Pacific Gas and Electric Company®

James R. Becker
Site Vice President

Diablo Canyon Power Plant
Mail Code 104/5/601
P. O. Box 56
Avila Beach, CA 93424

805.545.3462
Internal: 691.3462
Fax: 805.545.6445

November 17, 2009

PG&E Letter HIL-09-006

ATTN: Document Control Desk
Director, Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Materials License No. SNM-2514, Docket No. 72-27
Humboldt Bay Independent Spent Fuel Storage Installation
Changes to Technical Specification Bases and 10 CFR 72.48 Report of Changes, Tests, and Experiments for the Period of November 18, 2007 through November 17, 2009

Dear Commissioners and Staff:

On November 17, 2005, the NRC issued Materials License No. SNM-2514 authorizing Pacific Gas and Electric Company (PG&E) to receive, possess, store, and transfer spent fuel and associated radioactive materials resulting from the operation of Humboldt Bay Power Plant (HBPP) Unit 3 into the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI). Humboldt Bay ISFSI Technical Specification (TS) 5.1.1, "Technical Specifications (TS) Bases Control Program," requires biennial reporting of changes to the TS Bases. Title 10 CFR 72.48, "Changes, Tests and Experiments," requires biennial reporting of any changes, tests, and experiments, including a summary of the evaluation of each.

Changes to the ISFSI TS Bases

Humboldt Bay ISFSI TS 5.1.1, "Technical Specifications (TS) Bases Control Program," provides a means for processing changes to the Bases of the TS. TS 5.1.1.b states that changes to the TS Bases may be made without prior NRC approval in accordance with the criteria in 10 CFR 72.48. Further, TS 5.1.1.d requires that changes to the TS Bases implemented without prior NRC approval be provided to the NRC on a frequency consistent with 10 CFR 72.48 (d)(2). Enclosure 1 contains Revision 1 to the Humboldt Bay ISFSI TS Bases that is being submitted in accordance with TS 5.1.1.d. Changes are noted with revision bars.

Changes in the Facility as Described in the Final Safety Analysis Report (FSAR)

Enclosure 2 provides a summary of the evaluation of changes in accordance with 10 CFR 72.48. The changes were reviewed and accepted by the Plant Staff Review Committee (PSRC). The PSRC determined that the changes did not require prior NRC approval or require a change to the ISFSI Technical Specifications.

NMSS01

Changes in Procedures as Described in the FSAR

No changes were made to procedures as described in the FSAR during the reporting period.

Tests and Experiments Not Described in the FSAR

No tests or experiments were performed during the reporting period that are not described in the FSAR.

If you have any questions regarding this submittal, please contact Mr. David Sokolsky at (707) 444-0801.

Sincerely,

for

James R. Becker
Site Vice President

Enclosure

cc/enc: Elmo J. Collins, NRC Region IV
Shana Helton, NRC NMSS
Ray Kellar, NRC Region IV
PG Fossil Gen HBPP Humboldt Distribution

HUMBOLDT BAY INDEPENDENT SPENT FUEL STORAGE INSTALLATION

TECHNICAL SPECIFICATION BASES

Technical Specifications Bases

for the

Humboldt Bay ISFSI

Eureka, California

TECHNICAL SPECIFICATION BASES

FOR THE

HUMBOLDT BAY

INDEPENDENT SPENT FUEL STORAGE INSTALLATION

Docket No. 72-27

Materials License No. SNM-2514

TABLE OF CONTENTS

B 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY .... B 3.0-1
B 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY .... B 3.0-3
B 3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY .... B 3.1-1
B 3.1.1 Multi-Purpose Canister (MPC-HB) .... B 3.1-1
B 3.1.2 OVERPACK Heat Removal System .... B 3.1-7
B 3.1.3 Fuel Cool-Down .... B 3.1-10

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 Humboldt Bay 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.
LCO 3.0.5	This specification is not applicable to the Humboldt Bay 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)

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)

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)

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 Humboldt Bay 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 SFSC (HI-STAR HB OVERPACK with an empty MPC) is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements of 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 HI-STAR HB OVERPACK. The SFSC is raised to the top of the spent fuel pool surface. The SFSC is 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.

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 and temperature requirements of the SR.

Backfilling of the MPC fuel cavity with helium promotes gaseous heat dissipation and the inert atmosphere protects the fuel cladding.

(continued)

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 depends 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, corrected to 70° F, 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.
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. <u>A.1</u> If the cavity drying criteria 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

ACTIONS (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

ACTIONS (continued)

C.1

If the helium leak rate 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. Since the HI-STAR OVERPACK is a sealed system, any leakage from the MPC is contained within the OVERPACK. Since an increased helium leak rate represents a potential challenge to MPC heat removal, reasonably rapid action is warranted. The Completion Time is sufficient to complete the engineering evaluation commensurate with the safety significance of the CONDITION.

C.2

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, 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.

D.1

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 perform fuel cool-down operations, re-flood the MPC, install the lid retention device, cut the MPC lid welds, move the SFSC into the spent fuel pool, remove the lid retention device and the MPC lid, and remove the spent fuel assemblies in an orderly manner and without challenging personnel.

(continued)

BASES

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. 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.

Having the proper helium backfill pressure ensures adequate heat transfer from the fuel to the fuel basket and surrounding structure of the MPC. It should be noted that the MPC helium backfill pressure and temperature are not actually measured in meeting SR 3.1.1.2, since this is not practicably achievable. Instead, the SR temperature and the SR minimum and maximum pressures, which are based on the minimum acceptable helium density for heat transfer considerations and the maximum acceptable helium density for potential MPC overpressure considerations, respectively, are used in conjunction with the ideal gas law to calculate a range of acceptable backfill helium volumes, in standard cubic feet. Backfilling within the calculated helium volume range for each MPC loading, based upon the MPC free volume, ensure helium density will be in the analyzed range. It also follows from this that if the MPC average helium temperature were actually at 70° F, that the helium pressure would be ≥ 45.2 psig and ≤ 48.8 psig, validating the SR 3.1.1.2 is being met using the volume backfill methodology.

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 storage, which preserve the analysis basis supporting the cask design.

(continued)

SURVEILLANCE REQUIREMENTS SR 3.1.1.1, SR 3.1.1.2, and SR 3.1.1.3

REFERENCES

1. Humboldt Bay ISFSI SAR Sections 3.1
2. Humboldt Bay ISFSI SAR Section 4.2.3.3 and Table 4.5-1
3. Humboldt Bay ISFSI SAR Section 5.1.1.2 and Table 5.1-1
4. Humboldt Bay ISFSI SAR Sections 7.4 and Table 7.4-1
5. Humboldt Bay ISFSI SAR Sections 10.2.2.2, 10.2.2.3, and Figure 10.2-3.
6. HBPP Calculation NX-308, "Determine MPC Helium Backfill Volume per SR 3.1.1.2"

B 3.1 SPENT FUEL STORAGE CASK (SFSC) INTEGRITY

B 3.1.2 OVERPACK Heat Removal System

BASES

BACKGROUND	The OVERPACK heat removal system is a passive heat transfer system that ensures heat from the MULTI-PURPOSE CANISTER (MPC) is transferred to the environs by conduction and radiation.
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. Transfer of heat away from the fuel assemblies ensures that the fuel cladding and other SFSC component temperatures do not exceed applicable limits.
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 TRANSPORT and STORAGE OPERATIONS. Once a SFSC 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 MPC-HB. 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 cavity pressure 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 OVERPACK 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)

ACTIONS (continued)

A.2

Once the quantity of moisture potentially left in the OVERPACK cavity is determined, a corrective action plan shall be developed and actions initiated to the extent necessary to return the OVERPACK 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 OVERPACK cavity. Since too much or too little helium in the OVERPACK 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 OVERPACK cavity is determined, a corrective action plan shall be developed and initiated to the extent necessary to return the OVERPACK 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 OVERPACK 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.

C.1

If the helium leak rate 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 the heat removal capability. The Completion Time is sufficient to complete the engineering evaluation commensurate with the safety significance of the CONDITION.

(continued)

ACTIONS (continued)	C.2 Once the cause and consequences of the elevated leak rate from the OVERPACK are determined, a corrective action plan shall be developed and initiated to the extent necessary to return the OVERPACK 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, 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.
SURVEILLANCE REQUIREMENTS	SR 3.1.2.1, SR 3.1.2.2, and SR 3.1.2.3 The long-term integrity of the stored fuel is dependent on storage in a dry, inert environment. Cavity dryness is demonstrated by maintaining cavity pressure below the acceptance limit for the specified time period. Having the proper helium backfill pressure ensures adequate heat transfer from the MPC to the OVERPACK. Meeting the helium leak rate limit ensures there is adequate helium in the OVERPACK for long term storage. 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 storage, which preserve the analysis basis supporting the cask design.
REFERENCES	1. Humboldt Bay ISFSI SAR Section 3.4, Table 3.4-2 2. Humboldt Bay ISFSI SAR Section 4.4 3. Humboldt Bay ISFSI SAR Sections 7.1, 7.2, and 7.3 4. Humboldt Bay ISFSI SAR Section 8.1 5. Humboldt Bay ISFSI SAR Sections 8.2.11

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 SFSC 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, the lid retention device is installed, and the MPC lid weld is removed leaving the MPC lid in place. The SFSC is placed in the spent fuel pool and the lid retention device is removed, followed by the MPC lid. The fuel assemblies are removed from the MPC and the MPC and HI-STAR HB OVERPACK 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)

LCO	Determining that the circulating MPC gas exit temperature is below the acceptance criteria 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 bulk gas exit temperature is determined during UNLOADING OPERATIONS after the SFSC is back in the fuel building and is 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 bulk 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)

ACTIONS (continued)

A.2

If the LCO is not met, in addition to performing Required Action A.1 to restore the bulk gas temperature to within the limit, the proper conditions must 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 HI-STAR HB OVERPACK is filled with water. This places the system in a heat removal configuration which is bounded by the SAR 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-four (24) 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 HI-STAR HB OVERPACK located in a 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 less than 4°F per hour. Thus, the fuel cladding temperature rise in 24 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 that the design and analysis basis are preserved.

BASES (continued)

REFERENCES

1. Humboldt Bay ISFSI SAR Sections 4.2.3.3.5, 4.4.1, and 4.4.1.2.6
2. Humboldt Bay ISFSI SAR Table 5.1-1
3. Humboldt Bay ISFSI SAR Sections 9.4.1.1.2 and 9.4.1.1.4
4. Humboldt Bay ISFSI SAR Sections 10.2.3 and 10.2.3.1

10 CFR 72.48 REPORT OF CHANGES, TESTS AND EXPERIEMENTS NOVEMBER 18, 2007 THROUGH NOVEMBER 17, 2009

HUMBOLDT BAY INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) DOCKET NO. 72-27

Described below are changes made to the Humboldt Bay ISFSI during the period from November 18, 2007, through November 17, 2009, that include a brief description of the changes and a summary of the 10 CFR 72.48 evaluations. The Humboldt Bay Power Plant - Plant Staff Review Committee reviewed a more complete record of the changes and determined that the changes did not require prior NRC approval and did not require a change to the ISFSI Technical Specifications.

Description of Change 2008-02:

The Humboldt Bay ISFSI Final Safety Analysis Report (FSAR) did not address the minimum hydrogen density for the Holtite-A neutron shielding material. The Holtite-A mix did not meet the Holtec generic FSAR for the HI-STAR 100 system, which also applies to the Humboldt Bay ISFSI HI-STAR HB system. As a result, Holtec initiated an Engineering Change Order (ECO) to document a reduction in hydrogen density in Holtite-A. The ECO required a change to the Humboldt Bay ISFSI FSAR. As a result, the Humboldt Bay ISFSI FSAR Section 4.2.3 was revised to allow a minimum density of 0.091 g/cc.

Justification of Change:

A minimum hydrogen density for the Holtite-A needed to be addressed in the Humboldt Bay ISFSI FSAR. The reduced minimum hydrogen density proposed by Holtec did not result in exceeding the dose limit requirements of 10 CFR 72.104.

Description of Change HPP-1125-400

During the torquing of HISTAR lid bolts for cask serial number 12, five of the 54 bolts became damaged and, as a result, they deviate from the design requirements. Therefore, only 49 lid bolts were properly installed on the cask. A site specific analysis was performed to show that 49 bolts are adequate to perform the design basis requirements.

Justification of Change:

A site specific analysis demonstrating that all design basis conditions are met with only 49 lid bolts was performed to justify the bolt damage in HISTAR cask serial number 12. This analysis was performed using the same methodology as that used in the generic HISTAR FSAR. The analysis results show that there is a safety factor for the lid bolt preload of 1.4. The analysis is documented in Supplier Manufacturing Deviation Report (SMDR) 1783, Revision 0, dated December 9, 2008.