B 2.0 FUNCTIONAL AND OPERATING LIMITS

BASES

BACKGROUND

To protect the integrity of the fuel cladding and ultimately the public from radioactive materials in effluents and direct radiation levels associated with cask operation, the TN-40 and TN-40HT storage cask design requires certain criteria and limits to be placed on the spent fuel parameters for the fuel to be stored in a cask. These criteria and parameter limits include fuel type, initial enrichment, maximum burnup, minimum cooling time, and fuel assembly physical condition (i.e., unconsolidated and not DAMAGED FUEL ASSEMBLY). To limit the associated radiological dose terms from other devices to be stored in casks, i.e., burnable poison rod assemblies (BPRA's) and thimble plug devices (TPD's), similar limitations are placed on BPRA's and TPD's. These criteria and the associated limits are placed on the respective input assumptions used in the thermal, structural, criticality, shielding, and confinement analyses performed for the TN-40 and TN-40HT casks.

APPLICABLE SAFETY ANALYSIS

The applicable safety analyses, as described in the SAR, are the thermal, structural, criticality, shielding, and confinement. The associated Technical Specification criteria and limits are applied to the input assumptions for the specific fuel parameters within these analyses. Within these SAR analyses fuel is considered "Design Bases Fuel" which bounds all specific fuel types to be considered for the TN-40 or TN-40HT. Therefore, the respective SAR analyses do not describe the maximum uranium content for each fuel type. The fuel geometry is determined by the fuel type designation (i.e. 14x14 std, 14x14 TOPROD, 14x14 OFA, etc.). Reactor coolant radiochemistry data from the fuel assembly's final cycle of operation, fuel sipping, eddy current exams, or ultrasonic testing may be used to determine that a particular fuel assembly has no cladding breaches.

BASES (continued)

FUNCTIONAL AND OPERATING LIMITS VIOLATIONS

The Functional and Operational Limits are established to protect the integrity of the fuel clad barrier and the public from radioactive materials in effluents and direct radiation levels associated with cask operation. Therefore, all limit violations result in the following ACTIONS.

If Functional and Operating Limit 2.1, 2.2, or 2.3 is violated, the limitations on the fuel assemblies in the cask have not been met. ACTIONS must be taken to place the affected fuel assemblies in a safe condition. This safe condition may be established by returning the affected fuel assemblies to the spent fuel pool.

Any violation of a Functional and Operating Limit is to be reported to the NRC Operations Center within 24 hours and a written report of the violation must be accomplished within 30 days.

B 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

BASES

LCOs

LCO 3.0.1, 3.0.2, 3.0.3, 3.0.4, and 3.0.5 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 cask 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 are required to 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. If this

BASES

LCO 3.0.2 (continued)

type of Required Action is not completed within the specified Completion Time, the cask may have to be placed in the spent fuel pool and unloaded. (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 Specification.

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 is not to be made for operational convenience.

Individual Specifications may specify a time limit for performing a Surveillance Requirement (SR) when equipment is removed from service or bypassed for testing. In this case, the Completion Times of the Required Actions are applicable when this time limit expires, if the equipment remains removed from service or bypassed.

When a change in specified condition is required to comply with Required Actions, the cask may enter a specified condition in which another Specification becomes applicable. In this case, the Completion Times of the associated Required Actions would apply from the point in time that the new Specification becomes applicable and the ACTIONS Condition(s) are entered.

BASES (continued)

LCO 3.0.3

LCO 3.0.3 establishes that upon discovery of a failure to meet an LCO and that associated ACTIONS required cannot be met or an associated ACTION to resolve the condition is not provided, the Required Actions of this LCO establish those additional remedial measures that must be taken. These remedial measures provide for the implementation of appropriate compensatory actions to resolve the condition, verification that the cask is not in an unanalyzed condition, verification that required safety functions have not been compromised, and involvement of Plant Operations Management Staff has been included.

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 allows placing the cask in a specified condition stated in that Applicability (e.g., Applicability desired to be entered) when:

a. 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 the cask 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 cask for an unlimited period of time in a specified condition provides an acceptable level of safety for continued operation. 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 are not to be interpreted as endorsing the failure to exercise the good practice of restoring equipment or variables to within specified limits before entering an associated specified condition in the Applicability.

BASES

LCO 3.0.4 (continued)

The provisions of LCO 3.0.4 are not to prevent changes in specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of LCO 3.0.4 are not to prevent changes in specified conditions in the Applicability that are related to the unloading of a cask.

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.

Surveillances do not have to be performed on the associated equipment out of service (or on variables outside the specified limits), as permitted by SR 3.0.1. Therefore, changing specified conditions while in an ACTIONS Condition, either in compliance with LCO 3.0.4 or where an exception to LCO 3.0.4 is stated, is not a violation of SR 3.0.1 or SR 3.0.4 for those Surveillances that do not have to be performed due to the associated out of service equipment.

LCO 3.0.5

LCO 3.0.5 establishes the allowance for restoring equipment to service under administrative controls when it has been removed from service or not in service in compliance with ACTIONS. The sole purpose of this Specification is to provide an exception to LCO 3.0.2 (e.g., to not comply with the applicable Required Action(s)) to allow the performance of required testing to demonstrate:

a. the equipment being returned to service meets the LCO; or

b. other equipment meets the applicable LCOs.

The administrative controls ensure the time the equipment is returned to service in conflict with the requirements of the ACTIONS is limited to the time absolutely necessary to perform the allowed required testing. This Specification does not provide time to perform any other preventive or corrective maintenance.

BASES (continued)

LCO 3.0.6	This specification is not applicable to the ISFSI. The placeholder is retained for consistency with the Prairie Island Nuclear Generating Plant Technical Specifications.
LCO 3.0.7	This specification is not applicable to the ISFSI. The placeholder is retained for consistency with the Prairie Island Nuclear Generating Plant Technical Specifications.
LCO 3.0.8	This specification is not applicable to the ISFSI. The placeholder is retained for consistency with the Prairie Island Nuclear Generating Plant Technical Specifications.
LCO 3.0.9	This specification is not applicable to the ISFSI. The placeholder is retained for consistency with the Prairie Island Nuclear Generating Plant Technical Specifications.

B 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

BASES

SRs

SR 3.0.1 through SR 3.0.4 establishes 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 systems and components, and that variables are within specified limits. Failure to meet a Surveillance within the specified Frequency, in accordance with SR 3.0.2, constitutes a failure to meet an LCO. Surveillances may be performed by means of any series of sequential, overlapping, or total steps provided the entire Surveillance is performed within the specified Frequency. Additionally, the definitions related to instrument testing (e.g., CHANNEL OPERATION TEST) specify that these tests are performed by means of any series of sequential, overlapping, or total steps.

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.

BASES

SR 3.0.1 (continued)

Surveillances do not have to be performed when the cask 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 to declare equipment within its LCO. 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 cask 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.

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 plant operating conditions that may not be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities).

BASES

SR 3.0.2 (continued)

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 the 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. The requirements of regulations take precedence over the TS. Therefore, when a test interval is specified in the regulations, the test interval cannot be extended by the TS, and the SR includes 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 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.

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 greater, 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 or operational situations, 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 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.

BASES

SR 3.0.3 (continued)

If a surveillance is not completed within the allowed delay period, then the equipment is considered not in service 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 is not in service, 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.

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 in the Applicability for which these systems and components ensure safe operation of the facility.

The provisions of this Specification are not to be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to an appropriate status 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 its 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 such equipment. When equipment does not

BASES

SR 3.0.4 (continued)

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 are not to prevent changes in specified conditions in the Applicability that is required to comply with ACTIONS. In addition, the provisions of SR 3.0.4 are not to prevent changes in specified conditions in the Applicability that are related to the unloading of a cask. The precise requirements for 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. Alternatively, 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 SR annotation is found in Section 1.4, Frequency.

B 3.1 CASK INTEGRITY

B 3.1.1 Cask Cavity Vacuum Drying

BASES

BACKGROUND

A cask is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements of the Functional and Operating Limits. A lid is then placed on the cask. Subsequent operations involve lifting the cask above the fuel pool level, removing water from the cask fuel cavity, and then moving the cask to the decontamination area. After the cask lid is secured, vacuum drying of the cask cavity is performed and the cask cavity is backfilled with helium. During normal storage conditions, the cask is backfilled with helium, which is a better heat conductor than air, which results in lower temperatures for stored fuel and the basket.

Cavity vacuum drying is utilized to remove residual water/moisture from the fuel cavity after the cask has been drained of water. Any water which was not drained from the cask cavity evaporates from fuel or basket surfaces due to the vacuum. This is aided by the temperature increase due to the heat generation of the fuel.

APPLICABLE SAFETY ANALYSIS

The confinement of radioactive material during the storage of spent fuel in a cask is ensured by the use of multiple confinement barriers and systems. The barriers relied upon are the uranium dioxide fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the cask in which the fuel assemblies are stored. Long-term integrity of the fuel cladding depends on storage in an inert atmosphere. This protective environment is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas.

BASES (continued)

LCO

A vacuum drying pressure of less than the limit indicates that all liquid water has evaporated and has been removed from the cask cavity. Removing water from the cask cavity helps to ensure the long term minimization of fuel clad corrosion.

APPLICABILITY

Cavity vacuum drying is performed during LOADING OPERATIONS before the cask is transported to the ISFSI storage pad. Therefore, the vacuum requirements do not apply after the cask is backfilled with helium prior to TRANSPORT OPERATIONS and STORAGE OPERATIONS.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the internal environment of one cask is independent of the internal environment of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the cask cavity drying pressure limit cannot be achieved the cask is to be placed back into the spent fuel pool within 7 days. Seven days is sufficient time to reflood the cask. Once placed in the spent fuel pool, the fuel is provided with adequate decay heat removal to maintain the loaded fuel within limits.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

Cask cavity dryness is demonstrated by evacuating the cask cavity to a high vacuum and verifying that the vacuum is held over a specified time period. A maintained high vacuum for the specified time period is an indication that no further evaporation is occurring and the cask cavity is dry. During the dryness demonstration period, the vacuum evacuation pump is to be isolated from the cask cavity. This is accomplished by closing the isolation valve and shutting down of vacuum pump or other system line-ups established to ensure a leaking evacuation pump isolation valve could not be inappropriately maintaining the vacuum in the cask.

The dryness demonstration must be performed successfully on each cask prior to placing the cask in storage. The dryness demonstration must be performed prior to completing the final helium backfill required by SR 3.1.2.2.

REFERENCES None.

B 3.1 CASK INTEGRITY

B 3.1.2 Cask Helium Backfill Pressure

BASES

BACKGROUND

A cask is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements of the Functional and Operating Limits. A lid is then placed on the cask. Subsequent operations involve lifting the cask above the fuel pool level, removing water from the cask fuel cavity, and then moving the cask to the decontamination area. After the cask lid is secured, vacuum drying of the cask cavity is performed and the cask cavity is backfilled with helium. For normal storage conditions, the cask is backfilled with helium, which is a better heat conductor than air, which results in lower temperatures for stored fuel and the basket.

Backfilling the cask cavity with helium promotes heat transfer from the fuel and the inert atmosphere protects the fuel cladding. Providing a helium pressure greater than atmospheric pressure ensures that there will be no in-leakage of air over the life of the cask.

APPLICABLE SAFETY ANALYSIS

The confinement of radioactive material during the storage of spent fuel in a cask is ensured by the use of multiple confinement barriers and systems. The barriers relied upon are the uranium dioxide fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the cask in which the fuel assemblies are stored. Long-term integrity of the fuel cladding depends on storage in an inert atmosphere. This is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas. The failure of storage cask confinement capability is considered in the accident analysis (References 1 and 2).

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The thermal analyses of the cask are performed assuming that helium is in the cask. But during the period from draining of the cask until evacuation of the air and its replacement by helium, heat conduction out of the fuel occurs through air, which has a lower conductivity than helium. A thermal analysis for TN-40HT casks has shown that under these conditions, the maximum fuel cladding temperature will remain below the limit of 752°F for at least 34 hours (Reference 3).

Establishment of even a low pressure helium environment satisfies the helium properties described in design basis thermal analyses because thermal conductivity of gases is not pressure dependent until a very high vacuum is attained.

The heat-up analysis for the TN-40 casks does not contain a time limit on when helium must be introduced into the cask to maintain acceptable fuel cladding temperature. However, the time derived for the TN-40HT casks, .i.e. the Frequency established for SR 3.1.2.1, is conservatively applied to TN-40 casks.

LCO

Backfilling the cask cavity with helium ensures that the heat transfer, is in accordance with cask design functions.

Backfilling the cask cavity with helium at a pressure exceeding atmospheric pressure will ensure that there will be no air in-leakage into the cavity which could damage the fuel cladding over the licensed storage period. An initial helium pressure limit is specified to ensure that the pressure within the cask remains within the design pressure limits over the life of the cask (Reference 3). The helium pressure is the as left value immediately after helium fill is completed in preparation for long term storage.

BASES (continued)

APPLICABILITY Helium backfill is performed during LOADING OPERATIONS prior to transporting the cask to the ISFSI storage pad.

ACTIONS The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the internal environment of one cask is independent of the internal environment of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

Required Action A.1 is modified by a Note which allows exiting this Required Action to vent the helium cask environment to perform subsequent actions that may be necessary to ready the cask for storage.

The thermal analyses of the cask are performed assuming that helium is in the cask. If the helium back fill pressure is not met, then actions must be initiated immediately to establish a helium environment.

A.2

If the helium backfill pressure cannot be obtained, actions must be taken to meet the LCO. Once the helium atmosphere is established by Required Action A.1, there is enough conduction to maintain the loaded fuel within its temperature limits and to prevent thermal expansion from damaging the basket. Therefore, no time limit is required for this action, other than completion prior to helium leak testing.

BASES

ACTIONS (continued)

B.1

If a helium cask environment cannot be achieved and maintained, fuel clad temperatures may increase beyond the analyzed condition. Therefore, the cask will be required to be placed back into the spent fuel pool within 7 days and re-flooded. This time is sufficient time to return the cask to the spent fuel pool and re-flood the cask cavity. Once placed in the spent fuel pool, the fuel is provided adequate decay heat removal to maintain the loaded fuel within limits.

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

Establishment of even a low pressure (i.e. a fraction of a mbar) helium environment satisfies the helium properties described in design basis thermal analyses because thermal conductivity of gases is not pressure dependent until a high vacuum is attained. Thereby, design basis heat removal requirements will be satisfied provided some helium as been introduced to, and maintained in, the cask cavity within the 34 hour vacuum drying time frame analyzed in Reference 3.

SR 3.1.2.2

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.2 (continued)

The long-term integrity of the stored fuel is dependent on storage in a dry, inert environment and maintenance of adequate heat transfer mechanisms. Filling the cask cavity with helium at the initial pressure specified will ensure that there will be no air in-leakage, which could potentially damage the fuel cladding, and that the cask cavity internal pressure will remain within limits for the life of the cask.

Backfilling with helium at a specified pressure must be performed successfully on each cask prior to performance of leak testing activities and TRANSPORT and STORAGE OPERATIONS.

REFERENCES

1. SAR Section 8.2.
2. SAR Section A8.2.
3. SAR Section A3.3.

B 3.1 CASK INTEGRITY

B 3.1.3 Cask Helium Leak Rate

BASES

BACKGROUND

A cask is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements of the Functional and Operational Limits. A lid is then placed on the cask. Subsequent operations involve removing water from the cask fuel cavity and moving the cask to the decontamination area. After the cask lid is secured, vacuum drying of the cask cavity is performed, and the cavity is backfilled with helium.

During normal storage conditions, the cask is backfilled with helium, which is a better heat conductor than air, and the inert atmosphere protects the fuel cladding. Prior to moving the cask to the storage pad, the helium leak rate is determined to ensure that the fuel is confined.

APPLICABLE SAFETY ANALYSIS

The confinement of radioactive material during the storage of spent fuel in a cask is ensured by the use of multiple confinement barriers and systems. The barriers relied upon are the uranium dioxide fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the cask in which the fuel assemblies are stored. Long-term integrity of the fuel cladding depends on storage in an inert atmosphere. This is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas. In addition, the thermal analyses of the cask STORAGE OPERATIONS assume that the cask cavity is filled with helium.

BASES (continued)

LCO

Verifying that the cask cavity is sealed by measuring the helium leak rate will ensure that the assumptions in the normal, off-normal, and accident radiological evaluations are maintained. The safety analyses are based on an air leakage rate of 1.0 E-5 atm-cc/sec (Reference 1). Thus specifying a helium leak rate limit at the same value is conservative.

APPLICABILITY

The cask seal integrity verification, by measuring helium leak rate, is performed during LOADING OPERATIONS prior to TRANSPORT OPERATIONS and STORAGE OPERATIONS.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the internal environment of one cask is independent of the internal environment of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the helium leak rate limit is not met ACTIONS must be taken to meet the LCO. The 7 day Completion Time of Required Action A.1 provides ample time to investigate the source of the leak and reestablish the cask helium leak rate within limit.

BASES

ACTIONS (continued)

B.1

The 30 day Completion Time of Required Action B.1 is based on engineering judgment that any credible seal leak within the 30 day period would not result in a significant loss of helium inventory that would affect the heat removal capability of the cask. In the event of a significant leak, the cask environment would not be reduced to less than one atmosphere of helium because there is no mechanism to exchange the helium in the cask with external air. Based on engineering judgment, this 30 day Completion Time is sufficient to disconnect the test equipment, vent the cask, and return it to the spent fuel pool. Once placed in the spent fuel pool, the fuel is provided adequate decay heat removal to maintain the loaded fuel within limits.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

A primary design consideration of the cask is that it adequately contain radioactive material and retain an inert environment. The specified helium leak rate for this Surveillance demonstrates that an adequate confinement barrier has been established and that the cask is within design assumptions. The determination of the leak rate shall be done in accordance with ANSI N14.5 (Reference 2). The minimum sensitivity of the leak rate test is 5×10^{-6} atm-cc/sec and the test includes the overpressure system up to the isolation valve.

Measuring the helium leak rate must be performed successfully on each cask prior to placing it in storage. Once the helium atmosphere is established by SR 3.1.2.1, there is enough conduction to maintain

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1 (continued)

the loaded fuel within its temperature limits, and to prevent thermal expansion from damaging the basket. Therefore, no time limit is required for this Surveillance, other than completion prior to Transport Operations.

REFERENCES

1. SAR Section A8.2.

2. American National Standards Institute, "National Standard for Leakage Tests on Packages for Shipment of Radioactive Materials", ANSI N14.5-1997, New York, Oct. 1987.

B 3.1 CASK INTEGRITY

B 3.1.4 Cask Safety Status

BASES

BACKGROUND	The design intent of a dry storage cask is for the temporary confinement and shielding of irradiated nuclear fuel assemblies during cask placement on a concrete storage pad outside of the plant power block. The cask is designed and constructed within specific design requirements and parameters, as well as provided with associated design features that result in acceptable heat transfer rates away from the irradiated fuel assemblies through the exterior surfaces of the cask and into the environment. During STORAGE OPERATIONS the cask needs to be maintained free from damage and accumulation of debris so as not to compromise the confinement, shielding, and heat transfer design function of the cask.
APPLICABLE SAFETY ANALYSIS	The cask packaging is designed to passively reject decay heat under normal conditions of storage and hypothetical accidents while maintaining appropriate packaging temperatures and pressures within specified design limits. The applicable safety analysis is the heat transfer analysis and thermal model as well as the shielding and confinement analyses presented in the SAR (References 1 and 2).
LCO	Verifying that the cask is free from damage and accumulation of debris will ensure heat transfer, shielding, and confinement are in accordance with the cask design functions.
APPLICABILITY	This LCO is applicable during STORAGE OPERATIONS to ensure each cask is free from damage and accumulation of debris.

BASES (continued)

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the exterior surface of one cask is independent of the exterior surface of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

Required Action A.1 is in place to ensure that casks are maintained and that design heat transfer characteristics are not compromised by damage or accumulation of debris during cask storage.

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1

A primary design consideration of the cask is that it can adequately contain radioactive material and sufficiently transfer heat from the cask surfaces to the environment. This Surveillance is to visually ensure that a cask does not exhibit damage or deterioration during storage that could compromise the design function of the cask. A Surveillance Frequency of 92 days is sufficient to observe and ensure the implementation of necessary actions to resolve any unsatisfactory conditions.

SR 3.1.4.2

A primary design consideration of the cask is that it can adequately contain radioactive material and sufficiently transfer heat from the

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.4.2 (continued)

cask surfaces to the environment. This Surveillance is to visually ensure that a cask does not exhibit accumulation of debris during storage that could compromise the design function of the cask. A Surveillance Frequency of 92 days is sufficient to observe and ensure the implementation of necessary actions to resolve any unsatisfactory conditions.

REFERENCES.

1. SAR Section 3.3.
2. SAR Section A3.3.

B 3.1 CASK INTEGRITY

B 3.1.5 Cask Interseal Pressure

BASES

BACKGROUND

A cask is loaded, dried, and sealed prior to being transported to the ISFSI and placed on a storage pad. The cask is designed with redundant seals to contain the radioactive material. In addition, 10 CFR 72.122(h)(4) states that the casks must have the capability to be continuously monitored such that the licensee will be able to determine when corrective action needs to be taken to maintain safe storage conditions. The monitoring systems provide:

a. the capability to monitor interseal pressure that will indicate if cask seal integrity is compromised; and

b. local alarms to indicate that potential seal degradation has occurred.

It is necessary to verify cask seal integrity at regular intervals to ensure the cask's interseal containment boundary is being maintained and to verify there is no seal leakage to the environment.

APPLICABLE SAFETY ANALYSIS

The confinement of radioactive material during the storage of spent fuel in a cask is ensured by the use of multiple confinement barriers and systems. The barriers relied upon are the uranium dioxide fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the cask in which the fuel assemblies are stored. Long-term integrity of the fuel cladding depends on storage in an inert atmosphere. This is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas. The failure of storage cask confinement capability is considered in

BASES

APPLICABLE SAFETY ANALYSIS (continued)	the accident analysis (References 1 and 2). In addition, the thermal analyses of the cask STORAGE OPERATIONS assume that the cask cavity is filled with helium.
LCO	Verifying cask interseal pressure ensures that the assumptions relating to radioactive releases in the accident analyses and radiological evaluations are maintained. Seal integrity is verified by monitoring interseal pressure indication and associated alarms.
APPLICABILITY	Cask interseal pressure verification is performed regularly during STORAGE OPERATIONS to confirm that the cask confinement barriers have not been compromised. During LOADING OPERATIONS, the seal integrity is verified prior to moving the cask to the ISFSI storage pads. Verification during TRANSPORT OPERATIONS is not possible as the cask is being moved. However, TRANSPORT OPERATIONS are brief, follow the verification performed during LOADING OPERATIONS, and, therefore, do not represent a significant lapse in seal integrity monitoring.
ACTIONS	The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the sealing function of one cask is independent of the sealing function of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

BASES

ACTIONS (continued)

A.1

If the cask interseal pressure is below the limit, an appropriate assessment and evaluation is to be performed to determine the cause of the low pressure condition. The 7-day period is sufficient time to perform an assessment of the condition and make necessary repairs to the overpressure system and reestablish a pressure above the limit. Reestablishing the pressure above the limit prevents leakage of radioactive material from the cask cavity.

B.1

If it is determined that there is a leakage path in the cask seals or overpressure system, a repair is to be performed in a timely manner. If the interseal pressure has been reestablished to 30 psig or above, no leakage of radioactive material from the cask cavity can occur. The 30-day Completion Time of Required Action B.1 provides ample time to implement necessary repairs or for the return of the cask to the spent fuel pool and to be re-flooded. Once placed in the spent fuel pool, the fuel is provided adequate decay heat removal to maintain the loaded fuel within limits. The allowed completion times are bounded by the 45 day exposure duration for off-normal conditions in Reference 3.

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

This Surveillance is modified by a Note. This Note clarifies that performing the Surveillance is not required, and thus SR 3.0.4 does not apply, until 24 hours after first completion of SR 3.1.5.2. This Note is necessary to allow entry into STORAGE OPERATIONS and subsequent installation of the necessary monitoring equipment on the ISFSI pad to allow for performing the Surveillance during the STORAGE OPERATIONS.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1 (continued)

During STORAGE OPERATIONS the cask overpressure tank pressure is routinely monitored by associated system instrumentation. Every 24 hours the pressure is to be verified to be above the 30 psig pressure minimum limit. The 24 hours is an appropriate time-frame during STORAGE OPERATIONS to alert operations personnel of a potential cask seal leak, system leak, or system malfunction. The method for verifying seal integrity is to monitor the interseal pressure. Normally, the cask seal integrity is verified using installed instrumentation that alarms or indicates. If this system is not operating on one or more casks, monitoring of seal integrity at each affected cask may be performed by alternative means.

SR 3.1.5.2

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

To ensure operability of the interseal pressure monitoring system as a remote indicator during STORAGE OPERATIONS, SR 3.1.5.2 verifies the proper functioning and setpoint of the pressure switch or transducer within 7 days of commencing STORAGE OPERATIONS. This verification is a CHANNEL OPERATIONAL TEST (COT) which exercises the pressure switch by reducing the sensed pressure below the setpoint, and verifies the accuracy of the trip setpoint within the required range. Full channel calibration over the range of the instrument is not required because the instrument provides no analog indication. Subsequent operability is verified by a COT every 12 months. This time frame is a reasonable period to address any instrument drift and reliability of the pressure switch.

BASES (continued)

REFERENCES

1. SAR Section 8.2.

2. SAR Section A8.2.

3. SAR Section A7A.8

B 3.1 CASK INTEGRITY

B 3.1.6 Cask Maximum Surface Temperature

BASES

BACKGROUND

The design intent of a dry storage cask is for the temporary confinement and shielding of irradiated nuclear fuel assemblies during cask placement on a concrete storage pad outside of the plant power block. The cask is designed and constructed within specific design requirements and parameters, as well as provided with associated design features that result in acceptable heat transfer rates away from the irradiated fuel assemblies through the exterior surfaces of the cask and into the environment.

APPLICABLE SAFETY ANALYSIS

The cask packaging is designed to passively reject decay heat under normal conditions of storage and hypothetical accidents while maintaining appropriate packaging temperatures and pressures within specified design limits. The applicable safety analysis is the heat transfer analyses and thermal model as well as the shielding and confinement analyses presented in the SAR (References 1 and 2). These thermal analyses are also an integral input to other analyses such as the structural analyses.

LCO

A surface temperature in excess of the limit indicates that the cask heat transfer may not be functioning as designed and thus the design conclusions of the safety analyses may not be satisfied.

APPLICABILITY

In order to provide some indication that the cask heat transfer is performing as designed prior to removing the cask from the Auxiliary Building, the check of the surface temperature is performed during LOADING OPERATIONS.

BASES (continued)

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the surface temperature of one cask is independent of the surface temperature of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If cask surface temperature is above the limit, the cask must be returned to the spent fuel pool and the fuel removed. Once the cask has been placed in the spent fuel pool, the fuel is provided adequate decay heat removal facilities to maintain the loaded fuel within limits. Removal of fuel from the cask places the cask in a condition where this LCO is no longer applicable.

A.2

Violations of this LCO are significant to the extent that notification to the NRC is required within 30 days. A report is to be prepared and submitted to the NRC Region III Office with a copy to the Director, Office of Nuclear Material Safety and Safeguards.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

This Surveillance is modified by a Note. The Note clarifies that performing the Surveillance is not required, and thus SR 3.0.4 does not apply, prior to the specified Frequency.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1 (continued)

Prior to TRANSPORT OPERATIONS, the cask outer surface temperature is to be measured and verified to be below the specified limit. The Frequency of this Surveillance also requires a minimum time of 24 hours, after commencing cask draining, to allow the fuel assemblies, basket, and cask body to reach equilibrium temperature, prior to the performance of this Surveillance.

REFERENCES

1. SAR, Section 3.3.
2. SAR, Section A3.3.

B 3.2 CASK RADIATION PROTECTION

B 3.2.1 Cask Surface Contamination

BASES

BACKGROUND

A cask is immersed in the spent fuel pool in order to load the spent fuel assemblies. As a result, the surface of the cask will become contaminated with radioactive material from the spent fuel pool water. In order to minimize radioactive contamination to personnel or the environment this contamination is to be removed prior to moving the cask to the ISFSI pad. By removing cask surface contamination, an uncontaminated ISFSI environment can be maintained that allows ISFSI entry without additional radiological controls to prevent the spread of contamination. An uncontaminated ISFSI environment reduces personnel dose due from loose contamination or airborne contamination. This practice is consistent with ALARA principles (Reference 1).

APPLICABLE SAFETY ANALYSIS

The radiation protection measures implemented at the ISFSI are based on the assumption that the exterior surfaces of the cask have been decontaminated. Failure to decontaminate the surfaces of the casks would lead to higher than projected occupational doses.

LCO

Removable surface contamination limits on the cask exterior surfaces are based on the minimum level of activity that can be routinely detected under a surface contamination control program using direct survey methods. Experience has shown that these limits are low enough to prevent the spread of contamination to clean areas and are significantly less than the levels which would cause significant personnel skin dose.

BASES (continued)

APPLICABILITY

Verification that the cask surface contamination is less than the LCO limit is performed during LOADING OPERATIONS. This verification occurs prior to TRANSPORT OPERATIONS and STORAGE OPERATIONS. Measurement of the cask surface contamination is unnecessary during TRANSPORT OPERATIONS in preparation for UNLOADING OPERATIONS, because surface contamination would have been measured prior to moving the cask to the ISFSI.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the outer surface contamination of one cask is independent of the contamination of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the removable surface contamination of a cask that has been loaded with spent fuel is not within the LCO limits, action must be initiated to decontaminate the cask and bring the removable surface contamination within limits. The Completion Time requires that the decontamination be completed prior to TRANSPORT OPERATIONS, which will prevent the release of contamination to the environment and the ISFSI.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.2.1.1

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

This SR verifies that the removable surface contamination on the cask is less than the limits. The Frequency requires performing the verification once prior to initiating TRANSPORT OPERATIONS. This Frequency is adequate to confirm that the cask can be moved to the ISFSI without spreading loose contamination, and assumes that the cask will not develop surface contamination during TRANSPORT or STORAGE OPERATIONS. Storage of the fuel in the dry, redundantly-sealed cask eliminates the possibility for leakage of contaminated liquids.

REFERENCES

1. SAR Section 7.1.

B 3.2 CASK RADIATION PROTECTION

B 3.2.2 Cask Dose Rates

BASES

BACKGROUND

The design intent of a dry storage cask is for the temporary confinement of irradiated nuclear fuel assemblies and subsequent cask placement on a concrete storage pad outside of the plant power block. The cask is designed and constructed within specific design requirements and parameters, as well as provided with associated design features that result in acceptable dose rates at the exterior surfaces of the cask. Acceptable dose rates are defined as those that provide compliance with 10 CFR Part 20 and 10 CFR Part 72 radiation protection requirements.

Measurement of the resultant initial dose rates of the cask exterior surfaces and verification that the initial cask dose rates are within established limits prior to TRANSPORT OPERATIONS, ensure a specific cask is performing in accordance with its design requirements. Subsequent monitoring of the ISFSI environment dose rates ensures all casks continue to perform in accordance with design requirements.

APPLICABLE SAFETY ANALYSIS

The applicable safety analysis is the shielding analysis and subsequent dose rates from a cask(s) including contribution from direct radiation and in-direct radiation to arrive at the expected dose rates around the ISFSI (Reference 1). These analyses ensure that the offsite dose rates are within the regulatory limits.

LCO

Initial cask exterior surfaces dose rates, for each cask, at each of four specific cask locations, is to be measured and verified to be below limits prior to TRANSPORT OPERATIONS. Ensuring that the surface dose rates are consistent with the calculated surface dose

BASES

LCO (continued)

rates in Reference 1 provides assurance that the offsite dose rates would be consistent with the calculated offsite dose rates in Reference 1. Thus meeting the LCO requirements demonstrates that the dose rates are in compliance with 10 CFR Part 20 and 10 CFR Part 72 radiation protection requirements.

Note that the dose rates in Reference 1 are based on the TN-40HT cask design and conservatively bound operations with a mixture of TN-40 and TN-40HT casks. Thus the LCO may be applied to either a TN-40 or TN-40HT cask.

APPLICABILITY

Verification that exterior cask surface dose rates, at the specified locations, are less than the limits is performed during LOADING OPERATIONS. This verification occurs prior to TRANSPORT OPERATIONS and STORAGE OPERATIONS.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the dose rates of one cask is independent of the dose rates of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If any of the four specified exterior surface dose rates are in excess of the specified limit, a specific analysis demonstrating compliance with 10 CFR Part 20 and 10 CFR Part 72 radiation protection requirements is to be performed prior to TRANSPORT OPERATIONS.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.2.2.1

This Surveillance is modified by a Note. The Note clarifies that performing the Surveillance is not required, and thus SR 3.0.4 does not apply, prior to the specified Frequency.

This SR verifies that a cask exterior surface dose rate, in each of the four specified locations, is less than the respective specified dose rate limit for that location. The Frequency requires performing the verification once prior to TRANSPORT OPERATIONS. This Frequency is adequate to confirm that a cask is in compliance with 10 CFR Part 20 and 10 CFR Part 72 radiation protection requirements and can be moved to the ISFSI.

REFERENCES

1. SAR Section A7.

B 3.3 CASK CRITICALITY CONTROL

B 3.3.1 Dissolved Boron Concentration

BASES

BACKGROUND

The casks are designed to maintain the fuel sub-critical under all postulated fuel arrangements with the effective neutron multiplication factor (k_{eff}), including statistical uncertainties, of ≤ 0.95 (Reference 1). To counteract neutron moderation by water, water placed in the cask is to be borated water to provide the additional neutron absorption necessary to maintain the k_{eff} within the limit.

APPLICABLE SAFETY ANALYSIS

During LOADING OPERATIONS and UNLOADING OPERATIONS, the methods for criticality control rely on borated water used to fill the cask cavity. The borated water provides the additional neutron absorption to counteract the neutron moderating effect of water. Providing a boron concentration of the water in the spent fuel pool water and therefore the cask cavity water at or above the limit, prior to cask loading prevents violation of the criticality design criterion. Criticality analyses were performed for a TN-40HT cask assuming fresh fuel with an initial enrichment of 5.0 weight percent U-235 with all the cavity voids filled with 2450 ppm borated water and reflected all around by water. Analyses assume the fraction of boron-10 in the solution to be that of naturally-occurring boron.

The boron concentration limit established for SR 3.3.1.2 was derived from the criticality analyses for the TN-40HT and conservatively bounds the boron requirements for a TN-40 cask. Thus it is conservatively applied to TN-40 loading activities.

BASES (continued)

LCO

The water in the cask cavity must have a boron concentration greater than the limit. The minimum boron concentration limit ensures sub-critical conditions under design basis loading conditions in the cask.

APPLICABILITY

The boron concentration of the water in the cask cavity must be within its limit whenever there is water in the cask cavity. This condition occurs during LOADING OPERATIONS and UNLOADING OPERATIONS.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the dissolved boron concentration of one cask is independent of the dissolved boron concentration of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the dissolved boron concentration in the spent fuel pool and therefore, the cask cavity, is not within limit, loading of any additional fuel assemblies into the cask must be stopped. Without the required concentration of dissolved boron in the water, maintaining the sub-criticality limit in all conditions can not be guaranteed. The immediate Completion Time reflects the importance of prohibiting the introduction of any potential positive reactivity addition into the cask cavity without the required boron concentration.

BASES

ACTIONS (continued)

A.2

If the dissolved boron concentration in the spent fuel pool and therefore, the cask cavity, is not within the limit, all fuel assemblies must be removed from the cask. Removal of fuel from the cask places the cask in a condition where this LCO is no longer applicable. The 24-hour Completion Time takes into consideration the time necessary to unload a fully loaded cask.

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1

This SR specifically applies to LOADING OPERATIONS. The boron concentration of the spent fuel pool water is determined prior to commencing cask loading using chemical analysis of two samples analyzed by different individuals (per the requirements of License Condition 15G) to reduce the risk that a single error could lead to not meeting the LCO.

The requirement to verify the boron concentration within 4 hours prior to commencing LOADING OPERATIONS ensures that the water added to the cask is within the limit. The Frequency is based on the operating experience that boron concentration changes occur very slowly.

SR 3.3.1.2

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2 (continued)

This SR specifically applies to UNLOADING OPERATIONS. The boron concentration is analyzed as described above in SR 3.3.1.1. The requirement to verify the boron concentration within 4 hours prior to flooding the cask for UNLOADING OPERATIONS ensures that the water added to the cask cavity is within the limit. The Frequency is based on operating experience the boron concentration changes very slowly.

REFERENCES

1. SAR, Section A3.3.

B 3.4 CASK FUEL LOADING CONTROL

B 3.4.1 Fuel Stored in a Cask

BASES

BACKGROUND

The cask design is based upon certain spent fuel assembly parameters, including fuel type, fuel assembly weight, initial enrichment, maximum burnup, and minimum cooling time. These spent fuel parameters are used in the thermal, structural, radiological, and criticality evaluations performed for the cask. To assure that the spent fuel assemblies to be placed in casks do not exceed these design parameters, functional and operational limits are established for the selected fuel assemblies. The functional and operational limits are established to protect the integrity of the fuel clad barrier and the public from radioactive materials in effluents and direct radiation levels associated with cask operation. Prior to fuel assembly storage in a cask, fuel assemblies are to meet the established Functional and Operating Limits specified in Sections 2.1 through 2.3. Compliance with these limits is to be demonstrated by verification and documentation of the characteristics of each fuel assembly to be stored in a cask.

APPLICABLE SAFETY ANALYSIS

The established Functional and Operating Limits specified in Sections 2.1 through 2.3 are based upon the input parameters used for the various analyses for cask design including fuel thermal, criticality, structural, shielding, and confinement analyses.

LCO

Verification that fuel assembly characteristics are in accordance with the established functional and operating limits will ensure that the safety analyses bound the fuel being loaded.

APPLICABILITY

The verification of fuel assembly compliance with the established functional and operating limits is applicable prior to LOADING OPERATIONS.

BASES (continued)

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the fuel loading into one cask is independent of the fuel loaded in subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If a fuel assembly, previously placed in a cask, is found to not meet the specified functional and operating limits, the fuel assembly is to be immediately removed from the cask. The immediate Completion Time reflects the importance of maintaining the protection and integrity of the fuel clad barrier as well as the public from radioactive materials in effluents and direct radiation levels associated with cask operation by only storing fuel in accordance with cask design requirements.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1

This Surveillance is modified by a Note. The Note clarifies that performing the Surveillance is not required, and thus SR 3.0.4 does not apply, prior to the specified Frequency.

This SR applies prior to inserting the fuel into the cask. The spent fuel assembly compliance with the Functional and Operating Limits is to be demonstrated by administrative verification. This verification applies to fuel assemblies as well as BPRA's or TPD's. Per the requirements of License Condition 15F, satisfying the Functional and Operating Limits shall be independently verified by an individual other than the original individual making the selections. The Frequency is selected to ensure only fuel meeting cask design requirements is inserted into a cask.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.1.2

This Surveillance is modified by a Note. The Note clarifies that performing the Surveillance is not required, and thus SR 3.0.4 does not apply, prior to the specified Frequency.

The spent fuel assembly identity is to be verified once prior to inserting in a cask and once again prior to final closure of the cask. The fuel assembly and insert identity shall be independently verified. This verification applies to fuel assemblies as well as BPRA's or TPD's. The Frequency is selected to ensure only fuel meeting cask design requirements are inserted into a cask.

REFERENCES None.