



Sharon W. Peavyhouse
H. B. Robinson Steam
Electric Plant Unit 2
Dir - Nuc Org Effectiveness

Duke Energy Progress
3581 West Entrance Road
Hartsville, SC 29550

O: 843 857 1584
F: 843 857 1319

Sharon.Peavyhouse@duke-energy.c

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U.S. Nuclear Regulatory Commission
Washington, DC 20555

H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

Transmittal of Technical Specifications Bases Revisions

Ladies and Gentlemen:

In accordance with Technical Specifications 5.5.14.d, Duke Energy Progress, Inc., is transmitting revisions to the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, Technical Specifications Bases. The attachment to this letter provides Technical Specifications Bases pages for Revisions 50 through 61.

This letter contains no new Regulatory Commitments and no revision to existing Regulatory Commitments.

If you have any questions concerning this matter, please contact Richard Hightower, Manager – Nuclear Regulatory Affairs at (843) 857-1329.

Sincerely,

Sharon W. Peavyhouse
Director – Nuc Org Effectiveness

SWP/jmw

Attachment

cc: Mr. K. M. Ellis, NRC Senior Resident Inspector
Mr. S. P. Lingam, NRC Project Manager, NRR
Mr. V. M. McCree, NRC Region II Administrator

A001
NRR

H. B. Robinson Steam Electric Plant, Unit No. 2

Technical Specifications Bases Pages For Revisions 50 Through 61

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B 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

BASES

LCOs	LCO 3.0.1 through LCO 3.0.8 establish the general requirements applicable to all Specifications and apply at all times, unless otherwise stated.
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LCO 3.0.1	LCO 3.0.1 establishes the Applicability statement within each individual Specification as the requirement for when the LCO is required to be met (i.e., when the unit is in the MODES or other specified conditions of the Applicability statement of each Specification).
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LCO 3.0.2	LCO 3.0.2 establishes that upon discovery of a failure to meet an LCO, the associated ACTIONS shall be met. The Completion Time of each Required Action for an ACTIONS Condition is applicable from the point in time that an ACTIONS Condition is entered. The Required Actions establish those remedial measures that must be taken within specified Completion Times when the requirements of an LCO are not met. This Specification establishes that:
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- a. Completion of the Required Actions within the specified Completion Times constitutes compliance with a Specification; and
- b. Completion of the Required Actions is not required when an LCO is met within the specified Completion Time, unless otherwise specified.

There are two basic types of Required Actions. The first type of Required Action specifies a time limit in which the LCO must be met. This time limit is the Completion Time to restore an inoperable system or component to OPERABLE status or to restore variables to within specified limits. If this type of Required Action is not completed within the specified Completion Time, a shutdown may be required to place the unit in a MODE or condition in which the Specification is not applicable. (Whether stated as a Required Action or not, correction of the entered Condition is an action that may always be considered upon entering ACTIONS.)

(continued)

BASES

LCO 3.0.7

There are certain special tests and operations required to be performed at various times over the life of the unit.

These special tests and operations are necessary to demonstrate select unit performance characteristics, to perform special maintenance activities, and to perform special evolutions. Test Exception LCO 3.1.8 allows specified Technical Specification (TS) requirements to be changed to permit performances of these special tests and operations, which otherwise could not be performed if required to comply with the requirements of these TS. Unless otherwise specified, all the other TS requirements remain unchanged. This will ensure all appropriate requirements of the MODE or other specified condition not directly associated with or required to be changed to perform the special test or operation will remain in effect.

The Applicability of a Test Exception LCO represents a condition not necessarily in compliance with the normal requirements of the TS. Compliance with Test Exception LCOs is optional. A special operation may be performed either under the provisions of the appropriate Test Exception LCO or under the other applicable TS requirements. If it is desired to perform the special operation under the provisions of the Test Exception LCO, the requirements of the Test Exception LCO shall be followed.

LCO 3.0.8

LCO 3.0.8 establishes conditions under which systems are considered to remain capable of performing their intended safety function when associated snubbers are not capable of providing their associated support function(s). This LCO states that the supported system is not considered to be inoperable solely due to one or more snubbers not capable of performing their associated support function(s). This is appropriate because a limited length of time is allowed for maintenance, testing, or repair of one or more snubbers not capable of performing their associated support function(s) and appropriate compensatory measures are specified in the snubber requirements, which are located outside of the Technical Specifications (TS) under licensee control. LCO 3.0.8 applies to snubbers that have seismic function only. It does not apply to snubbers that also have design functions to mitigate steam/water hammer or other transient loads. The snubber requirements do not meet the criteria in 10 CFR 50.36(c)(2)(ii), and, as such, are appropriate for control by the licensee.

When a snubber is to be rendered incapable of performing its related support function (i.e., nonfunctional) for testing or maintenance or is discovered to not be functional, it must be determined whether any system(s) require the affected snubber(s) for system OPERABILITY, and whether the plant is in a MODE or specified condition in the Applicability that requires the supported system(s) to be OPERABLE.

(continued)

BASES

LCO 3.0.8
(continued)

If an analysis determines that the supported system(s) do not require the snubber(s) to be functional in order to support the OPERABILITY of the system(s), LCO 3.0.8 is not needed. If the LCO(s) associated with any supported system(s) are not currently applicable (i.e., the plant is not in a MODE or other specified condition in the Applicability of the LCO), LCO 3.0.8 is not needed. If the supported system(s) are inoperable for reasons other than snubbers, LCO 3.0.8 cannot be used. LCO 3.0.8 is an allowance, not a requirement. When a snubber is nonfunctional, any supported system(s) may be declared inoperable instead of using LCO 3.0.8.

Every time the provisions of LCO 3.0.8 are used, HBRSEP Unit No. 2 will confirm that at least one train (or subsystem) of systems supported by the inoperable snubbers will remain capable of performing their required safety or support functions for postulated design loads other than seismic loads.

A record of the design function of the inoperable snubber (i.e., seismic vs. non-seismic) and the associated plant configuration will be available on a recoverable basis for NRC staff inspection. The applicable action for each snubber (LCO 3.0.8.a, LCO 3.0.8.b or engineering evaluation required) will be listed in the Equipment Database (EDB). A list of all plant snubbers and applicable action is included in the Shock Suppressor (Snubber) Examination and Testing Program.

LCO 3.0.8 does not apply to non-seismic snubbers. The provisions of LCO 3.0.8 are not to be applied to supported TS systems unless the supported systems would remain capable of performing their required safety or support functions for postulated design loads other than seismic loads. The risk impact of dynamic loadings other than seismic loads was not assessed as part of the development of LCO 3.0.8. These shock-type loads include thrust loads, blowdown loads, water-hammer loads, steam-hammer loads, LOCA loads and pipe rupture loads. However, there are some important distinctions between non-seismic (shock-type) loads and seismic loads which indicate that, in general, the risk impact of the out-of-service snubbers is smaller for non-seismic loads than for seismic loads. First, while a seismic load affects the entire plant, the impact of a non-seismic load is localized to a certain system or area of the plant. Second, although non-seismic shock loads may be higher in total force and the impact could be as much or more than seismic loads, generally they are of much shorter duration than seismic loads. Third, the impact of non-seismic loads is more plant specific, and thus harder to analyze generically, than for seismic loads. For these reasons, every time LCO 3.0.8 is applied, at least one train of each system that is supported by the inoperable snubber(s) should remain capable of performing their required safety or support functions for postulated design loads other than seismic loads.

(continued)

BASES

LCO 3.0.8
(continued)

If the allowed time expires and the snubber(s) are unable to perform their associated support function(s), the affected supported system's LCO(s) must be declared not met and the Conditions and Required Actions entered in accordance with LCO 3.0.2.

LCO 3.0.8.a applies when one or more snubbers are not capable of providing their associated support function(s) to a single train or subsystem of a multiple train or subsystem supported system or to a single train or subsystem supported system. LCO 3.0.8.a allows 72 hours to restore the snubber(s) before declaring the supported system inoperable. The 72 hour Completion Time is reasonable based on the low probability of a seismic event concurrent with an event that would require operation of the supported system occurring while the snubber(s) are not capable of performing their associated support function and due to the availability of the redundant train of the supported system.

LCO 3.0.8.b applies when one or more snubbers are not capable of providing their associated support function(s) to more than one train or subsystem of a multiple train or subsystem supported system. LCO 3.0.8.b allows 12 hours to restore the snubber(s) before declaring the supported system inoperable. The 12 hour Completion Time is reasonable based on the low probability of a seismic event concurrent with an event that would require operation of the supported system occurring while the snubber(s) are not capable of performing their associated support function.

LCO 3.0.8 requires that risk be assessed and managed. Industry and NRC guidance on the implementation of 10 CFR 50.65(a)(4) (the Maintenance Rule) does not address seismic risk. However, use of LCO 3.0.8 should be considered with respect to other plant maintenance activities, and integrated into the existing Maintenance Rule process to the extent possible so that maintenance on any unaffected train or subsystem is properly controlled, and emergent issues are properly addressed. The risk assessment need not be quantified, but may be a qualitative awareness of the vulnerability of systems and components when one or more snubbers are not able to perform their associated support function.

B 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

BASES

SRs SR 3.0.1 through SR 3.0.4 establish the general requirements applicable to all Specifications and apply at all times, unless otherwise stated.

SR 3.0.1 SR 3.0.1 establishes the requirement that SRs must be met during the MODES or other specified conditions in the Applicability for which the requirements of the LCO apply, unless otherwise specified in the individual SRs. This Specification is to ensure that Surveillances are performed to verify the OPERABILITY of systems and components, and that variables are within specified limits. Failure to meet a Surveillance within the specified Frequency, in accordance with SR 3.0.2, constitutes a failure to meet an LCO.

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

- a. The systems or components are known to be inoperable, although still meeting the SRs; or
- b. The requirements of the Surveillance(s) are known not to be met between required Surveillance performances.

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

Unplanned events may satisfy the requirements (including applicable acceptance criteria) for a given SR. In this case, the unplanned event may be credited as fulfilling the performance of the SR. This allowance includes those SRs whose performance is normally precluded in a given MODE or other specified condition.

(continued)

BASES

SR 3.0.1 Surveillances, including Surveillances invoked by Required (continued) Actions, do not have to be performed on inoperable equipment because the ACTIONS define the remedial measures that apply. Surveillances have to be met and performed in accordance with SR 3.0.2, prior to returning equipment to OPERABLE status.

Upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable Surveillances are not failed and their most recent performance is in accordance with SR 3.0.2. Post maintenance testing may not be possible in the current MODE or other specified conditions in the Applicability due to the necessary unit parameters not having been established. In these situations, the equipment may be considered OPERABLE provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to proceed to a MODE or other specified condition where other necessary post maintenance tests can be completed.

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

SR 3.0.2 permits a 25% extension of the interval specified in the Frequency. This extension facilitates Surveillance scheduling and considers plant operating conditions that may not be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities).

The 25% extension does not significantly degrade the reliability that results from performing the Surveillance at its specified Frequency. This is based on the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the SRs. The exceptions to SR 3.0.2 are those Surveillances for which the 25% extension of the interval specified in the Frequency does not apply. These exceptions are stated in the individual Specifications. An example of where SR 3.0.2 does not apply is a Surveillance with a Frequency of "in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions."

(continued)

BASES

SR 3.0.2
(continued)

The requirements of regulations take precedence over the TS. The TS cannot in and of themselves extend a test interval specified in the regulations.

Therefore, there is a Note in the Frequency stating, "SR 3.0.2 is not applicable."

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

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

SR 3.0.3

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

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

The basis for this delay period includes consideration of unit conditions, adequate planning, availability of personnel,

(continued)

BASES

SR 3.0.3
(continued)

the time required to perform the Surveillance, the safety significance of the delay in completing the required Surveillance, and the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the requirements.

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

SR 3.0.3 provides a time limit for, and allowances for the performance of, Surveillances that become applicable as a consequence of MODE changes imposed by Required Actions.

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

While up to 24 hours or the limit of the specified Frequency is provided to perform the missed Surveillance, it is expected that the missed Surveillance will be performed at the first reasonable opportunity. The determination of the first reasonable opportunity should include consideration of the impact on plant risk (from delaying the Surveillance as well as any plant configuration changes required or shutting the plant down to perform the Surveillance) and impact on any analysis assumptions, in addition to unit conditions, planning, availability of personnel, and the time required to perform the Surveillance. This risk impact should be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementation guidance, Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants." This Regulatory Guide addresses consideration of temporary and aggregate risk impacts, determination of risk management action thresholds, and risk management action up to and including plant shutdown.

(continued)

BASES

SR 3.0.3
(continued)

The missed Surveillance should be treated as an emergent condition as discussed in the Regulatory Guide. The risk evaluation may use quantitative, qualitative, or blended methods. The degree of depth and rigor of the evaluation should be commensurate with the importance of the component. Missed Surveillances for important components should be analyzed quantitatively. If the results of the risk evaluation determine the risk increase is significant, this evaluation should be used to determine the safest course of action. Missed Surveillances will be placed into the Corrective Action Program.

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

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

SR 3.0.4

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

This Specification ensures that system and component OPERABILITY requirements and variable limits are met before entry into MODES or other specified conditions in the

Applicability for which these systems and components ensure (continued) safe operation of the unit. The provisions of this Specification should not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before entering an associated MODE or other specified condition in the Applicability.

(continued)

BASES

SR 3.0.4
(continued)

A provision is included to allow entry into a MODE or other specified condition in the Applicability when an LCO is not met due to Surveillance not being met in accordance with LCO 3.0.4. However, in certain circumstances, failing to meet an SR will not result in SR 3.0.4 restricting a MODE change or other specified condition change. When a system, subsystem, division, component, device, or variable is inoperable or outside its specified limits, the associated SR(s) are not required to be performed, per SR 3.0.1, which states that surveillances do not have to be performed on inoperable equipment. When equipment is inoperable, SR 3.0.4 does not apply to the associated SR(s) since the requirement for the SR(s) to be performed is removed. Therefore, failing to perform the Surveillance(s) within the specified Frequency does not result in an SR 3.0.4 restriction to changing MODES or other specified conditions of the Applicability. However, since the LCO is not met in this instance, LCO 3.0.4 will govern any restrictions that may (or may not) apply to MODE or other specified condition changes. SR 3.0.4 does not restrict changing MODES or other specified conditions of the Applicability when a Surveillance has not been performed within the specified Frequency, provided the requirement to declare the LCO not met has been delayed in accordance with SR 3.0.3.

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

The precise requirements for performance of SRs are specified such that exceptions to SR 3.0.4 are not necessary. The specific time frames and conditions necessary for meeting the SRs are specified in the Frequency, in the Surveillance, or both.

This allows performance of Surveillances when the prerequisite condition(s) specified in a Surveillance procedure requires entry into the MODE or other specified condition in the Applicability of the associated LCO prior to the performance or completion of a Surveillance. A Surveillance that could not be performed until after entering the LCO's Applicability, would have its Frequency specified such that it is not "due" until the specific conditions needed are met.

Alternately, the Surveillance may be stated in the form of a Note, as not required (to be met or performed) until a particular event, condition, or time has been reached. Further discussion of the specific formats of SRs' annotation is found in Section 1.4, Frequency.

BASES

LCO
(continued)

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 LHGRs, or unacceptable SDMs, all of which may constitute initial conditions inconsistent with the safety analysis.

This LCO is modified by a note indicating individual control rod position indications may not be within limits for up to and including one hour following substantial control rod movement. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach thermal equilibrium and thus present a consistent position indication. Substantial rod movement is considered to be 10 or more steps in one direction in less than one hour.

In accordance with this note, the comparison of the bank demand position and the RPI may take place at any time up to one hour after rod motion, at any power level. Based on this allowance, rod position may be considered within limits during the thermal soak time to allow position indication to stabilize.

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 inserted 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 MODES 3, 4, and 5 and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling.

(continued)

BASES

ACTIONS

A.1.1 and A.1.2

When one or more rods are inoperable (e.g., untrippable), 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 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.

(continued)

BASES

LCO
(continued)

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

This LCO is modified by a note indicating individual control rod position indications may not be within limits for up to and including one hour following substantial control rod movement. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach thermal equilibrium and thus present a consistent position indication. Substantial rod movement is considered to be 10 or more steps in one direction in less than one hour.

In accordance with this note, the comparison of the bank demand position and the RPI may take place at any time up to one hour after rod motion, at any power level. Based on this allowance, rod position may be considered within limits during the thermal soak time to allow position indication to stabilize.

APPLICABILITY

The requirements on the ARPI and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6), because these are the only MODES in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

ACTIONS

The ACTIONS table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

(continued)

BASES

A.1

When one ARPI channel per group fails, the position of the rod can still be determined by use of the incore movable detectors. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of B.1 or B.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

(continued)

BASES

- | | | |
|---|-----|---|
| APPLICABLE
SAFETY
ANALYSES, LCO,
and APPLICABILITY | 13. | <u>Steam Generator Water Level - Low Low</u> (continued)

operating or even critical. Decay heat removal is
accomplished by the AFW and MFW Systems in MODE 3 and by
the Residual Heat Removal (RHR) System in MODE 4, 5, or 6. |
| | 14. | DELETED |

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

14. DELETED

15. Turbine Trip

a. Turbine Trip - Low Auto-Stop Oil Pressure

The Turbine Trip - Low Auto-Stop Oil Pressure trip Function anticipates the loss of heat removal capabilities of the secondary system following a turbine trip. This trip Function acts to minimize the pressure/temperature transient on the reactor. Any turbine trip from a power level below the P-8 setpoint, approximately 40% power, will not actuate a reactor trip. Three pressure switches monitor the auto-stop oil pressure in the Turbine Trip System. A low pressure condition sensed by two-out-of-three pressure switches will actuate a reactor trip. These pressure switches do not provide any input to the control system. The unit is designed to withstand a complete loss of load and not sustain core damage or challenge the RCS pressure limitations. Core protection is provided by the Pressurizer Pressure - High trip Function and RCS integrity is ensured by the pressurizer safety valves.

The LCO requires three channels of Turbine Trip - Low Auto-Stop Oil Pressure to be OPERABLE in MODE 1 above P-8.

Below the P-8 setpoint, a turbine trip does not actuate a reactor trip. In MODE 3, 4, 5, or 6, there is no potential for a turbine trip, and the Turbine Trip - Low Auto-Stop Oil Pressure trip Function does not need to be OPERABLE.

(continued)

BASES

ACTIONS

D.1.1, D.1.2, D.2.1, D.2.2, and D.3 (continued)

6 hour Completion Time and the 12 hour Frequency are consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."

As an alternative to the above Actions, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Twelve hours are allowed to place the plant in MODE 3. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.

Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux Channel which renders the High Flux Trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the movable incore detectors once per 12 hours may not be necessary.

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low;
- Overtemperature ΔT ;
- Overpower ΔT ;
- Pressurizer Pressure - High;
- SG Water Level - Low Low; and
- DELETED

A known inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.1.2 (continued)

hours are allowed for performing the first Surveillance after reaching 15% RTP. At lower power levels, calorimetric data are inaccurate.

The Frequency of every 24 hours is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate the change in the absolute difference between NIS and heat balance calculated powers rarely exceeds 2% in any 24 hour period. In addition, control room operators periodically monitor redundant indications and alarms to detect deviations in channel outputs.

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output every 31 EFPD. If the absolute difference is $\geq 3\%$, the NIS channel is still OPERABLE, but must be readjusted.

If the NIS channel cannot be properly readjusted, the channel is declared inoperable. This Surveillance is performed to verify the $f(\Delta I)$ input to the overtemperature and overpower ΔT Functions.

Two Notes modify SR 3.3.1.3. Note 1 indicates that the excore NIS channel shall be adjusted if the absolute difference between the incore and excore AFD is $\geq 3\%$. Note 2 clarifies that the Surveillance is required only if reactor power is $\geq 15\%$ RTP and that 36 hours is allowed for performing the first Surveillance after reaching 15% RTP.

The Frequency of every 31 EFPD is adequate. It is based on industry operating experience, considering instrument reliability and operating history data for instrument drift. Also, the slow changes in neutron flux during the fuel cycle can be detected during this interval

(continued)

B 3.3 INSTRUMENTATION

B 3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operation. Undervoltage protection will generate an LOP start if a loss of voltage or degraded voltage condition occurs on the emergency bus. There are two LOP start signals for each 480 V emergency bus.

Undervoltage relays with definite time characteristics are provided on each 480 V emergency bus for detecting a sustained degraded voltage condition or a loss of bus voltage. The Loss of Voltage Function is provided by two relays on each bus. These relays are arranged in a one-out-of-two logic, such that either relay will generate an LOP signal if the voltage is below approximately 68% for a short time (loss of bus voltage). The Degraded Voltage Function is provided by three relays on each bus, which are combined in a two-out-of-three logic to generate an LOP signal if the voltage is below approximately 90% for a long period of time (degraded voltage). The LOP start actuation is described in UFSAR, Section 8.3 (Ref. 1).

Trip Setpoints and Allowable Values

The Trip Setpoints used in the relays are based on Degraded Grid Voltage Relay calculations (References 2 and 5). The selection of these Trip Setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account.

Trip Setpoints and tolerances are specified for each Function in the LCO. If the measured setpoint falls within the tolerance band, the relay is considered OPERABLE. Operation with a measured setpoint less conservative than the Trip Setpoint, but within the tolerance band, is acceptable provided that operation and testing is consistent with the assumptions of the setpoint calculation. Each Trip Setpoint specified is more conservative than the analytical values determined in References 2 and 5 in order to account for instrument uncertainties appropriate to the trip function.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.5.1 (continued)

The SR is modified by a Note that excludes verification of the setpoint from the TADOT. Setpoint verification is accomplished during the CHANNEL CALIBRATION.

SR 3.3.5.2

SR 3.3.5.2 is the performance of a CHANNEL CALIBRATION.

The setpoints, as well as the response to a loss of voltage and a degraded voltage test, should include a single point verification that the trip occurs within the required time delay, as shown in Reference 1.

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle and is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. UFSAR, Section 8.3.
 2. Calculation RNP-E-8.002, AC Auxiliary Electrical Distribution System Voltage/Load Flow/Fault Current Study
 3. UFSAR, Chapter 15.
 4. EGR-NGGC-0153, Engineering Instrument Setpoints
 5. RNP-I/INST-1010, Emergency Bus – Degraded Grid Voltage Relay
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BASES

BACKGROUND Trip Setpoints and Allowable Values (continued)

"as found" calibration tolerance band, such that the actual Trip Setpoint is within the "as left" calibration tolerance band.

The Nominal Trip Setpoints used in the bistables are based on the analytical limits or design limits. The selection of these Nominal Trip Setpoints is such that adequate protection is provided when all sensor and processing time delays accounted for in setpoint calculations and accident analyses are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those channels that must function in harsh environments as defined by 10 CFR 50.49, the Nominal Trip Setpoints and Allowable Values specified in Table 3.3.8-1 in the accompanying LCO are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the Nominal Trip Setpoints, including their explicit uncertainties, is provided in the company setpoint methodology procedure (Ref. 4). The actual Nominal Trip Setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a COT. One example of such a change in measurement error is drift during the surveillance interval. As noted in Table 3.3.8-1 (Note 1), a channel is considered OPERABLE with an actual Trip Setpoint value found outside its "as found" calibration tolerance band provided the Trip Setpoint value is conservative with respect to its Allowable Value and the channel is re-adjusted to within the "as left" calibration tolerance band of the Nominal Trip Setpoint.

Setpoints in accordance with the Allowable Value ensure that the consequences of Design Basis Accidents (DBAs) and transients will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA or transient and the equipment functions as designed.

Each channel can be tested on line to verify that the signal processing equipment and setpoint accuracy is within the specified allowance requirements of calculations performed in accordance with the company setpoint methodology procedure (Ref. 4). Once a designated channel is taken out

(continued)

BASES

BACKGROUND Trip Setpoints and Allowable Values (continued)

of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SR section.

The Nominal Trip Setpoints and Allowable Values listed in Table 3.3.8-1, are based on the methodology described in the company setpoint methodology procedure (Ref. 4), which incorporates all of the applicable uncertainties for each channel. The magnitudes of these uncertainties are factored into the determination of each Nominal Trip Setpoint. All field sensors and signal processing equipment for these channels are assumed to operate within the allowances of these uncertainty magnitudes.

APPLICABLE SAFETY ANALYSES The AFW System mitigates the consequences of any event with loss of normal feedwater. The design basis of the AFW System is to supply water to the SGs to remove decay heat and other residual heat by delivering at least the minimum required flow rate to the SGs at pressures corresponding to the lowest main steam safety valve (MSSV) set pressure plus 3%.

In addition, the AFW System must supply enough makeup water to replace SG secondary inventory lost as the unit cools to MODE 4 conditions. Sufficient AFW flow must also be available to account for flow losses such as pump recirculation and line breaks.

The limiting Design Basis Accidents (DBAs) and transients for the AFW System are as follows:

- a. Feedwater Line Break (FWLB); and
- b. Loss of main feedwater (MFW).

In addition, the minimum available AFW flow and system characteristics are serious considerations in the analysis of a small break loss of coolant accident (LOCA).

(continued)

BASES

LCO

Safety Injection (SI) (continued)

requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.8-1. Instead, Table 3.3.2-1, Function 1 (Safety Injection), is referenced for all initiating functions and requirements.

3. Loss of Offsite Power

A loss of offsite power to the 480 V emergency busses will be accompanied by a loss of MFW and reactor coolant pumping power, and the subsequent need for some method of decay heat removal. Loss of offsite power is detected by undervoltage relays sensing the voltage on each 480 volt emergency (E) bus. Loss of power to either emergency bus will start the motor driven AFW pumps in the station blackout loading sequence to ensure that at least one SG contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip. A loss of power to the E1 bus initiates a start of the "A" AFW pump and a loss of power to the E2 bus initiates a start of the "B" AFW pump. The relays are arranged in a one-out-of-two logic, such that either relay will generate a loss of power (LOP) signal if the voltage is below the setpoint for a short period of time. The LOP signal also initiates starting the emergency diesel generators as described in the bases to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation."

4. Undervoltage - Reactor Coolant Pump (RCP)

A loss of power on 4 kV buses 1 and 4, which provide power to both MFW pumps and two RCPs, provides indication of a loss of MFW and forced flow in the RCS. Two sensors are provided on each bus, with two-out-of-two logic on both busses required to start the turbine driven AFW pump to ensure that at least one SG contains enough water to serve as the heat sink for reactor decay heat and sensible heat removal following the reactor trip.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.3.8.3 (continued)

Pumps Function. The injection of the signal should be as close to the sensor as practical. The Frequency is adequate, based on industry operating experience and is consistent with the typical refueling cycle.

SR 3.3.8.4

SR 3.3.8.4 is the performance of a CHANNEL CALIBRATION. A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology (Ref. 4). The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology (Ref. 4).

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology (Ref. 4).

REFERENCES

1. UFSAR, Section 7.3.1
 2. UFSAR, Section 3.1
 3. WCAP-10271-P-A, Supplement 2, Rev. 1., June 1990
 4. EGR-NGGC-0153, Engineering Instrument Setpoints
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BASES

REFERENCES
(continued)

9. 10 CFR 50, Appendix K.
10. Generic Letter 90-06.
11. EGR-NGGC-0153, Engineering Instrument Setpoints

BASES (continued)

LCO

The LCO requires that SG tube integrity be maintained. The LCO also requires that all SG tubes that satisfy the plugging criteria be plugged in accordance with the Steam Generator Program.

During an SG inspection, any inspected tube that satisfies the Steam Generator Program plugging criteria is removed from service by plugging. If a tube was determined to satisfy the plugging criteria but was not plugged, the tube may still have tube integrity.

In the context of this Specification, the safety significant portion of a SG tube from 18.11 inches below the top of the tubesheet on the hot leg to 18.11 inches below the top of the hot leg is subject to inspection. The tube-to-tubesheet weld is not considered part of the tube.

A SG tube has tube integrity when it satisfies the SG performance criteria. The SG performance criteria are defined in Specification 5.5.9, "Steam Generator Program," and describe acceptable SG tube performance. The Steam Generator Program also provides the evaluation process for determining conformance with the SG performance criteria.

There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. Failure to meet any one of these criteria is considered failure to meet the LCO.

The structural integrity performance criterion provides a margin of safety against tube burst or collapse under normal and accident conditions, and ensures structural integrity of the SG tubes under all anticipated transients included in the design specification. Tube burst is defined as, "The gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation." Tube collapse is defined as, "For the load displacement curve for a given structure, collapse occurs at the top of the load versus displacement curve where the slope of the curve becomes zero." The structural integrity performance criterion provides guidance on assessing loads that have a

(continued)

BASES (Continued)

APPLICABILITY Steam generator tube integrity is challenged when the pressure differential across the tubes is large. Large differential pressures across SG tubes can only be experienced in MODE 1, 2, 3, or 4.

RCS conditions are far less challenging in MODES 5 and 6 than during MODES 1, 2, 3, and 4. In MODES 5 and 6, primary to secondary differential pressure is low, resulting in lower stresses and reduced potential for LEAKAGE.

ACTIONS The ACTIONS are modified by a Note clarifying that the Conditions may be entered independently for each SG tube. This is acceptable because the Required Actions provide appropriate compensatory actions for each affected SG tube. Complying with the Required Actions may allow for continued operation, and subsequently affected SG tubes are governed by subsequent Condition entry and application of associated Required Actions.

A.1 and A.2

Condition A applies if it is discovered that one or more SG tubes examined in an inservice inspection satisfy the tube plugging criteria but were not plugged in accordance with the Steam Generator Program as required by SR 3.4.18.2. An evaluation of SG tube integrity of the affected tube(s) must be made. Condition A does not apply to the occurrence of primary to secondary LEAKAGE, which is monitored and maintained in accordance with LCO 3.4.13. Steam generator tube integrity is based on meeting the SG performance criteria described in the Steam Generator Program. The SG plugging criteria define limits on SG tube degradation that allow for flaw growth between inspections while still providing assurance that the SG performance criteria will continue to be met. In order to determine if a SG tube that should have been plugged has tube integrity, an evaluation must be completed that demonstrates that the SG performance criteria will continue to be met until the next refueling outage or SG tube inspection. The tube integrity determination is based on the estimated condition of the tube at the time the situation is discovered and the estimated growth of the degradation prior to the next SG tube inspection. If it is determined that tube integrity is not being maintained, Condition B applies.

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BASES (Continued)

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(continued)

SR 3.4.18.1 (continued)

assessment determines the "as found" condition of the SG tubes. The purpose of the condition monitoring assessment is to ensure that the SG performance criteria have been met for the previous operating period.

The Steam Generator Program determines the scope of the inspection and the methods used to determine whether the tubes contain flaws satisfying the tube plugging criteria. Inspection scope (i.e., which tubes or areas of tubing within the SG are to be inspected) is a function of existing and potential degradation locations. The Steam Generator Program also specifies the inspection methods to be used to find potential degradation. Inspection methods are a function of degradation morphology, nondestructive examination (NDE) technique capabilities, and inspection locations.

The Steam Generator Program defines the Frequency of SR 3.4.18.1. The Frequency is determined by the operational assessment and other limits in the SG examination guidelines (Ref. 6). The Steam Generator Program uses information on existing degradations and growth rates to determine an inspection Frequency that provides reasonable assurance that the tubing will meet the SG performance criteria at the next scheduled inspection. In addition, Specification 5.5.9 contains prescriptive requirements concerning inspection intervals to provide added assurance that the SG performance criteria will be met between scheduled inspections. If crack indications are found in any SG tube, the maximum inspection interval for each affected and potentially affected SG is restricted by Specification 5.5.9 until subsequent inspections support extending the inspection interval.

SR 3.4.18.2

During an SG inspection, any inspected tube that satisfies the Steam Generator Program plugging criteria is removed from service by plugging. The tube plugging criteria delineated in Specification 5.5.9 are intended to ensure that tubes accepted for continued service satisfy the SG performance criteria with allowance for error in the flaw size measurement and for future flaw growth. In addition, the tube plugging criteria, in conjunction with other elements of the Steam Generator Program, ensure that the SG performance criteria will continue to be met until the next inspection of the subject tube(s). Reference 1 provides guidance for performing operational assessments to verify that the tubes remaining in service will continue to meet the SG performance criteria.

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BASES (Continued)

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(continued)

SR 3.4.18.2 (continued)

The Frequency of prior to entering MODE 4 following a SG inspection ensures that the Surveillance has been completed and all tubes meeting the plugging criteria are plugged prior to subjecting the SG tubes to significant primary to secondary pressure differential.

REFERENCES

1. NEI 97-06, "Steam Generator Program Guidelines."
 2. 10 CFR 50 Appendix A, GDC 19.
 3. 10 CFR 50.67.
 4. ASME Boiler and Pressure Vessel Code, Section III, Subsection NB.
 5. Draft Regulatory Guide 1.121, "Basis for Plugging Degraded Steam Generator Tubes," August 1976.
 6. EPRI, "Pressurized Water Reactor Steam Generator Examination Guidelines."
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B 3.7 PLANT SYSTEMS

B 3.7.2 Main Steam Isolation Valves (MSIVs)

BASES

BACKGROUND The MSIVs isolate steam flow from the secondary side of the steam generators following a high energy line break (HELB). MSIV closure terminates flow from the unaffected (intact) steam generators.

One MSIV is located in each main steam line outside, but close to, containment. The MSIVs are downstream from the main steam safety valves (MSSVs) and auxiliary feedwater (AFW) pump turbine steam supply, to prevent MSSV and AFW isolation from the steam generators by MSIV closure. Closing the MSIVs isolates each steam generator from the others, and isolates the turbine, Steam Dump System, and other auxiliary steam supplies from the steam generators.

The MSIVs close on a main steam isolation signal generated by either high steam flow coincident with low T_{avg} or with low steam pressure; or high-high containment pressure. The MSIVs fail closed on loss of control or actuation power. The MSIVs fail as is on a loss of instrument air pressure.

A bypass valve is provided around each MSIV to equalize pressure across the valve and to warm up the steam line during unit startup. The bypass valves are motor operated, manually actuated valves, which are normally closed.

A description of the MSIVs is found in the UFSAR, Section 10.3(Ref. 1).

APPLICABLE SAFETY ANALYSES The design basis of the MSIVs is established by the containment analysis for the large steam line break (SLB) inside containment, discussed in the UFSAR, Section 6.2 (Ref. 2). It is also affected by the accident analysis of the SLB events presented in the UFSAR, Section 15.1.5 (Ref. 3). The design precludes the blowdown of more than one steam generator, assuming a single active component failure (e.g., the failure of one MSIV to close on demand). Furthermore, the design can limit the blowdown through the break that would occur while the MSIVs are closing. This is due to a check valve installed downstream of each MSIV. Upon a failure of an MSIV, the check valve will prevent

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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 occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke.

The CREFS is a subsystem of the Control Room Air Conditioning System and consists of redundant air cleaning unit fans, redundant air intake dampers and associated ductwork, redundant air recirculation fans and associated ductwork, redundant air exhaust dampers, a non-redundant air filtration unit housing, and non-redundant ductwork and gravity dampers. The necessary instrumentation is also considered a part of the system. The air filtration unit housing contains a prefilter, a high efficiency particulate air (HEPA) filter bank, and an activated charcoal adsorber section for removal of gaseous activity (principally iodines). A second bank of HEPA filters follows the adsorber section to collect carbon fines and provides backup in case of failure of the main HEPA filter bank.

The control room envelope (CRE) is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the control room, and may encompass other areas to which personnel access is necessary in the event of an accident. The CRE is protected during normal operation, natural events, and accident conditions. The CRE boundary is the combination of walls, floor, roof, ducting, doors, penetrations, and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the inleakage of unfiltered air into the CRE will not exceed the inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

The CREFS is an emergency system, parts of which also operate during normal unit operations in the standby mode of operation. Upon receipt of the actuating signal(s), the stream of ventilation air is recirculated through the system filters. The prefilters remove any large particles in the air to prevent

(continued)

BASES

BACKGROUND
(continued)

excessive loading of the HEPA filters and charcoal (continued) absorbers.

The CREFS is actuated to the emergency pressurization mode of operation on a safety injection signal. A single area radiation monitor also provides a signal to the CREFS to actuate emergency pressurization. Upon actuation, the air recirculation fans start and move recirculation air through the air cleaning unit filter train, and the control room exhaust to the outdoors is isolated.

The control room envelope is maintained under a positive differential pressure with respect to adjacent areas and the outdoors during the emergency pressurization mode of operation. A maximum makeup rate of 400 CFM is provided for pressurizing the control room envelope. Periodic testing is required to demonstrate that the control room is pressurized to a minimum of 0.125 inches water gage with respect to the outdoors, and to a positive pressure with respect to adjacent areas, with an outside air makeup rate of ≤ 400 CFM, while in the emergency pressurization mode of operation. Periodic testing also demonstrates that a positive pressure can be maintained in the control room with respect to the outdoors. The CREFS operation in maintaining the control room habitable is discussed in the Updated Final Safety Analysis Report (UFSAR), Section 6.4 (Ref. 1).

Pressurization of the Control Room habitability envelope by the CREFS assumes that non-safety related ventilation fans in the Auxiliary Building adjacent to the Control Room either remain in operation or cease operation. In the event that the air supply fan to the Auxiliary Building (HVS-1) remains in operation simultaneously with the Auxiliary Building air exhaust fan not in operation (HVE-7), areas adjacent to the Control Room could be slightly positive with respect to the Control Room. In-leakage testing and analyses have shown that the dose to the Control Room operator would be satisfactory under this condition (Ref. 2).

The air entering the control room through the outside air intake is continuously monitored for radiation in the control room and smoke in the ventilation air duct.

The CREFS is designed to maintain the control room environment for 30 days of continuous occupancy after a

(continued)

BASES

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Table 3.8.6-1 (continued)

level correction is not required when battery charging current is < 2 amps on float charge. This current provides, in general, an indication of overall battery condition.

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days.

REFERENCES

1. UFSAR, Chapter 6.
 2. UFSAR, Chapter 15.
 3. IEEE-450-1995.
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