Progress Energy

Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

Ref: ITS 5.6.2.17

May 2, 2006
3F0506-05

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Crystal River Unit 3 – 2005 Technical Specifications Bases Control Program

Dear Sir:

As required by ITS 5.6.2.17, Florida Power Corporation, doing business as Progress Energy Florida, Inc., hereby submits the changes that were made to the Crystal River Unit 3 (CR-3) Improved Technical Specifications (ITS) Bases as required by ITS 5.6.2.17. The attachments provide revisions to the CR-3 ITS Bases that will update NRC copies of the CR-3 ITS.

Attachment A provides the instructions for updating the CR-3 ITS Bases. Attachment B provides the CR-3 ITS and Bases Lists of Effective Pages. Attachment C provides the replacement pages for the CR-3 ITS Bases.

If you have any questions regarding this submittal, please contact me at (352) 563-4796.

Sincerely,

Paul E. Infanger
Supervisor
Licensing & Regulatory Programs

PEI/ff

Attachments:

A. Instructions for Updating the Crystal River Unit 3 ITS Bases
B. CR-3 ITS and Bases Lists of Effective Pages
C. Replacement CR-3 ITS Bases Pages

xc: Regional Administrator, Region II (w/o Attachment C)
Senior Resident Inspector (w/o Attachment C)
NRR Project Manager (w/o Attachment C)

Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Power Line Street
Crystal River, FL 34428

A001

PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT A

INSTRUCTIONS FOR UPDATING THE CRYSTAL RIVER UNIT 3 ITS BASES

INSTRUCTIONS FOR UPDATING
THE CRYSTAL RIVER UNIT 3
IMPROVED TECHNICAL SPECIFICATIONS

5/01/06

Page(s) to be Removed		Page(s) to be Added	
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THE CRYSTAL RIVER UNIT 3
IMPROVED TECHNICAL SPECIFICATIONS

5/01/06

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PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT B

CR-3 ITS AND BASES LISTS OF EFFECTIVE PAGES

IMPROVED TECHNICAL SPECIFICATIONS

List of Effective Pages
(Through Amendment 222 and ITS Bases Revision 61)

Amendment Nos. 159, 164, 166, 171, 173, 181, 189 and 190 amended the CR-3 Operating License, only, and did not effect changes to the ITS LCOs or Bases.

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PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT C

REPLACEMENT CR-3 ITS BASES PAGES

BASES

LCO 3.0.3

LCO 3.0.3 establishes the actions that must be implemented when an LCO is not met and:

a. An associated Required Action and Completion Time is not met and no other Condition applies; or

b. The condition of the unit is not specifically addressed by the associated ACTIONS. This means that no combination of Conditions stated in the ACTIONS can be made that exactly corresponds to the actual condition of the unit. Sometimes, possible combinations of Conditions are such that entering LCO 3.0.3 is warranted; in such cases, the ACTIONS specifically state a Condition corresponding to such combinations and also that LCO 3.0.3 be entered immediately.

This Specification delineates the time limits for placing the unit in a safe MODE or other specified condition when operation cannot be maintained within the limits for safe operation as defined by the LCO and its ACTIONS. It is not intended to be used as an operational convenience that permits routine voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable.

Upon entering LCO 3.0.3, 1 hour is allowed to prepare for an orderly shutdown. These preparations consist of an assessment of the situation and formulation of shutdown plans, and allow time to permit the operator to coordinate the reduction in electrical generation with the load dispatcher to ensure the stability and availability of the electrical grid. During this time, the plant should establish a shutdown rate and schedule such that MODE 3 can be established in a safe and controlled manner within a total time of 7 hours from entry into LCO 3.0.3. If at the end of 1 hour, corrective measures which would allow exiting LCO 3.0.3 are not complete, but there is reasonable assurance that corrective measures will be completed in time to allow for an orderly plant shutdown, commencing a load decrease may be delayed until that time.

(continued)

LCO 3.0.3 (continued)

The time limits specified to reach lower MODES of operation permit the shutdown to proceed in a controlled and orderly manner that is well within the specified maximum cooldown rate and within the capabilities of the unit, assuming that only the minimum required equipment is OPERABLE. This reduces thermal stresses on components of the Reactor Coolant System and the potential for a plant upset that could challenge safety systems under conditions to which this Specification applies. The use and interpretation of specified times to complete the actions of LCO 3.0.3 are consistent with the discussion of Section 1.3, Completion Times.

A unit shutdown required in accordance with LCO 3.0.3 may be terminated and LCO 3.0.3 exited if any of the following occurs:

a. The LCO is now met.

b. A Condition exists for which the Required Actions have now been performed.

c. ACTIONS exist that do not have expired Completion Times. These Completion Times are applicable from the point in time that the Condition is initially entered and not from the time LCO 3.0.3 is exited.

The time limits of Specification 3.0.3 allow 37 hours for the unit to be in MODE 5 when a shutdown is required during MODE 1 operation. If the unit is in a lower MODE of operation when a shutdown is required, the time limit for reaching the next lower MODE applies. If a lower MODE is reached in less time than allowed, however, the total allowable time to reach MODE 5, or other applicable MODE, is not reduced. For example, if MODE 3 is reached in 2 hours, then the time allowed for reaching MODE 4 is the next 11 hours, because the total time for reaching MODE 4 is not reduced from the allowable limit of 13 hours. Therefore, if remedial measures are completed that would permit a return to MODE 1, a penalty is not incurred by having to reach a lower MODE of operation in less than the total time allowed.

In MODES 1, 2, 3, and 4, LCO 3.0.3 provides actions for Conditions not covered in other Specifications. The requirements of LCO 3.0.3 do not apply in MODES 5 and 6 because the unit is already in the most restrictive Condition required by LCO 3.0.3. The requirements of LCO 3.0.3 do not apply in other specified conditions of the Applicability (unless in MODE 1, 2, 3, or 4) because the ACTIONS of individual Specifications sufficiently define the remedial measures to be taken.

(continued)

BASES

LCO 3.0.3 (continued)	Exceptions to LCO 3.0.3 are provided in instances where requiring a unit shutdown, in accordance with LCO 3.0.3, would not provide appropriate remedial measures for the associated condition of the unit. An example of this is in Specification 3.7.13, "Fuel Storage Pool Water Level." Specification 3.7.13 has an Applicability of "During movement of irradiated fuel assemblies in fuel storage pool." Therefore, this Specification can be applicable in any or all MODES. If the LCO and the Required Actions of Specification 3.7.13 are not met while in MODE 1, 2, 3, or 4, there is no safety benefit to be gained by placing the unit in a shutdown condition. The Required Action of Specification 3.7.13 of "Suspend movement of irradiated fuel assemblies in fuel storage pool" is the appropriate Required Action to complete in lieu of the actions of LCO 3.0.3. These exceptions are addressed in the individual Specifications.
LCO 3.0.4	LCO 3.0.4 establishes limitations on changes in MODES or other specified conditions in the Applicability when an LCO is not met. It allows placing the unit in a MODE or other specified condition stated in that Applicability (e.g., the Applicability desired to be entered) when unit conditions are such that the requirements of the LCO would not be met, in accordance with LCO 3.0.4.a, LCO 3.0.4.b, or LCO 3.0.4.c. LCO 3.0.4.a allows entry into a MODE or other specified condition in the Applicability with the LCO not met when the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time. Compliance with Required Actions that permit continued operation of the unit for an unlimited period of time in a MODE or other specified condition provides an acceptable level of safety for continued operation. This is without regard to the status of the unit before or after the MODE change. Therefore, in such cases, entry into a MODE or other specified condition in the Applicability may be made in accordance with the provisions of the Required Actions. LCO 3.0.4.b allows entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the MODE or other specified condition in the Applicability, and establishment of risk management actions, if appropriate.

(continued)

BASES

LCO 3.0.4 (continued)

The risk assessment may use quantitative, qualitative, or blended approaches, and the risk assessment will be conducted using the plant program, procedures, and criteria in place to implement 10 CFR 50.65(a)(4), which requires that risk impacts of maintenance activities to be assessed and managed. The risk assessment, for the purposes of LCO 3.0.4 (b), must take into account all inoperable Technical Specification equipment regardless of whether the equipment is included in the normal 10 CFR 50.65(a)(4) risk assessment scope. The risk assessments will be conducted using the procedures and guidance endorsed by Regulatory 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants." Regulatory Guide 1.182 endorses the guidance in Section 11 of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." These documents address general guidance for conduct of the risk assessment, quantitative and qualitative guidelines for establishing risk management actions, and example risk management actions. These include actions to plan and conduct other activities in a manner that controls overall risk, increased risk awareness by shift and management personnel, actions to reduce the duration of the condition, actions to minimize the magnitude of risk increases (establishment of backup success paths or compensatory measures), and determination that the proposed MODE change is acceptable. Consideration should also be given to the probability of completing restoration such that the requirements of the LCO would be met prior to the expiration of ACTIONS Completion Times that would require exiting the Applicability.

LCO 3.0.4.b may be used with single, or multiple systems and components unavailable. NUMARC 93-01 provides guidance relative to consideration of simultaneous unavailability of multiple systems and components.

The results of the risk assessment shall be considered in determining the acceptability of entering the MODE or other specified condition in the Applicability, and any corresponding risk management actions. The LCO 3.0.4.b risk assessments do not have to be documented.

(continued)

BASES

LCO 3.0.4 (continued)

The Technical Specifications allow continued operation with equipment unavailable in MODE 1 for the duration of the Completion Time. Since this is allowable, and since in general the risk impact in that particular MODE bounds the risk of transitioning into and through the applicable MODES or other specified conditions in the Applicability of the LCO, the use of the LCO 3.0.4.b allowance should be generally acceptable, as long as the risk is assessed and managed as stated above. However, there is a small subset of systems and components that have been determined to be more important to risk and use of the LCO 3.0.4.b allowance is prohibited. The LCOs governing these system and components contain Notes prohibiting the use of LCO 3.0.4.b by stating that LCO 3.0.4.b is not applicable.

LCO 3.0.4.c allows entry into a MODE or other specified condition in the Applicability with the LCO not met based on a Note in the Specification which states LCO 3.0.4.c is applicable. These specific allowances permit entry into MODES or other specified conditions in the Applicability when the associated ACTIONS to be entered do not provide for continued operation for an unlimited period of time and a risk assessment has not been performed. This allowance may apply to all the ACTIONS or to a specific Required Action of a Specification. The risk assessments performed to justify the use of LCO 3.0.4.b usually only consider systems and components. For this reason, LCO 3.0.4.c is typically applied to Specifications which describe values and parameters (e.g., Reactor Coolant System Specific Activity), and may be applied to other Specifications based on NRC plant-specific approval.

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

The provisions of LCO 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of LCO 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from any unit shutdown. In this context, a unit shutdown is defined as a change in MODE or other specified condition in the Applicability associated with transitioning from MODE 1 to MODE 2, MODE 2 to MODE 3, MODE 3 to MODE 4, and MODE 4 to MODE 5.

(continued)

BASES

LCO 3.0.4 (continued)

Upon entry into a MODE or other specified condition in the Applicability with the LCO not met, LCO 3.0.1 and LCO 3.0.2 require entry into the applicable Conditions and Required Actions until the Condition is resolved, until the LCO is met, or until the unit is not within the Applicability of the Technical Specification.

Surveillances do not have to be performed on the associated inoperable equipment (or on variables outside the specified limits), as permitted by SR 3.0.1. Therefore, utilizing LCO 3.0.4 is not a violation of SR 3.0.1 or SR 3.0.4 for any Surveillances that have not been performed on inoperable equipment. However, SRs must be met to ensure OPERABILITY prior to declaring the associated equipment OPERABLE (or variable within limits) and restoring compliance with the affected LCO.

LCO 3.0.5

LCO 3.0.5 establishes the allowance of restoring equipment to service under administrative controls when it has been removed from service to comply with ACTIONS. The sole purpose of this Specification is to provide an exception to LCO 3.0.2 to allow the performance of SRs to demonstrate:

a. The OPERABILITY of the equipment being returned to service;

b. The OPERABILITY of other equipment; or

c. That variables are within limits.

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 SRs. This Specification does not provide time to perform any other preventive or corrective maintenance.

An example of demonstrating the OPERABILITY of the equipment being returned to service is reopening a containment isolation valve that has been closed to comply with Required Actions, and must be reopened to perform the SRs.

An example of demonstrating the OPERABILITY of other equipment is taking an inoperable channel or trip system out of the tripped condition to permit the logic to function and indicate the appropriate response during the performance of an SR on another channel in the same trip system.

(continued)

BASES

LCO 3.0.6

LCO 3.0.6 establishes an exception to LCO 3.0.2 for support systems that have a Specification specified in the Technical Specifications (TS). This exception is necessary because LCO 3.0.2 would require that the Conditions and Required Actions of the associated inoperable supported system Specification be entered solely due to the inoperability of the support system. This exception is justified because the actions that are required to ensure the unit is maintained in a safe condition are specified in the support system Specification's Required Actions. These Required Actions may include entering the supported system's Conditions and Required Actions or may specify other Required Actions.

When a support system is inoperable and there is an LCO specified for it in the TS, the supported system(s) are required to be declared inoperable if determined to be inoperable as a result of the support system inoperability. However, it is not necessary to enter into the supported systems' Conditions and Required Actions unless directed to do so by the support system's Required Actions. The confusion and inconsistency of interpretation of requirements related to the entry into multiple Specification's Conditions and Required Actions are eliminated by providing all the actions that are necessary to ensure the unit is maintained in a safe condition in the support system's Required Actions.

However, there are instances where a support system's Required Action may either direct a supported system to be declared inoperable or direct entry into Conditions and Required Actions for the supported system. This may occur immediately or after some specified delay to perform some other Required Action. Regardless of whether it is immediate or after some delay, when a support system's Required Action directs a supported system to be declared inoperable or directs entry in Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

Specification 5.6.2.16, "Safety Function Determination Program (SFDP)," ensures loss of safety function is detected and appropriate actions are taken. Upon failure to meet two or more LCOs at the same time, an evaluation shall be made

(continued)

BASES

LCO 3.0.6 (continued)

to determine if loss of safety function exists. Additionally, other limitations, remedial actions, or compensatory actions may be identified as a result of the support system inoperability and corresponding exception to entering supported system Conditions and Required Actions. The SFDP implements the requirements of LCO 3.0.6.

Cross train checks to verify a loss of safety function for those support systems that support multiple and redundant safety systems are required. The cross train check verifies that the supported systems of the remaining OPERABLE support systems are OPERABLE, thereby ensuring safety function is retained. If this evaluation determines that a loss of safety function exists, the appropriate Conditions and Required Actions of the Specification in which the loss of safety function exists are required to be entered.

When a support system becomes inoperable, its associated LCO ACTIONS are entered. Supported system LCO ACTIONS are not required to be entered when the supported system becomes inoperable solely due to the support system being inoperable. While the support system is inoperable the Completion Time for the support system defines the operating window. Should another system become inoperable that supports the same supported system, then its LCO ACTIONS are also entered, however, the most recent inoperable support system LCO ACTIONS may not receive the full benefit of its Completion Time. This is because the most restrictive Completion Time is associated with the supported system, even though its LCO ACTIONS were not formally entered. Therefore, operation must be limited in accordance with the limiting Completion Time, regardless of entering the ACTIONS of a LCO.

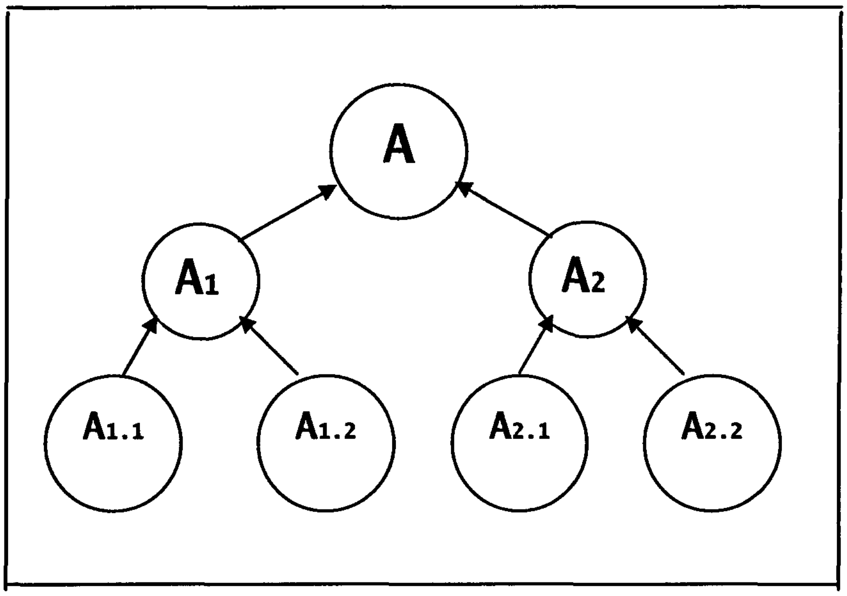
The following examples are provided for clarification.

(continued)

BASES

LCO 3.0.6
(continued)

SUPPORT - SUPPORTED

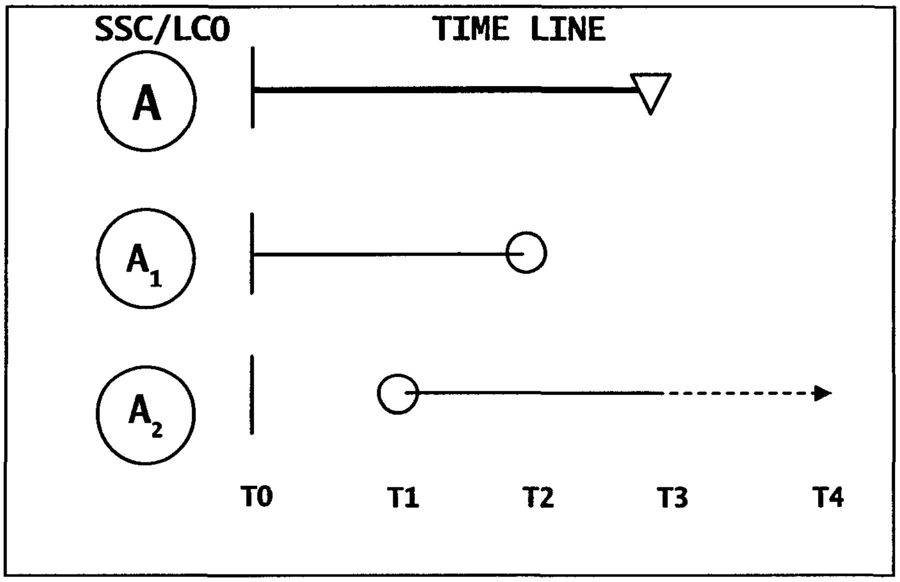


Above is a graphical representation of the relationships for support and supported SSCs and related LCOs for a single train. SSC A1.1 and A1.2 support SSC A1, which in turn supports SSC A. SSC A2.1 and A2.2 support SSC A2, which in turn supports SSC A. For the purpose of the following examples each support SSC is required to be OPERABLE in order to declare its associated supported SSC OPERABLE.

(continued)

LCO 3.0.6
(continued)

Example 1



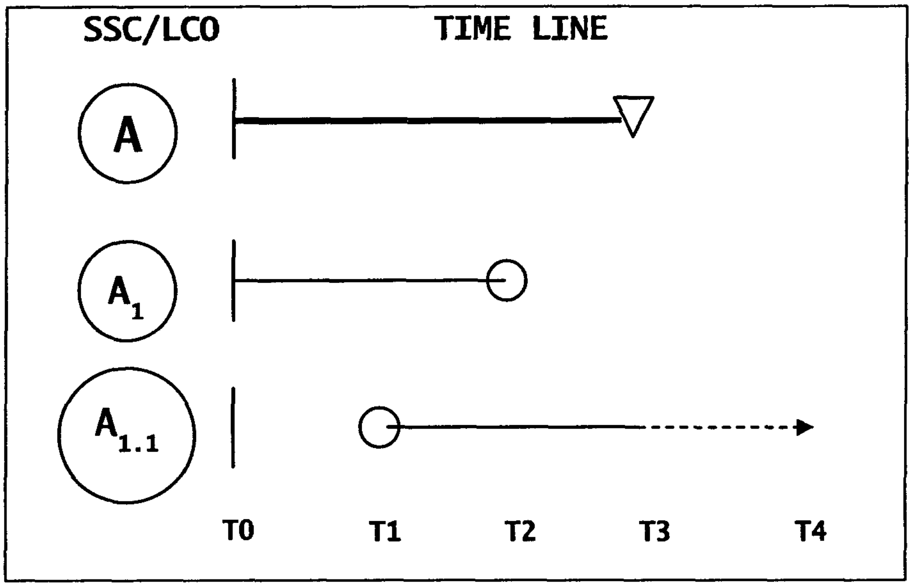
When A_1 is declared inoperable, then the ACTIONS for that SSC are entered (@T_0). The ACTIONS for **A** are not entered even though that SSC is determined inoperable (no cascading). In the event that A_2 becomes inoperable (@T_1) prior to exiting the Action Statement for A_1 (@T_2), then A_2 does not get the full benefit of its own Completion Time (@T_4). Furthermore, **A** is still inoperable from the time that A_1 was initially declared inoperable (@T_0). A_2 must be restored to OPERABLE prior to exceeding the Completion Time associated with A (@T_3).

(continued)

BASES

LCO 3.0.6
(continued)

Example 2



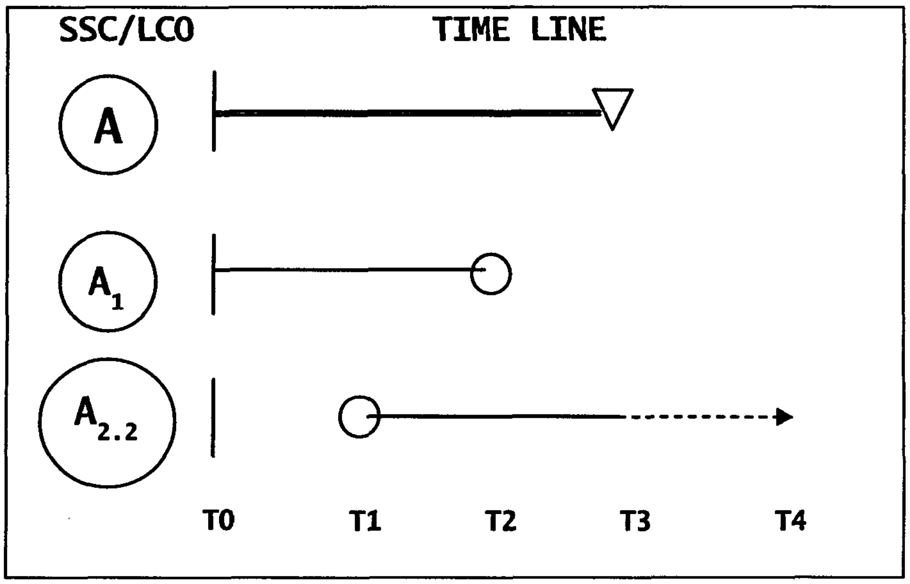
When A_1 is declared inoperable then the ACTIONS for that SSC are entered (@T_0). The ACTIONS for A are not entered even though that SSC is determined inoperable (no cascading). In the event that $A_{1.1}$ becomes inoperable (@T_1) prior to exiting the ACTIONS for A_1 (@T_2), then $A_{1.1}$ does not get the full benefit of its own Completion Time (@T_4). Furthermore, A is still inoperable from the time that A_1 was initially declared inoperable (@T_0). The ACTIONS for A_1 are exited (@T_2), even though $A_{1.1}$ being inoperable results in the SSC for A_1 inoperable, because of no cascading. $A_{1.1}$ must be restored to OPERABLE prior to exceeding the Completion Time associated with A (@T_3).

(continued)

BASES

LCO 3.0.6 (continued)

Example 3



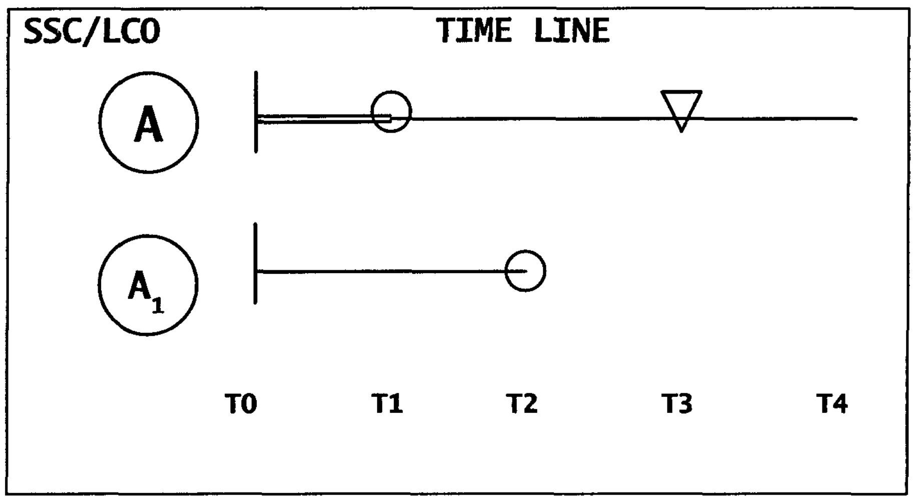
When A_1 is declared inoperable then the ACTIONS for that SSC are entered (@T_0). The ACTIONS for A are not entered even though that SSC is determined inoperable (no cascading). In the event that $A_{2.2}$ becomes inoperable (@T_1) prior to exiting the ACTIONS for A_1 (@T_2), then $A_{2.2}$ does not get the full benefit of its own Completion Time (@T_4). Furthermore, A is still inoperable from the time that A_1 was initially declared inoperable (@T_0). The ACTIONS for A_2 are not entered even though that SSC is determined inoperable (no cascading). $A_{2.2}$ must be restored to OPERABLE prior to exceeding the Completion Time associated with A (@T_3).

(continued)

BASES

LCO 3.0.6 (continued)

Example 4



When A_1 is declared inoperable then the ACTIONS for that SSC are entered (@T_0). The ACTIONS for **A** are not entered even though that SSC is determined inoperable (no cascading). In the event that **A** becomes inoperable (@T_1) prior to exiting the ACTIONS for A_1 (@T_2), then **A** does not get the full benefit of its own Completion Time (@T_4). Furthermore, **A** is still inoperable from the time that A_1 was initially declared inoperable (@T_0). **A** must be restored to OPERABLE prior to exceeding its Completion Time associated (@T_3).

(continued)

BASES

LCO 3.0.7

There are certain special tests and operations required to be performed at various times over the life of the unit. These special tests and operations are necessary to demonstrate select unit performance characteristics. PHYSICS TESTS Exceptions LCOs (Specification 3.1.8 and 3.1.9) allow specified TS requirements to be suspended to permit performances of these special tests and operations, which otherwise could not be performed if required to comply with the requirements of these TS. Unless otherwise specified, all other TS requirements remain unchanged. This will ensure all appropriate requirements of the MODE or other specified condition not directly associated with or required to be changed to perform the special test or operation will remain in effect.

Compliance with PHYSICS TESTS Exception LCO is optional. A special operation may be performed either under the provisions of the appropriate PHYSICS TESTS Exception LCO or under the other applicable TS requirements. If it is desired to perform the special operation under the provisions of the PHYSICS TESTS Exception LCO, the requirements of the PHYSICS TESTS Exception LCO shall be followed. The surveillances of the other LCO are not required to be met, unless specified in the PHYSICS TESTS Exception LCO.

B 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

BASES

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 MODES or other 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 the OPERABILITY of 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.

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

a. The systems or components are known to be inoperable, although still meeting the SRs; or

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

Surveillances do not have to be performed when the unit is in a MODE or other specified condition for which the requirements of the associated LCO are not applicable, unless otherwise specified. The SRs associated with a PHYSICS TEST Exception LCO are only applicable when the PHYSICS TEST Exception LCO is used as an allowable exception to the requirements of a Specification.

Surveillances, do not have to be performed on inoperable equipment because the ACTIONS define the remedial measures that apply. SRs have to be met in accordance with SR 3.0.2 prior to returning equipment to OPERABLE status.

Upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes meeting applicable SRs in accordance with SR 3.0.2. Post maintenance testing may not be possible in the current MODE or other specified

(continued)

BASES

SR 3.0.1 (continued)

conditions in the Applicability due to the necessary unit parameters not having been established. In these situations, the equipment may be considered OPERABLE 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 MODE or other 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).

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 include a Note in the Frequency stating, "SR 3.0.2 is not applicable." An example of an exception when the test interval is not specified in the regulations is the NOTE in the Containment Leakage Rate Testing Program, "SR 3.0.2 is not applicable." This exception is provided because the program already includes extension of test interval.

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

(continued)

BASES

SR 3.0.2 (continued)

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 inoperable 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.

SR 3.0.3

SR 3.0.3 establishes the flexibility to defer declaring affected equipment inoperable 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 an adequate time limit 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 unit 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 SRs.

When a Surveillance with a Frequency based not on time intervals, but upon specified unit conditions, operating situations, or requirements of regulations (e.g., prior to entering MODE 1 after each fuel loading, or in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions, etc.) is discovered to not have been performed when specified, SR 3.0.3 allows for the full delay period of up to the specified Frequency to perform the Surveillance. However, since there is not a time interval specified, the missed Surveillance should be performed at the first reasonable opportunity.

(continued)

BASES

SR 3.0.3 (continued)

SR 3.0.3 provides a time limit for, and allowances for the performance of, Surveillances that become applicable as a consequence of MODE changes 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. While up to 24 hours or the limit of the specified Frequency is provided to perform the missed Surveillance, it is expected that the missed Surveillance will be performed at the first reasonable opportunity. The determination of the first reasonable opportunity should include consideration of the impact on plant risk (from delaying the Surveillance as well as any plant configuration changes required or shutting the plant down to perform the Surveillance) and impact on any analysis assumptions, in addition to unit conditions, planning, availability of personnel, and the time required to perform the Surveillance. This risk impact should be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementing guidance, NRC Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants." This Regulatory Guide addresses consideration of temporary and aggregate risk impacts, determination of risk management action thresholds, and risk management action up to and including plant shutdown. The missed Surveillance should be treated as an emergent condition as discussed in Regulatory Guide 1.182. The risk evaluation may use quantitative, qualitative, or blended methods. The degree and depth and rigor of the evaluation should be commensurate with the importance of the component. Missed Surveillances for important components should be analyzed quantitatively. If the results of the risk evaluation determine the risk increase is significant, this evaluation should be used to determine the safest course of action. All missed Surveillances will be placed in the licensee's Corrective Action Program. Refer to the Master Surveillance Plan for additional guidance for missed surveillances.

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

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

(continued)

BASES

SR 3.0.4

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

This Specification ensures that system and component OPERABILITY requirements and variable limits are met before entry into MODES or other specified conditions in the Applicability for which these systems and components ensure safe operation of the unit. The provisions of this Specification should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before entering an associated MODE or other specified condition in the Applicability.

A provision is included to allow entry into a MODE or other specified condition in the Applicability when an LCO is not met due to Surveillance not being met in accordance with LCO 3.0.4.

However, in certain circumstances, failing to meet an SR will not result in SR 3.0.4 restricting a MODE change or other specified condition change. When a system, subsystem, division, component, device, or variable is inoperable or 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 inoperable equipment. When equipment is inoperable, 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 MODES or other 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 MODE or other specified condition changes. SR 3.0.4 does not restrict changing MODES or other specified conditions of the Applicability when a Surveillance has not been performed within the specified Frequency, provided the requirement to declare the LCO not met has been delayed in accordance with SR 3.0.3.

(continued)

BASES

SR 3.0.4 (continued)

The provisions of SR 3.0.4 shall not prevent entry into MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of SR 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from any unit shutdown. In this context, a unit shutdown is defined as a change in MODE or other specified condition in the Applicability associated with transitioning from MODE 1 to MODE 2, MODE 2 to MODE 3, MODE 3 to MODE 4, and MODE 4 to MODE 5.

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 MODE or other 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's 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 Section 1.4, Frequency.

BASES

ACTIONS (continued)

D.1

If the regulating rods cannot be restored to within the acceptable operating limits for the original THERMAL POWER, or if the power reduction cannot be completed within the associated Completion Time, then the plant must be is placed in a MODE in which this LCO does not apply. This Action ensures that the reactor does not continue operating in violation of the peaking limits, the ejected rod worth, the reactivity insertion rate assumed as initial conditions in the accident analyses, or the required minimum SDM assumed in the accident analyses. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, to reach the required plant conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.1.1

This Surveillance ensures that the sequence and overlap limits are not violated. A Surveillance Frequency of 12 hours or 4 hours is required depending on whether or not the CONTROL ROD drive sequence alarm is OPERABLE. Verification that the sequence and overlap are within limits at a 12 hour Frequency is sufficient to ensure these limits are preserved. The 4 hour Completion time is acceptable because little rod motion occurs in 4 hours due to fuel burnup, and the probability of a deviation occurring simultaneously with an inoperable sequence monitor in this relatively short time frame is low. Both Frequencies take into account the level of information available in the control room for monitoring the status of the regulating rods.

SR 3.2.1.2

With an OPERABLE regulating rod insertion limit alarm, verification of the regulating rod insertion limits as specified in the COLR at a Frequency of 12 hours is sufficient to detect regulating rod banks that may be approaching the group insertion limits, because little rod

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.2.1.2 (continued)

motion due to fuel burnup occurs in 12 hours. If the insertion limit alarm becomes inoperable, verification of the regulating rod group position at a Frequency of 4 hours is sufficient to detect whether the regulating rod groups may be approaching or exceeding their group insertion limits. Both Frequencies take into account the level of information available in the control room for monitoring the status of the regulating rods.

SR 3.2.1.3

Prior to achieving criticality, an estimated critical position for the CONTROL RODS or estimated critical boron concentration is determined. Verification that SDM meets the minimum requirements ensures that sufficient SDM capability exists with the CONTROL RODS at the estimated critical position if it is necessary to shut down or trip the reactor after criticality. The Frequency of 4 hours prior to criticality provides sufficient time to verify SDM capability and make the reactor critical.

REFERENCES

1. FSAR, Section 1.4.
2. 10 CFR 50.46.
3. FSAR, Section 14.2.2.4.
4. FSAR, Section 3.1.2.2.
5. FSAR, Section 14.
6. CR-3 COLR.
7. BAW-10143P-A, Rev. 1, "BWC Correlation of Critical Heat Flux", April 1985.
8. BAW-10241(P)(A)-00, BHTP DNB Correlation Applied with LYNXT.

BASES

LCO (continued)	Actual alarm setpoints are more restrictive than the maximum allowable setpoint values to allow for additional conservatism between the actual alarm setpoints and the measurement system independent limits.
APPLICABILITY	The APSR physical insertion limits shall be maintained with the reactor in MODES 1 and 2. These limits maintain the power distribution within the range assumed in the accident analyses. In MODE 1, the limits on APSR insertion specified by this LCO maintain the axial fuel burnup design conditions assumed in the reload safety evaluation analysis. In MODE 2, applicability is required because $k_{eff} \geq 0.99$. Applicability in MODES 3, 4, and 5 is not required, because the power distribution assumptions in the accident analyses would not be exceeded in these MODES.
ACTIONS	For steady state power operation, the normal position for the APSRs is specified in the station operating procedures and in the COLR. The APSRs may be positioned as necessary during the initial criticality, PIDC testing and power ascension for transient AXIAL POWER IMBALANCE control and then withdrawn prior to full power operation in accordance with the COLR. After the APSR withdrawal has occurred, the APSRs shall not be reinserted for the remainder of the fuel cycle. These restrictions ensure the axial burnup distribution that accumulates in the fuel will be consistent with the expected (as designed) distribution.

(continued)

BASES

ACTIONS (continued)

A.1 and A.2

For verification that the core parameters $F_Q(Z)$ and $F^N_{\Delta H}$ are within their limits, SR 3.2.5.1 is performed using the Incore Detector System to obtain a three dimensional power distribution map. Successful verification that $F_Q(Z)$ and $F^N_{\Delta H}$ are within their limits ensures that operation with the APSRs inserted or withdrawn in violation of the times specified in plant procedures does not violate either the ECCS or DNB criteria. The Completion Time of 2 hours is reasonable to obtain a power distribution map and to verify the power peaking factors. Repeating SR 3.2.5.1 every 2 hours is reasonable to ensure that continued verification of the power peaking factors is obtained as core conditions (primarily the regulating rod insertion and induced xenon redistribution) change.

Since Required Action A.1 only specifies a "perform", a failure of SR 3.2.5.1 acceptance criteria does not result in a Required Action not met (Condition B of this Specification). However, when SR 3.2.5.1 is not met, the Required Actions of LCO 3.2.5 are applicable. The conservative power reductions specified by the Required Actions for LCO 3.2.5 ensure the core continues to operate within an acceptable region for the duration of the Completion Time.

In the event that the APSR position indication system is found to be inoperable, it is overly conservative to assume the APSR insertion limits are not met. Instead, the APSR is considered to be inoperable and the Required Actions of LCO 3.1.6, "APSR Alignment Limits," apply.

Indefinite operation with the APSRs inserted or withdrawn in violation of the times specified in the COLR is not prudent. Even if power peaking monitoring per Required Action A.1 is continued, the abnormal APSR insertion or withdrawal may cause an adverse xenon redistribution, may cause the limits on AXIAL POWER IMBALANCE to be exceeded, or may affect the long term fuel depletion pattern. Therefore, power peaking monitoring is allowed for up to 24 hours. This Completion Time is reasonable based on the low probability of an event occurring simultaneously with the APSR limit out of specification. In addition, it precludes long term

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

depletion with the APSRs in positions that have not been analyzed, thereby limiting the potential for an adverse xenon redistribution. This time limit also ensures that the intended burnup distribution is maintained, and allows the operator sufficient time to reposition the APSRs to correct their positions.

Because the APSRs are not operated by the automatic control system, manual action by the operator is required to restore the APSRs to the positions specified in the COLR.

B.1

If the APSRs cannot be restored to their intended positions within the associated Completion Time, then the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours. This action ensures that the fuel does not continue to be depleted in an unintended burnup distribution. The allowed Completion Time is reasonable, based on operating experience, to reach the required plant conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.2.1

Verification that the APSRs are within their insertion limits at a 12 hour Frequency is sufficient to ensure that the APSR insertion limits are preserved. The 12 hour Frequency required for performing this verification is sufficient because APSRs are positioned by manual control and are normally moved infrequently. The probability of a deviation occurring simultaneously with a non-functioning APSR position computer alarm is low in this relatively short time frame. Also, the Frequency takes into account other information available in the control room for monitoring the axial power distribution in the reactor core.

REFERENCES

1. FSAR, Section 1.4.

2. 10 CFR 50.46.

(continued)

BASES

REFERENCES (continued)

3. FSAR, Section 14.2.2.4.

4. BAW-10143P-A, Rev. 1, "BWC Correlation of Critical Heat Flux", April 1985.

5. BAW-10241(P)(A)-00, BHTP DNB Correlation Applied with LYNXT.

BASES

ACTIONS

B.1 (continued)

Completion Time of 2 hours is reasonable based on limiting a potentially adverse xenon redistribution, the low probability of an accident occurring in this relatively short time period, and on operating experience regarding the amount of time required to reach 40% RTP from RTP without challenging plant systems.

SURVEILLANCE REQUIREMENTS

The AXIAL POWER IMBALANCE can be monitored by both the Incore and Excore Detector Systems. The AXIAL POWER IMBALANCE maximum allowable setpoints in the operating procedure are derived from their corresponding measurement system independent limits (in the COLR) by adjusting for both the system observability errors and instrumentation errors. Although they are based on the same measurement system independent limits, the setpoints for the different systems are not identical because of differences in the errors applicable for each of these systems. The uncertainty analysis that defines the required error adjustment to convert the measurement system independent limits to alarm setpoints assumes that 75% of the detectors in each quadrant are OPERABLE. Detectors located on the core major axes are assumed to contribute one half of their output to each quadrant; detectors in the center assembly are assumed to contribute one quarter of their output to each quadrant. For AXIAL POWER IMBALANCE measurements using the Incore Detector System, the Minimum Incore Detector System consists of detectors configured as follows:

a. Nine detectors shall be arranged such that there are three detectors in each of three strings and there are three detectors lying in the same axial plane, with one plane at the core midplane and one plane in each axial core half;

b. The axial planes in each core half shall be symmetrical about the core midplane; and

c. The detector strings shall not have radial symmetry.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Figure B 3.2.3-1 (Minimum Incore Detector System for AXIAL POWER IMBALANCE Measurement) depicts an example of this configuration. This arrangement is chosen to reduce the uncertainty in the measurement of the AXIAL POWER IMBALANCE by the Minimum Incore Detector System. For example, the requirement for placing one detector of each of the three strings at the core midplane puts three detectors in the central region of the core where the neutron flux tends to be higher. It also helps prevent measuring an AXIAL POWER IMBALANCE that is excessively large when the reactor is operating at low THERMAL POWER levels. The third requirement for placement of detectors (i.e., radial asymmetry) reduces uncertainty by measuring the neutron flux at core locations that are not radially symmetric.

SR 3.2.3.1

If the plant computer becomes inoperable, then the Excore System or Minimum Incore Detector System may be used to monitor the AXIAL POWER IMBALANCE. Although these systems do not provide a direct calculation and display of the AXIAL POWER IMBALANCE, a 1 hour Frequency provides reasonable time between calculations for detecting any trends in the AXIAL POWER IMBALANCE that may exceed its alarm setpoint and for undertaking corrective action.

When the AXIAL POWER IMBALANCE alarm is OPERABLE, the operator receives an alarm if the AXIAL POWER IMBALANCE increases to its alarm setpoint. Verification of the AXIAL POWER IMBALANCE indication every 12 hours ensures that the AXIAL POWER IMBALANCE limits are not violated. This Surveillance Frequency is acceptable because the mechanisms that can cause AXIAL POWER IMBALANCE, such as xenon redistribution or CONTROL ROD drive mechanism malfunctions that cause slow AXIAL POWER IMBALANCE increases, would likely be discovered by the operator before the specified limits are violated.

REFERENCES

1. 10 CFR 50.46.
2. BAW-10143P-A, Rev. 1, "BWC Correlation of Critical Heat Flux", April 1985.
3. BAW-10241(P)(A)-00, BHTP DNB Correlation Applied with LYNXT.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.2.4.1 (continued)

After a THERMAL POWER increase following restoration of the QPT to within the steady state limit, QPT must be determined to remain within the steady state limit at the increased THERMAL POWER level. This is accomplished by monitoring QPT for 12 consecutive hourly intervals or until verified acceptable at ≥ 95% RTP to determine whether the period of any oscillation due to xenon redistribution causes the QPT to exceed the steady state limit again. In case QPT exceeds the steady state limit for more than 24 hours or exceeds the transient limit (Condition A, B, or D), the potential for this xenon redistribution is greater.

REFERENCES

1. 10 CFR 50.46.
2. BAW 10122A, Rev. 1, "Normal Operating Controls", May 1984.
3. BAW-10143P-A, Rev. 1, "BWC Correlation of Critical Heat Flux", April 1985.
4. BAW-10241(P)(A)-00, BHTP DNB Correlation Applied with LYNXT.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.2.5.1 (continued)

for exceeding both the power peaking factors assumed in the accident analyses due to operation with unanalyzed core power distributions and spatial xenon distributions beyond their analyzed ranges.

The measured value of F_Q is increased by 1.4% to account for manufacturing tolerances on the fuel and further increased by 7.5% to account for measurement uncertainty. $F^N_{\Delta H}$ is increased by 5% for measurement uncertainty.

REFERENCES

1. 10 CFR 50.46.

2. BAW-10143P-A, Rev. 1, "BWC Correlation of Critical Heat Flux", April 1985.

3. BAW-10241(P)(A)-00, BHTP DNB Correlation Applied with LYNXT.

B 3.3 INSTRUMENTATION

B 3.3.9 Source Range Neutron Flux

BASES

BACKGROUND

The source range neutron flux channels provide the operator with an indication of the approach to criticality at lower neutron power levels than can be monitored by the intermediate range neutron flux instrumentation. These channels also provide the operator indication of changes in reactivity that may occur during other shutdown operations.

The normally relied upon source range instrumentation (NI-1 and -2) consist of two redundant count rate channels originating in two high sensitivity proportional counters. The two detectors are externally located on opposite sides of the core 180° apart. These channels are used over a neutron count rate range of 0.1 cps to 1E6 cps and are displayed on the main control board (MCB) in terms of log count rate. The channels also measure the rate of change of the neutron flux level, which is displayed on the MCB in terms of startup rate from -0.5 decades to +5 decades per minute. An interlock provides a control rod withdraw "inhibit" on a high startup rate of +2 decades per minute in either channel.

The proportional counters of the source range channels are BF_3 chambers. High voltage will be turned off automatically when the flux level on a start-up (count rate increasing) is above 1E-9 amp as seen by both intermediate range channels, or 10% RTP in NI-5 or -6 and NI-7 or -8 power range channels. Conversely, the high voltage is turned on automatically when the flux level returns to within approximately one decade of the detectors' maximum useful range.

Although not normally relied upon to perform the source range neutron flux level monitoring function, the post-accident monitoring instrumentation (NI-14,-15) has been shown to be functionally equivalent to NI-1 and NI-2 and may be used to comply with this LCO.

(continued)

BASES

APPLICABLE SAFETY ANALYSES	The source range neutron flux channels are necessary to monitor core reactivity changes. They are also the primary means for detecting and triggering operator actions to respond to reactivity transients initiated from conditions in which the Reactor Protection System (RPS) is not required to be OPERABLE. However, the monitors. are not assumed as part of any accident analysis sequence.
LCO	Two source range neutron flux channels are required to be OPERABLE during MODE 2 with each intermediate range channel ≤ 5E-10 amps or NI-5 or NI-6, and NI-7 or NI-8 ≤ 5% RTP; and MODES 3, 4 and 5 since they are the primary indication of core neutron power at low power levels. The original intent of the Applicability was to require source range instrumentation to be OPERABLE until the automatic functions from intermediate or power range instrumentation deenergized the source range detectors. The logical structure of the Applicability (OR statement) states that the source range detectors are required in Mode 2 when the intermediate range detectors OR the power range detectors are below their respective setpoints. Since the power range setpoint is orders of magnitude higher than the intermediate range setpoint, operating below the intermediate range setpoint will always be below the power range setpoint. Effectively, the existing wording for the Applicability requires the SR to be OPERABLE until the power range instrumentation reached 5% RTP. Although the source range detectors are deenergized by the intermediate range setpoint below the power range setpoint, the source range detectors are still OPERABLE because the detectors will automatically re-energize when counts decrease below the intermediate range setpoint. Above the neutron power level specified for MODE 2, the source range instrumentation is not the primary neutron power level indication and the high voltage to the detector has been removed. The setpoints are based upon the power levels where the instrumentation is re-energized on decreasing flux levels.
APPLICABILITY	Two source range neutron flux channels are required in MODES 2, 3, 4 and 5. In MODE 2 (as described in the LCO Section above), OPERABILITY of the instrumentation ensures redundant indication during an approach to criticality. The intermediate range and power range instrumentation provide sufficient neutron flux level indication with the reactor critical; therefore, source range instrumentation is not required in MODE 1 (the instrumentation is de-energized and cannot function anyway). In MODES 3, 4, and 5, source range neutron flux instrumentation provide the operator with a means of monitoring changes in SDM and provides an indication of reactivity changes. The requirements for source range neutron flux instrumentation during MODE 6 are addressed in LCO 3.9.2, "Nuclear Instrumentation."

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

PAM instrumentation that is determined to display a Regulatory Guide 1.97 Type A variable, satisfies Criterion 3 of the NRC Policy Statement. Category 1, non-Type A, instrumentation does not meet any of the criterion in the NRC Policy Statement. However, it is retained in Technical Specifications because it is considered important to reducing risk to the public.

LCO

LCO 3.3.17 requires redundant channels be OPERABLE to ensure no single failure prevents the operators from being presented with the information necessary to determine the status of the unit and to bring the unit to, and maintain it in, a safe condition following that accident. The provision of two channels also allows for relative comparison of the channels (a CHANNEL CHECK type of qualitative assessment) during the post accident phase to confirm the validity of displayed information.

An exception to the two channel requirement is containment isolation valve position. In this case, the important information is the status of the containment penetration. The LCO requires one position indicator for each automatic containment isolation valve. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the automatic valve and prior knowledge of the passive valve or via system boundary status. If a normally active containment isolation valve is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Another exception to the redundant channel requirement pertains to the reactor coolant inventory and pressurizer level variables. Various SSCs have been identified that are not protected from the jet impingement and/or pipe whip effects of certain LOCAs. Among these are several components associated with RG 1.97 Post Accident Monitoring Instruments providing pressurizer level indication, and hot leg and reactor vessel level indication for assessing reactor coolant inventory. The subject instruments would be rendered non-functional as a result of the failure of the target SSCs. Therefore, a consequential failure of these instruments due to a LOCA along with a single failure in the redundant train would not satisfy RG 1.97 Category 1 redundancy requirements. However, the failure of these instruments due to the effects of a LOCA does not violate the LCO requirements for operability on the basis that an instrument need not be declared inoperable during normal operation if the instrument has no accident mitigation function for the specific LOCA causing its failure. Details on the basis for this assessment are provided in the discussion for reactor coolant inventory and pressurizer level (Items 4 and 13, respectively).

(continued)

BASES

The following table identifies the specific instrument tag numbers for PAM instrumentation identified in Table 3.3.17-1.

FUNCTION	CHANNEL A	CHANNEL B
1. Wide Range Neutron Flux	NI-15-NI-1 or NI-15-NIR	NI-14-NI-1
2. RCS Hot Leg Temperature	RC-4A-TI4-1	RC-4B-TIR1
3. RCS Pressure(Wide Range)	RC-158-PI2 or RC-158-PIR	RC-159-PI2
4. Reactor Coolant Inventory	RC-163A-LR1 (Hot leg level) and RC-164A-LR1 (Vessel Head level)	RC-163B-LR1 (Hot leg level) and RC-164B-LR1 (Vessel Head level)
5. Borated Water Storage Tank Level	DH-7-LI or DH-7-LIR1	DH-37-LI
6. High Pressure Injection Flow	A1: MU-23-FI8-1 A2: MU-23-FI10 B1: MU-23-FI9 B2: MU-23-FI7-1	A1: MU-23-FI12 A2: MU-23-FI6-1 B1: MU-23-FI5-1 B2: MU-23-FI11
7. Containment Sump Water Level (Flood Level)	WD-303-LI or WD-303-LR	WD-304-LI or WD-304-LR
8. Containment Pressure (Expected Post-Accident Range)	BS-16-PI	BS-17-PI
9. Containment Pressure (Wide Range)	BS-90-PI or BS-90-PR	BS-91-PI or BS-91-PR
10. Containment Isolation Valve Position	**ES Light Matrix "A":** AHV-1B/1C; CAV-1/3/4/5/126; CFV-11/12/15/16; LRV-70/72; MUV-258 thru -261/567;WDV-3/60/94/406; WSV-3/5	**ES Light Matrix "B":** AHV-1A/1D; CAV-2/6/7/431; CFV-29/42; LRV-71/73; MUV-18/27/49/253; WDV-4/61/62/405; WSV-4/6
	ES Light Matrix "AB": CFV-25 thru-28; CIV-34/35/40/41; DWV-160; MSV-130/148; SWV-47 thru 50/79 thru 86/109/110	
11. Containment Area Radiation (High Range)	RM-G29-RI or RM-G29-RIR	RM-G30-RI
12. Not Used		
13. Pressurizer Level	RC-1-LIR-1	RC-1-LIR-3
14. Steam Generator Water Level (Startup Range)	**OTSG A:** SP-25-LI1 or SP-25-LIR **OTSG B:** SP-29-LI1 OR SP-29-LIR	**OTSG A:** SP-26-LI1 **OTSG B:** SP-30-LI1

(continued)

BASES

LCO

12. Not Used

13. Pressurizer Level

Pressurizer level is indicated to provide information on proper operation of the pressurizer for a variety of anticipated transients. These include decreasing feedwater temperature, excessive main feedwater flow, decreasing steam flow, small steam leaks, loss-of-offsite power (and subsequent natural circulation ensured by pressurizer heater operation), loss of condenser vacuum, as well as several others. For these events, pressurizer level is expected to remain on-scale for the installed indication.

For severe transients or accidents such as a steam line break, steam generator tube rupture, and many small break LOCAs, the pressurizer will void. For the case of a loss of main feedwater, the pressurizer could potentially be made water-solid. This is undesirable in that RCS pressure control is degraded and the potential for passing liquid through the pressurizer safety valves is increased. Studies have shown the safeties have a higher potential to fail to re-seat (creating an unisolable LOCA) if this condition were to occur.

Two channels of pressurizer level, each covering a range of 0 to 320 inches, are indicated and recorded in the control room. These instruments are not assumed to provide information required by the operator to take a mitigation action specified in the safety analysis. As such, they are not Type A variables. However, the monitors are deemed risk significant (Category 1) and are included within the LCO based upon this consideration.

The following instrument associated with primary coolant system operation monitoring would be rendered non-functional due to the dynamic effects of a LOCA:

- RC-1-LT3

RC-1-LT3 is a transmitter used in providing pressurizer level indication (RC-1-LIR-3) in one of two RG 1.97 compliant instrument strings. There is also a third non-safety related pressurizer level instrument string. Pressurizer level is classified as a Type D variable that is used to indicate proper

(continued)

BASES

LCO 13. Pressurizer Level (continued)

operation of the pressurizer and one of the parameters demonstrating operation of the reactor coolant system. The tubing associated with this instrument would be a jet impingement target of a pressurizer surge line rupture. Failure of the tubing pressure boundary would result in the indication failing to the low position, i.e., show the pressurizer level off-scale low. Assuming a single failure of the redundant safety-related train of pressurizer level indication (RC-1-LIR-1) would result in neither train indicating pressurizer level. However, the redundant train would indicate no pressurizer level regardless of any consideration of a single failure for this specific accident. As noted above, the pressurizer will void for many small break LOCAs. Specifically, since the LOCA of concern is the pressurizer surge line, the pressurizer will void causing the level indication to go off-scale low even if both trains were to remain operable. This fact was highlighted in CR-3's request for an exception to RG 1.97 requirements regarding the scale of the level indicating instrumentation. The SER for this exception stated that the range was acceptable because, "For severe transients (accidents), the pressurizer will either void or go solid. This would cause the pressurizer level indication to go off-scale low or high depending on the accident, regardless of the span of the range. In these cases of off-scale pressurizer instrumentation, action to be taken must be determined by subcooling margin, RCS pressure, PORV status, and pressurizer safety valve status." These indications would all still be available after this LOCA event. Therefore, loss of pressurizer level indication would not inhibit the operators in their ability to mitigate the accident and bring the plant to a safe shutdown condition.

(continued)

BASES

LCO

14,15. Steam Generator Water Level (Start-up Range and Operating Range

The CR-3 Type A/Category 1 indication of steam generator level is the startup range and operating range EFIC level instrumentation. The combined instrument ranges cover a span of 6 to 394 inches above the lower tubesheet. The measured low range differential pressure is displayed in inches of water. The low range indicates a range of 0 to 150 inches, where 0 inches indicates an actual level of 6 inches above the lower tubesheet. The high range steam generator level instrumentation indicates a span of 0 to 100%, where 0% corresponds to a 102 inch actual level above the lower tubesheet. Redundant monitoring capability is provided by two channels of each range of instrumentation per OTSG.

The level signals are displayed on control room indicators. The steam generator level signals are calculated from differential pressure signals which are pressure compensated by a module in the EFIC System cabinets. Compensation is based on the densities of the water and steam assuming the OTSGs are normally operating at saturation. Each operating range level transmitter also inputs to a recorder in the control room. Since operator action is based on the control room indication, the LCO deals specifically with this portion of the instrument string.

(continued)

BASES

LCO

16. Steam Generator Pressure

Steam generator pressure is measured on each main steam line between the respective main steam safety valves and the main steam isolation valve. Redundant monitoring capability is provided by two pressure transmitters per OTSG. Each pressure transmitter provides an input signal to pressure indicators and a recorder in the control room. The control room indication of OTSG pressure is one of the primary indications used by the operator during an accident. Therefore, the LCO deals specifically with the control room indication portion of the OTSG pressure instrument string. The range of the indication is 0 to 1200 psig.

OTSG pressure decreases rapidly during a design basis steam line break accident. This rapid decrease in pressure is a positive indication of a breach in the secondary system pressure boundary. In order to minimize the primary system cooldown caused by the decreasing secondary system pressure, feedwater flow to the affected OTSG must be terminated. OTSG pressure is considered a Type A variable because it is the primary indication used by the operator to identify and isolate the affected OTSG. In addition, OTSG pressure is a key parameter used by the operator to evaluate primary-to-secondary heat transfer. For example, the operator may use this indication to control the primary system cooldown following a steam generator tube rupture or a small break loss of coolant accident (LOCA).

(continued)

BASES

APPLICABILITY

The PAM instrumentation requirements are applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and pre-planned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, plant operating conditions are such that the likelihood of an event occurring that would require PAM instrumentation is low; therefore, PAM instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

A Note was added to clarify the application of Completion Time rules to this Specification. The Conditions of this Specification are entered independently for each Function listed in Table 3.3.17-1. The Completion Time(s) of the inoperable channels of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

When one or more Functions have one required channel inoperable, the inoperable channel must be restored to. OPERABLE status within 30 days. The 30 day Completion Time is based on engineering judgment and a variety of considerations. These considerations include availability of the remaining OPERABLE channel, the passive nature of the instrument,(no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring PAM instrumentation during this interval.

(continued)

BASES

ACTIONS

A.1 (continued)

For penetrations having only one CIV having control room indication, Required Action A.1 is the applicable ACTION to enter when the single indication is determined to be inoperable. This practice is consistent with the philosophy used in the isolation design for these types of penetrations.

B.1

When a PAM instrumentation channel cannot be restored to OPERABLE status within 30 days, Required Action B.1 specifies the action described in Specification 5.7.2.a be initiated immediately. This action requires a written report be submitted to the NRC. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified and implemented before loss of functional capability occurs. The immediate Completion Time ensures the requirements of Specification 5.7.2.a are initiated without delay.

C.1

When one or more Functions have two required channels inoperable (i.e., two channels inoperable in the same Function), one channel in the Function must be restored to OPERABLE status within 7 days. The Completion Time of 7 days is based on the low probability of an event requiring operator action from the PAM instrumentation and the availability of alternative means for obtaining the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because alternate diverse monitoring indications may not fully satisfy Regulatory Guide 1.97 qualification requirements applicable to the Category 1 instrumentation, Therefore, requiring restoration of one channel of the Function to OPERABLE status minimizes the possibility that the PAM Function will be in a degraded condition should an accident occur.

(continued)

BASES

ACTIONS (continued)

D.1

Required Action D.1 directs entry into the appropriate Condition referenced in Table 3.3.17-1. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met the Required Action of Condition C and the associated Completion Time has expired, Condition D is entered for that channel and provides for transfer to the appropriate subsequent Condition.

E.1

If the Required Action and associated Completion Time of Conditions C is not met and Table 3.3.17-1 directs entry into Condition E, the plant must be placed in a MODE in which the requirements of this LCO do not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

F.1

Alternative means of monitoring containment area radiation and reactor vessel level are available and may be relied upon if the normal PAM channels cannot be restored to OPERABLE status within the associated Completion Time. Based upon this capability, it is inappropriate to require plant shutdown in this condition. Rather, in conjunction with the alternate monitoring means, the Required Action specifies action be immediately initiated in accordance with Specification 5.7.2.a, "Special Reports," in the Administrative Controls section of the Technical Specifications. The report provided to the NRC should discuss the alternate means of monitoring, describe the degree to which the alternative means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels to OPERABLE status.

(continued)

BASES

ACTIONS

F.1 (continued)

In the case of reactor vessel level, Reference 4 demonstrated that from a risk perspective, the appropriate Required Action was not to mandate a plant shutdown, but rather to follow the actions of Specification 5.7.2.a.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs apply to each PAM instrumentation Function in Table 3.3.17-1, except as noted.

SR 3.3.17.1

Performance of the CHANNEL CHECK once every 31 days for each required instrumentation channel that is normally energized ensures that a gross failure of the instrumentation has not occurred. A CHANNEL CHECK is a comparison of the parameter indicated on one channel with a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious.

Acceptance criteria are determined by the plant staff, and are presented in the Surveillance Procedures. The criteria may consider, but is not limited to, channel instrument uncertainties, including indication and readability. If a channel is outside the acceptance criteria, it may be an indication that the sensor or the signal processing equipment has excessively drifted. If the channels are within the acceptance criteria, it is an indication that the channels are OPERABLE. If the channels are normally off-scale when the Surveillance is performed, the CHANNEL CHECK will only verify that they are off-scale in the same direction. Off-scale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

The Frequency is based on operating experience that demonstrates channel failure is an uncommon event.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.17.1 (continued)

A note to the Surveillance excludes the performance of a CHANNEL CHECK on Function 4. FPC requested, and was granted, exception from performing a CHANNEL CHECK on this instrumentation as part of Amendment 124, dated October 17, 1989. The basis for not performing this SR is based on the design of the system. The system utilizes differential pressure (dp) measurements across vertical elevations of the hot leg and the reactor vessel when the RCPs are tripped. Performance of the SR with the RCPs in operation provides no meaningful information, such that a CHANNEL CHECK of this Function is not required.

SR 3.3.17.2

CHANNEL CALIBRATION is a complete check of the instrument channel, including the sensor, to verify the channel responds to the measured parameter(s) within the necessary range and accuracy.

For the Containment Area Radiation instrumentation, a CHANNEL CALIBRATION consists of an electronic calibration of the channel, not including the detector, for range decades above 10 R/hr. The calibration also provides a one point check of the detector below 10 R/hr using a gamma test source (Reference NUREG 0737, Table II.F.1-3).

The 24 month Frequency is based on the results of comprehensive instrument uncertainty calculations that accommodate 30 months of drift as approved in Amendment 152 (Ref. 5).

A Note clarifies that the neutron detectors are not required to be tested as part of the CHANNEL CALIBRATION. Adjustment of the detectors is unnecessary because they are passive devices and operating experience has shown them to exhibit minimal drift. Furthermore, there is no adjustment that can be made to the detectors.

A Note to the Surveillance excludes the performance of a CHANNEL CALIBRATION on Functions 23 and 25. FPC requested, and was granted, exception from performing a CHANNEL CALIBRATION on this instrumentation as part of Amendment 177, dated June 3, 1999. Since no adjustment of these on-off indications is possible, performance of the SR provides no meaningful information such that a CHANNEL CALIBRATION of this Function is not required. Instead, these indications are subjected to a CHANNEL FUNCTIONAL TEST as described in SR 3.3.17.3.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.17.3

CHANNEL FUNCTIONAL TEST is, for switch contacts, the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY, including required alarm and trip functions.

For the LPI Pump Run Status, and the HPI Pump Run Status, the CHANNEL FUNCTIONAL TEST verifies the red indicating lights on the main control board and the ES Light Matrix indicators during testing of the pumps already required by other surveillance requirements.

The 24 month frequency is based on providing consistency between this surveillance testing and the other surveillance requirements for verifying operability of these specific pumps.

REFERENCES

1. FSAR, Table 7-12.
2. Regulatory Guide 1.97, Revision 3.
3. NUREG-0737, 1979.
4. 32-1177256-00, "Technical Basis for Reactor Vessel Level Indication System (RVLIS) Action Statement," April 10, 1990.
5. Amendment No. 152 to the CR-3 Technical Specifications, dated February 13, 1996.

BASES

APPLICABILITY (continued)

time is available to restore necessary instrument Functions if it becomes necessary to abandon the control room.

ACTIONS

A Note was added to clarify the application of Completion Time rules to this Specification. The Conditions of the Specification may be entered independently for each Function listed in Table 3.3.18-1. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A addresses the situation where one or more required Functions listed in Table 3.3.18-1 of the Remote Shutdown System are inoperable.

With one or more Remote Shutdown System instrumentation Functions inoperable, the Function must be restored to OPERABLE status within 30 days. The Completion Time is based on operating experience and takes into account other indication available to provide the required information, and the low probability of an event that would require evacuation of the control room.

B.1 and B.2

If Required Action A.1 cannot be met within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 4 within 12 hours. The allowed Completion Times are

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.18.1

Performance of the CHANNEL CHECK once every 31 days for each required instrumentation channel that is normally energized ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is a comparison of the indicated parameter to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value.

Significant deviations between instrument channels could be an indication of excessive instrument-drift in one of the channels or of something even more serious. Acceptance criteria are determined by the plant staff and are presented in the Surveillance Procedure. The criteria may consider, but is not limited to, channel instrument uncertainties, including indication and readability. If the channel is outside the acceptance criteria, it may be an indication that the sensor or the signal processing equipment has excessively drifted. If the channels are within the acceptance criteria, it is an indication that the channels are OPERABLE. As specified in the Surveillance, a CHANNEL CHECK is only required for those channels that are normally energized. If the channels are normally off-scale when the Surveillance is performed, the CHANNEL CHECK will only verify that they are off-scale in the same direction. Off-scale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

The Frequency is based on plant operating experience, which demonstrates that channel failure is an uncommon event.

(continued)

BASES

APPLICABILITY (continued)

to be OPERABLE in order to provide redundant heat removal capability, but does not have to be in operation. Forced circulation is required in all MODES and is addressed by the following Specifications:

LCO 3.4.5, "RCS Loops—MODE 4";
LCO 3.4.6, "RCS Loops—MODE 5, Loops Filled";
LCO 3.4.7, "RCS Loops—MODE 5, Loops Not Filled";
LCO 3.9.4, "Decay Heat Removal (DHR) and Coolant Circulation—High Water Level" (MODE 6); and
LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation—Low Water Level" (MODE 6).

Forced circulation is implicitly required in MODES 1 and 2 in order to prevent a Reactor Protection System actuation (Ref. LCO 3.3.1).

ACTIONS

A.1

If one RCS loop is inoperable, redundant forced flow heat removal capability is lost. The RCS loop must be restored to OPERABLE status within 72 hours. This Completion Time is a justified period to be without the redundant non-operating loop, and is consistent with allowed outage times for loss of redundancy in other two-train TS systems. Thus, the Completion Time is based on engineering judgment.

B.1

If the inoperable RCS loop cannot be restored to OPERABLE status within 72 hours, the plant must be placed in MODE 4. In MODE 4, additional decay heat removal (DHR) system options are available to satisfy the redundant heat transfer requirements of LCO 3.4.5, "RCS Loops-Mode 4." The Completion Time of 12 hours to achieve MODE 4 conditions is reasonable, based on operating experience, to cooldown and

(continued)

BASES

ACTIONS

B.1 (continued)

depressurize from the existing plant conditions without challenging plant systems. Failure to have redundant heat removal capability necessitates entry into the Required Actions of LCO.

C.1 and C.2

This Condition is not entered when using the allowance in the Note to the LCO to de-energize all reactor coolant pumps.

If no RCS loop is OPERABLE or in operation, all operations involving a reduction of RCS boron concentration must be immediately suspended. This is necessary because boron dilution requires forced circulation for proper homogenization. Action to restore one RCS loop to operation shall be immediately initiated and continued until one RCS loop is restored to operation and to OPERABLE status. The immediate Completion Time reflects the importance of maintaining forced reactor coolant circulation for decay heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification every 12 hours that one RCS loop, with a minimum of one RCP, is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms indicate loop status and will typically alert operations personnel to anomalous flow conditions/loss of flow should this occur.

SR 3.4.4.2

Verification that the required number of RCPs are OPERABLE ensures that redundant heat removal capability is provided

(continued)

BASES

APPLICABLE SAFETY ANALYSIS (continued)	representative probabilistic risk assessments. The PORV and its block valve are deemed important to risk; specifically the ability to isolate the flowpath to mitigate a stuck-open PORV.
LCO	The LCO requires the PORV and its associated block valve to be OPERABLE. The block valve is required to be OPERABLE so it may be used to isolate the flow path if the PORV is not OPERABLE. If the block valve is not OPERABLE, the PORV may be used for isolation. The primary purpose of this LCO is to ensure that the PORV and the block valve are operating correctly so the potential for a small break LOCA through the PORV pathway is minimized, or if a small break LOCA were to occur through a failed open PORV, the block valve could be closed to isolate the flow path.
APPLICABILITY	In MODES 1, 2, and 3, the PORV and its block valve are required to be OPERABLE to limit the potential for a small break LOCA through the flow path. The most likely scenario for a PORV LOCA is a pressure increase transient that causes the PORV to open followed by its failure to re-seat. Pressure increase transients can occur any time the steam generators are used for heat removal. The most rapid increases will occur at higher operating power and pressure conditions of MODES 1 and 2. Pressure increases are less prominent in MODE 3 because the core input energy is reduced, but the RCS pressure is still potentially elevated. The LCO is not applicable in the lower MODES when both pressure and core energy are decreased and the potential pressure surges become much less significant.

(continued)

BASES

ACTIONS

A.1 and A.2

With the PORV inoperable, the PORV must be restored or the flow path isolated within 1 hour. The block valve should be closed and power must be removed from the block valve to eliminate the potential for inadvertent PORV opening and depressurization.

B.1.1, B.1.2, B.2.1, and B.2.2

If the block valve is inoperable, it must be restored to OPERABLE status or the flowpath isolated within 1 hour. The prime importance for the capability to close the block valve is to isolate a stuck open PORV. Therefore, if the block valve cannot be restored to OPERABLE status, the Required Action is to close the block valve and remove power or close the PORV and remove power to its associated solenoid valve. Either of the two Required Actions will render the PORV isolated. The 1 hour Completion Times are consistent with an allowance of some time for correcting minor problems, restoring the valve to operation, and establishing correct valve positions and restricting the time without adequate protection against RCS depressurization.

C.1 and C.2

If the Required Action and associated Completion Time is not met, the plant must be placed in MODE in which the requirement does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 4 within 12 hours. The Completion Times are reasonable, based on operating experience, to reach the specified MODES and conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1

Block valve cycling verifies that it can be closed if needed. The Frequency of 92 days is based on ASME Code, Section XI (Ref. 3) requirements. Block valve cycling, as stated in the Note, is not required to be performed when it

(continued)

BASES

LCO

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with the detection of unidentified LEAKAGE and is well within the capability of the RCS makeup system. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE or controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE). Violation of this LCO could result in continued degradation of a component or system.

d. Primary to Secondary LEAKAGE through Any One Steam Generator (OTSG)

This LEAKAGE limit is established to ensure that tubes initially leaking during normal operation do not contribute excessively to total leakage during postulated accident conditions. The 150 gpd limit is a conservative limit which is consistent with the operational leakage limit specified in NRC Generic Letter 95-05 for plants implementing Alternate Repair Criteria. CR-3 has elected to voluntarily adopt this conservative limit to ensure plant shutdown in a timely manner in response to detection of primary to secondary LEAKAGE. Primary to secondary LEAKAGE must be included in the total allowable limit for identified LEAKAGE.

Two OTSGs are also required to be OPERABLE. This requirement is met by satisfying the augmented inservice inspection requirements of the Steam Generator Tube Surveillance Program (Specification 5.6.2.10).

(continued)

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE or an event that challenges OTSG tube integrity is greatest since the RCS is pressurized. In MODES 5 and 6, LEAKAGE limits and OTSG OPERABILITY are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE or failure.

LCO 3.4.13, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leaktight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the determination of allowable identified LEAKAGE.

(continued)

BASES

LCO (continued)	The requirements of the LCO are met when monitors of diverse measurement means are available. Thus, the containment sump monitor (narrow range), in combination with a particulate or gaseous radioactivity monitor, provides an acceptable minimum.
APPLICABILITY	RCS leakage detection instrumentation is required to be OPERABLE in MODES 1, 2, 3 and 4 due to the elevated RCS temperature and pressure. In MODE 5 or 6, the temperature is ≤ 200°F and pressure is low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, 3, and 4, the likelihood of leakage and crack propagation is much smaller. Additionally, below 200°F leakage from the RCS will likely be liquid and the atmospheric monitors are less effective. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.
ACTIONS	A.1 and A.2 With the narrow range containment sump monitor inoperable, no other form of sampling will provide equivalent information (range and sensitivity). However, the containment atmosphere activity monitor will provide an indication of changes in leakage. Together with the atmosphere monitor, the periodic RCS water inventory balance, (SR 3.4.12.1), must be performed at an increased Frequency of 24 hours to provide information adequate to detect leakage. Since Required Action A.1 only specifies "perform", a failure of SR 3.4.12.1 does not result in a Required Action not met (Condition C). However, if the failure of SR 3.4.12.1 is valid and not due to the inability to establish steady state conditions, the ACTIONS of Specification 3.4.12 must be entered immediately. Restoring the sump monitor to OPERABLE status within 30 days is required to regain the function provided by the instrument. This Completion Time is acceptable considering

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

the frequency and adequacy of the RCS water inventory balance required by Required Action A.1.

B.1.1, B.1.2, and B.2

With the required gaseous or particulate containment atmosphere radioactivity monitoring instrumentation channel inoperable, grab samples of the containment atmosphere must be taken and analyzed or water inventory balances must be performed to provide alternate periodic information. With a sample obtained and analyzed or a water inventory balance performed every 24 hours, operation may continue for up to 30 days to allow restoration of at least one of the radioactivity monitors.

The 24 hour interval provides periodic information that is adequate to detect leakage. The 30 day Completion Time is based on having at least one other form of leak detection (sump level) available.

Since Required Action B.1.2 only specifies "perform", a failure of SR 3.4.12.1 does not result in a Required Action not met (Condition C). However, if the failure of SR 3.4.12.1 is valid and not due to the inability to establish steady state conditions, the ACTIONS of Specification 3.4.12 must be entered immediately.

Required Actions B.1.1, B.1.2, and B.2 are modified by a Note indicating that the provisions of LCO 3.0.4 do not apply. As a result, a MODE change is allowed when the containment atmosphere radioactivity monitor is inoperable. This allowance is provided because other instrumentation is available to monitor RCS LEAKAGE and the Completion Time for restoring the monitor to OPERABLE status is lengthy.

(continued)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Specific Activity

BASES

BACKGROUND

The limits on specific activity ensure that the doses are within the 10 CFR 50.67 limits during analyzed transients and accidents (Ref. 1).

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and gross specific activity.

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensure that the resulting doses will not exceed the 10 CFR 50.67 dose limits. These values represent a reasonable operating capability rather than a specific analytical result. RCS specific activity is an input to the dose analyses for a Steam Generator Tube Rupture, Main Steam Line Break and Letdown Line Rupture (Ref. 2).

RCS Specific Activity satisfies Criterion 2 of the NRC Policy Statement.

LCO

The specific iodine activity is limited to 1.0 μCi/gm DOSE EQUIVALENT I-131, and the gross specific activity in the primary coolant is limited to the number of μCi/gm equal to 100 divided by $\bar{E}$ (average disintegration energy of the sum of the average beta and gamma energies of the coolant nuclides in terms of MeV). These values represent a reasonable operating capability rather than a specific analytical result.

Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of an accident, lead to site boundary doses that exceed the applicable dose limits of 10 CFR 50.67.

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS average temperature ≥ 500°F, the energy in the RCS is sufficient to lift secondary side relief valves in the event of a SGTR.

For operation in MODE 3 with RCS average temperature < 500°F, and in MODES 4 and 5, the release of radioactivity in the event of an SGTR is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the atmospheric dump valves and main steam safety valves.

(continued)

BASES

ACTIONS

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate the limits of Figure 3.4.15-1 are not exceeded. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling must continue for trending purposes.

The DOSE EQUIVALENT I-131 must be restored to limits within 48 hours. The Completion Time of 48 hours limits operation in the Condition, but provides a reasonable time for temporary coolant activity increases (iodine spiking or crud bursts) to be cleaned up with processing systems. As such, the Completion Time is based on engineering judgment.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS.

B.1

If either Required Action and associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is in the unacceptable region of Figure 3.4.15-1, the reactor must be placed in MODE 3 with RCS average temperature < 500°F within 6 hours. The Completion Time of 6 hours is required to get to MODE 3 below 500°F without challenging plant systems.

C.1 and C.2

With gross specific activity in excess of the allowed limit, an analysis must be performed within 4 hours to determine DOSE EQUIVALENT I-131. The Completion Time of 4 hours is required to obtain and analyze a sample.

(continued)

BASES

ACTIONS

A.1

With one or more ECCS trains inoperable and at least 100% of the flow equivalent to a single OPERABLE ECCS train available, the inoperable components must be returned to OPERABLE status within 72* hours. The 72 hour Completion Time is based on NRC recommendations (Ref. 3) that are based on a risk evaluation and is a reasonable time for many repairs.

*On a one-time basis, an Emergency Core Cooling System train may be inoperable as specified by Required Action A.1 for up to 10 days to allow performance of Decay Heat Seawater System Pump RWP-3B repairs online. Upon completion of the refurbishment and system restoration this footnote is no longer applicable.

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. The intent of this Condition is to maintain a combination of equipment such that the safety injection (SI) flow equivalent to 100% of a single train remains available. This allows increased flexibility in plant operations under circumstances when components in opposite trains are inoperable.

For example, removing a train of the recirculation line to the RB sump or the entire bank of valves for maintenance does not render the HPI System inoperable, given the diverse ability to recirculate to the Makeup Tank. HPI satisfies Criterion 3 of the NRC Policy Statement which addresses SSCs that are part of the primary success path, and which function or actuate to mitigate a design basis accident or transient challenging a fission product barrier. Since this recirculation line supports piggyback operation in long-term cooling, and piggyback operation is not a primary success path, LCO 3.5.2 need not be entered when this recirculation path is not available.

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. 3) has shown the risk of having one full ECCS train inoperable to be sufficiently low to justify continued operation for 72 hours.

With one or more components inoperable such that the flow equivalent to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be immediately entered.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

If the inoperable components cannot be returned to OPERABLE status within the associated Completion Times, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and at least MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing.

These valves include valves in the main flow paths and the first normally closed valve in a branch line. In lieu of the first normally closed valve in the branch line, credit may be taken for verifying valve position of another valve downstream, providing the isolation of the flow path is achieved. Verifying correct valve alignment of valves immediately downstream of an unsecured valve still assures isolation of the flow path. There are several exceptions for valve position verification due to the low potential for these types of valves to be mispositioned. The valve types which are not verified as part of this SR include vent or drain valves, relief valves, instrumentation valves, check valves, and sample line valves. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition within the proper stroke time. For a power operated valve to be considered "locked, sealed, or otherwise secured", the component must be electrically and physically restrained. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position.

(continued)

BASES

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to inoperable ECCS LPI loops when entering MODE 4 from MODE 5. There is an increased risk associated with entering MODE 4 from MODE 5 with LPI inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1

If no LPI subsystem is OPERABLE, the unit is not prepared to respond to a LOCA or to continue cooldown using the DHR/LPI pumps and decay-heat heat exchangers. The immediate Completion Time ensures that prompt action is initiated to restore the required cooling capacity. Normally, in MODE 4, reactor decay heat must be removed by a DHR/LPI train operating with suction from the RCS. If no DHR/LPI train is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generator(s) (OTSG). The alternate means of heat removal must continue until the inoperable ECCS LPI subsystem can be restored to operation so that continuation of decay heat removal (DHR) is provided.

B.1

If no ECCS HPI subsystem is OPERABLE, due to the inoperability of the HPI pump or flow path from the BWST, the plant is not prepared to provide high pressure response to Design Basis Events requiring ECCS response. The 1 hour Completion Time to restore at least one ECCS HPI subsystem to OPERABLE status ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the plant in MODE 5, where an ECCS train is not required.

This Condition does not apply to HPI subsystem components which are deactivated for the purposes of complying with LCO 3.4.11, "Low Temperature Overpressure Protection (LTOP) System". With these components deactivated, the HPI subsystem is still considered OPERABLE based upon guidance in NRC Generic Letter 91-18. This guidance allows substitution of manual operator action for otherwise automatic functions for the purposes of determining OPERABILITY. The substitutions are limited and must be evaluated against the assumptions in the accident analysis. In the case of deactivating HPI in MODE 4, the components are available for injection following manual operator action to restore the system to OPERABLE status and this action can be accomplished within the time frame required to respond to the transient/accident.

(continued)

BASES

ACTIONS (continued)

C.1

If the Required Actions and associated Completion Times are not met, the plant must be placed in a MODE in which the Specification does not apply. When the Required Actions of Condition B cannot be completed within the associated Completion Time, a controlled shutdown should be initiated, provided adequate decay heat removal capability exists. The allowed Completion Time of 24 hours is reasonable, based on operating experience, to reach MODE 5 from MODE 4 conditions in an orderly manner and without challenging plant systems. Should adequate decay heat removal capability not exist, or Required Action A.1 not be completed within its associated Completion Time, consideration should be given to pursuing Discretionary Enforcement from the NRC on the requirement to proceed to MODE 5.

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply.

This SR is modified by a Note which allows a DHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the DHR mode during MODE 4, if necessary.

REFERENCES

The applicable references from Bases 3.5.2 apply.

BASES

ACTIONS

C.1 and C.2 (continued)

isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, and a blind flange. A check valve may not be used to isolate the affected penetration. Required Action C.1 must be completed within the 4 hour Completion Time. The specified time period is reasonable, considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of supporting containment OPERABILITY during MODES 1, 2, 3, and 4. In the event the affected penetration is isolated in accordance with Required Action C.1, the affected penetration flow path must be verified to be isolated on a periodic basis. This periodic verification is necessary to assure leak tightness of containment and that containment penetrations requiring isolation following an accident are isolated. The Completion Time of once per 31 days for verifying that each affected penetration flow path is isolated is appropriate considering the fact that the valves are operated under administrative controls and the probability of their misalignment is low.

Condition C is modified by a Note indicating that this Condition is only applicable to those penetration flow paths with only one containment isolation valve and a closed system. This Note is necessary since this Condition is written to specifically address those penetration flow paths utilizing a closed system.

Required Action C.2 is modified by two Notes. Note 1 applies to isolation devices located in high radiation areas and allows these devices to be verified by use of administrative means. Allowing verification by administrative means is considered acceptable since access to these areas is typically restricted. Note 2 applies to isolation devices that are locked, sealed, or otherwise secured in position and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since the function of locking, sealing or securing components is to ensure that these devices are not inadvertently repositioned. Therefore, the probability of misalignment of these devices, once verified to be in the proper position, is small.

(continued)

BASES

ACTIONS (continued)

D.1

In the event one or more containment 48 inch purge valves in one or more penetration flow paths are not within the purge valve leakage limits, purge valve leakage must be restored to within limits within 24 hours. The maximimum allowable leakage per penetration flow path should not exceed 0.05 L_a. The specified time is a reasonable period for restoring the valve leakage to within limits, provided overall containment leakage rate remains within limits. With the purge valve seal degraded such that leakage exceeds the limits, there is an increased potential for the same mechanism that caused the initial degradation to cause further degradation. If left unchecked, this could result in a loss of containment OPERABILITY. Thus, the 24 hour Completion Time is necessary to limit the length of time the plant can operate in this condition.

E.1 and E.2

If the Required Actions and associated Completion Times are not met, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.3.1

Each 48 inch containment purge valve is required to be verified sealed closed at 31 day intervals. This Surveillance is designed to ensure that a gross breach of containment is not caused by an inadvertent or spurious opening of a containment purge valve. Detailed analysis of the purge valves failed to conclusively demonstrate their ability to close during a LOCA in time to maintain offsite doses to within licensing basis limits. Therefore, these valves are required to be in the sealed closed position during MODES 1, 2, 3, and 4. A containment purge valve that is sealed closed must have motive power to the valve operator removed. This can be accomplished by de-energizing

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.3.5

Verifying that the isolation time of each power operated and automatic containment isolation valve that is not locked, sealed, or otherwise secured in the isolation position is within limits is required to demonstrate OPERABILITY. The isolation time test ensures the valve will isolate in a time period less than or equal to that assumed in the safety analyses. The isolation time and Frequency of this SR are in accordance with the Inservice Testing Program.

SR 3.6.3.6

For 48 inch containment purge valves, additional leakage rate testing beyond the test requirements of 10 CFR 50, Appendix J, is required to ensure OPERABILITY. The maximum allowable leakage per penetration flow path should not exceed 0.05 L_a. Operating experience has demonstrated that this type of valve seal has the potential to degrade in a shorter time period than do other seal types. Based on this observation and the importance of maintaining this penetration leak tight (due to the direct path between containment and the environment), additional purge valve testing was established as part of the NRC resolution of Generic Issue B-20, "Containment Leakage Due to Seal Deterioration" (Ref. 7).

The specified Frequencies are based on plant-specific as-found/as-left leakage rate data for these valves. The data indicates the CR-3 purge valve resilient seals do not degrade during the operating cycle with the valves in the sealed closed position. The 92 day Frequency after opening the valves recognizes the seals are prone to excessive leakage following use and is consistent with the NRC resolution of B-20.

A Note to this SR requires the results to be evaluated against the Containment Leakage Rate Testing Program. This ensures that excessive containment purge valve leakage is properly accounted for in determining the overall containment leakage rate to verify containment OPERABILITY.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.3.7

Automatic containment isolation valves close on a containment isolation signal to prevent leakage of radioactive material from containment following a DBA. This SR ensures each automatic containment isolation valve that is not locked, sealed, or otherwise secured in the isolation position, will actuate to its isolation position on an actual or simulated actuation signal. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass this Surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint. (Ref. 4 and 9)

The SR is modified by a note indicating the SR is not applicable in the identified MODE. This is necessary in order to make the requirements for automatic system response consistent with those for the actuation instrumentation.

REFERENCES

1. FSAR, Section 5.3.1.
2. FSAR, Section 5.2.1.1
3. FSAR, Sections 14.2.2.
4. FSAR, Table 5-9.
5. FSAR, Section 5.3.3.1
6. Generic Issue B-24.
7. Generic Issue B-20.
8. 10 CFR 50.67.
9. FSAR, Section 5.3.2.

BASES

LCO (continued)

iodine from the containment atmosphere and maintain concentrations below those assumed in the safety analysis. To ensure that these requirements are met, two RB spray trains and two containment cooling units must be OPERABLE. Therefore, in the event of an accident, the minimum requirements are met, assuming the worst-case single active failure occurs.

Each RB Spray System train includes a spray pump, spray headers, nozzles, valves, piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the BWST upon an Engineered Safeguards Actuation System signal and manually transferring suction to the reactor building emergency sump.

Each Containment Cooling System train includes demisters, cooling coils, dampers, an axial flow fan driven by a two speed water cooled electrical motor, instruments, and controls to ensure an OPERABLE flow path.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment and an increase in containment pressure and temperature, requiring the operation of the RB spray trains and containment cooling trains.

In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Thus, the RB Spray System and the Containment Cooling System are not required to be OPERABLE in MODES 5 and 6.

ACTIONS

A.1

With one RB spray train inoperable, the inoperable containment spray train must be restored to OPERABLE status within 72* hours. In this Condition, the remaining OPERABLE spray and cooling trains are adequate to perform the iodine removal and containment cooling functions. The 72 hour Completion Time takes into account the redundant heat

(continued)

BASES

ACTIONS

A.1 (continued)

removal capability afforded by the OPERABLE RB spray train and cooling system train(s), reasonable time for repairs, and the low probability of a DBA occurring during this period.

*On a one-time basis, a Reactor Building Spray System train may be inoperable as specified by Required Action A.1 for up to 10 days to allow performance of Decay Heat Seawater System Pump RWP-3B repairs online. Upon completion of the refurbishment and system restoration this footnote is no longer applicable.

The 10 day portion of the Completion Time for Required Action A.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this LCO coupled with the low probability of an accident occurring during this time. Refer to Section 1.3, "Completion Times", for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

B.1 and B.2

If the inoperable RB spray train cannot be restored to OPERABLE status within the required Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 84 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time to attempt restoration of the RB spray train and is reasonable when considering the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

C.1

With one of the required containment cooling trains inoperable, the inoperable containment cooling train must be restored to OPERABLE status within 7 days. The components in this degraded condition provide iodine removal capabilities and are capable of providing at least 100% of the heat removal needs after an accident. The 7 day Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the RB Spray System and Containment Cooling System and the low probability of a DBA occurring during this period.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.6.7 (continued)

approximately in half (motor at low speed). Thus, this SR ensures that one of the running motors automatically switches to low speed upon receipt of the containment cooling engineered safeguards actuation signal and the other running motor trips. To prevent exceeding SW design temperatures, by having two RB fans in service, this SR also ensures that only one RB fan will start on an ES actuation signal. The 24 month Frequency is based on engineering judgment and has been shown to be acceptable through operating experience. See SR 3.6.6.5 and SR 3.6.6.6, above, for further discussion of the basis for the 24 month Frequency.

The SR is modified by a note indicating the SR is not applicable in the identified MODE. This is necessary in order to make the requirements for automatic system response consistent with those for the actuation instrumentation.

SR 3.6.6.8

With the containment spray header isolated and drained of any solution, low pressure air or smoke can be blown through test connections. As an alternative, a visual inspection (e.g., boroscope) of the nozzles or piping could be utilized in lieu of an air or smoke test if a visual inspection is determined to provide a more effective post-maintenance test. A visual inspection may be more effective if the potential for material intrusion is localized and the affected area is accessible. Performance of this Surveillance demonstrates that each spray nozzle is unobstructed and provides assurance that spray coverage of the containment during an accident is not degraded. Due to the passive nature of the design of the nozzles, and the corrosion resistant design of the system, a test performed following maintenance which could result in nozzle blockage is considered adequate to detect obstruction of the spray nozzles. Maintenance that could result in nozzle blockage would be those maintenance activities where the Foreign Material Exclusion (FME) Program (MNT-NGGC-0007) controls were deemed ineffective. Results of the visual inspection and any associated evaluation should be documented in the Nuclear Condition Report (NCR) generated for the loss of FME control. The NCR should also note that it is documenting completion of SR 3.6.6.8.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.6.8 (continued)

For activities, such as a valve repair/replacement, a visual inspection would be the preferred post-maintenance test since small debris in a localized area is the most likely concern. A smoke or air test would be appropriate following an event where a large amount of debris entered the system or water was actually discharged through the spray nozzles. For an inadvertent actuation of the Reactor Building Spray system, an air or smoke test should be performed at the next outage of sufficient duration.

REFERENCES

1. FSAR, Section 1.4.
2. FSAR, Section 14.2.2.5.9.
3. FSAR, Section 6.3.
4. RO-2787 Requirement Outline, Reactor Building Fan Assemblies, Addendum B, February 19, 1971.
5. ASME, Boiler and Pressure Vessel Code, Section XI.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.7 Containment Emergency Sump pH Control (CPCS)

BASES

BACKGROUND

The CPCS raises the pH of water in the containment emergency sump to at least 7.0 following a Design Basis Accident (DBA). In the event of a loss of coolant accident (LOCA), the trisodium phosphate dodecahydrate (TSP-C) contained in the CPCS storage baskets will be automatically dissolved in the reactor coolant and BWST inventory lost through the break. The CPCS performs no function during normal plant operations.

Radioiodine in its various forms is the fission product of primary concern in the evaluation of a DBA. It is absorbed by the spray from the containment atmosphere. To reduce the potential for elemental iodine re-evolution, the spray solution during the ECCS recirculation phase is adjusted (buffered) to an alkaline pH. This promotes iodine hydrolysis, in which iodine is converted to nonvolatile forms. TSP-C, because of its stability when exposed to radiation and elevated temperature and its non-toxic nature, is the preferred buffer material.

The TSP-C storage baskets are designed and located to permit the contents of the baskets to be dissolved into-the inventory in the RB sump as water level increases post-LOCA. To ensure the desired range of pH is achieved, the stainless steel mesh screen storage baskets are located at the 95' elevation of the RB.

The design of the CPCS was established to provide a spray solution during the ECCS recirculation phase with a pH between 7.0 and 11.0 (Ref. 1). This range of alkalinity was established not only to ensure elemental iodine does not re-evolve, but also to minimize the long-term stress corrosion of mechanical system components that would occur if the acidic borated water were not buffered. The pH range also considers the environmental qualification of equipment in containment that may be subjected to the spray.

(continued)

BASES

APPLICABLE SAFETY ANALYSES	Following the assumed release of radioactive materials into containment, the containment is assumed to leak at its design value following the accident. The LOCA radiological dose analysis assumes the amount of radioactive material available for release is reduced by operation of the RB spray system and that most of the containment volume is covered by the spray. The analysis demonstrates that unbuffered BWST inventory, delivered by the RB Spray System during the ECCS injection phase, is adequate to remove elemental and particulate iodine from the post-LOCA containment atmosphere and limit doses to within 10 CFR 50.67 limits. The CPCS provides long-term pH control of the spray to ensure iodine does not come out of the solution and once again, become available for release. The CPCS satisfies Criterion 3 of the NRC Policy Statement.
LCO	The OPERABILITY of the CPCS ensures sufficient TSP-C is maintained in the three TSP-C storage baskets to increase pH of water in the emergency sump to at least 7.0 following a LOCA. To be considered OPERABLE, the volume, density, and solubility of the TSP-C must be sufficient to raise the average spray solution pH to between 7.0 and 11.0. This pH range ensures iodine does not re-evolve from solution during the ECCS recirculation phase without introducing conditions that may induce caustic stress corrosion cracking of mechanical system components.
APPLICABILITY	In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment requiring the operation of the CPCS. The CPCS assists in reducing the iodine fission product inventory which re-evolves from the reactor coolant to the RB during the ECCS recirculation phase. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Thus, the CPCS is not required to be OPERABLE in MODES 5 and 6.

(continued)

BASES

ACTIONS

A.1

With the CPCS inoperable, the system must be restored to OPERABLE status within 72 hours. The pH adjustment of the Reactor Building Spray System for corrosion protection and iodine re-evolution enhancement is reduced in this Condition. The Containment Spray System would still be available and would remove iodine from the containment atmosphere in the event of a DBA. However, some of this iodine could come back out of solution without the proper long-term sump pH control. The 72 hour Completion Time takes into account the passive nature of the CPCS design and the low probability of the worst-case DBA occurring during this period.

B.1 and B.2

If the CPCS cannot be restored to OPERABLE status within the required Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 84 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time for restoration of the CPCS and is reasonable when considering that the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

SURVEILLANCE REQUIREMENTS

SR 3.6.7.1

To reduce the potential for post-LOCA iodine re-evolution from the water in the sump, the containment spray must be an alkaline solution. Since the BWST contents are normally acidic, the volume of the CPCS must provide a sufficient volume of TSP-C to adjust pH for all water injected. This SR is performed to verify the availability of sufficient TSP-C volume in the three TSP-C mesh storage baskets. A volume of 246 ft^3 to 254 ft^3 of TSP-C will produce a pH range between 7.0 and 7.6 at the onset of the recirculation

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.7.1 *(continued)*

phase and therefore, will create the desired pH level of the spray. The 24 month Frequency is based on the passive nature of the CPCS design and the low probability of an undetected change in TSP-C volume occurring during the SR interval (the baskets are located on the 95' elevation of the RB and are inaccessible during normal plant operation).

SR 3.6.7.2

This SR provides verification of the density of a representative sample of TSP-C obtained from each storage basket and is sufficient to ensure that the spray solution being injected into containment during the ECS recirculation phase is at the correct pH level. The 24 month Frequency is sufficient to ensure that the density of TSP-C contained in the storage baskets remains within the established limits. This is based on the low likelihood of an uncontrolled change in density.

SR 3.6.7.3

This SR provides verification of the solubility of the TSP-C contained in the storage baskets. The surveillance performs a time and temperature-dependent test of a representative sample of TSP-C, submerged without agitation, in water with a boron concentration consistent with that which would be found in the BWST. The verification demonstrates the pH of the solution is increased to at least 7.0 under conditions as close as practicable to those during a DBA. The 24 month Frequency is adequate to ensure TSP-C solubility remains within limits. This conclusion is based on the passive nature of the CPCS design, the inaccessibility of the TSP-C storage baskets during normal plant operations, and the low likelihood of an uncontrolled change in solubility.

REFERENCES

1. FSAR, Section 6.2.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The EFW System is designed to remain functional following the maximum hypothetical earthquake. It will also remain functional following a single failure in addition to any of the above events. No single failure prevents EFW from being supplied to the intact OTSG nor allows EFW to be supplied to the faulted OTSG. Note that in most cases of a main feedwater break or a steam line break, the depressurization of the affected OTSG would cause the automatic initiation of EFW. However, there will be some small break sizes for which automatic detection will not be possible. For these small breaks, the operator will have sufficient time in which to take appropriate action to terminate the event (Ref. 1).

The EFW System satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent emergency feedwater pumps and their associated flow paths are required to be OPERABLE. The OPERABILITY of the EFW pumps requires that each be capable of developing its required discharge pressure and flow. Additionally, the OPERABILITY of the turbine driven pump requires that it be capable of being powered from an OPERABLE steam supply through ASV-5. ASV-204 was installed to improve EFW reliability and is not required for OPERABILITY.

The motive power for the turbine driven pump is steam supplied from either OTSG from a main steam header upstream of the main steam isolation valves so that their closure does not isolate the steam supply to the turbine. Both steam supply flow paths through MSV-55 and MSV-56 (Condition A) to the turbine driven pump are required to be OPERABLE. The OPERABILITY of the associated EFW flow paths requires all valves be in their correct positions or be capable of actuating to their correct positions on a valid actuation signal.

The diesel driven EFW pump has a starting air system consisting of a safety-related air receiver that is maintained pressurized by a non-safety-related air compressor. The requirements for the air receiver are covered by Specification 3.7.19. The air is delivered to the diesel engine through DC powered valves. The DC power is provided by the diesel driven EFW pump DC distribution system battery.

(continued)

BASES

LCO (continued)

Inoperability of the EFW System may result in inadequate decay heat removal following a transient or accident during which main feedwater is not available. The resulting RCS heatup and pressure increase can potentially result in significant loss of coolant through the pressurizer code safety valves or the PORV.

APPLICABILITY

In MODES 1, 2, and 3 the EFW System is required to be OPERABLE and to function in the event that main feedwater is lost. In addition, the EFW System is required to supply enough makeup water to replace the secondary side inventory lost as the plant cools to MODE 4 conditions.

In MODES 4, 5 and 6, the OTSG need not be used to cooldown the RCS. Therefore, the EFW System is not required to be OPERABLE in these MODES.

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable EFW train when entering MODE 1. There is an increased risk associated with entering MODE 1 with EFW inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1

With one of the two steam supplies to the turbine driven EFW pump inoperable, action must be taken to restore the steam supply to OPERABLE status within 7 days. Allowing 7 days in this Condition is reasonable, based on the redundant OPERABLE steam supply to the pump and the low probability of an event occurring that would require the inoperable steam supply to the turbine driven EFW pumps.

The 10 day Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be entered during any continuous failure to meet this LCO. The 10 day Completion Time provides a limitation time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The 'AND' connector between 7 days and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

(continued)

BASES

APPLICABILITY

In MODES 1, 2, and 3, the DC System is not a normally operating system, but must be capable of performing its post-accident safety functions, which include providing cooling water to components required for RCS and containment heat removal. Two independent 100 percent capacity DC trains must be OPERABLE to accommodate the design system heat load requirements and satisfy reliability considerations assuming a single failure.

In MODE 4, although RCS temperature and pressure are reduced, there remains sufficient stored energy that the occurrence of an accident would necessitate the post-accident cooling functions of the DC System. When temperature and pressure have been reduced sufficiently to allow alignment of the DHR System to the RCS, the DC System is no longer required for post-accident component cooling, but must continue to provide cooling to the DHR heat exchangers. Therefore, two trains of the DC System must remain OPERABLE throughout MODE 4 to ensure emergency preparedness and/or decay heat removal, assuming a single active failure.

In MODES 5 and 6, the DC System is in operation performing its normal safety function of RCS decay heat removal. The various means of removing reactor decay heat in MODES 5 and 6 are addressed in LCO 3.4.6, "RCS Loops - MODE 5, Loops Filled"; LCO 3.4.7, "RCS Loops - MODE 5, Loops Not Filled"; LCO 3.9.4, "DHR and Coolant Circulation - High Water Level"; and LCO 3.9.5, "DHR and Coolant Circulation - Low Water Level". In other words, the OPERABILITY requirements for the DC System are determined by the systems it supports. Therefore, this LCO is not applicable in MODES 5 and 6.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.5, "RCS Loops - MODE 4," be entered if an inoperable DC train results in an inoperable required DHR loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for an inoperability of a required DHR loop.

(continued)

BASES

ACTIONS

A.1 (continued)

With one DC train inoperable, action must be taken to restore the train to OPERABLE status within 72* hours. In this Condition, the remaining OPERABLE DC train is adequate to perform the heat removal function. The 72 hour Completion Time for restoring full DC System OPERABILITY is the same as that for the ECCS Systems, whose safety functions are supported by the DC System. This Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE train and the low probability of a DBA occurring during this period.

*On a one-time basis, a Decay Heat Closed Cycle Cooling Water System train may be inoperable as specified by Required Action A.1 for up to 10 days to allow performance of Decay Heat Seawater System Pump RWP-3B repairs online. Upon completion of the refurbishment and system restoration this footnote is no longer applicable.

B.1 and B.2

If the inoperable DC train cannot be restored to OPERABLE status within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.8.1

Verifying the correct alignment for manual and power operated valves in the DC flow path provides assurance that the proper flow paths exist for DC operation. The isolation of the DC flow to individual components may render those components inoperable, but does not affect the operability of the DC system. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing.

These valves include valves in the main flow paths and the first normally closed valve in a branch line. In lieu of the first normally closed valve in the branch line, credit may be taken for verifying valve position of another valve downstream, providing the isolation of the flow path is achieved. Verifying correct valve alignment of valves immediately downstream of an unsecured valve still assures isolation of the flow path.

(continued)

BASES

BACKGROUND (continued)

The Nuclear Services Seawater System is designed to seismic category I requirements, except for the standpipe drain line. The design and operation of the Nuclear Services Seawater System along with a list of components served by SW during normal and emergency conditions, can be found in FSAR Section 9.5 (Ref. 2). Following an Engineered Safeguards Actuation System (ESAS) actuation, SW System flow paths are realigned to provide a reliable source of cooling to essential safeguards equipment which may be supplied by non-safety cooling water systems during normal operations. To ensure these additional heat loads can be accommodated, both emergency pumps are started simultaneously by an ESAS signal to provide adequate cooling in the event of a single active failure which disables one emergency pump.

APPLICABLE SAFETY ANALYSES

The Nuclear Services Seawater System supports the SW System in providing cooling for components essential to the mitigation of plant transients and accidents. The system has two separate 100 percent capacity underground intake conduits, independent emergency pumps, and underground discharge conduits to allow for a single failure while still providing the required flow. An ESAS signal will start both emergency pumps. This ensures the required cooling capacity is provided to the SW System following a steam line break, steam generator tube rupture, makeup system letdown line failure, or loss of coolant accident.

The Nuclear Services Seawater System satisfies Criterion 3 of the NRC Policy Statement.

(continued)

BASES

LCO

The requirement for the OPERABILITY of the Nuclear Services Seawater System including two emergency nuclear services seawater pumps provides redundancy necessary to ensure the system will provide adequate post-accident heat removal in the event of a coincident single failure.

Emergency nuclear services seawater pump OPERABILITY requires that each be capable of being powered from separate OPERABLE emergency buses. OPERABILITY of the associated flow paths requires that each valve in the flow path must be aligned to permit sea water flow from the intake canal to the SW heat exchangers, and subsequently to the discharge canal. The OPERABILITY of the SW heat exchangers, required to ensure proper heat removal capability, is addressed in LCO 3.7.7, "Nuclear Services Closed Cycle Cooling Water System".

APPLICABILITY

In MODES 1 through 4 the SW and Nuclear Services Seawater Systems are normally operating systems which must be prepared to provide post-accident cooling for components required for RCS and containment heat removal, equipment essential in providing the capability to safely shutdown the plant, and equipment required for adequate spent fuel pool cooling. The Nuclear Services Seawater System must be capable of providing its post-accident cooling assuming a single active failure. Therefore, both emergency pumps are required to be OPERABLE during these MODES.

In MODES 5 and 6, the Nuclear Services Seawater System is not required to be OPERABLE due to the limitations on RCS temperature and pressure in these MODES. Additionally, there are no other Technical Specification LCOs supported by the system which are applicable during these plant conditions.

ACTIONS

<u>A.1</u>

With one of the Nuclear Services Seawater pumps inoperable, action must be taken to restore the pump to OPERABLE status within 72 hours. The 72 hour Completion Time for restoring full Nuclear Services Seawater System OPERABILITY is consistent with that for ECCS Systems, whose safety functions are supported by the system. This Completion Time is based on engineering judgement and is consistent with accepted industry-accepted practice.

(continued)

BASES

LCOs (continued)

The OPERABILITY of the decay heat seawater pumps requires that they each be capable of being powered from an OPERABLE emergency bus. Each valve in the flow path must be in its correct position for permitting sea water flow from the intake canal to the DC heat exchangers, and subsequently to the discharge canal. The OPERABILITY of the DC System, required to ensure proper heat removal capability, is addressed in LCO 3.7.8, "Decay Heat Closed Cycle Cooling Water System."

APPLICABILITY

In MODES 1, 2, and 3 the DC and Decay Heat Seawater Systems may not be operating, but must be prepared to perform post-accident safety functions, which include providing cooling water to components required for RCS and containment heat removal. The Decay Heat Seawater System must be capable of providing its post-accident cooling assuming a single failure. Therefore, both pumps are required to be OPERABLE during these MODES.

In MODE 4, although RCS temperature and pressure are reduced, there remains sufficient stored energy that the occurrence of an accident would necessitate the post-accident cooling functions of the DC and Decay Heat Seawater Systems. When temperature and pressure have been reduced sufficiently to allow alignment of the DHR System to the RCS, the Decay Heat Seawater System is no longer needed for post-accident component cooling, but must provide cooling to the DC heat exchangers for cooldown and holding operations. Therefore, two trains of the Decay Heat Seawater System must remain OPERABLE throughout MODE 4 to ensure emergency preparedness and/or decay heat removal, assuming a single failure.

In MODES 5 and 6 the DHR, DC, and Decay Heat Seawater Systems are in operation performing their normal safety function of RCS decay heat removal. The various means of removing reactor decay heat in MODES 5 and 6 are addressed in LCO 3.4.6, "RCS Loops - MODE 5, Loops Filled"; LCO 3.4-7, "RCS Loops - MODE 5, Loops Not Filled"; LCO 3.9.4, "DHR and Coolant Circulation - High Water Level"; and LCO 3.9.5, "DHR and Coolant Circulation - Low Water Level". In other words, the OPERABILITY requirements for the DC System are determined by the systems it supports. Therefore, this particular LCO is not applicable in MODES 5 and 6.

(continued)

BASES

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.5, "RCS Loops - MODE 4," should be entered if an inoperable decay heat seawater train results in an inoperable required DHR loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for an inoperability of a required DHR loop.

If one of the decay heat seawater trains is inoperable, action must be taken to restore the train to OPERABLE status within 72* hours. In this Condition, the remaining OPERABLE train is adequate to perform the heat removal function. The 72 hour Completion Time for restoring full Decay Heat Seawater System OPERABILITY is the same as that for the ECCS Systems, whose safety functions are supported by the Decay Heat Seawater System. This Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE train and the low probability of a DBA occurring during this period.

*On a one-time basis, a Decay Heat Seawater System train may be inoperable as specified by Required Action A.1 for up to 10 days to allow performance of Decay Heat Seawater System Pump RWP-3B repairs online. Upon completion of the refurbishment and system restoration this footnote is no longer applicable.

B.1 and B.2

If the inoperable decay heat seawater train cannot be restored to OPERABLE status within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Verifying the correct alignment for manual valves in the Decay Heat Seawater System flow path provides assurance that the proper flow paths exist for DC operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing.

These valves include valves in the main flow paths and the first normally closed valve in a branch line. In lieu of the first normally closed valve in the branch line, credit may be taken for verifying valve position of another valve downstream, providing the isolation of the flow path is achieved. Verifying correct valve alignment of valves immediately downstream of an unsecured valve still assures isolation of the flow path.

(continued)

BASES

ACTIONS

A.1 (continued)

With one or more components inoperable such that the cooling capability equivalent to a single OPERABLE train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be immediately entered.

With one or more Control Complex Cooling trains inoperable and at least 100% cooling capability of a single OPERABLE train available, the inoperable components must be restored to OPERABLE status within 7 days. In this Condition, the remaining Control Complex Cooling System equipment is adequate to maintain the control complex temperature. Adequate cooling capability exists when the control complex air temperature is maintained within the limits for the contained equipment and components. However, the overall reliability is reduced because additional failures could result in a loss of Control Complex Cooling System function. The 7 day Completion Time is based on the low probability of an event occurring requiring the Control Complex Cooling System and the consideration that the remaining components can provide the required capabilities.

B.1 and B.2

If the inoperable Control Complex Cooling System component cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner without challenging unit systems.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.18.1

Verifying that each Control Complex Cooling chiller's developed head at the flow test point is greater than or equal to the required developed head ensures that chiller's performance has not degraded during the cycle. Flow and differential pressure are normal tests of centrifugal pump performance required by Section XI of the ASME Code (Ref. 3). This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. The Frequency of the SR is in accordance with the Inservice Testing Program.

SR 3.7.18.2

This SR verifies that the heat removal capability of the system is sufficient to meet design requirements. This SR consists of a combination of testing and calculations. A 24 month Frequency is appropriate, as significant degradation of the system is slow and is not expected over this time period.

REFERENCES

1. FSAR, Section 9.7.

2. Deleted.

3. ASME, Boiler and Pressure Vessel Code, Section XI.

B.3.7 PLANT SYSTEMS

B 3.7.19 Diesel Driven EFW (DD-EFW) Pump Fuel Oil, Lube Oil and Starting Air

BASES

BACKGROUND

The DD-EFW Pump is provided with a dedicated fuel oil supply tank. The fuel oil capacity of this tank, which is located in a dedicated compartment in the DD-EFW Pump building, is sufficient for the pump to perform its intended function for a period of 7 days. The fuel oil supply capacity is calculated using 10 CFR 50 Appendix K assumptions to supply EFW flow to one or two steam generators for seven days and enough fuel capacity to cool the RCS to decay heat removal cut-in temperature. Margin for instrument error and fuel needed for normal surveillance is included in the fuel oil tank size calculation. This fuel oil capacity ensures adequate time is available to replenish the onsite supply from outside sources prior to the diesel engine running out of fuel.

Due to the proximity and location of the supply tank to the engine, the fuel oil is directly fed to the engine from the supply tank by the engine fuel pump. The fuel oil tank and piping are located inside the DD-EFW Pump building which is a seismic Class I building, which precludes consideration of the effects of missiles in their design.

For proper operation of the DD-EFW Pump, it is necessary to ensure the proper quality of the fuel oil. CR-3 has a Diesel Fuel Oil (DFO) Testing Program which is an overall effort to ensure the quality of the fuel oil. The program includes fuel purchasing, testing of new fuel, and periodic testing of stored fuel oil. Additionally, the program includes water removal and biocide addition to control bacteriological growth. CR-3 is not committed to Regulatory Guide 1.137 or ANS 59.51 (ANSI N195), however, these standards were utilized as guidance in the development of the DFO Testing Program.

The DD-EFW Pump lube oil subsystem is designed to provide sufficient lubrication to permit proper operation of its associated diesel engine under all loading conditions. The system is required to circulate the lube oil to the diesel

(continued)

BASES

BACKGROUND (continued)

engine working surfaces and to remove excess heat generated by friction during operation. The onsite lube oil storage is sufficient to ensure 7 days of operation. This supply ensures adequate time is available to replenish lube oil from outside sources prior to the system running out of lube oil.

The DD-EFW Pump engine has an air start system with adequate capacity for six successive start attempts on the engine without recharging the air start receivers. A single DD-EFW pump engine start is assured with air receiver pressure > 150 psig.

APPLICABLE SAFETY ANALYSIS

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 14 (Ref. 5), assume Engineered Safeguard (ES) systems are OPERABLE. The DD-EFW Pump is designed to provide sufficient EFW flow capacity to ensure the availability of necessary emergency feedwater to one or two steam generators. The DD-EFW pump is part of the redundant and diverse EFW system that provide steam generator secondary side cooling water.

Since diesel fuel oil, lube oil, and the air start subsystem support the operation of the DD-EFW pump system, they satisfy Criterion 3 of the NRC Policy Statement.

LCO

A sufficient quantity of stored diesel fuel oil supply is required to be available to ensure the capability to operate the DD-EFW Pump for 7 days. Diesel fuel oil is also required to meet specific quality standards. This EFW train is one of the two, full capacity and diverse sources of emergency feedwater for steam generator secondary side cooling.

A sufficient lube oil supply must be available to ensure the capability to operate the diesel engine for its 7 day fuel capacity (without refueling) rating. Engine lube oil

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.19.3 (continued)

new fuel to the storage tank(s). Receipt of fuel oil without testing results may be authorized by the Emergency Coordinator, provided the vendor's certificate of conformance is in accordance with procurement specifications. In this case, fuel oil samples should be taken from the delivery, with test results to be documented within 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel in accordance with ASTM D4057-88 (Ref. 6);

b. Verify in accordance with the tests specified in ASTM D975-00, (Ref. 7) that the new fuel oil sample has:

   1. A maximum of 0.05% by volume water and sediment per ASTM D2709-96(2001) (Ref. 11);

      OR

      A maximum of 0.05% by volume water and sediment per ASTM D1796-97(2002) (Ref. 12);

   2. A Saybolt viscosity at 100°F of ≥ 32.6 SUS and ≤ 40.1 SUS. Conversion from kinematic units can be made per ASTM D2161-93(1999) (Ref. 15);

      OR

      A Kinematic viscosity at 40°C (104°F) of ≥ 1.9 mm²/s and ≤ 4.1 mm²/s per ASTM D445-03 (Ref. 14). Conversion to SUS units can be made using ASTM D2161-93(1999) (Ref. 15);

   3. A flash point of ≥ 125°F per ASTM D93-02a Procedure "A", Manual or Automated Method (Ref. 16);

   4. A maximum Cloud Point of -6.7°C (20°F) per ASTM D2500-02 (Ref. 8);

c. Verify in accordance with the test specified in ASTM D287-92(2000) (Ref. 17) that the new fuel has an API specific gravity of ≥ 30 and ≤ 38;

   OR

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.19.3 (continued)

Verify in accordance with the test specified in ASTM D1298-99 (Ref. 18) that the new fuel has an API specific gravity of ≥ 30 and ≤ 38;

d. Verify in accordance with the test specified in ASTM D4176-02 (Ref. 19) and ASTM D1500-02 (Ref. 20) that the new fuel oil has a clear and bright appearance with proper color at 21°C (70°F).

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tank. If the fuel oil fails on clear and bright, it may be accepted provided the water and sediment is within limits. The specification for water and sediment recognizes that a small amount of water and sediment is acceptable.

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-00, (Ref. 7), are met for new fuel oil when tested in accordance with ASTM D975-00, (Ref. 7), except that a calculated Cetane Index, per ASTM D4737-96a (Ref. 9), is determined to estimate the actual Cetane Number. If the Cetane Index is not met, then a sample of fuel is tested in accordance with ASTM D613-03a (Ref. 10) to determine Cetane Number. The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DD-EFW Pump operation. This Surveillance ensures the availability of high quality fuel oil for the DD-EFW Pump diesel engine.

Fuel oil degradation during long-term storage is typically detected as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment which can cause engine failure.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.19.3 (continued)

Particulate concentrations should be determined in accordance with ASTM D2276-91, Method A (Ref. 21). This method involves a gravimetric determination of total particulate concentration in the fuel oil. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing.

The Frequency of this SR takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between tests.

SR 3.7.19.4

This Surveillance ensures that, without the aid of the re-fill compressor, sufficient air start capacity for the DD-EFW Pump diesel engine is available. The design requirements provide for a minimum of six engine start cycles without recharging. The pressure specified in this SR reflects the lowest value at which the six starts can be accomplished.

The 31 day Frequency takes into account the capacity, capability and other indications available in the control room for DD-EFW Pump start readiness, including alarms, to alert the operator to below normal air start pressure. In addition, the system design includes a feature to automatically start the air compressors on low air pressure.

(continued)

BASES

REFERENCES

1. FSAR, Section 10.5.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. FSAR, Chapter 6.
5. FSAR, Chapter 14.
6. ASTM Standard, D4057-88.
7. ASTM Standard, D975-00.
8. ASTM Standard, D2500-02.
9. ASTM Standard, D4737-96a.
10. ASTM Standard, D613-03a.
11. ASTM Standard, D2709-96(2001).
12. ASTM Standard, D1796-97(2002).
13. Deleted.
14. ASTM Standard, D445-03.
15. ASTM Standard, D2161-93(1999).
16. ASTM Standard, D93-02a.
17. ASTM Standard, D287-92(2000).
18. ASTM Standard, D1298-99.
19. ASTM Standard, D4176-02.
20. ASTM Standard, D1500-02.
21. ASTM Standard, D2276-91, Method A.
22. Deleted.

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(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

b. A worst-case single failure.

The AC Sources satisfy Criterion 3 of the NRC Policy Statement.

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E electrical power distribution system and separate and independent EDGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR. Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ES buses.

The qualified circuits, both of which are required to be OPERABLE to satisfy this LCO, consist of:

a. The offsite power transformer, cabling through breakers 3211, and 3212, connecting to ES bus 3A and 3B respectively.

b. The BEST transformer, BEST Auxiliary Bus 3, cabling and nonsegregated-phase bus through breakers 3205, and 3206, connecting to ES bus 3A and 3B respectively.

(continued)

LCO (continued)

The 230 kV and 500 kV substations, while part of the offsite network, are not considered part of the circuit required by this LCO. The OPERABILITY of the circuit is supported by the substation provided the substation is capable of supplying the required post accident loads. Each EDG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ES bus on detection of bus undervoltage. This must be accomplished within 10 seconds. Each EDG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ES buses. These capabilities are required to be met from a variety of initial conditions, such as the EDG in standby with the engine hot and the EDG in standby with the engine at ambient conditions. Proper sequencing of loads, including shedding of non-essential loads, is a required function for EDG OPERABILITY.

EDG OPERABILITY requires proper ventilation using EDG Air Handling System cooling fan(s) for each EDG in order to maintain the temperature of the EDG engine room and EDG control room within manufacturer's limits. Based on analysis, single fan or dual fan operation is acceptable dependent upon fan supply air temperature.

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the EDGs, separation and independence are complete. For the offsite AC sources, separation and independence exist to the extent practical. A circuit may be connected to more than one ES bus and not violate separation criteria. A circuit that is not connected to an ES bus is required to have the capability for the operator to transfer power to the ES buses in order to be considered OPERABLE.

APPLICABILITY

Two onsite and two offsite AC sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of anticipated operational occurrences (AOOs) or abnormal transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

(continued)

BASES

APPLICABILITY (continued)

AC power requirements for MODES 5 and 6 are addressed in LCO 3.8.2, "AC Sources- Shutdown."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable EDG. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable EDG and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit on a more frequent basis.

Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action not met (Condition F). However, if the remaining required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition C, for two offsite circuits inoperable, is entered.

A 2

Required Action A.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated EDG will not result in a complete loss of safety function of redundant required features. These features are powered from the redundant AC electrical power train. Single train systems (from an electrical perspective), such as the turbine driven emergency feedwater pump, are not included.

The Completion Time for Required Action A.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal a "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The train has no offsite power supplying its loads; and

b. A required feature on the other train is inoperable.

(continued)

BASES

ACTIONS

B.2 (continued)

The Completion Time for Required Action B.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilties. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. An EDG is inoperable; and

b. A required feature on the other train is inoperable.

If at any time during the existence of this Condition (one EDG inoperable) a required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Declaring the required features inoperable within four hours from the discovery of items 'a' and 'b' existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the plant to transients associated with shutdown.

In this Condition, the remaining OPERABLE EDG and offsite circuits are adequate to supply electrical power to the onsite Class 1E distribution system. Thus, on a component basis, single-failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

(continued)

BASES

ACTIONS

B.3.1 and B.3.2

Required Action B.3.1 provides an option to testing the OPERABLE EDG in order to avoid unnecessary testing. If it can be determined that the cause of the inoperable EDG does not exist on the OPERABLE EDG, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on the other EDG, the other EDG would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered. If the common cause failure evaluation is indeterminate (the cause of the initial inoperable EDG cannot be confirmed not exist on the remaining EDG), performance of SR 3.8.1.2 is adequate to provide assurance of continued OPERABILITY of that EDG.

The Completion Time of 24 hours is reasonable to confirm that the OPERABLE EDG is not affected by the same problem as the inoperable EDG and is based on the recommendations of Generic Letter 84-15 (Ref. 7).

B.4

According to the recommendations of Regulatory Guide 1.93 (Ref. 6), operation with one EDG inoperable should be limited to a period not to exceed 72 hours. The completion time may be extended to 14 days if alternate AC (AAC) power is available. The alternate AC source must be capable of being aligned to the same bus as the inoperable EDG and must be capable of supporting loads required for safe shutdown of the reactor under non-accident conditions.

In Condition B, the remaining OPERABLE EDG, AAC source and offsite circuits are adequate to supply electrical power to the onsite Class 1E distribution system. The Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, the ability to perform online preventative maintenance, and the low probability of a DBA occurring during this period.

During online preventative maintenance that is planned to take over 72 hours, the following compensatory measures will be put in place prior to initiating the activity:

(continued)

ACTIONS (continued)

B.4 (continued)

Availability will be assured during an extended EDG AOT by the following:

- Starting the AAC and assuring proper operation prior to removing the EDG from service,
- Verifying every 72 hours that a 24-hour fuel supply is onsite, and
- Ensuring the AAC is electrically and mechanically ready for manual operation and can be aligned to supply the applicable safety-related bus with simple operator action every 72 hours.
- Designating the AAC Diesel Generator administratively as “protected” (no planned maintenance or discretionary equipment manipulation). The term “discretionary equipment manipulation” is not intended to preclude manipulations required for normal operation of the plant, required surveillances or operator response to abnormal conditions.

CR-3 will perform procedure CP-253, “Power Operation Risk Assessment and Management,” which requires both a deterministic and probabilistic evaluation of risk for the performance of all maintenance activities. This procedure uses the Level 1 PSA model to evaluate the impact of maintenance activities on CDF. CR-3 will not plan any maintenance that results in “Higher Risk” (Orange Color Code) during EDG maintenance.

ECCS equipment, emergency feedwater, Control Complex Cooling and auxiliary feedwater (FWP-7) will be designated administratively as “protected”.

Prior to initiating a planned EDG outage, CR-3 will verify the availability of offsite power to the 230 kV switchyard and ensure that the capability to power both ES busses is available from each of the two ES offsite power transformers (OPT and BEST).

CR-3 will not initiate an EDG extended preventive maintenance outage if adverse weather, as designated by Emergency Preparedness procedures, is anticipated.

No elective maintenance will be scheduled in the switchyard that would challenge the availability of offsite power to the ES busses.

CR-3 will perform a comprehensive walkdown of redundant electrical and mechanical systems.

(continued)

ACTIONS (continued)

B.4 (continued)

A periodic fire watch will be established in fire areas that are considered risk-significant by the IPEEE, affect both EDGs or have increased risk significance due to EDG maintenance. The fire areas are listed in Table B 3.8.1-1.

The 17-day Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failure to meet the LCO. Refer to the Bases for Required Action A.3 for additional information on this Completion Time.

(continued)

LCO (continued)

One of the following qualified circuits is required to be OPERABLE to satisfy this LCO:

a. The offsite power transformer, cabling through breakers 3211, and 3212, connecting to ES bus 3A and 3B respectively.

b. The BEST transformer, BEST Auxiliary Bus 3, cabling and nonsegregated-phase bus through breakers 3205 and 3206, connecting to ES bus 3A and 3B respectively.

c. Back feed from the 500 kV substation through the Unit 3 step-up transformers and the Unit 3 auxiliary transformer, nonsegregated-phase bus through breakers 3207 and 3208, connecting to ES bus 3A and 3B respectively. In order to make use of this power source, the step up transformer must first be manually disconnected from the CR-3 main generator by disengaging the disconnect links, and the backfeed ground fault protection scheme enabled.

The 230 kV and 500 kV substations, while part of the offsite network, are not considered part of the circuit required by this LCO. The OPERABILITY of the circuit is supported by the substation provided the substation is capable of supplying the required post accident loads.

The EDG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ES bus on detection of bus undervoltage. The EDG must be capable of shedding non-essential loads, starting and picking up the ES bus, and must continue to operate until offsite power can be restored to the bus. These capabilities are required to be met from a variety of initial conditions such as the EDG in standby with the engine hot or the EDG in standby at ambient conditions.

EDG OPERABILITY requires proper ventilation using EDG Air Handling System cooling fan(s) for each EDG in order to maintain the temperature of the EDG engine room and EDG control room within manufacturer's limits. Based on analysis, single fan or dual fan operation is acceptable dependent upon fan supply air temperature.

It is acceptable for electric power distribution trains to be cross-tied during *shutdown conditions*, allowing a single offsite power circuit to supply all required trains.

(continued)

BASES (continued)

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 provide assurance that:

a. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

b. Instrumentation and control capability is available for monitoring and maintaining the plant in a cold shutdown condition or refueling condition.

AC power source requirements for MODES 1, 2, 3, and 4 are addressed in LCO 3.8.1.

ACTIONS

A.1

Pursuant to LCO 3.0.6, the distribution system ACTIONS are not entered if the de-energization of the buses was due to all AC sources to them being inoperable. Therefore, the Required Actions of Condition A are modified by a Note indicating that when Condition A is entered with no AC power to one required train, the ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit, whether or not a required train is de-energized. LCO 3.8.10 provides the appropriate restrictions for a de-energized train.

An offsite circuit would be considered inoperable if it were not available to the required ES train(s). Although two trains may be required by LCO 3.8.10, one train with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS and fuel movement. By allowing the option to declare features with no offsite power available inoperable, appropriate restrictions will be implemented in accordance with the affected required features LCO's ACTIONS while allowing shutdown activities to proceed.

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each emergency diesel generator (EDG) is provided with a fuel oil storage tank. The combined fuel oil capacity of both storage tanks is sufficient to operate one diesel for a period of 7 days while the EDG is supplying the upper limit of its 200-hour rating (Ref. 1). The fuel oil supply is calculated using the assumption that one EDG is available to supply sufficient post accident loads. This onsite fuel oil capacity ensures adequate time is available to replenish the onsite supply from outside sources prior to the diesel running out of fuel.

Fuel oil is transferred from the storage tank to the day tank by either of two transfer pumps associated with each EDG. The pumps and piping are redundant to preclude failure of one pump, or the rupture of any pipe, valve or tank resulting in the loss of more than one EDG. All outside tanks and piping are located underground to preclude consideration of the effects of missiles in their design.

For proper operation of the EDGs, it is necessary to ensure the proper quality of the fuel oil. CR-3 has a Diesel Fuel Oil (DFO) Testing Program which is an overall effort to ensure the quality of the fuel oil. The program includes fuel purchasing, testing of new fuel, and periodic testing of stored fuel oil. Additionally, the program includes water removal and biocide addition to control bacteriological growth, and performance checks of the cathodic protection system for underground storage tanks. CR-3 is not committed to Regulatory Guide 1.137 or ANS 59.51 (ANSI N195), however, these standards were utilized as guidance in the development of the DFO Testing Program.

The EDG lube oil subsystem is designed to provide sufficient lubrication to permit proper operation of its associated EDG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during

(continued)

BASES

BACKGROUND (continued)

operation. The onsite lube oil storage, in addition to that contained in the engine sump, is sufficient to ensure 7 days of one EDG supplying the upper limit of its 200-hour rating. This supply ensures adequate time is available to replenish lube oil from outside sources prior to the EDG running out of lube oil.

Each EDG has an air start system with adequate capacity for six successive start attempts on the EDG without recharging the air start receivers. A single EDG start is assured with air receiver pressure ≥ 150 psig. Additional evaluations have been performed which indicate there is substantial margin included in the single start receiver pressure limit (Ref. 9).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 14 (Ref. 5), assume Engineered Safeguard (ES) systems are OPERABLE. The EDGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ES systems so that fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil, lube oil, and the air start subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement.

LCO

A sufficient combined stored diesel fuel oil supply is required to be available to ensure the capability to operate a single EDG at the upper limit of its 200-hour rating for 7 days. During an event that requires 7 days operation before replacement fuel oil is obtained, manual reconfiguration of loads and transferring the stored fuel oil supply from one tank to the other may be needed to support operation of the EDG. Diesel fuel oil is also required to meet specific quality standards.

(continued)

BASES

LCO (continued)

A sufficient lube oil supply must be available to ensure the capability to operate a single EDG at the upper limit of its 200-hour rating for 7 days. EDG lube oil sump level, in conjunction with the on-site supply and the ability to obtain replacement supplies within the required timeframe, supports the availability of EDGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power. EDG day tank fuel requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1,"AC Sources-Operating," and LCO 3.8.2, "AC Sources-Shutdown."

The starting air system is required to have a minimum capacity for six successive EDG start attempts without recharging the air start receivers. As such, the air start compressors are not addressed as a part of this (or any other) LCO.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required in order to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil, lube oil, and the starting air subsystem support EDG OPERABILITY, these features are required to be within limits whenever the associated EDG is required to be OPERABLE.

ACTIONS

The ACTIONS are modified by a Note. The Note indicates separate Condition entry is allowed for each EDG. This is acceptable based upon the fact each EDG is treated as an independent entity for this Specification.

(continued)

BASES

ACTIONS (continued)

A.1

With usable fuel oil volume in one or more storage tanks < 22,917 gallons, prompt action must be taken within 1 hour to verify that the combined fuel oil supply > 45,834 gallons. However, the Condition is restricted to fuel oil level reductions that maintain at least a combined 7 day supply. In this Condition, a period of 1 hour is allowed to ensure that sufficient fuel oil supply for 7 days of EDG operation at its upper 200-hour rating is available. In order to maintain the ability to treat the EDG as independent entities for the ACTIONS (from a fuel oil perspective), an artificial lower limit on stored fuel oil has been established. The minimum usable volume specified for each tank is equivalent to 3 days operation and was set to ensure a minimum combined 6 day supply.

The limit on combined supply recognizes that while one tank may contain less than 3.5 day supply, the usable volume in the other tank could be such that 7 day capacity still exists.

Verification of the fuel oil volume refers only to ascertaining the value of the total volume of the two fuel oil tanks and does not imply that the tanks must be restored to the ITS limit in one hour. If the verification shows that the combined stored volume is less than 45,834 gallons, Required Action B.1 is applicable and fuel oil level must be restored within 48 hours from the initial time of discovery.

Consistent with the Bases for Surveillance 3.0.1, OPERABILITY is verified by ensuring the associated surveillance(s) has been satisfactorily completed within the required frequency and the equipment is not otherwise known to be inoperable.

B.1

With usable fuel oil volume in one or more storage tanks < 22,917 gallons and combined fuel oil supply < 45,834 gallons, sufficient fuel oil supply for 7 days of EDG operation at its upper 200-hour rating is not available. However, the Condition is restricted to fuel oil level reductions, that maintain at least a combined 6 day supply. In this Condition, a period of 48 hours is allowed prior to declaring the associated EDG inoperable. In order to maintain the ability to treat the EDG as independent entities for the ACTIONS (from a fuel oil perspective), an artificial lower limit on stored fuel oil has been established. The minimum usable volume specified for each tank is equivalent to 3 days operation and was set to ensure a minimum combined 6 day supply.

(continued)

BASES

ACTIONS

C.1 (continued)

EDGs inoperable. The volume specified includes the lube oil contained in the sump as well as the lube oil stored onsite (off-engine). If the required stored volume cannot be restored, both EDGs must be declared inoperable since this volume is common to both EDGs.

The 48 hour Completion Time is acceptable based on the remaining capacity (> 6 days), the tow rate of usage, the fact that actions will be initiated to obtain replenishment, and the low probability of an event occurring during this brief period.

D.1

This Condition is entered as a result of a failure to meet the acceptance criterion for EDG fuel oil particulates. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. However poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean the fuel oil will not burn properly and given that proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period of time prior to declaring the associated EDG inoperable. The 7 day Completion Time allows for further evaluation, re-sampling, and re-analysis of the EDG fuel oil.

E.1

With the new fuel oil properties defined in the Bases for SR 3.8.3.3 not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties prior to declaring the associated EDG inoperable. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil remains acceptable, or to restore the stored fuel oil properties. This restoration may involve feed and bleed, filtering, or combinations of these procedures. Even if an EDG start and load was required during this time and the fuel oil properties were outside limits, there is a high likelihood that the EDG would still be capable of performing its intended function.

(continued)

BASES

ACTIONS (continued)

F.1

With starting air receiver pressure < 225 psig, sufficient capacity for six successive EDG start attempts does not exist. However, as long as the receiver pressure is > 150 psig, there is adequate capacity for at least one start attempt, and the EDG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the associated EDG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most EDG starts are accomplished on the first attempt, and the low probability of an event occurring during this brief period.

G.1

With a Required Action and associated Completion Time not met, or one or more EDGs with fuel oil, lube oil, or starting air subsystems not within limits for reasons other than addressed by Conditions A through F, the associated EDG must be immediately declared inoperable. In this case, the ACTIONS of Specification 3.8.1 or 3.8.2, as applicable, are entered. In the case of stored EDG lube oil, both EDGs must be declared inoperable since the stored lube oil volume is common to both EDGs.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate usable inventory of fuel oil in each storage tank to support operation of one EDG for 3.5 days at the upper limit of its 200-hour rating (assuming no offsite power). The SR also verifies combined capacity of the two tank to be > 7 days fuel supply. The 3.5 day period (7 day capacity provided by the combined inventory of both tanks) is sufficient time to place the plant in a safe shutdown condition, cross connect fuel storage tanks, if necessary, and to bring in replenishment fuel from an offsite location.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and the likelihood any large uses of fuel oil during this period would be detected.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.2

This Surveillance ensures that sufficient lube oil inventory is available to support at least 7 days of operation of a single EDG at the upper limit of its 200-hour rating. The 280 gallon requirement is based on the EDG manufacturer consumption values for the run time of the EDG. The specified volume includes the lube oil contained in the sump as well as the onsite stored stock. As such, implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the EDG. When determining compliance with this requirement, both EDGs may take credit for the same volume of onsite stored lube oil.

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since EDG starts and run time are closely monitored by the plant staff.

SR 3.8.3.3

The tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s). Receipt of fuel oil without testing results may be authorized by the Emergency Coordinator, provided the vendor's certificate of conformance is in accordance with procurement specifications. In this case, fuel oil samples should be taken from the delivery, with test results to be documented within 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel in accordance with ASTM D4057-88 (Ref. 6);

b. Verify in accordance with the tests specified in ASTM D975-00 (Ref. 7) that the new fuel oil sample has:

   1. A maximum of 0.05% by volume water and sediment per ASTM D2709-96(2001) (Ref. 10);

      OR

      A maximum of 0.05% by volume water and sediment per ASTM D1796-97(2002) (Ref. 11);

   2. A Saybolt viscosity at 100°F of ≥ 32.6 SUS and ≤ 40.1 SUS. Conversion from kinematic units can be made per ASTM D2161-93(1999) (Ref. 14);

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

OR

A Kinematic viscosity at 40°C (104°F)of ≥ 1.9 mm²/s and ≤ 4.1 mm²/s per ASTM D445-03 (Ref. 13). Conversion to SUS units can be made using ASTM D2161-93(1999) (Ref. 14);

3. A flash point of ≥ 125°F per ASTM D93-02a Procedure "A", Manual or Automated Method (Ref. 15);

4. A maximum Cloud Point of -6.7°C (20°F) per ASTM D2500-02 (Ref. 21).

c. Verify in accordance with the test specified in ASTM D287-92(2000) (Ref. 16) that the new fuel has an API specific gravity of ≥ 30 and ≤ 38;

OR

Verify in accordance with the test specified in ASTM D1298-99 (Ref. 17) that the new fuel has an API specific gravity of ≥ 30 and ≤ 38;

d. Verify in accordance with the test specified in ASTM D4176-02 (Ref. 18) and ASTM D1500-02 (Ref. 19) that the new fuel oil has a clear and bright appearance with proper color at 21°C (70°F).

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted provided the water and sediment is within limits. The specification for water and sediment recognizes that a small amount of water and sediment is acceptable.

Within 31 days following the initial new fuel oil sample the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-00, (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975-00, (Ref. 7), except that a calculated Cetane Index, per ASTM D4737-96a (Ref. 22), is determined to estimate the actual Cetane Number. If the Cetane Index is not met, then a sample of fuel is tested in accordance with ASTM D613-03a (Ref. 23) to determine Cetane Number. The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on EDG operation. This Surveillance ensures the availability of high quality fuel oil for the EDGs.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

Fuel oil degradation during long-term storage is typically detected as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment which can cause engine failure.

Particulate concentrations should be determined in accordance with ASTM D2276-91, Method A (Ref. 20). This method involves a gravimetric determination of total particulate concentration in the fuel oil. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. Because the total stored fuel oil volume is contained in two isolated tanks, each tank must be considered and tested separately.

The Frequency of this SR takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between tests.

SR 3.8.3.4

This Surveillance ensures that, without the aid of the re-fill compressor, sufficient air start capacity for each EDG is available. The design requirements provide for a minimum of six engine start cycles without recharging. The pressure specified in this SR reflects the lowest value at which the six starts can be accomplished, with substantial margin.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure. In addition, the system design includes a feature to automatically start the air compressors on low air pressure.

(continued)

BASES

REFERENCES

1. FSAR, Section 8.2.3.1.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. FSAR, Chapter 6.
5. FSAR, Chapter 14.
6. ASTM Standard, D4057-88.
7. ASTM Standard, D975-00.
8. ASME, Boiler and Pressure Vessel Code, Section XI.
9. Correspondence, G/CI to FPC, FCS-6541, dated May 25, 1985.
10. ASTM Standard, D2709-96(2001).
11. ASTM Standard, D1796-97(2002).
12. Deleted.
13. ASTM Standard, D445-03.
14. ASTM Standard, D2161-(1999).
15. ASTM Standard, D93-02a.
16. ASTM Standard, D287-92(2000).
17. ASTM Standard, D1298-99.
18. ASTM Standard, D4176-02.
19. ASTM Standard, D1500-02.
20. ASTM Standard, D2276-91, Method A.
21. ASTM Standard, D2500-02.
22. ASTM Standard, D4737-96a.
23. ASTM Standard, D613-03a.
24. Deleted.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the DC electrical power system batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources - Operating," and LCO 3.8.5, "DC Sources- Shutdown."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safeguard systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the EDGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC electrical power subsystems is consistent with the initial assumptions of the accident analyses and the design basis of the plant. This includes maintaining at least one train of DC electric power OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst-case single failure.

Battery cell parameters support operation of the DC electrical power system. As such, they satisfy Criterion 3 of the NRC Policy Statement.

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Battery cell parameter limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

(continued)

BASES

APPLICABILITY

The battery cell parameters are required solely for the support of the DC electrical power systems. Therefore, the limits of the LCO are only required when the associated DC electrical power subsystem is required to be OPERABLE. Refer to the Applicability discussion in the Bases for Specifications 3.8.4 and 3.8.5.

ACTIONS

The ACTIONS are modified by a Note. The Note indicates separate Condition entry is allowed for each 250 VDC battery. This is acceptable based upon the fact each battery is treated as an independent entity for this Specification.

A.1. A.2. and A.3

With one or more required cells (e.g., not including cell(s) allowed to be jumpered) in one or more batteries not within the limits specified in Table 3.8.6-1 in the accompanying LCO, but within the allowable value (Category C limits are met) operation is permitted to continue for a limited period since sufficient battery capacity exists to perform its intended function.

Electrolyte level and float voltage of the pilot cell are required to be verified to meet the Category C allowable values within 1 hour (Required Action A.1). This check provides a quick indication of the status of the remainder of the battery cells. One hour provides adequate time to inspect the electrolyte level and to confirm the float voltage of the pilot cells, and is considered a reasonable amount of time to perform the required verification.

Verification that the Category C allowable values are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to within the

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems-Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and AC vital bus electrical power distribution systems are divided into two redundant and independent AC, DC, and AC vital bus electrical power distribution subsystems (trains).

The AC electrical power distribution subsystem for each train consists of a primary Engineered Safeguard (ES) 4160 V bus and secondary 480 and 120 V buses, distribution panels, motor control centers (MCCs) and load centers. Each 4160 V ES bus is fed from an offsite circuit as well as a dedicated onsite emergency diesel generator (EDG). During normal operation, each 4160 V ES bus is connected to a preferred offsite source. If all offsite sources are unavailable or not connected to a power supply, the EDG supplies power to the 4160 V ES bus. Control power for the 4160 V breakers is supplied from the Class 1E batteries. Additional description of these systems may be found in the Bases for LCO 3.8.1, "AC Sources-Operating," and the Bases for LCO 3.8.4, "DC Sources-Operating."

The secondary AC electrical power distribution system for each train includes the safety related load centers, MCCs, and distribution panels shown in Table B 3.8.9-1.

The 120 VAC vital buses are arranged in two load groups per train and are normally powered from the inverters. The alternate power supply for the vital buses are Class 1E constant voltage transformers (CVTs) powered from the same train as the associated inverter. Each constant voltage transformer is powered from a Class 1E AC bus. Operation of the inverters and CVTs is governed by LCO 3.8.7, "Inverters-Operating."

There are two independent 250/125 VDC electrical power distribution subsystems (one for each train).

The list of all required DC distribution buses is also presented in Table B 3.8.9-1.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2) of the FSAR assume two ES trains are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ES systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution systems is consistent with the initial assumptions of the accident analyses and the design basis of the plant. This includes maintaining electrical power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power; and

b. A worst-case single failure.

The distribution systems satisfy Criterion 3 of the NRC Policy Statement.

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and AC vital bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The distribution system is required to be OPERABLE if any required supported equipment is OPERABLE. For certain distribution subsystems, only a single train of equipment is supported. If the supported systems are not OPERABLE, then the associated distribution subsystem is not a required portion of the distribution system. These distribution breakers are marked with a note in Table B 3.8.9-1. This provision is not intended to permit entering only the supported equipment ACTION for an inoperable distribution system. If the supported system is made inoperable because of failure or voluntary opening of a distribution breaker, the ACTION for the distribution system must be followed.

Two trains of AC, DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE in order to ensure that the redundancy incorporated into the ES systems design is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the AC, DC, and AC vital bus electrical power distribution systems are functioning properly, with all the required circuit breakers closed and the buses energized from normal power. The verification of proper voltage availability on the buses ensures that the required power is available for motive as well as control functions for critical system loads fed from these buses. The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital bus electrical power distribution subsystems, and indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 14.
3. Regulatory Guide 1.93, December 1974.

Table B 3.8.9-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	TRAIN A*	TRAIN B*
AC safety buses	4160 VAC	ES Bus 3A	ES Bus 3B
	480 VAC	ES Bus 3A	ES Bus 3B
	480 VAC	Motor Control Centers 3AB**, 3A1, 3A2, 3A3	Motor Control Centers 3AB**, 3B1, 3B2, 3B3
DC buses	125 VDC	Bus 3A	Bus 3B
		Distribution Panels DPDP 5A, 6A#, 7A, 8A, 8C#	Distribution Panels DPDP 5B, 6B#, 7B, 8B, 8D#
AC Vital buses	120 VAC	VBEN-1, VBEN-3	VBEN-2, VBEN-4
		VBDP-3, VBDP-8 VBDP-5, VBDP-9 VBDP-12#	VBDP-4, VBDP-10 VBDP-6, VBDP-11 VBDP-14#

* Each train of the AC and DC electrical power distribution systems is a subsystem.

**ES MCC 3AB can be fed from Train A or Train B.

\# This distribution breaker is not required to be closed if all supported equipment is inoperable.