NMC
Committed to Nuclear Excellence

Point Beach Nuclear Plant
Operated by Nuclear Management Company, LLC

NRC 2001-074

10 CFR 50.36

November 1, 2001

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Ladies/Gentlemen:

DOCKETS 50-266 AND 50-301
TECHNICAL SPECIFICATION BASES REVISIONS
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Nuclear Management Company, LLC (NMC), licensee for the Point Beach Nuclear Plant (PBNP) Units 1 and 2, hereby submits a revision to the following Bases for Technical Specifications (TS): B 3.0, "Limiting Conditions for Operability (LCO) Applicability", B 3.1.4, "Rod Group Alignment Limits", B 3.1.5, "Shutdown Bank Insertion Limits", B 3.1.6, "Control Bank Insertion Limits", B 3.1.7, "Rod Position Indication", B 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)", B 3.4.7, "RCS Loops – Mode 5, Loops Filled", B 3.4.10, "Pressurizer Safety Valves", B 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)", B 3.4.16, "RCS Specific Activity", B 3.5.2, "ECCS – Operating", B 3.6.3, "Containment Isolation Valves", B 3.7.8, "Service Water (SW) System", B 3.7.9, "Control Room Emergency Filtration System (CREFS)", B 3.8.1, "AC Sources – Operating", B 3.8.2, "AC Sources – Shutdown", B.3.8.3, "Diesel Fuel Oil and Starting Air", B 3.9.3, "Containment Penetrations", and B 3.9.6, "Refueling Cavity Water Level". A description of the changes is provided in Attachment I. The listed Bases are associated with the PBNP Improved Technical Specifications only, which were approved by the NRC on August 8, 2001, and are scheduled for implementation on November 20, 2001.

These changes have been screened for evaluation pursuant to the requirements of 10 CFR 50.59 in accordance with approved PBNP procedures and were determined to be acceptable.

Attachment II provides clean copies of the affected Technical Specification Bases pages indicating the changes.

Sincerely,

A. J. Cayia
Plant Manager

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Rec'd at NRC/DED 12/12/01

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Attachments: I - Description and Assessment
II - Revised Technical Specification Bases Pages

cc: NRC Regional Administrator
NRC Resident Inspector
NRC Project Manager
PSCW

DESCRIPTION AND ASSESSMENT OF CHANGES
TECHNICAL SPECIFICATION BASES REVISIONS
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

1.0 INTRODUCTION

Nuclear Management Company, LLC (NMC), licensee for the Point Beach Nuclear Plant (PBNP) Units 1 and 2, hereby submits a revision to the following Bases for Technical Specifications (TS): B 3.0, "Limiting Conditions for Operability (LCO) Applicability", B 3.1.4, "Rod Group Alignment Limits", B 3.1.5, "Shutdown Bank Insertion Limits", B 3.1.6, "Control Bank Insertion Limits", B 3.1.7, "Rod Position Indication", B 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)", B 3.4.7, "RCS Loops – Mode 5, Loops Filled", B 3.4.10, "Pressurizer Safety Valves", B 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)", B 3.4.16, "RCS Specific Activity", B 3.5.2, "ECCS – Operating", B 3.6.3, "Containment Isolation Valves", B 3.7.8, "Service Water (SW) System", B 3.7.9, "Control Room Emergency Filtration System (CREFS)", B 3.8.1, "AC Sources – Operating", B 3.8.2, "AC Sources – Shutdown", B.3.8.3, "Diesel Fuel Oil and Starting Air", B 3.9.3, "Containment Penetrations", and B 3.9.6, "Refueling Cavity Water Level".

2.0 DESCRIPTION AND ANALYSIS

B 3.0, "Limiting Conditions for Operability (LCO) Applicability"

Corrected typographical error in the reference to the Fuel Storage Pool Water Level LCO (reference to LCO 3.7.15 was corrected to read LCO 3.7.10), as stated in NRC SER dated August 8, 2001 (ITS LCO 3.7.10).

B 3.1.4, "Rod Group Alignment Limits"

Added explanation of condition for invoking one hour thermal soak allowance, including explanation of substantial rod movement, as stated in NRC SER dated May 8, 2001 and procedure DCS 3.1.35.

B 3.1.5, "Shutdown Bank Insertion Limits"

Added explanation of condition for invoking one hour thermal soak allowance, including explanation of substantial rod movement, as stated in NRC SER dated May 8, 2001 and procedure DCS 3.1.35.

B 3.1.6, "Control Bank Insertion Limits"

Added explanation of condition for invoking one hour thermal soak allowance, including explanation of substantial rod movement, as stated in NRC SER dated May 8, 2001 and procedure DCS 3.1.35.

B 3.1.7, "Rod Position Indication"

Revised description of PPCS temperature compensation as affected by plant modification MR 98-045 and MR 98-046, New Analog Rod Position Indication (NARPI) Modification.

B 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)"

Revised the excluded area for the transient $F_Q(Z)$ surveillance to address the more conservative recommendations from the fuel vendor (Westinghouse). The vendor's evaluation determined that at end-of-life, the limiting region of the fuel assembly was the section between 10% and 15% from the bottom of the core. Therefore, the top 15% and bottom 10% could be excluded. This change brings the BASES in conformance with the Core Operating Limits Report (COLR).

B 3.4.7, "RCS Loops – Mode 5, Loops Filled"

Corrected "two SGs" to "one SG" for SR 3.4.7.3 Bases to correspond to the requirements of LCO 3.4.7.b, as stated in NRC SER dated August 8, 2001.

B 3.4.10, "Pressurizer Safety Valves"

Corrected the stated value of pressure safety limit from 2734 to 2735 psig (typographical error), as stated in NRC SER dated August 8, 2001.

B 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)"

Corrected the stated value of PORV actuation setpoint from 2350 to 2335 psig (typographical error), as stated in NRC SER dated August 8, 2001.

B 3.4.16, "RCS Specific Activity"

Corrected the stated value of limit for specific activity of secondary coolant from 0.1 μCi/gm to 1.0 μCi/gm; corrected numbering of reference to LCO 3.7.13 (vice incorrect numbering of 3.7.6) (typographical errors), as stated in NRC SER dated August 8, 2001 (ITS 3.7.13).

B 3.5.2, "ECCS – Operating"

Deleted the paragraph in the Background Section referring to the Bases for LCO 3.4.12 (the approved ITS amendment eliminated the requirement for LTOP in MODE 3, thereby obviating the need for this reference), as stated in NRC SER dated August 8, 2001 (ITS 3.4.12).

B 3.6.3, "Containment Isolation Valves"

Corrected LCO numbering (3.9.3 vice incorrect numbering of 3.9.4) (typographical error) in Applicability section, as stated in NRC SER dated August 8, 2001.

B 3.7.8, "Service Water (SW) System"

Added SW operability discussion as stated in procedure DCS 3.1.7. Added a statement that refers the reader to another Bases section for additional information.

B 3.7.9, "Control Room Emergency Filtration System (CREFS)"

Changed the word "mode" from uppercase to lowercase for all occurrences where it applies to ventilation mode (vice reactor MODE).

B 3.8.1, "AC Sources – Operating"

Added Emergency Diesel Generator (EDG) and SW background information as stated in procedures DCS 3.1.7 and DCS 3.1.17. Added a statement to refer to another Bases section for additional information.

B 3.8.2, "AC Sources – Shutdown"

Added a statement to refer to the Bases for LCO 3.8.1 for additional information.

B.3.8.3, "Diesel Fuel Oil and Starting Air"

Corrected the stated value of the limit for total particulate concentration in the fuel oil from 10 mg/ml to 10 mg/l (typographical error), as stated in NRC SER dated August 8, 2001 (ITS 5.5.12.c).

Changed discussion of SR 3.8.3.2 (a) to reference ASTM D4057-95 and added D1500-98 as a reference to SR 3.8.3.2 (c). References Section also changed as indicated.

B 3.9.3, "Containment Penetrations"

Corrected "100 hours" to "161 hours" for fuel decay time, as stated in NRC SER dated February 8, 2000.

B 3.9.6, "Refueling Cavity Water Level"

Corrected "100 hours" to "161 hours" for fuel decay time, as stated in NRC SER dated February 8, 2000.

REVISED TECHNICAL SPECIFICATION BASES PAGES

(incorporating proposed changes)

BASES

LCO 3.0.3 (continued)

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.

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 LCO 3.7.10, "Fuel Storage Pool Water Level." LCO 3.7.10 has an Applicability of "During movement of irradiated fuel assemblies in the fuel storage pool." Therefore, this LCO can be applicable in any or all MODES. If the LCO and the Required Actions of LCO 3.7.10 are not met while in MODE 1, 2, or 3, there is no safety benefit to be gained by placing the unit in a shutdown condition. The Required Action of LCO 3.7.10 of "Suspend movement of irradiated fuel assemblies in the 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.

BASES

LCO (continued)

Control rod malfunctions that result in the inability to move a control rod (e.g. lift coil and rod control system logic failures), but do not impact the control rod trippability, do not result in control rod inoperability. The LCO requirements also ensure that the RCCAs and banks maintain the correct power distribution and rod alignment.

The requirement to maintain the rod alignment to within plus or minus 12 steps is conservative. The minimum misalignment assumed in safety analysis is 24 steps (15 inches), and in some cases a total misalignment from fully withdrawn to fully inserted is assumed. Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and LHRs, or unacceptable SDMs, all of which may constitute initial conditions inconsistent with the safety analysis.

APPLICABILITY

The requirements on RCCA OPERABILITY and alignment are applicable in MODES 1 and 2 because these are the only MODES in which neutron (or fission) power is generated, and the OPERABILITY (i.e., trippability) and alignment of rods have the potential to affect the safety of the plant. In MODES 3, 4, 5, and 6, the alignment limits do not apply because the control rods are bottomed and the reactor is shut down and not producing fission power. In the shutdown MODES, the OPERABILITY of the shutdown and control rods has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the RCS. See LCO 3.1.1, "SHUTDOWN MARGIN (SDM)" for SDM in MODE 2 with $k_{eff} < 1.0$, and MODES 3, 4, and 5 and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling.

ACTIONS

The ACTIONS table is modified by a Note indicating that verification of rod operability and the comparison of bank demand position and RPI System may take place at any time up to one hour after rod motion, at any power level. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. For purposes of invoking this allowance, a substantial rod movement is required. Substantial rod movement is considered to be 10 or more steps in one direction in less than or equal to one hour.

A.1.1 and A.1.2

When one or more rods are inoperable, there is a possibility that the required SDM may be adversely affected. Under these conditions, it is important to determine the SDM, and if it is less than the required value, initiate boration until the required SDM is recovered. The Completion

BASES

ACTIONS (continued)

Time of 1 hour is adequate for determining SDM and, if necessary, for initiating emergency boration and restoring SDM. In this situation, SDM verification must include the worth of the untrippable rod, as well as a rod of maximum worth.

A.2

If the inoperable rod(s) cannot be restored to OPERABLE status, the plant must be brought to a MODE or condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

B.1

When a rod becomes misaligned, it can usually be moved and is still trippable. If the rod can be realigned within the Completion Time of 1 hour, local xenon redistribution during this short interval will not be significant, and operation may proceed without further restriction.

An alternative to realigning a single misaligned RCCA to the group average position is to align the remainder of the group to the position of the misaligned RCCA. However, this must be done without violating the bank sequence, overlap, and insertion limits specified in LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits." The Completion Time of 1 hour gives the operator sufficient time to adjust the rod positions in an orderly manner.

B.2.1.1 and B.2.1.2

With a misaligned rod, SDM must be verified to be within limit or boration must be initiated to restore SDM to within limit.

In many cases, realigning the remainder of the group to the misaligned rod may not be desirable. For example, realigning control bank B to a rod that is misaligned 25 steps from the top of the core would require a significant power reduction, since control bank D must be moved fully in and control bank C must be moved in to approximately 100 to 115 steps.

Power operation may continue with one RCCA misaligned, provided that SDM is verified within 1 hour. The Completion Time of 1 hour

BASES

LCO	The shutdown banks must be within their insertion limits any time the reactor is critical or approaching criticality. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown bank insertion limits are defined in the COLR.
APPLICABILITY	The shutdown banks must be within their insertion limits, with the reactor in MODES 1 and 2. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown banks do not have to be within their insertion limits in MODE 3, unless an approach to criticality is being made. In MODE 3, 4, 5, or 6, the shutdown banks are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1 for SDM requirements in MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6. The Applicability requirements have been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the shutdown bank to move below the LCO limits, which would normally violate the LCO.
ACTIONS	The ACTIONS table is modified by a Note indicating that up to one hour after rod motion is allowed for comparison of the bank insertion limits and the RPI System, at any power level. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. This comparison is sufficient to verify that the shutdown banks are above the insertion limits and thus assures the presence of sufficient shutdown margin to satisfy the assumptions of the safety analyses. For purposes of invoking this allowance, a substantial rod movement is required. Substantial rod movement is considered to be 10 or more steps in one direction in less than or equal to one hour. <u>A.1.1, A.1.2 and A.2</u> When one or more shutdown banks is not within insertion limits, 2 hours is allowed to restore the shutdown banks to within the insertion limits. This is necessary because the available SDM may be significantly reduced, with one or more of the shutdown banks not within their insertion limits. Also, verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If shutdown banks are not within their insertion limits, then

BASES

ACTIONS (continued)

SDM will be verified by performing a reactivity balance calculation, considering the following listed reactivity effects:

a. RCS boron concentration;

b. Control bank position;

c. Power defect;

d. Fuel burnup;

e. Xenon concentration; and

f. Samarium concentration.

The allowed Completion Time of 2 hours provides an acceptable time for evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time.

B.1

If the shutdown banks cannot be restored to within their insertion limits within 2 hours, the unit must be brought to a MODE where the LCO is not applicable. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown banks are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown banks will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip. This SR and Frequency ensure that the shutdown banks are withdrawn before the control banks are withdrawn during a unit startup. Typically, the individual rod position indicators are used to confirm shutdown bank insertion limits.

Since the shutdown banks are positioned manually by the control room operator, a verification of shutdown bank position at a Frequency of 12 hours, after the reactor is taken critical, is adequate to ensure that they are within their insertion limits. Also, the 12 hour Frequency takes into account other information available in the control room for the purpose of monitoring the status of shutdown rods.

BASES

ACTIONS

The ACTIONS table is modified by a Note indicating that up to one hour after rod motion is allowed for comparison of the bank insertion limits and the RPI System, at any power level. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. This comparison is sufficient to verify that the control banks are above the insertion limits and thus assures the presence of sufficient shutdown margin to satisfy the assumptions of the safety analyses. For purposes of invoking this allowance, a substantial rod movement is required. Substantial rod movement is considered to be 10 or more steps in one direction in less than or equal to one hour.

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

When the control banks are outside the acceptable insertion limits, they must be restored to within those limits. This restoration can occur in two ways:

a. Reducing power to be consistent with rod position; or

b. Moving rods to be consistent with power.

Also, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 with $K_{eff} \geq 1.0$ is normally ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") has been upset. If control banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the following listed reactivity effects:

a. RCS boron concentration;

b. Control bank position;

c. Power defect;

d. Fuel burnup;

e. Xenon concentration; and

f. Samarium concentration.

Similarly, if the control banks are found to be out of sequence or in the wrong overlap configuration, they must be restored to meet the limits.

BASES

BACKGROUND (continued)

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The Bank Demand Position Indication System is considered highly precise (± 1 step or ± 5/8 inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod.

The individual rod position indication system consists of three separate control room readouts; analog meters, digital displays, and the plant process computer. The position indication signal to each of these readouts is supplied by a linear variable differential transmitter (LVDT) which uses the control rod drive shaft to vary the amount of magnetic coupling between primary and secondary windings of the transformer. This generates an analog output signal proportional to actual control rod position. The New Analog Rod Position Indication (NARPI) modules are designed to compensate for the effects of the inherent LVDT non-linearity and the temperature effect on the coil stacks. The NARPI modules will use a signal from the rod insertion limit programmable logic controller (RIL PLC) which is representative of reactor power to compensate for the temperature effect on the coil stacks. All three control room readouts receive the same output from the NARPI modules. Any one of these three readouts can be used for the purpose of verifying control rod position and alignment. The RPI system has an indication accuracy of 5% of span (11.5 steps); therefore, the maximum deviation between actual and demanded indication could be 24 steps or approximately 15 inches.

APPLICABLE SAFETY ANALYSES

Control and shutdown rod position accuracy is essential during power operation. Power peaking, ejected rod worth, or SDM limits may be violated in the event of a Design Basis Accident (Ref. 2), with control or shutdown rods operating outside their limits undetected. Therefore, the acceptance criteria for rod position indication is that rod positions must be known with sufficient accuracy in order to verify the core is operating within the group sequence, overlap, design peaking limits, ejected rod worth, and with minimum SDM (LCO 3.1.5, "Shutdown Bank Insertion Limits, " and LCO 3.1.6, "Control Bank Insertion Limits"). The rod positions must also be known in order to verify the alignment limits are preserved (LCO 3.1.4, "Rod Group Alignment Limits"). Control rod positions are continuously monitored to provide operators with information that ensures the plant is operating within the bounds of the accident analysis assumptions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

maneuvers in normal operation. The maximum peaking factor increase over steady state values, calculated as a function of core elevation, Z, is called W(Z). Multiplying the measured total peaking factor, $F_Q^C(Z)$, by W(Z) gives the maximum $F_Q(Z)$ calculated to occur in normal operation, $F_Q^W(Z)$.

The limit with which $F_Q^W(Z)$ is compared varies inversely with power above 50% RTP and directly with the function K(Z) provided in the COLR.

The W(Z) curve is provided in the COLR for discrete core elevations. Flux map data are typically taken for 30 to 75 core elevations. $F_Q^W(Z)$ evaluations are not applicable for all axial core regions.

Depending on analyses, the top and bottom regions of the core may be excluded from the evaluation because of the low probability that these regions would be more limiting in the safety analyses and because of the difficulty of making a precise measurement in these regions (usually the top and bottom 10% or 15%).

This Surveillance has been modified by a Note that may require that more frequent surveillances be performed. If $F_Q^W(Z)$ is evaluated, an evaluation of the expression below is required to account for any increase to $F_Q^M(Z)$ that may occur and cause the $F_Q(Z)$ limit to be exceeded before the next required $F_Q(Z)$ evaluation.

If the two most recent $F_Q(Z)$ evaluations show an increase in the expression

$$\text{maximum over z} \left[\frac{F_Q^C(Z)}{K(Z)} \right]$$

it is required to meet the $F_Q(Z)$ limit with the last $F_Q^W(Z)$ increased by the greater of a factor of 1.02, or by an appropriate factor specified in the COLR (Ref. 5), or to evaluate $F_Q(Z)$ more frequently, each 7 EFPD. These alternative requirements prevent $F_Q(Z)$ from exceeding its limit for any significant period of time without detection.

Performing the Surveillance in MODE 1 prior to exceeding 75% RTP ensures that the $F_Q(Z)$ limit is met when RTP is achieved, because peaking factors are generally decreased as power level is increased.

BASES

SURVEILLANCE REQUIREMENTS (continued)

$F_Q(Z)$ is verified at power levels ≥ 10% RTP above the THERMAL POWER of its last verification, 12 hours after achieving equilibrium conditions to ensure that $F_Q(Z)$ is within its limit at higher power levels.

The Surveillance Frequency of 31 EFPD is adequate to monitor the change of power distribution with core burnup. The Surveillance may be done more frequently if required by the results of $F_Q(Z)$ evaluations.

The Frequency of 31 EFPD is adequate to monitor the change of power distribution because such a change is sufficiently slow, when the plant is operated in accordance with the TS, to preclude adverse peaking factors between 31 day surveillances.

REFERENCES

1. 10 CFR 50.46, 1974.
2. FSAR, Section 14.2.6.
3. FSAR, Chapter 3.
4. WCAP - 7308-L-P-A, "Evaluation of Nuclear Hot Channel Factor Uncertainties," June 1988.
5. WCAP - 10216-P-A, Rev. 1A, “Relaxation of Constant Axial Offset Control (and) FQ Surveillance Technical Specification,” February 1994.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.7.2

Verifying that at least one SG is OPERABLE by ensuring its secondary side narrow range water level is ≥ 30% narrow range ensures an alternate decay heat removal method via natural circulation (Ref. 1) in the event that the second RHR loop is not OPERABLE. If both RHR loops are OPERABLE, this Surveillance is not needed. The 12 hour Frequency is considered adequate in view of other indications available in the control room to alert the operator to the loss of SG level.

SR 3.4.7.3

Verification that a second RHR pump is OPERABLE ensures that an additional pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the RHR pump. If secondary side water level is ≥ 30% narrow range in at least one SG, this Surveillance is not needed. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.

REFERENCES

1. NRC Information Notice 95-35, "Degraded Ability of Steam Generators to Remove Decay Heat by Natural Circulation."

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.10 Pressurizer Safety Valves

BASES

BACKGROUND

The pressurizer safety valves provide, in conjunction with the Reactor Protection System, overpressure protection for the RCS. The pressurizer safety valves are totally enclosed pop type, spring loaded, self actuated valves with backpressure compensation. The safety valves are designed to prevent the system pressure from exceeding the system Safety Limit (SL), 2735 psig, which is 110% of the design pressure.

Because the safety valves are totally enclosed and self actuating, they are considered independent components. The relief capacity for each valve, 288,000 lb/hr, is based on postulated overpressure transient conditions resulting from a complete loss of steam flow to the turbine. This event results in the maximum surge rate into the pressurizer, which specifies the minimum relief capacity for the safety valves. The discharge flow from the pressurizer safety valves is directed to the pressurizer relief tank. This discharge flow is indicated by an increase in temperature downstream of the pressurizer safety valves or increase in the pressurizer relief tank temperature or level.

Overpressure protection is required in MODES 1, 2, 3, 4, and 5; however, in MODE 4, with one or more RCS cold leg temperatures ≤ the LTOP enabling temperature specified in the PTLR, and MODE 5 and MODE 6 with the reactor vessel head on, overpressure protection is provided by operating procedures and by meeting the requirements of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."

The pressurizer safety valve setpoint is ± 3% for OPERABILITY; however, the valves are reset to +2.67%/-1.78% during surveillance to allow for drift and account for the ambient conditions associated with MODES 1, 2 and 3.

The pressurizer safety valves are part of the primary success path and mitigate the effects of postulated accidents. OPERABILITY of the safety valves ensures that the RCS pressure will be limited to 110% of design pressure.

The consequences of exceeding the American Society of Mechanical Engineers (ASME) pressure limit (Ref. 1) could include damage to RCS components, increased leakage, or a requirement to perform additional stress analyses prior to resumption of reactor operation.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

BASES

BACKGROUND

The pressurizer is equipped with two types of devices for pressure relief: pressurizer safety valves and PORVs. The PORVs are air operated valves that are controlled to open at a specific set pressure when the pressurizer pressure increases and close when the pressurizer pressure decreases. The PORVs may also be manually operated from the control room.

Block valves, which are normally open, are located between the pressurizer and the PORVs. The block valves are used to isolate the PORVs in case of excessive leakage or a stuck open PORV. Block valve closure is accomplished manually using controls in the control room. A stuck open PORV is, in effect, a small break loss of coolant accident (LOCA). As such, block valve closure terminates the RCS depressurization and coolant inventory loss.

The PORVs and their associated block valves may be used by plant operators to depressurize the RCS to recover from certain transients if normal pressurizer spray is not available. Additionally, the series arrangement of the PORVs and their block valves permit performance of surveillances on the valves during power operation.

The PORVs may also be used for feed and bleed core cooling in the case of multiple equipment failure events that are not within the design basis, such as a total loss of feedwater.

The PORVs, their block valves, and their controls are powered from the vital buses that receive power from emergency power sources. Two PORVs and their associated block valves are powered from two separate safety trains (Ref. 1).

The plant has two PORVs, each having a relief capacity of 179,000 lb/hr at 2335 psig. For plant operation at 2250 psia, the functional design of each PORV is based on maintaining pressure below the Pressurizer Pressure-High reactor trip setpoint following a step reduction of 50% of full load with steam dump. However, for plant operation at 2000 psia, a 50% load rejection results in a maximum peak pressure of 2113 psia (Ref. 2). This peak pressure is below the Pressurizer Pressure-High reactor trip setpoint of 2210 psig and below the PORV actuation setpoint of 2335 psig, and will therefore not result in a reactor trip nor automatic actuation of the PORVs. In addition, the PORVs may be used for low temperature overpressure protection

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.16 RCS Specific Activity

BASES

BACKGROUND

The maximum dose to the whole body and the thyroid that an individual at the site boundary can receive for 2 hours during an accident is specified in 10 CFR 100 (Ref. 1). The limits on specific activity ensure that the doses are held to a small fraction of the 10 CFR 100 limits during analyzed transients and accidents.

The RCS specific activity LCO limits the allowable concentration level of radionuclides in the reactor coolant. The LCO limits are established to minimize the offsite radioactivity dose consequences in the event of a steam generator tube rupture (SGTR) accident.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and gross specific activity. The allowable levels are intended to limit the 2 hour dose at the site boundary to a small fraction of the 10 CFR 100 dose guideline limits. The limits in the LCO are standardized, based on parametric evaluations of offsite radioactivity dose consequences for typical site locations.

The parametric evaluations showed the potential offsite dose levels for a SGTR accident were an appropriately small fraction of the 10 CFR 100 dose guideline limits. Each evaluation assumes a broad range of site applicable atmospheric dispersion factors in a parametric evaluation.

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensures that the resulting 2 hour doses at the site boundary will not exceed a small fraction of the 10 CFR 100 dose guideline limits following a SGTR accident. The SGTR safety analysis (Ref. 2) assumes the specific activity of the reactor coolant at the LCO limit and an existing reactor coolant steam generator (SG) tube leakage rate of 1 gpm. The safety analysis assumes the specific activity of the secondary coolant at its limit of 1.0 μCi/gm DOSE EQUIVALENT I-131 from LCO 3.7.13, "Secondary Specific Activity."

The analysis for the SGTR accident establishes the acceptance limits for RCS specific activity. Reference to this analysis is used to assess changes to the unit that could affect RCS specific activity, as they relate to the acceptance limits.

BASES

BACKGROUND (continued)

exchangers, and the SI pumps. Each of the two subsystems consists of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required to mitigate the accident consequences. ECCS Train interconnections could allow utilization of components from the opposite ECCS train to achieve the required ECCS flowpaths; however, cross train operation in the recirculation mode of operation requires local valve manipulations. Based on estimated times to establish the required valve line ups, the capability of establishing ECCS recirculation mode without interrupting injection flow to the core could be impaired. Therefore, with more than one component inoperable such that both Trains of ECCS are inoperable, the facility is in a condition outside of its design basis.

During the injection phase of LOCA recovery, a suction header supplies water from the RWST to the ECCS pumps.

For LOCAs that are too small to depressurize the RCS below the shutoff head of the SI pumps, the steam generators provide core cooling until the RCS pressure decreases below the SI pump shutoff head.

During the recirculation phase of LOCA recovery, RHR pump suction is transferred to the containment sump. The RHR pumps then supply the SI pumps.

The SI subsystem of the ECCS also functions to supply borated water to the reactor core following increased heat removal events, such as a main steam line break (MSLB). The limiting design conditions occur when the negative moderator temperature coefficient is highly negative, such as at the end of each cycle.

The ECCS subsystems are actuated upon receipt of an SI signal. If offsite power is available, the safeguard loads start immediately. If offsite power is not available, the Engineered Safety Feature (ESF) buses shed normal operating loads and are connected to the emergency diesel generators (EDGs). Safeguard loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, upper plenum injection line valve stroke, and pump starting determines the time required before pumped flow is available to the core following a LOCA.

The active ECCS components, along with the passive accumulators and the RWST covered in LCO 3.5.1, "Accumulators," and LCO 3.5.4, "Refueling Water Storage Tank (RWST)," provide the cooling water necessary to meet the Point Beach Design Criteria (Ref. 1).

BASES

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46 (Ref. 2), will be met following a LOCA:

a. Maximum fuel element cladding temperature is ≤ 2200°F;

b. Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation;

c. Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;

d. Core is maintained in a coolable geometry; and

e. Adequate long term core cooling capability is maintained.

The LCO also limits the potential for a post trip return to power following an MSLB event and ensures that containment temperature limits are met.

Each ECCS subsystem is taken credit for in a large break LOCA event at full power (Refs. 3 and 4). This event establishes the requirement for runout flow for the ECCS pumps. The SI pumps are credited in a small break LOCA event. This event establishes the flow and discharge head at the design point for the SI pumps, as well as the maximum response time for their actuation. The SGTR and MSLB events also credit the SI pumps. The small break LOCA and MSLB events establish the maximum response time for the SI pumps. The OPERABILITY requirements for the ECCS are based on the following LOCA analysis assumptions:

a. A large break LOCA event, with offsite power available and a single failure disabling one RHR pump (offsite power is assumed for modeling full containment heat removal and reactor coolant pump operation); and

b. A small break LOCA event, with a loss of offsite power and a single failure disabling one ECCS train.

During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control rod insertion for small breaks. Following depressurization, emergency cooling water injected into the reactor

BASES

APPLICABLE SAFETY ANALYSES (continued)

vessel upper plenum and RCS cold legs, flows into the downcomer, fills the lower plenum, and refloods the core.

The effects on containment mass and energy releases are accounted for in appropriate analyses (Ref. 4). The LCO ensures that an ECCS train will deliver sufficient water to match boiloff rates soon enough to minimize the consequences of the core being uncovered following a large LOCA.

It also ensures that the SI pumps will deliver sufficient water and boron during a small LOCA to maintain core subcriticality.

For smaller LOCAs, the steam generators continue to serve as the heat sink, providing part of the required core cooling.

The ECCS trains satisfy Criterion 3 of the NRC Policy Statement.

LCO

In MODES 1, 2, and 3, two independent (and redundant) ECCS trains are required to ensure that sufficient ECCS flow is available, assuming a single failure affecting either train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents.

In MODES 1, 2, and 3, an ECCS train consists of, an SI subsystem, and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path taking suction from the RWST upon an SI signal and capable of manually transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to the RCS. In the long term, this flow path may be switched to take its supply from the containment sump.

The flow path for each train must maintain its designed independence to ensure that no single failure can disable both ECCS trains.

As indicated in the Note, the SI pump flow paths may be isolated for 2 hours in MODE 3, under controlled conditions, to perform pressure isolation valve testing per SR 3.4.14.1. The flow path is readily restorable from the control room.

BASES

APPLICABILITY

In MODES 1, 2, and 3, the ECCS OPERABILITY requirements for the limiting Design Basis Accident, a large break LOCA, are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. The SI pump performance requirements are based on a small break LOCA. MODE 2 and MODE 3 requirements are bounded by the MODE 1 analysis.

This LCO is only applicable in MODE 3 and above. Below MODE 3, the low pressurizer pressure and low steam generator pressure automatic SI signals are manually bypassed by operator control, and system functional requirements are relaxed as described in LCO 3.5.3, "ECCS — Shutdown."

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation — High Water Level," and LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation — Low Water Level."

ACTIONS

A.1

With one train inoperable, the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on an NRC reliability evaluation (Ref. 5) and is a reasonable time for repair of many ECCS components.

An ECCS train is inoperable if it is not capable of delivering the limiting design basis analysis flow rate to the RCS or if the train is not capable of supporting recirculation mode operation. Individual components are inoperable if they are not capable of performing their design function or supporting systems are not available.

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 multiple components in the same train (e.g. the "A" SI pump and the "A" RHR pump), result in a loss of function for the ECCS.

The intent of this Condition is to maintain a combination of equipment such that a single OPERABLE ECCS train remains available.

BASES

ACTIONS (continued)

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. 5) has shown that the impact of having one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

With more than one component inoperable such that both ECCS trains are not available, the facility is in a condition outside design and licensing basis. Therefore, LCO 3.0.3 must be immediately entered.

B.1 and B.2

If the inoperable trains cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and 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 were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a non-accident position provided the valve will automatically reposition within the proper stroke time. 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. The 31 day Frequency is appropriate because the valves are operated under administrative control, and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.2.2

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of the ASME Code. This type of testing may be accomplished by measuring the pump developed head at only one point of the pump characteristic curve. This verifies both that the measured performance is within an acceptable tolerance

BASES

SURVEILLANCE REQUIREMENTS (continued)

of the original pump baseline performance and that the performance at the test flow is greater than or equal to the performance assumed in the plant safety analysis. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

SR 3.5.2.3 and SR 3.5.2.4

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and that each ECCS pump starts on receipt of an actual or simulated SI signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned plant transients if the Surveillances were performed with the reactor at power. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program.

SR 3.5.2.5

Periodic inspections of the containment sump suction inlet ensure that it is unrestricted and stays in proper operating condition. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage, and on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

REFERENCES

1. FSAR, Section 6.1.1.
2. 10 CFR 50.46.
3. FSAR, Section 6.2.1.
4. FSAR, Chapter 14, "Accident Analysis."
5. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

BASES

LCO (continued)	The normally closed isolation valves are considered OPERABLE when manual valves are closed, automatic valves are de-activated and secured in their closed position, blind flanges are in place, and closed systems are intact. Position verification, when necessary in accordance with the required actions and/or surveillance requirements, is still required for these valves. These passive isolation valves/devices are those listed in Reference 2. This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.
APPLICABILITY	In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODE 5. The requirements for containment isolation valves during MODE 6 are addressed in LCO 3.9.3, "Containment Penetrations."
ACTIONS	The ACTIONS are modified by a Note allowing penetration flow paths, except for containment purge supply and exhaust penetration flow paths, to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated. Due to the size of the containment purge line penetrations and the fact that those penetrations exhaust directly from the containment atmosphere to the environment, the penetration flow path containing these valves may not be opened under administrative controls in MODES 1, 2, 3, and 4. A single purge valve in a penetration flow path may be opened to effect repairs to an inoperable valve, as allowed by SR 3.6.3.1. A second Note has been added to provide clarification that, for this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable containment isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable containment isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

BASES

BACKGROUND (continued)	Emergency Diesel Generator output breaker closure generates an automatic sequenced start of the SW pumps in order to meet the immediate cooling needs of G-01 and/or G-02 upon a Loss of Offsite Power event. This function is not required for SW pump OPERABILITY. The Bases for LCO 3.8.1, "AC Sources – Operating," provides information regarding this function on standby emergency power OPERABILITY. Additional information about the design and operation of the SW System, along with a list of the components served, is presented in the FSAR, Section 9.6 (Ref. 1).
APPLICABLE SAFETY ANALYSES	The design basis of the SW System is three SW pumps, in conjunction with the CCW System and a 100% capacity containment cooling system, to remove core decay heat following a design basis LOCA as discussed in the FSAR, Section 14.3.4 (Ref. 2). This prevents the containment sump fluid from increasing in temperature during the recirculation phase following a LOCA and provides for a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System by the ECCS pumps. The SW System is designed to perform its function with a single failure of any active component, assuming the loss of offsite power. The SW System, in conjunction with the CCW System, also cools the unit from residual heat removal (RHR), as discussed in the FSAR, Section 9.2, (Ref. 3) entry conditions to MODE 5 during normal and post accident operations. The time required for this evolution is a function of the number of CCW and RHR System pumps and heat exchangers that are operating. Heat transferred from the reactor core to the SW System during accidents and anticipated operational occurrences in which the unit is cooled down and placed on residual heat removal (RHR) operation is removed by Lake Michigan. Operating limits for the SW System are based on the approved SW System analyses as stated in Appendix C, Additional Conditions, Operating Licenses DPR-24 and DPR-27. The SW System satisfies Criterion 3 of the NRC Policy Statement.
LCO	The SW System is required to be OPERABLE to provide the required redundancy to ensure that the system will function to remove post accident heat loads, assuming the worst case single active failure. The SW System is OPERABLE during MODES 1, 2, 3, and 4 when: a. six SW pumps are OPERABLE; b. the SW ring header continuous flowpath is not interrupted;

BASES

LCO (continued)	c. the required non-essential-SW-load isolation valves are OPERABLE or the affected non-essential flowpath is isolated; d. the opposite unit's containment fan cooler SW outlet motor operated valves are closed or the SW flowpath is isolated; and e. the instrumentation and controls required to perform the safety related function are OPERABLE.
APPLICABILITY	In MODES 1, 2, 3, and 4, the SW System is a normally operating system that is required to support the OPERABILITY of the equipment serviced by the SW System and required to be OPERABLE in these MODES. In MODES 5 and 6, the OPERABILITY requirements of the SW System are determined by the systems it supports.
ACTIONS	The Actions Table is modified by a Note which requires the applicable Conditions and Required Actions to be entered for the system made inoperable as a result of any SW System inoperability. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. <u>A.1</u> If one SW pump is inoperable, action must be taken to restore the pump to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE SW pumps assure adequate system flow capability. However, the overall reliability is reduced because a single failure could result in less than the required number of pumps to assure this flow. The 7 day Completion Time is based on the redundant capabilities afforded by the remaining OPERABLE pumps, and the low probability of a DBA occurring during this time period. The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO. The 14 day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which multiple Conditions are entered concurrently. The <u>AND</u> connector between 7 days and 14 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

BASES

ACTIONS (continued) B.1

If two or three SW pumps are inoperable, action must be taken to restore at least the minimum number of pumps to OPERABLE status required to exit this Condition within 72 hours. In this Condition, the remaining OPERABLE SW pumps are capable of providing the required system flow capability provided the requirements of the LCO are met (e.g., SW ring header continuous flowpath, non-essential SW isolation valves and the opposite Unit's containment fan cooler service water outlet valves). With four or more SW pumps inoperable, Condition G must be entered.

The 72 hour Completion Time is based on the redundant capabilities afforded by the remaining OPERABLE pumps, the probability for an additional active or passive failure, and the low probability of a DBA occurring during this time period.

C.1 and C.2

If the SW ring header continuous flowpath is interrupted, the ability of the System to provide required cooling water flow to required equipment must be verified within 1 hour. The 1 hour Completion Time for Required Action C.1 effectively limits the allowed system configuration to alignments previously evaluated and found acceptable (Reference 4). Evaluated alignments with the continuous flowpath interrupted include a minimum required number of OPERABLE SW pumps with each OPERABLE SW pump aligned to all required portions of the SW header. Acceptable alignments must comport to the SW system analyses. Additionally, the 1 hour Completion Time provides sufficient time to accommodate transitory operations (e.g. additional equipment inoperabilities, operations required to realign systems and equipment, etc;) without requiring initiation of a unit shutdown. The 1 hour Completion Time is commensurate with the importance of maintaining the SW System in an OPERABLE configuration.

Additionally, Required Action C.2 directs that the SW ring header continuous flowpath must be restored within 7 days. Since acceptable alignments during this period may include less than five OPERABLE SW pumps, Required Action B.1 may limit operation in Condition C to less than 7 days.

With one or more ring header isolation valves incapable of being closed, the SW System will continue to be capable of providing the required cooling water flow to required equipment. However, the ability to isolate a break in the system while continuing to provide cooling water to required equipment may be impaired.

BASES

ACTIONS (continued)

With one or more ring header isolation valves closed, the SW System may remain capable of providing the required cooling water flow to the minimum required number of components depending on system alignment and the OPERABILITY of other SW System components.

Multiple closed ring header isolation valves could result in loss of cooling water to required equipment (e.g. closure of valves SW-2869 and SW-2870 will render two of the four containment fan coolers inoperable on each Unit). If multiple closed ring header isolation valves result in required equipment being inoperable, the Note to the ACTIONS Table requires entry into the applicable conditions and required actions for the systems made inoperable.

The 7 day Completion Time is acceptable based on the redundant capabilities afforded by the remaining OPERABLE equipment, and the low probability of a DBA or SW System line break occurring during this time period. Piping failures are not considered as the single failure for system functionality during an accident.

The second Completion Time for Required Action C.2 establishes a limit on the maximum time allowed for any combination of Conditions to be in effect during any continuous failure to meet this LCO. The 14 day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which multiple Conditions are entered concurrently. The AND connector between 7 days and 14 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

D.1 and D.2

In the event one required automatic isolation valves in one or more non-essential-SW-load flowpath(s) is inoperable and the affected non-essential flowpath(s) is not isolated, the required redundant automatic isolation valve in the affected non-essential flowpath(s) must be verified OPERABLE within 1 hour. This verification may be performed administratively.

The 1 hour Completion Time for Required Action D.1 provides sufficient time to accommodate transitory operations (e.g. additional equipment inoperabilities, operations required to realign systems and equipment, etc;) without requiring initiation of a unit shutdown. The 1 hour Completion Time is commensurate with the importance of maintaining the SW System in an OPERABLE configuration. Required Action D.1 is modified by a Note stating it is not required to be met if in Condition E.

BASES

ACTIONS (continued)

This Note precludes entry into Condition H, when the required redundant automatic isolation valve in the affected non-essential flowpath(s) is inoperable and Required Action D.1 cannot be met.

Additionally, the valve(s) must be restored to OPERABLE status or the flowpath(s) isolated with a seismically qualified isolation valve within 72 hours. In this Condition, the overall reliability is reduced because a single failure could result in system configuration which could not assure adequate flow to required equipment. The 72 hour Completion Time is based on the flow capabilities afforded by the number of OPERABLE pumps, and the low probability of a DBA occurring during this time period.

The second Completion Time for Required Action D.2 establishes a limit on the maximum time allowed for any combination of Conditions to be in effect during any continuous failure to meet this LCO.

The 14 day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which multiple Conditions are entered concurrently. The AND connector between 72 hours and 14 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

E.1 and E.2

With two required automatic isolation valves in one or more non-essential-SW-load flowpath(s) inoperable, the affected flowpath(s) shall be isolated with a seismically qualified isolation valve within 1 hour. The Completion Time of 1 hour reflects the importance of isolating the non-essential-SW-loads to meet SW capacity demands under limiting conditions.

F.1 and F.2

If one or more opposite unit containment fan cooler service water outlet motor operated valves are open and the opposite unit containment accident fan cooler unit SW flowpath is not isolated, the ability of the SW System to provide required cooling water flow to required equipment must be verified within 1 hour. The 1 hour Completion Time for ACTION F.1 effectively limits the allowed system configuration to a configuration that has been previously evaluated and found acceptable. Additionally, the 1 hour Completion Time provides sufficient time to accommodate transitory operations (e.g. additional equipment inoperabilities, operations required to realign systems and equipment, etc;) without requiring initiation of a unit shutdown. The 1 hour Completion Time is commensurate with the importance of maintaining

BASES

ACTIONS (continued)

the SW System in an OPERABLE configuration.

Additionally, the flowpath associated with any opposite unit containment fan cooler service water outlet motor operated valve that is open must be isolated within 72 hours. (The flowpath is considered isolated if total flow would not exceed the expected flowrate during accident conditions.) In this Condition, the overall reliability is reduced because a single failure could result in a system configuration which could not assure adequate flow to required equipment. The 72 hour Completion Time is based on the confirmed ability of the SW pumps to provide required cooling water flow to required components. This time frame is also considered acceptable based on the low probability of a DBA occurring during this time period.

The second Completion Time for Required Action F.2 establishes a limit on the maximum time allowed for any combination of Conditions to be in effect during any continuous failure to meet this LCO. The 14 day Completion Time provides a limitation on the time allowed in this specified Condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which multiple Conditions are entered concurrently. The AND connector between 72 hours and 14 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.

G.1

If four or more SW pumps are inoperable, action must be taken within 1 hour to restore the SW pump(s) to OPERABLE status. The 1 hour Completion Time provides sufficient time to accommodate transitory operations (e.g. additional equipment inoperabilities, operations required to realign systems and equipment, etc;) to either restore the pump(s) to OPERABLE status or prepare for an orderly shutdown of the plant, and is commensurate with the importance of maintaining the SW System in an OPERABLE configuration.

H.1 and H.2

If the SW System cannot be restored to OPERABLE status within the associated Completion Times, 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 and without challenging unit systems.

B 3.7 PLANT SYSTEMS

B 3.7.9 Control Room Emergency Filtration System (CREFS)

BASES

BACKGROUND

The CREFS provides a protected environment from which operators can control the unit following an uncontrolled release of radioactivity.

The CREFS consists of one emergency make-up air filtration unit, two emergency make-up fans, two recirculation fans, and the required ducts and dampers necessary to establish the required flow paths and isolation boundaries. The CREFS is an emergency system, parts of which operate during normal unit operations. The CREFS has four modes of operation.

- Mode 1 (normal operation) - One of the two recirculation fans (W-13B1 or W-13B2) are in operation. Outside air is supplied from an intake penthouse located on the roof of the auxiliary building at a rate of approximately 1000 cfm (5% of system design flow) via damper VNCR-4849C which is throttled to a predetermined position. The make-up air combines with return air from the control room and computer room then passing through filter (F-43) and cooling units (HX-100 A&B) before entering the recirculation fan. Filtered and cooled air is supplied to the mechanical equipment room and through separate heating coils (HX-92 and HX-91 A&B), and humidifiers (Z-78 and Z-77) to the computer and control rooms respectively. Room thermostats and humidistats control the operation of the heating coils, chilled water system, and humidifiers. The control room heating, cooling, and humidification systems are not required to demonstrate compliance with the control room habitability limits of 10 CFR 50 Appendix A, GDC-19 as required by NUREG-0737, Item III.D.3.4. The computer room is supplied with supplementary cooling during normal operation via supplementary air conditioning units (W-107A/HX-190A/HX-191A or W-107B/HX-190B/HX-191B). Nominally, the control room washroom exhaust fan (W-15) is also in operation. Operation of the Control Room Ventilation System in mode 1 (normal operation) is not assumed for control room habitability, and is therefore not a Technical Specification required mode of operation.

- Mode 2 (recirculation operation) - 100% of the control room and computer room air is recirculated. In this mode, the outside air damper (VNCR-4849C) is closed and the control room washroom exhaust fan is de-energized. Recirculation can be automatically initiated by a Containment Isolation or Safety Injection signal, or can be manually initiated from the control room. Operation of the

BASES

BACKGROUND (continued)

Control Room Ventilation System in mode 2 (recirculation) is not assumed for control room habitability, and is therefore not a Technical Specification required mode of operation.

- Mode 3 (recirculation/charcoal adsorber operation) - One of two control room emergency make-up fans (W-14A or W-14B) is in operation and air is supplied to the emergency make-up charcoal filter unit (F-16) via the computer and control room return air duct (damper VNCR-4851B). The normal outside air supply is secured (damper VNCR-4849C closed) and the control room washroom exhaust fan is de-energized. In this mode approximately 25% of the return air is being recirculated by the emergency make-up charcoal filter unit back to the suction of the control room recirculation fans. Recirculation/charcoal adsorber mode is manually initiated from the control room. Operation of the Control Room Ventilation System in mode 3 (recirculation/charcoal adsorber mode) is not assumed for control room habitability, and is therefore not a Technical Specification required mode of operation.

- Mode 4 (emergency make-up) - Operation in this mode is similar to mode 3 except return air inlet damper VNCR-4851B to the emergency fans remains closed and outside air supply to the emergency make-up charcoal filter unit opens (damper VNCR-4851A). This allows approximately 4950 cfm (25% of system design flow) of make-up air to pass through the emergency make-up charcoal filter unit to the suction of the control room recirculation fan. This make-up flow rate is sufficient to assure a positive pressure of ≥ 1/8 in. water gage is maintained in the control and computer rooms to prevent excessive unfiltered in-leakage into the control room ventilation boundary. Mode 4 (emergency make-up) is automatically initiated by a high radiation signal from the control room area monitor RE-101, or a high radiation signal from noble gas monitor RE-235 located in the supply duct to the control room. This mode of operation can also be manually initiated from the control room. Operation of the Control Room Ventilation System in mode 4 (emergency make-up) is the assumed mode of operation for the control room habitability analysis, and is therefore the only mode of operation addressed by this LCO.

The air entering the control room is continuously monitored by noble gas radiation monitors and the control room itself is continuously monitored by an area radiation monitor. One detector output above its setpoint will actuate the emergency make-up mode of operation (mode 4) for the CREFS.

The limiting design basis accident for the control room dose analysis is

BASES

BACKGROUND (continued)

the large break LOCA. CREFS does not automatically restart after being load shed following a loss of offsite power; manual action is required to restart CREFS. The control room emergency make-up and recirculation fans have been included in the emergency diesel generator loading profile during the recirculation phase of a loss of coolant accident.

The CREFS will pressurize the control and computer rooms to at least 0.125 inches water gauge in the emergency make-up mode of operation. The CREFS role in maintaining the control room habitable is discussed in the FSAR, Section 9.8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The CREFS provides airborne radiological protection for control room personnel, as demonstrated by the limiting control room dose analyses for the design basis large break loss of coolant accident. Control room dose analysis assumptions are presented in the FSAR, Section 14.3.5 (Ref. 2).

The analyses for radiological consequences in the control room are based on operation of CREFS in the emergency make-up mode (mode 4). The radiological effects in the control room, of the stopping and subsequent restart of CREFS after a loss of offsite power would not be significantly greater than the doses associated with continuous operation of CREFS post-accident, based on the following:

1. The control room would start from positive pressurization because the system normally runs in a positive pressurization mode (mode 1).

2. During the loss of ventilation, the air inside the control room would heat up and expand, which would continue to enhance outflow, minimizing in-leakage.

3. The control room would normally be closed which reduces in-leakage.

4. The control room ventilation system damper positions would automatically reposition to the emergency make-up configuration (mode 4). Therefore, if any in-leakage through the control room intake occurred, it would be filtered at the same or higher efficiency assumed in the analysis.

5. Noble gases would not be drawn into the control room by the control room charcoal filter fan.

The CREFS satisfies Criterion 3 of the NRC Policy Statement.

BASES

LCO

The CREFS (mode 4) is required to be OPERABLE to ensure that the control room habitability limits are met following a limiting design basis LOCA. Total system failure could result in exceeding the control room operator thyroid dose limit of 30 rem in the event of a large radioactive release. The CREFS is considered OPERABLE when the individual components necessary to filter and limit control room in-leakage are OPERABLE. CREFS is considered OPERABLE when:

a. Both emergency make-up fans (W-14A and W-14B) are OPERABLE;

b. Both recirculation fans (W-13B1 and W-13B2) are OPERABLE;

c. Emergency make-up filter unit (F-16), HEPA filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions;

d. Control room ventilation envelope is capable of achieving and maintaining a positive pressure of at least 0.125 inches water gauge in the emergency make-up mode of operation;

e. Ductwork and dampers are OPERABLE, and air circulation can be maintained; and

f. CREFS is capable of being manually initiated in the emergency make-up mode of operation (mode 4).

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

APPLICABILITY

In MODES 1, 2, 3, 4, and during movement of irradiated fuel assemblies and during CORE ALTERATIONS, CREFS must be OPERABLE to control operator exposure during and following a DBA.

During movement of irradiated fuel assemblies and CORE ALTERATIONS, the CREFS must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

When CREFS is inoperable, action must be taken to restore the system to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREFS components may be adequate to perform the control room protection function; however, overall reliability may be

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.9.3

This SR verifies that each CREFS emergency make-up fan starts and operates on an actual or simulated actuation signal. The Frequency of 18 months is specified in Regulatory Guide 1.52 (Ref. 3).

SR 3.7.9.4

This SR verifies that each CREFS automatic damper in the emergency make-up mode flow path will actuate to its required position on an actuation signal. The Frequency of 18 months is specified in Regulatory Guide 1.52 (Ref. 3).

SR 3.7.9.5

This test verifies manual actuation capability for CREFS. Manual actuation capability is a required for OPERABILITY of the CREFS because CREFS does not automatically restart after being load shed following a loss of offsite power. Manual action is required to restart and align the CREFS after a loss of offsite power, which is verified through performance of this SR. The 18 month Frequency is acceptable based on the inherent reliability of manual actuation circuits.

SR 3.7.9.6

This SR verifies the integrity of the control room enclosure. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper functioning of the CREFS. During the emergency mode of operation, the CREFS is designed to pressurize the control room ≥ 0.125 inches water gauge positive pressure with respect to adjacent areas in order to minimize unfiltered inleakage. The CREFS is designed to maintain this positive pressure with one emergency make-up fan in operation at a makeup flow rate of ± 10% of the nominal make-up pressurization flow rate of approximately 4950 cfm. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800 (Ref. 4).

REFERENCES

1. FSAR. Section 9.8.
2. FSAR. Section 14.3.5.
3. Regulatory Guide 1.52, Rev. 2.
4. NUREG-0800, Section 6.4, Rev. 2, July 1981.

BASES

BACKGROUND (continued)

initiation signal(s) which are received. The standby emergency power sources will start and operate in the standby mode without tying to its respective 4.16 kV ESF bus(es) on an SI signal alone.

Response to a undervoltage condition alone is as follows:

a. The standby emergency power source(s) auto starts.

b. Trip of the 4.16 kV bus supply breaker(s).

c. All feeder and bus tie breakers on the 480 V safeguards bus, except for the component cooling pump motor, auxiliary feedwater pump motor, and the safeguards motor control centers, are tripped. For the A train 480 V buses, this load shedding function is blocked after the bus emergency diesel generator output circuit breaker closes. This is necessary to prevent inadvertent load shedding during load sequencing. For the train B buses, this load shedding function is not blocked. The train B emergency diesel generator transient voltage response is sufficient to maintain bus voltage above the 480 VAC Loss of Voltage Relay setpoint during load sequencing.

d. After the standby emergency power source comes up to speed (as sensed by diesel generator speed switches) and voltage (as determined by generator field being present), the associated standby emergency power source breaker closes, re-energizing the safeguards buses.

e. Automatic sequencing of SW pumps upon standby emergency power source breaker closure.

f. Manually start any auxiliary as required for safe plant operation.

Response to a Safety Injection signal, coincident with an undervoltage condition, is as follows:

a. The standby emergency power source(s) auto starts.

b. Trip of the 4.16 kV bus supply breaker(s) in response to the undervoltage condition.

c. All feeder and bus tie breakers on the 480 V safeguards bus, except for auxiliary feedwater pump motor, and the safeguards motor control centers, are tripped. For the A train 480 V buses, this load shedding function is blocked after the bus emergency diesel generator output circuit breaker closes. This is necessary to prevent inadvertent load shedding during load sequencing. For the

BASES

BACKGROUND (continued)

train B buses, this load shedding function is not blocked. The train B emergency diesel generator transient voltage response is sufficient to maintain bus voltage above the 480 VAC Loss of Voltage Relay setpoint during load sequencing.

d. Automatic start of the component cooling pump motor is blocked, and the battery charger input contactors are tripped open.

e. After the standby emergency power source comes up to speed (as sensed by diesel generator speed switches) and voltage (as determined by generator field being present), the associated standby emergency power source breaker closes, re-energizing the safeguards buses.

f. Loading sequence of ESF equipment is initiated (refer to FSAR Section 8.8 for sequencer times).

g. Starting of containment spray pumps is independent of the ESF starting sequence. Containment spray start occurs within 10 seconds after a containment high pressure signal with the safeguards bus energized and may occur simultaneously with the start of other equipment.

The emergency generator automatic loading sequence, including engine starting, will be accomplished in approximately 60 seconds. The time between when the emergency diesel generator receives a start signal (i.e., after actuation of the 4.16 kV Loss of Voltage relay), until the emergency diesel generator is ready to accept load, shall not exceed 10 seconds.

The Train A standby emergency power sources (G01 and G02) are rated at 2,850 kW for 2000 hours, 0.8 power factor. Additional ratings for the Train A units include 2963 kW for 200 hours, 3000 kW for 4 hours and 3053 kW for a 30-minute period. The Train B standby emergency power sources are rated at 2848 kW for 2000 hours. Additional ratings for the Train B units include 2951 kW for 200 hours, and 2987 kW for 4 hours. The ESF loads that are powered from the 4.16 kV ESF buses are listed in Reference 2.

The two Train A emergency diesel-generator sets are located in separate rooms in the seismic Class I section of the turbine building. The two Train B emergency diesel-generator sets are located in separate rooms in the seismic Class I Emergency Diesel Generator building.

BASES

BACKGROUND (continued)

The emergency diesel generators have several auxiliary support systems that must function in order to perform their safety related functions, including; the diesel starting air system, engine fuel oil system, engine cooling system, engine lubricating system, room ventilation system, and SW (for G-01 and G-02).

A diesel generator is OPERABLE when diesel room temperature can be maintained ≤ 120°F with the diesel engine operating at full load. Temperature will be maintained ≤ 120°F when: 1) all gravity-operated louvers are OPERABLE, and 2) both diesel room exhaust fans are OPERABLE.

For G-01 or G-02, three of four fire dampers associated with the diesel room exhaust fans must be open to maintain room temperature.

In lieu of both diesel room exhaust fans being OPERABLE for G-01 and G-02; only one diesel room exhaust fan is required to be OPERABLE when outside air temperature is ≤ 80°F.

In lieu of both diesel room exhaust fans being OPERABLE for G-03 and G-04, only the large capacity fan (W-183C for G-03, W-184B for G-04) is required to be OPERABLE when outside air temperature is < 84°F, or only the small capacity fan (W-183B for G-03, W-184C for G-04) is required to be OPERABLE when outside air temperature is ≤ 36°F.

For G-03 and G-04, two radiator fans operate when the associated EDG receives a start signal regardless of outside environmental conditions. Thermostatic controls will be utilized for a third fan. If outside air temperature is ≤ 95 °F, then only two of three fans are required to be OPERABLE. For G-03, the radiator fans are W-181A1, W-181A2, and W-181A3. For G-04, the radiator fans are W-181B1, W-181B2, and W-181B3.

G-01 or G-02 output breaker closure to 1A05 (1A52-60 and 1A52-66) generates an automatic start signal for Train A service water pumps P-32A, B and F. This feature is required for 1A05 standby emergency power operability. This auto start signal is powered from Unit 1, Train A safeguards rack 1C157 (D17-12).

G-01 or G-02 output breaker closure to 2A05 (2A52-73 and 2A52-67) generates an automatic start signal for Train A service water pumps P-32A, B and F. This feature is required for 2A05 standby emergency power operability. This auto start signal is powered from Unit 2, Train A safeguards rack 2C157 (D22-03).

G-03 or G-04 output breaker closure to 1A06 or 2A06 generates

BASES

BACKGROUND (continued)

automatic start signals for Train B service water pumps P-32C, D and E. Since G-03 and G-04 are not dependent on service water for cooling, these auto start signals are not required for 1(2)A06 standby emergency power operability.

G-01 and G-02 output breakers provide input to block 1B03 and 2B03 undervoltage. The 1B03 and 2B03 undervoltage protection circuitry blocks the load shedding for its respective 480 V bus (1B03 or 2B03) any time a diesel generator output breaker is closed on the associated 4160 V bus (1A05 or 2A05). Bypass switches (also referred to as defeat switches) also exist for this blocking function. Placing the switches in the bypass (or defeat) position disables the blocking function of the EDG output breaker closure for 480 V undervoltage protection circuitry for that bus. Therefore, the standby emergency power source for 1 A05 or 2A05, or both, shall be considered not capable of supplying its connected bus anytime G-01 or G-02 is in-service as emergency power for both 1A05 and 2A05 and the switch to bypass the blocking function for the associated 1B03 or 2B03, or both, is placed in the bypass (or defeat) position.

A detailed description of the AC power distribution network is contained in FSAR, Chapter 8 (Ref. 2).

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 14 (Ref. 3), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least the minimum number of safeguard buses required in support of equipment required to mitigate the consequences of design basis accidents and anticipated operational occurrences in the event of:

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

b. A worst case single failure.

The AC sources satisfy Criterion 3 of NRC Policy Statement.

BASES

LCO

Qualified sources of power between the offsite transmission network, the onsite Class 1E electrical power distribution system, and separate and independent standby emergency power sources for each safeguards train ensures the availability of 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.

The following AC electrical power sources are required to be OPERABLE:

a. One circuit between the offsite transmission network and the associated unit's 4.16 kV Class 1E safeguards buses, A05 and A06, utilizing the associated unit's X03 transformer or the opposite unit's X03 transformer with the gas turbine in operation, and associated unit's X04 transformer; and

b. One circuit between the offsite transmission network and the opposite unit's 4.16 kV Class 1E safeguards buses, A05 and A06; and

c. One standby emergency power source capable of supplying each 4.16 kV/480 V Class 1E safeguards bus, A05/B03 and A06/B04.

Each of the above required offsite sources is described in detail as follows:

The source of offsite AC power between the offsite transmission network and the associated unit's 4.16 kV Class 1E safeguards buses, A05 and A06, consists of:

a. The associated unit's high voltage system auxiliary transformer, X03, supplied from 345 kV Switchyard; or, the opposite unit's X03 with the gas turbine in operation;

b. The associated unit's low voltage station auxiliary transformer, X04;

c. The associated unit's 4.16 kV distribution buses, A03 and A04; and

d. All associated breakers, switches, interrupting devices, cabling, and controls required to transmit power from the Offsite 345 kV Distribution System to its respective unit's 4.16 kV safeguards buses A05 and A06.

BASES

LCO (continued)

The offsite AC power circuit between the offsite transmission network and the opposite unit's 4.16 kV Class 1E safeguards buses, A05 and A06, consists of:

a. Either high voltage system auxiliary transformer, X03, supplied from the 345 kV Switchyard, supplying power to either unit's low voltage station auxiliary transformer, X04, the opposite unit's 4.16 kV distribution buses, A03 and A04, the associated unit's 4.16 kV distribution buses, A03 and A04 (when power is being supplied by the associated unit's low voltage station auxiliary X04 transformer); and

b. All associated breakers, switches, interrupting devices, cabling, and controls required to transmit power from the Offsite 345 kV Distribution System to the opposite unit's 4.16 kV safeguards buses, A05 and A06.

Each of the required offsite sources must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses. For the offsite AC sources, separation and independence are to the extent practical. A circuit may be connected to more than one ESF bus. Additionally, fast transfer capability of offsite power to the opposite 13.8 kV AC Power Distribution Circuit or Gas Turbine Generator does not violate separation criteria. The closing of the tie breakers into a common fault is prevented by trip and lockout interlocks in the breaker control circuits.

Each Onsite Class 1E Safeguards AC Power Distribution System must be capable of being powered from an OPERABLE standby emergency power source. Each standby emergency power source must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective safeguards bus(es) on detection of undervoltage within 10 seconds. Each standby emergency power source must also be capable of accepting ESF loads within the predetermined sequence established by the ESF safeguards logic and sequence timers, and continue to operate until offsite power can be restored to the ESF buses. Sequencing of loads is a required function for standby emergency power source OPERABILITY.

Information regarding OPERABILITY of an emergency diesel generator used as a standby emergency power source is provided in the Background section.

BASES

APPLICABILITY

The 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 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.

ACTIONS

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

Bases Table B 3.8.1-1 provides a reference of Conditions that are applicable based on various inoperabilities.

A.1 and A.2

To ensure a highly reliable power source of offsite power remains available when the associated unit's X03 transformer is inoperable, Required Action A.1 requires verification that offsite power is supplying the associated unit's 4.16 kV safeguards buses from the opposite unit's X03 transformer within 24 hours and Required Action A.2 requires that the gas turbine generator be placed in operation within 24 hours. The 24 hour Completion Time associated with Required Action A.2 is sufficient time to start, synchronize and load the gas turbine.

The 24 hour Completion Time associated with Required Action A.1 is sufficient to verify that the associated unit's safeguards buses continue to be energized from offsite power, since transfer to the opposite unit's X03 transformer should have occurred automatically. If auto bus transfer has not occurred, the 24 hour Completion Time is sufficient to return offsite power to the associated unit's safeguards buses.

B.1

Required Action B.1 applies when the associated unit's X04 transformer is inoperable. The inoperability of the associated unit's X04 transformer renders offsite power to the associated units safeguards buses inoperable. According to Regulatory Guide 1.93 (Ref. 5), operation may continue in Condition B for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite

BASES

ACTIONS (continued)

AC sources have not been degraded.

Because of the normally high availability of the offsite source, this level of degradation may appear to be more severe than other combinations of AC sources inoperable that involve one or more inoperable standby emergency power sources. However, two factors tend to decrease the severity of this level of degradation:

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With the required offsite circuit inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

C.1

Required Action C.1, applies when offsite power to both safeguards buses on the same unit are inoperable (i.e., 1A05 and 1A06, or 2A05 and 2A06), or offsite power to safeguards buses 1A05 and 2A06 are inoperable. This level of degradation means that the offsite electrical power system does not have the capability to supply the minimum number of ESF systems required to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This condition is similar to that of Condition B, which according to Regulatory Guide 1.93 (Ref. 5), allows operation to continue for a period that should not exceed 24 hours. Because of the normally high availability of the offsite source, this level of degradation may appear to be more severe than other combinations of AC sources inoperable that involve one or more inoperable standby emergency power sources. However, two factors tend to decrease the severity of this level of degradation:

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and

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ACTIONS (continued)

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With the required offsite circuit inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

D.1

Condition D applies when offsite power is inoperable to one or more required 4.16 kV safeguards bus(es). The Required Actions for this Condition provide appropriate compensatory actions for each inoperable power supply, while the combination of Condition C and Condition D dictates which combinations of buses with inoperable power sources are allowed for 7 days versus 24 hours.

Required Action D.1 is intended to provide assurance that an event coincident with a single failure of the associated standby emergency power source will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant safeguards train.

The Completion Time for Required Action D.1 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 "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

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

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

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

Discovering no offsite power to one safeguards bus coincident with one or more inoperable required redundant support or supported features, or both, results in starting the Completion Times for the Required

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ACTIONS (continued)

Action. Twelve hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE safeguards bus(es)' offsite power supplies and standby emergency power sources are adequate to supply electrical power to Train A and Train B of the onsite Class 1E Distribution System. The 12 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 12 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.

D.2

Operation may continue in Condition D for a period that should not exceed 7 days with offsite power to one or more 4.16 kV safeguards buses inoperable. In this condition, the reliability of the offsite system is degraded, and the potential for a loss of offsite power may be increased, with attendant potential for a challenge to the unit safety systems. However, the remaining OPERABLE 4.16 kV safeguards buses supplied by offsite power and standby emergency power sources are adequate to supply electrical power to the onsite Class 1E Safeguards Distribution System.

The 7 day 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.

The second Completion Time for Required Action D.2 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 failing to meet the LCO. If Condition D is entered while, for instance, a standby emergency power source is inoperable and that standby emergency power source is subsequently returned to OPERABLE, the LCO may already have been not met for up to 7 days. This could lead to a total of 14 days, since initial failure to meet the LCO, to restore the offsite power supply. At this time, a standby emergency power source could again become inoperable, the offsite power supply restored OPERABLE, and an additional 7 days (for a total of 21 days) allowed prior to complete restoration of the LCO. The 14 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions D and E are entered concurrently. The "AND" connector between the 7 day and

BASES

ACTIONS (continued)

14 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action D.1, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition D was entered.

E.1

Condition E applies when one or more standby emergency power supplies are inoperable. Condition E contains a Note which provide clarification that, for this Condition, separate Condition entry is allowed for each inoperable standby emergency power supply. This is acceptable since the Required Actions for this Condition provide appropriate compensatory actions for each inoperable power supply, while the combination of Condition E and Condition G dictates which combinations of buses with inoperable power sources are allowed for 7 days versus 2 hours.

Required Action E.1 is intended to provide assurance that a loss of offsite power, during the period that a standby emergency power source is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has the inoperable standby emergency power source.

The Completion Time for Required Action E.1 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 "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. An inoperable standby emergency power source exists; and

b. A required redundant feature is inoperable.

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

Discovering an inoperable standby emergency power source coincident with one or more inoperable required support or supported features, or both, that are associated with the remaining OPERABLE standby emergency power source, results in starting the Completion Time for

BASES

ACTIONS (continued)

the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this Condition, the remaining OPERABLE standby emergency power source(s) 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.

E.2.1, E.2.2, and E.2.3

Required Action E.2.1 provides an allowance to avoid unnecessary testing of OPERABLE standby emergency power source(s). If it can be determined that the cause of the inoperable standby emergency power source does not exist on the OPERABLE standby emergency power source, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on other standby emergency power source(s), the other standby emergency power source(s) would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered for the additional inoperable source. Which additional standby emergency power supply(ies) are inoperable will dictate whether entry into LCO 3.8.1 Condition F is required. Once the failure is repaired, the common cause failure no longer exists, and Required Action E.2.1 is satisfied. If the cause of the initial inoperable standby emergency power source cannot be confirmed not to exist on the remaining standby emergency power source(s), performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that standby emergency power source.

In the event the inoperable standby emergency power source is restored to OPERABLE status prior to completing either E.2.1 or E.2.2, the plant corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition E.

According to Generic Letter 84-15 (Ref. 6), 24 hours is reasonable to confirm that the OPERABLE standby emergency power source(s) is not affected by the same problem as the inoperable standby emergency power source.

BASES

ACTIONS (continued)

Failure to complete Required Action E.2.1 or E.2.2 outlined above will result in declaring the other required standby emergency power sources inoperable in accordance with Required Action E.2.3.

E.3

Operation may continue in Condition E for a period that should not exceed 7 days.

In Condition E, the remaining OPERABLE standby emergency power source and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 7 day 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.

The second Completion Time for Required Action E.3 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 failing to meet the LCO. If Condition E is entered while, for instance, an offsite source is inoperable and that source is subsequently restored OPERABLE, the LCO may already have been not met for up to 7 days. This could lead to a total of 14 days, since initial failure to meet the LCO, to restore the standby emergency power source. At this time, an offsite source could again become inoperable, the standby emergency power source restored OPERABLE, and an additional 7 days (for a total of 21 days) allowed prior to complete restoration of the LCO. The 14 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions D and E are entered concurrently. The "AND" connector between the 7 day and 14 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action E.1, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition E was entered.

F.1 and F.2

Pursuant to LCO 3.0.6, the distribution system Actions would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, the Required Action of Condition F are modified by a Note to indicate that when Condition F is entered with no

BASES

ACTIONS (continued)

AC power to any Class 1E 4.16 kV bus, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems – Operating" must be immediately entered. This allows Condition F to provide requirements for the loss of one offsite power source to one or more Class 1E 4.16 kV bus(es) and one required standby emergency power source, without regard to whether a train is de-energized. LCO 3.8.9 provides appropriate restrictions for a de-energized Class 1E 4.16 kV bus.

G.1

Required Action G.1 applies to each unit in MODE 1, 2, 3 or 4, when standby emergency power to both safeguards buses on the same unit are inoperable (i.e., 1A05/1B03 and 1A06/1B04, or 2A05/2B03 and 2A06/2B04), or standby emergency power to safeguards buses 1A05/1B03 and 2A06/2B04 are inoperable. Thus, with an assumed loss of offsite electrical power, insufficient standby emergency power sources are available to power the minimum required ESF functions.

Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Reference 5, operation may continue for a period that should not exceed 2 hours.

H.1 and H.2

If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to 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 and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with the Point Beach Design Criteria (Ref. 1). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions).

Where various SRs discussed herein specify voltage and frequency limitations, the following is applicable. The minimum continuous rating for safety-related electrical motors is 90% of nominal motor voltage as recommended by ANSI C50.41-1977 and NEMA MG-1. Additionally, the safety-related motors have a one-minute rating of 75% of nominal motor voltage as recommended by ANSI C50.41-1977. Therefore, under a worst case (maximum) loading condition, safeguards bus voltages must be maintained high enough to prevent the terminal voltage at any 4160 or 480 V motor from falling below 3600 / 414 V continuous (90% of nominal) or 3000 / 345 V for one minute (75% of normal). Additionally, motor control center continuous and instantaneous voltages must be maintained above 400 V and 308 V, respectively, to ensure that 480 V Motor Control Center contactors are able to close and do not drop out. These voltages are below the minimum continuous and instantaneous 480 V motor voltage requirements.

The maximum allowable 4160 V system voltage must be low enough to ensure all connected equipment will operate properly. Motors are the most sensitive 4.16 kV and 480 V loads to high voltages. The maximum continuous rating for safety-related motors is 110% of nominal as recommended by ANSI C50.41-1977. Therefore, under a worst case (minimum) loading condition, 4160 V System voltages should be maintained low enough to remain below 110% of the ratings.

The safeguards distribution system frequency must be maintained within the limits allowed by connected equipment; below the setting of overcurrent relays; and above the setting of underfrequency relays. Electrical motors are sensitive to variations in operating frequency.

Equipment Technical Manuals for various 4160 V and 480 V motors have indicated motor terminal frequency must be maintained between 57 - 63 Hz, which is consistent with industry motor standards. The 57 - 63 Hz rating is also consistent with the allowable frequency ranges for other frequency sensitive non-motor loads (i.e., 480 V battery chargers). Although 63 Hz is the upper limit for motor operation to prevent motor damage, motors may not be capable of operating at 63 Hz due to circuit breaker settings. Since motor current increases with frequency, the possibility exists that circuit breakers supplying 480 V motors may trip on overcurrent if the 4160 V System is operated

BASES

SURVEILLANCE REQUIREMENTS (continued)

at elevated frequencies. Calculations performed verify that all safety related 480 V motors will not trip on overcurrent assuming their terminal frequency does not exceed 62.4 Hz. Therefore, to ensure that connected safety-related loads do not trip on overcurrent, 4160 V System frequency must not exceed 62.4 Hz.

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.1.2

This SR helps to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, SR 3.8.1.2 is modified by a Note to indicate that all standby emergency power source starts for this surveillance may be preceded by an engine prelube and followed by a warmup period prior to loading.

For the purposes of SR 3.8.1.2 testing, the standby emergency power sources are started from standby conditions. Standby conditions for a standby emergency power source mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

SR 3.8.1.2 requires that, at a 31 day Frequency, the standby emergency power source starts from standby conditions and achieves required voltage and frequency.

The 31 day Frequency for SR 3.8.1.2 is consistent with Regulatory Guide 1.9 (Ref. 4). This Frequency provides adequate assurance of standby emergency power source OPERABILITY, while minimizing degradation resulting from testing.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.3

This Surveillance verifies that the standby emergency power sources are capable of synchronizing with the offsite electrical system and accepting loads ≥ 2500 kW and ≤ 2850 kW. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the standby emergency power source is connected to the offsite source.

Although no power factor requirements are established by this SR, the standby emergency power source is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the standby emergency power source. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain standby emergency power source OPERABILITY.

The 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 4).

This SR is modified by three Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 stipulates a prerequisite requirement for performance of this SR. A successful standby emergency power source start must precede this test to credit satisfactory performance.

SR 3.8.1.4

This Surveillance demonstrates that each required fuel oil transfer pump system operates and transfers fuel oil from its associated storage tank to its associated day tank and engine mounted sump as applicable. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer system is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The design of fuel transfer systems is such that pumps and valves operate automatically to maintain an adequate volume of fuel oil in the

BASES

SURVEILLANCE REQUIREMENTS (continued)

day and engine mounted sump tanks during or following standby emergency source testing.

The 31 day Frequency is adequate to assure that the fuel oil transfer system is OPERABLE, since low level alarms are provided.

SR 3.8.1.5

In the event of a DBA coincident with a loss of offsite power, the standby emergency power sources are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the standby emergency power source operation, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal.

This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the standby emergency power source. It further demonstrates the capability of the standby emergency power source to automatically achieve the required voltage and frequency within analysis limits.

The standby emergency power source autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the standby emergency power source loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the standby emergency power source systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 4), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with standard fuel cycle lengths.

For the purpose of this testing, the standby emergency power sources must be started from standby conditions. That is, with the engine oil continuously circulated and engine temperature maintained consistent with manufacturer recommendations for standby emergency power sources.

This SR is modified by a note. The reason for the Note is that the performance of the Surveillance would remove a required offsite source from service, perturb the electrical distribution system and challenge safety systems.

SR 3.8.1.6

As required by Regulatory Guide 1.9 (Ref. 4), this Surveillance ensures that the manual synchronization and load transfer from the standby emergency power source to the offsite source can be made and the standby emergency power source can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the standby emergency power source to reload if a subsequent loss of offsite power occurs. The standby emergency power source is considered to be in ready to load status when the standby emergency power source is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 4), and takes into consideration unit conditions required to perform the Surveillance.

REFERENCES

1. FSAR. Section 1.3.
2. FSAR. Chapter 8.
3. FSAR. Chapter 14.
4. Regulatory Guide 1.9, Rev. 3, July 1993.
5. Regulatory Guide 1.93, Rev. 0, December 1974.
6. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.

Table B 3.8.1-1 (page 1 of 2)
Conditions for AC Sources Component Inoperabilities

Inoperable Equipment	Condition(s)
Inoperable standby emergency power source to 1A05/1B03, 1A06/1B04, 2A05/2B03, or 2A06/2B04. OR Inoperable standby emergency power sources to 1A05/1B03 and 2A05/2B03. OR Inoperable standby emergency power sources to 1A06/1B04 and 2A06/2B04.	Condition E
Inoperable standby emergency power source to A05/B03 and A06/B04 on the same unit. OR Inoperable standby emergency power to 1A05/1B03 and 2A06/2B04.	Condition E AND Condition G
One or more de-energized 4.16 kV safeguards buses (1A05/2A05/1A06/2A06). OR One or more 4.16 kV safeguards buses (1A05/2A05/1A06/2A06) with inoperable standby emergency power source(s) and inoperable offsite power source(s).	Condition D AND Condition E AND Condition F OR Condition G
Inoperable offsite power source to the associated unit's A05 and A06. OR Inoperable offsite power to 1A05 and 2A06.	Condition C AND Condition D
Inoperable offsite power source to 1A05, 1A06, 2A05, or 2A06. OR Inoperable offsite sources to 1A05 and 2A05. OR Inoperable offsite sources to 1A06 and 2A06.	Condition D

Table B 3.8.1-1 (page 2 of 2)
Conditions for AC Sources Component Inoperabilities

Inoperable Equipment	Condition(s)
X04 transformer de-energized.	Condition B AND Condition C AND Condition D
Associated unit's X03 transformer de-energized.	Condition A -------NOTE------- Enter appropriate Conditions for a de-energized X04 if auto bus transfer is incomplete. ---------------------

BASES

LCO (continued)

a. Either unit's X03 and X04 transformers;

b. Either unit's 4.16 kV buses, A03 and A04;

c. Associated unit's 4.16 kV Class 1E safeguards buses, A05 and A06; and,

d. All associated breakers, switches, interrupting devices, cabling, and controls required to transmit power from the Offsite 345 kV Distribution System to the required 480 VAC safeguards buses B03 and B04.

The standby emergency power source must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ESF bus on detection of bus undervoltage. This sequence must be accomplished within 10 seconds. The standby emergency power source must be capable of accepting required loads within the assumed loading sequence intervals and continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as standby emergency power source in standby with the engine hot and standby emergency power source in standby at ambient conditions.

Information regarding OPERABILITY of an emergency diesel generator used as a standby emergency power source is provided in the Bases for LCO 3.8.1, "AC Sources – Operating."

It is acceptable for safeguards buses to be cross tied during shutdown conditions for limited periods of time as addressed in LCO 3.8.9 and 3.8.10.

APPLICABILITY

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

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core;

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

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

BASES

APPLICABILITY (continued)	The AC power requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.1.

ACTIONS

A.1 and A.2

An offsite circuit would be considered inoperable if it were not available to the safeguards buses required to be OPERABLE by LCO 3.8.10. Declaring the required features associated with an inoperable offsite circuit inoperable ensures that the appropriate restrictions are implemented in accordance with the affected supported features LCO Required Actions. The Completion Time of immediately is consistent with the required times for actions requiring prompt attention.

It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the unit safety systems. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

B.1 and B.2

With the required standby emergency power source inoperable, the minimum required diversity of AC power sources is not available. Declaring the required features associated with the inoperable standby emergency power source inoperable ensures that the appropriate restrictions are implemented in accordance with the affected supported features LCO Required Actions. The Completion Time of immediately is consistent with the required times for actions requiring prompt attention.

It is further required to immediately initiate action to restore the required standby emergency power source to OPERABLE status. The restoration of the required standby emergency power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred offsite power source. The 7 day Frequency

BASES

SURVEILLANCE REQUIREMENTS (continued)

is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.2.2

This SR helps to ensure the availability of the standby electrical power supply to mitigate DBAs and to maintain the unit in a safe shutdown condition.

To minimize wear on moving parts that do not get lubricated when the engine is not running, SR 3.8.2.2 is modified by a Note to indicate that all standby emergency power source starts for this Surveillance may be preceded by an engine prelube period and followed by a warmup period prior to loading.

SR 3.8.2.2 requires that, at a 31 day Frequency, the standby emergency power source starts from standby conditions and achieves required voltage and frequency. While not specifically stated within this SR, the standby emergency power source must be capable of starting and accepting loads.

This Frequency provides adequate assurance of standby emergency power source OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.2.3

This Surveillance demonstrates that each required fuel oil transfer system operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer system is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The design of fuel transfer systems is such that pumps and valves operate automatically in order to maintain an adequate volume of fuel oil in the day tanks during or following standby emergency source testing.

The 31 day Frequency is adequate to assure that the fuel oil transfer system is OPERABLE, since low level alarms are provided.

BASES

SURVEILLANCE REQUIREMENTS (continued)

fuel oil in the storage tanks. These tests are to be conducted in accordance with the Diesel Fuel Oil Testing Program.

The tests, limits and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057-95 (Ref. 5);

b. Verify in accordance with the test specified in ASTM D1298-99 (Ref. 5) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89 or an API specific gravity at 60°F of ≥27° and ≤ 39°. Verify in accordance with tests specified in ASTM D975-98b (Ref. 6) a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flashpoint of ≥ 125°F; and

c. Verify that the new fuel oil has a clear and bright appearance when testing in accordance with ASTM D4176-91 (Ref. 5) and proper color in accordance with D1500-98.

Failure to meet any of the above limits 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.

Within 31 days following the initial new fuel oil sample, the fuel is analyzed to establish that the other properties specified in Table 1 for Grade Low Sulfur No. 2D of ASTM D975-98b (Ref. 6) are met for new fuel oil when tested in accordance with ASTM D975-98b (Ref. 6), except that the analysis for sulfur may be performed in accordance with ASTM D1552-95 (Ref. 5) or ASTM D 2622-98 (Ref. 5). 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 DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs.

Fuel oil degradation during long term storage shows up 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. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure.

Particulate concentrations should be determined in accordance with ASTM D6217-98, Method A (Ref. 5). This method involves gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/L. It is acceptable to obtain a field sample for subsequent laboratory testing.

BASES

REFERENCES (continued)	5. ASTM Standards: D4057-95; D1298-99; D4176-91; D1500-98; D1552-95; D2622-98; D6217-98, Method A.
	6. ASTM Standards D975-98b, Table 1.

BASES

BACKGROUND (continued)	The requirements for containment purge and exhaust system penetration closure ensure that a release of fission product radioactivity within containment will be restricted to within regulatory limits. The Containment Purge and Exhaust System includes a 36 inch purge penetration and a 36 inch exhaust penetration. During MODES 1, 2, 3, and 4, the two valves in each of the purge and exhaust penetrations are secured in the closed position. The Containment Purge and Exhaust System is not subject to a Specification in MODE 5. In MODE 6, large air exchanges are necessary to conduct refueling operations. The 36 inch purge system is used for this purpose, and all four valves are closed by the Containment Purge and Exhaust Isolation Instrumentation.
APPLICABLE SAFETY ANALYSES	During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 1). Fuel handling accidents, analyzed in Reference 2, include dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies. The requirements of LCO 3.9.6, "Refueling Cavity Water Level," and the minimum decay time of 161 hours prior to CORE ALTERATIONS ensure that the release of fission product radioactivity subsequent to a fuel handling accident, results in doses that are well within the guideline values specified in 10 CFR 100. Standard Review Plan, Section 15.7.4, Rev. 1 (Ref. 2), defines "well within" 10 CFR 100 to be 25% or less of the 10 CFR 100 values. The acceptance limits for offsite radiation exposure will be 25% of 10 CFR 100 values or the NRC staff approved licensing basis (e.g., a specified fraction of 10 CFR 100 limits). Containment penetrations satisfy Criterion 3 of the NRC Policy Statement.
LCO	This LCO limits the consequences of a fuel handling accident in containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any Containment Purge and Exhaust System penetration to be closed except for the OPERABLE containment purge and exhaust penetrations. For the OPERABLE containment purge and exhaust penetrations, this LCO ensures that these penetrations are isolable by the Containment Purge and Exhaust Isolation System. The

B 3.9 REFUELING OPERATIONS

B 3.9.6 Refueling Cavity Water Level

BASES

BACKGROUND	The movement of irradiated fuel assemblies or performance of CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts, within containment requires a minimum water level of 23 ft above the top of the reactor vessel flange. During refueling, this maintains sufficient water level in the containment, refueling canal, fuel transfer canal, refueling cavity, and spent fuel pool. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident (Refs. 1 and 2). Sufficient iodine activity would be retained to limit offsite doses from the accident to < 25% of 10 CFR 100 limits, as provided by the guidance of Reference 3.
APPLICABLE SAFETY ANALYSES	During CORE ALTERATIONS and movement of irradiated fuel assemblies, the water level in the refueling canal and the refueling cavity is an initial condition design parameter in the analysis of a fuel handling accident in containment, as postulated by Regulatory Guide 1.25 (Ref. 1). A minimum water level of 23 ft (Regulatory Position C.1.c of Ref. 1) allows a decontamination factor of 100 (Regulatory Position C.1.g of Ref. 1) to be used in the accident analysis for iodine. This relates to the assumption that 99% of the total iodine released from the pellet to cladding gap of all the dropped fuel assembly rods is retained by the refueling cavity water. The fuel pellet to cladding gap is assumed to contain 10% of the total fuel rod iodine inventory (Ref. 1). The fuel handling accident analysis inside containment is described in Reference 2. With a minimum water level of 23 ft and a minimum decay time of 161 hours prior to fuel handling, the analysis and test programs demonstrate that the iodine release due to a postulated fuel handling accident is adequately captured by the water and offsite doses are maintained within allowable limits (Refs. 4 and 5). Refueling cavity water level satisfies Criterion 2 of the NRC Policy Statement.
LCO	A minimum refueling cavity water level of 23 ft above the reactor vessel flange is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment are within acceptable limits, as provided by the guidance of Reference 3.