
Robert R. Wellington, Esq.
Jacquelyn Wheeler

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of PACIFIC GAS AND ELECTRIC COMPANY Diablo Canyon Independent Spent Fuel Storage Installation	Docket No. 72-26

AFFIDAVIT

Lawrence F. Womack, of lawful age, first being duly sworn upon oath states that he is Vice President, Nuclear Services of Pacific Gas and Electric Company; that he is familiar with the content thereof; that he has executed this revision to Proposed Technical Specifications and Technical Specification Bases for Diablo Canyon Independent Spent Fuel Storage Installation on behalf of said company with full power and authority to do so; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

Lawrence F. Womack
Vice President Nuclear Services

Subscribed and sworn to before me this 10th day of October 2003.

Notary Public
State of California
County of San Luis Obispo

CHUCK MACKEY
Commission # 1397547
Notary Public - California
San Luis Obispo County
My Comm. Expires Feb 1, 2007

ENCLOSURE 1

REVISED PROPOSED TECHNICAL SPECIFICATIONS FOR DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION

PROPOSED TECHNICAL SPECIFICATIONS

FOR

DIABLO CANYON

INDEPENDENT SPENT FUEL STORAGE INSTALLATION

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1.0 USE AND APPLICATION

1.1 Definitions

---NOTE---

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Specifications and Bases.

Term	Definition
ACTIONS	ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
CASK TRANSFER FACILITY (CTF)	The CASK TRANSFER FACILITY includes the following components and equipment: (1) A cask transfer structure (built into the transporter) used to lift and stabilize the TRANSFER CASK and MPC during lifts involving spent fuel outside of structures governed by 10 CFR 50, and (2) an in-ground cask transfer structure with a mechanical lifting device used in concert with the transporter to lift the OVERPACK and MPC.
DAMAGED FUEL ASSEMBLY	DAMAGED FUEL ASSEMBLIES are fuel assemblies with known or suspected cladding defects, as determined by a review of records, greater than pinhole leaks or hairline cracks, empty fuel rod locations that are not filled with solid Zircaloy or stainless steel rods, or those that cannot be handled by normal means. DAMAGED FUEL ASSEMBLIES if stored in an MPC, must be stored in a DAMAGED FUEL CONTAINER.
DAMAGED FUEL CONTAINER (DFC)	DFCs are specially designed enclosures for DAMAGED FUEL ASSEMBLIES or FUEL DEBRIS that permit gaseous and liquid media to escape to the atmosphere in the MPC, while minimizing dispersal of gross particulates within the MPC. A DFC can hold one DAMAGED FUEL ASSEMBLY or an amount of FUEL DEBRIS equivalent to that of an INTACT FUEL ASSEMBLY.
FUEL DEBRIS	FUEL DEBRIS is ruptured fuel rods, severed rods, loose fuel pellets or fuel assemblies with known or suspected defects, which cannot be handled by normal means due to fuel cladding damage.

(continued)

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.
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 assemblies (RCCAs), and wet annular burnable absorbers (WABAs).
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).
OVERPACK	OVERPACK is a cask that receives and contains a sealed MPC for interim storage in the independent spent fuel storage installation (ISFSI). It provides gamma and neutron shielding, and provides for ventilated air flow to promote heat transfer from the MPC to the environs. The OVERPACK does not include the TRANSFER CASK.

(continued)

1.1 Definitions (continued)

SPENT FUEL STORAGE CASKS (SFSCs)	SFSCs are containers approved for the storage of spent fuel assemblies, FUEL DEBRIS, and associated NONFUEL HARDWARE at the ISFSI. The HI-STORM 100 SFSC System consists of the OVERPACK and its integral MPC *loaded with any approved contents.*
SPENT NUCLEAR FUEL	SPENT NUCLEAR 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 NUCLEAR FUEL includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies.
STORAGE OPERATIONS	STORAGE OPERATIONS include all licensed activities that are performed at the ISFSI *while a* ~~after a loaded~~ SFSC *containing approved contents is sitting on a storage pad within the ISFSI perimeter.*~~has been anchored to the storage pad within the ISFSI protected area perimeter.~~ STORAGE OPERATIONS does not include MPC transfer between the TRANSFER CASK and the OVERPACK.
TRANSFER CASK	TRANSFER CASKs are containers designed to contain the MPC during and after loading of its approved contents and to transfer the loaded MPC to or from the OVERPACK.
TRANSPORT OPERATIONS	TRANSPORT OPERATIONS include all licensed activities performed on an OVERPACK or TRANSFER CASK *loaded* ~~containing a MPC loaded~~ with any approved contents when it is being moved to and from the ISFSI. TRANSPORT OPERATIONS begin when the OVERPACK or TRANSFER CASK is first suspended from or secured on the transporter and end when the OVERPACK or TRANSFER CASK is at its destination and no longer secured on or suspended from the transporter. TRANSPORT OPERATIONS include transfer of the MPC between the OVERPACK and the TRANSFER CASK.

(continued)

1.1 Definitions (continued)

UNLOADING OPERATIONS	UNLOADING OPERATIONS include all licensed activities on a TRANSFER CASK while its contained MPC is being unloaded of its approved contents. UNLOADING OPERATIONS begin when the TRANSFER CASK is no longer suspended from or secured on the transporter and end when the last of its approved contents is removed from the MPC. UNLOADING OPERATIONS do not include MPC transfer between the TRANSFER CASK and the OVERPACK.

1.0 USE AND APPLICATION

1.2 Logical Connectors

PURPOSE

The purpose of this section is to explain the meaning of logical connectors.

Logical connectors are used in Technical Specifications (TS) to discriminate between, and yet connect, discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in TS are <u>AND</u> and <u>OR</u>. The physical arrangement of these connectors constitutes logical conventions with specific meanings.

BACKGROUND

Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentions of the logical connectors.

When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency.

EXAMPLES

The following examples illustrate the use of logical connectors.

<u>EXAMPLE 1.2-1</u>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Verify...... <u>AND</u> A.2 Restore....	

In this example, the logical connector <u>AND</u> is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

(continued)

1.2 Logical Connectors

EXAMPLES
(continued)

EXAMPLE 1.2-2

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. LCO not met.	A.1	Stop.....	
	OR		
	A.2.1	Verify....	
	AND		
	A.2.2.1	Reduce....	
		OR	
	A.2.2.2	Perform....	
	OR		
	A.3	Remove....	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three ACTIONS may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

1.0 USE AND APPLICATION

1.3 Completion Times

PURPOSE

The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.

BACKGROUND

Limiting Conditions for Operation (LCOs) specify the lowest functional capability or performance levels of equipment required for safe operation of the facility. The ACTIONS associated with an LCO state Conditions that typically describe the ways in which the requirements of the LCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Time(s).

DESCRIPTION

The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., equipment or variable not within limits) that requires entering an ACTIONS condition unless otherwise specified, providing the cask system is in a specified condition stated in the Applicability of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the condition no longer exists or the cask system is not within the LCO Applicability.

Once a Condition has been entered, subsequent subsystems, components, or variables expressed in the Condition, discovered to be not within limits, will <u>not</u> result in separate entry into the Condition unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition.

(continued)

1.3 Completion Times (continued)

EXAMPLES

The following examples illustrate the use of Completion Times with different types of Conditions and changing Conditions.

<u>EXAMPLE 1.3-1</u>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Perform Action B.1	12 hours
	<u>AND</u>	
	B.2 Perform Action B.2	36 hours

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

The Required Actions of Condition B are to complete action B.1 within 12 hours <u>AND</u> complete action B.2 within 36 hours. A total of 12 hours is allowed for completion action B.1 and a total of 36 hours (not 48 hours) is allowed for completing action B.2 from the time that Condition B was entered. If action B.1 is completed within 6 hours, the time allowed for completing action B.2 is the next 30 hours because the total time allowed for completing action B.2 is 36 hours.

(continued)

1.3 Completion Times

EXAMPLES
(continued)

EXAMPLE 1.3-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One system not within limit.	A.1 Restore system to within limit.	7 days
B. Required Action and associated Completion Time not met.	B.1 Complete action B.1. AND B.2 Complete action B.2.	12 hours 36 hours

When a system is determined not to meet the LCO, Condition A is entered. If the system is not restored within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the system is restored after Condition B is entered, Conditions A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

(continued)

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-3

ACTIONS

--NOTE--
Separate Condition entry is allowed for each component.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Restore compliance with LCO.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Complete action B.1 AND B.2 Complete action B.2	6 hours 12 hours

The Note above the ACTIONS table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each component, and Completion Times tracked on a per component basis. When a component is determined to not meet the LCO, Condition A is entered and its Completion Time starts. If subsequent components are determined to not meet the LCO, Condition A is entered for each component and separate Completion Times start and are tracked for each component.

IMMEDIATE COMPLETION TIME

When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

1.0 USE AND APPLICATION

1.4 Frequency

PURPOSE	The purpose of this section is to define the proper use and application of Frequency requirements.
DESCRIPTION	Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated Limiting Condition for Operation (LCO). An understanding of the correct application of the specified Frequency is necessary for compliance with the SR. The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR. Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

(continued)

1.4 Frequency (continued)

EXAMPLES

The following examples illustrate the various ways that frequencies are specified.

EXAMPLE 1.4-1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify pressure within limit	12 hours

Example 1.4-1 contains the type of SR most often encountered in the Technical Specifications (TS). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an extension of the time interval to 1.25 times the interval specified in the Frequency is allowed by SR 3.0.2 for operational flexibility. The measurement of this interval continues at all times, even when the SR is not required to be met per SR 3.0.1 (such as when the equipment or variables are outside specified limits, or the facility is outside the Applicability of the LCO). If the interval specified by SR 3.0.2 is exceeded while the facility is in a condition specified in the Applicability of the LCO, the LCO is not met in accordance with SR 3.0.1.

If the interval as specified by SR 3.0.2 is exceeded while the facility is not in a condition specified in the Applicability of the LCO for which performance of the SR is required, the Surveillance must be performed within the Frequency requirements of SR 3.0.2 prior to entry into the specified condition. Failure to do so would result in a violation of SR 3.0.4.

(continued)

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours prior to starting activity AND 24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one-time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicated that both Frequency requirements must be met. Each time the example activity is to be performed, the Surveillance must be performed within 12 hours prior to starting the activity.

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the 25 percent extension allowed by SR 3.0.2.

"Thereafter" indicated future performances must be established per SR 3.0.2, but only after a specified condition is first met (i.e., the "once" performance in this example). If the specified activity is cancelled or not performed, the measurement of both intervals stops. New intervals start upon preparing to restart the specified activity.

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 ($\geq$ 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.

TABLE 2.1-1

MPC-24 FUEL ASSEMBLY LIMITS

A. Allowable Contents

1. Uranium oxide, INTACT FUEL ASSEMBLIES listed in Table 2.1-5, with or without NONFUEL HARDWARE and meeting the following specifications (Note 1):

Cladding type	Zr (Note 2)
Initial enrichment	As specified in Table 2.1-5 for the applicable fuel assembly.
Post-irradiation cooling time and average burnup per assembly:	
Fuel	As specified in Tables 2.1-6 or 2.1-8.
NONFUEL HARDWARE	As specified in Table 2.1-10.
Decay heat per assembly	As specified in Tables 2.1-7 or 2.1-9.
Fuel assembly length	≤ 176.8 inches (nominal design)
Fuel assembly width	≤ 8.54 inches (nominal design)
Fuel assembly weight	≤ 1,680 lb (including NONFUEL HARDWARE)

B. Quantity per MPC: Up to 24 fuel assemblies.

C. DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS are not authorized for loading into the MPC-24.

NOTE 1: Fuel assemblies containing BPRAs, WABAs, or TPDs may be stored in any fuel cell location. Fuel assemblies containing RCCAs may only be loaded in fuel storage locations 9, 10, 15, and/or 16 of Figure 2.1-1. These requirements are in addition to any other requirements specified for uniform or regionalized fuel loading.

NOTE 2: Zr designates fuel-cladding material made of Zircaloy-2, Zircaloy-4 and ZIRLO.

TABLE 2.1-2 Sheet 1 of 2

MPC-24E FUEL ASSEMBLY LIMITS

A. Allowable Contents

1. Uranium oxide, INTACT FUEL ASSEMBLIES listed in Table 2.1-5, with or without NONFUEL HARDWARE and meeting the following specifications (Note 1):

Cladding type	Zr (Note 2)
Initial enrichment	As specified in Table 2.1-5 for the applicable fuel assembly.
Post-irradiation cooling time and average burnup per assembly	
Fuel	As specified in Tables 2.1-6 or 2.1-8.
NONFUEL HARDWARE	As specified in Table 2.1-10.
Decay heat per assembly	As specified in Tables 2.1-7 or 2.1-9.
Fuel assembly length	≤ 176.8 inches (nominal design)
Fuel assembly width	≤ 8.54 inches (nominal design)
Fuel assembly weight	≤ 1,680 lb (including NONFUEL HARDWARE)

2. Uranium oxide, DAMAGED FUEL ASSEMBLIES, with or without NONFUEL HARDWARE, placed in DAMAGED FUEL CONTAINERS. Uranium oxide DAMAGED FUEL ASSEMBLIES shall meet the criteria specified in Table 2.1-5 and meet the following specifications (Note 1):

Cladding type	Zr (Note 2)
Initial enrichment	≤ 4.0 wt% ^{235}U.
Post-irradiation cooling time and average burnup per assembly:	
Fuel	As specified in Tables 2.1-6 or 2.1-8.
NONFUEL HARDWARE	As specified in Table 2.1-10.
Decay heat per assembly	As specified in Tables 2.1-7 or 2.1-9.
Fuel assembly length	≤ 176.8 inches (nominal design)
Fuel assembly width	≤ 8.54 inches (nominal design)
Fuel assembly weight	≤ 1,680 lb (including NONFUEL HARDWARE and DFC)

TABLE 2.1-2 Sheet 2 of 2

B. Quantity per MPC: Up to four (4) DAMAGED FUEL ASSEMBLIES in DAMAGED FUEL CONTAINERS, stored in fuel storage locations 3, 6, 19 and/or 22 of Figure 2.1-2. The remaining MPC-24E fuel storage locations may be filled with INTACT FUEL ASSEMBLIES meeting the applicable specifications.

C. FUEL DEBRIS is not authorized for loading in the MPC-24E.

NOTE 1: Fuel assemblies containing BPRAs, WABAs, or TPDs may be stored in any fuel storage location. Fuel assemblies containing RCCAs must be loaded in fuel storage locations 9, 10, 15 and/or 16 of Figure 2.1-2. These requirements are in addition to any other requirements specified for uniform or regionalized fuel loading.

NOTE 2: Zr designates fuel-cladding material, which is made of Zircaloy-2, Zircaloy-4 and ZIRLO.

TABLE 2.1-3

MPC-24EF FUEL ASSEMBLY LIMITS

A. Allowable Contents

1. Uranium oxide, INTACT FUEL ASSEMBLIES listed in Table 2.1-5, with or without NONFUEL HARDWARE and meeting the following specifications (Note 1):

Cladding type	Zr (Note 3)
Initial enrichment	As specified in Table 2.1-5 for the applicable fuel assembly.
Post-irradiation cooling time and average burnup per assembly:	
Fuel	As specified in Tables 2.1-6 or 2.1-8.
NONFUEL HARDWARE	As specified in Table 2.1-10.
Decay heat per assembly	As specified in Tables 2.1-7 or 2.1-9.
Fuel assembly length	≤ 176.8 inches (nominal design)
Fuel assembly width	≤ 8.54 inches (nominal design)
Fuel assembly weight	≤ 1,680 lb (including NONFUEL HARDWARE)

2. Uranium oxide, DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS, with or without NONFUEL HARDWARE, placed in DAMAGED FUEL CONTAINERS. Uranium oxide DAMAGED FUEL ASSEMBLIES shall meet the criteria specified in Table 2.1-5 and meet the following specifications (Note 1 and 2):

Cladding type	Zr (Note 3)
Initial enrichment	≤ 4.0 wt% ^{235}U.
Post-irradiation cooling time and average burnup per assembly	
Fuel	As specified in Tables 2.1-6 or 2.1-8.
NONFUEL HARDWARE	As specified in Table 2.1-10.
Decay heat per assembly	As specified in Tables 2.1-7 or 2.1-9.
Fuel assembly length	≤ 176.8 inches (nominal design)
Fuel assembly width	≤ 8.54 inches (nominal design)
Fuel assembly weight	≤ 1,680 lb (including NONFUEL HARDWARE and DFC)

TABLE 2.1-3 Sheet 2 of 2

B. Quantity per MPC: Up to four (4) DAMAGED FUEL ASSEMBLIES and/or FUEL DEBRIS in DAMAGED FUEL CONTAINERS, stored in fuel storage locations 3, 6, 19 and/or 22 of Figure 2.1-2. The remaining MPC-24EF fuel storage locations may be filled with INTACT FUEL ASSEMBLIES meeting the applicable specifications.

NOTE 1: Fuel assemblies containing BPRAs, WABAs, or TPDs may be stored in any fuel storage location. Fuel assemblies containing RCCAs must be loaded in fuel storage locations 9, 10, 15 and/or 16 of Figure 2.1-2. These requirements are in addition to any other requirements specified for uniform or regionalized fuel loading.

NOTE 2: The total quantity of FUEL DEBRIS permitted in a single DAMAGED FUEL CONTAINER is limited to the equivalent weight and special nuclear material quantity of one INTACT FUEL ASSEMBLY.

NOTE 3: Zr designates fuel-cladding material, which is made of Zircaloy-2, Zircaloy-4 and ZIRLO.

TABLE 2.1-4

MPC-32 FUEL ASSEMBLY LIMITS

A. Allowable Contents

1. Uranium oxide, INTACT FUEL ASSEMBLIES listed in Table 2.1-5, with or without NONFUEL HARDWARE and meeting the following specifications (Note 1):

Cladding type	Zr (Note 2)
Initial enrichment	As specified in Table 2.1-5 for the applicable fuel assembly.
Post-irradiation cooling time and average burnup per assembly:	
Fuel	As specified in Tables 2.1-6 or 2.1-8.
NONFUEL HARDWARE	As specified in Table 2.1-10.
Decay heat per assembly	As specified in Tables 2.1-7 or 2.1-9.
Fuel assembly length	≤ 176.8 inches (nominal design)
Fuel assembly width	≤ 8.54 inches (nominal design)
Fuel assembly weight	≤ 1,680 lb (including NONFUEL HARDWARE)

B. Quantity per MPC: Up to 32 intact fuel assemblies.

C. DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS are not authorized for loading in the MPC-32.

NOTE 1: Fuel assemblies containing BPRAs, WABAs, or TPDs may be stored in any fuel storage location. Fuel assemblies containing RCCAs must be loaded in fuel storage locations 13, 14, 19 and/or 20 of Figure 2.1-3. These requirements are in addition to any other requirements specified for uniform or regionalized fuel loading.

NOTE 2: Zr designates fuel-cladding material, which is made of Zircaloy-2, Zircaloy-4 and ZIRLO.

TABLE 2.1-5

FUEL ASSEMBLY CHARACTERISTICS (Note 1)

Fuel Assembly Type	Vantage 5	Standard or LOPAR
Cladding Material	Zr (Note 5)	Zr (Note 5)
Design Initial U (kg/assy.) (Note 2)	≤ 467	≤ 467
Initial Enrichment (MPC-24, 24E, and 24EF without soluble boron credit) (wt% ^{235}U) (Note 4)	≤ 4.0 (24) ≤ 4.4 (24E/24EF)	≤ 4.0 (24) ≤ 4.4 (24E/24EF)
Initial Enrichment (MPC-24, 24E, 24EF, or 32 with soluble boron credit) (wt% ^{235}U) (Notes 3 and 4)	≤ 5.0	≤ 5.0
No. of Fuel Rod Locations	264	264
Fuel Rod Cladding O.D. (in.)	≥ 0.360	≥ 0.372
Fuel Rod Cladding I.D. (in.)	≤ 0.3150	≤ 0.3310
Fuel Pellet Dia. (in.)	≤ 0.3088	≤ 0.3232
Fuel Rod Pitch (in.)	≤ 0.496	≤ 0.496
Active Fuel Length (in.)	≤ 150	≤ 150
No. of Guide and/or Instrument Tubes	25	25
Guide/Instrument Tube Thickness (in.)	≥ 0.016	≥ 0.014

NOTE 1: All dimensions are design nominal values. Maximum and minimum dimensions are specified to bound variations in design nominal values among fuel assemblies.

NOTE 2: Design initial uranium weight is the nominal uranium weight specified for each assembly by the fuel manufacturer or DCPP. For each fuel assembly, the total uranium weight limit specified in this table may be increased up to 2.0 percent for comparison with DCPP fuel records to account for manufacturers tolerances.

NOTE 3: Soluble boron concentration per Technical Specification LCO 3.2.1.

NOTE 4: For those MPCs loaded with both INTACT FUEL ASSEMBLIES and DAMAGED FUEL ASSEMBLIES or FUEL DEBRIS, the maximum initial enrichment of the INTACT FUEL ASSEMBLIES is limited to the maximum initial enrichment of the DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS (i.e., 4.0 wt.% ^{235}U).

NOTE 5: Zr designates fuel-cladding material, which is made of Zircaloy-2, Zircaloy-4 and ZIRLO.

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)
≥ 5	40,600	41,100	39,200	32,200
≥ 6	45,000	45,000	43,700	36,500
≥ 7	45,900	46,300	44,500	37,500
≥ 8	48,300	48,900	46,900	39,900
≥ 9	50,300	50,700	48,700	41,500
≥ 10	51,600	52,100	50,100	42,900
≥ 11	53,100	53,700	51,500	44,100
≥ 12	54,500	55,100	52,600	45,000
≥ 13	55,600	56,100	53,800	45,700
≥ 14	56,500	57,100	54,900	46,500
≥ 15	57,400	58,000	55,800	47,200

NOTE 1: Linear interpolation between points is permitted.
NOTE 2: Burnup for fuel assemblies with cladding made of ZIRLO is limited to 45,000 MWD/MTU or the value in this table, whichever is less.

TABLE 2.1-7

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

Post-Irradiation Cooling Time (years)	MPC-24 Assembly *Decay Heat*~~Burnup~~ (INTACT FUEL ASSEMBLIES) (Watts)	MPC-24E/24EF Assembly Decay Heat (INTACT FUEL ASSEMBLIES) (Watts)	MPC-24E/24EF Assembly Decay Heat (DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS) (Watts)	MPC-32 Assembly Decay Heat (INTACT FUEL ASSEMBLIES) (Watts)
≥ 5	1157	1173	1115	898
≥ 6	1123	1138	1081	873
≥ 7	1030	1043	991	805
≥ 8	1020	1033	981	800
≥ 9	1010	1023	972	794
≥ 10	1000	1012	962	789
≥ 11	996	1008	958	785
≥ 12	992	1004	954	782
≥ 13	987	999	949	773
≥ 14	983	995	945	769
≥ 15	979	991	941	766

NOTE 1: Linear interpolation between points is permitted.

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

TABLE 2.1-8

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

Post-Irradiation Cooling Time (years)	MPC-24 Assembly Burnup for Region 1 (MWD/MTU)	MPC-24 Assembly Burnup for Region 2 (MWD/MTU)	MPC-24E/24EF Assembly Burnup for Region 1 (MWD/MTU)	MPC-24E/24EF Assembly Burnup for Region 2 (MWD/MTU)	MPC-32 Assembly Burnup for Region 1 (MWD/MTU)	MPC-32 Assembly Burnup for Region 2 (MWD/MTU)
≥ 5	49,800	32,200	51,600	32,200	39,800	22,100
≥ 6	56,100	37,400	58,400	37,400	43,400	26,200
≥ 7	56,400	41,100	58,500	41,100	44,500	29,100
≥ 8	58,800	43,800	60,900	43,800	46,700	31,200
≥ 9	60,400	45,800	62,300	45,800	48,400	32,700
≥ 10	61,200	47,500	63,300	47,500	49,600	34,100
≥ 11	62,400	49,000	64,900	49,000	50,900	35,200
≥ 12	63,700	50,400	65,900	50,400	51,900	36,200
≥ 13	64,800	51,500	66,800	51,500	52,900	37,000
≥ 14	65,500	52,500	67,500	52,500	53,800	37,800
≥ 15	66,200	53,700	68,200	53,700	54,700	38,600
≥ 16	-	55,000	-	55,000	-	39,400
≥ 17	-	55,900	-	55,900	-	40,200
≥ 18	-	56,800	-	56,800	-	40,800
≥ 19	-	57,800	-	57,800	-	41,500
≥ 20	-	58,800	-	58,800	-	42,200

NOTE 1: Linear interpolation between points is permitted.

NOTE 2: These limits apply to INTACT FUEL ASSEMBLIES, DAMAGED FUEL ASSEMBLIES, and FUEL DEBRIS.

NOTE 3: Burnup for fuel assemblies with cladding made of ZIRLO is limited to 45,000 MWD/MTU or the value in this table, whichever is less.

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	1072	600
≥ 7	1335	900	1395	900	993	600
≥ 8	1301	900	1360	900	978	600
≥ 9	1268	900	1325	900	964	600
≥ 10	1235	900	1290	900	950	600
≥ 11	1221	900	1275	900	943	600
≥ 12	1207	900	1260	900	937	600
≥ 13	1193	900	1245	900	931	600
≥ 14	1179	900	1230	900	924	600
≥ 15	1165	900	1215	900	918	600
≥ 16	-	900	-	900	-	600
≥ 17	-	900	-	900	-	600
≥ 18	-	900	-	900	-	600
≥ 19	-	900	-	900	-	600
≥ 20	-	900	-	900	-	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

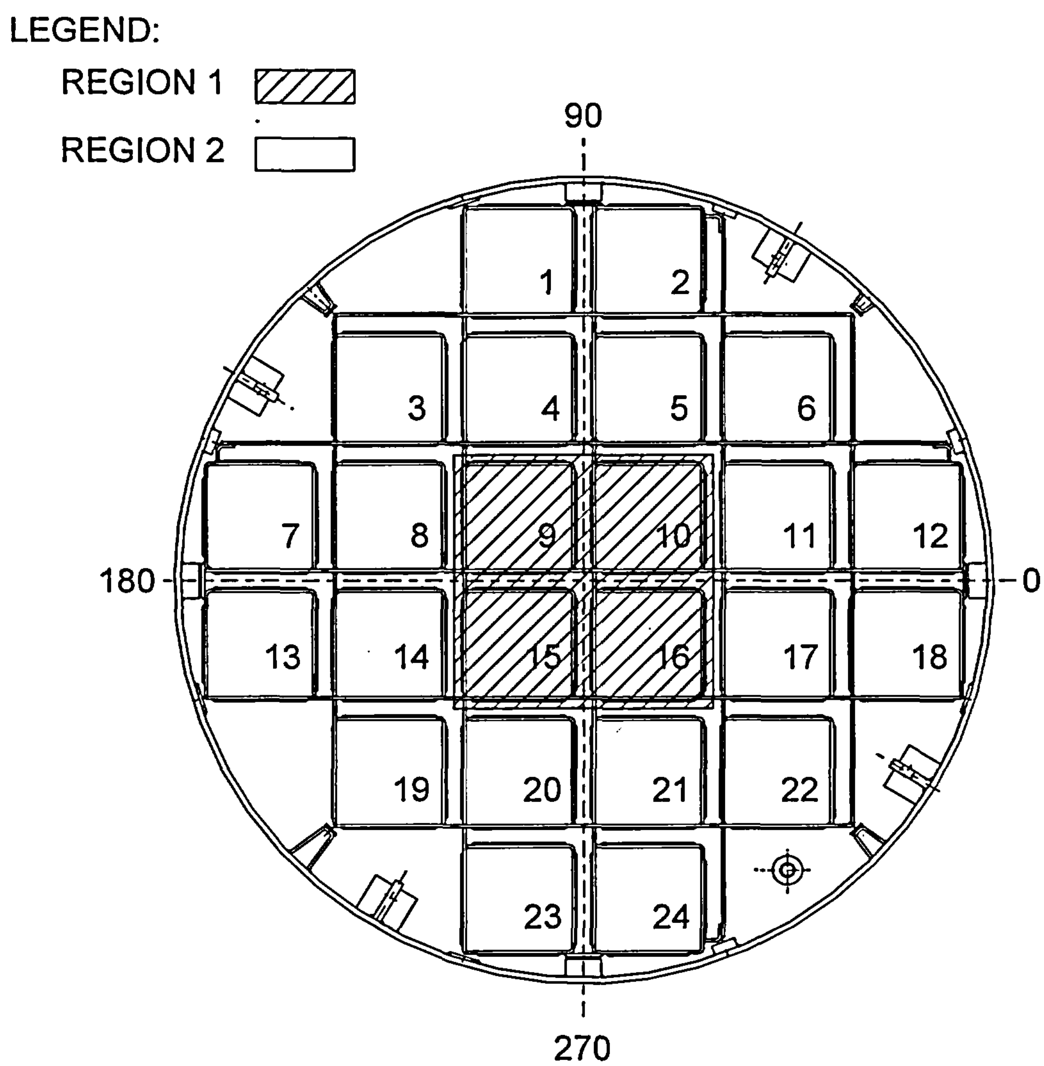
NONFUEL HARDWARE COOLING AND AVERAGE ACTIVATION

Post-Irradiation Cooling Time (years)	BPRA and WABA Burnup (MWD/MTU)	TPD 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	-

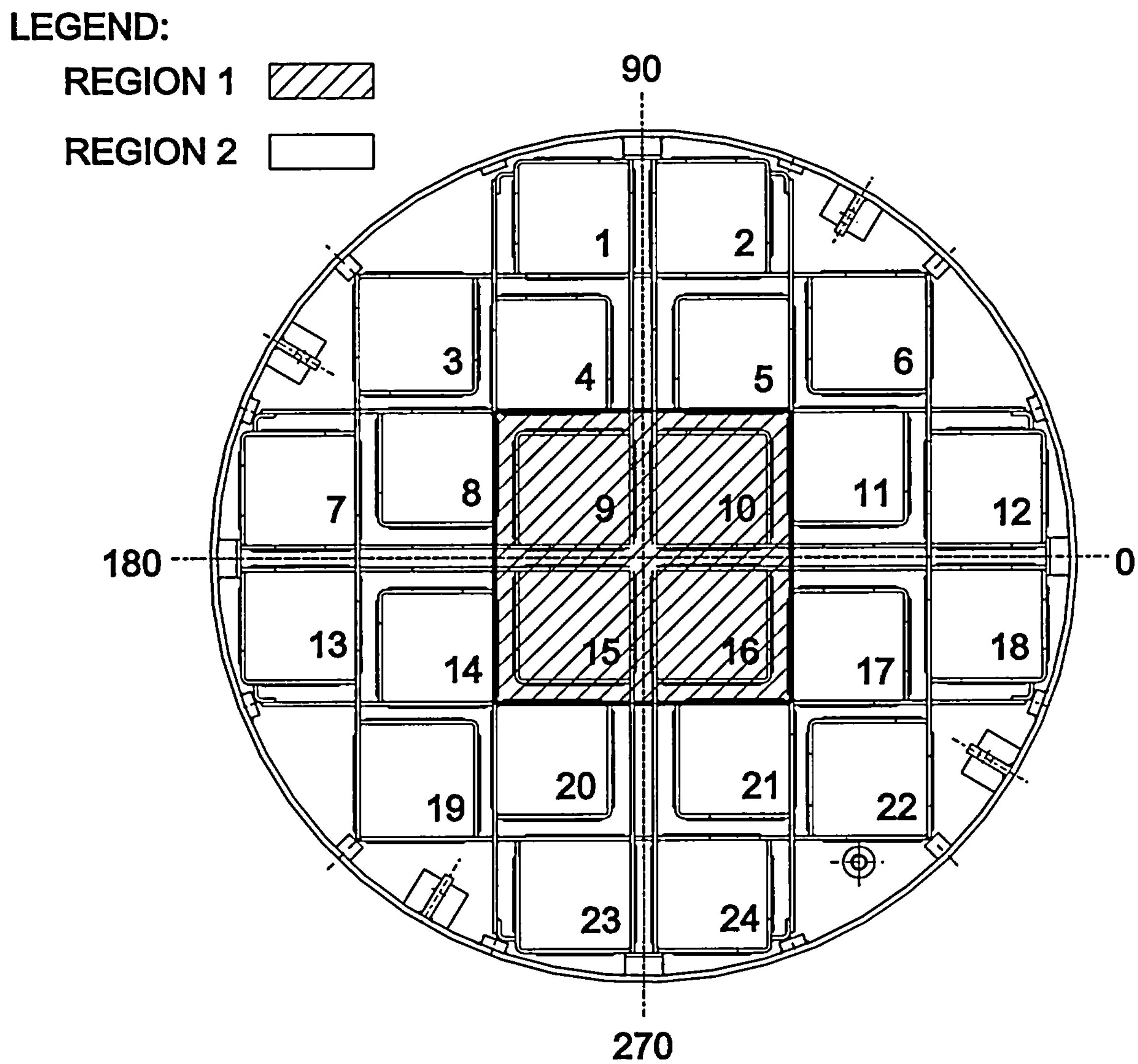
NOTE 1: Linear interpolation between points is permitted, except that TPD burnups > 180,000 MWD/MTU and ≤ 630,000 MWD/MTU must be cooled ≥ 14 years.

NOTE 2: Applicable to uniform loading and regionalized loading.

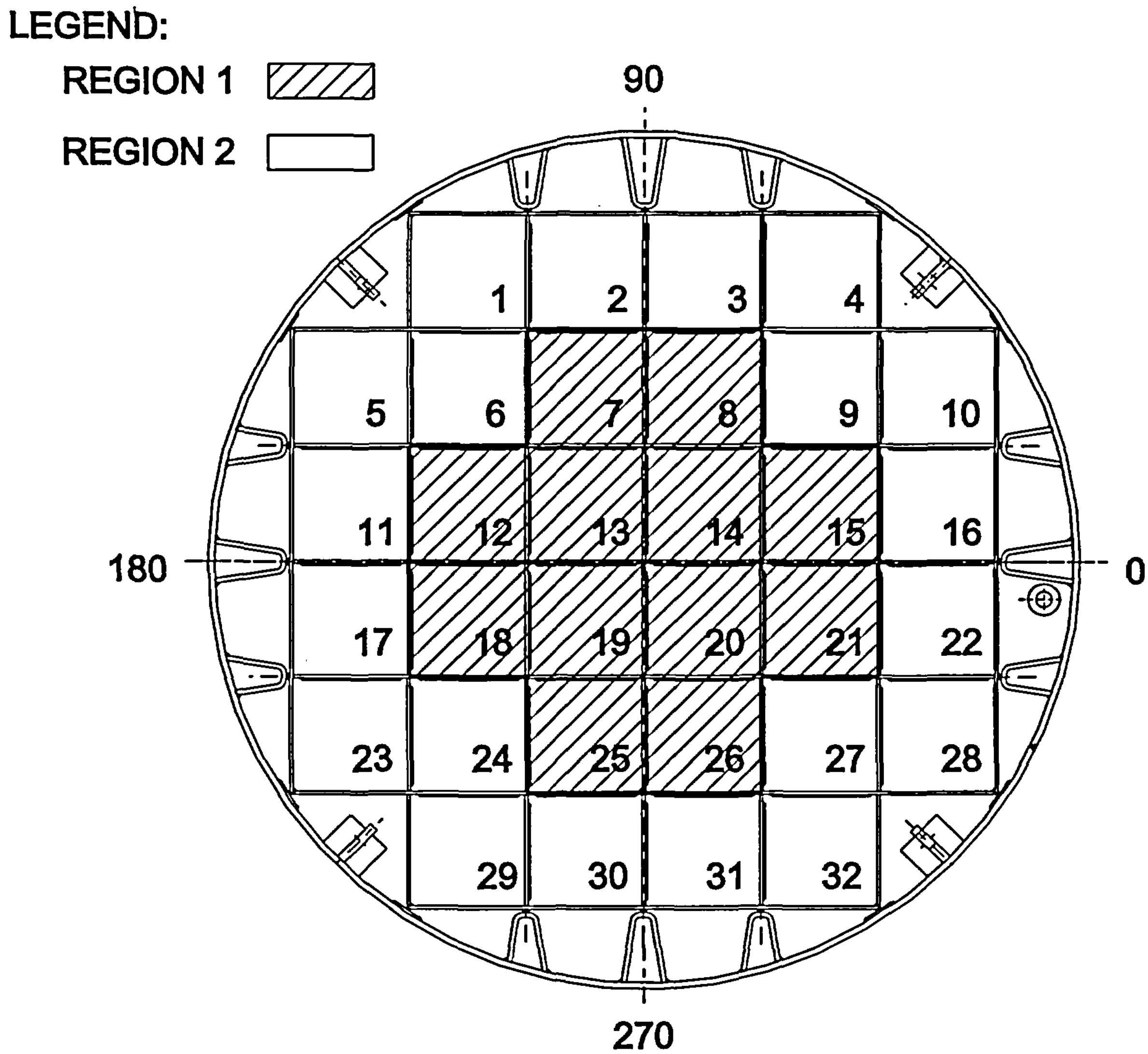
NOTE 3: NA means not authorized for loading.



DIABLO CANYON ISFSI
FIGURE 2.1-1 **FUEL LOADING REGIONS** **MPC-24**



DIABLO CANYON ISFSI
FIGURE 2.1-2 FUEL LOADING REGIONS MPC-24E/24EF



DIABLO CANYON ISFSI

FIGURE 2.1-3
FUEL LOADING REGIONS
MPC-32

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

LCO 3.0.1	LCOs shall be met during specified conditions in the Applicability, except as provided in LCO 3.0.2
LCO 3.0.2	Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met. If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.
LCO 3.0.3	Not applicable.
LCO 3.0.4	When an LCO is not met, entry into a specified condition in the Applicability shall not be made except when the associated ACTIONS to be entered permit continued operation in the specified condition in the Applicability for an unlimited period of time. This Specification shall not prevent changes in specified conditions in the Applicability that are required to comply with ACTIONS or that are related to the unloading of an SFSC.
LCO 3.0.5	Not applicable.

3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

SR 3.0.1	SRs shall be met during specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on equipment or variables outside specified limits.
SR 3.0.2	The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. For Frequencies specified as "once," the above interval extension does not apply. If a Completion Time requires periodic performance on a "once per ..." basis, the above Frequency extension applies to each performance after the initial performance. Exceptions to this Specification are stated in the individual Specifications.
SR 3.0.3	If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is less. This delay period is permitted to allow performance of the Surveillance. If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered. When the Surveillance is performed within the delay period and the Surveillance is not met, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.
SR 3.0.4	Entry into a specified condition in the Applicability of an LCO shall not be made unless the LCOs Surveillances have been met within their specified Frequency. This provision shall not prevent entry into specified conditions in the Applicability that are required to comply with Actions or that are related to the unloading of an SFSC.

3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

3.1.1 MULTI-PURPOSE CANISTER (MPC)

LCO 3.1.1 The MPC shall be dry and helium filled.

APPLICABILITY: During TRANSPORT OPERATIONS and STORAGE OPERATIONS

ACTIONS

~~------------------------------------NOTE------------------------------------~~
~~The LCO is only applicable to wet UNLOADING OPERATIONS.~~

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each MPC.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. MPC cavity vacuum drying pressure or demoisturizer exit gas temperature limit not met.	A.1.	Perform an engineering evaluation to determine the quantity of moisture left in the MPC.	7 days
	<u>AND</u>		
	A.2	Develop and initiate corrective actions necessary to return the MPC to an analyzed condition.	30 days
B. MPC helium backfill pressure limit not met.	B.1	Perform an engineering evaluation to determine the impact of helium pressure differential.	72 hours
	<u>AND</u>		
	B.2	Develop and initiate corrective actions necessary to return the MPC to an analyzed condition.	14 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. MPC helium leak rate limit not met.	C.1	Perform an engineering evaluation to determine the impact of increased helium leak rate on heat removal capability and offsite dose.	24 hours
	<u>AND</u>		
	C.2	Develop and initiate corrective actions necessary to return the MPC to an analyzed condition.	7 days
D. Required Actions and associated Completion Times not met.	D.1	Remove all fuel assemblies from the MPC.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	For those MPCs containing all moderate burnup (≤ 45,000 MWD/MTU) fuel assemblies, verify MPC cavity vacuum drying pressure is ≤ 3 torr for ≥ 30 min. <u>OR</u> For those MPCs containing fuel assemblies of any authorized burnup, while recirculating helium ~~or nitrogen~~ through the MPC cavity, verify that the ~~MPC~~ gas ~~exit~~ temperature *exiting the demoisturizer* is ≤ 21°F for ≥ 30 min.	Once, prior to TRANSPORT OPERATIONS.
SR 3.1.1.2	Verify MPC helium backfill pressure is ≥ 29.3 psig and ≤ 33.3 psig.	Once, prior to TRANSPORT OPERATIONS.
SR 3.1.1.3	Verify that the total helium leak rate through the MPC lid confinement weld and the drain and vent port confinement welds is ≤ 5.0E-6 atm-cc/sec (He).	Once, prior to TRANSPORT OPERATIONS.

3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

3.1.2 Spent Fuel Storage Cask (SFSC) Heat Removal System

LCO 3.1.2 The SFSC Heat Removal System shall be operable.

APPLICABILITY: During STORAGE OPERATIONS

ACTIONS

---NOTE---

Separate Condition entry is allowed for each SFSC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Restore SFSC Heat Removal System to OPERABLE status.	8 hours
	<u>OR</u>	
	A.2.1 Verify adequate heat removal to prevent exceeding short-term fuel temperature limit;	Immediately
	<u>AND</u>	
	A.2.2 Restore SFSC Heat Removal System to OPERABLE status.	30 days
B. Required Actions and associated Completion Time not met.	B.1 Transfer the MPC into a TRANSFER CASK.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.2.1	Verify all *SFSC*~~OVERPACK~~ inlet and outlet air duct screens are free of blockage.	24 hours

3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

3.1.3 Fuel Cool-Down

LCO 3.1.3 The MPC helium exit temperature shall be ≤ 200°F.

------------------------------------NOTE------------------------------------
The LCO is only applicable to wet UNLOADING OPERATIONS.

APPLICABILITY: During UNLOADING OPERATIONS prior to re-flooding.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each MPC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. MPC helium gas exit temperature not within limit.	A.1 Establish MPC helium gas exit temperature within limit.	Prior to initiating MPC reflooding operations.
	AND	
	A.2 Ensure adequate heat transfer from the MPC to the environment	22 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.3.1	Verify MPC helium gas exit temperature within limit.	Prior to MPC reflooding operations.

3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

3.1.4 Spent Fuel Storage Cask (SFSC) Time Limitation in Cask Transfer Facility (CTF)

LCO 3.1.4 The SFSC shall not be in the CTF for greater than 22 Hours

APPLICABILITY: During TRANSPORT OPERATIONS while the SFSC is in the CTF ~~and contains a loaded MPC.~~.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each SFSC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Remove SFSC from CTF.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	Verify *a* SFSC ~~containing a loaded MPC~~ in the CTF *meets the time limitation.*	*8 hours*~~Once per shift~~~~22 hours from the SFSC containing a loaded MPC initially being placed in the CTF or from a loaded MPC initially being lowered into an empty SFSC in the CTF~~

3.2 Cask Criticality Control Program

3.2.1 Dissolved Boron Concentration

LCO 3.2.1 The dissolved boron concentration in the water of the MPC cavity shall be as follows:

a. For all MPCs with one or more fuel assemblies having initial enrichment of ≤ 4.1 wt% ^{235}U: ≥ 2000 ppmb.

b. For MPC-24/24E/24EF with one or more fuel assemblies having initial enrichment of > 4.1 and ≤ 5.0 wt% ^{235}U: ≥ 2000 ppmb.

c. For MPC-32 with one or more fuel assemblies having initial enrichment of > 4.1 and ≤5.0 wt% ^{235}U: ≥ 2600 ppmb.

APPLICABILITY: During LOADING OPERATIONS and UNLOADING OPERATIONS with water and at least one fuel assembly in the MPC.

ACTIONS

-----------------------------NOTE-----------------------------

Separate Condition entry is allowed for each MPC.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Dissolved boron concentration not met.	A.1	Suspend LOADING OPERATIONS or UNLOADING OPERATIONS	Immediately
	<u>AND</u>		
	A.2	Suspend positive reactivity additions	Immediately
	<u>AND</u>		
	A.3	Initiate action to restore boron concentration to within limits	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify the dissolved boron concentration is met using two independent measurements.	Within 8 hours prior to commencing LOADING OPERATIONS AND Every 48 hours thereafter while the MPC is in the spent fuel pool or while water is in the MPC.
SR 3.2.1.2	Verify the dissolved boron concentration is met using two independent measurements.	Within 8 hours prior to commencing UNLOADING OPERATIONS AND Every 48 hours thereafter while the MPC is in the spent fuel pool or while water is in the MPC.

4.0 DESIGN FEATURES

4.1 Design Features Significant to Safety

4.1.1 Criticality Control

a. MULTI-PURPOSE CANISTER (MPC) MPC-24

1. Flux trap size: ≥ 1.09 in.
2. ^{10}B loading in the Boral neutron absorbers: ≥ 0.0267 g/cm^2

b MPC-24E and MPC-24EF

1. Flux trap size:
   - Cells 3, 6, 19, and 22: ≥ 0.776 in.
   - All Other Cells: ≥ 1.076 in.
2. ^{10}B loading in the Boral neutron absorbers: ≥ 0.0372 g/cm^2

c. MPC-32

1. Fuel cell pitch: ≥ 9.158 in.
2. ^{10}B loading in the Boral neutron absorbers: ≥ 0.0372 g/cm^2

4.2 Codes and Standards

The following provides information on the governing codes for the confinement boundary (important to Safety) design:

MPC (Shell and Head)	Applicable Codes	Editions/Years
Material Procurement	ASME III, NB-2000	ASME Code, 1995 Edition. 1997 Addenda
Design	ASME III, NB-3200	ASME Code, 1995 Edition. 1997 Addenda
Fabrication	ASME III, NB-4000	ASME Code, 1995 Edition. 1997 Addenda
Examination	ASME III, NB-5000	ASME Code, 1995 Edition. 1997 Addenda

Any specific alternatives to these codes and standards, and the codes and standards for other components followed for the Diablo Canyon ISFSI storage system, are provided in the Diablo Canyon ISFSI Safety Analysis Report (SAR).

(continued)

4.0 DESIGN FEATURES (continued)

4.2.1 Alternatives to Design Codes, Standards, and Criteria

Proposed construction/fabrication alternatives to the above MPC design codes and standards, including alternatives in SAR Table 3.4-6, may be used when authorized by the Director of the Office of Nuclear Material Safety and Safeguards or designee. The licensee should demonstrate that:

1. The proposed alternatives would provide an acceptable level of quality and safety, or

2. Compliance with the specified requirements of ASME Code Section III, 1995 Edition with Addenda through 1997, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Requests for relief in accordance with this section shall be submitted in accordance with 10 CFR 72.4.

(continued)

4.0 DESIGN FEATURES (continued)

4.3 Cask Handling/Cask Transfer Facility

4.3.1 Cask Transporter

A site-specific cask transporter is used to transport the TRANSFER CASK between the power plant and the CASK TRANSFER FACILITY (CTF) and the SPENT FUEL STORAGE CASK (SFSC) between the CTF and ISFSI pad. The requirements for the cask transporter are as follows:

a. TRANSPORT OPERATIONS shall be conducted using the cask transporter.

b. The cask transporter fuel tank shall not contain > 50 gallons of diesel fuel at any time.

c. The cask transporter shall be designed, fabricated, inspected, maintained, operated, and tested in accordance with the applicable guidelines of NUREG-0612.

d. The cask transporter lifting towers shall have redundant drop protection features.

e. Lifting of a SFSC, loaded TRANSFER CASK, or loaded MPC outside of structures governed by 10 CFR 50 shall be performed with lifting devices that are designed, fabricated, inspected, maintained, operated and tested in accordance with the applicable guidelines of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants."

4.3.2 Storage Capacity

The Diablo Canyon ISFSI can accommodate up to 4,400 spent fuel assemblies and other NONFUEL HARDWARE. The ISFSI storage capacity will accommodate up to 140 SFSCs (138 plus 2 spare locations).

4.3.3 ~~OVERPACK~~ *SFSC* Load Handling Equipment

Lifting of a *SFSC*~~loaded OVERPACK~~ outside of structures governed by 10 CFR 50 shall be performed with load handling equipment that is designed, fabricated, inspected, maintained, operated and tested in accordance with the applicable guidelines of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" as clarified by Section 4.3.4 below. Section 4.3.4 below does not apply to the lifting of heavy loads outside the structures governed by the regulations of 10 CFR 50.

4.3.4 CTF Structure Requirements

a. Permanent Load Handling Equipment

1. The weldment structure of the CTF shall be designed to comply with the stress limits of ASME Code, Section III, Subsection NF, Class 3 for linear structures. All compression-loaded members shall satisfy the buckling criteria of ASME Section III, Subsection NF. The applicable loads, load combinations, and associated service condition definitions are provided in Diablo Canyon ISFSI SAR Section 4.4.5.

2. The reinforced concrete structure of the CTF shall be designed in accordance with ACI-349-1997, as clarified in Diablo Canyon ISFSI SAR Section 4.2.1.2.

(continued)

4.0 DESIGN FEATURES (continued)

b. Mobile Load Handling Equipment

Mobile load handling equipment used in lieu of permanent load handling equipment, shall meet the guidelines of NUREG-0612, Section 5.1, with the following clarifications:

1. Mobile lifting devices shall have a minimum safety factor of two over the allowable load table for the lifting device in accordance with the guidance of NUREG-0612, Section 5.1.6(1)(a) and shall be capable of stopping and holding the load during a Design Basis Earthquake (DBE) event.
2. Mobile lifting devices shall conform to the requirements of ASME B30.5, "Mobile and Locomotive Cranes," in lieu of the requirements of ASME B30.2, "Overhead and Gantry Cranes."
3. Mobile cranes are not required to meet the guidance of NUREG-0612, Section 5.1.6(2) for new cranes.
4. Horizontal movements of the TRANSFER CASK and MPC using a mobile crane are prohibited.

5.0 ADMINISTRATIVE CONTROLS

5.1 Administrative Programs

The following programs shall be established, implemented, and maintained:

5.1.1 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases of these TS.

a. Changes to the TS Bases shall be made under appropriate administrative controls and reviews.

b. Changes to the TS Bases may be made without prior NRC approval in accordance with the criteria in 10 CFR 72.48.

c. The TS Bases Control Program shall contain provisions to ensure that the TS Bases are maintained consistent with the Diablo Canyon ISFSI SAR.

d. Proposed changes that do not meet the criteria of 5.5.1.b above shall be reviewed and approved by the NRC prior to implementation. Changes to the TS Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 72.48 (~~b~~*d*) (2).

5.1.2 Radioactive Effluent Control Program

This program is established and maintained to:

a. Implement the requirements of 10 CFR 72.44 (d) or 72.126, as appropriate

b. Provide limits on surface contamination of the TRANSFER CASK and verification of meeting those limits prior to removal of a loaded TRANSFER CASK from the fuel handling building/auxiliary building.

c. Provide MPC leakage rate limits and verification of meeting those limits prior to removal of a loaded TRANSFER CASK from the fuel handling building/auxiliary building.

d. Provide an effluent monitoring program, as appropriate, if the surface contamination limits are greater than the values specified in Regulatory Guide 1.86; or if the leakage rate limits are greater then the values specified as "Leaktight" in ANSI N14.5 – 1997 "Leakage Tests on Packages for Shipment."

(continued)

5.0 ADMINISTRATIVE CONTROLS (continued)

5.1.3 MPC and SFSC Loading, Unloading, and Preparation Program

This program shall be established and maintained to implement Diablo Canyon ISFSI SAR Section 10.2 requirements for loading fuel and components into MPCs, unloading fuel and components from MPCs, and preparing the MPCs for storage in the SFSCs. The requirements of the program for loading and preparing the MPC shall be complete prior to removing the MPC from the fuel handling building/auxiliary building. The program provides for evaluation and control of the following requirements during the applicable operation:

a. Verify that no transfer cask handling operations are allowed at environmental temperatures below -18 $^{\circ}$C [0 $^{\circ}$F].

b. Verify the maintenance of water in the annular gap between the loaded MPC and TRANSFER CASK during MPC moisture removal operations (loading) or MPC reflooding operations (unloading).

c. The water temperature of a water-filled or partially filled loaded MPC shall be shown by analysis to be less than boiling at all times.

d. Verify that the drying times and pressures assure that short-term fuel temperature limits are not violated and the MPC is adequately dry.

e. Verify that the inerting backfill pressure and purity assure adequate heat transfer and corrosion control.

f. Verify that leak testing assure adequate MPC integrity and consistency with offsite dose analysis.

g. Verify surface dose rates on the TRANSFER CASK are adequate to assure proper loading and consistency with the offsite dose analysis.

h. Verify surface dose rates on the SFSCs are adequate to assure proper storage and consistency with the offsite dose analysis.

i. During MPC re-flooding, verify the helium exit temperature is such that water quenching or flashing does not occur.

j. Fuel cladding oxide thickness shall be evaluated to determine the average fuel cladding oxide thickness of high burnup (> 45,000 MWD/MTU) SPENT NUCLEAR FUEL assemblies proposed to be stored in the ISFSI facility. Direct physical measurements or an appropriate predictive methodology with due consideration of all significant variables (e.g., in-core flux, cycle length and number, power history, coolant temperature profile, coolant chemistry, and metallurgy of the fuel cladding material) to determine the average oxide thickness on the fuel cladding may be used. If a predictive methodology is used to determine average fuel cladding oxide thickness, a sufficient number of fuel cladding thickness measurements shall be made to adequately benchmark the methodology.

(continued)

5.0 ADMINISTRATIVE CONTROLS (continued)

5.1.3 (cont'd) In order to classify a high burnup spent fuel assembly as an INTACT FUEL ASSEMBLY, the maximum allowable average fuel cladding oxidation layer thickness (t_{ox}) shall be:

For DCPP LOPAR assemblies without IFBA fuel, t_{ox} = 173.5 micrometers.

For DCPP VANTAGE 5 assemblies without IFBA fuel, t_{ox} = 190.5 micrometers.

For DCPP LOPAR assemblies with IFBA fuel, t_{ox} = 67 micrometers.

For DCPP VANTAGE 5 assemblies with IFBA fuel, t_{ox} = 88 micrometers.

A high burnup spent fuel assembly shall be considered a DAMAGED FUEL ASSEMBLY if the computed or measured average oxidation layer thickness on any fuel rod exceeds the applicable limit above.

This program will control limits, surveillances, compensatory measures and appropriate completion times to assure the integrity of the fuel cladding at all times in preparation of and during LOADING, UNLOADING or TRANSPORT OPERATIONS, as applicable.

5.1.4 ISFSI Operations Program

This program will implement the Diablo Canyon ISFSI SAR requirements for ISFSI operations. It will included criteria to be verified and controlled:

a) SFSC cask storage location.

b) Design features listed in Section 4.0 and design basis ISFSI pad parameters consistent with the Diablo Canyon ISFSI SAR analysis.

c) Condition of the ISFSI Pad anchor bolt surface coatings exposed directly to the elements.

5.1.5 Cask Transportation Evaluation Program

This program will evaluate and control the transportation of loaded MPCs between the DCPP fuel handling building/auxiliary building, the CTF and the ISFSI storage pads. Included in this program will be pre-transport evaluation and control during transportation of the following:

- Transportation route road surface conditions.
- Onsite hazards along the transportation route.
- Security
- Transporter control functions and operability
- CTF equipment operability
- SFSC auxiliary cooling capability availability

ENCLOSURE 2

REVISED PROPOSED TECHNICAL SPECIFICATION BASES FOR DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION

TECHNICAL SPECIFICATION BASES
FOR
DIABLO CANYON
INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

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B 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

BASES

LCO	LCO 3.0.1, 3.0.2, and 3.0.4 establish the general requirements applicable to all Specifications and apply at all times, unless otherwise stated.
LCO 3.0.1	LCO 3.0.1 establishes the Applicability statement within each individual Specification as the requirement for when the LCO is required to be met (i.e., when the facility is in the specified conditions of the Applicability statement of each Specification.)

LCO 3.0.2

LCO 3.0.2 establishes that upon discovery of a failure to meet an LCO, the associated ACTIONS shall be met. The Completion Time of each Required Action for an ACTIONS condition is applicable from the point in time that an ACTIONS condition is entered. The Required Actions establish those remedial measures that must be taken within specified Completion Times when the requirements of an LCO are not met. This Specification establishes that:

a. Completion of the Required Actions within the specified Completion Times constitutes compliance with a Specification; and

b. Completion of the Required Actions is not required when an LCO is met within the specified Completion Time, unless otherwise specified.

There are two basic types of Required Actions. The first type of Required Action specifies a time limit in which the LCO must be met. This time limit is the Completion Time to restore a system or component or to restore variables to within specified limits. Whether stated as a Required Action or not, correction of the entered condition is an action that may always be considered upon entering ACTIONS. The second type of Required Action specifies the remedial measures that permit continued operation that is not further restricted by the Completion Time. In this case, compliance with the Required Actions provides an acceptable level of safety for continued operation.

Completing the Required Actions is not required when an LCO is met or is no longer applicable, unless otherwise stated in the individual Specifications.

The Completion Times of the Required Actions are also applicable when a system or component is removed from service intentionally. The reasons for intentionally relying on the ACTIONS include, but are not limited to, performance of Surveillances, preventive maintenance, corrective maintenance, or investigation of operational problems. Entering ACTIONS for these reasons must be done in a manner that does not compromise safety. Intentional entry into ACTIONS should not be made for operational convenience.

(continued)

BASES (continued)

LCO 3.0.3	This specification is not applicable to the Diablo Canyon ISFSI because it describes conditions under which a power reactor must be shut down when an LCO is not met and an associated ACTION is not met or provided. The placeholder is retained for consistency with the power reactor technical specifications.
LCO 3.0.4	LCO 3.0.4 establishes limitations on changes in specified conditions in the Applicability when an LCO is not met. It precludes placing the facility in a specified condition stated in that Applicability (e.g., Applicability desired to be entered) when the following exist: a. Facility conditions are such that the requirements of the LCO would not be met in the Applicability desired to be entered; and b. Continued noncompliance with the LCO requirements, if the Applicability were entered, would result in being required to exit the Applicability desired to be entered to comply with the Required Actions. Compliance with Required Actions that permit continued operation of the facility for an unlimited period of time in a specified condition provides an acceptable level of safety for continued operation. This is without regard to the status of the facility. Therefore, in such cases, entry into a specified condition in the Applicability may be made in accordance with the provisions of the Required Actions. The provisions of this Specification should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components before entering an associated specified condition in the Applicability. The provisions of LCO 3.0.4 shall not prevent changes in specified conditions in the Applicability that are required to comply with ACTIONS, or that are related to the unloading of an SFSC Exceptions to LCO 3.0.4 are stated in the individual Specifications. Exceptions may apply to all the ACTIONS or to a specific Required Action of a Specification.

(continued)

BASES (continued)

LCO 3.0.5	This specification is not applicable to the Diablo Canyon ISFSI because it describes conditions under which a power reactor must be shut down when an LCO is not met and an associated ACTION is not met or provided. The placeholder is retained for consistency with the power reactor technical specifications.

B 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

BASES

SRs	SR 3.0.1 through SR 3.0.4 establish the general requirements applicable to all Specifications and apply at all times, unless otherwise stated.
SR 3.0.1	SR 3.0.1 establishes the requirement that SRs must be met during the specified conditions in the Applicability for which the requirements of the LCO apply, unless otherwise specified in the individual SRs. This Specification is to ensure that Surveillances are performed to verify that systems and components meet the LCO and variables are within specified limits. Failure to complete a Surveillance within the specified Frequency, in accordance with SR 3.0.2, constitutes a failure to meet an LCO.

Systems and components are assumed to meet the LCO when the associated SRs have been met. Nothing in this Specification, however, is to be construed as implying that systems or components meet the associated LCO when:

a. The systems or components are known to not meet the LCO, although still meeting the SRs; or

b. The requirements of the Surveillance(s) are known to be not met between required Surveillance performances.

Surveillances do not have to be performed when the facility is in a specified condition for which the requirements of the associated LCO are not applicable, unless otherwise specified.

Surveillances including Surveillances invoked by Required Actions, do not have to be performed on equipment that has been determined to not meet the LCO because the ACTIONS define the remedial measures that apply. Surveillances have to be met and performed in accordance with SR 3.0.2, prior to returning equipment to service. Upon completion of maintenance, appropriate post-maintenance testing is required. This includes ensuring applicable Surveillances are not failed and their most recent performance is in accordance with SR 3.0.2.

Post-maintenance testing may not be possible in the current specified conditions in the Applicability due to the necessary facility parameters not having been established. In these situations, the equipment may be considered to meet the LCO provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to proceed to a specified condition where other necessary post-maintenance tests can be completed.

(continued)

BASES (continued)

SR 3.0.2

SR 3.0.2 establishes the requirements for meeting the specified Frequency for Surveillances and any Required Action with a Completion Time that requires the periodic performance of the Required Action on a "once per....." interval.

SR 3.0.2 permits a 25% extension of the interval specified in the Frequency. This extension facilitates Surveillance scheduling and considers facility conditions that may be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities).

The 25% extension does not significantly degrade the reliability that results from performing the Surveillance at its specified Frequency. This is based on the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with SRs. The exceptions to SR 3.0.2 are those Surveillances for which the 25% extension of the interval specified in the Frequency does not apply. These exceptions are stated in the individual Specifications as a Note in the Frequency stating, "SR 3.0.2 is not applicable."

As stated in SR 3.0.2, the 25% extension also does not apply to the initial portion of a periodic Completion Time that requires performance on a "once per ...." basis. The 25% extension applies to each performance after the initial performance. The initial performance of the Required Action, whether it is a particular Surveillance or some other remedial action, is considered a single action with a single Completion Time. One reason for not allowing the 25% extension to this Completion Time is that such an action usually verifies that no loss of function has occurred by checking the status of redundant or diverse components or accomplishes the function of the affected equipment in an alternative manner.

The provisions of SR 3.0.2 are not intended to be used repeatedly merely as an operational convenience to extend Surveillance intervals or periodic Completion Time intervals beyond those specified.

(continued)

BASES (continued)

SR 3.0.3

SR 3.0.3 establishes the flexibility to defer declaring affected equipment as not meeting the LCO or an affected variable outside the specified limits when a Surveillance has not been completed within the specified Frequency. A delay period of up to 24 hours or up to the limit of the specified Frequency, whichever is less, applies from the point in time that it is discovered that the Surveillance has not been performed in accordance with SR 3.0.2, and not at the time that the specified frequency was not met.

This delay period provides adequate time to complete Surveillances that have been missed. This delay period permits the completion of a Surveillance before complying with Required Actions or other remedial measures that might preclude completion of the Surveillance.

The basis for this delay period includes consideration of facility conditions, adequate planning, availability of personnel, the time required to perform the Surveillance, the safety significance of the delay in completing the required Surveillance, and the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the requirements. When a Surveillance with a Frequency based not on time intervals, but upon specified facility conditions, is discovered not to have been performed when specified, SR 3.0.3 allows the full delay period of 24 hours to perform the Surveillance.

SR 3.0.3 also provides a time limit for completion of Surveillances that become applicable as a consequence of changes in the specified conditions in the Applicability imposed by the Required Actions.

Failure to comply with specified Frequencies for SRs is expected to be an infrequent occurrence. Use of the delay period established by SR 3.0.3 is a flexibility, which is not intended to be used as an operational convenience to extend Surveillance intervals.

If a Surveillance is not complete within the allowed delay period, then the equipment is considered to not meet the LCO or the variable is considered outside the specified limits and the Completion Times of the Required Actions for the applicable LCO Conditions begin immediately upon expiration of the delay period. If a Surveillance is failed within the delay period, then the equipment does not meet the LCO, or the variable is outside the specified limits and the Completion Times of the Required Actions for the applicable LCO Conditions begin immediately upon the failure of the Surveillance.

Completion of the Surveillance within the delay period allowed by this Specification, or within the Completion Time of the ACTIONS, restores compliance with SR 3.0.1.

(continued)

BASES (continued)

SR 3.0.4

SR 3.0.4 establishes the requirement that all applicable SRs must be met before entry into a specified condition in the Applicability.

This Specification ensures that system and component requirements and variable limits are met before entry into specified conditions in the Applicability for which these systems and components ensure safe operation of the facility.

The provisions of this Specification should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components before entering an associated specified condition in the Applicability.

However, in certain circumstances, failing to meet an SR will not result in SR 3.0.4 restricting a change in specified condition. When a system, subsystem, division, component, device, or variable is outside the specified limits, the associated SR(s) are not required to be performed per SR 3.0.1, which states that Surveillances do not have to be performed on equipment that has been determined to not meet the LCO. When equipment does not meet the LCO, SR 3.0.4 does not apply to the associated SR(s) since the requirement for the SR(s) to be performed is removed. Therefore, failing to perform the Surveillance(s) within the specified Frequency does not result in an SR 3.0.4 restriction to changing specified conditions of the Applicability. However, since the LCO is not met in this instance, LCO 3.0.4 will govern any restrictions that may (or may not) apply to specified condition changes.

The provisions of SR 3.0.4 shall not prevent changes in specified conditions in the Applicability that are required to comply with ACTIONS.

The precise requirements of performance of SRs are specified such that exceptions to SR 3.0.4 are not necessary. The specific time frames and conditions necessary for meeting the SRs are specified in the Frequency, in the Surveillance, or both. This allows performance of Surveillances when the prerequisite condition(s) specified in a Surveillance procedure require entry into the specified condition in the Applicability of the associated LCO prior to the performance or completion of a Surveillance. A Surveillance that could not be performed until after entering the LCO Applicability would have its Frequency specified such that it is not "due" until the specific conditions needed are met. Alternately, the Surveillance may be stated in the form of a Note as not required (to be met or performed) until a particular event, condition, or time has been reached. Further discussion of the specific formats of SRs annotation is found in Diablo Canyon ISFSI Technical Specification Section 1.4, Frequency.

B 3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

B 3.1.1 Multi-Purpose Canister (MPC)

BASES

BACKGROUND

A TRANSFER CASK with an empty MPC is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements TS Section 2.0 Approved Contents. A lid is then placed on the MPC. An MPC lid retention device is placed over the lid and attached to the TRANSFER CASK. The TRANSFER CASK and MPC are raised to the top of the spent fuel pool 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 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. Inspections are performed on the welds. TRANSFER CASK bottom pool lid is replaced with the transfer lid to allow eventual transfer of the MPC into the OVERPACK.

MPC cavity moisture removal using vacuum drying or forced helium recirculation is performed to remove residual moisture from the MPC fuel cavity after the MPC has been drained of water. If vacuum drying is used, any water that has not drained from the fuel cavity evaporates from the fuel cavity due to the vacuum. This is aided by the temperature increase due to the decay heat of the fuel.

If helium recirculation is used, the dry gas introduced to the MPC cavity through the vent and drain port absorbs the residual moisture in the MPC. This humidified gas exits the MPC via the other port and the absorbed water is removed through condensation and/or mechanical drying. The dried helium is then forced back though the MPC until the temperature acceptance limit is met.

After the completion of moisture removal, the MPC cavity is backfilled with helium meeting the backfill pressure requirements of the LCO.

Backfilling of the MPC fuel cavity with helium promotes gaseous heat dissipation and the inert atmosphere protects the fuel cladding. Providing a helium pressure in the required range at room temperature (70° F), eliminates air in-leakage over the life of the MPC because the cavity pressure rises due to heat up of the confined gas by the fuel decay heat during storage.

In-leakage of air could be harmful to the fuel. Prior to moving the SFSC to the storage pad, the MPC helium leak rate is determined to ensure that the fuel is confined.

(continued)

BASES

APPLICABLE SAFETY ANALYSIS	The confinement of radioactivity during the storage of spent fuel in the MPC is ensured by the multiple confinement boundaries and systems. The barriers relied on are the fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the MPC in which the fuel assemblies are stored. Long-term integrity of the fuel and cladding depend on storage in an inert atmosphere. This is accomplished by removing water from the MPC and backfilling the cavity with an inert gas. The thermal analyses of the MPC assume that the MPC cavity is filled with dry helium of a minimum quality to ensure the assumptions used for convection heat transfer are preserved. Keeping the backfill pressure below the maximum value preserves the initial condition assumptions made in the MPC over-pressurization evaluation.
LCO	A dry, helium filled and sealed MPC establishes an inert heat removal environment necessary to ensure the integrity of the multiple confinement boundaries. Moreover, it also ensures that there will be no air in-leakage into the MPC cavity that could damage the fuel cladding over the storage period.
APPLICABILITY	The dry, sealed and inert atmosphere is required to be in place during TRANSPORT OPERATIONS and STORAGE OPERATIONS to ensure both the confinement barriers and heat removal mechanisms are in place during these operating periods. These conditions are not required during LOADING OPERATIONS or UNLOADING OPERATIONS as these conditions are being established or removed, respectively during these periods in support of other activities being performed with the stored fuel.
ACTIONS	A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each MPC. This is acceptable since the Required Actions for each Condition provide appropriate compensatory measures for each MPC not meeting the LCO. Subsequent MPCs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions. A.1 If the cavity vacuum drying pressure *or* demoisturizer exit gas temperature limit has been determined not to be met during TRANSPORT OPERATIONS or STORAGE OPERATIONS, an engineering evaluation is necessary to determine the potential quantity of moisture left within the MPC cavity. Since moisture remaining in the cavity during these modes of operation may represent a long-term degradation concern, immediate action is not necessary. The Completion Time is sufficient to complete the engineering evaluation commensurate with the safety significance of the CONDITION.

(continued)

BASES (continued)

A.2

Once the quantity of moisture potentially left in the MPC cavity is determined, a corrective action plan shall be developed and actions initiated to the extent necessary to return the MPC to an analyzed condition. Since the quantity of moisture estimated under Required Action A.1 can range over a broad scale, different recovery strategies may be necessary. Since moisture remaining in the cavity during these modes of operation may represent a long-term degradation concern, immediate action is not necessary. The Completion Time is sufficient to develop and initiate the corrective actions commensurate with the safety significance of the CONDITION.

B.1

If the helium backfill pressure limit has been determined not to be met during TRANSPORT OPERATIONS or STORAGE OPERATIONS, an engineering evaluation is necessary to determine the quantity of helium within the MPC cavity. Since too much or too little helium in the MPC during these modes represents a potential overpressure or heat removal degradation concern, an engineering evaluation shall be performed in a timely manner. The Completion Time is sufficient to complete the engineering evaluation commensurate with the safety significance of the CONDITION.

B.2

Once the quantity of helium in the MPC cavity is determined, a corrective action plan shall be developed and initiated to the extent necessary to return the MPC to an analyzed condition. Since the quantity of helium estimated under Required Action B.1 can range over a broad scale, different recovery strategies may be necessary. Since elevated or reduced helium quantities existing in the MPC cavity represent a potential overpressure or heat removal degradation concern, corrective actions should be developed and implemented in a timely manner. The Completion Time is sufficient to develop and initiate the corrective actions commensurate with the safety significance of the CONDITION.

(continued)

BASES (continued)

<u>C.1</u>

If the helium leakrate limit has been determined not to be met during TRANSPORT OPERATIONS or STORAGE OPERATIONS, an engineering evaluation is necessary to determine the impact of increased helium leak rate on heat removal and off-site dose. Since the HI-STORM OVERPACK is a ventilated system, any leakage from the MPC is transported directly to the environment. Since an increased helium leak rate represents a potential challenge to MPC heat removal and the off-site doses calculated in the SAR confinement analyses, reasonably rapid action is warranted. The Completion Time is sufficient to complete the engineering evaluation commensurate with the safety significance of the CONDITION.

<u>C.2</u>

Once the cause and consequences of the elevated leak rate from the MPC are determined, a corrective action plan shall be developed and initiated to the extent necessary to return the MPC to an analyzed condition. Since the recovery mechanisms can range over a broad scale based on the evaluation performed under Required Action C.1, different recovery strategies may be necessary. Since an elevated helium leak rate represents a challenge to heat removal rates and off-site doses, reasonably rapid action is required. The Completion Time is sufficient to develop and initiate the corrective actions commensurate with the safety significance of the CONDITION.

<u>D.1</u>

If the MPC fuel cavity cannot be successfully returned to a safe, analyzed condition, the fuel must be placed in a safe condition in the spent fuel pool. The Completion Time is reasonable based on the time required to replace the transfer lid with the pool lid, perform fuel cooldown operations, re-flood the MPC, cut the MPC lid welds, move the TRANSFER CASK into the spent fuel pool, remove the MPC lid, and remove the spent fuel assemblies in an orderly manner and without challenging personnel.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1, SR 3.1.1.2, and SR 3.1.1.3

The long-term integrity of the stored fuel is dependent on storage in a dry, inert environment. For moderate burnup fuel cavity dryness may be demonstrated either by evacuating the cavity to a very low absolute pressure and verifying that the pressure is held over a specified period of time or by recirculating dry helium through the MPC cavity to absorb moisture until the demoisturizer exit temperature reaches and remains below the acceptance limit for the specified time period. A low vacuum pressure or a demoisturizer exit temperature meeting the acceptance limit is an indication that the cavity is dry.

For high burnup fuel, the forced helium recirculation method of moisture removal must be used to provide necessary cooling of the fuel during drying operations. Cooling provided by normal operation of the forced helium dehydration system ensures that the fuel cladding temperature remains below the applicable limits since forced recirculation of helium provides more effective heat transfer than that which occurs during normal storage operations.

Having the proper helium backfill pressure ensures adequate heat transfer from the fuel to the fuel basket and surrounding structure of the MPC. Meeting the helium leak rate limit ensures there is adequate helium in the MPC for long term storage and the leak rate assumed in the confinement analyses remains bounding for off-site dose.

The leakage rate acceptance limit is specified in units of atm-cc/ sec. This is a mass-like leakage rate as specified in ANSI N14.5 (1997). This is defined as the rate of change of the pressure-volume product of the leaking fluid at test conditions. This allows the leakage rate as measured by a mass spectrometer leak detector (MSLD) to be compared directly to the acceptance limit without the need for unit conversion from test conditions to standard, or reference conditions.

All three of these surveillances must be successfully performed once, prior to TRANSPORT OPERATIONS to ensure that the conditions are established for SFSC storage, which preserve the analysis basis supporting the cask design.

(continued)

REFERENCES	1. Diablo Canyon ISFSI SAR Sections 3.1.2, and 3.3.1.7 2. Diablo Canyon ISFSI SAR Section 4.2.3.3 and Table 4.5-1 3. Diablo Canyon ISFSI SAR Section 5.1.1.2 and Table 5.1-1 4. Diablo Canyon ISFSI SAR Sections 7.5.2.1 and Table 7.4-1 5. Diablo Canyon ISFSI SAR Section 8.2.7.2.2 6. Diablo Canyon ISFSI SAR Sections 10.2.2.3, 10.2.2.4, 10.2.2.5 and Figure 10.2-4.

(continued)

B 3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

B 3.1.2 Spent Fuel Storage Cask (SFSC) Heat Removal System

BASES

BACKGROUND

The SFSC heat removal system is a passive, air-cooled, convective heat transfer system that ensures heat from the MULTI-PURPOSE CANISTER (MPC) is transferred to the environs by the chimney effect. Relatively cool air is drawn into the annulus between the OVERPACK and the MPC through the four inlet air ducts at the bottom of the OVERPACK. The MPC transfers its heat from the canister surface to the air via natural convection. The buoyancy created by the heating of the air creates a chimney effect and the air is forced back into the environs through the four outlet air ducts at the top of the OVERPACK.

APPLICABLE SAFETY ANALYSIS

The thermal analyses of the SFSC take credit for the decay heat from the spent fuel assemblies being ultimately transferred to the ambient environment surrounding the ~~OVERPACK~~*SFSC*. Transfer of heat away from the fuel assemblies ensures that the fuel cladding and other SFSC component temperatures do not exceed applicable limits. Under normal storage conditions, the four inlet and four outlet air ducts are unobstructed and full air flow (i.e., maximum heat transfer for the given ambient temperature) occurs.

Analyses have been performed for the complete obstruction of two, three, and four inlet air ducts. Blockage of two inlet air ducts reduces airflow through the OVERPACK annulus and decreases heat transfer from the MPC. Under this off-normal condition, no SFSC components exceed the short-term temperature limits.

Blockage of three inlet air ducts further reduces airflow through the OVERPACK annulus and decreases heat transfer from the MPC. Under this accident condition, no SFSC components exceed the short-term temperature limits.

The complete blockage of all four inlet air ducts stops air-cooling of the MPC. The MPC will continue to radiate heat to the relatively cooler inner shell of the OVERPACK. With the loss of air-cooling, the SFSC component temperatures will increase toward their respective short-term temperature limits. None of the components reach their temperature limits over the 72-hour duration of the analyzed event. Therefore, the limiting component is assumed to be the fuel cladding.

(continued)

BASES (continued)

LCO

The SFSC heat removal system must be verified to be operable to preserve the assumptions of the thermal analyses. The operability of the heat removal system ensures that the decay heat generated by the stored fuel assemblies is transferred to the environs at a sufficient rate to maintain fuel cladding and other SFSC component temperatures within design limits.

APPLICABILITY

The LCO is applicable during STORAGE OPERATIONS. Once an OVERPACK containing an MPC loaded with approved contents has been placed in storage, the heat removal system must be operable to ensure adequate heat transfer of the decay heat away from the fuel assemblies.

ACTIONS

A note has been added to the ACTIONS, which states that for this LCO, separate condition entry is allowed for each SFSC. This is acceptable since the Required Actions for each condition provide appropriate compensatory measures for each SFSC not meeting the LCO. Subsequent SFSCs that don't meet the LCO are governed by subsequent condition entry and application of associated Required Actions.

<u>A.1</u>

If the heat removal system has been determined to be inoperable, it must be restored to operable status within 8 hours. Eight hours is reasonable period of time (typically, one operating shift) to take action to remove the obstructions in the air flow path.

<u>A.2.1</u>

As an alternative to meeting A.1, adequate heat removal capability must be verified to exist to prevent exceeding the short-term fuel cladding temperature limit. This verification must be performed immediately.

Thermal analysis of a fully blocked SFSC shows that without adequate heat removal the fuel cladding short-term temperature limit could be exceeded over time. As a result, requiring immediate verification of adequate heat removal capability will ensure that the SFSC components and the fuel cladding do not exceed their short-term temperature limits.

The thermal analysis also shows that only complete blockage of all four vents results in the potential for exceeding short-term fuel cladding or other SFSC component limits. As a result, verifying that there is at least one vent operable or the equivalent cooling of one operable vent will ensure that the short-term limits are not exceeded while the remainder of the inlet vents are returned to operable status under Action A.2.2.

(continued)

BASES

ACTIONS (continued)

<u>A.2.2</u>

In addition to Required Action A.2.1, efforts must continue to restore the heat removal system to operable status.

As long as the adequate heat removal capability that was verified in A.2.1 exists, restoring the SFSC heat removal system to complete operability is not an immediate concern. Therefore, restoring it within 30 days is considered a reasonable period of time.

<u>B.1</u>

If the A.1, A.2.1 and A.2.2 actions cannot be met then the affected MPC must be placed in a safe condition. Transferring the affected MPC from the inoperable SFSC to the TRANSFER CASK will place the MPC in an analyzed condition. The TRANSFER CASK has adequate heat removal capability to ensure that the short-term fuel cladding temperature limit is not exceeded.

Transfer of the MPC into a TRANSFER CASK removes the SFSC from the LCO applicability. STORAGE OPERATIONS does not include time restrictions when the MPC resides in the TRANSFER CASK because of adequate heat transfer in this configuration to maintain peak fuel cladding temperature well below the short term limit.

(continued)

BASES

ACTIONS (continued)	<u>B.1 (continued)</u> If actions A.1, A.2.1 and A.2.2 are not met the Completion Time for this Required Action is immediate. Thermal analysis of a fully blocked SFSC shows that without adequate heat removal the fuel cladding short-term temperature limit could be exceeded over time. The analysis shows that without heat removal for the first 72 hours the SFSC components and the fuel cladding do not exceed their short-term temperature limits. However at that time, the temperatures are continuing to increase. By requiring immediate action, this should allow adequate time to transfer the MPC to the TRANSFER CASK as not to exceed the 72 hours.
SURVEILLANCE REQUIREMENTS	<u>SR 3.1.1</u> The long-term integrity of the stored fuel is dependent on the ability of the SFSC to reject heat from the MPC to the environment. Visual observation that all four inlet and outlet air ducts are unobstructed and intact ensures that airflow past the MPC is occurring and heat transfer is taking place. Complete blockage of any one or more inlet or outlet air ducts renders the heat removal system inoperable and this LCO not met. Partial blockage of one or more inlet or outlet air ducts does not constitute inoperability of the heat removal system. However, corrective actions should be taken promptly to remove the obstruction and restore full flow through the affected duct(s). The Frequency of 24 hours is reasonable based on the time necessary for SFSC components to heat up to unacceptable temperatures assuming design basis heat loads, and allowing for corrective actions to take place upon discovery of blockage of air ducts.
REFERENCES	7. Diablo Canyon ISFSI SAR Section 3.4, Table 3.4-2 8. Diablo Canyon ISFSI SAR Section 4.4 9. Diablo Canyon ISFSI SAR Sections 7.1, 7.2, and 7.3 10. Diablo Canyon ISFSI SAR Section 8.1 11. Diablo Canyon ISFSI SAR Sections 8.2.11, 8.2.12, and 8.2.15

B 3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

B 3.1.3 Fuel Cool-Down

BASES

BACKGROUND	In the event that an MPC must be unloaded, the TRANSFER CASK with its enclosed MPC is returned to the cask preparation area to begin the process of fuel unloading. The MPC closure ring, and vent and drain port cover plates are removed. The MPC gas is sampled to determine the integrity of the spent fuel cladding. The MPC is attached to the Cool-Down System. The Cool-Down System is a closed-loop forced ventilation gas cooling system that cools the fuel assemblies by cooling the surrounding helium gas. Following fuel cool-down, the MPC is then re-flooded with water and the MPC lid weld is removed leaving the MPC lid in place. The transfer cask and MPC are placed in the spent fuel pool and the MPC lid is removed. The fuel assemblies are removed from the MPC and the MPC and transfer cask are removed from the spent fuel pool and decontaminated. Reducing the fuel cladding temperatures significantly reduces the temperature gradients across the cladding thus minimizing thermally-induced stresses on the cladding during MPC re-flooding. Reducing the MPC internal temperatures eliminates the risk of high MPC pressure due to sudden generation of steam during re-flooding.
APPLICABLE SAFETY ANALYSIS	The confinement of radioactivity during the storage of spent fuel in the MPC is ensured by the multiple confinement boundaries and systems. The barriers relied on are the fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the MPC in which the fuel assemblies are stored. Long-term integrity of the fuel and cladding depend on minimizing thermally induced stresses to the cladding. This is accomplished during the unloading operations by lowering the MPC internal temperatures prior to MPC re-flooding. The Integrity of the MPC depends on maintaining the internal cavity pressures within design limits. This is accomplished by reducing the MPC internal temperatures such that there is no sudden formation of steam during MPC re-flooding.

(continued)

BASES (continued)

LCO

Monitoring the circulating MPC gas exit temperature ensures that there will be no large thermal gradient across the fuel assembly cladding during re-flooding which could be potentially harmful to the cladding. The temperature limit specified in the LCO was selected to ensure that the MPC gas exit temperature will closely match the desired fuel cladding temperature prior to re-flooding the MPC. The temperature was selected to be lower than the boiling temperature of water with an additional margin.

APPLICABILITY

The MPC helium gas exit temperature is measured during UNLOADING OPERATIONS after the transfer cask and integral MPC are back in the fuel building and are no longer suspended from, or secured in, the transporter. Therefore, the Fuel Cool-Down LCO does not apply during TRANSPORT OPERATIONS and STORAGE OPERATIONS.

A note has been added to the APPLICABILITY for LCO 3.1.3 which states that the Applicability is only applicable during wet UNLOADING OPERATIONS. This is acceptable since the intent of the LCO is to avoid uncontrolled MPC pressurization due to water flashing during re-flooding operations. This is not a concern for dry UNLOADING OPERATIONS.

ACTIONS

A note has been added to the ACTIONS which states that, for this LCO, separate Condition entry is allowed for each MPC. This is acceptable since the Required Actions for each Condition provide appropriate compensatory measures for each MPC not meeting the LCO. Subsequent MPCs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

<u>A.1</u>

If the MPC helium gas exit temperature limit is not met, actions must be taken to restore the parameters to within the limits before re-flooding the MPC. Failure to successfully complete fuel cool-down could have several causes, such as failure of the cool down system, inadequate cool down, or clogging of the piping lines. The Completion Time is sufficient to determine and correct most failure mechanisms and proceeding with activities to flood the MPC cavity with water are prohibited.

(continued)

BASES (continued)

A.2

If the LCO is not met, in addition to performing Required Action A.1 to restore the gas temperature to within the limit, the user must ensure that the proper conditions exist for the transfer of heat from the MPC to the surrounding environs to ensure the fuel cladding remains below the short term temperature limit.

Ensure the annulus between the MPC and the TRANSFER CASK is filled with water. This places the system in a heat removal configuration which is bounded by the FSAR thermal evaluation of the system considering a vacuum in the MPC. The system is open to the ambient environment which limits the temperature of the ultimate heat sink (the water in the annulus) and, therefore, the MPC shell to 212°F.

Twenty-two (22) hours is an acceptable time frame to allow for completion of Required Action A.2 and is conservatively based on a thermal evaluation of a TRANSFER CASK located in a pit or vault. In such a configuration, passive cooling mechanisms will be largely diminished. Eliminating 90 percent of the passive cooling mechanisms with the cask emplaced in the vault, the thermal inertia of the cask (approximately 20,000 Btu/°F) will limit the rate of temperature rise with design basis maximum heat load to approximately 4.5°F per hour. Thus, the fuel cladding temperature rise in 22 hours will be less than 100°F. Large short term temperature margins exist to preclude any cladding integrity concerns under this temperature rise.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1

The long-term integrity of the stored fuel is dependent on the material condition of the fuel assembly cladding. By minimizing thermally-induced stresses across the cladding the integrity of the fuel assembly cladding is maintained. The integrity of the MPC is dependent on controlling the internal MPC pressure. By controlling the MPC internal temperature prior to re-flooding the MPC there is no formation of steam during MPC re-flooding.

The MPC helium exit gas temperature limit ensures that there will be no large thermal gradients across the fuel assembly cladding during MPC re-flooding and no formation of steam which could potentially overpressurize the MPC.

Fuel cool down must be performed successfully on each SFSC before the initiation of MPC re-flooding operations to ensure the design and analysis basis are preserved.

(continued)

BASES (continued)

REFERENCES	12. Diablo Canyon ISFSI SAR Sections 4.2.3.3.3, 4.4.1, and 4.4.1.2.6
	13. Diablo Canyon ISFSI SAR Table 5.1-1
	14. Diablo Canyon ISFSI Sections 9.4.1.1.2 and 9.4.1.1.4
	15. Diablo Canyon ISFSI SAR Sections 10.2.3, 10.2.3.1 and 10.2.3.6

B 3.1 FUEL INTEGRITY

B 3.1.4 Spent Fuel Storage Case (SFSC) Time Limitation in Cask Transfer Facility (CTF)

BASES

BACKGROUND

The SFSC heat removal system is a passive, air-cooled, convective heat transfer system that ensures heat from the MULTI-PURPOSE CANISTER (MPC) is transferred to the environs by the chimney effect. Relatively cool air is drawn into the annulus between the OVERPACK and the MPC through the four inlet air ducts at the bottom of the OVERPACK. The MPC transfers its heat from the canister surface to the air via natural convection. The buoyancy created by the heating of the air creates a chimney effect and the air is forced back into the environs through the four outlet air ducts at the top of the OVERPACK. However, while the SFSC is in the CTF there is a reduced cooling capability over this normal storage configuration because of ambient air access restrictions. As a result, over time the decay heat produced by the spent fuel may cause exceedance of the short term temperature limit of the fuel cladding or damage the shielding material. To ensure that this does not take place the time that a SFSC, with a loaded MPC, is allowed to be in the CTF shall be limited to 22 hours.

If other CTF lifting mechanisms are not operable, the cask transporter is designed and shall be used to remove the ~~loaded~~ SFSC from the CTF without additional assistance using the HI-STORM Lift Links and Lifting Brackets

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APPLICABLE SAFETY ANALYSIS

The thermal analyses of the SFSC take credit for the decay heat from the spent fuel assemblies being ultimately transferred to the ambient environment surrounding the ~~OVERPACK~~*SFSC*. Transfer of heat away from the fuel assemblies ensures that the fuel cladding and other SFSC component temperatures do not exceed applicable limits. Under normal storage conditions, the four inlet and four outlet air ducts are unobstructed and full airflow (i.e., maximum heat transfer for the given ambient temperature) occurs.

However while the SFSC is in the CTF the restricted airflow around the SFSC decreases heat transfer capability. This case has been bounded by an analysis of a loaded TRANSFER CASK being in a loading pit with no external ventilation capability and is provided in the HI-STORM 100 System FSAR, Section 4.5.2. In that analysis, there is assumed to be only 10 percent of the normal heat transfer capability. Based on this, the temperature inside the MPC is shown not to reach the short-term limit of the fuel cladding within the first 22 hours. This analysis is considered bounding of the SFSC because the thermal inertia of the SFSC is greater then that of the TRANSFER CASK, therefore the heat-up is much slower. As a result, providing a time limitation of 22 hours for the SFSC to be in the CTF is conservative and adequate to ensure that the short-term temperature limits will not be met or exceeded.

(continued)

BASES (continued)

LCO	The SFSC~~, containing a loaded MPC,~~ must not remain in the CTF for greater than 22 hours. This time limitation ensures that the decay heat generated by the approved content in a loaded MPC does not reach or exceed the approved content or other SFSC component temperature design limits.
APPLICABILITY	The LCO is applicable during TRANSPORT OPERATIONS while a SFSC ~~containing a loaded MPC~~ is in its lowered position in the CTF. If an OVERPACK in the CTF does not contain an MPC, which contains approve contents, then this LCO does not apply.
ACTIONS	A note has been added to the ACTIONS, which states that for this LCO, separate condition entry is allowed for each SFSC. This is acceptable since the Required Actions for each condition provide appropriate compensatory measures for each SFSC not meeting the LCO. Subsequent SFSCs that don't meet the LCO are governed by subsequent condition entry and application of associated Required Actions. <u>A.1</u> If the LCO cannot be met the ~~loaded~~ SFSC must be removed from the CTF immediately to ensure adequate heat removal capability exist to prevent exceeding the short-term fuel cladding and SFSC component temperature limit. If the normal lifting mechanisms of the CTF are not capable of moving the ~~loaded~~ SFSC out of the CTF, the cask transporter shall be used to remove the ~~loaded~~ SFSC from the CTF. While the SFSC is in the CTF the restricted airflow around the SFSC decreases heat transfer capability. This case has been bounded by an analysis of a loaded TRANSFER CASK being in a loading pit with no external ventilation capability. In that analysis, there is assumed to be only 10 percent of the normal heat transfer capability. Based on this, the temperature inside the MPC is shown not to reach the short-term temperature limit of the fuel cladding within the first 22 hours. This analysis is considered bounding because the thermal inertia of the SFSC is greater when compared to the TRANSFER CASK, therefore the heat-up is much slower. As a result, providing a time limitation of 22 hours for the SFSC to be in the CTF is conservative and adequate to ensure that the short-term temperature limits will not be met or exceeded.

(continued)

BASES

ACTIONS	A.1 (continued) The Completion Time for this Required Action is immediately. The bounding analysis shows that the temperature inside the MPC does not reach the short-term temperature limit of the fuel cladding within the first 22 hours. As a result, providing a time limitation of 22 hours for the SFSC to be in the CTF is conservative and requiring immediate action to remove the ~~loaded~~ SFSC will ensure that the short-term temperature limits will not be met or exceeded.
SURVEILLANCE REQUIREMENTS	SR 3.1.1 The integrity of the stored fuel is dependent on the ability of the SFSC to reject heat from the MPC to the environment. Verification that a ~~loaded~~ SFSC does not remain in the CTF for more then 22 hours will ensure that the short-term temperature limits will not be met or exceeded. The Frequency of *once per 8 hours while a SFSC is in the CTF will ensure that the* 22 hours *time limitation* from the initial movement of a ~~loaded~~ SFSC into the CTF or from a loaded MPC being lowered into an empty ~~SFSC~~ *OVERPACK* in the CTF i*is not exceeded. The once every 8 hours verification* is reasonable based on the time necessary for SFSC components to heat up to unacceptable temperatures assuming design basis heat loads, and allows~~ing~~ for corrective actions to take place. This surveillance is only required if a~~the~~ SFSC ~~contains a loaded MPC and~~ is in the CTF.
REFERENCES	1. Diablo Canyon ISFSI SAR Section 3.4, Table 3.4-2 2. Diablo Canyon ISFSI SAR Section 4.4 3. Diablo Canyon ISFSI SAR Sections 7.1, 7.2, and 7.3 4. Diablo Canyon ISFSI SAR Section 8.1 5. Diablo Canyon ISFSI SAR Sections 8.2.11, 8.2.12, 8.2.15, and 8.2.17

B 3.2 SPENT FUEL STORAGE CASK (SFCS) CRITICALITY CONTROL

B 3.2.1 Dissolved Boron Concentration

BASES

BACKGROUND	A TRANSFER CASK with an empty MULTI-PURPOSE CANISTER (MPC) is placed in the spent fuel pool (SFP) and loaded with fuel assemblies and associated NONFUEL HARDWARE meeting the requirements of Section 2.0, Approved Content. After loading the MPC, an MPC lid is placed on the MPC along with a lid retention device attached to the TRANSFER CASK. The TRANSFER CASK with the MPC inside is removed from the SFP to a washdown area. In the washdown area, the MPC lid is welded in place and the MPC is leak tested, drained, dried, and backfilled with helium. The TRANSFER CASK and accessible portions of the contained MPC are also surveyed to ensure that any radioactive contamination is within administrative limits. For those MPCs containing fuel assemblies of relatively high initial enrichment, credit is taken in the criticality analyses for boron in the water within the MPC. To preserve the analysis basis, users must verify that the dissolved boron concentration of the water in the MPC meets specified limits when there is fuel and water in the MPC. This may occur during LOADING OPERATIONS and UNLOADING OPERATIONS.
APPLICABLE SAFETY ANALYSIS	The spent nuclear fuel stored in the SFSC is required to remain subcritical ($k_{eff} \leq 0.95$) under all conditions of storage. The SFSC is analyzed to store a wide variety of spent nuclear fuel assembly types with differing initial enrichments and associated NONFUEL HARDWARE. For all allowed fuel loaded in the MPCs credit was taken in the criticality analyses for neutron poison in the form of soluble boron in the water within the MPC. Compliance with this LCO preserves the assumptions made in the criticality analyses regarding credit for soluble boron.

(continued)

BASES

LCO

Compliance with this LCO ensures that the stored fuel will remain subcritical with a $k_{eff} \leq 0.95$ while water is in the MPC. The LCO provides the minimum concentration of soluble boron required in the MPC water based on type of MPC and the initial enrichment of the fuel.

LCO 3.2.1.a provides the minimum concentration of soluble boron required in any of the MPCs if one or more fuel assemblies are loaded with an initial enrichment of ≤ 4.1 wt% U-235. LCO 3.2.1.b provides the minimum concentration of soluble boron required in MPC-24/24E/24EF if one or more fuel assemblies are loaded with an initial enrichment of > 4.1 wt% and ≤ 5.0 wt% U-235. LCO 3.2.1.c provides the minimum concentration of soluble boron required in MPC-32 if one or more fuel assemblies are loaded with an initial enrichment of > 4.1 wt% and ≤ 5.0 wt% U-235.

All INTACT FUEL ASSEMBLIES loaded into the MPC-24, MPC-24E, MPC-24EF, and MPC-32 are limited by analysis to maximum enrichments of 5.0 wt% U-235.

For all INTACT FUEL ASSEMBLIES loaded into an MPC that contains DAMAGED FUEL ASSEMBLIES or FUEL DEBRIS, the maximum initial enrichment of the INTACT FUEL ASSEMBLES is limited to the maximum initial enrichment of the DAMAGED FUEL ASSEMBLIES and FUEL DEBRIS (i.e., 4.0 wt% U-235).

APPLICABILITY

The dissolved boron concentration LCO is applicable whenever an MPC-24, MPC-24E, MPC-24EF, or MPC-32 has at least one fuel assembly in a storage location and water in the MPC.

During LOADING OPERATIONS, the LCO is applicable immediately upon the loading of the first fuel assembly in the MPC. It remains applicable until the MPC is drained of water.

During UNLOADING OPERATIONS, the LCO is applicable when the MPC is reflooded with water after helium cool-down operations. Note that compliance with SR 3.0.4 ensures that the water to be used to flood the MPC is of the correct dissolved boron concentration to ensure the LCO is met upon entering the Applicability.

(continued)

BASES

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate condition entry is allowed for each MPC. This is acceptable since the Required Actions for each condition provide appropriate compensatory measures for each MPC not meeting the LCO. Subsequent MPCs that do not meet the LCO are governed by subsequent condition entry and application of associated Required Actions.

A.1 and A2

Continuation of LOADING OPERATIONS, UNLOADING OPERATIONS or positive reactivity additions (including ACTIONS to reduce dissolved boron concentration) is contingent upon maintaining the MPC in compliance with the LCO. If the dissolved boron concentration of water in the MPC is less than its limit, LOADING OPERATIONS or UNLOADING OPERATIONS, and any positive reactivity additions must be suspended immediately. Inherent in the required action to stop these activities is the requirement to place any in progress activity, such as the movement of a fuel assemble, in a safe condition.

A.3

In addition to immediately suspending LOADING OPERATIONS or UNLOADING OPERATIONS, and any positive reactivity additions, action to restore the concentration to within the limit specified in the LCO must be initiated immediately.

One means of complying with this action is to initiate boration of the affected MPC. In determining the required combination of boration flow rate and concentration, there is no unique design bases event that must be satisfied; only that boration be initiated without delay. In order to raise the boron concentration as quickly as possible, the operator should begin boration with the best source available for existing plant conditions. The methods available for boration should include, but not be limited to, direct boration of the MPC or boration of the SFP if the MPC is located in the pool at the time.

Once boration is initiated, it must be continued until the boron concentration is restored. The restoration time depends on the amount of boron that must be injected to reach the required concentration.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.2.1.1

When the MPC is placed in the SFP the dissolved boron concentration in the MPC water must be verified by two independent measurements to be within the applicable limit within 8 hours prior to entering the applicability of the LCO. For LOADING OPERATIONS, this means within 8 hours prior to loading any approved content into the cask.

The use of two independent measurements provides reasonable assurance that the dissolved boron LCO limit is met and maintained. The 8 hours limitation is considered a reasonably short time period which minimizes any potential for changes in the critical dissolved boron concentration prior to loading and still allows flexibility in the operation. Once the dissolved boron concentration has been verified a change in this concentration is not credible unless there is some action specifically taken to modify it. During the period between verification and loading all changes in water volume including additions or subtractions in the SFP or MPC; recirculation of water through the MPC; or the addition or dilution of the dissolved boron concentration in the SFP or MPC to be loaded, will be administratively controlled. If any of these actions or operations takes place during the 8-hour period, the dissolved boron concentration will be re-verified to be within limits prior to loading any authorized contents in the MPC.

In addition, while the MPC is in the SFP or while water is in the MPC the boron concentration will continue to be verified to be within the applicable limits every 48 hours. This reflects the premise that normally there is no real need to re-verify the boron concentration of the water in the MPC after it is removed from the SFP unless water is to be added to, or recirculated through the MPC, because these are the only credible activities that could potentially change the dissolved boron concentration during this time. The 48-hour Completion Time for the re-verification is infrequent enough to prevents the interference of unnecessary sampling activities while lid closure welding and other MPC storage preparation activities are taking place in an elevated radiation area atop the MPC. However, it is often enough to ensure that any change in the concentration for any reason is detected in a reasonable time to take proper action. Plant procedures shall specifically ensure that any water to be added to, or recirculated through the MPC is at a dissolved boron concentration greater than or equal to the minimum boron concentration specified in the LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.2.1.2

For UNLOADING OPERATIONS, this means verifying the source of borated water to be used to reflood the MPC within 8 hours prior to commencing reflooding operations. This ensures that when the LCO is applicable (upon introducing water into the MPC), the LCO will be met.

The use of two independent measurements provides reasonable assurance that the dissolved boron LCO limit is met and maintained in the source of water. The 8 hours limitation is considered a reasonably short time period which minimizes any potential for changes in the critical dissolved boron concentration in the source of water prior to introduction into the MPC and still allows flexibility in the operation. Once the dissolved boron concentration has been verified a change in this concentration is not credible unless there is some action specifically taken to modify it. During the period between verification and introducing the water into the MPC all changes in water source or volume including additions or subtractions in the source; or the addition or dilution of the dissolved boron concentration in the source will be administratively controlled. If any of these actions or operations takes place during the 8-hour period, the dissolved boron concentration in the source water will be re-verified prior to introducing any water into the MPC to be unloaded.

In addition, while the MPC to be unloaded is in the SFP or while water is in the MPC to be unloaded the dissolved boron concentration will continue to be verified to be within the applicable limits every 48 hours. This reflects the premise that normally there is no real need to re-verify the dissolved boron concentration of the water in the MPC unless water is to be added to, or recirculated through the MPC, because these are the only credible activities that could potentially change the dissolved boron concentration during this time.

The 48-hour Completion Time for the re-verification is infrequent enough to prevent the interference of unnecessary sampling activities while MPC UNLOADING OPERATIONS are taking place in an elevated radiation area atop the MPC. However, it is often enough to ensure that any change in the concentration for any reason is detected in a reasonable time to take proper action. Plant procedures shall specifically ensure that any water to be added to, or recirculated through the MPC is at a dissolved boron concentration is greater than or equal to the minimum dissolved boron concentration specified in the LCO.

REFERENCES

1. Diablo Canyon ISFSI SAR Section 4.2

ENCLOSURE 3

Amendment 2 to
Proposed Technical Specifications and Bases
Description of Changes

Amendment 2 to
Proposed Technical Specifications and Bases
Description of Changes

T.S. Section	Description of Change
Table 2.1-7	Changed title of the second column to MPC-24 Assembly Decay Heat (INTACT FUEL ASSEMBLIES)(Watts).
1.1 Definitions	The definition for SFSCs has been changed for clarification and the definitions for Storage Operations and Transfer Operations have been revised for consistency with Holtec definitions. For consistency with these revised definitions, changes have been made in LCO 3.1.4, SR 3.1.4.1, Design Feature 4.3.3, Bases 3.1.2, and Bases 3.1.4 (11 places).
LCO 3.1.1 and 3.1.3	The note stating the LCO is only applicable to Wet Unloading Operations has been deleted from LCO 3.1.1 and added to LCO 3.1.3 (this was a typographical error). The helium exit temperature location has been clarified in SR 3.1.1.1. The exit temperature on loading is taken at the exit of the demoisturizer. For unloading it is taken at the exit of the MPC.
SR 3.1.1.1	The reference to nitrogen has been removed from SR 3.1.1.1, as Diablo Canyon only uses helium.
SR 3.1.4.1 and Bases SR 3.1.1	The surveillance requirement has been changed to "verify a SFSC in the CTF meets the time limitation." The associated surveillance frequency has been changed to 8 hours. The LCO Applicability has been changed by deleting "and contains a loaded MPC", which is redundant.
Admin. Prog. 5.1.1d	The reference to 10 CFR 72.48 (d) (2) has been corrected.