ITS | A01 | ITS 3.7.12

REFUELING OPERATIONS

3/4.9.12 AUXILIARY BUILDING GAS TREATMENT SYSTEM

LIMITING CONDITION FOR OPERATION

LCO 3.7.12 ~~Note 2~~

3.9.12 ~~One~~ Two auxiliary building gas treatment filter train shall be OPERABLE. L06

Applicability

APPLICABILITY: ~~Whenever irradiated fuel is in the storage pool.~~ During movement of recently irradiated fuel assemblies in the auxiliary building. L06

ACTION: Add proposed ACTION A L06

Add proposed Required Action ~~D~~ E.1 L06

ACTION ~~D~~ E

a. With no auxiliary building gas treatment filter train OPERABLE, ~~suspend all operations involving movement of fuel within the spent fuel pit or crane operation with loads over the spent fuel pit until at least one auxiliary building gas treatment filter train is restored to OPERABLE status~~.

ACTIONS Note

b. The provisions of Specification 3.0.3 are not applicable.

Add proposed ACTION D L06

SURVEILLANCE REQUIREMENTS ~~L06~~

SR 3.7.12.1, SR 3.7.12.3

4.9.12 The above required auxiliary buildings gas treatment filter train shall be demonstrated OPERABLE:

In accordance with the Surveillance Frequency Control Program LA02

SR 3.7.12.1

a. ~~At least once per 31 days on a STAGGERED TEST BASIS~~ by initiating, ~~from the control room, flow through the HEPA filters and charcoal adsorbers~~ and verifying that the system operates for at least ~~10 hours~~ 15 continuous minutes with the heaters on. L03 LA03 L04

Add proposed SR 3.7.12.2 A02

See ITS 5.5.9

b. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system by:

1. Verifying that the cleanup system satisfies the in-place testing acceptance criteria and uses the test procedures of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978 (except for the provisions of ANSI N510 Sections 8 and 9), and the system flow rate is 9000 cfm ± 10%.

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than 2.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%.

3. Verifying a system flow rate of 9000 cfm ± 10% during system operations when tested in accordance with ANSI N510-1975.

REFUELING OPERATIONS

3/4.9.12 AUXILIARY BUILDING GAS TREATMENT SYSTEM

LIMITING CONDITION FOR OPERATION

LCO 3.7.12 ~~Note 2~~ — Two — L06

3.9.12 ~~One~~ auxiliary building gas treatment filter train shall be OPERABLE.

Applicability — APPLICABILITY: ~~Whenever irradiated fuel is in the storage pool.~~ During movement of recently irradiated fuel assemblies in the auxiliary building. L06

ACTION: Add proposed ACTION A — L06

Add proposed Required Action ~~D~~.1 — L06 — E

ACTION ~~D~~ — E

a. With no auxiliary building gas treatment filter train OPERABLE, ~~suspend all operations involving movement of fuel within the spent fuel pit or crane operation with loads over the spent fuel pit until at least one auxiliary building gas treatment filter train is restored to OPERABLE status~~.

ACTIONS Note

b. The provisions of Specification 3.0.3 are not applicable.

Add proposed ACTION D — L06

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1, SR 3.7.12.3

4.9.12 The above required auxiliary building gas treatment filter train shall be demonstrated OPERABLE:

In accordance with the Surveillance Frequency Control Program — LA02

SR 3.7.12.1 — L03 — LA03

15 continuous minutes — L04

a. ~~At least once per 31 days on a STAGGERED TEST BASIS~~ by initiating, ~~from the control room, flow through the HEPA filters and charcoal adsorbers~~ and verifying that the system operates for at least ~~10 hours~~ with the heaters on.

Add proposed SR 3.7.12.2 — A02

See ITS 5.5.9

b. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system by:

1. Verifying that the cleanup system satisfies the in-place testing acceptance criteria and uses the test procedures of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978 (except for the provisions of ANSI N510 Sections 8 and 9), and the system flow rate is 9000 cfm $\pm$ 10%.

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than 2.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86° F) and a relative humidity of 70%.

3. Verifying a system flow rate of 9000 cfm $\pm$ 10% during system operation when tested in accordance with ANSI N510-1975.

REFUELING OPERATIONS

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. A minimum of one door in each airlock is closed, and both doors of both containment personnel airlocks may be open if:

1. One personnel airlock door in each airlock is capable of closure, and

~~2. One train of the Auxiliary Building Gas Treatment System is OPERABLE in accordance with Technical Specification 3.9.12, and~~

L08

c. Each penetration* providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, manual valve, or equivalent, or

2. Be capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.

(See ITS 3.9.4)

APPLICABILTY:

3.9.4.a. Containment Building Equipment Door - During movement of recently irradiated fuel within the containment.

3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel within the containment.

ACTION:

1. With the requirements of the above specification not satisfied for the containment building equipment door, immediately suspend all operations involving movement of recently irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

2. With the requirements of the above specification not satisfied for containment airlock doors or penetrations, immediately suspend all operations involving movement of irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

(See ITS 3.9.4)

SURVEILLANCE REQUIREMENTS

4.9.4 Each of the above required containment building penetrations shall be determined to be either in its required condition or capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve once per 7 days during movement of irradiated fuel in the containment building by:

a. Verifying the penetrations are in their required condition, or

b. Verifying the Containment Ventilation isolation valves not locked, sealed, or otherwise secured in position, actuate to the isolation position on an actual or simulated actuation signal.

* Penetration flow path(s) providing direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure may be unisolated under administrative controls.

REFUELING OPERATIONS

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. A minimum of one door in each airlock is closed, or both doors of both containment personnel airlocks may be open if:

1. One personnel airlock door in each airlock is capable of closure, and

~~2. One train of the Auxiliary Building Gas Treatment System is OPERABLE in accordance with Technical Specification 3.9.12, and~~

(See ITS 3.9.4)

L08

c. Each penetration* providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, manual valve, or equivalent, or

2. Be capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.

APPLICABILITY:

3.9.4.a. Containment Building Equipment Door - During movement of recently irradiated fuel within the containment.

3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel within the containment.

ACTION:

1. With the requirements of the above specification not satisfied for the containment building equipment door, immediately suspend all operations involving movement of recently irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

2. With the requirements of the above specification not satisfied for containment airlock doors or penetrations, immediately suspend all operations involving movement of irradiated fuel in the containment building. The provisions of Specification 3.0.3 are not applicable.

(See ITS 3.9.4)

SURVEILLANCE REQUIREMENTS

4.9.4 Each of the above required containment building penetrations shall be determined to be either in its required condition or capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve once per 7 days during movement of irradiated fuel in the containment building by:

a. Verifying the penetrations are in their required condition, or

b. Verifying the Containment Ventilation isolation valves not locked, sealed, or otherwise secured in position, actuate to the isolation position on an actual or simulated actuation signal.

* Penetration flow path(s) providing direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure may be unisolated under administrative controls.

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DOC L07 for a discussion of specifying that the actuation signal may be either actual or simulated. See DOC L06 for a discussion on limiting the Applicability of the ABGTS to the conditions during which it is required to mitigate a fuel handling accident ~~is postulated to occur~~.)

The purpose of CTS 3.7.8 is to ensure the ABGTS trains are OPERABLE during the plant conditions that a loss of coolant accident is postulated to occur (MODES 1, 2, 3 and 4). The purpose of CTS 3.9.12 is to ensure that radioactive material that is released from an irradiated fuel assembly during a fuel handling accident is processed through filtration prior to release to the atmosphere (during the movement of recently irradiated fuel assemblies in the auxiliary building). ITS 3.7.12 combines CTS 3.7.8 and 3.9.12 into one Specification with an Applicability of MODES 1, 2, 3 and 4 and during the movement of recently irradiated fuel assemblies in the auxiliary building. This results in the need to specify the plant conditions in which each actuation signal is required to actuate ABGTS to mitigate the associated accident. The plant conditions under which each ABGTS actuation signal is required to be OPERABLE remains unchanged between CTS and ITS. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 4.7.8.d.3 requires verification that each ABGTS system can maintain the spent fuel storage area and the ESF pump rooms at a pressure equal to or less than - 0.25 inches water gauge relative to the outside atmosphere while maintaining a total system flow of 9,000 cfm plus or minus 10% every 18 months in MODES 1, 2, 3 and 4. ITS SR 3.7.12.4 requires the same verification every 18 months on a STAGGERED TEST BASIS in MODES 1, 2, 3 and 4 and during movement of recently irradiated fuel assemblies in the auxiliary building. This changes the CTS by adding a Surveillance Requirement to verify the ABGTS can maintain a negative pressure at the required flow rate during movement of recently irradiated fuel assemblies in the auxiliary building. (See DOC L05 for the discussion regarding the change of the testing Frequency to "on a STAGGERED TEST BASIS." See DOC LA02 for the discussion regarding movement of the Surveillance Frequency to the Surveillance Frequency Control Program.)

This change is acceptable because the ABGTS is required to be OPERABLE during movement of recently irradiated fuel assemblies in the auxiliary building. The Surveillance Requirement is required to verify that the ABGTS can perform its required safety function during this Applicability. This change is designated as more restrictive because an additional Surveillance Requirement is being required that was not in the CTS.

RELOCATED SPECIFICATIONS

None

DISCUSSION OF CHANGES
ITS 3.7.12, AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS)

adequate protection of public health and safety. ITS 3.7.12 retains the requirement to verify that each ABGTS train will automatically start as designed ~~that two ABGTS trains are required to be OPERABLE~~. Also, this change is acceptable because these types of details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA05 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.7.8.d.3 requires verification that the ABGTS system maintains the spent fuel storage area and the ESF pump rooms at a pressure equal to or more negative than minus 1/4 inch water gage relative to the outside atmosphere while maintaining a total system flow of 9000 cfm plus or minus 10%. ITS 3.7.12.4 requires verification that the ABGTS train can maintain a pressure less ~~greater~~ than or equal to -0.25 inches water gauge with respect to atmospheric pressure at a flow rate greater than or equal to 8,100 and less than or equal to 9,900 cfm. This changes the CTS by moving the statement that the system maintains the spent fuel storage area and the ESF pump rooms at the specified pressure to the Bases.

The removal of these details for performing a Surveillance Requirement from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirements to verify the ABGTS train can maintain a pressure less ~~greater~~ than or equal to -0.25 inches water gauge with respect to atmospheric pressure at a flow rate of greater than or equal to 8,100 and less than or equal to 9,900 cfm. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specifications are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 1 – Relaxation of LCO Requirements)* CTS 3.7.8 requires two ABGTS trains to be OPERABLE. ITS LCO 3.7.12 includes the same ABGTS OPERABILITY requirements but is modified by a Note ~~1~~, which states "The Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary may be opened intermittently under administrative control." This changes the CTS by allowing the ABSCE boundary to be opened under administrative controls when the ABGTS is required to be OPERABLE.

The purpose of CTS 3.7.8 is to maintain the air pressure in the auxiliary building below atmospheric, reduce the concentration of nuclides in air releases from the Auxiliary Building Secondary Containment Enclosure (ABSCE), and to minimize the spread of airborne radioactivity within the Auxiliary Building following an

DISCUSSION OF CHANGES
ITS 3.7.12, AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS)

accidental release in the fuel handling areas. ITS LCO 3.7.12 Note ~~1~~ will allow the ABSCE boundary to be opened under administrative controls when the ABGTS is required to be OPERABLE. This change is acceptable because the administrative controls are described in the Bases. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for auxiliary building isolation is indicated. This change is designated as less restrictive because less stringent LCO requirements are being applied in the ITS than were applied in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.7.8 ACTION contains compensatory actions to take when one auxiliary building gas treatment filter train is inoperable in MODES 1, 2, 3 and 4. CTS 3.7.8 does not contain compensatory actions to take when both auxiliary building gas treatment filter trains are inoperable. Therefore, CTS 3.0.3 would be entered for two auxiliary building gas treatment filter trains inoperable. CTS 3.0.3 requires action to be initiated within one hour to be in HOT STANDBY (equivalent to ITS MODE 3) in the following 6 hours, to be in HOT SHUTDOWN (equivalent to ITS MODE 4) in the following 6 hours, and to be in COLD SHUTDOWN (equivalent to ITS MODE 5) in the subsequent 36 hours. ITS 3.7.12 ACTIONS contain a Note stating LCO 3.0.3 is not applicable. ITS 3.7.12 ACTION B states with two ABGTS trains inoperable due to an inoperable Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary in MODE 1, 2, 3, or 4 to restore the auxiliary building boundary to OPERABLE status within 24 hours. Additionally, ITS 3.7.12 ACTION C states, in part, when two ABGTS trains are inoperable for reasons other than Condition B (i.e., an inoperable ABSCE boundary) or if the Required Action and associated Completion Time of Condition B is not met in MODE 1, 2, 3, or 4 to be in MODE 3 within 6 hours and to be in MODE 5 within 36 hours. This changes the CTS by not requiring entry into LCO 3.0.3 when two ABGTS trains are inoperable in MODE 1, 2, 3, or 4, and adds compensatory actions to take when two ABGTS trains are inoperable in MODE 1, 2, 3, or 4.

in the auxiliary building

ITS 3.7.12 is applicable during movement of recently irradiated fuel assemblies in addition to MODE 1, 2, 3, or 4. Since the movement of recently irradiated fuel assemblies can occur in MODES 1, 2, 3, and 4, it is necessary to add an ACTIONS Note stating that LCO 3.0.3 is not applicable because the movement of fuel is independent of reactor operations. This change is acceptable because ITS 3.7.12 ACTIONS B and C will provide compensatory measures to take when two trains of ABGTS are inoperable in MODE 1, 2, 3, or 4. ITS 3.7.12 ACTION B applies when two ABGTS trains are inoperable because of an inoperable ABSCE boundary in MODE 1, 2, 3, or 4 and provides 24 hours to restore the inoperable auxiliary building boundary to OPERABLE status. During these 24 hours, compensatory measures will be taken to protect plant personnel from potential hazards, and preplanned compensatory measures will be in place to address both the intentional and unintentional inoperability of the ABSCE boundary. Furthermore, the 24 hour Completion Time is based on the low probability of a DBA occurring during this time period and the compensatory measures that will be taken. ITS 3.7.12 ACTION C applies when the Required Action and associated Completion Time of Condition B is not met or when two ABGTS trains

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are in operable for reasons other than Condition B in MODE 1, 2, 3, or 4. ITS 3.7.12 ACTION C provides 6 hours to be in MODE 3 and 36 hours to be in MODE 5. This change is acceptable because ITS continues to require the unit to be placed outside of the MODE of Applicability when two ABGTS trains are inoperable in MODE 1, 2, 3, or 4, for reasons other than an inoperable ABSCE boundary, or if one ABGTS train is not restored to an OPERABLE status within 24 hours. This change is designated as less restrictive because the less stringent requirements are being applied in the ITS than were applied in the CTS.

L03 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.7.8.a and 4.9.12.a require the operation of each ABGTS train every 31 days on a STAGGERED TEST BASIS. ITS SR 3.7.12.1 requires the operation of each ABGTS train every 31 days. This changes the CTS by deleting the requirement to perform the verification on a STAGGERED TEST BASIS. (See DOC LA02 for the discussion on moving the 31 day Frequency to the Surveillance Frequency Control Program.)

The purpose of CTS 4.7.8.b and 4.9.12.a is to ensure that ABGTS is OPERABLE. The CTS 1.35 STAGGERED TEST BASIS definition, defines a testing schedule for n systems, subsystems, or trains by dividing the specified test interval into n equal subintervals, with the testing of one system, subsystem, or train occurring at the beginning of each subinterval. In other words, a Surveillance Requirement to verify the OPERABILITY of each train in a two train system at a Frequency of 31 days on a STAGGERED TEST BASIS would result in each train being verified OPERABLE every 31 days, with one train being verified in alternating 15.5 day subintervals. Removal of the STAGGERED TEST BASIS scheduling requirement does not change the requirement to verify the OPERABILITY of each train every 31 days, but rather removes the requirement to schedule testing every 15.5 days. The new Surveillance Frequency will not change the testing Frequency of each train. The intent of the CTS staggered testing requirement is to evenly distribute testing of each ABGTS train across the system. However, as each ABGTS train is independent, no increase in reliability or safety is achieved by evenly staggering the testing subintervals. This change is acceptable, because removal of the staggered testing requirement will increase operational and scheduling flexibility without decreasing safety or system reliability. This change is designated as less restrictive, because the intervals between performances of the Surveillances for the ABGTS trains can be larger or smaller under the ITS than under the CTS.

L04 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.7.8.a and CTS 4.9.12.a require~~s~~ the periodic operation of each ABGTS train for at least 10 hours with the heaters on. ITS SR 3.7.12.1 requires the periodic operation of each ABGTS train for at least 15 continuous minutes with the heaters on. This changes the CTS by reducing the amount of time each ABGTS train is required to be operated.

The purpose of CTS 4.7.8.b and CTS 4.9.12.a is to periodically verify that each train of ABGTS can operate properly. The requirement to operate each train for at least 10 hours per month with the heaters on in order to reduce the buildup of moisture on the adsorbers and HEPA filters was derived from the guidance provided in Regulatory Guide (RG) 1.52, "Design, Testing, and Maintenance Criteria for Post

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Replace with "New" L06.

L06 ~~*(Category 2 – Relaxation of Applicability)* CTS 3.9.12 states that the requirements of the ABGTS are applicable "Whenever irradiated fuel is in the storage pool." CTS 3.9.12 ACTION a requires when no ABGTS is OPERABLE, suspend all operations involving movement of fuel within the spent fuel pit or crane operation with loads over the spent fuel pit until at least one ABGTS train is restored to an OPERABLE stratus. ITS 3.7.12 states, in part, that the requirements of the ABGTS are applicable "During movement of recently irradiated fuel assemblies in the auxiliary building." ITS 3.7.12 ACTION D requires when two ABGTS trains are inoperable during movement of recently irradiated fuel assemblies in the auxiliary building immediately to suspend movement of recently irradiated fuel assemblies in the auxiliary building. This changes the CTS by restricting the ABGTS Specification to only when there is a potential for a fuel handling accident (i.e., during movement of recently irradiated fuel assemblies in the auxiliary building).~~

~~The purpose of CTS 3.9.12 is to ensure the ABGTS is OPERABLE to mitigate the consequences of a fuel handling accident in the auxiliary building. This change is acceptable because the requirements continue to ensure that the structures, system and components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. The Sequoyah Nuclear Plant (SQN) fuel handling analysis for the auxiliary building has been analyzed using the methodology from Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." The SQN fuel handling analysis assumes, in part, that the accident occurs within 100 hours after a plant shutdown, radioactive decay during the interval between shutdown and placement of the first spent fuel assembly into the spent fuel pool is taken into account, and a single fuel assembly is damaged. Additionally, a fuel handling accident is only assumed to occur when a recently irradiated fuel assembly is being moved. Therefore, the ITS imposes the controls on the ABGTS during movement of recently irradiated fuel assemblies in the auxiliary building. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.~~

L07 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.7.8.d.2 requires verification that the filter trains start on a Containment Phase A Isolation test signal. CTS 4.9.12.d.2 requires verification that the filter train starts on a high radiation signal from the fuel pool radiation monitoring system. ITS SR 3.7.12.3 requires verification that each ABGTS train actuates on an actual or simulated actuation signal. This changes the CTS by specifying that the actuation signal may be either actual or simulated. (See DOC LA04 for a discussion of moving the details of the test signal to the Bases.)

The purpose of CTS 4.7.8.d.2 and 4.9.12.d.2 is to verify that each ABGTS train operates correctly upon a receipt of an actuation signal. This change is acceptable because it has been determined that the relaxed Surveillance Requirement acceptance criteria are not necessary for verification that the equipment used to meet the LCO can perform its safety function. Equipment cannot discriminate between an "actual" or "simulated" signal; therefore, the results of testing are unaffected by the type of signal used to initiate the test.

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"New" DOC L06

(Category 2 – Relaxation of Applicability) CTS 3.9.12 states that the requirements of the ABGTS are applicable "Whenever irradiated fuel is in the storage pool." CTS 3.9.12 ACTION a requires when no ABGTS train is OPERABLE, suspend all operations involving movement of fuel within the spent fuel pit or crane operation with loads over the spent fuel pit until at least one ABGTS train is restored to an OPERABLE status. ITS 3.7.12 states, in part, that two ABGTS trains are required to be OPERABLE "During movement of recently irradiated fuel assemblies in the auxiliary building." ITS 3.7.12 ACTION A requires one inoperable ABGTS train to be restored to an OPERABLE status in 7 days. ITS 3.7.12 ACTION D provides actions to either place a train of ABGTS in operation or suspend movement of recently irradiated fuel assemblies in the auxiliary building if the Required Actions and associated Completion Time of Condition A are not met. ITS 3.7.12 ACTION E requires when two ABGTS trains are inoperable during movement of recently irradiated fuel assemblies in the auxiliary building immediately to suspend movement of recently irradiated fuel assemblies in the auxiliary building. This changes the CTS by restricting the ABGTS Specification to only when ABGTS is required to mitigate a fuel handling accident (i.e., during movement of recently irradiated fuel assemblies in the auxiliary building).

The purpose of CTS 3.9.12 is to ensure the ABGTS is OPERABLE to mitigate the consequences of a fuel handling accident in the auxiliary building. This change is acceptable because the requirements continue to ensure that the structures, system and components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. The Sequoyah Nuclear Plant (SQN) fuel handling analysis for the auxiliary building has been analyzed using the methodology from Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." The SQN fuel handling analysis inside the auxiliary building assumes, in part, that the accident occurs 100 hours after a plant shutdown, radioactive decay during the interval between shutdown and placement of the first spent fuel assembly into the spent fuel pool is taken into account, and a single fuel assembly is damaged. The damaged fuel assembly is assumed to be the highest powered assembly in the core region to be discharged with a radial peaking factor of 1.70. All of the gap activity in the damaged rods is released to the spent fuel pool and consists of 5% of the total noble gases other than Kr-85, 10% of the Kr-85, 5% of the toal radioactive iodine other than I-131, and 8% of the I-131 in the rods at the time of the accident. Noble gases released to the spent fuel pool do not experience retention in the water pool. The iodine gap inventory is composed of 99.85% inorganic species, and 0.15% organic species. The spent fuel pool decontamination factor is 200. No credit is taken for natural decay due to holdup in the auxiliary building or after the activity has been released to the atmosphere. The activity released from the spent fuel pool is all assumed to be released to the environment over a 2-hour period. Doses were determined at the EAB and LPZ for the 2-hour interval over which the releases are assumed to take place, and in the control room for an extended period of time after termination of releases in order to address the continual presence of activity in the control room atmosphere. The accident doses were calculated using the dose model consistent with the use of the alternate source term methodology (RG 1.183). The doses are within the dose acceptance limits of 6.3 rem TEDE for offsite doses and 5.0 rem TEDE for control room doses. Because ABGTS is not credited in the mitigation of a fuel handling accident in the auxiliary building involving fuel that has at least 100 hours of decay time, it is not required to be OPERABLE during that evolution. However, fuel movement could still proceed prior to a decay time of 100 hours. Therefore, to mitigate the consequences of a fuel handling accident involving the movement of recently irradiated fuel, ITS imposes the controls on the ABGTS during movement of recently irradiated fuel assemblies in the auxiliary building. Consistent with NUMARC 93-01, "Safety Assessment for Removal of Equipment from Service During Shutdown Conditions," TVA will

implement procedural requirements for a single normal or contingency method to promptly close primary or secondary containment penetrations. Additionally, TVA will implement procedural requirements for one train of ABGTS to be OPERABLE during movement of irradiated fuel assemblies (whether in the auxiliary building or within the containment). This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

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This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

L08 *(Category 1 - Relaxation of LCO Requirements)* CTS 3.9.4 states that one train of ABGTS is required to be OPERABLE with both doors of one or both containment personnel airlock(s) open "During movement of irradiated fuel within the containment." ITS 3.7.12 states, in part, that two trains of ABGTS are required to be OPERABLE "During movement of recently irradiated fuel assemblies in the auxiliary building." This changes the CTS by restricting the ABGTS requirement to only when ABGTS is required to mitigate a design basis fuel handling accident (FHA) (i.e., during movement of recently irradiated fuel assemblies in the auxiliary building).

The purpose of CTS 3.9.4 is to ensure the ABGTS is OPERABLE to mitigate a FHA in the auxiliary building. Although ABGTS is not credited in the mitigation of a FHA within the containment, the requirement for one train of ABGTS to be OPERABLE was added to the CTS with Amendments 209 and 199 for Units 1 and 2, respectively (ADAMS Accession number ML013320204). The amendments allowed both doors in one or both containment personnel airlock(s) to be open during core alterations and during the movement of irradiated fuel within the containment, provided one door in each airlock is capable of closure and one train of ABGTS remains OPERABLE. The change to restrict the ABGTS requirement to only when the system is required to mitigate a design basis FHA is acceptable because the requirements continue to ensure that the structures, system and components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. The Sequoyah Nuclear Plant (SQN) fuel handling accident has been analyzed using the methodology from Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." For the FHA within the containment, the time after shutdown is assumed to be 100 hours. The containment equipment hatch and personnel air locks may be open during fuel handling operations, and although the purge line would be quickly isolated, activity release is assumed to continue through these open penetrations. The accident postulates that a spent fuel assembly is dropped after refueling. All of the fuel rods in the assembly are assumed to rupture, releasing the radionuclides within the reactor cavity water. Fission products released from the damaged fuel are decontaminated by passage through the reactor cavity water. The fission products released are exhausted by the building purge system. On detection of increased radiation levels in the containment, the purge system automatically isolates (assumed 300 seconds following accident). After purge is isolated, the remaining fission products in the containment are assumed to leak to the environment through containment penetrations within 2 hours with no credit for holdup, dilution, or filtration of the release. The accident doses are within the acceptable dose limits of 6.3 rem TEDE for offsite doses (RG 1.183) and 5.0 rem TEDE for control room dose (GDC 19). Therefore, the removal of the requirement for one train of ABGTS to be OPERABLE with both doors of one or both personnel airlocks open during movement of irradiated fuel assemblies in the containment is justified. Consistent with NUMARC 93-01, "Safety Assessment for Removal of Equipment from Service During Shutdown Conditions," TVA will implement procedural requirements for a single normal or contingency method to promptly close primary or secondary containment penetrations. Additionally, TVA will implement procedural requirements for one train of ABGTS to be OPERABLE during movement of irradiated fuel assemblies (whether in the auxiliary building or within the containment). This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

CTS

ABGTS ~~FBACS~~ 1
3.7.~~13~~ 12

3.7 PLANT SYSTEMS

3.7.~~13~~ 12 Auxiliary Building Gas Treatment ~~Fuel Building Air Cleanup~~ System ABGTS ~~(FBACS)~~ 1

3.7.8
3.9.12

LCO 3.7.~~13~~ 12 Two ABGTS ~~FBACS~~ trains shall be OPERABLE. 1

DOC L01
~~3.9.12~~

Auxiliary Building Secondary Containment Enclosure (ABSCE) ~~S~~

---NOTE--- 3 ~~2~~

~~1.~~ The ~~fuel building~~ boundary may be opened intermittently under administrative control.

~~INSERT 1~~

3.7.8 Applicability, 3.9.12 Applicability

APPLICABILITY: ~~[~~MODES 1, 2, 3, and 4, ~~]~~
During movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building. 4 3

ACTIONS

DOC L02, 3.9.12 ACTION b

---NOTE---
LCO 3.0.3 is not applicable.

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.7.8 ACTION DOC L06	A. One ABGTS ~~FBACS~~ train inoperable ~~in MODE 1, 2, 3, or 4~~.	A.1 Restore ABGTS ~~FBACS~~ train to OPERABLE status.	7 days	1 ~~2~~
DOC L02	B. Two ABGTS ~~FBACS~~ trains inoperable due to inoperable ABSCE ~~fuel building~~ boundary ~~in MODE 1, 2, 3, or 4~~.	B.1 Restore ABSCE ~~fuel building~~ boundary to OPERABLE status.	24 hours	1 3

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2

~~INSERT 1~~

~~3.9.12~~ ~~2. Only one ABGTS train is required to be OPERABLE during movement of recently irradiated fuel assemblies in the auxiliary building.~~

CTS

ABGTS ~~FBACS~~ 3.7.~~13~~ 12 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.7.8 ACTION C. ~~[~~Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4. OR DOC L02 Two ABGTS ~~FBACS~~ trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 4 36 hours ~~]~~ 4 1
DOC L06 ~~D. Required Action and associated Completion Time [of Condition A] not met during movement of [recently] irradiated fuel~~ auxiliary ~~assemblies in the fuel building.~~	~~D.1 Place OPERABLE FBACS~~ ABGTS ~~train in operation.~~ ~~OR~~ ~~D.2 Suspend movement of [recently] irradiated fuel assemblies in the fuel~~ auxiliary ~~building.~~	Keep, with changes indicated in black. ~~Immediately~~ ~~Immediately~~ 1 4 ~~2~~ 4 3 4 3
3.9.12 ACTION a E D ~~E~~. ~~One required~~ two ~~Two FBACS~~ ABGTS trains inoperable during movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building.	E D ~~E~~.1 Suspend movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building.	Immediately ~~2~~ 1 4 4 3 3

CTS

ABGTS ~~FBACS~~ 1
3.7.~~13~~ 12

3.7 PLANT SYSTEMS

3.7.~~13~~ 12 Auxiliary Building Gas Treatment ~~Fuel Building Air Cleanup~~ System ABGTS ~~(FBACS)~~ 1

3.7.8
3.9.12

LCO 3.7.~~13~~ 12 Two ABGTS ~~FBACS~~ trains shall be OPERABLE. 1

DOC L01
~~3.9.12~~

------------------------------------NOTE------------------------------------ ~~S~~ 3 ~~2~~
~~1.~~ The Auxiliary Building Secondary Containment Enclosure (ABSCE) ~~fuel building~~ boundary may be opened intermittently under administrative control.
~~INSERT 1~~

3.7.8 Applicability, 3.9.12 Applicability

APPLICABILITY: ~~[~~MODES 1, 2, 3, and 4, ~~]~~ 4 3
During movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the auxiliary ~~fuel~~ building.

ACTIONS

DOC L02, 3.9.12 ACTION b

------------------------------------NOTE------------------------------------
LCO 3.0.3 is not applicable.

3.7.8 ACTION
DOC L06

DOC L02

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ABGTS ~~FBACS~~ train inoperable~~, In MODE 1, 2, 3, or 4~~.	A.1 Restore ABGTS ~~FBACS~~ train to OPERABLE status.	7 days
B. Two ABGTS ~~FBACS~~ trains inoperable due to inoperable ABSCE ~~fuel building~~ boundary ~~in MODE 1, 2, 3, or 4~~.	B.1 Restore ABSCE ~~fuel building~~ boundary to OPERABLE status.	24 hours

1 ~~2~~

1 3

~~2~~

~~INSERT 1~~

~~3.9.12~~ ~~2. Only one ABGTS train is required to be OPERABLE during movement of recently irradiated fuel assemblies in the auxiliary building.~~

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CTS

ABGTS ~~FBACS~~ 3.7.~~13~~ 12 (1)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.7.8 ACTION C. ~~[~~ Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4. OR DOC L02 Two ~~FBACS~~ ABGTS trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours (4) 36 hours ~~]~~ (4) (1)
DOC L06 ~~D. Required Action and associated Completion Time [of Condition A] not met during movement of [recently] irradiated fuel assemblies in the fuel building.~~ auxiliary	~~D.1 Place OPERABLE FBACS train in operation.~~ ABGTS ~~OR~~ ~~D.2 Suspend movement of [recently] irradiated fuel assemblies in the fuel building.~~ auxiliary	~~Immediately~~ ~~Immediately~~ Keep, with changes indicated in black. 1 4 4 3 4 3
3.9.12 ACTION a ~~E.~~ D E. ~~Two~~ ~~One required~~ two ~~FBACS~~ ABGTS trains s inoperable during movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building.	~~E~~ D E.1 Suspend movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building.	Immediately (1) (4) (4) (3) (3)

JUSTIFICATION FOR DEVIATIONS
ITS 3.7.12, AUXILIARY BUILDING GAS TREATMENT SYSTEM (ABGTS)

1. Sequoyah Nuclear Plant (SQN) design does not include the ISTS 3.7.12, "Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)." Therefore, ISTS 3.7.13, "Fuel Building Air Cleanup System (FBACS)" has been renumbered as ITS 3.7.12. Additionally, SQN refers to the Fuel Building Air Cleanup System (FBACS) as the Auxiliary Building Gas Treatment System (ABGTS).

   Not used.

2. ~~ISTS 3.7.13 ACTION A has been revised to only apply in MODES 1, 2, 3, or 4 and ACTION D has been deleted, as the SQN current licensing basis only credits one train of ABGTS to mitigate a fuel handling accident involving the movement of recently irradiated fuel assemblies in the auxiliary building. Therefore, the only applicable ACTION for the required ABGTS train being inoperable during the movement of recently irradiated fuel assemblies in the auxiliary building is ISTS 3.7.13 ACTION E (ITS 3.7.12 ACTION D).~~

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

4. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

5. ISTS SR 3.7.13.1, SR 3.7.13.3 and SR 3.7.13.4 (ITS SR 3.7.12.1, SR 3.7.12.3 and SR 3.7.12.4, respectively) provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

6. Changes made for consistency with the Applicability of the ABGTS actuation functions provided in ITS 3.3.8.

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ABGTS ~~FBACS~~ 1
B 3.7.~~13~~ 12

BASES

APPLICABLE SAFETY ANALYSES (continued)

~~material provided by the one remaining train of this filtration system.~~ The amount of fission products available for release from the ~~fuel handling~~ auxiliary building is determined for a fuel handling accident and for a LOCA. ~~[~~Due to radioactive decay, ~~FBACS~~ ABGTS is only required to isolate during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous ~~[X] days~~ 100 hours).~~]~~ These assumptions and the analysis follow the guidance provided in Regulatory Guide ~~1.25~~ 1.183 (Ref. ~~4~~ 3). 2 1 3 1 3 2

The ~~FBACS~~ ABGTS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). 1

LCO

Two independent and redundant trains of the ~~FBACS~~ ABGTS are required to be OPERABLE to ensure that at least one train is available, assuming a single failure that disables the other train, coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the ~~fuel handling~~ auxiliary building exceeding the 10 CFR 100 (Ref. ~~5~~ 4) limits in the event of a ~~fuel handling accident [involving handling recently irradiated fuel]~~ LOCA. INSERT 2 1 1 2 2

The ~~FBACS~~ ABGTS is considered OPERABLE when the individual components necessary to control exposure in the ~~fuel handling~~ auxiliary building are OPERABLE in both trains. An ~~FBACS~~ ABGTS train is considered OPERABLE when its associated: 1

a. Fan is OPERABLE,

b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function, and

c. Heater, ~~demister,~~ ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained. 1

The LCO is modified by ~~a Note allowing~~ ~~two Notes. Note 1 allows~~ a Note allowing the ~~fuel building~~ Auxiliary Building Secondary Containment Enclosure (ABSCE) boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for ~~fuel~~ auxiliary building isolation is indicated. 1 1

~~INSERT 3~~ ~~4~~

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2

INSERT 2

One train of the ABGTS is required to be OPERABLE to mitigate the consequences of a fuel handling accident involving handling recently irradiated fuel to limit releases to the environment to within the 10 CFR 50.67 limits.

~~4~~

~~**INSERT 3**~~

~~Note 2 specifies that only one ABGTS train is required to be OPERABLE during the movement of recently irradiated fuel assemblies in the auxiliary building.~~

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BASES

APPLICABILITY

In MODE 1, 2, 3, or 4, the ~~FBACS~~ ABGTS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA and leakage from containment and annulus.

In MODE 5 or 6, the ~~FBACS~~ ABGTS is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

During movement of ~~[~~recently~~]~~ irradiated fuel in the ~~fuel handling area~~ auxiliary building, the ~~FBACS~~ ABGTS is required to be OPERABLE to alleviate the consequences of a fuel handling accident.

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

A.1

With one ~~FBACS~~ ABGTS train inoperable~~, in MODE 1, 2, 3, or 4~~ action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the ~~FBACS~~ ABGTS function. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable ~~FBACS~~ ABGTS train, and the remaining ~~FBACS~~ ABGTS train providing the required protection.

B.1

~~-----REVIEWER'S NOTE-----~~
~~Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.~~
~~----------~~

If the ~~fuel building~~ ABSCE boundary is inoperable in MODE 1, 2, 3, or 4, the ~~FBACS~~ ABGTS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE ~~fuel building~~ ABSCE boundary within 24 hours. During the period that the ~~fuel building~~ ABSCE boundary is inoperable, appropriate compensatory measures ~~[~~consistent with the intent, as

BASES

ACTIONS (continued)

applicable, of GDC 19, 60, 61, 63, 64 and 10 CFR Part 100~~]~~ should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the ~~fuel building~~ ABSCE boundary.

~~[~~ C.1 and C.2

In MODE 1, 2, 3, or 4, when Required Action A.1 or B.1 cannot be completed within the associated Completion Time, or when both ~~FBACS~~ ABGTS trains are inoperable for reasons other than an inoperable ~~fuel building~~ ABSCE boundary (i.e., Condition B), 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 MODE 3 within 6 hours, and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. ~~]~~

Keep with changes marked in black.

~~D.1 and D.2~~

~~When Required Action A.1 cannot be completed within the required Completion Time, during movement of [recently] irradiated fuel assemblies in the fuel building, the OPERABLE FBACS train must be started immediately or [recently] irradiated fuel movement suspended. This action ensures that the remaining train is OPERABLE, that no undetected failures preventing system operation will occur, and that any active failure will be readily detected.~~

auxiliary

ABGTS

~~If the system is not placed in operation, this action requires suspension of [recently] irradiated fuel movement, which precludes a fuel handling accident [involving handling recently irradiated fuel]. This does not preclude the movement of fuel assemblies to a safe position.~~

ABGTS ~~FBACS~~ 1
B 3.7.~~13~~ 12

BASES

ACTIONS (continued)

E D ~~E~~.1

When ~~two~~ two trains ~~of~~ S ~~the FBACS are~~ the required ABGTS ~~is~~ are inoperable during movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building, action must be taken to place the unit in a condition in which the LCO does not apply. Action must be taken immediately to suspend movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building. This does not preclude the movement of fuel to a safe position. 4 2 3 1 3 1

SURVEILLANCE REQUIREMENTS

SR 3.7.~~13~~ 12.1 1

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

3 INSERT 4 ~~Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for ≥10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥15 minutes to demonstrate the function of the system.] [The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.~~ TSTF-522 6

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~REVIEWER'S NOTE~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~]~~ 5

~~[~~ SR 3.7.~~13~~ 12.2 3

This SR verifies that the required ~~FBACS~~ ABGTS testing is performed in accordance with the ~~[~~Ventilation Filter Testing Program (VFTP)~~]~~. The ~~[~~VFTP~~]~~ includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the ~~[~~VFTP~~]~~. ~~]~~ 2 3 3

TSTF-522

INSERT ~~4~~ 3

Operation [with heaters on] for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that [heater failure,] blockage, fan or motor failure, or excessive vibration can be detected for corrective action. 3 3

Operation will be demonstrated by initiating, from the control room, flow through the HEPA filter and charcoal adsorber train. 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~[~~ SR 3.7.~~13~~ 12.3

This SR verifies that each ~~FBACS~~ ABGTS train starts and operates on an actual or simulated actuation signal. INSERT ~~5~~ 4 ~~[The [18] month Frequency is consistent with Reference 6.]~~

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~

SR 3.7.~~13~~ 12.4

This SR verifies the integrity of the ~~fuel~~ auxiliary building enclosure (i.e., spent fuel storage area and the ESF pump rooms). The ability of the ~~fuel~~ auxiliary building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the ~~FBACS~~ ABGTS. During the ~~[~~post accident~~]~~ mode of operation, the ~~FBACS~~ ABGTS is designed to maintain a slight negative pressure in the ~~fuel~~ auxiliary building, to prevent unfiltered LEAKAGE. The ~~FBACS~~ ABGTS is designed to maintain a ≤ ~~[-0.125]~~ - 0.25 inches water gauge with respect to atmospheric pressure at a flow rate ~~of [20,000]~~ ≥ 8,100 and ≤ 9,900 cfm to the ~~fuel~~ auxiliary building. ~~[The Frequency of [18] months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 7).~~

~~An [18] month Frequency (on a STAGGERED TEST BASIS) is consistent with Reference 6.~~

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

6

INSERT ~~5~~ 4

The SR is modified by two Notes that specify when verification of ABGTS actuation for each actuation signal is required to be met. ABGTS actuation on a Containment Phase A isolation signal is required to be met in MODES 1, 2, 3 and 4. ABGTS actuation on fuel storage pool area high radiation signal is required to be met during movement of recently irradiated fuel assemblies in the auxiliary building.

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BASES

APPLICABLE SAFETY ANALYSES (continued)

~~material provided by the one remaining train of this filtration system.~~ The amount of fission products available for release from the auxiliary ~~fuel handling~~ building is determined for a fuel handling accident and for a LOCA. ~~[~~Due to radioactive decay, ABGTS ~~FBACS~~ is only required to isolate during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours ~~[X] days~~).~~]~~ These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.183 ~~1.25~~ (Ref. 3 ~~4~~). (2) (1) (3) (1) (3) (2)

The ABGTS ~~FBACS~~ satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). (1)

LCO

Two independent and redundant trains of the ABGTS ~~FBACS~~ are required to be OPERABLE to ensure that at least one train is available, assuming a single failure that disables the other train, coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the auxiliary ~~fuel handling~~ building exceeding the 10 CFR 100 (Ref. 4 ~~5~~) limits in the event of a LOCA ~~fuel handling accident [involving handling recently irradiated fuel]~~. INSERT 2 (1) (1) (2) (2)

The ABGTS ~~FBACS~~ is considered OPERABLE when the individual components necessary to control exposure in the auxiliary ~~fuel handling~~ building are OPERABLE in both trains. An ABGTS ~~FBACS~~ train is considered OPERABLE when its associated: (1)

a. Fan is OPERABLE,

b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function, and

c. Heater, ~~demister,~~ ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained. (1)

a Note allowing ~~two Notes. Note 1 allows~~

The LCO is modified by ~~a Note allowing~~ the Auxiliary Building Secondary Containment Enclosure (ABSCE) ~~fuel building~~ boundary to be opened intermittently under administrative controls. For entry and exit through doors the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for auxiliary ~~fuel~~ building isolation is indicated. (1) (1)

~~INSERT 3~~ ~~(4)~~

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2

INSERT 2

One train of the ABGTS is required to be OPERABLE to mitigate the consequences of a fuel handling accident involving handling recently irradiated fuel to limit releases to the environment to within the 10 CFR 50.67 limits.

~~4~~

~~**INSERT 3**~~

~~Note 2 specifies that only one ABGTS train is required to be OPERABLE during the movement of recently irradiated fuel assemblies in the auxiliary building.~~

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BASES

APPLICABILITY

In MODE 1, 2, 3, or 4, the ~~FBACS~~ ABGTS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA and leakage from containment and annulus. 1

In MODE 5 or 6, the ~~FBACS~~ ABGTS is not required to be OPERABLE since the ECCS is not required to be OPERABLE. 1

During movement of ~~[~~recently~~]~~ irradiated fuel in the ~~fuel handling area~~ auxiliary building, the ~~FBACS~~ ABGTS is required to be OPERABLE to alleviate the consequences of a fuel handling accident. 3 2 1

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

A.1

With one ~~FBACS~~ ABGTS train inoperable, ~~in MODE 1, 2, 3, or 4~~ action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the ~~FBACS~~ ABGTS function. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable ~~FBACS~~ ABGTS train, and the remaining ~~FBACS~~ ABGTS train providing the required protection. ~~4~~ 1

B.1

~~-----------------------------------REVIEWER'S NOTE-------------------------~~
~~Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.~~
~~--~~ 5

If the ~~fuel building~~ ABSCE boundary is inoperable in MODE 1, 2, 3, or 4, the ~~FBACS~~ ABGTS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE ~~fuel building~~ ABSCE boundary within 24 hours. During the period that the ~~fuel building~~ boundary is inoperable, appropriate compensatory measures ~~[~~consistent with the intent, as 1 3

BASES

ACTIONS (continued)

applicable, of GDC 19, 60, 61, 63, 64 and 10 CFR Part 100~~]~~ should be utilized to protect plant personnel from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the ~~fuel building~~ ABSCE boundary.

~~[~~ C.1 and C.2

In MODE 1, 2, 3, or 4, when Required Action A.1 or B.1 cannot be completed within the associated Completion Time, or when both ~~FBACS~~ ABGTS trains are inoperable for reasons other than an inoperable ~~fuel building~~ ABSCE boundary (i.e., Condition B), 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 MODE 3 within 6 hours, and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. ~~]~~

Keep with changes marked in black.

~~D.1 and D.2~~

~~When Required Action A.1 cannot be completed within the required Completion Time, during movement of [recently] irradiated fuel assemblies in the fuel building, the OPERABLE FBACS train must be started immediately or [recently] irradiated fuel movement suspended. This action ensures that the remaining train is OPERABLE, that no undetected failures preventing system operation will occur, and that any active failure will be readily detected.~~

~~If the system is not placed in operation, this action requires suspension of [recently] irradiated fuel movement, which precludes a fuel handling accident [involving handling recently irradiated fuel]. This does not preclude the movement of fuel assemblies to a safe position.~~

auxiliary ABGTS

ABGTS ~~FBACS~~
B 3.7.~~13~~ 12

BASES

ACTIONS (continued)

E ~~D~~ ~~E~~.1

When ~~two~~ two trains ~~of~~ the required ~~the FBACS are~~ S ABGTS is are inoperable during movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building, action must be taken to place the unit in a condition in which the LCO does not apply. Action must be taken immediately to suspend movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building. This does not preclude the movement of fuel to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.7.~~13~~ 12.1

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

3 INSERT ~~4~~

~~Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for ≥10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥15 minutes to demonstrate the function of the system.] [The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.~~

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~------]~~

~~[~~ SR 3.7.~~13~~ 12.2

This SR verifies that the required ~~FBACS~~ ABGTS testing is performed in accordance with the ~~[~~Ventilation Filter Testing Program (VFTP)~~]~~. The ~~[~~VFTP~~]~~ includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the ~~[~~VFTP~~]~~. ~~]~~

TSTF-522

3

INSERT ~~4~~

Operation ~~[~~with heaters on~~]~~ for ≥ 15 continuous minutes demonstrates OPERABILITY of the system. Periodic operation ensures that ~~[~~heater failure,~~]~~ blockage, fan or motor failure, or excessive vibration can be detected for corrective action. 3 3

Operation will be demonstrated by initiating, from the control room, flow through the HEPA filter and charcoal adsorber train. 2

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BASES

SURVEILLANCE REQUIREMENTS (continued)

~~[~~ SR 3.7.~~13~~ 12.3 3 1

This SR verifies that each ~~FBACS~~ ABGTS train starts and operates on an actual or simulated actuation signal. INSERT ~~5~~ 4 ~~[The [18] month Frequency is consistent with Reference 6.]~~ 1 4 6

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~REVIEWER'S NOTE~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~]~~ 5

SR 3.7.~~13~~ 12.4 1

This SR verifies the integrity of the ~~fuel~~ auxiliary building enclosure (i.e., spent fuel storage area and the ESF pump rooms). The ability of the ~~fuel~~ auxiliary building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the ~~FBACS~~ ABGTS. During the ~~[~~post accident~~]~~ mode of operation, the ~~FBACS~~ ABGTS is designed to maintain a slight negative pressure in the ~~fuel~~ auxiliary building, to prevent unfiltered LEAKAGE. The ~~FBACS~~ ABGTS is designed to maintain a ≤ - 0.25 ~~[-0.125]~~ inches water gauge with respect to atmospheric pressure at a flow rate ~~of [20,000]~~ ≥ 8,100 and ≤ 9,900 cfm to the ~~fuel~~ auxiliary building. ~~[The Frequency of [18] months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 7).~~ 2 1 3 3 1

~~An [18] month Frequency (on a STAGGERED TEST BASIS) is consistent with Reference 6.~~ 6

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

6

INSERT ~~5~~ 4

The SR is modified by two Notes that specify when verification of ABGTS actuation for each actuation signal is required to be met. ABGTS actuation on a Containment Phase A isolation signal is required to be met in MODES 1, 2, 3 and 4. ABGTS actuation on fuel storage pool area high radiation signal is required to be met during movement of recently irradiated fuel assemblies in the auxiliary building.

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Licensee Response/NRC Response/NRC Question Closure

Id	**399**
NRC Question Number	**RPG-001**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation. The change to recently irradiated fuel will be addressed under the AST review, and further questions on this will be included in the AST RAIs**
Question Closure Date	**12/16/2014**
Notification	**Mark Blumberg** **Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**12/16/2014 12:56 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**62**
NRC Question Number	**RPG-002**
Category	**Technical**
ITS Section	**3.9**
ITS Number	
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**SQN's Current Technical Specifications specify requirements for LCOs 3/4.9.11 "Spent Fuel Pit Water Level,' and 3/4.9.12 'Auxiliary Building Gas Treatment System.' The Staff's review of Enclosure 2, Volume 14 (Revision 0), ITS Section 3.9, 'Refueling Operations,' in SQN's conversion application found no discussion of these LCOs. Please explain.**
Attach File 1	
Attach File 2	
Issue Date	**5/13/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**5/13/2014 3:18 PM**
Notification	**Scott Bowman Michelle Conner Robert Elliott Ravinder Grover Khadijah Hemphill Andrew Hon Ray Schiele**

Licensee Response/NRC Response/NRC Question Closure

Id	**92**
NRC Question Number	**RPG-002**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**In response to RPG-002, with respect to the disposition of CTS 3/4.9.11, "Spent Fuel Pit Water Level," the requirements of CTS 3/4.9.11 (with an Applicability of "Whenever irradiated fuel assemblies are in the spent fuel pit") have been included in ITS 3.7.13, "Spent Fuel Pool Water Level," (with an Applicability of "During movement of irradiated fuel assemblies in the spent fuel pool"). The change in Applicability from "Whenever irradiated fuel assemblies are in the spent fuel pit," to "During movement of irradiated fuel assemblies in the spent fuel pool," is discussed in ITS 3.7.13 discussion of change (DOC) L01.** **With respect to the disposition of CTS 3/4.9.12, "Auxiliary Building Gas Treatment System," the requirements of CTS 3/4.9.12 (with an Applicability of "Whenever irradiated fuel is in the storage pool") have been included with the requirements of CTS 3/4.7.8, "Auxiliary Building Gas Treatment System," (with an Applicability of "MODES 1, 2, 3, and 4") to form ITS 3.7.12, "Auxiliary Building Gas Treatment System," (with an Applicability of "MODES 1, 2, 3, and 4, and During movement of recently irradiated fuel assemblies in the auxiliary building"). The change in Applicability from "Whenever irradiated fuel is in the storage pool," to "During movement of recently irradiated fuel assemblies in the auxiliary building," is discussed in ITS 3.7.12 DOC L06.**
Response Date/Time	**6/4/2014 10:40 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/4/2014 9:37 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**271**
NRC Question Number	**RPG-002**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/20/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/20/2014 1:03 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**63**
NRC Question Number	**RPG-003**
Category	**Technical**
ITS Section	**3.9**
ITS Number	**3.9.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

SQN Units 1 and 2 Current Technical Specifications (CTS) LCOs 3/4.9.1,"Boron Concentration," 3/4.9.2, "Instrumentation," and 3/4.9.8, "Residual Heat Removal And Coolant Circulation," address limiting conditions for refueling operations. When a requirement of any of these LCOs is not satisfied, one of the REQUIRED ACTIONS is to immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SQN's proposed changes to these LCOs delete REQUIRED ACTION for CORE ALTERATIONS operations in accordance with Standard Technical Specifications (STS, NUREG-1431, Revision 4). STS incorporated the Staff approved Technical Specification Task Force (TSTF) traveler TSTF-471 Revision 1, "Eliminate Use Of Term Core Alterations In Actions And Notes," which deleted reference to the term Core Alteration from the Specifications.

During a review of certain plant-specific license amendments requesting adoption of TSTF-471 and other related TSTFs, (such as, TSTFs-51 and 286), the Staff identified certain concerns with these TSTF's changes. The NRC staff's concerns relate to core monitoring instrumentation and dose consequences. <u>Specifically</u>, during core alterations (i.e., movement of fuel), there is the potential for operable neutron detectors to become effectively decoupled from the fuel assemblies being monitored. The NRC staff is concerned that the removal of the words CORE ALTERATIONS from

the TS LCO for source range monitors may create a situation where a boron dilution accident, misloaded fuel assembly, or an increase in neutron flux might go undetected. Secondly, the Staff is concerned that a dropped source, fuel assembly, or component (or any other item allowed to be moved by CORE ALTERATIONS) could damage a fuel assembly or break creating a radioactive source term. Additionally, a dropped source, component, or fuel assembly could add reactivity if it is dropped over or in the vicinity of other fuel.

The Staff is currently pursuing with the industry for a resolution to these concerns (for details, please refer to the Staff's letter, dated October 7, 2013, (Agencywide Documents Access and Management System (ADAMS) Accession No ML13246A358). The letter suggested to the industry that licensees should not submit amendments to adopt these three Travelers until a final resolution is achieved.

Therefore, the Staff requests the SQN licensee to withdraw the requested changes associated with TSTFs-51and 471, 'core alterations,' related changes from its conversion since at this time, there is no definite timeframe by which the concerns will be resolved.

Attach File 1	
Attach File 2	
Issue Date	**5/13/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**5/13/2014 3:30 PM**
Notification	**Scott Bowman Kristy Bucholtz Robert Elliott Ravinder Grover Matthew Hamm Khadijah Hemphill Andrew Hon Ray Schiele Carl Schulten**

Licensee Response/NRC Response/NRC Question Closure

Id	**102**
NRC Question Number	**RPG-003**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**In response to RPG-003, the following information is provided to address the staff's concerns related to removal of the Required Action to suspend CORE ALTERATIONS with an inoperable source range neutron flux monitor:**

TSTF-51 removed the Technical Specifications (TS) requirements for certain systems to be OPERABLE from the Improved Standard Technical Specifications (ISTS) after sufficient radioactive decay has occurred to ensure the projected offsite dose from a fuel handling accident will be less than a small fraction of the 10 CFR 100 limit. To support this change in requirements during the handling of irradiated fuel, the OPERABILITY requirements during CORE ALTERATIONS were deleted. TSTF-51 eliminated all uses of the defined term CORE ALTERATIONS from Applicability statements and most uses of CORE ALTERATIONS in Required Actions in the ISTS. However, TSTF-51 did not make changes to NUREG-1431, LCO 3.9.3, "Nuclear Instrumentation."

TSTF-286 replaced the TS Required Action to suspend positive reactivity additions with one inoperable source range neutron flux monitor inoperable with a Required Action to suspend operations that would cause an introduction of coolant into the RCS with boron concentration less than required to meet the boron concentration of LCO 3.9.1. This change was necessary to address the fact that during conditions in which these Required Actions may be required, various unit operations such as maintaining RCS inventory and controlling RCS temperature must be continued. These activities necessarily involve additions to the RCS of cooler water (a positive reactivity effect in most cases) and may involve inventory makeup from sources that are at boron concentrations less than RCS concentration. These activities should not be precluded if the worst-case overall effect on the core would still assure SHUTDOWN MARGIN (SDM) (or the required refueling boron concentration) is maintained. Therefore, the proposed changes provide the flexibility necessary to provide for continued safe reactor operations, while also limiting any potential for excess positive reactivity addition. However, TSTF-286 did not remove the NUREG-1431, LCO 3.9.3 Required Action to suspend CORE ALTERATIONS with one inoperable source range neutron flux monitor inoperable.

TSTF-471 replaced the TS 3.9.3 Required Action to suspend CORE ALTERATIONS with one inoperable source range neutron flux monitor inoperable with a Required Action to suspend positive reactivity additions. Since CORE ALTERATIONS only occur when the reactor vessel head is removed, it only applies in MODE 6. For SQN, the only credible accident during MODE 6 is a fuel handling accident (FHA). A FHA is initiated by the dropping of an irradiated fuel assembly, either in the

containment or in the auxiliary building. The suspension of CORE ALTERATIONS, except for the suspension of movement of irradiated fuel, will not prevent or impair the mitigation of a fuel handling accident.

Per UFSAR Section 15.2.4.2, an uncontrolled boron dilution accident is not credible during refueling. ITS 3.9.2, "Unborated Water Source Isolation Valves," requires that while in MODE 6, all isolation valves in a specified combination for reactor makeup water sources containing unborated water that are connected to the RCS must be closed to prevent unplanned boron dilution of the reactor coolant. These valves will block the significant dilution flow paths which could allow unborated makeup to reach the RCS. Therefore, the possibility of an inadvertent boron dilution event occurring in MODE 6 refueling operations is precluded by adherence to LCO 3.9.2 and the availability of source range neutron flux monitors to alert operators to a possible boron dilution event is irrelevant.

With regard to misloaded fuel assemblies, fuel assembly loading errors are prevented by administrative procedures implemented during core loading. To reduce the probability of core loading errors, each fuel assembly is marked with an identification number and loaded in accordance with a core loading diagram. During core loading the identification number will be checked before each assembly is moved into the core. Serial numbers read during fuel movement are subsequently recorded on the loading diagram as a further check on proper placing after the loading is completed. The power distortion due to any combination of misplaced fuel assemblies would significantly raise peaking factors and would be readily observable with in-core flux monitors. In addition to the flux monitors, thermocouples are located at the outlet of about one third of the fuel assemblies in the core. There is a high probability that these thermocouples would also indicate any abnormally high coolant enthalpy rise. In-core flux measurements are taken during the startup subsequent to every refueling operation. To address the possibility of a misloaded fuel assembly, ITS 3.9.3, Required Action A.1 suspends positive reactivity additions if one source range neutron flux monitor is inoperable. This precludes movement of fuel assemblies which could add reactivity to the core.

Lastly, as stated in 10 CFR 50.36(b), "The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to § 50.34." As discussed above, the suspension of CORE ALTERATIONS with an inoperable source range neutron flux monitor is not based on the analyses in the safety analysis report. Therefore, removal of this Required Action is justified.

Response Date/Time	**6/6/2014 6:40 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**

Date Added	**6/6/2014 5:36 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**272**
NRC Question Number	**RPG-003**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Regarding TVA's proposed changes related to the adoption of TSTFs-51, -286 and -471, in a 8/12/14 meeting between the NRC and TVA at the NRC HQ followed by 8/19/14 phone call between the NRC and TVA, the NRC was informed of the TVA's decision for rescinding all changes associated with the subject TSTFs as currently specified in its TS conversion amendment. Please submit the revised pages for the NRC's review.**
Response Date/Time	**8/20/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman Kristy Bucholtz Michelle Conner Robert Elliott Ravinder Grover Matthew Hamm Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott Pete Snyder Caroline Tilton**
Added By	**Ravinder Grover**
Date Added	**8/20/2014 2:10 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**325**
NRC Question Number	**RPG-003**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**Staff's follow-up response to RPG-003:**

On 8/20/2014, the Staff provided the following in response to the licensee's explanation provided in its 6/6/14 response to RAI RPG-003 regarding its proposed deletion of core alteration requirements from its Current Licensing Basis.

> **"Regarding TVA's proposed changes related to the adoption of TSTFs-51, -286 and -471, in a 8/12/14 meeting between the NRC and TVA at the NRC HQ followed by 8/19/14 phone call between the NRC and TVA, the NRC was informed of the TVA's decision for rescinding all changes associated with the subject TSTFs as currently specified in its TS conversion amendment.**
>
> **Please submit the revised pages for the NRC's review."**

As stated in the Staff's RAI-003, the Staff is currently pursuing with the industry for a resolution to these concerns (for details, please refer to the Staff's letter, dated November 7, 2013, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13246A358)). The letter suggested to the industry that licensees should not submit amendments to adopt these three Travelers until a final resolution is achieved.

On 8/25/2014, during a follow-up phone call between the Staff and the licensee, the licensee requested the Staff for additional information on its 6/6/2014 response to RPG-003. Specifically, the licensee asked for feedback as to why their previous response to RPG-003 was not acceptable and therefore, the Staff was requesting that the licensee to remove proposed changes related to TSTFs-51, 286 and 471.

Below please find, the Staff's feedback:

The licensee's assertion that a fuel assembly misloading during refueling is not credible lacks sufficient justification. Fuel assembly misloadings have occurred in the past and absent evidence to the contrary would be expected to occur in the future. The licensee's citing of Startup Physics Testing as a means to detect a core fuel assembly misloading in Mode 6 does not address the Staff's concerns, since that testing isn't done until

Mode 2. Additionally, the licensee's citing of Core Exit Thermal couples as a means to detect a core fuel assembly misloading in Mode 6 doesn't address the Staff's concerns, since they are not operable in Mode 6 and could not be relied upon to detect a misloading in that Mode.

The use of one source range monitor being inoperable and removal of CORE ALTERATIONS by the licensee is of concern in regards to positive reactivity insertions. When one source range monitor is inoperable, and certain, strategically located fuel assemblies are removed; then the other, operable neutron source monitor may no longer be capable of monitoring some fuel assemblies that are located in the far half of the core and detect a positive reactivity insertion. Fuel movement occurs in MODE 6 and can lead to misloading of fuel assemblies. As noted above, the in-core detectors will not be able to detect misloading of fuel assemblies in the reactor core when in MODE 6. The in-core detectors will not detect core misloading until MODE 2 for Startup Physics Testing.

In addition to the misloaded fuel assembly concerns discussed above, the Staff's November 7, 2013, letter (ADAMS Accession No. ML13246A358, referenced in RPG-003) stated that the Staff is concerned that a dropped source, fuel assembly, or component (or any other item allowed to be moved by CORE ALTERATIONS) could damage or break a fuel assembly creating a radioactive source term. If so, the NRC Staff may require an analysis to show that the dose consequences of these scenarios are less limiting than the current fuel handling accident. The licensee's response to RPG-003 does not address such concern.

These generic issues with the TSTFs coupled with the licensee RAI responses regarding one inoperable source range monitor and removal of CORE ALTERATIONS do not address NRC Staff concerns. The licensee has not provided a plant specific basis with analysis to justify the adoption of these TSTFs that would address the generic NRC Staff issues. Therefore, the NRC Staff is concerned that the removal of the words CORE ALTERATIONS from the TS LCO for source range monitors may create a situation where a misloaded fuel assembly or an increase in neutron flux might go undetected. The NRC Staff's preliminary review of this issue indicates that the removal of the words CORE ALTERATIONS may create a situation not consistent with the SRP guidance related to 'redundant alarms,' described in SRP Section 15.4.6.

Therefore, the Staff requests that the amendment should be revised to reflect your current licensing basis for those TS sections affected by your proposed adoption of TSTFs in question. Please submit revised pages for the Staff's review.

Response Date/Time	**9/5/2014 6:00 PM**
Closure Statement	

Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**9/5/2014 1:20 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**372**
NRC Question Number	**RPG-003**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**Per discussion, on October 7, 2014, between SQN and NRC staff, SQN proposes that changes incorporated in NUREG-1431, Revision 4, associated with TSTFs-51, -286, and -471 be reviewed as submitted in the SQN ITS conversion submittal. SQN understands, that during staff review, there may be additional requests for information related to the changes made to NUREG-1431, Revision 4.**
Response Date/Time	**10/16/2014 2:10 AM**
Closure Statement	
Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Kristy Bucholtz** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**10/16/2014 1:11 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**374**
NRC Question Number	**RPG-003**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**10/16/2014**
Notification	**Scott Bowman Michelle Conner Ravinder Grover Khadijah Hemphill Andrew Hon Lynn Mynatt Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**10/16/2014 1:24 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**106**
NRC Question Number	**RPG-004**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.5**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**CTS page 3/4 4-1a; pdf page 137**
NRC Reviewer Supervisor	**Select**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**CTS (page 3/4 4-1a; pdf page 137) LCO 3.4.1.2, "Hot Standby,' states, "At least two of the reactor coolant loops listed below shall be OPERABLE with at least two reactor coolant loops in operation when the Reactor Trip System breakers are closed and at least one reactor coolant loop in operation when the Reactor Trip System breakers are open."** **ITS LCO 3.4.5 states, "[Two] RCS loops shall be OPERABLE and either:** **a. [Two] RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal or** **b. One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.** **Please explain differentiation between the 'and,' 'or,' (as shown in bold) Action statements.**
Attach File 1	
Attach File 2	
Issue Date	**5/29/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	

Date Added	**5/29/2014 11:56 AM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**141**
NRC Question Number	**RPG-004**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**The choice of the use of "either… or" versus "and" in ITS LCO 3.4.5, as it relates to Rod Control System capability (e.g., Reactor Trip System (RTS) breaker position), does not technically alter the SQN CTS requirements since the plant condition of RTS breakers closed is mutually exclusive from the plant condition of RTS breakers open. Likewise, the plant condition when the Rod Control System is capable of rod withdrawal is mutually exclusive from the plant condition when the Rod Control System is not capable of rod withdrawal. As such, both the CTS and ITS require at least two reactor coolant loops in operation with the RTS breakers closed and both the CTS and the ITS require at least one reactor coolant loop in operation with the RTS breakers open. As indicated in Discussion of Change A01 (page 139 of Enclosure 2, Volume 9), in the conversion of the SQN CTS to the plant specific ITS, certain changes, including wording preferences, editorial changes, and formatting, are made to obtain consistency with NUREG–1431.** **Specifically, CTS LCO 3.4.12 requires two reactor coolant loops to be OPERABLE and includes the preposition "with" followed by a prepositional phrase requiring: a) at least two reactor coolant loops in operation when the RTS breakers are closed; <u>and</u> b) at least one reactor coolant loop in operation when the RTS breakers are open. The conjunction "and" in the CTS case correctly connects the subjects in the prepositional phrase. ITS LCO 3.4.5 also requires two Reactor Coolant System (RCS) loops to be OPERABLE and uses the correlative "either-or" to correctly connect the two parallel sentences. Thus, <u>either</u>: a) Two RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal; <u>or</u> b) One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.**
Response Date/Time	**6/20/2014 2:40 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman**

	Michelle Conner Ravinder Grover Khadijah Hemphill Andrew Hon Ray Schiele
Added By	**Scott Bowman**
Date Added	**6/20/2014 1:37 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**274**
NRC Question Number	**RPG-004**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/20/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/20/2014 2:27 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**108**
NRC Question Number	**RPG-005**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.9**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**page 3/4 4-9, pdf page 272**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

CTS SR 4.4.4.3 (page 3/4 4-9, pdf page 272) requires that the emergency power supply for the pressurizer heaters shall be demonstrated OPERABLE at least once per 18 months by transferring power from the normal to the emergency power supply and energizing the heaters. SQN proposes to delete the SR and explains the deletion as follows:

> **"L01: (Category 5 – Deletion of Surveillance Requirement) CTS 4.4.4.3 requires verification that the emergency power supply for the pressurizer heaters be demonstrated OPERABLE at least once per 18 months by transferring power from the normal to the emergency power supply and energizing the heaters. ISTS SR 3.4.9.3 requires a similar test but does not require the surveillance if pressurizer heater are supplied from a Class 1E power supply. Electrical power to the SQN pressurizer heaters can only be supplied from Class 1E power. This changes the CTS by deleting the Surveillance Requirement to demonstrate OPERABILITY of the pressurizer heater emergency power supply.**
>
> **The purpose of CTS 4.4.4.3 is to verify OPERABILITY of the pressurizer heater emergency power supply. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify the pressurizer heaters used to meet the LCO can perform its required functions. The pressurizer heaters continue to be tested in a manner and at a frequency necessary to give confidence that the pressurizer can perform its assumed safety**

function. Electrical power to the pressurizer heaters is only provided by Class 1E power sources. Therefore, there is no requirement to verify the transfer from a non- Class 1E power supply to a Class 1E power supply. This change is designated as less restrictive because a Surveillance required in CTS will not be required in ITS."

The staff is requesting the licensee to provide the following information:

1. **A single line diagram and description showing the Class 1E power circuits feeding the pressurizer heaters, switchgear numbers, breakers, and emergency diesel generators.**

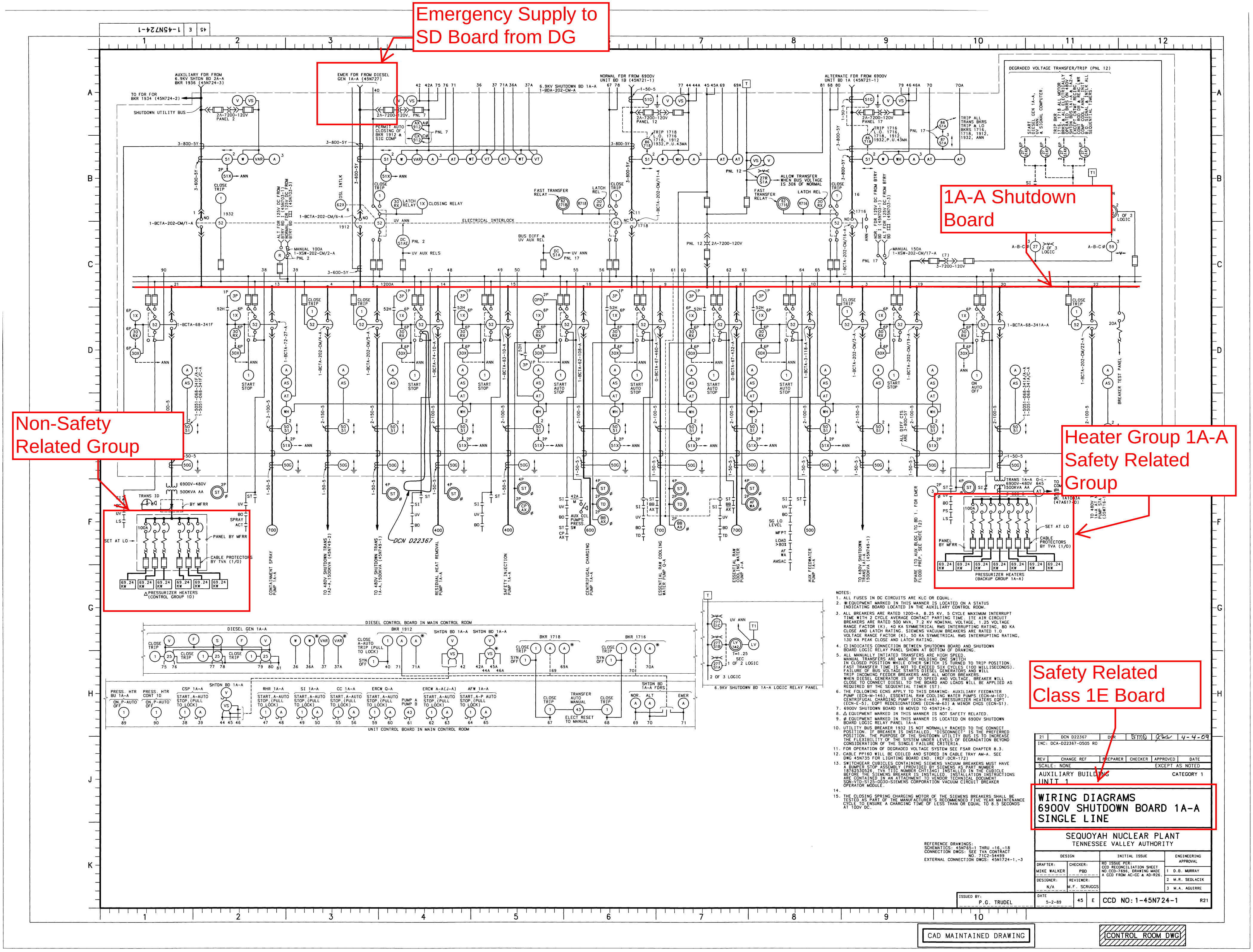
2. **Are pressurizer heaters credited in Chapter 6 or Chapter 15 events or conditions? Are pressurizer heaters automatically sequenced or manually connected? If it is manually connected, briefly describe how the power supplies are connected to the heater banks. Is there any need for power supply transfer?**

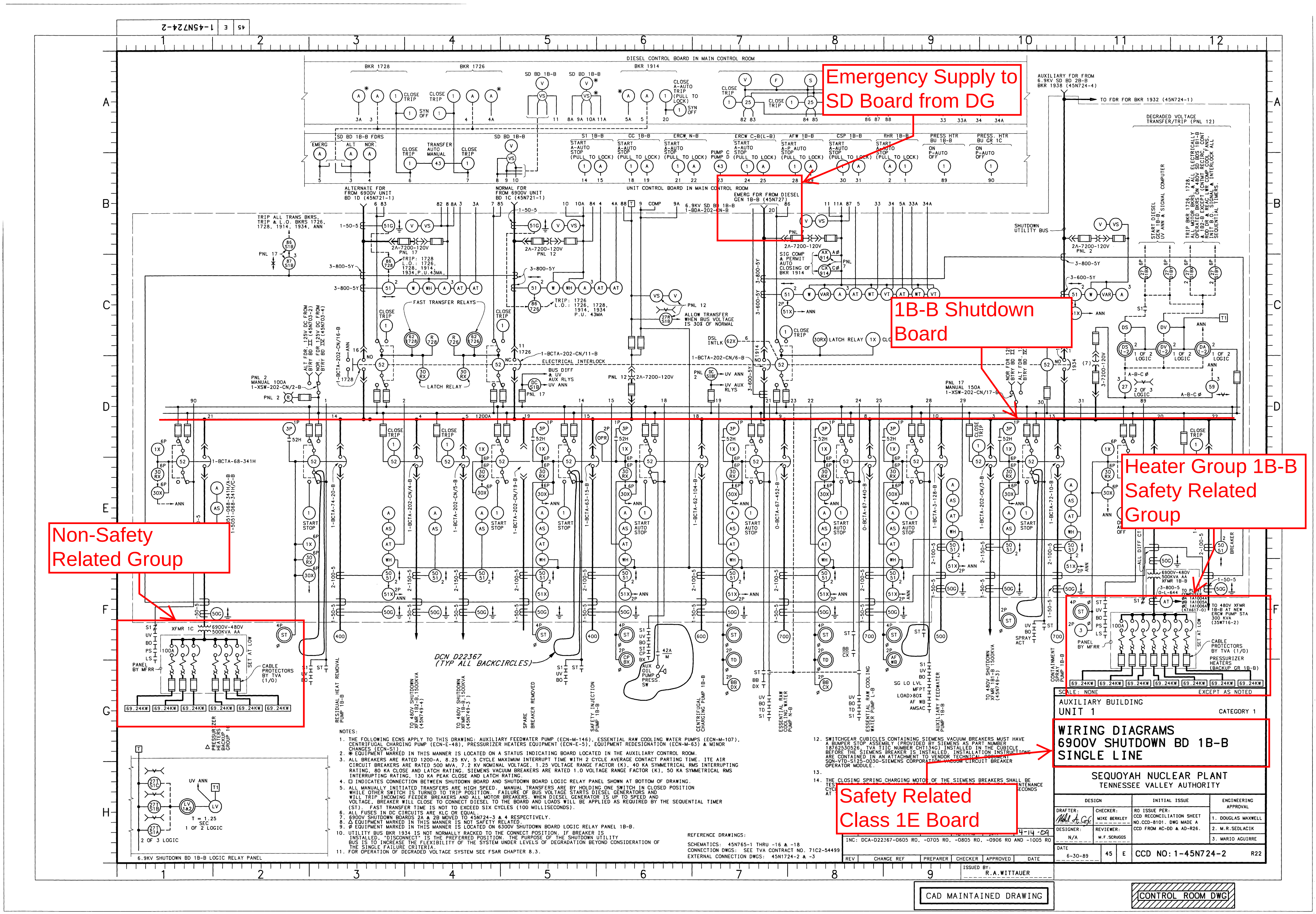
Attach File 1	
Attach File 2	
Issue Date	**5/30/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**5/30/2014 7:25 AM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

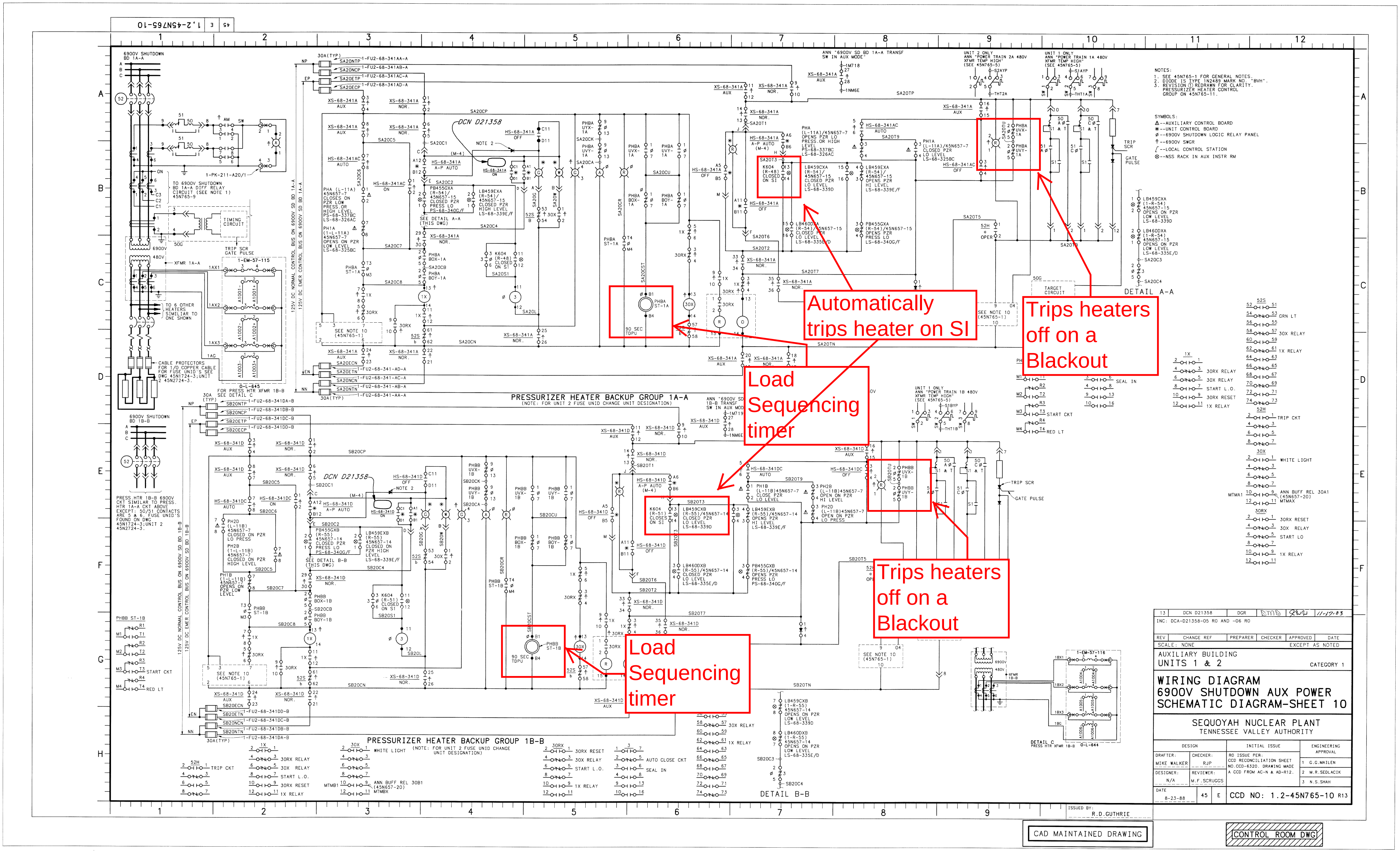
Id	**145**
NRC Question Number	**RPG-005**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 schematics for PZR HTRS.pdf** (2MB)
Attachment 2	
Response Statement	**For each unit, there are four groups of pressurizer heaters. All four groups (A, B, C and D) are powered from the Class 1E Safety Related Shutdown Boards. For SQN, Unit 1, groups A and D are supplied by the 1A-A 6.9 kV Shutdown Board and groups B and C are supplied by the 1B-B 6.9 kV Shutdown Board (Unit 2 is similar, groups A and D on 2A-A and groups B and C on 2B–B). Pressurizer heater groups A and B are the only two groups that are considered safety related. During a loss of offsite power event (blackout), the A and B group pressurizer heaters are prevented from being energized by a load sequencing timer until after the emergency diesel generator (DG) has reestablished power to the shutdown board. Pressurizer heater groups C and D will be automatically load shed on the blackout and locked out, preventing them from being reenergized as long as the DG is supplying power to the shutdown board. If a safety injection signal has been initiated, all four groups of pressurizer heaters are automatically de–energized and prevented from being reenergized until the safety injection signal has been manually reset by the operator from the main control room.** **There is no credit taken in the transient or accident analysis for the pressurizer heaters unless it would make the transient or accident more severe. The transients discussed in UFSAR Section 15.2.7, Loss of External Electrical Load and/or Turbine Trip, assume that the pressurizer heaters function because heater operation on a high pressurizer water level would potentially increase the maximum surge rate through the pressurizer safety valves. In all other transient or accident scenarios, it is assumed that the pressurizer heaters do not function.** **CTS 4.4.4.3 requires the emergency power supply for the pressurizer heaters to be demonstrated OPERABLE by transferring power from the normal to the emergency power supply and energizing the heaters. Therefore, because the heaters are only supplied power by the Class 1E power supply, there is no need to perform and retain CTS 4.4.4.3 (ISTS SR 3.4.9.3).** **Attachment 1 contains the single line and schematic drawings showing the power feed and operation of the pressurizer heaters.**

Response Date/Time	**6/23/2014 1:25 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/23/2014 12:25 PM**
Date Modified	
Modified By	

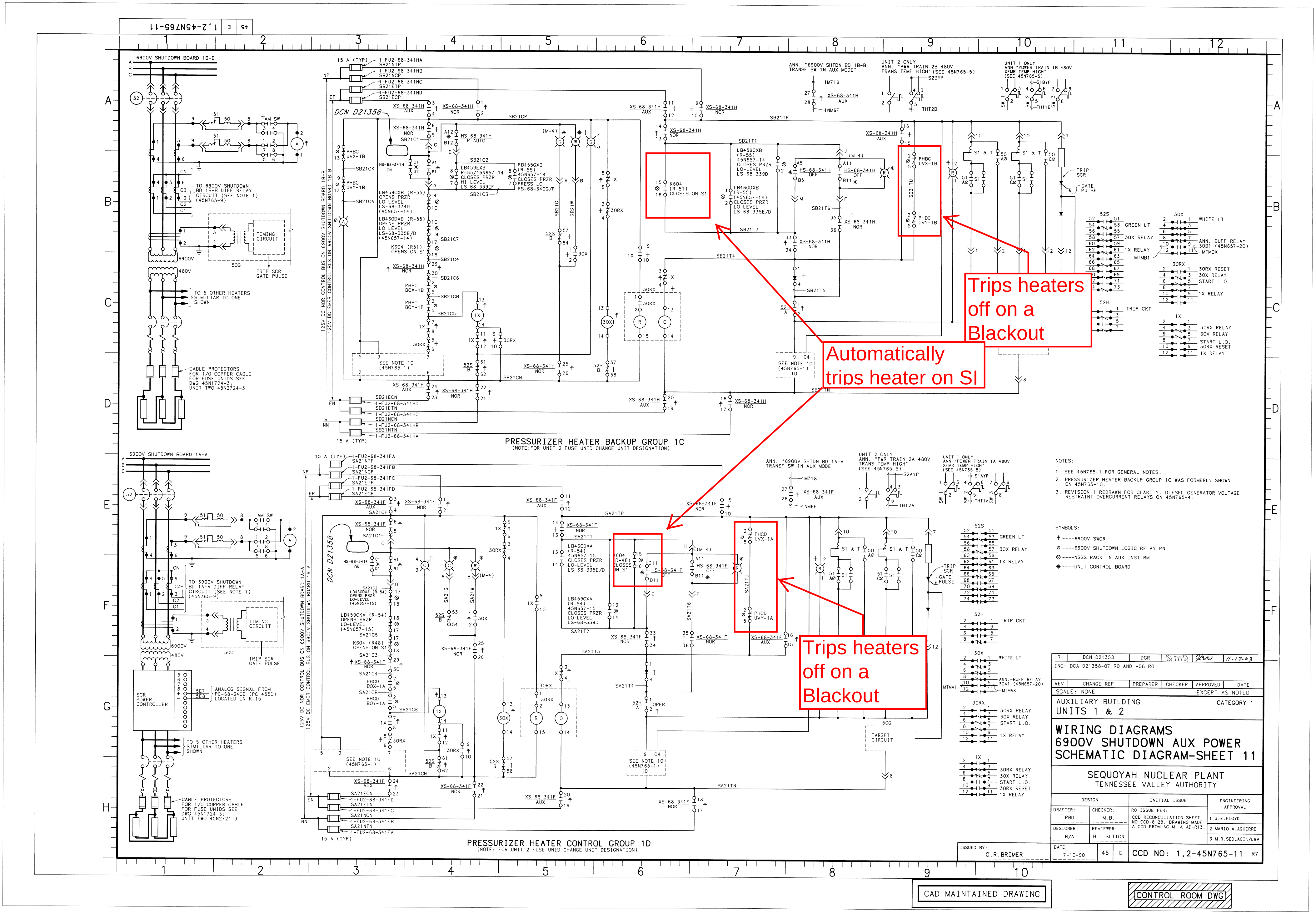

Emergency Supply to SD Board from DG
1A-A Shutdown Board
Non-Safety Related Group
Heater Group 1A-A Safety Related Group
Safety Related Class 1E Board
1-45N724-1
WIRING DIAGRAMS
6900V SHUTDOWN BOARD 1A-A
SINGLE LINE
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
AUXILIARY BUILDING
UNIT 1
CCD NO: 1-45N724-1
CAD MAINTAINED DRAWING
CONTROL ROOM DWG



Emergency Supply to SD Board from DG
1B-B Shutdown Board
Heater Group 1B-B Safety Related Group
Non-Safety Related Group
Safety Related Class 1E Board
DIESEL CONTROL BOARD IN MAIN CONTROL ROOM
UNIT CONTROL BOARD IN MAIN CONTROL ROOM
EMERG FDR FROM DIESEL GEN 1B-B (45N727)
6.9KV SD BD 1B-B
PRESSURIZER HEATERS (BACKUP GR 1B-B)
6.9KV SHUTDOWN BD 1B-B LOGIC RELAY PANEL
NOTES:
1. THE FOLLOWING ECNS APPLY TO THIS DRAWING: AUXILIARY FEEDWATER PUMP (ECN-M-146), ESSENTIAL RAW COOLING WATER PUMPS (ECN-M-107), CENTRIFUGAL CHARGING PUMP (ECN-E-48), PRESSURIZER HEATERS EQUIPMENT (ECN-E-5), EQUIPMENT REDESIGNATION (ECN-M-63) & MINOR CHANGES (ECN-S1).
2. ✳ EQUIPMENT MARKED IN THIS MANNER IS LOCATED ON A STATUS INDICATING BOARD LOCATED IN THE AUXILIARY CONTROL ROOM.
3. ALL BREAKERS ARE RATED 1200-A, 8.25 KV, 5 CYCLE MAXIMUM INTERRUPT TIME WITH 2 CYCLE AVERAGE CONTACT PARTING TIME. ITE AIR CIRCUIT BREAKERS ARE RATED 500 MVA, 7.2 KV NOMINAL VOLTAGE, 1.25 VOLTAGE RANGE FACTOR (K), 40 KA SYMMETRICAL RMS INTERRUPTING RATING, 80 KA CLOSE AND LATCH RATING. SIEMENS VACUUM BREAKERS ARE RATED 1.0 VOLTAGE RANGE FACTOR (K), 50 KA SYMMETRICAL RMS INTERRUPTING RATING, 130 KA PEAK CLOSE AND LATCH RATING.
4. □ INDICATES CONNECTION BETWEEN SHUTDOWN BOARD AND SHUTDOWN BOARD LOGIC RELAY PANEL SHOWN AT BOTTOM OF DRAWING.
5. ALL MANUALLY INITIATED TRANSFERS ARE HIGH SPEED. MANUAL TRANSFERS ARE BY HOLDING ONE SWITCH IN CLOSED POSITION WHILE OTHER SWITCH IS TURNED TO TRIP POSITION. FAILURE OF BUS VOLTAGE STARTS DIESEL GENERATORS AND WILL TRIP INCOMING FEEDER BREAKERS AND ALL MOTOR BREAKERS. WHEN DIESEL GENERATOR IS UP TO SPEED AND VOLTAGE, BREAKER WILL CLOSE TO CONNECT DIESEL TO THE BOARD AND LOADS WILL BE APPLIED AS REQUIRED BY THE SEQUENTIAL TIMER (ST). FAST TRANSFER TIME IS NOT TO EXCEED SIX CYCLES (100 MILLISECONDS).
6. ALL FUSES IN DC CIRCUITS ARE KLC OR EQUAL.
7. 6900V SHUTDOWN BOARDS 2A & 2B MOVED TO 45N724-3 & 4 RESPECTIVELY.
8. △ EQUIPMENT MARKED IN THIS MANNER IS NOT SAFETY RELATED.
9. Ø EQUIPMENT MARKED IN THIS MANNER IS LOCATED ON 6300V SHUTDOWN BOARD LOGIC RELAY PANEL 1B-B.
10. UTILITY BUS BKR 1934 IS NOT NORMALLY RACKED TO THE CONNECT POSITION. IF BREAKER IS INSTALLED, "DISCONNECT" IS THE PREFERRED POSITION. THE PURPOSE OF THE SHUTDOWN UTILITY BUS IS TO INCREASE THE FLEXIBILITY OF THE SYSTEM UNDER LEVELS OF DEGRADATION BEYOND CONSIDERATION OF THE SINGLE FAILURE CRITERIA.
11. FOR OPERATION OF DEGRADED VOLTAGE SYSTEM SEE FSAR CHAPTER 8.3.
12. SWITCHGEAR CUBICLES CONTAINING SIEMENS VACUUM BREAKERS MUST HAVE A BUMPER STOP ASSEMBLY (PROVIDED BY SIEMENS AS PART NUMBER 18762530526, TVA TIIC NUMBER CHT134G) INSTALLED IN THE CUBICLE BEFORE THE SIEMENS BREAKER IS INSTALLED. INSTALLATION INSTRUCTIONS ARE CONTAINED IN AN ATTACHMENT TO VENDOR TECHNICAL [illegible] SQN-VTD-S125-0030-SIEMENS CORPORATION [illegible] CIRCUIT BREAKER OPERATOR MODULE.
13.
14. THE CLOSING SPRING CHARGING MOTOR OF THE SIEMENS BREAKERS SHALL BE [illegible]
REFERENCE DRAWINGS:
SCHEMATICS: 45N765-1 THRU -16 & -18
CONNECTION DWGS: SEE TVA CONTRACT NO. 71C2-54499
EXTERNAL CONNECTION DWGS: 45N1724-2 & -3
INC: DCA-D22367-0605 R0, -0705 R0, -0805 R0, -0906 R0 AND -1005 R0
SCALE: NONE EXCEPT AS NOTED
AUXILIARY BUILDING
UNIT 1
CATEGORY 1
WIRING DIAGRAMS
6900V SHUTDOWN BD 1B-B
SINGLE LINE
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DRAFTER:
CHECKER: MIKE BERKLEY
DESIGNER: N/A
REVIEWER: M.F.SCRUGGS
RO ISSUE PER: CCD RECONCILIATION SHEET NO.CCD-8101. DWG MADE A CCD FROM AC-DD & AD-R26.
ENGINEERING APPROVAL
1. DOUGLAS MAXWELL
2. M.R.SEDLACIK
3. MARIO AGUIRRE
DATE 6-30-89
45
E
CCD NO: 1-45N724-2
R22
ISSUED BY: R.A.WITTAUER
CAD MAINTAINED DRAWING
CONTROL ROOM DWG



Automatically trips heater on SI
Trips heaters off on a Blackout
Load Sequencing timer
Load Sequencing timer
Trips heaters off on a Blackout
PRESSURIZER HEATER BACKUP GROUP 1A-A
PRESSURIZER HEATER BACKUP GROUP 1B-B
DETAIL A-A
DETAIL B-B
DCN D21358
AUXILIARY BUILDING
UNITS 1 & 2
WIRING DIAGRAM
6900V SHUTDOWN AUX POWER
SCHEMATIC DIAGRAM-SHEET 10
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
CCD NO: 1.2-45N765-10 R13
CAD MAINTAINED DRAWING
CONTROL ROOM DWG


1,2-45N765-11
PRESSURIZER HEATER BACKUP GROUP 1C
(NOTE: FOR UNIT 2 FUSE UNID CHANGE UNIT DESIGNATION)
PRESSURIZER HEATER CONTROL GROUP 1D
(NOTE: FOR UNIT 2 FUSE UNID CHANGE UNIT DESIGNATION)
6900V SHUTDOWN BOARD 1B-B
6900V SHUTDOWN BOARD 1A-A
DCN D21358
Trips heaters off on a Blackout
Automatically trips heater on SI
Trips heaters off on a Blackout
K604 (R-51) CLOSES ON SI
CABLE PROTECTORS FOR 1/0 COPPER CABLE FOR FUSE UNIDS SEE DWG 45N1724-3; UNIT TWO 45N2724-3
TO 5 OTHER HEATERS SIMILIAR TO ONE SHOWN
NOTES:
1. SEE 45N765-1 FOR GENERAL NOTES.
2. PRESSURIZER HEATER BACKUP GROUP 1C WAS FORMERLY SHOWN ON 45N765-10.
3. REVISION 1 REDRAWN FOR CLARITY. DIESEL GENERATOR VOLTAGE RESTRAINT OVERCURRENT RELAYS ON 45N765-4.
SYMBOLS:
----6900V SWGR
----6900V SHUTDOWN LOGIC RELAY PNL
----NSSS RACK IN AUX INST RM
----UNIT CONTROL BOARD
AUXILIARY BUILDING
UNITS 1 & 2
CATEGORY 1
WIRING DIAGRAMS
6900V SHUTDOWN AUX POWER
SCHEMATIC DIAGRAM-SHEET 11
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
ISSUED BY: C.R.BRIMER
DATE 7-10-90
CCD NO: 1,2-45N765-11 R7
CAD MAINTAINED DRAWING
CONTROL ROOM DWG

Licensee Response/NRC Response/NRC Question Closure

Id	**347**
NRC Question Number	**RPG-005**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/25/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**9/25/2014 7:14 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**111**
NRC Question Number	**RPG-006**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.12**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**page 3/4 4-30; pdf page 375**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS SR 3.4.12.1 states, "Verify a maximum of one HPSI pump is capable of injecting into the RCS. CTS SR 4.4.12.2 states, "Verify no safety injection pumps are capable of injecting into the RCS within 4 hours after entering MODE 4 from MODE 3 and prior to the temperature of one or more RCS cold legs decreasing below 325°F." CTS marked-up SR 4.4.12.2 (page 3/4 4-30; pdf page 375) shows both surveillances as 'similar/equivalent'. Similarly, on the same page, CTS marked-up changes for CTS SRs 4.4.12.1.a and 4.4.12.1.c refer to ITS SRs 3.4.12.6 and 3.4.12.5, respectively. These surveillances are not identical. Please explain the basis for concluding that the CTS SRs are similar or identical to the ITS SRs.**
Attach File 1	
Attach File 2	
Issue Date	**5/30/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**5/30/2014 10:18 AM**
Notification	**Scott Bowman Michelle Conner Robert Elliott Ravinder Grover Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**143**
NRC Question Number	**RPG-006**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**SQN ITS SR 3.4.12.1 and SR 3.4.12.5 are equivalent to CTS 4.4.12.2 and 4.4.12.1.c, respectively. ITS SR 3.4.12.6 is similar to CTS 4.4.12.1.a, as modified by discussion of change (DOC) M01.** **ISTS SR 3.4.12.1 states, "Verify a maximum of [one] [HPI] pump is capable of injecting into the RCS." ISTS SR 3.4.12.1 was modified to ITS SR 3.4.12.1 to state, "Verify no safety injection pumps are capable of injecting into the RCS." (ISTS justification for deviation 4 provides the discussion for the change to ISTS SR 3.4.12.1.) The first Frequency for ITS SR 3.4.12.1 is, "within 4 hours after entering MODE 4 from MODE 3 prior to the temperature of one or more RCS cold legs decreasing below 325°F." This is equivalent to CTS 4.4.12.2, which states in part, "Verify no safety injection pumps are capable of injecting into the RCS within 4 hours after entering MODE 4 from MODE 3 prior to the temperature of one or more RCS cold legs decreasing below 325°F…" Following the initial performance of the SR, both surveillances are required to be performed at a 12 hour Frequency.** **ITS SR 3.4.12.5 states, "Verify PORV block valve is open for each required PORV." This is equivalent to CTS 4.4.12.1.c, which states in part, "Verifying the PORV block valve is open for each required PORV…" The Surveillance Frequency for CTS 4.4.12.1.c and ITS SR 3.4.12.5 is 72 hours.** **ITS SR 3.4.12.6 states, "Perform a COT on each required PORV, excluding actuation." This is similar to CTS 4.4.12.1.a as modified by DOC M01. CTS 4.4.12.1.a states, in part, "Performance of a CHANNEL FUNCTIONAL TEST*, but excluding valve operation..." DOC M01 discusses the change from a CHANNEL FUNCTIONAL TEST to a CHANNEL OPERATIONAL TEST (COT). Also, the * Note associated with CTS 4.4.12.1.a is equivalent to the Note in ITS SR 3.4.12.6, which states, "Not required to be performed until 12 hours after decreasing RCS cold leg temperatures to ≤ the LTOP arming temperature in the PTLR."**
Response Date/Time	**6/20/2014 2:50 PM**
Closure Statement	

Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**6/20/2014 1:47 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**342**
NRC Question Number	**RPG-006**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/22/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**9/22/2014 1:43 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**134**
NRC Question Number	**RPG-007**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**pdf page 23**
NRC Reviewer Supervisor	**Select**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

ITS SECTION 3.4, "REACTOR COOLANT SYSTEM (RCS)," RAIs (Ref. ENCLOSURE 2, VOLUME 9

ITS Surveillance Requirement (SR) 3.4.1.4 states, "Verify by precision heat balance that RCS total flow rate is ≥ [284,000] gpm and greater than or equal to the limit specified in the COLR. ITS explains the precision heat balance measurement as follows,

> **"Measurement of RCS total flow rate by performance of a precision calorimetric heat balance allows the installed RCS flow instrumentation to be calibrated and verifies the actual RCS flow rate is greater than or equal to the minimum required RCS flow rate."**

SQN's proposed change on Page 23 in above reference states, "Verify by measurement that RCS total flow rate is ≥ [284,000] gpm and greater than or equal to the limit specified in the COLR. SQN's Justification For Deviation # 6 on page 24 states,

> **"ISTS SR 3.4.1.4 has been changed to reflect current licensing basis. SQN used heat balance RCS flow measurements until the RTD Bypass manifolds were removed, after which problems were experienced due to hot leg streaming. SQN changed licensing basis to allow the measurement of RCS total flow using elbow tap flow differential pressure method."**

The Staff's review of TS amendments 138 and 130 referenced in SQN units 1 and 2 TSs for LCO 3/4.2.5 respectively, did not find the Staff's approval for SQN's licensing basis to allow the measurement of RCS total flow using elbow tap flow differential pressure method.

Please provide additional information regarding the Staff's approval of SQN's licensing basis (e.g., date of issuance and amendment number) for the use of the elbow tap flow differential pressure method.

Attach File 1	
Attach File 2	
Issue Date	**6/3/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**6/3/2014 3:44 PM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**196**
NRC Question Number	**RPG-007**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 TS 92-07 from TVA 8-21-92 AccNo. 9208310198.pdf** (2MB)
Attachment 2	**Attachment 2 NRC issued Amendments 221 and 212.pdf** (523KB)
Response Statement	**In response to RAI RPG-007, the following information is being provided regarding the Staff's approval of SQN's licensing basis to allow the use of the elbow tap flow differential pressure method for measuring the reactor coolant system (RCS) total flow.** **By letter dated August 21, 1992 (Accession Number 9208310198), SQN requested a license amendment to increase the allowable value for the RCS loss of coolant reactor trip setpoint. The change was necessary to update the SQN TSs to the latest revision of the Westinghouse Electric Corporation setpoint methodology for SQN (WCAP 11239, Revision 6). The WCAP revised the allowable value based on evaluation of SQN's use of RCS elbow tap differential pressures to determine RCS flow because temperature streaming invalidated the use of primary to secondary calorimetrics. Supplemental letters were sent on September 3, 1993 (Accession Number 9309080173), and March 28, 1996 (Accession Number 9604080368). By letter dated April 26, 1996 (Accession Number 9605010304), the Commission issued Amendments 221 and 212 for SQN, Units 1 and 2, respectively. The Safety Evaluation related to Amendments 221 and 212 acknowledged that, "Flow is measured in each loop by three differential pressure measurements at an elbow tap in each of the four coolant loops."** **Attachment 1 is the initial SQN license amendment request dated August 21, 1992.** **Attachment 2 is the Commission's issuance of Amendments 221 and 212 for SQN, Units 1 and 2.**
Response Date/Time	**7/21/2014 12:05 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill**

	Andrew Hon **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/21/2014 11:03 AM**
Date Modified	
Modified By	

August 21, 1992

TVA-SQN-TS-92-07 10 CFR 50.90

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - TECHNICAL SPECIFICATION (TS) CHANGE 92-07, "REACTOR COOLANT SYSTEM (RCS) LOSS OF FLOW REACTOR TRIP SETPOINT ALLOWABLE VALUE INCREASE"

In accordance with 10 CFR 50.90, we are enclosing a requested amendment to Licenses DPR-77 and DPR-79 to change the TSs of SQN Units 1 and 2. The proposed change increases the allowable value for the RCS loss of flow reactor trip setpoint in Table 2.2-1.

The proposed TS change is identified in Enclosure 1. The justification for the proposed TS change is provided in Enclosure 2. A proposed determination of no significant hazards consideration performed pursuant to 10 CFR 50.92 is provided in Enclosure 3.

TVA requests a 30-day implementation period for this TS change following issuance.

A001
1/1

Please direct questions concerning this issue to K. C. Weller at (615) 843-7527

Sincerely,

J.L. Wilson

J. L. Wilson

Sworn to and subscribed before me
this 21st day of August, 1992

Notary Public
My Commission Expires 5-6-96

Enclosures
cc (Enclosures):

Mr. D. E. LaBarge, Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. Michael H. Mobley, Director (w/o Enclosures)
Division of Radiological Health
T.E.R.R.A. Building
150 9th Avenue, N
Nashville, Tennessee 37203

NRC Resident Inspector
Sequoyah Nuclear Plant
2600 Igou Ferry Road
Soddy Daisy, Tennessee 37379

Mr. B. A Wilson Project Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-92-07)

LIST OF AFFECTED PAGES

Unit 1

2-5

Unit 2

2-5

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

TIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
Manual Reactor Trip	Not Applicable	Not Applicable
Power Range, Neutron Flux	Low Setpoint - $\leq$ 25% of RATED THERMAL POWER High Setpoint - $\leq$ 109% of RATED THERMAL POWER	Low Setpoint - $\leq$ 27.4% of RATED THERMAL POWER High Setpoint - $\leq$ 111.4% of RAT THERMAL POWER
Power Range, Neutron Flux, High Positive Rate	$\leq$ 5% of RATED THERMAL POWER with a time constant $\geq$ 2 second	$\leq$ 6.3% of RATED THERMAL POWER with a time constant $\geq$ 2 second
Power Range, Neutron Flux, High Negative Rate	$\leq$ 5% of RATED THERMAL POWER with a time constant $\geq$ 2 second	$\leq$ 6.3% of RATED THERMAL POWER with a time constant $\geq$ 2 second
Intermediate Range, Neutron Flux	$\leq$ 25% of RATED THERMAL POWER	$\leq$ 30% of RATED THERMAL POWER
Source Range, Neutron Flux	$\leq 10^5$ counts per second	$\leq 1.3 \times 10^5$ counts per second
Overtemperature ΔT	See Note 1	See Note 3
Overpower ΔT	See Note 2	See Note 4
Pressurizer Pressure--Low	$\geq$ 1970 psig	$\geq$ 1964.8 psig
Pressurizer Pressure--High	$\leq$ 2385 psig	$\leq$ 2390.2 psig
Pressurizer Water Level--High	$\leq$ 92% of instrument span	$\leq$ 92.7% of instrument span
Loss of Flow	$\geq$ 90% of design flow per loop*	$\geq$ ~~89.4%~~ 89.6% of design flow per loop*

ign flow is 91,400 gpm per loop.

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

NCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. Manual Reactor Trip	Not Applicable	Not Applicable
2. Power Range, Neutron Flux	Low Setpoint - ≤ 25% of RATED THERMAL POWER High Setpoint - ≤ 109% of RATED THERMAL POWER	Low Setpoint - ≤ 27.4% of RATED THERMAL POWER High Setpoint - ≤ 111.4% of RATED THERMAL POWER
3. Power Range, Neutron Flux, High Positive Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 seconds	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 second
4. Power Range, Neutron Flux, High Negative Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 seconds	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 second
5. Intermediate Range, Neutron Flux	≤ 25% of RATED THERMAL POWER	≤ 30% of RATED THERMAL POWER
6. Source Range, Neutron Flux	≤ 10^5 counts per second	≤ 1.3 x 10^5 counts per second
7. Overtemperature ΔT	See Note 1	See Note 3
8. Overpower ΔT	See Note 2	See Note 4
9. Pressurizer Pressure--Low	≥ 1970 psig	≥ 1964.8 psig
10. Pressurizer Pressure--High	< 2385 psig	≤ 2390.2 psig
11. Pressurizer Water Level--High	≤ 92% of instrument span	≤ 92.7% of instrument span
12. Loss of Flow	≥ 90% of design flow per loop*	≥ ~~89.4%~~ 89.6% of design flow per loop

*Design flow is 91,400 gpm per loop

ENCLOSURE 2

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-92-07)

DESCRIPTION AND JUSTIFICATION FOR
REACTOR COOLANT SYSTEM (RCS)
LOSS OF FLOW REACTOR TRIP SETPOINT ALLOWABLE VALUE INCREASE

Description of Change

TVA proposes to modify the Sequoyah Nuclear Plant (SQN) Units 1 and 2 technical specifications (TSs) to revise the allowable value for the reactor coolant system (RCS) loss of flow reactor trip setpoint from greater than or equal to 89.4 percent to greater than or equal to 89.6 percent. This change affects Functional Unit 12 in TS Table 2.2-1.

Reason for Change

This change is necessary to update the SQN TSs to the latest revision of the Westinghouse Electric Corporation setpoint methodology for SQN (Westinghouse Commercial Atomic Power (WCAP) 11239, Revision 6). This WCAP revised the allowable value based on an evaluation of SQN's use of RCS elbow tap differential pressures to determine RCS flow because temperature streaming has invalidated the use of primary to secondary calorimetrics. This evaluation is documented in Westinghouse Letter TVA-91-349, dated November 6, 1991. The reason for this increase from greater than or equal to 89.4 percent to greater than or equal to 89.6 percent is because of the effect of additional uncertainties in the use of elbow taps on the allowances provided for the loss of flow reactor trip setpoint. No other functions were affected such that the analysis would not support their existing TS values.

Justification for Change

The RCS loss of flow reactor trip protects the core from departure from nucleate boiling. The flow is sensed by three elbow taps in each RCS loop that indicate the status o RCS flow. The basic function of the elbow taps is to provide information as to whether or not a reduction in RCS flow has occurred. Detection of low flow by two of the three comparators for a loop would indicate a low flow in that loop. This reactor trip is blocked below Permissive P-7 (10 percent reactor power) to allow for unit start-up. One loop detecting a low flow condition is required to trip the reactor above Permissive P-8 (35 percent reactor power) and two loops are required between Permissives P-7 and P-8.

The previous evaluations of the allowances for the loss of flow reactor trip normalized the uncertainties associated with RCS elbow tap calibration, pressure effects and temperature effects to a value of 0.0 percent flow span based on the use of primary to secondary calorimetrics. The impact of RCS hot and cold leg temperature streaming has resulted in inability to use the calorimetrics to accurately calculate the RCS flow. Therefore, the normalization of the elbow tap uncertainties can no longer be applied and Westinghouse has included a $^+$0.3 percent flow span allowance for each of the items discussed above. This increase in the allowances has resulted in an increase in the channel statistical allowance from 2.3 percent span to 2.5 percent span. This correlates to the increase in the loss of flow reactor trip setpoint allowable value from greater than or equal to 89.4 percent to greater than or equal to 89.6 percent when applied to the Westinghouse setpoint methodology. The setpoint value was not impacted by this increase in the allowances.

This change in the allowable value is in the conservative direction and provides the requirements to maintain instrumentation in the proper configuration to support the assumptions used in SQN's accident analysis. No other changes are required for the loss of flow reactor trip setpoint or any other safety-related functions as a result of the elbow tap measurement of RCS flow. This change does not adversely affect nuclear safety, but does provide a conservative increase in the RCS loss of flow reactor trip setpoint allowable value to be consistent with the SQN accident analysis.

SQN's present method for calibrating the loss of flow reactor trip setpoint utilizes actual RCS flow measurements during initial unit start-up to determine the greater than or equal to 90 percent trip setpoint and the greater than or equal to 89.4 percent allowable value. This RCS flow value is at least 3.5 percent greater than design flow as required by SQN TS 3.2.5. Since the TS trip and allowable value setpoints are based on design flow SQN's calibration method has a built-in 3.5 percent conservative margin plus any additional flow above the TS limit measured during the initial unit start-up. Therefore, the actual trip setpoint is presently set at greater than or equal to 93.5 percent and the allowable value at greater than or equal to 92.9 percent of design flow plus any flow that was measured above the TS 3.2.5 requirement. This extra conservatism ensures that this 0.2 percent increase in the allowable value to greater than or equal to 89.6 percent has not created an operability or nuclear safety concern based on SQN's present calibration of this function and therefore this change to the SQN TSs can be pursued on a normal processing basis.

Environmental Impact Evaluation

The proposed change request does not involve an unreviewed environmental question because operation of SQN Units 1 and 2 in accordance with this change would not:

1. Result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the staff's testimony to the Atomic Safety and Licensing Board, supplements to the FES, environmental impact appraisals, or decisions of the Atomic Safety and Licensing Board.

2. Result in a significant change in effluents or power levels.

3. Result in matters not previously reviewed in the licensing basis for SQN that may have a significant environmental impact.

Enclosure 3

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-92-07)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Significant Hazards Evaluation

TVA has evaluated the proposed technical specification (TS) change and has determined that it does not represent a significant hazards consideration based on criteria established in 10 CFR 50.92(c). Operation of Sequoyah Nuclear Plant (SQN) in accordance with the proposed amendment will not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change to increase the reactor coolant system (RCS) loss of flow reactor trip allowable value from greater than or equal to 89.4 percent to greater than or equal to 89.6 percent does not alter the functions of any safety-related equipment. The change implements a more conservative allowable value that is consistent with the latest assumptions for SQN's accident analysis. This new value provides for reactor trip initiation consistent with SQN's previous analysis with the additional consideration of RCS flow measurement uncertainties for elbow taps without the normalization from a primary to secondary calorimetric. Therefore, accident mitigation functions remain consistent with the analysis and there is not an increase in the consequences of an accident. Likewise, the increase in this allowable value will not increase the probability of an accident because this function provides accident mitigation actions and is not considered the source of any accident.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

   As discussed above, the RCS loss of flow reactor trip function provides an accident mitigation function and is not an initiator of any accident. Therefore, the increase in the allowable value for this function will not create a new or different kind of accident previously analyzed, but does implement a more conservative value that is consistent with the accident analysis.

3. Involve a significant reduction in a margin of safety.

   This change implements a conservative increase in the loss of flow allowable value to maintain the margin of safety. This increase is being implemented to offset the potential decrease in margin created by using the elbow taps to determine RCS flow. Therefore, this change does not reduce any margin of safety and provides conservative values that will maintain the margin of safety within the SQN accident analysis assumptions.

Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

April 26, 1996

SUBJECT: ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENTS FOR THE SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 (TAC NOS. M84390 AND M84391) (TS 92-07)

Dear Mr. Kingsley:

The Commission has issued the enclosed Amendment No. 221 to Facility Operating License No. DPR-77 and Amendment No. 212 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant, Units 1 and 2, respectively. These amendments are in response to your application dated August 21, 1992, which was supplemented by letters dated September 3, 1993, and March 28, 1996.

The amendments revise the allowable value for the reactor coolant system loss of flow reactor trip setpoint from greater than or equal to 89.4 percent to greater than or equal to 89.6 percent.

As explained in the safety evaluation, we request that TVA inform the staff if the value of any of the elbow tap flow correlation coefficients is changed.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by
David E. LaBarge, Sr. Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosures:
1. Amendment No. 221 to License No. DPR-77
2. Amendment No. 212 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 221
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated August 21, 1992, which was supplemented September 3, 1993, and March 28, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-77 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 221, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Frederick J. Hebdon

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 26, 1996

cc:
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Mr. William E. Holland
Senior Resident Inspector
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Mr. Michael H. Mobley, Director
Division of Radiological Health
3rd Floor, L and C Annex
401 Church Street
Nashville, TN 37243-1532

County Judge
Hamilton County Courthouse
Chattanooga, TN 37402-2801

ATTACHMENT TO LICENSE AMENDMENT NO. 221

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
2-5	2-5

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
1. Manual Reactor Trip	Not Applicable	Not Applicable	
2. Power Range, Neutron Flux	Low Setpoint - ≤ 25% of RATED THERMAL POWER	Low Setpoint - ≤ 27.4% of RATED THERMAL POWER	R145
	High Setpoint - ≤ 109% of RATED THERMAL POWER	High Setpoint - ≤ 111.4% of RATED THERMAL POWER	R145
3. Power Range, Neutron Flux, High Positive Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 second	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 second	
4. Power Range, Neutron Flux, High Negative Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 second	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 second	
5. Intermediate Range, Neutron Flux	≤ 25% of RATED THERMAL POWER	≤ 45.20% of RATED THERMAL POWER	R189
6. Source Range, Neutron Flux	≤ 10^5 counts per second	≤ 1.45 x 10^5 counts per second	R189
7. Overtemperature ΔT	See Note 1	See Note 3	
8. Overpower ΔT	See Note 2	See Note 4	
9. Pressurizer Pressure--Low	≥ 1970 psig	≥ 1964.8 psig	
10. Pressurizer Pressure--High	≤ 2385 psig	≤ 2390.2 psig	R145
11. Pressurizer Water Level--High	≤ 92% of instrument span	≤ 92.7% of instrument span	
12. Loss of Flow	≥ 90% of design flow per loop*	≥ 89.6% of design flow per loop*	

*Design flow is 91,400 gpm per loop.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 212
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated August 21, 1992, which was supplemented September 3, 1993, and March 28, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No.212 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Frederick J. Hebdon

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 26, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 212

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
2-5	2-5

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
1. Manual Reactor Trip	Not Applicable	Not Applicable	
2. Power Range, Neutron Flux	Low Setpoint - ≤ 25% of RATED THERMAL POWER	Low Setpoint - ≤ 27.4% of RATED THERMAL POWER	R132
	High Setpoint - ≤ 109% of RATED THERMAL POWER	High Setpoint - ≤ 111.4% of RATED THERMAL POWER	R132
3. Power Range, Neutron Flux, High Positive Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 seconds	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 seconds	R36
4. Power Range, Neutron Flux, High Negative Rate	≤ 5% of RATED THERMAL POWER with a time constant ≥ 2 seconds	≤ 6.3% of RATED THERMAL POWER with a time constant ≥ 2 seconds	R3
5. Intermediate Range, Neutron Flux	≤ 25% of RATED THERMAL POWER	≤ 45.20% of RATED THERMAL POWER	R177
6. Source Range, Neutron Flux	≤ 10^5 counts per second	≤ 1.45 x 10^5 counts per second	R177
7. Overtemperature ΔT	See Note 1	See Note 3	
8. Overpower ΔT	See Note 2	See Note 4	R132
9. Pressurizer Pressure--Low	≥ 1970 psig	≥ 1964.8 psig	
10. Pressurizer Pressure--High	≤ 2385 psig	≤ 2390.2 psig	R203
11. Pressurizer Water Level--High	≤ 92% of instrument span	≤ 92.7% of instrument span	
12. Loss of Flow	≥ 90% of design flow per loop*	≥ 89.6% of design flow per loop*	

*Design flow is 91,400 gpm per loop.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 221 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 212 TO FACILITY OPERATING LICENSE NO. DPR-79

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

By application dated August 21, 1992, which was supplemented by letters dated September 3, 1993, and March 28, 1996, the Tennessee Valley Authority (the licensee) proposed amendments to the Technical Specifications (TS) for Sequoyah Nuclear Plant (SQN) Units 1 and 2. The requested changes would revise the allowable value for the reactor coolant system (RCS) loss of flow reactor trip setpoint from greater than or equal to 89.4 percent to greater than or equal to 89.6 percent. The proposed change would affect TS Table 2.2-1.

The supplements supplied additional information that did not affect the previous no significant hazards consideration.

2.0 EVALUATION

The function of the RCS loss of flow reactor trip is to protect the core from departure from nucleate boiling should coolant flow be lost and to provide protection against loss of flow conditions that affect only one reactor coolant loop. Flow is measured in each loop by three differential pressure measurements at an elbow tap in each of the four coolant loops. A reactor trip signal would be generated should two of the three flow instruments (two-of-three coincidence circuit) in a loop detect a low flow condition in that loop. This reactor trip signal is blocked below Permissive P-7 (10 percent power) to allow for plant startup. Above this power level, up to Permissive P-8 (35 percent power), two of the four loops detecting low flow would cause a reactor trip. Above P-8, detection of low flow in any loop will cause a reactor trip.

The minimum RCS low flow setpoint presently specified in the TS is 89.4 percent of design flow. Therefore, if two out of the three coolant flow instruments in any loop detect that flow has decreased from full flow to 89.4 percent, a reactor trip will occur unless the trip is blocked.

ENCLOSURE 3

The TS require that the setpoint be equal to or greater than 89.4 percent of design flow. The licensee has requested that this setpoint be changed to 89.6 percent in order to update the TS to the latest revision of the Westinghouse Electric Corporation setpoint methodology. This methodology incorporates the effects of additional uncertainties from using elbow taps on the allowances used to determine the loss of flow setpoint. This evaluation is described in Westinghouse Letter TVA-91-349 dated November 6, 1991. Previously, the evaluation that determined the allowances for the loss of flow reactor trip setpoint normalized the uncertainties associated with RCS elbow tap sensor calibration accuracy, measurement and test equipment accuracy, sensor pressure effects, and sensor temperature effects, to a value of 0.0 percent of flow instrument span, based on the use of primary to secondary calorimetrics. However, hot and cold leg temperature streaming phenomena has invalidated the use of primary to secondary calorimetrics to accurately calculate RCS flow.

In their letter dated March 28, 1996, the licensee described the methodology currently being used to determine the RCS loss of flow reactor trip setpoint. The licensee indicated that flow correlation coefficients, or K values, are used to calculate the RCS flow rate from the equation $Q=K(\Delta P)^{0.5}$. The licensee determined the K values for each elbow tap in each loop based on the initial baseline Cycle 1 calorimetric flow rate. The K values for the three elbows taps in each of the four loops for Units 1 and 2 are provided in Tables 1 and 2, respectively. These K values are used to determine the full scale span of the flow instrument loop and, hence, the RCS loss of flow setpoint. It is requested that the licensee inform the staff if these elbow tap coefficients are changed.

Since normalization of the elbow tap uncertainties can no longer be applied, a ±0.3 percent flow span allowance is applied to each of the sensor effects indicated above. The change to the individual allowances has resulted in an increase in the channel statistical allowance from 2.3 percent to 2.5 percent, which correlates to an increase in the loss of flow reactor trip setpoint allowable value from 89.4 percent to 89.6 percent.

This change in the allowable value would be in the conservative direction (i.e., the setpoint would be closer to actual RCS flow). Therefore, the proposed change does not adversely affect nuclear safety, but would result in a conservative increase in the RCS loss of flow reactor trip setpoint allowable value that is consistent with the SQN accident analysis. The licensee has determined that no other changes are required for the setpoint change, nor are any other safety-related functions affected as a result of the elbow tap measurement of RCS flow. Based on this analysis, the staff has determined that the proposed change is acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (57 FR 45090). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Attachment: Tables 1 & 2

Principal Contributors: J. Ganiere, H. Balukjian, D. LaBarge

Dated: April 26, 1996

TABLE 1
UNIT 1
ELBOW TAP FULL SCALE ΔP SPAN

1-FT-68-	MMI TEST POINT	FLOW COEFFICIENT (K)	DESCRIPTION	FULL SCALE ΔP ("H_2O)
6A	F-414	5679.10	Loop 1 RCS Flow	335.74
6B	F-415	5590.30	Loop 1 RCS Flow	346.50
6D	F-416	5545.83	Loop 1 RCS Flow	352.07
29A	F-424	5626.24	Loop 2 RCS Flow	342.08
29B	F-425	5505.13	Loop 2 RCS Flow	357.30
29D	F-426	5333.06	Loop 2 RCS Flow	380.73
48A	F-434	5493.91	Loop 3 RCS Flow	358.76
48B	F-435	5493.04	Loop 3 RCS Flow	358.87
48D	F-436	5459.96	Loop 3 RCS Flow	363.24
71A	F-444	5117.16	Loop 4 RCS Flow	413.53
71B	F-445	5668.62	Loop 4 RCS Flow	336.99
71D	F-446	5582.65	Loop 4 RCS Flow	347.45

TABLE 2
UNIT 2
ELBOW TAP FULL SCALE ΔP SPAN

2-FT-68-	MMI TEST POINT	FLOW COEFFICIENT (K)	DESCRIPTION	FULL SCALE ΔP ("H_2O)
6A	F-414	5486.40	Loop 1 RCS Flow	359.74
6B	F-415	5357.52	Loop 1 RCS Flow	377.26
6D	F-416	5424.51	Loop 1 RCS Flow	368.00
29A	F-424	5317.59	Loop 2 RCS Flow	382.95
29B	F-425	5201.25	Loop 2 RCS Flow	400.27
29D	F-426	5409.51	Loop 2 RCS Flow	370.04
48A	F-434	5623.24	Loop 3 RCS Flow	342.45
48B	F-435	5422.28	Loop 3 RCS Flow	368.30
48D	F-436	5236.38	Loop 3 RCS Flow	394.92
71A	F-444	5417.06	Loop 4 RCS Flow	369.01
71B	F-445	5421.93	Loop 4 RCS Flow	368.35
71D	F-446	5591.30	Loop 4 RCS Flow	346.37

Attachment

Licensee Response/NRC Response/NRC Question Closure

Id	**275**
NRC Question Number	**RPG-007**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/20/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/20/2014 3:27 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**148**
NRC Question Number	**RPG-008**
Category	**Technical**
ITS Section	**3.9**
ITS Number	**3.9.3**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**Enclosure 2, Volume 14, Revision 0, (pdf page 99 of 236)**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

Page B 3.9.3-5 of ITS Bases for LCO 3.9.3, "Nuclear Instrumentation," provides a listing of references which are relevant to the LCO's Conditions and Surveillance requirements. One of the references concerns applicability of the 10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29 requirements. SQN's LCO Bases mark-up in Enclosure 2, Volume 14, Revision 0, (pdf page 99 of 236) replaces the reference to these specific GDCs with a reference to UFSAR Chapter 7.1.2, titled as, 'Identification of Safety Criteria.' The licensee's Justification For Deviations #2 on page 100 explains the deletion as follows:

> **"Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description."**

A Staff's review of UFSAR Chapter 7.1.2 reveals that the Chapter contains a general listing of design criteria, which do not relate directly to the LCO's requirements, whereas a specific listing of GDCs referenced in the ITS LCO Bases, address certain requirements which are relevant to an explicit LCO's Conditions and Surveillance requirements. The NRC Staff as well as the Regions use such LCO-specific references as one of the tools to ensure that TS specified Systems, Structures and Components are operable per the stated requirements in the references.

The Staff's review has also found similar mark-ups in other TS Bases

	sections. Please review the submittal whether the change(s) is consistent with CTS Bases or negate deletion of specific 10 CFR related references.
Attach File 1	
Attach File 2	
Issue Date	**6/16/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**6/16/2014 2:02 PM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**240**
NRC Question Number	**RPG-008**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 Draft Response to RAI RPG-008.pdf** (2MB)
Attachment 2	
Response Statement	

In response to RAI RPG-008, the References Section of ITS 3.9.3 Bases markup will be revised from including UFSAR Section 7.1.2, to including 10 CFR 50, Appendix A, General Design Criteria (GDC) 13, 26, 28 and 29, as specified in the ISTS (pages 93 and 99 of Enclosure 2, Volume 14).

Additional instances of 10 CFR related references being deleted or replaced with other references in the ISTS Bases markups occur in the following Bases Sections:

- **ISTS 3.4.14 Bases markup, Reference 8 (10 CFR 50.55a(g)) – The only place within the ISTS 3.4.14 Bases markup that this reference is used is in the discussion of the basis for the 18 month Frequency associated with the performance of SR 3.4.14.1. This discussion is being moved to the Surveillance Frequency Control Program as part of the adoption of TSTF-425, as discussed in JFD 6.**

- **ISTS 3.4.16 Bases markup, second Reference 1 of Insert 8 (TSTF-490) – As stated in the Reviewer's Note of TSTF-490, Insert 8, the first listed References 1 and 2 are for plants that are licensed to 10 CFR 100.11. The second listed References 1 and 2 are for plants that are licensed to 10 CFR 50.67. The RCS specific activity limits are established to minimize the dose consequences in the event of a steam line break (SLB) or steam generator tube rupture (SGTR) event. SQN is licensed to 10 CFR 50.67 only for a fuel handling accident. Therefore, SQN has adopted the first listed References 1 and 2 to reflect the license basis use of the 10 CFR 100.11 dose limits for SLB and SGTR. This results in a deletion of the second listed References 1 and 2.**

- **ISTS 3.6.6C (ITS 3.6.6) Bases markup, Reference 1 – Reference 1 lists several GDCs to which the Containment Spray System is designed. ISTS 3.6.6C Bases assume that the Containment Spray System includes a Spray Additive System that injects sodium hydroxide solution into the spray to adjust the pH of the water to scavenge iodine fission products from the containment atmosphere and ensure their retention in the containment sump water. However, as discussed in JFD 3, SQN design does not include a Spray Additive System. Therefore, the GDCs (41, 42, and 43) that are associated with containment atmosphere cleanup have not been retained in Reference 1.**

- **ISTS 3.6.10 (ITS 3.6.8) Bases markup, Reference 2 – Reference 2 (10 CFR 50, Appendix A, GDC 41) appears in ISTS Bases 3.6.10 Background Section as a part of the discussion regarding the regulatory basis for requiring the**

Hydrogen Ignition System (Hydrogen Mitigation System). However, as discussed in SQN UFSAR Section 3.1, regarding compliance with GDC 41, "Containment Atmosphere Cleanup," the systems relied upon for compliance with GDC 41 are the Emergency Gas Treatment System, Auxiliary Building Gas Treatment System, and the Air Return Fan System. Therefore, the discussion of GDC 41 has been removed from the discussion in the Background Section of the Hydrogen Mitigation System Bases, as indicated in the ISTS 3.6.10 Bases markup.

- ISTS 3.7.15 (ITS 3.7.13) Bases markup, Reference 5 – Reference 5 (10 CFR 100.11) is provided in the ISTS 3.7.15 Bases Applicable Safety Analyses Section to indicate that doses at the exclusion area boundary, as the result of a fuel handling accident, are within the licensed dose limits. Because SQN has been approved for selective use of the alternate source term dose limits of 10 CFR 50.67 for a fuel handling accident, Reference 5 has been changed from 10 CFR 100.11 to 10 CFR 50.67.

- ISTS 3.9.7 Bases markup, Reference 4 (ITS 3.9.7 Reference 3) – Reference 4 (10 CFR 100.11) is provided in the ISTS 3.9.7 Bases Applicable Safety Analyses Section to indicate that offsite doses, as the result of a fuel handling accident, are within the licensed dose limits. Because SQN has been approved for selective use of the alternate source term dose limits of 10 CFR 50.67 for a fuel handling accident, Reference 4 has been changed from 10 CFR 100.11 to 10 CFR 50.67.

See Attachment 1 for the draft ITS 3.9.3 Bases changes discussed above.

Response Date/Time	**8/5/2014 9:20 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/5/2014 8:18 AM**
Date Modified	
Modified By	

10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 1

REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29~~. ~~2~~

~~UFSAR, Section 7.1.2~~

U

2. FSAR, Section ~~[~~15.2.4~~]~~. 3 2

3. UFSAR, Section 15.3.3 2

10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-------------------------------REVIEWER'S NOTE-------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--~~]

1

REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29~~. ~~2~~

~~UFSAR, Section 7.1.2~~

U

2. FSAR, Section ~~[~~15.2.4~~]~~. 3 2

3. UFSAR, Section 15.3.3 2

Licensee Response/NRC Response/NRC Question Closure

Id	**280**
NRC Question Number	**RPG-008**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/21/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/21/2014 1:22 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**149**
NRC Question Number	**RPG-009**
Category	**Technical**
ITS Section	**3.9**
ITS Number	**3.9.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**Enclosure 2, Volume 14, Revision 0, Page B 3.9.1-2; (pdf page 29 of 236),**
NRC Reviewer Supervisor	**Select**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS Bases for LCO 3.9.1, "Boron Concentration,' states,**

> **During refueling operations, the reactivity condition of the core is SAFETY consistent with the initial conditions assumed for the boron dilution ANALYSES accident in the accident analysis and is conservative for MODE 6. The boron concentration limit specified in the COLR is based on the core reactivity at the beginning of each fuel cycle (the end of refueling) and includes an uncertainty allowance.**

SQN's mark-up in Enclosure 2, Volume 14, Revision 0, Page B 3.9.1-2; (pdf page 29 of 236), for LCO 3.9.3 1 Bases replaces the first sentence (shown in bold above) with the following insert:

> **'An uncontrolled boron dilution accident is not credible during refueling. This accident is prevented by administrative controls which isolate the RCS from significant sources of unborated water.'**

The licensee's Justification For Deviations #2 on page 38 explains the proposed change as follows:

> **"Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description."**

The staff's review of UFSAR Chapter 15.2.4.determined that Boron dilution during refueling, startup, and power operation are considered in the licensee's analysis for the Uncontrolled Boron Dilution. The purpose of the Technical Specification Bases is to explain the reasons for the TS requirements. The licensee's proposed change to the Bases appears to conflict with the accident analysis in the CLB, and appears to imply, without any supporting technical basis, that the LCO doesn't apply during refueling. However, the LCO does apply during refueling mode, so please correct the proposed Bases to correctly reflect the CLB and associated TS requirements, or explain the basis for stating that an uncontrolled boron dilution accident is not credible during refueling.

Attach File 1	
Attach File 2	
Issue Date	**6/16/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**6/16/2014 2:06 PM**
Notification	**Scott Bowman Michelle Conner Robert Elliott Ravinder Grover Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**197**
NRC Question Number	**RPG-009**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**SQN UFSAR Section 15.2.4.2 states, "An uncontrolled boron dilution accident is not credible during refueling. This accident is prevented by administrative controls which isolate the RCS from significant sources of unborated water." The requirements of ITS 3.9.1, "Boron Concentration," are applicable during MODE 6 (Refueling) to ensure adequate boron concentration exists in the reactor coolant system (and the connected refueling canal and refueling cavity) in order to maintain an overall core reactivity of $k_{eff} \leq 0.95$. The ISTS 3.9.1 Bases, as submitted in the ITS Conversion license amendment request, have been marked up to reflect that a boron dilution event is not credible during refueling, as stated in UFSAR Section 15.2.4.2.**
Response Date/Time	**7/21/2014 12:10 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/21/2014 11:08 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**281**
NRC Question Number	**RPG-009**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/21/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/21/2014 2:11 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**150**
NRC Question Number	**RPG-010**
Category	**Technical**
ITS Section	**3.9**
ITS Number	**3.9.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	**Enclosure 2, Volume 14, Revision 0, Page B 3.9.1-2; (pdf page 29 of 236),**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

Page B 3.9.1-2 of ITS Bases for LCO 3.9.1, "Boron Concentration,' states,

> **'The limiting boron dilution accident analyzed occurs in MODE 5 (Ref. 2). A detailed discussion of this event is provided in Bases B 3.1.1, "SHUTDOWN MARGIN (SDM)."'**

SQN's mark-up in Enclosure 2, Volume 14, Revision 0, Page B 3.9.1-2; (pdf page 29 of 236), for LCO 3.9.3 1 Bases replaces the word, 'MODE 5,' with 'during startup,' in the above sentence.

The licensee's Justification For Deviations (JFD) #2 on pdf page 38 explains the deviation as follows:

> **"Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description."**

The SQN's UFSAR Section 15.2.4 discusses the Boron Dilution Accident analysis for the plant operational modes of refueling, startup, and power operations. LCO 3.9.1 mode of applicability is in Mode 6, 'Refueling.' Please provide basis for stating the limiting boron dilution accident analyzed occurs 'during startup,' as the JFD does not provide specific information for the change.

Attach File 1

Attach File 2	
Issue Date	**6/16/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**6/16/2014 2:08 PM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**302**
NRC Question Number	**RPG-010**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 to RGP-010.pdf** (35KB)
Attachment 2	
Response Statement	**In response to RPG-010, the Applicable Safety Analyses section for the Bases of ITS 3.9.1, on pages 29 and 34 of Enclosure 2, Volume 14, will be revised. Specifically, the following sentence, "The limiting boron dilution accident analyzed occurs during startup (Ref. 2)." will be revised to read, "The limiting boron dilution accident analyzed occurs in MODE 5 (Ref. 2)." See Attachment 1 for the draft revised ITS 3.9.1 Bases change discussed above.**
Response Date/Time	**8/28/2014 6:15 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman Michelle Conner Ravinder Grover Khadijah Hemphill Andrew Hon Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/28/2014 5:11 AM**
Date Modified	
Modified By	

BASES

INSERT 1

APPLICABLE SAFETY ANALYSES

~~During refueling operations, the reactivity condition of the core is consistent with the initial conditions assumed for the boron dilution accident in the accident analysis and is conservative for MODE 6.~~ The boron concentration limit specified in the COLR is based on the core reactivity at the beginning of each fuel cycle (the end of refueling) and includes an uncertainty allowance. 2

The required boron concentration and the plant refueling procedures that verify the correct fuel loading plan (including full core mapping) ensure that the k_{eff} of the core will remain ≤ 0.95 during the refueling operation. Hence, at least a 5% Δk/k margin of safety is established during refueling.

During refueling, the water volume in the spent fuel pool, the transfer canal, the refueling canal, the refueling cavity, and the reactor vessel form a single mass. As a result, the soluble boron concentration is relatively the same in each of these volumes.

~~during startup~~

The limiting boron dilution accident analyzed occurs ~~in MODE 5~~ (Ref. 2). A detailed discussion of this event is provided in Bases B 3.1.1, "SHUTDOWN MARGIN (SDM)." ~~2~~

stet

The RCS boron concentration satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires that a minimum boron concentration be maintained in the RCS, the refueling canal, and the refueling cavity while in MODE 6. The boron concentration limit specified in the COLR ensures that a core k_{eff} of ≤ 0.95 is maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality during MODE 6.

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a k_{eff} ≤ 0.95. Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," ensures that an adequate amount of negative reactivity is available to shut down the reactor and maintain it subcritical.

The Applicability is modified by a Note. The Note states that the limits on boron concentration are only applicable to the refueling canal and the refueling cavity when those volumes are connected to the RCS. When the refueling canal and the refueling cavity are isolated from the RCS, no potential path for boron dilution exists.

ACTIONS

A.1

Continuation of positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant

BASES

INSERT 1

APPLICABLE SAFETY ANALYSES

~~During refueling operations, the reactivity condition of the core is consistent with the initial conditions assumed for the boron dilution accident in the accident analysis and is conservative for MODE 6.~~ The boron concentration limit specified in the COLR is based on the core reactivity at the beginning of each fuel cycle (the end of refueling) and includes an uncertainty allowance. 2

The required boron concentration and the plant refueling procedures that verify the correct fuel loading plan (including full core mapping) ensure that the k_{eff} of the core will remain ≤ 0.95 during the refueling operation. Hence, at least a 5% Δk/k margin of safety is established during refueling.

During refueling, the water volume in the spent fuel pool, the transfer canal, the refueling canal, the refueling cavity, and the reactor vessel form a single mass. As a result, the soluble boron concentration is relatively the same in each of these volumes.

~~during startup~~

The limiting boron dilution accident analyzed occurs ~~in MODE 5~~ (Ref. 2). A detailed discussion of this event is provided in Bases B 3.1.1, "SHUTDOWN MARGIN (SDM)." ~~2~~

stet

The RCS boron concentration satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires that a minimum boron concentration be maintained in the RCS, the refueling canal, and the refueling cavity while in MODE 6. The boron concentration limit specified in the COLR ensures that a core k_{eff} of ≤ 0.95 is maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality during MODE 6.

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a k_{eff} ≤ 0.95. Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," ensures that an adequate amount of negative reactivity is available to shut down the reactor and maintain it subcritical.

The Applicability is modified by a Note. The Note states that the limits on boron concentration are only applicable to the refueling canal and the refueling cavity when those volumes are connected to the RCS. When the refueling canal and the refueling cavity are isolated from the RCS, no potential path for boron dilution exists.

ACTIONS

A.1

Continuation of positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant

Licensee Response/NRC Response/NRC Question Closure

Id	**343**
NRC Question Number	**RPG-010**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/22/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**9/22/2014 1:48 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**151**
NRC Question Number	**RPG-011**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.10**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

SQN's LCO 3.4.13 Bases mark-up in Enclosure 2, Volume 14, Revision 0, (pdf page 464 of 696) deletes the following paragraph:

> **For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.**

The licensee's Justification For Deviations #1 on page 474 explains the deletion as follows:

> **"Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description."**

The subject paragraph concerns definition of steady state as applied to the ITS plants. SQN UFSAR Chapter 15 provides a discussion on steady state operations. Please provide plant-specific definition for steady state if it differs from that stated for the ITS plants.

Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Ravinder Grover**
Date Modified	

Modified By	
Date Added	**6/18/2014 2:12 PM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**198**
NRC Question Number	**RPG-011**
Select Application	**Licensee Response**
Attachment 1	**Atachment 1 - RAI RPG-011 Response.PDF** (2MB)
Attachment 2	
Response Statement	**In response to RAI RPG-011, the ITS 3.4.13 Bases markup for the definition of steady state, as it applies to the determination of RCS primary to secondary LEAKAGE, will be included in the discussion of SR 3.4.13.2 (pages 464 and 472 of Enclosure 2, Volume 9), as provided in NUREG-1431, Rev. 4.** **See Attachment 1 for the draft ITS SR 3.4.13.2 Bases changes discussed above.**
Response Date/Time	**7/21/2014 12:55 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/21/2014 11:55 AM**
Date Modified	
Modified By	

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.~~20~~ 17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at ~~room~~ ambient temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG. 5 1

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. ~~For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.~~ For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows. 1

~~[The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.~~

~~OR~~ 3

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 4

The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.~~20~~ 17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at ~~room~~ ambient temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG. 5 1

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. ~~For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.~~ For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows. ~~1~~

~~[The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.~~ 3

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~----------]~~ 4

The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

Licensee Response/NRC Response/NRC Question Closure

Id	**283**
NRC Question Number	**RPG-011**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/21/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/21/2014 2:21 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**152**
NRC Question Number	**RPG-012**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.10**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**pdf page 317 of 696**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

Page B 3.4.10-2 (pdf page 317 of 696 in Enclosure 2, Volume 14, Revision 0) of ITS Bases for LCO 3.4.10, "Pressurizer Safety Valves," lists items 'a' thru 'f' of accidents that could result in overpressurization if not properly terminated. Specifically, item 'b' concerns a Loss of reactor coolant flow accident and item 'f' relates to a Locked rotor occurrence. SQN's mark-up change relocates items 'f'' to item 'b', thus combines the listing of both accidents in item 'b'.

The licensee's Justification For Deviation #3 on page 324 explains the proposed change as follows:

> **"Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description."**

The staff's review of UFSAR Chapter 15 noticed that a 'Complete loss of forced reactor coolant flow,' is considered by the licensee as one of the CONDITION III's Infrequent faults, and a 'Single Coolant reactor pump locked rotor,' is designated as one of the CONDITION IV's Limiting Faults. Since, both of these occurrences are related to a different set of CONDITIONS, these accidents should be listed separately as shown in the ITS Bases. Please explain the basis for combining both accident conditions.

Attach File 1

Attach File 2	
Issue Date	**6/18/2014**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:20 PM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**199**
NRC Question Number	**RPG-012**
Select Application	**Licensee Response**
Attachment 1	**Atachment 1 - RAI RPG-012 Response.PDF** (2MB)
Attachment 2	
Response Statement	**In response to RAI RPG-012, the ITS 3.4.10 Bases markup regarding the discussion of accidents that could result in overpressurization if not properly terminated, will be revised to reflect the standard wording for items a. through f. (pages 317 and 321 of Enclosure 2, Volume 9), as provided in NUREG-1431, Rev. 4.** **See Attachment 1 for the draft ITS 3.4.10 Bases changes discussed above.**
Response Date/Time	**7/21/2014 1:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/21/2014 11:58 AM**
Date Modified	
Modified By	

BASES

APPLICABLE SAFETY ANALYSES

~~All~~ The most limiting accident and safety analyses in the U FSAR (Ref. 2) that require safety valve actuation assume operation of three pressurizer safety valves to limit increases in RCS pressure. The overpressure protection analysis (Ref. 3) is also based on operation of [three] safety valves. Accidents that could result in overpressurization if not properly terminated include: 3

a. Uncontrolled rod withdrawal from full power,

b. Loss of reactor coolant flow, ~~(reactor coolant pump locked rotor)~~ ~~3~~

c. Loss of external electrical load,

d. Loss of normal feedwater, ~~and~~ ~~4~~

e. Loss of all AC power to station auxiliaries~~, and~~ , and ~~.~~ ~~4~~

~~f. Locked rotor.~~ f. Locked rotor. ~~3~~

Detailed analyses of the above transients are contained in Reference 2. Safety valve actuation is required in events c, d, and e (above) to limit the pressure increase. Compliance with this LCO is consistent with the design bases and accident analyses assumptions.

Pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The [three] pressurizer safety valves are set to open at the RCS design pressure (~~2500 psia~~ 2485 psig), and within the ASME specified tolerance, to avoid exceeding the maximum design pressure SL, to maintain accident analyses assumptions, and to comply with ASME requirements. The upper and lower pressure tolerance limits are based on the ± ~~1~~ 3% tolerance requirements (Ref. 1) for lifting pressures above 1000 psig. The limit protected by this Specification is the reactor coolant pressure boundary (RCPB) SL of 110% of design pressure. Inoperability of one or more valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation. 1 3

APPLICABILITY

In MODES 1, 2, and 3~~, and portions of MODE 4 above the LTOP arming temperature,~~ OPERABILITY of [three] valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents. MODE 3 ~~and portions of MODE 4 are~~ is conservatively included, although the listed accidents may not require the safety valves for protection. 2 1 2

BASES

The most limiting U

APPLICABLE SAFETY ANALYSES

~~All~~ accident and safety analyses in the FSAR (Ref. 2) that require safety valve actuation assume operation of three pressurizer safety valves to limit increases in RCS pressure. The overpressure protection analysis (Ref. 3) is also based on operation of [three] safety valves. Accidents that could result in overpressurization if not properly terminated include: 3

a. Uncontrolled rod withdrawal from full power,

b. Loss of reactor coolant flow, ~~(reactor coolant pump locked rotor)~~ ~~3~~

c. Loss of external electrical load,

d. Loss of normal feedwater, ~~and~~ , and ~~4~~

e. Loss of all AC power to station auxiliaries~~, and~~ . ~~4~~

f. Locked rotor. ~~f. Locked rotor.~~ ~~3~~

Detailed analyses of the above transients are contained in Reference 2. Safety valve actuation is required in events c, d, and e (above) to limit the pressure increase. Compliance with this LCO is consistent with the design bases and accident analyses assumptions.

Pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The [three] pressurizer safety valves are set to open at the RCS design pressure (2485 psig ~~2500 psia~~), and within the ASME specified tolerance, to avoid exceeding the maximum design pressure SL, to maintain accident analyses assumptions, and to comply with ASME requirements. The upper and lower pressure tolerance limits are based on the ± 3 ~~1~~% tolerance requirements (Ref. 1) for lifting pressures above 1000 psig. The limit protected by this Specification is the reactor coolant pressure boundary (RCPB) SL of 110% of design pressure. Inoperability of one or more valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation. 1 3

APPLICABILITY

In MODES 1, 2, and 3~~, and portions of MODE 4 above the LTOP arming temperature,~~ OPERABILITY of [three] valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents. MODE 3 is ~~and portions of MODE 4 are~~ conservatively included, although the listed accidents may not require the safety valves for protection. 2 1 2

Licensee Response/NRC Response/NRC Question Closure

Id	**285**
NRC Question Number	**RPG-012**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/21/2014**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**8/21/2014 2:27 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**168**
NRC Question Number	**RPG-013**
Category	**Technical**
ITS Section	**3.4**
ITS Number	**3.4.16**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	**Enclosure 2, Volume 9, Rev. 0 (several pages)**
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Mark Blumberg**
Conf Call Requested	**N**

NRC Question

Question 1

In the subject license amendment request, the licensee proposed technical specification (TS) changes to revise *LIMITING CONDITION FOR OPERATIONS* (*LCO*) 3.4.16 (currently *LCO* 3.4.8), "RCS Specific Activity," *APPLICABILITY* requirements to specify that the *LCO* is applicable in *MODES* 1, 2, 3, and 4. The proposed Bases entitled, "B 3.4.16 RCS Specific Activity," states: "In MODES 1, 2, 3, and 4, operation within the *LCO* limits for *DOSE EQUIVALENT I-131* (*DEI*) and *DOSE EQUIAVALENT XE-133* (*DEX*) is necessary to limit the potential consequences of a SLB [Steam line break] or SGTR [steam generator tube rupture] to within the SRP [Standard Review Plan] acceptance criteria." The licensee also proposed to revise *SURVEILLANCE REQUIREMENT* (*SR*) 3.4.16.1 and *SR* 3.4.16.2 to add the following *NOTE*, "Only required to be performed in MODE 1," thus removing the *APPLICABILITY* of this *SR* to other *MODES*.

The NRC staff has a concern about the proposed addition of the *NOTE* to *SR* 3.4.16.1 and *SR* 3.4.16.2 and the proposed changes to the *MODES* of *APPLICABILITY*. The proposed change revises the conditions for sampling for *SR* 3.4.16.1 and *SR* 3.14.16.2, and may exclude sampling during the plant conditions where *LCO* 3.4.16 may be exceeded. After transient conditions (i.e. reactor trip, plant depressurization, shutdown or startup) that end in *MODES* 2, 3 or 4, the *SR* is not required to be performed. Isotopic spiking and fuel failures are more likely during transient conditions than during steady state plant operations.

Question 1a

Because *LCO* 3.4.16 could potentially be exceeded after plant transient or power changes, please justify why sampling is no longer needed in the plant *MODES* that are proposed to be eliminated and justify how the *LCO* 3.4.16 remains consistent with the design bases analysis from which the *LCO* limits are derived (i.e. SLB, SGTR, etc.).

Question 1b

Please justify why there is an apparent disparity between the *MODES* of *APPLICABILITY* (*MODES* 1, 2, 3, and 4) and the limited mode (*MODE* 1) under which *SR* 3.4.16.1 and *SR* 3.14.16.2 are required.

Question 1c

Enclosure 2, Volume 9, Rev. 0 of the SQN, ITS Conversion, Section 3.4, “Reactor Coolant System (RCS)," (ADAMS Accession No. ML13330A928), page 606 states under the revision to the *APPLICABILITY*:

In MODES 5 and 6, the steam generators are not being used for decay heat removal, the RCS and steam generators are depressurized, and primary to secondary leakage is minimal. Therefore, the monitoring of RCS specific activity is not required.

The current TS 3.4.16 *APPLICABILITY* includes *MODE* 5.

The NRC staff is concerned that limiting the consideration of design basis accidents (DBAs) to only the SGTR and SLB has not been fully justified. Other accidents may be included in the licensing basis that uses the reactor coolant system (RCS) activity such as the small line break outside the containment or some anticipated operating occurrences. By limiting the review to only the SGTR and SLB, other accidents in the licensing basis (or previously not analyzed in the licensing basis because they were not limiting with the current *LCO APPLICABILITY*) do not appear to be considered by the proposed change.

For example, by only considering the SGTR and SLB, some Modes may no longer be considered in the *APPLICABILITY* for *LCO* 3.4.16. This may be equivalent to saying that in Mode 5, that any [emphasis added] *DEI* or *DEX* value would yield acceptable design basis accident doses. A justification for unlimited *DEI* and *DEX* in all possible MODES has not been provided.

Please justify why the *LCO APPLICABILITY* and *SR* should not consider *MODE* 5 accidents.

Question 2

Per the SQN Updated Final Safety Analysis Report (UFSAR), Appendix 15A, “Dose Models Used to Evaluate the Environmental Consequences of Accidents,” Section 15A.2, “Assumptions,” the dose conversion factors (DCFs) used for the dose models of postulated accidents, such as those provided in Section 15A.1 (SGTR, Main SLB [or SLB]), are provided in Table 15A-1. The DCFs in Table 15A-1, “Physical Data for Isotopes,” are taken from the Environmental Protection Agency (EPA), Federal Guidance Report Nos. 11 and 12.

Enclosure 2, Volume 3, Rev. 0 of the SQN, ITS Conversion, Chapter 1.0, Use and Application," (ADAMS Accession No. ML13329A790), page 26 provides

the proposed definition of *DEI*. Unlike the UFSAR analyses, *DEI* is derived using the DCFs from Technical Information Document [TID] -14844, Atomic Energy Commission (AEC), 1962, "Calculation of Distance Factors for Power and Test Reactor Sites." The definition states:

DOSE EQUIVALENT I-131 shall be that concentration of I-131(microcuries per gram) that alone could produce the same thyroid dose when inhaled as the combined activities of iodine isotopes I-131, I-132, I-133, I-134, and I-135 actually present. The determination of DOSE EQUIVALENT I-131 shall be performed using thyroid dose conversion factors from Table III of TID-14844, AEC, 1962, "Calculation of Distance Factors for Power and Test Reactor Sites."

The definition of *DEX* in Enclosure 2 uses the effective DCF for air submersion listed in Table III.1 of EPA, *Federal Guidance Report* No. 12, "External Exposure to Radionuclides in Air, Water, and Soil."

The purpose of the *LCO* for *DEI* and *DEX* is to satisfy Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, criterion 2, which establishes an operating restriction that is an initial condition of a design basis accident (DBA). When a surveillance of the reactor coolant system radionuclides is performed, each acceptable set of DCFs will yield a different *DEI* and *DEX*. As approved by the NRC staff, the intent of TSTF-490 was to allow the licensee to select, from the acceptable list, one DCF reference for the calculation of *DEI*, and one DCF reference for the calculation of *DEX*.

Question 2a

Please confirm that the site-specific limits for both *DEI* and DEX, and the DCFs used for the determination of *DEI* and DEX surveillances, are consistent with the SQN current design-basis radiological dose consequence analyses (i.e. SGTR, SLB, letdown line break, etc.) or justify why the use of different DCFs in the "dose equivalent" TS definitions from those in the DBA analyses yield conservative RCS radioisotopic concentrations and offsite consequence analyses for compliance with 10 CFR 100.

Question 2b

Please provide the information necessary (DCFs and RCS radioisotopic concentrations) for the NRC staff to verify the proposed value of 1612.6 μCi/gm (micro Curies per gram) in the surveillance requirement for DEX.

Question 3

The proposed change deletes the CONDITION requiring gross specific activity of the coolant less than or equal to 100/Ç μCi/gm and proposes to replace it with DEX not within limits. In the current *LCO* 3.4.16, when the gross specific activity of the coolant is greater than 100/Ç μCi/gm, the

REQUIRED ACTION is to take immediate action to begin shutdown of the reactor (be in *HOT STANDBY* with T_{avg} less than 500 °F within 6 hours [emphasis added]). SQN proposes 48 hours [emphasis added] to restore DEX within limits. TSTF-490, Revision 0 provided the following justification for this change:

The Completion Time for revised TS 3.4.16 Required Action B.1 will require restoration of Dose Equivalent Xe-133 to within limit in 48 hours. This is consistent with the Completion Time for current Required Action A.2 for Dose Equivalent I-131. The Completion Time of 48 hours for revised Required Action B.1 is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of an accident occurring during this time period.

For the following reasons the staff needs additional justification for the proposed change:

While it is a correct statement that the proposed change makes the *COMPLETION TIME*s of *REQUIRED ACTION* A.2 and B.1 consistent it is not clear to the NRC staff why the *COMPLETION TIME*s should be consistent. The plant *CONDITIONs* for these *REQUIRED ACTION*s are different. *REQUIRED ACTION* A.2 is required when the plant is in a *CONDITION* analyzed in the design basis accident analyses (RCS *DEI* is between 1 and 60 μCi/gm). Action B.1 is required when the plant is in a *CONDITION* not analyzed [emphasis added] in the design basis accident analyses (DEX is greater than 1612.61 μCi/gm). Typically, the *REQUIRED ACTION* for a *CONDITION* not analyzed requires the plant to take immediate actions to begin shutdown of the plant. The proposed change does not take immediate actions to begin shutdown of the plant, but allows 48 hours before the plant is required to begin shutting down.

Therefore, please provide additional justification for the proposed change to increase the *COMPLETION TIME* of *REQUIRED ACTION* B.1 to 48 hours and why it is acceptable to be in an unanalyzed *CONDITION* for 48 hours consistent with *CONDITION* A which is an analyzed *CONDITION* in the DBA analyses

Typo

Enclosure 2, Volume 9, Rev. 0, page 611, Insert 6 appears to have a typo. DOS EQUIVALENT should be DOSE EQUIVALENT.

Attach File 1

Attach File 2

Issue Date **6/23/2014**

Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**6/23/2014 8:55 AM**
Notification	**Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**328**
NRC Question Number	**RPG-013**
Select Application	**Licensee Response**
Attachment 1	**RAI RPG-013 Attachment 1 Posted Response.pdf** (36KB)
Attachment 2	**RAI RPG-013 Attachment 2 Posted Response.pdf** (2MB)
Response Statement	**Attachment 1 contains the responses to Questions 1a, 1b, 1c, 2a, 2b, and 3 concerning RPG−013. Attachment 2 contains the revised CTS and ISTS markups, revised DOCs M01 and L01, and the addition of JFDs 4 and 6.**

Changes to the ITS submittal associated with the response to RPG-013 are discussed below:

1. **The ITS definition for DOSE EQUIVALENT XE-133 in ITS Section 1.1 will be revised to be consistent with the proposed definition in the CTS markups. Specifically, the phrase, "or the average gamma disintegration energies as provided in ICRP Publication 38, 'Radionuclide Transformations or similar source,' will be deleted. SQN uses the effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, 1993, "External Exposure to Radionuclides in Air, Water, and Soil" to determine DOSE EQUIVALENT XE−133. A Justification for deviation (JFD) 2 indicator will be added to the ITS markups associated with this change. (Pages 57 and 87 of Enclosure 2, Volume 3)**

2. **The CTS markups will be revised to indicate the deletion of proposed ITS 3.4.16 Condition B and the re-sequencing of Condition C to Condition B. The ITS cross references will be revised to align with changes made to ITS 3.4.16. (Pages 578 and 582 of Enclosure 2, Volume 9)**

3. **Discussion of changes (DOCs) M01 and L01 will be revised to align with the deletion of proposed ITS 3.4.16 Condition B and the re-sequencing of Condition C to Condition B. Additionally, DOC L01 will be revised to align with the proposed revision of ITS SR 3.4.16.1 Note. See No. 5 below concerning the revision to the Note. (Pages 587, 588 and 589 of Enclosure 2, Volume 9)**

4. **The ISTS markups will be revised to reflect the deletion of ITS 3.4.16 Condition B. ITS 3.4.16 Condition C will be re-sequenced as Condition B and revised to state, "Required Action and associated Completion Time of Condition A not met. <u>OR</u> DOSE EQUIVALENT I−131 > 21 μCi/gm.**

OR DOSE EQUIVALENT XE-133 not within limit." Justification for deviation (JFD) 4 indicators will be added to the ISTS markups associated with these changes. (Pages 591, 592, 596, and 597 of Enclosure 2, Volume 9)

5. **The ISTS markups will be revised for ITS SR 3.4.16.1 Note and ITS SR 3.4.16.2 Note. Specifically, ITS SR 3.4.16.1 Note will be revised to state, "Only required to be performed in MODES 1, 2, and 3 with T_{avg} ≥ 500ºF." ITS SR 3.4.16.2 Note will be deleted. JFD 4 indicators will be added to the ISTS markups associated with these changes. (Pages 592, 593, 597, and 598)**

6. **JFD 4 will be added to the ITS 3.4.16 Justification for Deviations Section. JFD 4 will state, "Changes are made to ISTS 3.4.16 as a result of discussions between NRC staff and TVA during a public meeting held on August 12, 2014. ISTS 3.4.16 Condition B is deleted, ISTS 3.4.16 Condition C is re-sequenced to Condition B and revised to include a third Condition of 'OR DOSE EQUIVALENT XE-133 not within limit,' and ISTS SR 3.4.16.2 Note associated with DEI is deleted. Additionally, TSTF-490 proposed adding a Note to ISTS SR 3.4.16.1, 'Only required to be performed in MODE 1.' This Note is revised to state, 'Only required to be performed in MODES 1, 2, and 3 with Tavg ≥ 500ºF.'" (Page 601 of Enclosure 2, Volume 9)**

7. **ITS 3.4.16 Bases Actions Section Insert 4 will be deleted. Insert 4 is associated with the originally proposed ITS 3.4.16 Condition B that is now being deleted. ITS 3.4.16 Bases Actions C.1 and C.2 will be re-sequenced to Actions B.1 and B.2 and revised to reflect the changes discussed in No. 4, above. JFD 6 indicators will be added to the markups associated with these changes. (Pages 610, 611, 623, and 624 of Enclosure 2, Volume 9)**

8. **ITS 3.4.16 Bases Surveillance Requirement Section Insert 6 for SR 3.4.16.1 will be revised to state, "A Note modifies the SR to only require the surveillance to be performed in MODES 1, 2, and 3 with Tavg ≥ 500ºF." JFD 6 indicators will be added to the markups associated with this change. Additionally, the typographical error (DOS changed to DOSE) in Insert 6 will be corrected. (Pages 610, 611, 623, and 624 of Enclosure 2, Volume 9)**

9. **ITS 3.4.16 Bases Surveillance Requirement Section Insert 7 for SR 3.4.16.2 will be deleted. This deletion reflects proposed changes to ITS SR 3.4.16.2 discussed in No. 5, above. (Pages 612, 613, 625, and 626 of Enclosure 2, Volume 9)**

10. **JFD 6 will be added to the ITS 3.4.16 Bases Justification for Deviations Section. JFD 6 will state, "Changes are made to be consistent with changes made to the Specification." (Page 629)**

Response Date/Time **9/9/2014 4:35 PM**

Closure Statement	
Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Lynn Mynatt**
Date Added	**9/9/2014 3:34 PM**
Date Modified	
Modified By	

Question 1a Response:

The proposed changes to ITS LCO 3.4.16 remain consistent with the design basis analysis from which the LCO limits are derived (i.e., SLB and SGTR). The SQN design basis SGTR and SLB analyses are based on power operating (MODE 1) conditions and assume RCS activity at TS limits (please refer to the response to question 2a). Therefore, these design basis analyses are bounding for the lower modes of operation. In addition, TVA is proposing to revise the Notes modifying ITS SR 3.4.16.1 and ITS SR 3.4.16.2 (please refer to the response to question 1b).

Question 1b Response:

In response to RAI RPG-013, Question 1b, TVA proposes to delete the ITS SR 3.4.16.2 Note associated with DEI. Sampling for DEI does not require a pressurized sample to maintain gases in solution. Therefore, the requirement to verify DEI within limits will be required to be performed in MODES 1, 2, 3, and 4. The proposed SR 3.4.16.1 Note restricting the sampling of DEX to MODES 1, 2, and 3 with RCS average temperature ≥ 500°F is needed since RCS pressure outside these modes may be insufficient to ensure collection of a representative, homogeneous sample for analysis of gaseous isotopes. Restricting the surveillance to MODES 1, 2, and 3 with T_{avg} ≥ 500°F ensures the necessary plant conditions have been established to produce sufficient pressure and sample flow. Therefore, TVA proposes to change the ITS SR 3.4.16.1 Note associated with DEX to state "Only required to be performed in MODES 1, 2, and 3 with Reactor Coolant System (RCS) average temperature (T_{avg}) ≥ 500 ºF." These changes reduce the apparent disparity between the LCO MODES of Applicability and MODES under which the surveillance requirements are required. These changes are a conservative and more restrictive deviation from TSTF-490, Revision 0. The deletion of SR 3.4.16.2 Note for DEI provides continued assessment of RCS activity for all Modes of Applicability. Given that iodine is the dominant contributor in the SQN Steam Generator Tube Rupture (SGTR) and Steam Line Break (SLB) dose analysis and that TVA is proposing to sample DEI in MODE 1 through MODE 4, the small disparity between the MODES of Applicability and the MODES that require sampling under SR 3.4.16.1 for DEX is acceptable.

Question 1c Response:

The revised LCO is applicable in MODES 1 through 4 to limit the potential radiological consequences of an SLB or SGTR that could occur during these Modes. In MODE 5 with the RCS loops filled, the steam generators are specified as a backup means of decay heat removal via natural circulation. In this Mode however, due to the reduced temperature of the RCS, the probability of a DBA involving the release of significant quantities of RCS inventory is greatly reduced. Therefore, monitoring of RCS specific activity is not required. In Mode 5 with the RCS loops not filled and in Mode 6, the steam generators are not used for decay heat removal, the RCS and steam generators are depressurized, and primary-to-secondary leakage is minimal. Therefore, the monitoring of RCS specific activity is not required.

Question 2a Response:

The Steam Generator Tube Rupture, Main Steam Line Break, and Loss of AC Power all utilize the RCS activity as a source term and scale it to the maximum allowed per Technical Specifications. The Dose Conversion Factors (DCFs) used to determine the Xe-133 equivalence were the Effective

Dose Equivalent DCFs found in Table III.1 of EPA Federal Guidance Report 12. This is consistent with the proposed definition of Xe-133 equivalence.

The DCFs used in the DBA analyses to determine the I-131 equivalence were those corresponding to the Thyroid Committed Dose Equivalent per Unit Intake from Table 2.1 of the EPA Federal Guidance Report (FGR) 11. These are not consistent with the DCFs in Table III of TID-14844. However, the use of the EPA FGR 11 values results in a higher concentration of iodine than if the TID-14844 values were used. Thus the concentrations used in the DBA analyses exceed that which would be allowed by Tech Specs. Therefore the use of the EPA FGR 11 values instead of those in TID-14844 is conservative.

Question 2b Response:

The following is the RCS concentration used in the DBA analyses, the DCFs used, and the determination of the Xe-133 equivalent value.

	Concentration µCi/g	DCF Sv/Bq s m^{-3}	Xe-133 eqv µCi/g
Kr85m	6.74E+00	7.48E-15	3.23E+01
Kr85	1.05E+01	1.19E-16	8.01E-01
Kr87	6.35E+00	4.12E-14	1.68E+02
Kr88	1.18E+01	1.02E-13	7.72E+02
Xe131m	2.58E+01	3.89E-16	6.43E+00
Xe133m	2.83E+00	1.37E-15	2.49E+00
Xe133	9.98E+01	1.56E-15	9.98E+01
Xe135m	5.48E+00	2.04E-14	7.17E+01
Xe135	3.56E+01	1.19E-14	2.72E+02
Xe138	5.09E+00	5.77E-14	1.88E+02
Total			**1612.6**

Question 3 Response:

In response to RAI RPG-013, Question 3, ITS 3.4.16 Condition B will be deleted. In addition, ITS 3.4.16 Condition C will be re-sequenced to Condition B and revised to include a third Condition of “OR DOSE EQUIVALENT XE-133 not within limit.”

The above changes will no longer allow continued operation for up to 48 hours with DEX above the limit. As stated above, the revised ITS 3.4.16 Condition C (re-sequenced to Condition B) will require actions to place the unit in MODE 3 in 6 hours and MODE 5 in 36 hours, if DEX is not within limits.

TSTF-490

INSERT 1 (continued)

DOSE EQUIVALENT XE-133

DOSE EQUIVALENT XE-133 shall be that concentration of Xe-133 (microcuries per gram) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides ~~[~~Kr-85m, Kr-85, Kr-87, Kr-88, Xe-131m, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138~~]~~ actually present. If a specific noble gas nuclide is not detected, it should be assumed to be present at the minimum detectable activity. The determination of DOSE EQUIVALENT XE-133 shall be performed using ~~[~~effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, 1993, "External Exposure to Radionuclides in Air, Water, and Soil" ~~or the average gamma disintegration energies as provided in ICRP Publication 38, "Radionuclide Transformations" or similar source]~~. 2

TSTF-490

INSERT 1 (continued)

DOSE EQUIVALENT XE-133	DOSE EQUIVALENT XE-133 shall be that concentration of Xe-133 (microcuries per gram) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides ~~[~~Kr-85m, Kr-85, Kr-87, Kr-88, Xe-131m, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138~~]~~ actually present. If a specific noble gas nuclide is not detected, it should be assumed to be present at the minimum detectable activity. The determination of DOSE EQUIVALENT XE-133 shall be performed using ~~[~~effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, 1993, "External Exposure to Radionuclides in Air, Water, and Soil" ~~or the average gamma disintegration energies as provided in ICRP Publication 38, "Radionuclide Transformations" or similar source~~]. 2

REACTOR COOLANT SYSTEM

3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits L01

LCO 3.4.16 3.4.8 ~~The specific activity of the primary coolant shall be limited to:~~

SR 3.4.16.2 a. Less than or equal to 0.35 microcuries/gram DOSE EQUIVALENT I-131, and

~~b. Less than or equal to 100/$\bar{E}$ microcuries/gram~~.

Applicability APPLICABILITY: MODES 1, 2, 3, and 4 ~~and 5~~

ACTION: L01

MODES 1, 2 and 3~~*~~

not within limit L01

L01

Add proposed Required Action C.2. M01

Action A a. With ~~the specific activity of the primary coolant greater than 0.35 microcuries/gram~~ DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval or ~~exceeding the limit line shown on Figure 3.4-1~~, be in at least HOT STANDBY ~~with T_{avg} less than 500°F~~ within 6 hours. LCO 3.0.4.c is applicable.

Required Action C.1

Action A Note

DOSE EQUIVALENT XE-133 not within limits ~~restore within limits in 48 hours.~~ L01

Action B b. With the ~~specific activity of the primary coolant greater than~~ 100/$\bar{E}$ ~~microcuries/gram~~, be in at least HOT STANDBY ~~with T_{avg} less than 500°F~~ within

Required Action C.1 6 hours. ~~Add proposed Action B Note.~~ L01

Add proposed Required Action C.2 M01

B MODES 1, 2, 3, 4 ~~and 5~~ B L01

a. With ~~the specific activity of the primary coolant greater than~~

not within limit L01

Required Action A.1 ~~0.35 microcuries/gram~~ DOSE EQUIVALENT I-131 ~~or greater than 100/$\bar{E}$ microcuries/gram~~, perform the sampling and analysis requirements of item 4a of Table 4.4-4 ~~until the specific activity of the primary coolant is restored to within its limits~~. A02

L01

~~*With T_{avg} greater than or equal 500°F~~.

REACTOR COOLANT SYSTEM

3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

LCO 3.4.16 3.4.8 ~~The specific activity of the primary coolant shall be limited to:~~ RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits L01

SR 3.4.16.2 a. Less than or equal to 0.35 microcurie per gram DOSE EQUIVALENT I-131, and

~~b. Less than or equal to 100/Ē microcuries per gram.~~

Applicabilty APPLICABILITY: MODES 1, 2, 3, and 4 ~~and 5~~

ACTION:

MODES 1, 2 and 3~~*~~: L01

not within limit

Action A a. With ~~the specific activity of the primary coolant greater than 0.35 microcurie per gram~~ DOSE EQUIVALENT I-131 not within limit for more than 48 hours during one continuous time interval ~~or~~

Required Action ~~C~~ B.1 ~~exceeding the limit line shown on Figure 3.4-1~~, be in at least HOT STANDBY ~~with T_{avg} less than 500°F~~ within 6 hours. LCO 3.0.4.c is applicable. Add proposed Required Action ~~C~~ B.2. L01

Action A Note

Add proposed Action B

Action B b. With the ~~specific activity of the primary coolant greater than 100/Ē microcurie per gram~~ DOSE EQUIVALENT XE-133 not within limits ~~restore within limits in 48 hours.~~, be

Required Action ~~C~~ B.1 in at least HOT STANDBY ~~with T_{avg} less than 500°F~~ within 6 hours. L01

B

Add proposed Required Action ~~C~~ B.2.

MODES 1, 2, 3, 4 ~~and 5~~: M01

Required Action A.1 a. With ~~the specific activity of the primary coolant greater than 0.35 microcurie per gram~~ DOSE EQUIVALENT I-131 not within limit ~~or greater than 100/Ē microcuries per gram,~~ perform the sampling and analysis requirements of item 4a of Table 4.4-4 ~~until the specific activity of the primary coolant is restored to within its limits~~. L01 A02

~~* With T_{avg} greater than or equal to 500°F~~. L01

DISCUSSION OF CHANGES
ITS 3.4.16, RCS SPECIFIC ACTIVITY

MORE RESTRICTIVE CHANGES

M01 CTS 3.4.8 requires the specific activity of the reactor coolant to be within limit whenever the reactor is in MODES 1, 2, 3, 4 and 5. In addition when a unit shutdown is required in MODES 1, 2 and 3* (Footnote * limits MODE 3 Applicability to Tavg ≥ 500°F) by CTS 3.4.8 ACTION a and CTS 3.4.8 ACTION b, the unit is required to be in HOT STANDBY with T_{avg} less than 500°F within 6 hours. ITS 3.4.16 Applicability, with TSTF-490-A incorporated, requires the RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity to be within limits during MODES 1, 2, 3 and 4. ITS 3.4.16 Required Action ~~C~~.1 requires the unit to be in MODE 3 within 6 hours and Required Action ~~C~~.2 requires the unit to be in MODE 5 within 36 hours. This changes the CTS by relaxing the requirement to be "less than 500°F within 6 hours," to "be in MODE 3 in 6 hours," and by adding Required Action ~~C~~.2 to enter MODE 5 within 36 hours. The change that deletes the E-bar requirement and replaces it with a DOSE EQUIVALENT XE-133 requirement is discussed in DOC L01.

B

This change is acceptable because the requirement to place the unit in MODE 5 places the unit outside the MODE of Applicability. The Completion Time is based on operating experience and the need to reach the required condition from full power in an orderly manner and without challenging unit systems. This change is designated as more restrictive because it adds a new requirement for the unit to be in MODE 5.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS Table 4.4-4 Item 2 requires, in part, verifying isotopic analysis for DOSE EQUIVALENT I-131 concentration once per 14 days. ITS SR 3.4.16.2 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." Additionally ITS SR 3.4.16.1 has been added to verify reactor coolant DOSE EQUIVALENT XE-133 specific activity within limits at a periodic Frequency of, "In accordance with the Surveillance Frequency Control Program." (See DOC L01 for discussion of adding ITS SR 3.4.16.1.) This changes the CTS by moving the specified Frequencies for these SRs and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the

DISCUSSION OF CHANGES
ITS 3.4.16, RCS SPECIFIC ACTIVITY

Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LA02 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS Table 4.4-4 Item 2 requires an isotopic analysis to determine whether DOSE EQUIVALENT I-131 concentration is within limit. CTS Table 4.4-4 Item 4 requires an isotopic analysis for iodine including I-131, I-133, and I-135. ITS SR 3.4.16.2 requires the verification that the reactor coolant DOSE EQUIVALENT I-131 specific activity is within limit. ITS 3.4.16 Required Action A.1 requires the verification that DOSE EQUIVALENT I-131 is ≤ 21.0 μCi/gm. This changes the CTS by moving the detail that an Isotopic Analysis or Isotopic Analysis for Iodine including I-131, I-133, and I-135 must be performed to satisfy the requirements of the Surveillance and Action to the ITS Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because the type of information is not necessary to be included in the Technical Specifications to provide adequate protection to public health and safety. ITS SR 3.4.16.2 and ITS 3.4.16 Required Action A.1 still retain the requirements to verify the reactor coolant DOSE EQUIVALENT I-131 is within limit. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 1 – Relaxation of LCO Requirements)* CTS 3.4.8 requires the specific activity of the primary coolant to be less than or equal to 100/$\bar{E}$ μCi/gram. CTS 3.4.8 ACTION b states that if the limit is not met, then the unit must be shut down to HOT STANDBY with T_{avg} less than 500°F within 6 hours – no restoration time prior to the shutdown is provided. Furthermore, if the limit is not met, ACTION a (MODES 1, 2, 3, 4 and 5) requires the sample and analysis requirements of Table TS 4.4-4, item 4.a (an isotopic analysis for iodine), to be performed every 4 hours. Table 4.4-4 Item 3, requires a "Radiochemical for E bar Determination" analysis performed every 6 months with a Footnote limitation (Footnote *) that a minimum of 2 EFPD and 20 days of POWER OPERATION have elapsed since the reactor was last subcritical for 48 hours or longer prior to performance of the analysis. ITS 3.4.16 does not include any requirements related to $\bar{E}$. ITS LCO 3.4.16 requires the DOSE EQUIVALENT XE-133 limit to be met. SR 3.4.16.1

DISCUSSION OF CHANGES
ITS 3.4.16, RCS SPECIFIC ACTIVITY

states that the DOSE EQUIVALENT XE-133 must be ≤ 1612.6 μCi/gm and only requires ~~of~~ the Surveillance to be performed in MODES 1, 2, and 3 with T_{avg} ≥ 500°F. If DOSE EQUIVALENT XE-133 is not within the limit, ITS 3.4.16 ACTION B ~~provides 48 hours to restore the DOSE EQUIVALENT XE-133 to within its limits prior to requiring~~ requires a unit shutdown. ~~It also allows LCO 3.0.4.c to be applicable when in ACTION B~~. Furthermore, when DOSE EQUIVALENT XE-133 is not within its limit, the ITS does not require the isotopic analysis for iodine to be performed every 4 hours. This changes the CTS by deleting the Ē requirements on the primary coolant gross specific activity and replacing it with the DOSE EQUIVALENT XE-133 requirements on primary coolant noble gas activity, consistent with Technical Specification Task Force (TSTF) change traveler TSTF-490-A.

CTS 3.4.8 Applicability for DOSE EQUIVALENT I-131 and E bar is required in MODES 1, 2, 3, 4, and 5. ITS 3.4.16 Applicability for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 is required in MODES 1, 2, 3, and 4. This changes the CTS Applicability for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 to MODES 1, 2, 3, and 4, consistent with TSTF-490-A.

The proposed changes are consistent with TSTF-490-A, Revision 0. TSTF-490-A, Revision 0, "Deletion of E Bar definition and Revision to RCS Specific Activity Tech Spec" was announced for availability in the Federal Register on March 15, 2007 as part of the consolidated line item improvement process. The changes were approved by the NRC staff Safety Evaluation (SE) dated March 8, 2007 (ADAMS Accession No. ML070250176). TVA has reviewed the NRC staff SE listed above, the Federal Notice for comment published November 20, 2006 (including the SE), and the Federal Notice for availability published on March 15, 2007. TVA has concluded that the justifications presented in TSTF-490-A, Revision 0 and the model SE prepared by the NRC staff are applicable to SQN and justify this change. The change incorporating the newly defined quantity DOSE EQUIVALENT XE-133 is acceptable from a radiological dose perspective, since it will result in an LCO that more closely relates to non-iodine RCS activity limits to the dose consequence analysis which form the bases. The Dose Conversion Factors used in the determination of DOSE EQUIVALENT I-131 and XE-133 are consistent with Dose Conversion factors used in the applicable dose consequence analysis. This change is less restrictive because the LCO is now being based on noble gas activity ~~and a limited amount of time (48 hours) is provided to restore the limit prior to requiring a unit shutdown~~.

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CTS

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

TSTF-490-A

3.4.8 LCO 3.4.16 ~~The specific activity of the reactor coolant shall be within limits~~ RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits.

TSTF-490-A

Applicability APPLICABILITY: MODES ~~1 and 2,~~ 1, 2, 3, and 4
~~MODE 3 with RCS average temperature (T_{avg}) ≥ 500°F~~.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 ~~> 1.0 μCi/gm~~ not within limit.	--------------------NOTE------------------- LCO 3.0.4.c is applicable. --	
	A.1 Verify DOSE EQUIVALENT I-131 ~~within the acceptable region of Figure 3.4.16-1~~ ≤ ~~[60]~~ 21.0 μCi/gm.	Once per 4 hours
	AND	
	A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
B. ~~Gross specific activity of the reactor coolant not within limit.~~ DOSE EQUIVALENT XE-133 not within limit	--------------NOTE----------------- LCO 3.0.4.c is applicable. -- B.1 ~~Be in MODE 3 with T_{avg} < 500°F.~~ Restore DOSE EQUIVALENT XE-133 to within limit.	~~6~~ 48 hours

ACTION a (MODES 1, 2, and 3* and MODES 1, 2, 3, 4, and 5)

Table 4.4-4 Item 4.a

TSTF-490-A

TSTF-490-A 1

~~TSTF-490-A~~ 4

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ACTION a (MODES 1, 2, and 3*)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B ~~C~~. Required Action and associated Completion Time of Condition A ~~or B~~ not met. OR DOSE EQUIVALENT I-131 ~~in the unacceptable region of Figure 3.4.16-1~~ > ~~[60]~~ 21.0 μCi/gm. OR DOSE EQUIVALENT XE-133 not within limit.	B ~~C~~.1 Be in MODE 3 ~~with T_{avg} < 500°F~~. AND B ~~C~~.2 Be in MODE 5	6 hours 36 hours

4 TSTF-490-A 1 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	~~Verify reactor coolant gross specific activity ≤ 100/Ē μCi/gm~~. -----NOTE----- ~~Only required to be performed in MODE 1.~~ Only required to be performed in MODES 1, 2, and 3 with $T_{avg} \geq$ 500°F ----- Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ ~~[280]~~ 1612.6 μCi/gm.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~

4.4.8 Table 4.4-4 Item 1

2 4 TSTF-490-A 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.16.2	~~-----NOTE-----~~ ~~Only required to be performed in MODE 1.~~ ~~----------~~	4
LCO 3.4.8.a Table 4.4-4 Item 2	Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ ~~1.0~~ [ ] 0.35 μCi/gm.	~~[14 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ AND
Table 4.4-4 Item 4.b		Between 2 and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period

1 2 TSTF-490-A 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

3.4.8 LCO 3.4.16 ~~The specific activity of the reactor coolant shall be within limits~~. RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits TSTF-490-A

Applicability APPLICABILITY: MODES ~~1 and 2,~~ 1, 2, 3, and 4
~~MODE 3 with RCS average temperature (T_{avg}) ≥ 500°F~~. TSTF-490-A

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a (MODES 1, 2, and 3* and MODES 1, 2, 3, 4, and 5) A. DOSE EQUIVALENT I-131 ~~> 1.0 μCi/gm~~ not within limit.	--------------------NOTE------------------- LCO 3.0.4.c is applicable. ---	TSTF-490-A
Table 4.4-4 Item 4.a	A.1 Verify DOSE EQUIVALENT I-131 ~~within the acceptable region of Figure 3.4.16-1~~ ≤ ~~[60]~~ 21.0 μCi/gm.	Once per 4 hours TSTF-490-A 1
	AND	
	A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
~~B. Gross specific activity of the reactor coolant not within limit.~~ DOSE EQUIVALENT XE-133 not within limit	--------------NOTE----------------- LCO 3.0.4.c is applicable. --- B.1 ~~Be in MODE 3 with T_{avg} < 500°F~~. Restore DOSE EQUIVALENT XE-133 to within limit.	~~6~~ 48 hours ~~TSTF-490-A~~ 4

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a (MODES 1, 2, and 3*) B ~~C~~. Required Action and associated Completion Time of Condition A ~~or B~~ not met. OR DOSE EQUIVALENT I-131 ~~in the unacceptable region of Figure 3.4.16-1~~ > ~~[60]~~ 21.0 μCi/gm. OR DOSE EQUIVALENT XE-133 not within limit.	B ~~C~~.1 Be in MODE 3 ~~with T_{avg} < 500°F~~. ~~AND~~ ~~C.2 Be in MODE 5~~	6 hours ~~36 hours~~

4 TSTF-490-A 1 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
4.4.8 Table 4.4-4 Item 1 SR 3.4.16.1 ~~Verify reactor coolant gross specific activity ≤ 100/Ē μCi/gm~~. **Only required to be performed in MODES 1, 2, and 3 with $T_{avg} \geq$ 500ºF** -----NOTE----- ~~Only required to be performed in MODE 1.~~ ---------- Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ ~~[280]~~ 1612.6 μCi/gm.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~

2 4 TSTF-490-A 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.16.2	~~-----NOTE-----~~ ~~Only required to be performed in MODE 1.~~ ~~----------~~	4
LCO 3.4.8.a Table 4.4-4 Item 2	Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ [~~1.0~~] 0.35 μCi/gm.	~~[14 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program] 1 2 TSTF-490-A 2 AND
Table 4.4-4 Item 4.b		Between 2 and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.16, RCS SPECIFIC ACTIVITY

1. The ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

2. ISTS SR 3.4.16 (ITS SR 3.4.16.1), and ISTS SR 3.4.16.2 (ITS SR 3.4.16.2) provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies for these SRs under the Surveillance Frequency Control Program.

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant-specific nomenclature, number, reference, system description, analysis, or licensing basis description.

4. Changes are made to ISTS 3.4.16 as a result of discussions between NRC staff and TVA during a public meeting held on August 12, 2014. ISTS 3.4.16 Condition B is deleted, ISTS 3.4.16 Condition C is re-sequenced to Condition B and revised to include a third Condition of "OR DOSE EQUIVALENT XE-133 not within limit," and ISTS SR 3.4.16.2 Note associated with DEI is deleted. Additionally, TSTF-490 proposed adding a Note to ISTS SR 3.4.16.1, "Only required to be performed in MODE 1." This Note is revised to state, "Only required to be performed in MODES 1, 2, and 3 with $T_{avg} \geq 500°F$."

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BASES

ACTIONS (continued)

B.1 and B.2 6

~~INSERT 4~~

~~With the gross specific activity in excess of the allowed limit, the unit must be placed in a MODE in which the requirement does not apply.~~

~~The change within 6 hours to MODE 3 and RCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and prevents venting the SG to the environment in an SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems.~~

or if the DOSE EQUIVALENT XE-133 is > 1612.6 μCi/gm,

~~C.1~~ ~~and C.2~~ 6

~~or B~~

If a Required Action and the associated Completion Time of Condition A is not met , or if the DOSE EQUIVALENT I-131 is > ~~[60.0]~~ 21.0 μCi/gm ~~in the unacceptable region of Figure 3.4.16-1~~, the reactor must be brought to MODE 3 ~~with RCS average temperature < 500°F~~ within 6 hours and MODE 5 within 36 hours. The Completion Times ~~of 6 hours is~~ are allowed reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems ~~MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems~~. 1 TSTF-490-A

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

INSERT 5

~~SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.~~

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. ~~The Surveillance is applicable in MODES 1 and 2, and in MODE 3 with T_{avg} at least 500°F.~~ ~~[The 7 day Frequency considers the unlikelihood of a gross fuel failure during the time.~~ TSTF-490-A 3

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. TSTF-490-A

INSERT 6

INSERT 4

TSTF-490-A

With the DOSE EQUIVALENT XE-133 greater than the LCO limit, DOSE EQUIVALENT XE-133 must be restored to within limit within 48 hours. The allowed Completion Time of 48 hours is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

6

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODES(S), relying on Required Action B.1 while the DOSE EQUIVALENT XE-133 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

INSERT 5

TSTF-490-A

SR 3.4.16.1 requires performing a gamma isotopic analysis and calculating the DOSE EQUIVALENT XE-133 using the dose conversion factors in the DOSE EQUIVALENT XE-133 definition ~~once every 7 days~~. This measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in the noble gas specific activity. 3

INSERT 6

TSTF-490-A

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes with similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of ~~DOS~~ DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

A Note modifies the SR to ~~allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.~~ only require the surveillance to be performed in MODES 1, 2, and 3 with $T_{avg} \geq$ 500°F 6

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~

4

SR 3.4.16.2

specific activity

This Surveillance is performed ~~in MODE 1 only~~ to ensure iodine remains within limit during normal operation and following fast power changes when ~~fuel failure is more apt to occur~~. ~~[The 14 day Frequency is adequate to trend changes in the iodine activity level, considering gross activity is monitored every 7 days.~~

the LCO

iodine spiking is more apt to occur

TSTF-490-A

3

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~

4

The Frequency, between 2 and 6 hours after a power change ≥ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following ~~fuel failure~~; samples at other times would provide inaccurate results.

iodine spiking initiation

TSTF-490-A

~~INSERT 7~~

~~SR 3.4.16.3~~

~~A radiochemical analysis for Ē determination is required with the plant operating in MODE 1 equilibrium conditions. The Ē determination directly relates to the LCO and is required to verify plant operation within the specified gross activity LCO limit. The analysis for Ē is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. [The Frequency of 184 days recognizes Ē does not change rapidly.~~

TSTF-490-A

INSERT 7

TSTF-490-A

~~The Note modifies the SR to allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.~~

BASES

ACTIONS (continued)

6

B.1 and B.2

~~INSERT 4~~

~~With the gross specific activity in excess of the allowed limit, the unit must be placed in a MODE in which the requirement does not apply.~~

~~The change within 6 hours to MODE 3 and RCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and prevents venting the SG to the environment in an SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems.~~

or if the DOSE EQUIVALENT XE-133 is > 1612.6 µCi/gm,

6

~~C.1~~ ~~and C.2~~

~~or B~~

21.0

If a Required Action and the associated Completion Time of Condition A is not met , or if the DOSE EQUIVALENT I-131 is > ~~[60.0]~~ µCi/gm ~~in the unacceptable region of Figure 3.4.16-1~~, the reactor must be brought to MODE 3 ~~with RCS average temperature < 500°F~~ within 6 hours and MODE 5 within 36 hours. The Completion Times ~~of 6 hours is~~ 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 ~~MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems~~.

allowed

1

TSTF-490-A

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

INSERT 5

~~SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.~~

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. ~~The Surveillance is applicable in MODES 1 and 2, and in MODE 3 with T_{avg} at least 500°F.~~ ~~[The 7 day Frequency considers the unlikelihood of a gross fuel failure during the time.~~

TSTF-490-A

3

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

TSTF-490-A

INSERT 6

INSERT 4 TSTF-490-A

With the DOSE EQUIVALENT XE-133 greater than the LCO limit, DOSE EQUIVALENT XE-133 must be restored to within limit within 48 hours. The allowed Completion Time of 48 hours is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period. 6

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODES(S), relying on Required Action B.1 while the DOSE EQUIVALENT XE-133 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

INSERT 5 TSTF-490-A

SR 3.4.16.1 requires performing a gamma isotopic analysis and calculating the DOSE EQUIVALENT XE-133 using the dose conversion factors in the DOSE EQUIVALENT XE-133 definition ~~once every 7 days~~. 3 This measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in the noble gas specific activity.

INSERT 6 TSTF-490-A

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes with similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of ~~DOS~~ DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

A Note modifies the SR to ~~allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.~~ only require the surveillance to be performed in MODES 1, 2, and 3 with $T_{avg} \geq 500^oF$ 6

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~

4

SR 3.4.16.2

specific activity

This Surveillance is performed ~~in MODE 1 only~~ to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur ~~fuel failure is more apt to occur~~. ~~[The 14 day Frequency is adequate to trend changes in the iodine activity level, considering gross activity is monitored every 7 days.~~

TSTF-490-A

3

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~

4

The Frequency, between 2 and 6 hours after a power change ≥ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following iodine spiking initiation ~~fuel failure~~; samples at other times would provide inaccurate results.

TSTF-490-A

~~INSERT 7~~

~~SR 3.4.16.3~~

~~A radiochemical analysis for Ē determination is required with the plant operating in MODE 1 equilibrium conditions. The Ē determination directly relates to the LCO and is required to verify plant operation within the specified gross activity LCO limit. The analysis for Ē is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. [The Frequency of 184 days recognizes Ē does not change rapidly.~~

TSTF-490-A

INSERT 7

TSTF-490-A

~~The Note modifies the SR to allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.~~

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.16 BASES, RCS SPECIFIC ACTIVITY

1. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant-specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. ISTS SR 3.4.16.1 and ISTS SR 3.4.16.2 provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.4.16.1 and SR 3.4.16.2 is "In accordance with the Surveillance Frequency Control Program."

4. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

5. Editorial/grammatical changes to enhance clarity.

6. Changes are made to be consistent with changes made to the Specification.

Enclosure 2, Volume 9, Rev. 0, Page 629 of 696

Licensee Response/NRC Response/NRC Question Closure

Id	**349**
NRC Question Number	**RPG-013**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	
Response Statement	**The NRC staff has reviewed the licensee's response to RPG-013 question 1c. The response states that monitoring of the reactor coolant system is not required in Mode 5 based upon the probability of an accident occurring in Mode 5. Reasonable assurance of adequate protection cannot be based solely on risk.** **Therefore, the staff requests that the licensee provide a justification why the current APPLICABILITY of MODE 5 should be removed from the technical specifications.**
Response Date/Time	**9/25/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**9/25/2014 3:25 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**381**
NRC Question Number	**RPG-013**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**The following information is provided concerning the Staff's response to RAI RPG-013, Question 1.c.** **CTS LCO 3.4.8 is applicable in MODES 1, 2, 3, 4, and 5. ITS LCO 3.4.16 is applicable in MODES 1, 2, 3, and 4. The LCO limits are established to minimize the radiological dose consequences in the event of a steam line break (SLB) or steam generator tube rupture (SGTR) accident. In MODES 1, 2, 3, and 4, operation within the LCO limits for DOSE EQUIVALENT I–131 and DOSE EQUIVALENT XE-133 is necessary to limit the potential consequences of an SLB or SGTR. In MODE 5, the SLB and SGTR are not credible events for a radiological release. (In MODE 5, there is no steam production because the RCS average temperature is ≤ 200ºF.) Therefore, the Applicability for ITS 3.4.16 is limited to the MODES (MODES 1, 2, 3, and 4) in which a radiological release from an SLB or SGTR is credible.**
Response Date/Time	**11/24/2014 12:20 PM**
Closure Statement	
Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**11/24/2014 11:18 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**398**
NRC Question Number	**RPG-013**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**12/16/2014**
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**12/16/2014 8:21 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**205**
NRC Question Number	**RPG-014**
Category	**Technical**
ITS Section	**3.9**
ITS Number	**3.9.4**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

Second paragraph in REVIEWER'S NOTE of ITS Bases for LCO 3.9.4, "Containment Penetrations," in Enclosure 2, Volume 14, Revision 0, Page 127 of 236, states the following:

> **"Additionally, licensees adding the term "recently" must make the following commitment which is consistent with NUMARC 93-01, Revision 4, Section 11.3.6.5 "Safety Assessment for Removal of Equipment from Service During Shutdown Conditions," subheading "Containment -Primary (PWR)/Secondary (BWR)."**

The licensee's proposed change deletes the paragraph in its entirety. The licensee's JUSTIFICATION FOR DEVIATIONS #5 for Bases on page 145 explains the deletion as follow;

> **"The Reviewer's Note has been deleted and appropriate information retained. This Reviews Note is associated with the adoption of TSTF-51, "Revise containment requirements during handling irradiated fuel and core alterations," which added the term 'recently'. TVA added information to the CTS bases when the term 'recently' was added to SQN TS**

under License Amendments 288/278 (Unit 1/Unit 2) (ADAMS Accession Nos. ML033030206 and ML033070057). The Bases is changed to include the applicable information contained in TSTF-51 and NUMARC 91-06. This will allow TVA to have a method in place to promptly close the primary containment (i.e., the equipment hatch) or the secondary containment (i.e., auxiliary building secondary containment enclosure (ABSCE)) using the ABGTS to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored."

The Staff's review finds concerns in two areas:

a) The justification does not address deletion of NUMARC 93-01. It references NUMARC 91-06, and

b) Is SQN committed to specific section 11.3.6.5 of NUMARC 93-01, Revision 4, as identified in the REVIEWERS NOTE? The Staff has noticed that Enclosure 8 provides a listing of SQN's Regulatory Commitments. Item 7 on Page 121 lists commitment to NUMARC 93-01, Section 11 for TSTF-427. However, the NOTE states, "Additionally, licensees adding the term "recently" must make the following commitment which is consistent with NUMARC 93-01, Revision 4, Section 11.3.6.5."

Please explain the above concerns.

Attach File 1	
Attach File 2	
Issue Date	**1/16/2015**
Added By	**Ravinder Grover**
Date Modified	
Modified By	
Date Added	**1/16/2015 1:03 PM**
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**

Roger Scott

Licensee Response/NRC Response/NRC Question Closure

Id	**430**
NRC Question Number	**RPG-014**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for RAI RPG-014.pdf** (1MB)
Attachment 2	
Response Statement	

In response to RPG-014, Justification for Deviation 5 (page 145 of Enclosure 2, Volume 14) will be revised to state, "The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not to be retained in the final version of the plant specific submittal. See Enclosure 8 for SQN's commitment associated with the Reviewer's Note." There will no longer be a reference in JFD 5 to NUMARC 91-06.

Additionally, Enclosure 8, Regulatory Commitments, will be revised to include the commitment required by the Reviewer's Note in ISTS 3.9.4, Applicability Section. The commitment is consistent with NUMARC 93-01, Revision 4, Section 11.3.6.5 "Safety Assessment for Removal of Equipment from Service During Shutdown Conditions," subheading "Containment - Primary (PWR)/Secondary (BWR)." The commitment will state:

"The following guidelines are included in the assessment of systems removed from service during movement [of] irradiated fuel:

- During fuel handling/core alterations, ventilation system and radiation monitor availability (as defined in NUMARC 91-06) should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the fuel decays away fairly rapidly. The basis of the Technical

Specification OPERABILITY amendment is the reduction in doses due to such decay. The goal of maintaining ventilation system and radiation monitor availability is to reduce doses even further below that provided by the natural decay.

- A single normal or contingency method to promptly close primary or secondary containment penetrations should be developed. Such prompt methods need not completely block the penetration or be capable of resisting pressure.

The purpose of the "prompt methods" mentioned above are to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored."

See Attachment 1 for the draft revised ITS 3.9.4 Bases JFD 5 and Enclosure 8.

Response Date/Time	**3/4/2015 6:00 AM**
Closure Statement	
Question Closure Date	
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**3/4/2015 5:01 AM**
Date Modified	
Modified By	

JUSTIFICATION FOR DEVIATIONS
ITS 3.9.4 BASES, CONTAINMENT PENETRATIONS

1. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal. Disposition of the issue associated with this Reviewers Note was in SQN License Amendment 209/199 (U1/U2) [ADAMS Accession No ML013320204], which added CTS 3.9.4.b.2.

4. Typographical/grammatical error corrected.

5. ~~The Reviewer's Note has been deleted and appropriate information retained. This Reviews Note is associated with the adoption of TSTF-51, "Revise containment requirements during handling irradiated fuel and core alterations," which added the term 'recently'. TVA added information to the CTS bases when the term 'recently' was added to SQN TS under License Amendments 288/278 (Unit 1/Unit 2) (ADAMS Accession Nos. ML033030206 and ML033070057). The Bases is changed to include the applicable information contained in TSTF-51 and NUMARC 91-06. This will allow TVA to have a method in place to promptly close the primary containment (i.e., the equipment hatch) or the secondary containment (i.e., auxiliary building secondary containment enclosure (ABSCE)) using the ABGTS to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored.~~

6. ISTS SR 3.9.4.1 Bases contains a statement "This Surveillance demonstrates that each of the containment penetrations required to be in its closed position is in that position. The Surveillance on the open purge and exhaust valves will demonstrate that the valves are not blocked from closing. Also the Surveillance will demonstrate that each valve operator has motive power, which will ensure that each valve is capable of being closed by an OPERABLE automatic containment purge and exhaust isolation signal." ITS SR 3.9.4.1 Bases states "This Surveillance demonstrates that each containment penetration is in its required status. The requirement that penetrations are capable of being closed by an OPERABLE automatic containment ventilation isolation valve, can be verified by ensuring that each required containment ventilation isolation valve operator has motive power." This change is acceptable because it is consistent with the requirements in the Specification.

7. ISTS SR 3.9.4.1 and SR 3.9.4.2 Bases provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not to be retained in the final version of the plant specific submittal. See Enclosure 8 for SQN's commitment associated with the Reviewer's Note.

No.	Commitments for TSTF-446	Due Date/Event
9	Sequoyah Unit 1 & Unit 2 will implement the capability to assess the effect on incremental large early release probability when using the extended completion times for containment isolation valves in the program for managing risk in accordance with 10 CFR 50.65(a)(4) and the plant-specific configuration risk management program.	Upon Implementation
No.	**Commitments for TSTF-493**	**Due Date/Event**
10	Sequoyah will revise the UFSAR to include the methodologies used to determine the as-found and as-left tolerances for Limiting Safety Setting System (LSSS) instrument channel setpoints.	Upon Implementation
11	Sequoyah will develop a monitoring program to adequately track the performance of Master Relays, Slave Relays, Logic Cabinets, Universal Logic Cards, Undervoltage Driver Cards, Safeguards Driver Cards, and Reactor Trip Breakers. (Reference Westinghouse Reports Section 3.2 and 3.5)	Upon Implementation

The above table identifies 13 ~~11~~ commitments by TVA in Enclosure 8 for the SQN conversion to Improved Technical Specifications license amendment request (LAR). Any other statements in this LAR submittal are provided for informational purposes and are not considered regulatory commitments.

No.	Commitment for ITS 3.7.12 Condition B	Due Date/Event
12	Sequoyah will have guidance available describing compensatory measures to be taken in the event of an intentional or unintentional entry into ITS 3.7.12 Condition B.	Upon Implementation

See following page for Commitment 13

No.	Commitment for ITS 3.9.4 Reviewer's Note	Due Date/Event
13	“The following guidelines are included in the assessment of systems removed from service during movement irradiated fuel: - During fuel handling/core alterations, ventilation system and radiation monitor availability (as defined in NUMARC 91-06) should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the fuel decays away fairly rapidly. The basis of the Technical Specification OPERABILITY amendment is the reduction in doses due to such decay. The goal of maintaining ventilation system and radiation monitor availability is to reduce doses even further below that provided by the natural decay. - A single normal or contingency method to promptly close primary or secondary containment penetrations should be developed. Such prompt methods need not completely block the penetration or be capable of resisting pressure. The purpose of the "prompt methods" mentioned above are to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored."	Upon Implementation

Licensee Response/NRC Response/NRC Question Closure

Id	**435**
NRC Question Number	**RPG-014**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**4/21/2015**
Notification	**Mark Blumberg** **Scott Bowman** **Michelle Conner** **Robert Elliott** **Ravinder Grover** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Ravinder Grover**
Date Added	**4/21/2015 4:06 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**153**
NRC Question Number	**VKG001**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1 (a) states, "Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and"** **In order to clearly define the AC Electrical Distribution System as part of this LCO, the LCO 3.8.1 (a) should be reworded as follows: "Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System (two trains of the 6.9 kV Shutdown Boards 1A-A, 1B-B; and 2A-A, 2B-B); and" The change is considered necessary because power supply to Shutdown Boards 1A-A, 1B-B, 2A-A, and 2B-B is discussed in various LCO 3.8.1 conditions. Please provided re-wording of LOC 3.8.1 (a) or justify otherwise.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:39 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**175**
NRC Question Number	**VKG001**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**In response to RAI VKG-001, the following information is provided to justify not including details of the Class 1E electrical distribution system within ITS LCO 3.8.1.** **The Sequoyah Nuclear Plant (SQN) Class 1E electrical distribution system is adequately described in ITS 3.8.1 Bases, Background Section. Within ISTS 3.8.1 Bases markup, on page B 3.8.1-1, Insert 1(pages 99 and 149 of Enclosure 2, Volume 13), the onsite Class 1E electrical distribution system includes a description of the 6.9 kV Shutdown Board arrangement. On page B 3.8.1-3, Insert 8 (pages 104-106 and 154-156), a detailed description of the offsite circuits is provided. The description provides several examples of offsite circuit configurations, including various offsite "power source" combinations available to meet the GDC 17 requirements for an OPERABLE offsite circuit.** **The descriptions of the Class 1E electrical distribution system and offsite circuits provided in the ITS 3.8.1 Bases are details of system design that are not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety.**
Response Date/Time	**7/16/2014 2:30 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:28 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**227**
NRC Question Number	**VKG001**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:52 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**154**
NRC Question Number	**VKG002**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition A states, "One offsite circuit inoperable for reasons other than Condition C." The Completion Time corresponding to Required Action A.2 states, "24 hours from discovery of no offsite power to 6.9 kV Shutdown Board 1A-A or 1B-B concurrent with inoperability of redundant required features"** **It is not clear how the Condition A is related to Shutdown Board 1A-A or 1B-B indicated in Action A.2, and how it is related to Condition C. Because of the complexity of various alternate power feeds to the four 6 kV Shutdown Boards 1A-A, 2A-A, 1B-B, and 2B-B, the Condition A should clearly state the offsite circuit to which specific Shutdown Board(s) is considered inoperable as part of Condition A. Condition A should be revised (similar to the Condition A the licensee presented in the pre-submittal meeting dated June 4, 2013), as follows: "One offsite circuit to 6.9 kV Shutdown Board 1A-A inoperable OR One offsite circuit to 6.9 kV Shutdown Board 1B-B inoperable OR One offsite circuit to 6.9 kV Shutdown Boards 1A-A and 2A-A inoperable OR One offsite circuit to 6.9 kV Shutdown Boards 1B-B and 2B-B inoperable" with a NOTE: "Inoperable offsite circuits to Shutdown Board 2A-A or 2B-B are addressed in Condition C." Please provide requisite re-wording of Condition A or justify otherwise.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**

Date Modified	
Modified By	
Date Added	**6/18/2014 2:40 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**176**
NRC Question Number	**VKG002**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

Current Technical Specifications (CTS) 3.8.1.1, Action a, requires the restoration of an inoperable offsite circuit to an operable status in 72 hours. This action applies to an offsite circuit that is inoperable for any reason.

As stated in ITS 3.8.1 Bases markup, Insert 2, there are several offsite power sources that can be combined to form an offsite circuit. In some cases, combinations of different transformers (i.e., unit station service transformers (USSTs) and/or common service station transformers (CSSTs)) are used. Insert 8 provides four common offsite power source alignments using different combinations of transformers to provide two qualified offsite circuits.

For example, Insert 8, offsite power configuration 2 provides the following combination (simplified):

2. Two offsite circuits consisting of a and b (Circuit 2 relies on automatic transfer to CSST A or CSST C on a loss of one or more USSTs):

a. Normal power source alignments (Circuit 1)

1) USST 1A to 6.9 kV Shutdown Board 1A-A;

2) USST 1B to 6.9 kV Shutdown Board 1B-B;

3) USST 2A to 6.9 kV Shutdown Board 2A-A; and

4) USST 2B to 6.9 kV Shutdown Board 2B-B.

b. Alternate power source alignments (b.1 or b.2) (Circuit 2)

1) From the 161 kV transmission network, through:

(a) CSST A (winding X) to 6.9 kV Shutdown Board 1B-B; and

(b) CSST A (winding Y) to 6.9 kV Shutdown Board 2B-B; or

2) From the 161 kV transmission network, through:

(a) CSST C (winding X) to 6.9 kV Shutdown Board 2A-A; and

(b) CSST C (winding Y) to 6.9 kV Shutdown Board 1A-A.

In the above example, as it pertains to Unit 1 operation, if USST 2A becomes inoperable to 6.9 kV Shutdown Board 2A-A, the offsite circuit is inoperable solely due to an inoperable offsite power source to an opposite unit's shutdown board. Therefore, ITS 3.8.1, Condition C, applies and is entered. If the offsite circuit is inoperable for any other reason, then ITS 3.8.1, Condition A, applies and is entered.

The Required Actions associated with ITS 3.8.1, Condition C, focus on the impact to the shared equipment that the associated unit is crediting that is powered from the opposite unit's 6.9 kV Shutdown Board. The intent of ITS 3.8.1 Condition A is to address the instances of an offsite circuit inoperable for any reason other than the cases covered by Condition C. Therefore, ITS 3.8.1, Condition A is worded correctly to address all other reasons that an offsite circuit may be inoperable.

ITS 3.8.1, Required Action A.2, is provided to ensure that during the time that Condition A is entered, if a required feature becomes inoperable that is redundant to a required feature powered from an associated unit's shutdown board (i.e., for Unit 1, 6.9 kV Shutdown Board 1A−A or 1B-B), then the required feature powered from the associated unit's shutdown board is required to be declared inoperable in 24 hours. Required Action A.2 provides assurance that an event coincident with a single failure of the associated DG will not result in a complete loss of safety function of critical redundant required features.

Response Date/Time	**7/16/2014 2:35 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:33 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**228**
NRC Question Number	**VKG002**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:52 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**155**
NRC Question Number	**VKG003**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition C states, "One offsite circuit inoperable solely due to an offsite power source to 6.9 kV Shutdown Board 2A-A or 2B-B inoperable."** **It is not clear why in the Condition C, the "offsite circuit inoperable" is constrained to "solely due to an offsite power source inoperable" while no such constraint is considered in Condition A.** **Condition C should be revised (similar to the Condition C the licensee presented in the pre-submittal meeting dated June 4, 2013), as follows: "One offsite circuit to 6.9 kV Shutdown Board 2A-A or 2B-B inoperable" with a NOTE: "Only applicable when offsite circuits to 6.9 kV Shutdown Boards 1A-A and 1B-B are OPERABLE." Please provide requisite re-wording of Condition C or justify otherwise. Also, please identify parameters and value/range of parameters which will render an offsite power source/circuit inoperable.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:42 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**177**
NRC Question Number	**VKG003**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

ITS 3.8.1 Condition C is applicable to the specific cases of an inoperable offsite circuit due to an inoperable power source to an opposite unit's 6.9 kV Shutdown Board. The Required Actions associated with Condition C focus on the impact to the shared equipment that the associated unit is crediting that is powered from the opposite unit's 6.9 kV Shutdown Board. The Note that modified Condition C, as presented during the June 4, 2013 pre-submittal meeting, was later removed with the rewording of Condition C to refer to an offsite circuit inoperable solely due to an inoperable power source to an opposite unit's 6.9 kV Shutdown Board. The reworded Condition meets the same intent of specifying that Condition C entry depends on the operability of offsite circuits to the associated unit's 6.9 kV Shutdown Boards.

The intent of ITS 3.8.1 Condition A is to address the instances of an offsite circuit inoperable for any reason other than the cases covered by Condition C. ITS 3.8.1 Condition A addresses all instances of an inoperable offsite circuit that are currently addressed by CTS 3.8.1.1 Action a, with the exception of an offsite circuit inoperable due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition C). Therefore, the wording of ITS 3.8.1 Condition C is appropriate.

The operability of Sequoyah Nuclear Plant (SQN) offsite power sources is dependent on several factors which are under the control of and are the responsibility of the Transmission Operator. These include:

1. **Total System Load**

2. **SQN Switchyard configuration (including Intertie Transformer and Capacitor Bank)**

3. **Configuration of 161kV and 500kV Transmission Lines outside SQN**

The required minimum post-accident voltage for a normal SQN load alignment is 153kV at all times. SQN has alternate load alignments with higher minimum post-accident voltage requirements (159kV) which, therefore, require notification to the Transmission Operator:

1. **Supplying more than one shutdown board from a single common station service transformer (CSST) winding (Start Bus).**

2. **Transferring any boards fed from the 6.9kV Common Boards to alternate or**

transferring any 480V Unit Board, Turbine Building Motor Operated Valve or Vent Board to alternate.

3. **Any CSST tap changer not in automatic for a CSST winding which is supplying a Start Bus.**

The 500kV bus voltage should be maintained at a level of 520kV.

With a unit station service transformer (USST) load tap changer (LTC) in any position other than AUTO, if the transformer is supplying a Shutdown Board, then the offsite power source to the associated Shutdown Boards is inoperable.

Response Date/Time	**7/16/2014 2:40 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:36 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**263**
NRC Question Number	**VKG003**
Select Application	**NRC Response**
Attachment 1	
Attachment 2	

Response Statement

In response to RAI # VKG003, the licensee stated:

"The required minimum post-accident voltage for a normal SQN load alignment is 153kV at all times. SQN has alternate load alignments with higher minimum post-accident voltage requirements (159kV) which, therefore, require notification to the Transmission Operator:

1. Supplying more than one shutdown board from a single common station service transformer (CSST) winding (Start Bus).

2. Transferring any boards fed from the 6.9kV Common Boards to alternate or transferring any 480V Unit Board, Turbine Building Motor Operated Valve or Vent Board to alternate.

3. Any CSST tap changer not in automatic for a CSST winding which is supplying a Start Bus.

The 500kV bus voltage should be maintained at a level of 520kV."

Whereas the licensee provided minimum post-accident voltage required at 161 kV level, the minimum post-accident voltage required at 500 kV level is not provided. It is not clear whether 520 kV is the minimum bus voltage required corresponding to the post-accident at 500 kV level. Please provide necessary information and confirm that minimum post-accident voltage(s) are based upon appropriate supporting calculation (s)/documentation. Also, confirm the voltage level(s) of 161 kV and 500 kV sources below which these sources will be declared inoperable.

Response Date/Time	**8/13/2014 6:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel**

	Khadijah Hemphill **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/13/2014 9:39 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**332**
NRC Question Number	**VKG003**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**The offsite transmission network supplies power to SQN onsite loads via the 161 kV and the 500 kV switchyard. In order to ensure that adequate power can be supplied to the onsite power loads for a Design Basis Event, a minimum worst case transient voltage has been established for each switchyard. The minimum voltage for the 161 kV and the 500 kV switchyard has been set at 153 kV and 480 kV, respectively. Voltage drops below these values would indicate inoperable offsite power sources. The TVA Transmission Group has established normal operational parameters for each switchyard that SQN monitors. Operators in the Main Control Room monitor the 161 kV switchyard for voltages between 165 kV and 170 kV. The 500 kV switchyard is monitored for voltages between 510 kV and 530 kV. If the switchyard voltages are outside these limits, the Transmission Operator is required to be notified within 30 minutes. The TVA Transmission Group then determines if the offsite power source has the necessary capacity and capability to be considered OPERABLE.**
Response Date/Time	**9/11/2014 4:30 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman Michelle Conner Robert Elliott Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Lynn Mynatt**
Date Added	**9/11/2014 3:24 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**333**
NRC Question Number	**VKG003**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/15/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**9/15/2014 7:47 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**156**
NRC Question Number	**VKG004**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition C, Required Action C.3 states, "Declare associated required feature(s) inoperable." Completion Time: 7 days** **In the ITS Bases, Page B 3.8.1-8a (LAR, Enclosure 2, Volume 13, Page 114), for Action C.3, the licensee stated that, "The required offsite circuit must be returned to OPERABLE status within 7 days, or the support function for the associated required feature is considered inoperable." To be consistent with ITS Bases, the Action C.3 of LCO 3.8.1 should be revised to state, "Return required offsite circuit to OPERABLE status OR Declare associated required feature(s) inoperable." Please provide detailed justification why declaring only the associated required feature(s) is considered adequate. Also provide detailed justification for completion time of 7 days for Action C.3 comparing it to the corresponding Completion Time of 72 hours for Action A.3.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:44 PM**

Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**178**
NRC Question Number	**VKG004**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," Section 4.1.6.g states, "A Required Action which requires restoration, such that the Condition is no longer met, is considered superfluous. It is only included if it would be the only Required Action for the Condition or it is needed for presentation clarity." Therefore, it is unnecessary to include a Required Action to return a required DG to an operable status, as it is always an option to restore compliance with the LCO.

Proposed ITS 3.8.1 Condition C is entered when one offsite circuit is inoperable solely due to an inoperable offsite power source to an opposite unit's shutdown board. Therefore, Required Action C.3 requires declaration that the associated required features are inoperable with a Completion Time of 7 days. This action is appropriate due to the limited amount of shared equipment that exists on an opposite unit's shutdown board (see lists below). In addition, notwithstanding the inoperability of the power source, the current technical specifications (CTS 3.0.5) allow equipment to be considered operable for an indefinite amount of time with an inoperable normal or emergency power supply, as long as the redundant equipment remains operable.

Major shared equipment on an opposite unit's shutdown board:

<u>6.9 kV Shutdown Board 1A-A (and associated 480 V shutdown boards)</u>
ERCW Pump J-A (Note 1)
ERCW Pump Q-A (Note 1)
Control Room AHU A-A (Note 2)
Control Room AC Compressor A-A (Note 2)
CCS Pump 1A-A (Note 3)
EGTS Fan A-A (Note 4)
125 V Vital Battery Charger I (Note 5)

<u>6.9 kV Shutdown Board 1B-B (and associated 480 V shutdown boards)</u>
ERCW Pump L-B (Note 1)
ERCW Pump N-B (Note 1)
Control Room AHU B-B (Note 2)
Control Room AC Compressor B-B (Note 2)
CCS Pump 1B-B (Note 3)
EGTS Fan B-B (Note 4)
125 V Vital Battery Charger II (Note 5)

<u>6.9 kV Shutdown Board 2A-A (and associated 480 V shutdown boards)</u>

ERCW Pump R-A (Note 1)
ERCW Pump K-A (Note 1)
CCS Pump 2A-A (Note 3)
ABGTS Fan A-A (Note 6)
Auxiliary Control Air Compressor A-A (Note 7)
125 V Vital Battery Charger III (Note 5)

6.9 kV Shutdown Board 2B-B (and associated 480 V shutdown boards)
ERCW Pump P-B (Note 1)
ERCW Pump M-B (Note 1)
CCS Pump 2B-B (Note 3)
CCS Pump C-S (Note 3)
ABGTS Fan B-B (Note 6)
Auxiliary Control Air Compressor B-B (Note 7)
125 V Vital Battery Charger IV (Note 5)

NOTES:

1. **The current requirement is for one operable ERCW pump per 6.9 kV Shutdown Board. Following implementation of an approved license amendment (TS-SQN-13-01 and TS-SQN-13-02, ML13280A267) an operable ERCW system train can require as few as one ERCW pump with consideration of the UHS temperature requirements. Until then, ITS 3.7.8, Condition A will require an inoperable ERCW system train to be restored in 72 hours.**
2. **Per ITS 3.7.10, Condition A, an inoperable train of CREVS is required to be restored in 7 days. Per ITS 3.7.11, Condition A, an inoperable CRACS train is required to be restored in 30 days.**
3. **CCS trains can be aligned and meet the requirements of ITS LCO 3.7.7 with the remaining operable pumps with one 6.9 kV Shutdown Board inoperable.**
4. **Per ITS 3.6.10, Condition A, an inoperable EGTS train is required to be restored in 7 days.**
5. **With the adoption of TSTF-500, ITS 3.8.4, Condition A requires an inoperable battery charger to be restored in 7 days, provided battery terminal voltage can be maintained greater than or equal to the minimum established float voltage and battery float current is maintained less than or equal to 2 amps.**
6. **Per ITS 3.7.12, Condition A, an inoperable ABGTS train is required to be restored in 7 days.**
7. **Following implementation of the proposed plant modification to install one or more auxiliary control air compressor(s), two trains of auxiliary control air can be maintained with either 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. Until then, the most limiting components are the Atmospheric Relief Valves (ARVs) and the Auxiliary Feedwater (AFW) System level control valves. ITS 3.7.4, Condition A requires one or more ARV lines inoperable due to one train of Auxiliary Control Air nonfunctional to be restored in 72 hours. ITS 3.7.5, AFW, Condition B requires (in MODE 1, 2, or 3) one AFW train inoperable for reasons other than an inoperable steam supply to a turbine driven train to be restored in 72 hours.**

Response Date/Time	**7/16/2014 2:40 PM**
Closure Statement	
Question Closure Date	

Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:39 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**229**
NRC Question Number	**VKG004**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:53 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**157**
NRC Question Number	**VKG005**
Category	**Technical**
ITS Section	**3.8**
ITS Number	
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**According to UFAR Section 8.1.4, the onsite (standby) power system is designed for postulated accident conditions in one unit and safe shutdown of the other unit, considering loss of offsite power and considering a single failure.** **Please provide summary of worst case diesel generator (DG) loadings, considering loss of offsite power to both units; Unit 1 in accident condition; Unit 2 in safe shutdown condition; and single failure considered as follows (two separate scenarios): (1) One DG inoperable in Unit 1 (say DG 1A-A or DG 1B-B), and (2) One DG inoperable in Unit 2 (say DG 2A-A or DG 2B-B).**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:46 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**179**
NRC Question Number	**VKG005**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1, RAI VKG-005 Draft Response.pdf** (94KB)
Attachment 2	
Response Statement	**The diesel generator (DG) loading calculation evaluates the loading of each DG separately, in that all permanently connected and sequenced loads are considered to load onto each respective DG during any loss of offsite power (LOOP) event. The calculation contains analysis to support the safe shutdown during a LOOP, as well as a LOOP with a loss of coolant accident (LOCA). Because each DG is analyzed separately to its respective worst case loading, it is not necessary to differentiate which unit is in an accident condition or which DG is inoperable.** **Attachment 1 contains excerpts from the DG loading calculation that reflect the calculated worst-case loading for each DG.**
Response Date/Time	**7/16/2014 2:45 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:42 PM**
Date Modified	
Modified By	

Attachment 1 – SQN DG Loading

DG Load Carrying Capability

The following tables show the maximum steady state (running) load of each DG during a loss of offsite power (LOOP), LOOP with safety injection and containment isolation Phase A (LOOP+SIA), and LOOP with safety injection and containment isolation Phase B (LOOP+SIB). These tables represent the total steady-state running load of all sequenced loads plus the base continuous load on each DG plus random loads.

DG Loading, Load Carrying Capability

Maximum Steady-State Running Load, 0 hrs to 2 hrs

kW	1A-A	1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
LOOP Time	3413.13 >120 sec	3589.95 >25 min	3594.86 >25 min	3687.63 >120 sec	4840	23.8
LOOP + SIA Time	3726.18 >720 sec	3868.80 >25 min	3901.45 >25 min	3975.06 >720 sec	4840	17.9
LOOP + SIB Time	4056.42 >720 sec	4197.20 >25 min	4272.39 >25 min	4344.83 >720 sec	4840	10.2

kVA	1A-A	1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
LOOP Time	3775.66 >120 sec	3977.05 >25 min	3971.53 >25 min	4073.29 >120 sec	5500	25.9
LOOP + SIA Time	4207.34 >720 sec	4368.94 >25 min	4399.56 >25 min	4478.99 >720 sec	5500	18.6
LOOP + SIB Time	4550.78 >720 sec	4708.11 >25 min	4798.90 >25 min	4863.29 >720 sec	5500	11.6

Maximum Steady-State Running Load, 2 hrs to End

kW	1A-A	1B-B	2A-A	2B-B	Continuous Rating	Minimum Margin
LOOP Time	3351.98 End	3514.35 End	3576.16 End	3615.91 End	4400	17.8
LOOP + SIA Time	3601.39 End	3731.80 End	3748.77 End	3842.54 End	4400	12.7
LOOP + SIB Time	3931.46 End	4060.05 End	4119.03 End	4154.04 End	4400	5.6

kVA	1A-A	1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
LOOP Time	3706.21 End	3894.81 End	3950.92 End	3991.01 End	5000	20.2
LOOP + SIA Time	4063.12 End	4213.80 End	4225.24 End	4323.80 End	5000	13.5
LOOP + SIB Time	4407.27 End	4553.99 End	4624.65 End	4644.92 End	5000	7.1

Attachment 1 – SQN DG Loading

Motor Starting Capability

The following tables show the maximum transient loading (starting + running) load of each DG during LOOP, LOOP+SIA, and LOOP+SIB. These tables represent the total transient loading of all sequenced loads plus the base continuous load on each DG including the random loads and the starting of the largest random load.

DG Loading, Motor Starting Capability

Maximum Transient Loading (Real Power) 0 to 180 sec

kW	1A-A	1B-B	2A-A	2B-B	Cold Engine Capability	Minimum Margin (%)
LOOP Time	3613.12 120 sec	3580.40 120 sec	3617.84 120 sec	3906.18 120 sec	4785	18.4
LOOP + SIA Time	3720.74 30 sec	3694.47 30 sec	3702.74 30 sec	4181.53 30 sec	4785	12.6
LOOP + SIB Time	3476.26 30 sec	3398.37 30 sec	3510.32 30 sec	3978.24 30 sec	4785	16.9

Maximum Transient Loading (Real Power) 180 sec to End

kW	1A-A	1B-B	2A-A	2B-B	Hot Engine Capability	Minimum Margin (%)
LOOP Time	3497.08 25 min	3837.82 25 min	3852.93 25 min	3789.31 25 min	5073	24.1
LOOP + SIA Time	3844.69 210 sec	4114.06 25 min	4155.07 25 min	4117.81 210 sec	5073	18.1
LOOP + SIB Time	4622.41 180 sec	4508.76 180 sec	4639. 12 180 sec	4930.42 180 sec	5073	2.8

Maximum Step Load Increase (Apparent Power) 0 sec to End

kVA	1A-A	1B-B	2A-A	2B-B	Generator Step Load Capability	Minimum Margin (%)
LOOP Time	4670.59 0 sec	4820.23 0 sec	4197.17 2 sec	4351.30 0 sec	6500	25.8
LOOP + SIA Time	4772.05 0 sec	4904.62 0 sec	4171.27 2 sec	4458.34 0 sec	6500	24.5
LOOP + SIB Time	4174.37 180 sec	4186.03 180 sec	4249.41 180 sec	4200.36 180 sec	6500	34.6
Parallel Time	6298.45 N/A	6390.36 N/A	6246.06 N/A	6376.23 N/A	6500	1.7

Attachment 1 – SQN DG Loading

The following is a summary of DG loads compared to the DG ratings and capabilities, and the margin available:

Worst Case DG Loading, Load Carrying Capability

Maximum Steady-State Running Load, 0 hrs to 2 hrs

	1A-A	. 1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
kW Event/Time	4056.42 SI B >720 sec	4197.20 SI B >25 min	4272.39 SI B >25 min	4344.83 SI B >720 sec	4840	10.2
kVA Event/Time	4550.78 SI B >720 sec	4708.11 SI B >25 min	4798.90 SI B >25 min	4863.29 SI B >720 sec	5500	11.6

Maximum Steady-State Running Load, 2 hrs to End

	1A-A	. 1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
kW Event/Time	3931.46 SI B End	4060.05 SI B End	4119.03 SI B End	4154.04 SI B End	4400	5.6
kVA Event/Time	4407.27 SI B End	4553.99 SI B End	4624.65 SI B End	4644.92 SI B End	5000	7.1

Licensee Response/NRC Response/NRC Question Closure

Id	**230**
NRC Question Number	**VKG005**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:54 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**158**
NRC Question Number	**VKG006**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition B also applies to the condition when two DGs of the same train A or B become inoperable.** **Provide summary of worst case DG loadings, considering loss of offsite power to both units; Unit 1 in accident condition; Unit 2 in safe shutdown condition; and two DGs considerable inoperable as follows (two separate scenarios): (1) DGs 1A-A and 2A-A of the same train inoperable, and (2) DGs 1B-B and 2B-B of the same train inoperable.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:48 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**180**
NRC Question Number	**VKG006**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1, RAI VKG-006 Draft Response.pdf** (94KB)
Attachment 2	
Response Statement	**The diesel generator (DG) loading calculation evaluates the loading of each DG separately, in that all permanently connected and sequenced loads are considered to load onto each respective DG during any loss of offsite power (LOOP) event. The calculation contains analysis to support the safe shutdown during a LOOP, as well as a LOOP with a loss of coolant accident (LOCA). Because each DG is analyzed separately to its respective worst case loading, it is not necessary to differentiate which unit is in an accident condition or which DG is inoperable.** **Attachment 1 contains excerpts from the DG loading calculation that reflect the calculated worst-case loading for each DG.**
Response Date/Time	**7/16/2014 2:45 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:44 PM**
Date Modified	
Modified By	

Attachment 1 – SQN DG Loading

DG Load Carrying Capability

The following tables show the maximum steady state (running) load of each DG during a loss of offsite power (LOOP), LOOP with safety injection and containment isolation Phase A (LOOP+SIA), and LOOP with safety injection and containment isolation Phase B (LOOP+SIB). These tables represent the total steady-state running load of all sequenced loads plus the base continuous load on each DG plus random loads.

DG Loading, Load Carrying Capability

Maximum Steady-State Running Load, 0 hrs to 2 hrs

kW	1A-A	1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
LOOP Time	3413.13 >120 sec	3589.95 >25 min	3594.86 >25 min	3687.63 >120 sec	4840	23.8
LOOP + SIA Time	3726.18 >720 sec	3868.80 >25 min	3901.45 >25 min	3975.06 >720 sec	4840	17.9
LOOP + SIB Time	4056.42 >720 sec	4197.20 >25 min	4272.39 >25 min	4344.83 >720 sec	4840	10.2

kVA	1A-A	1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
LOOP Time	3775.66 >120 sec	3977.05 >25 min	3971.53 >25 min	4073.29 >120 sec	5500	25.9
LOOP + SIA Time	4207.34 >720 sec	4368.94 >25 min	4399.56 >25 min	4478.99 >720 sec	5500	18.6
LOOP + SIB Time	4550.78 >720 sec	4708.11 >25 min	4798.90 >25 min	4863.29 >720 sec	5500	11.6

Maximum Steady-State Running Load, 2 hrs to End

kW	1A-A	1B-B	2A-A	2B-B	Continuous Rating	Minimum Margin
LOOP Time	3351.98 End	3514.35 End	3576.16 End	3615.91 End	4400	17.8
LOOP + SIA Time	3601.39 End	3731.80 End	3748.77 End	3842.54 End	4400	12.7
LOOP + SIB Time	3931.46 End	4060.05 End	4119.03 End	4154.04 End	4400	5.6

kVA	1A-A	1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
LOOP Time	3706.21 End	3894.81 End	3950.92 End	3991.01 End	5000	20.2
LOOP + SIA Time	4063.12 End	4213.80 End	4225.24 End	4323.80 End	5000	13.5
LOOP + SIB Time	4407.27 End	4553.99 End	4624.65 End	4644.92 End	5000	7.1

Attachment 1 – SQN DG Loading

Motor Starting Capability

The following tables show the maximum transient loading (starting + running) load of each DG during LOOP, LOOP+SIA, and LOOP+SIB. These tables represent the total transient loading of all sequenced loads plus the base continuous load on each DG including the random loads and the starting of the largest random load.

DG Loading, Motor Starting Capability

Maximum Transient Loading (Real Power) 0 to 180 sec

kW	1A-A	1B-B	2A-A	2B-B	Cold Engine Capability	Minimum Margin (%)
LOOP Time	3613.12 120 sec	3580.40 120 sec	3617.84 120 sec	3906.18 120 sec	4785	18.4
LOOP + SIA Time	3720.74 30 sec	3694.47 30 sec	3702.74 30 sec	4181.53 30 sec	4785	12.6
LOOP + SIB Time	3476.26 30 sec	3398.37 30 sec	3510.32 30 sec	3978.24 30 sec	4785	16.9

Maximum Transient Loading (Real Power) 180 sec to End

kW	1A-A	1B-B	2A-A	2B-B	Hot Engine Capability	Minimum Margin (%)
LOOP Time	3497.08 25 min	3837.82 25 min	3852.93 25 min	3789.31 25 min	5073	24.1
LOOP + SIA Time	3844.69 210 sec	4114.06 25 min	4155.07 25 min	4117.81 210 sec	5073	18.1
LOOP + SIB Time	4622.41 180 sec	4508.76 180 sec	4639. 12 180 sec	4930.42 180 sec	5073	2.8

Maximum Step Load Increase (Apparent Power) 0 sec to End

kVA	1A-A	1B-B	2A-A	2B-B	Generator Step Load Capability	Minimum Margin (%)
LOOP Time	4670.59 0 sec	4820.23 0 sec	4197.17 2 sec	4351.30 0 sec	6500	25.8
LOOP + SIA Time	4772.05 0 sec	4904.62 0 sec	4171.27 2 sec	4458.34 0 sec	6500	24.5
LOOP + SIB Time	4174.37 180 sec	4186.03 180 sec	4249.41 180 sec	4200.36 180 sec	6500	34.6
Parallel Time	6298.45 N/A	6390.36 N/A	6246.06 N/A	6376.23 N/A	6500	1.7

Attachment 1 – SQN DG Loading

The following is a summary of DG loads compared to the DG ratings and capabilities, and the margin available:

<u>Worst Case DG Loading, Load Carrying Capability</u>

Maximum Steady-State Running Load, 0 hrs to 2 hrs

	1A-A	. 1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
kW Event/Time	4056.42 SI B >720 sec	4197.20 SI B >25 min	4272.39 SI B >25 min	4344.83 SI B >720 sec	4840	10.2
kVA Event/Time	4550.78 SI B >720 sec	4708.11 SI B >25 min	4798.90 SI B >25 min	4863.29 SI B >720 sec	5500	11.6

Maximum Steady-State Running Load, 2 hrs to End

	1A-A	. 1B-B	2A-A	2B-B	Short-Time Rating	Minimum Margin (%)
kW Event/Time	3931.46 SI B End	4060.05 SI B End	4119.03 SI B End	4154.04 SI B End	4400	5.6
kVA Event/Time	4407.27 SI B End	4553.99 SI B End	4624.65 SI B End	4644.92 SI B End	5000	7.1

Licensee Response/NRC Response/NRC Question Closure

Id	**231**
NRC Question Number	**VKG006**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:54 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**159**
NRC Question Number	**VKG007**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition D, Required Action D.4 states, "Declare associated required feature(s) inoperable." Completion Time: 7 days** **In the ITS Bases, Page B 3.8.1-8c (LAR, Enclosure 2, Volume 13, Page 116), for Action D.4, the licensee stated that, "<u>The required DG must be returned to OPERABLE status within 7 days, or</u> the support function for the associated required feature is considered inoperable." To be consistent with ITS Bases, the Action D.4 for LCO 3.8.1 should be revised to state, "Return required DG OPERABLE status <u>OR</u> Declare associated required feature(s) inoperable." Please provide detailed justification why declaring only the associated required feature(s) is considered adequate.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:49 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**181**
NRC Question Number	**VKG007**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," Section 4.1.6.g states, "A Required Action which requires restoration, such that the Condition is no longer met, is considered superfluous. It is only included if it would be the only Required Action for the Condition or it is needed for presentation clarity." Therefore, it is unnecessary to include a Required Action to return a required DG to an operable status, as it is always an option to restore compliance with the LCO.

Proposed ITS 3.8.1 Condition D is entered when one opposite unit's DG is inoperable. Therefore, Required Action C.4 requires declaration that the associated required features are inoperable with a Completion Time of 7 days. This action is appropriate due to the limited amount of shared equipment that exists on an opposite unit's shutdown board (see lists below). In addition, notwithstanding the inoperability of the power source, the current technical specifications (CTS 3.0.5) allow equipment to be considered operable for an indefinite amount of time with an inoperable normal or emergency power supply, as long as the redundant equipment remains operable.

Major shared equipment on an opposite unit's shutdown board:

6.9 kV Shutdown Board 1A-A (and associated 480 V shutdown boards)
ERCW Pump J-A (Note 1)
ERCW Pump Q-A (Note 1)
Control Room AHU A-A (Note 2)
Control Room AC Compressor A-A (Note 2)
CCS Pump 1A-A (Note 3)
EGTS Fan A-A (Note 4)
125 V Vital Battery Charger I (Note 5)

6.9 kV Shutdown Board 1B-B (and associated 480 V shutdown boards)
ERCW Pump L-B (Note 1)
ERCW Pump N-B (Note 1)
Control Room AHU B-B (Note 2)
Control Room AC Compressor B-B (Note 2)
CCS Pump 1B-B (Note 3)
EGTS Fan B-B (Note 4)
125 V Vital Battery Charger II (Note 5)

6.9 kV Shutdown Board 2A-A (and associated 480 V shutdown boards)
ERCW Pump R-A (Note 1)

ERCW Pump K-A (Note 1)
CCS Pump 2A-A (Note 3)
ABGTS Fan A-A (Note 6)
Auxiliary Control Air Compressor A-A (Note 7)
125 V Vital Battery Charger III (Note 5)

<u>6.9 kV Shutdown Board 2B-B (and associated 480 V shutdown boards)</u>
ERCW Pump P-B (Note 1)
ERCW Pump M-B (Note 1)
CCS Pump 2B-B (Note 3)
CCS Pump C-S (Note 3)
ABGTS Fan B-B (Note 6)
Auxiliary Control Air Compressor B-B (Note 7)
125 V Vital Battery Charger IV (Note 5)

<u>NOTES</u>:

1. **The current requirement is for one operable ERCW pump per 6.9 kV Shutdown Board. Following implementation of an approved license amendment (TS-SQN-13-01 and TS-SQN-13-02, ML13280A267) an operable ERCW system train can require as few as one ERCW pump with consideration of the UHS temperature requirements. Until then, ITS 3.7.8, Condition A will require an inoperable ERCW system train to be restored in 72 hours.**
2. **Per ITS 3.7.10, Condition A, an inoperable train of CREVS is required to be restored in 7 days. Per ITS 3.7.11, Condition A, an inoperable CRACS train is required to be restored in 30 days.**
3. **CCS trains can be aligned and meet the requirements of ITS LCO 3.7.7 with the remaining operable pumps with one 6.9 kV Shutdown Board inoperable.**
4. **Per ITS 3.6.10, Condition A, an inoperable EGTS train is required to be restored in 7 days.**
5. **With the adoption of TSTF-500, ITS 3.8.4, Condition A requires an inoperable battery charger to be restored in 7 days, provided battery terminal voltage can be maintained greater than or equal to the minimum established float voltage and battery float current is maintained less than or equal to 2 amps.**
6. **Per ITS 3.7.12, Condition A, an inoperable ABGTS train is required to be restored in 7 days.**
7. **Following implementation of the proposed plant modification to install one or more additional auxiliary control air compressor(s), two trains of auxiliary control air can be maintained with either 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. Until then, the most limiting components are the Atmospheric Relief Valves (ARVs) and the Auxiliary Feedwater System (AFW) level control valves. ITS 3.7.4, ARVs, Condition A requires one or more ARV lines inoperable due to one train of auxiliary control air nonfunctional to be restored in 72 hours. ITS 3.7.5, AFW, Condition B requires (in MODE 1, 2, or 3) one AFW train inoperable for reasons other than an inoperable steam supply valve to a turbine driven train to be restored in 72 hours.**

Response Date/Time	**7/16/2014 2:50 PM**
Closure Statement	
Question Closure Date	

Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:47 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**232**
NRC Question Number	**VKG007**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman Michelle Conner Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:55 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**160**
NRC Question Number	**VKG008**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS 3.8.1, Condition E states, "Two offsite circuits inoperable."** **Condition E should be expanded to clarify the two circuits to which 6.9 kV switchboards are inoperable, such as: "Two offsite circuits to 6.9 kV Switchboards 1A-A and 1B-B inoperable." Please provide rewording of Condition E or justify otherwise.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:51 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**182**
NRC Question Number	**VKG008**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**ITS 3.8.1 Condition E is written to be similar to the wording of CTS 3.8.1.1 Action d, which states, "With two of the above required offsite circuits inoperable. . ." The intent of the CTS 3.8.1.1 Action d and ITS 3.8.1 Condition E wording is to enter the Action / Condition when two offsite circuits are inoperable for any offsite circuit configuration and regardless of the 6.9 kV Shutdown Boards that are affected. Therefore, ITS 3.8.1, Condition E is correct as written.**
Response Date/Time	**7/16/2014 2:50 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:49 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**233**
NRC Question Number	**VKG008**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:55 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**161**
NRC Question Number	**VKG009**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition F states, "One offsite circuit inoperable for reasons other than Condition C. AND DG 1A-A or DG 1B-B inoperable."** **It is not clear how the Condition F is related to Condition C. Since there are four 6 kV Shutdown Boards 1A-A, 2A-A, 1B-B, and 2B-B, the Condition F should clearly state the offsite circuit to which specific Shutdown Board(s) is considered inoperable as part of Condition F. Condition F should be revised (similar to the Condition F the licensee presented in the pre-submittal meeting dated June 4, 2013), as follows: "One offsite circuit to 6.9 kV Shutdown Board 1A-A or 1B-B inoperable. AND DG 1A-A or 1B-B inoperable." Please provide requisite re-wording of Condition F or justify otherwise.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:52 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**183**
NRC Question Number	**VKG009**
Select Application	**Licensee Response**
Attachment 1	**RAI VKG-009 Response Attachment 1, Rev 1.pdf** (13KB)
Attachment 2	

Response Statement

ITS 3.8.1 Condition C is applicable to the specific cases of an inoperable offsite circuit due to an inoperable power source to an opposite unit's 6.9 kV Shutdown Board. ITS 3.8.1 Condition F addresses the combination of an inoperable offsite circuit for reasons other than Condition C (similar to Condition A) concurrent with an inoperable DG on the associated unit's 6.9 kV Shutdown Board. ITS 3.8.1 Condition F addresses the instances of an inoperable offsite circuit concurrent with an inoperable DG that are currently addressed by CTS 3.8.1.1 Action c, with the exception of:

1. **An offsite circuit inoperable due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board concurrent with an inoperable DB on the associated unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition G),**

2. **An inoperable offsite circuit for reasons other than Condition C concurrent with an inoperable DG on the opposite unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition H), and**

3. **An offsite circuit inoperable due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board concurrent with an inoperable DG on the opposite unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition I).**

Therefore ITS 3.8.1 Condition F is correct as written.

Attachment 1 provides a table that compares the CTS Actions and proposed ITS Actions for each combination of inoperable AC power sources. Proposed ITS Actions that differ from the CTS Actions are highlighted.

Response Date/Time	**7/16/2014 3:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**

Date Added	**7/16/2014 1:56 PM**
Date Modified	
Modified By	

Inoperable power source	CTS Action	ITS Action
DG 1A-A or DG 1B-B	Restore DG in 7 days.	Restore DG in 7 days.
DG 1A-A and DG 2A-A OR DG 1B-B and DG 2B-B	Restore DGs in 7 days.	Restore DGs in 7 days.
DG 1A-A and/or DG 2A-A AND DG 1B-B and/or DG 2B-B	Restore one train of DGs in 2 hours.	Restore one train of DGs in 2 hours.
DG 2A-A or DG 2B-B	Restore DG in 7 days.	Declare associated required features inoperable in 7 days.
Offsite power to 1A-A or 1B-B	Restore offsite circuit in 72 hours.	Restore offsite circuit in 72 hours.
Offsite power to 1A-A and 2A-A OR Offsite power to 1B-B and 2B-B	Restore offsite circuit in 72 hours.	Restore offsite circuit in 72 hours.
Offsite power to 1A-A and/or 2A-A AND Offsite power to 1B-B and/or 2B-B	Restore one offsite circuit in 24 hours.	Restore one offsite circuit in 24 hours.
Offsite power to 2A-A or 2B-B only	Restore in 72 hours.	Declare associated required features inoperable in 7 days.
Offsite power to 1A-A, or 1A-A and 2A-A, or 1B-B, or 1B-B and 2B-B AND DG 1A-A or 1B-B	Restore offsite circuit or DG in 12 hours.	Restore offsite circuit or DG in 12 hours.

Inoperable power source	CTS Action	ITS Action
Offsite power to 2A-A or 2B-B AND DG 1A-A or 1B-B	Restore offsite circuit or DG in 12 hours.	Restore DG in 7 days. AND Declare associated required features inoperable in 7 days.
Offsite power to 1A-A, or 1A-A and 2A-A, or 1B-B, or 1B-B and 2B-B AND DG 2A-A or 2B-B	Restore offsite circuit or DG in 12 hours.	Restore offsite circuit in 72 hours. AND Declare associated required features inoperable in 72 hours.
Offsite power to 2A-A or 2B-B AND DG 2A-A or 2B-B	Restore offsite circuit or DG in 12 hours.	Restore offsite circuit or DG in 7 days. AND Immediately declare associated required features inoperable, if power sources are on the same 6.9 kV Shutdown Board.
Two offsite circuits AND One or more Train A or Train B DGs	Enter LCO 3.0.3	Enter LCO 3.0.3
One offsite circuit AND One or more Train A AND Train B DGs	Enter LCO 3.0.3	Enter LCO 3.0.3

Licensee Response/NRC Response/NRC Question Closure

Id	**234**
NRC Question Number	**VKG009**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:56 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**162**
NRC Question Number	**VKG010**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition G states, "One offsite circuit inoperable solely due to an offsite power source to 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. AND DG 1A-A or 1B-B inoperable."** **As stated in the ITS Bases, Conditions B and C will be entered concurrent with entry into Condition G. Similar to the request for re-wording for Condition C, please provide re-wording of Condition G or justify otherwise. Also, justify 7 days of Completion Time considering both Conditions B and C will be entered concurrently.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:54 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**184**
NRC Question Number	**VKG010**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**ITS 3.8.1 Condition G addresses the combination of an offsite circuit inoperable due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board concurrent with an inoperable DG on the associated unit's 6.9 kV Shutdown Board. ITS 3.8.1 Condition G addresses the instances of an inoperable offsite circuit concurrent with an inoperable DG that are currently addressed by CTS 3.8.1.1 Action c, with the exception of:** **1. An inoperable offsite circuit for reasons other than Condition C concurrent with an inoperable DG on the associated unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition F),** **2. An inoperable offsite circuit for reasons other than Condition C concurrent with an inoperable DG on the opposite unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition H), and** **3. An offsite circuit inoperable due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board concurrent with an inoperable DG on the opposite unit's 6.9 kV Shutdown Board (ITS 3.8.1 Condition I).** **In Condition G, individual redundancy is lost in the offsite electrical power system for one unit and the onsite AC electrical power system for the other unit. Because Conditions B and C are entered concurrently with entry into Condition G, the Required Actions of Conditions B and C provide the appropriate compensatory measures to ensure the onsite and offsite power sources are either restored to an OPERABLE status, or the associated required features are declared inoperable, thereby requiring entry into the appropriate Conditions associated with the associated feature's LCO. The 7 day Completion Time of Required Action G.1 is consistent with the 7 day Completion Time of Required Action C.3** **Therefore, ITS 3.8.1 Condition G is correct as written.**
Response Date/Time	**7/16/2014 3:00 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel**

	Khadijah Hemphill **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 1:59 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**235**
NRC Question Number	**VKG010**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:56 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**163**
NRC Question Number	**VKG011**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition H states, "One offsite circuit inoperable for reasons other than Condition C. AND DG 2A-A or 2B-B inoperable."** **As stated in the ITS Bases, Conditions A and D will be entered concurrent with entry into Condition H. Similar to the request for re-wording for Condition A, please provide re-wording of Condition H or justify otherwise. Also, justify 7 days of Completion Time considering both Conditions A and D will be entered concurrently.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:55 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**185**
NRC Question Number	**VKG011**
Select Application	**Licensee Response**
Attachment 1	**RAI VKG-011 Response Attachment 1, Rev 1.pdf** (2MB)
Attachment 2	
Response Statement	**In response to RAI VKG-011, the Completion Time for ITS 3.8.1 Required Action H.1 (pages 52 and 76 of Enclosure 2, Volume 13) will be changed to 72 hours, consistent with the Completion Time for ITS 3.8.1 Required Action A.3. This change also results in a change to ITS 3.8.1 discussion of change (DOC) L01 (page 33) and to the ITS 3.8.1 Bases discussion of Required Action H.1 (pages 119 and 169).** **See Attachment 1 for the draft ITS 3.8.1 changes discussed above.**
Response Date/Time	**7/16/2014 3:05 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 2:03 PM**
Date Modified	
Modified By	

DISCUSSION OF CHANGES
ITS 3.8.1, AC SOURCES - OPERATING

restored to an OPERABLE status. ITS 3.8.1 ACTION D requires declaration that the affected required feature(s) with no OPERABLE DG are inoperable when its redundant required feature is inoperable in 4 hours. Otherwise, the affected required feature(s) are declared inoperable in 7 days, if the DG cannot be restored to an OPERABLE status. ITS 3.8.1 ACTION E requires declaration that the affected required feature(s) with no offsite power available are inoperable when its redundant required feature is inoperable in 12 hours. Otherwise, one offsite circuit is required to be restored to an OPERABLE status in 24 hours. ITS 3.8.1 ACTION F provides actions for one associated unit's offsite circuit inoperable concurrent with one associated unit's DG inoperable, and allows 12 hours to restore one of the inoperable AC sources to OPERABLE status. ITS ACTION G requires declaring the required feature(s) on the opposite unit's 6.9 kV Shutdown Board with no offsite power available inoperable in 7 days. ITS ACTION H requires declaring the required feature(s) on the opposite unit's 6.9 kV Shutdown Board with no DG available inoperable in ~~7 days~~ 72 hours. ITS ACTION I provides actions for one offsite circuit inoperable solely due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board concurrent with one opposite unit's DG inoperable, and allows 7 days to restore one of the inoperable AC sources to OPERABLE status. In addition, a Note modifying ITS ACTION I requires entry into the applicable Conditions and Required Actions of LCO 3.8.9 with no AC power source to an opposite unit's 6.9 kV Shutdown Board. ITS 3.8.1 ACTION J provides actions for one or more Train A and one or more Train B DGs inoperable and allows 2 hours to restore one Train of DGs to OPERABLE status. ITS 3.8.1 ACTION K requires the unit to be shut down and cooled down if a Required Action and associated Completion Time of Condition A, B, E, F, I, or J is not met. These changes to the CTS provide separate ACTIONS to declare the required features powered from the opposite unit's Class 1E AC Electrical Power Distribution System inoperable as the remedial measures for the inoperable AC sources.

The purpose of the CTS 3.8.1.1 ACTIONS is to limit the time the unit can remain operating with different combinations of inoperable offsite circuits and DGs. The onsite Class 1E AC Electrical Distribution System supplies electrical power to two power trains shared between the two units. The core cooling and containment cooling system loads (e.g., Safety Injection (SI) pumps, Auxiliary Feedwater (AFW) pumps, Residual Heat Removal (RHR) pumps, Centrifugal Charging pumps, Containment Spray pumps, and Air Return System (ARS) fans) are unitized to the respective unit's 6.9 kV Shutdown Boards. However, some safety-related systems (e.g., Essential Raw Cooling Water (ERCW), Component Cooling (CCS), Emergency Gas Treatment (EGTS), Auxiliary Building Gas Treatment, (ABGTS), Control Room Emergency Ventilation (CREVs), and Control Room HVAC (CRACS)) are shared between the units. The AC sources for the shared loads are distributed across both unit's shutdown boards. Therefore, two qualified offsite circuits and four DGs capable of supplying the onsite Class 1E AC Electrical Distribution System are required to be OPERABLE. However, the impacts of an inoperable offsite power source or DG on an opposite unit's 6.9 kV Shutdown Board differ from the impacts of an inoperable offsite power source or DG on an associated unit's 6.9 kV Shutdown Board, due to the loads powered from the respective board.

5 **INSERT 3**

DOC L01	G. One offsite circuit inoperable solely due to an offsite power source to 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. AND DG 1A-A or 1B-B inoperable.	G.1	Declare required feature(s) on associated Unit 2 6.9 kV Shutdown Board inoperable.	7 days
DOC L01	H. One offsite circuit inoperable for reasons other than Condition C. AND DG 2A-A or 2B-B inoperable.	H.1	Declare required feature(s) on associated Unit 2 6.9 kV Shutdown Board inoperable.	~~7 days~~ 72 hours

Insert Page 3.8.1-3a

5 **INSERT 3**

DOC L01	G. One offsite circuit inoperable solely due to an offsite power source to 6.9 kV Shutdown Board 1A-A or 1B-B inoperable. AND DG 2A-A or 2B-B inoperable.	G.1	Declare required feature(s) on associated Unit 1 6.9 kV Shutdown Board inoperable.	7 days
DOC L01	H. One offsite circuit inoperable for reasons other than Condition C. AND DG 1A-A or 1B-B inoperable.	H.1	Declare required feature(s) on associated Unit 1 6.9 kV Shutdown Board inoperable.	~~7 days~~ $\boxed{\text{72 hours}}$

B 3.8.1

5 **INSERT 12**

G.1 and H.1

In Conditions G and H, individual redundancy is lost in the offsite electrical power system for one unit and the onsite AC electrical power system for the other unit. Since Conditions B and C are entered concurrent with entry into Condition G, and Conditions A and D are entered concurrent with entry into Condition H, the Required Actions of Conditions B and C (or Conditions A and D) provide the appropriate compensatory measures to ensure the onsite and offsite power sources are either restored to an OPERABLE status, or the associated required features are declared inoperable, thereby requiring entry into the appropriate Conditions associated with the associated feature's LCO. The Completion Time~~s~~ of Required Action~~s~~ G.1 is ~~and H.1 are~~ consistent with the Completion Time~~s~~ of Required Action~~s~~ C.3 ~~and D.4~~. The Completion Time of Required Action H.1 is consistent with the Completion Time of Required Action A.3. If, while in Condition G or H, a redundant required feature is determined to be inoperable, the required feature(s) would be declared inoperable at the Completion Times specified in Conditions A, B, C, or D, as applicable.

I.1 and I.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 Actions of Condition I are modified by a Note to indicate that when Condition I is entered with no AC source to 6.9 kV Shutdown Board 2A-A or 2B-B, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems - Operating," must be immediately entered. This allows Condition I to provide requirements for the loss of one offsite power source and one DG, without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized 6.9 kV Shutdown Board.

In Condition I, individual redundancy is lost in the offsite electrical power system and the onsite AC electrical power system. Concurrent with entry into Condition I, entry into Condition C (inoperable offsite power source) and Condition D (inoperable DG) are required. The Required Actions of Conditions C and D ensure the remaining offsite circuit and DGs are OPERABLE and that required features with no offsite or onsite power sources are declared inoperable when its redundant required feature is inoperable within the Completion Times of Required Actions C.2 and D.2.

Insert Page B 3.8.1-10

5 **INSERT 12**

G.1 and H.1

In Conditions G and H, individual redundancy is lost in the offsite electrical power system for one unit and the onsite AC electrical power system for the other unit. Since Conditions B and C are entered concurrent with entry into Condition G, and Conditions A and D are entered concurrent with entry into Condition H, the Required Actions of Conditions B and C (or Conditions A and D) provide the appropriate compensatory measures to ensure the onsite and offsite power sources are either restored to an OPERABLE status, or the associated required features are declared inoperable, thereby requiring entry into the appropriate Conditions associated with the associated feature's LCO. The Completion Time~~s~~ of Required Action~~s~~ G.1 is ~~and H.1 are~~ consistent with the Completion Time~~s~~ of Required Action~~s~~ C.3 ~~and D.4~~. If, while in Condition G or H, a redundant required feature is determined to be inoperable, the required feature(s) would be declared inoperable at the Completion Times specified in Conditions A, B, C, or D, as applicable.

The Completion Time of Required Action H.1 is consistent with the Completion Time of Required Action A.3.

I.1 and I.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 Actions of Condition I are modified by a Note to indicate that when Condition I is entered with no AC source to 6.9 kV Shutdown Board 1A-A or 1B-B, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems - Operating," must be immediately entered. This allows Condition I to provide requirements for the loss of one offsite power source and one DG, without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized 6.9 kV Shutdown Board.

In Condition I, individual redundancy is lost in the offsite electrical power system and the onsite AC electrical power system. Concurrent with entry into Condition I, entry into Condition C (inoperable offsite power source) and Condition D (inoperable DG) are required. The Required Actions of Conditions C and D ensure the remaining offsite circuit and DGs are OPERABLE and that required features with no offsite or onsite power sources are declared inoperable when its redundant required feature is inoperable within the Completion Times of Required Actions C.2 and D.2.

Licensee Response/NRC Response/NRC Question Closure

Id	**236**
NRC Question Number	**VKG011**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:57 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**164**
NRC Question Number	**VKG012**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition I states, "One offsite circuit inoperable solely due to an offsite power source to 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. <u>AND</u> DG 2A-A or 2B-B inoperable."** **It is not clear why in the Condition I, the "offsite <u>circuit</u> inoperable" is constrained to "solely due to an offsite <u>power source</u> inoperable." Condition I should be revised (similar to the Condition I the licensee presented in the pre-submittal meeting dated June 4, 2013), as follows: "One offsite circuit to 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. <u>AND</u> DG 2A-A or 2B-B inoperable." with a NOTE: "Only applicable when offsite circuits to 6.9 kV Shutdown Boards 1A-A and 1B-B are OPERABLE, and DGs 1A-A and 1B-B are OPERABLE." Please provide requisite re-wording of Condition I or justify otherwise. Also, provide justification of Completion Time of 7 days for Action I.1 when compared to the Completion Time of 72 hours for Action A.3.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:56 PM**
Notification	**Scott Bowman** **Michelle Conner**

Vijay Goel
Matthew Hamm
Khadijah Hemphill
Andrew Hon
Lynn Mynatt
Ray Schiele
Roger Scott

Licensee Response/NRC Response/NRC Question Closure

Id	**186**
NRC Question Number	**VKG012**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

Proposed ITS 3.8.1 Condition I is entered when one DG on an opposite unit's 6.9 kV Shutdown Board is inoperable concurrent with one offsite circuit inoperable solely due to an inoperable offsite power source to an opposite unit's 6.9 kV Shutdown Board. The assumption for the affected offsite circuit is that it is otherwise operable, i.e., capable of providing adequate power to the associated unit's 6.9 kV Shutdown Board to power the required features on that board used to mitigate an accident on the associated unit. Therefore, the Condition focuses on the impact to the shared equipment that the associated unit is crediting that is powered from the opposite unit's 6.9 kV Shutdown Board.

The Required Actions require restoration of either the offsite circuit or the DG in 7 days. In addition, if the inoperable AC sources result in an opposite unit's 6.9 kV Shutdown Board having no AC power, the applicable Conditions and Required Actions of ITS 3.8.9 are entered. ITS 3.8.9 Condition D is entered when one or more opposite unit's AC electrical power distribution subsystems are inoperable. ITS 3.8.9 Required Action D.1 requires the associated required features to be declared inoperable immediately.

The ITS 3.8.1 Required Action I.1 and I.2 Completion Times of 7 days are appropriate due to the limited amount of shared equipment that exists on an opposite unit's shutdown board. In addition, notwithstanding the inoperability of the power source, the current technical specifications (CTS 3.0.5) allow equipment to be considered operable for an indefinite amount of time with an inoperable normal or emergency power supply, as long as the redundant equipment remains operable. If the inoperable offsite circuit and inoperable DG are on different 6.9 kV Shutdown Boards such that redundancy for one or more systems is lost, ITS 3.8.1 Required Actions C.2 and D.2 will direct the affected required features to be declared inoperable in 24 hours and 4 hours, respectively. Therefore, the Conditions and Required Actions of the associated LCOs provide adequate actions to address the inoperable required features.

Major shared equipment on an opposite unit's shutdown board:

<u>6.9 kV Shutdown Board 1A-A (and associated 480 V shutdown boards)</u>
ERCW Pump J-A (Note 1)
ERCW Pump Q-A (Note 1)
Control Room AHU A-A (Note 2)
Control Room AC Compressor A-A (Note 2)
CCS Pump 1A-A (Note 3)
EGTS Fan A-A (Note 4)

125 V Vital Battery Charger I (Note 5)

<u>6.9 kV Shutdown Board 1B-B (and associated 480 V shutdown boards)</u>
ERCW Pump L-B (Note 1)
ERCW Pump N-B (Note 1)
Control Room AHU B-B (Note 2)
Control Room AC Compressor B-B (Note 2)
CCS Pump 1B-B (Note 3)
EGTS Fan B-B (Note 4)
125 V Vital Battery Charger II (Note 5)

<u>6.9 kV Shutdown Board 2A-A (and associated 480 V shutdown boards)</u>
ERCW Pump R-A (Note 1)
ERCW Pump K-A (Note 1)
CCS Pump 2A-A (Note 3)
ABGTS Fan A-A (Note 6)
Auxiliary Control Air Compressor A-A (Note 7)
125 V Vital Battery Charger III (Note 5)

<u>6.9 kV Shutdown Board 2B-B (and associated 480 V shutdown boards)</u>
ERCW Pump P-B (Note 1)
ERCW Pump M-B (Note 1)
CCS Pump 2B-B (Note 3)
CCS Pump C-S (Note 3)
ABGTS Fan B-B (Note 6)
Auxiliary Control Air Compressor B-B (Note 7)
125 V Vital Battery Charger IV (Note 5)

<u>NOTES</u>:

1. **The current requirement is for one operable ERCW pump per 6.9 kV Shutdown Board. Following implementation of an approved license amendment (TS-SQN-13-01 and TS-SQN-13-02, ML13280A267) an operable ERCW system train can require as few as one ERCW pump with consideration of the UHS temperature requirements. Until then, ITS 3.7.8, Condition A will require an inoperable ERCW system train to be restored in 72 hours.**
2. **Per ITS 3.7.10, Condition A, an inoperable train of CREVS is required to be restored in 7 days. Per ITS 3.7.11, Condition A, an inoperable CRACS train is required to be restored in 30 days.**
3. **CCS trains can be aligned and meet the requirements of ITS LCO 3.7.7 with the remaining operable pumps with one 6.9 kV Shutdown Board inoperable.**
4. **Per ITS 3.6.10, Condition A, an inoperable EGTS train is required to be restored in 7 days.**
5. **With the adoption of TSTF-500, ITS 3.8.4, Condition A requires an inoperable battery charger to be restored in 7 days, provided battery terminal voltage can be maintained greater than or equal to the minimum established float voltage and battery float current is maintained less than or equal to 2 amps.**
6. **Per ITS 3.7.12, Condition A, an inoperable ABGTS train is required to be restored in 7 days.**

7. Following implementation of the proposed plant modification to install one or more additional auxiliary control air compressor(s), two trains of auxiliary control air can be maintained with either 6.9 kV Shutdown Board 2A-A or 2B-B inoperable. Until then, the most limiting components are the Atmospheric Relief Valves (ARVs) and the Auxiliary Feedwater System (AFW) level control valves. ITS

3.7.4, ARVs, Condition A requires one or more ARV lines inoperable due to one train of auxiliary control air nonfunctional to be restored in 72 hours. ITS 3.7.5, AFW, Condition B requires (in MODE 1, 2, or 3) one AFW train inoperable for reasons other than an inoperable steam supply to a turbine driven train to be restored in 72 hours.

Response Date/Time	**7/16/2014 3:05 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 2:06 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**237**
NRC Question Number	**VKG012**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:57 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**165**
NRC Question Number	**VKG013**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition L states, "Two offsite circuits inoperable. AND…"** **Condition L should be expanded to clarify the two circuits to which specific Shutdown Boards are inoperable, such as: "Two offsite circuits to 6.9 kV Shutdown Boards 1A-A and 1B-B inoperable. AND…" Please provide rewording of Condition L or justify otherwise.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:57 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**187**
NRC Question Number	**VKG013**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**When ITS Condition L is entered, one or more DGs in either train are inoperable concurrent with two inoperable offsite circuits regardless of the 6.9kV Shutdown Boards that are affected. In this Condition, there are inadequate AC power sources available to power the required features needed to mitigate an accident. In this Condition, entry into LCO 3.0.3 is appropriate. Therefore, ITS 3.8.1, Condition L is correct as written.**
Response Date/Time	**7/16/2014 3:10 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 2:10 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**238**
NRC Question Number	**VKG013**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:58 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**166**
NRC Question Number	**VKG014**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Rob Elliott**
Technical Branch POC	**Vijay Goel**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.1, Condition M states, "One offsite circuits inoperable. AND…"** **Condition M should be expanded to clarify the circuit to which Shutdown Board is inoperable, such as: "One offsite circuits to 6.9 kV Shutdown Board 1A-A or 1B-B inoperable. AND…" Please provide rewording of Condition M or justify otherwise.**
Attach File 1	
Attach File 2	
Issue Date	**6/18/2014**
Added By	**Matthew Hamm**
Date Modified	
Modified By	
Date Added	**6/18/2014 2:58 PM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Matthew Hamm** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**188**
NRC Question Number	**VKG014**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**When ITS 3.8.1 Condition M is entered, one or more DGs in both trains are inoperable concurrent with an inoperable offsite circuit. In this condition, there are inadequate AC power sources available to power the required features needed to mitigate an accident. Condition M is entered for any offsite circuit configuration regardless of the 6.9 kV Shutdown Boards that are affected. In this Condition, entry into LCO 3.0.3 is appropriate. Therefore, ITS 3.8.1, Condition M is correct as written.**
Response Date/Time	**7/16/2014 3:15 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**7/16/2014 2:12 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**239**
NRC Question Number	**VKG014**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/4/2014 5:59 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**175**
NRC Question Number	**VKG015**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.1**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**Notes 2 of ITS SRs 3.8.1.9 and 3.8.1.10, and Note 3 of ITS SR 3.8.1.14 state: "If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.89."** **Please provide the basis (summary of calculation) for selecting the above limiting power factor value of 0.89.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:07 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**246**
NRC Question Number	**VKG015**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

ITS SRs 3.8.1.9, 3.8.1.10, and 3.8.1.14 each contain a Note that states, in part, "If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.89." The limiting power factor of 0.89 is based on the most limiting power factor of the four DGs. The following table provides the maximum kW loading, maximum kVA loading and the corresponding power factor for each DG during the first two hours when the DG is operating at 110% load and the running load from zero to two hours and two hours through the end of the 7 days that the DG is required to operate.

Maximum Steady-State Running Load, 0 hours to 2 hours				
110% Load	**1A-A**	**1B-B**	**2A-A**	**2B-B**
kW (LOOP)	3413.13	3589.95	3594.86	3687.63
KVA (LOOP)	3775.66	3977.05	3971.53	4073.29
power factor	0.90	0.90	0.91	0.91
kW (LOOP+SIA)	3726.18	3868.80	3901.45	3975.06
KVA (LOOP+SIA)	4207.34	4368.94	4399.56	4478.99
power factor	0.89	0.89	0.89	0.89
kW (LOOP+SIB)	4056.42	4197.20	4272.39	4344.83
KVA (LOOP+SIB	4550.78	4708.11	4798.90	4863.29
power factor	0.89	0.89	0.89	0.89

Maximum Steady-State Running Load, 2 hours to End				
100% Load	**1A-A**	**1B-B**	**2A-A**	**2B-B**
kW (LOOP)	3351.98	3514.35	3576.16	3615.91
KVA (LOOP)	3706.21	3894.81	3950.92	3991.01
power factor	0.90	0.90	0.91	0.91
kW (LOOP+SIA)	3601.39	3731.80	3748.77	3842.54
KVA (LOOP+SIA)	4063.12	4213.80	4225.24	4323.80
power factor	0.89	0.89	0.89	0.89
kW (LOOP+SIB)	3931.46	4060.05	4119.03	4154.04
KVA (LOOP+SIB	4407.27	4553.99	4624.65	4644.92
power factor	0.89	0.89	0.89	0.89

Loss of Offsite Power (LOOP)
LOOP concurrent with safety injection and containment isolation signal Phase A (LOOP+SIA)
LOOP concurrent with safety injection and containment isolation signal Phase B (LOOP+SIB)

Based on DG loading, the most limiting power factor is 0.89 which corresponds to the Note in ITS SRs 3.8.1.9, 3.8.1.10, and 3.8.1.14.

Response Date/Time	**8/7/2014 3:50 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/7/2014 2:49 PM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**304**
NRC Question Number	**VKG015**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/28/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/28/2014 3:54 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**176**
NRC Question Number	**VKG016**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.3**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.3, Condition A, Action A.1 requires: "Restore fuel oil level to within limits" when the Condition "One or more DGs with fuel level less than a 7 day supply and greater than a 6 day supply in storage tank" occurs.** **ITS LCO 3.8.3, Conditions A, Bases provide volume of fuel oil [53719 gallons] which is equivalent to 6 day supply.** **Please provide summary of calculation which provides fuel consumption rate to verify that fuel oil volume of 53719 gallons is equivalent to 6 day supply, and 62,000 gallons (value provided in CTS) is equivalent to 7 day supply.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:09 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**247**
NRC Question Number	**VKG016**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**ITS LCO 3.8.3, Bases states that each diesel generator (DG) is provided with a 7 day storage tank, comprised of four inter-connected tanks, having a fuel oil capacity sufficient to operate that diesel for a period of 7 days while the DG is supplying maximum post loss of coolant accident load demand discussed in UFSAR, Section 9.5.4.3 and Regulatory Guide 1.137. LCO 3.8.3, Condition A, Required Action A.1, requires that the fuel oil level be restored to within limits if the fuel oil level is less than a 7 day supply and greater than a 6 day supply. The Bases states that the fuel oil level equivalent to a 6 day supply is 53,719 gallons and the 7 day supply is 62,000 gallons.** **The fuel oil consumption rate for each DG is 337 gallons per hours (GPH) when supplying 100% load. The DG is also assumed to operate at 110% load during the first two hours of the design basis event, at 110% load, the fuel oil consumption rate is 395 GPH. A 6 day supply (144 hours) would require 2 hours at 395 GPH (790 gallons) and 142 hours at 337 GPH (47,854 gallons) for a total of 48,644 gallons. An additional 674 gallons of diesel fuel is added to account for periodic testing of the DG. The total required volume for 6 days would be 49,318 gallons which is less than stated in the Bases for ITS LCO 3.8.3, therefore, 53,719 gallons as stated in the Bases will ensure that the DG has sufficient fuel oil for 6 days.** **The 7 day supply would require 168 hours of operation, 2 hours are at 395 GPH (790 gallons) and 166 hours at 337 GPH (55,942) for a total of 56,732 gallons. An additional 674 gallons is added to account for periodic testing of the DG. The total required volume for 7 days would be 57,406 gallons which is less than stated in the Bases for ITS LCO 3.8.3, therefore, 62,000 gallons as stated in the Bases will ensure that the DG has sufficient fuel oil for 7 days.**
Response Date/Time	**8/8/2014 7:50 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner**

	Vijay Goel **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/8/2014 6:47 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**305**
NRC Question Number	**VKG016**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/28/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/28/2014 3:55 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**177**
NRC Question Number	**VKG017**
Category	**Technical**
ITS Section	**3.8**
ITS Number	
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.3, Condition B, Action B.1 requires: “Restore lube oil inventory to within limits” when the Condition “One or more DGs with lube oil inventory less than a 7 day supply and greater than a 6 day supply” occurs.** **ITS LCO 3.8.3, Conditions B, Bases provide volume of lube oil [120 gallons] which is equivalent to 6 day supply. Please provide summary of calculation which provides lube oil consumption rate to verify that lube oil volume of 120 gallons is equivalent to 6 day supply.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:10 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**248**
NRC Question Number	**VKG017**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**The ITS 3.8.3 Bases for ACTIONS B.1 states that the lube oil inventory equivalent to a 6 day supply is 120 gallons per diesel engine. The estimated lube oil consumption rate for each diesel engine is 0.83 gal/hr. At that consumption rate, 119.52 gallons of lube oil would be consumed. Therefore, 120 gallons of lube oil will adequately provide a 6 day supply for each diesel engine.**
Response Date/Time	**8/8/2014 8:00 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/8/2014 6:56 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**306**
NRC Question Number	**VKG017**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/28/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/28/2014 3:56 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**178**
NRC Question Number	**VKG018**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.4**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS LCO 3.8.4 Bases, Required Action A.2 contains the following statement: "The 2 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery." Page E9-1 of the LAR contains the following statement: "Describes how a 5 percent design margin for the 125 V Vital batteries corresponds to a 2 amp float current value indicating that the battery is 98 percent charged." Please explain the relationship between the 95% charge value stated in ITS Bases and 98% charge value stated in the commitment made on Page E9-1 of the LAR.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:11 AM**
Notification	**Scott Bowman Michelle Conner Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**249**
NRC Question Number	**VKG018**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for VKG018.pdf** (25KB)
Attachment 2	
Response Statement	**In response to VKG018, the ITS 3.8.4 Bases for ACTIONS A.1, A.2, and A.3, on pages 326 and 341 of Enclosure 2, Volume 13, will be revised. Specifically, the sentence, "The 2 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery," in the fifth paragraph will be revised to state, "The 2 amp value is based on returning the battery to 98% charge and assumes a 5% design margin for the battery."** **This change aligns the statement provided on page E9-1 of Enclosure 9, which states Sequoyah will change or verify that the FSAR describes how a 5 percent design margin for the 125V Vital batteries corresponds to a 2 amp float current value indicating that the battery is 98 percent charged, and the letter provided by the battery manufacturer, C&D Technologies, Inc., provided in the response to RAI GMW-002, which states, "For the LCUN-33 batteries, after a discharge, when the float current drops to less than or equal to 2 amps, the battery should be at least 98% recharged," with the ITS 3.8.4 Bases.** **See Attachment 1 for the draft revised ITS 3.8.4 Bases.**
Response Date/Time	**8/8/2014 8:00 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/8/2014 7:00 AM**
Date Modified	
Modified By	

BASES

ACTIONS (continued)

A discharged battery having terminal voltage of at least the minimum established float voltage indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within ~~[~~12~~]~~ hours, avoiding a premature shutdown with its own attendant risk.

If established battery terminal float voltage cannot be restored to greater than or equal to the minimum established float voltage within ~~[~~2~~]~~ hours, and the charger is not operating in the current-limiting mode, a faulty charger is indicated. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

2

If the charger is operating in the current limit mode after 2 hours that is an indication that the battery is partially discharged and its capacity margins will be reduced. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within ~~[~~12~~]~~ hours (Required Action A.2).

Required Action A.2 requires that the battery float current be verified as less than or equal to ~~[~~2~~]~~ amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The ~~[~~2~~]~~ amp value is based on returning the battery to ~~[95]~~ 98% charge and assumes a ~~[~~5~~]~~% design margin for the battery. If at the expiration of the initial ~~[~~12~~]~~ hour period the battery float current is not less than or equal to ~~[~~2~~]~~ amps this indicates there may be additional battery problems and the battery must be declared inoperable.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Any licensee wishing to adopt Completion Time greater than 72 hours for Required Action A.3 will need to demonstrate that the longer Completion Time is appropriate for the plant in accordance with the guidance in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," and RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."~~

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BASES

ACTIONS (continued)

A discharged battery having terminal voltage of at least the minimum established float voltage indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within ~~[~~12~~]~~ hours, avoiding a premature shutdown with its own attendant risk.

If established battery terminal float voltage cannot be restored to greater than or equal to the minimum established float voltage within ~~[~~2~~]~~ hours, and the charger is not operating in the current-limiting mode, a faulty charger is indicated. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

If the charger is operating in the current limit mode after 2 hours that is an indication that the battery is partially discharged and its capacity margins will be reduced. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within ~~[~~12~~]~~ hours (Required Action A.2).

98

Required Action A.2 requires that the battery float current be verified as less than or equal to ~~[~~2~~]~~ amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The ~~[~~2~~]~~ amp value is based on returning the battery to ~~[95]~~% charge and assumes a ~~[~~5~~]~~% design margin for the battery. If at the expiration of the initial ~~[~~12~~]~~ hour period the battery float current is not less than or equal to ~~[~~2~~]~~ amps this indicates there may be additional battery problems and the battery must be declared inoperable.

2

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Any licensee wishing to adopt Completion Time greater than 72 hours for Required Action A.3 will need to demonstrate that the longer Completion Time is appropriate for the plant in accordance with the guidance in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," and RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."~~

4

Licensee Response/NRC Response/NRC Question Closure

Id	**307**
NRC Question Number	**VKG018**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**8/28/2014**
Notification	**Scott Bowman Michelle Conner Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**8/28/2014 3:57 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**179**
NRC Question Number	**VKG019**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.4**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS Bases SR 3.8.4.1 contains the following statement: "The voltage requirements are based on the nominal design voltage of the battery and are consistent with the minimum float voltage established by the manufacturer (129 V for the Vital batteries and 124 V for the DG batteries)." Provide the basis for selecting 124 V minimum float voltage for DG batteries.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:12 AM**
Notification	**Scott Bowman Michelle Conner Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**351**
NRC Question Number	**VKG019**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for RAI VKG019.pdf** (2MB)
Attachment 2	**Attachment 2 for RAI VKG019.pdf** (360KB)

Response Statement

In response to RAI VKG019, the following information is being provided regarding the basis for selecting 124 volts as the minimum float voltage for the DG batteries.

The minimum float voltage requirements for the DG batteries, as discussed in ITS 3.8.4 Bases Surveillance Requirements Section 3.8.4.1, reflects CTS 4.8.1.1.3.a.2 that requires verifying, "the total battery terminal voltage is greater than or equal to 124 volts on float charge," for the DG batteries. By letter dated September 17, 1982 (Accession Number 8209220277), SQN requested a license amendment to change the minimum float voltage requirement specified in surveillance requirement 4.8.1.1.3.a.2 for the DG batteries from 129 volts to 124 volts. The change was necessary because SQN replaced the DG batteries with lead calcium batteries with 57 cells with a manufacturer's recommended minimum float voltage of 2.17 volts/cell. The original minimum float voltage requirement of 129 volts exceeded the manufacturer's recommended maximum of 128.25 volts and could contribute to shorter battery life. Therefore, 124 volts should be the minimum total float voltage requirement. By letter dated December 23, 1982 (Accession Number 8301060001), the Commission issued Amendments 17 and 8 for SQN, Units 1 and 2, respectively. The Safety Evaluation related to Amendments 17 and 8 stated that, "from this justification, the staff agrees that surveillance requirement 4.8.1.1.3.9.2 [sic] should be changed from 129 volts to 124 volts."

Attachment 1 is the SQN license amendment request.

Attachment 2 is the Commission's issuance of Amendments 17 and 8 for SQN, Units 1 and 2.

Response Date/Time	**9/26/2014 6:55 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner**

	Vijay Goel **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/26/2014 5:49 AM**
Date Modified	
Modified By	

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

September 17, 1982

TVA-SQN-TS-36

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Denton:

In the Matter of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

In accordance with 10 CFR Part 50.59, we are enclosing 40 copies of a requested amendment to the operating licenses DPR-77 and DPR-79 for a change to the Sequoyah Nuclear Plant units 1 and 2 technical specifications. The proposed changes to the technical specifications and justifications for the changes are provided in the following enclosures.

Enclosure 1 - Change No. 1 - Diesel Generator Battery Float Voltage

Enclosure 2 - Change No. 2 - Isolation Times for Containment Isolation Valves

Enclosure 3 - Change No. 3 - Instrumentation Surveillance Requirement Test Frequency of Tables 4.3-1 and 4.3-2

Enclosure 4 - Change No. 4 - Changes to Reflect Installation of Permanent Hydrogen Mitigation System

Enclosure 5 - Change No. 5 - Addition of Second Level of Undervoltage Protection

NRC approval of the changes to the technical specifications, provided in Enclosures 4 and 5, is required for unit 1 of our Sequoyah Nuclear Plant before startup from the present refueling outage.

B021
s
1/40

Mr. Harold R. Denton, Director   September 17, 1982

In accordance with the provisions of 10 CFR Part 170.22, we have determined the proposed amendment to be Class IV for unit 1 and Class I for unit 2. This classification is based on the fact that the amendment involves several changes of the Class III type incorporated into this amendment and involves a second essentially identical unit at the same site. The remittance of $12,700 is being wired to the Nuclear Regulatory Commission, Attention: Licensing Fee Management Branch.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

D S Kammer

D. S. Kammer
Nuclear Engineer

Sworn to and subscribed before me
this 17th day of Sept 1982

Bryant M. Lowery
Notary Public
My Commission Expires 4/8/86

Enclosures (40)
cc: U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

ENCLOSURE 1

SEQUOYAH NUCLEAR PLANT

PROPOSED TECHNICAL SPECIFICATIONS

TVA-SQN-TS-36

CHANGE NO. 1

DIESEL GENERATOR BATTERY FLOAT VOLTAGE

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.3 The 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger for each diesel generator shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying:

1. That the parameters in Table 4.8-1a meet the Category A limits.

2. That the total battery terminal voltage is greater than or equal to 124-volts on float charge.

b. At least once per 92 days by:

1. Verifying that the parameters in Table 4.8-1a meet the Category B limits,

2. Verifying there is no visible corrosion at either terminals or connectors, or the cell to terminal connection resistance of these items is less than 150 x 10^{-6} ohms, and

3. Verifying that the average electrolyte temperature of 6 connected cells is above 60 F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.

2. The battery to battery and terminal connections are clean, tight and coated with anti-corrosion material.

3. The resistance of each cell to terminal connection is less than or equal to 150 x 10^{-6} ohms.

4.8.1.1.4 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per nuclear unit basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

SURVEILLANCE REQUIREMENTS (Continued)

f. At least once per 10 years* by:

1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypoclorite solution, and

2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.

4.8.1.1.3 The 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger for each diesel generator shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying:

1. That the parameters in Table 4.8-1a meet the Category A limits.

2. That the total battery terminal voltage is greater than or equal to 124-volts on float charge.

b. At least once per 92 days by:

1. Verifying that the parameters in Table 4.8-1a meet the Category B limits,

2. Verifying there is no visible corrosion at either terminals or connectors, or the cell to terminal connection resistance of these items is less than 150×10^{-6} ohms, and

3. Verifying that the average electrolyte temperature of 6 connected cells is above 60 F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.

2. The battery to battery and terminal connections are clean, tight and coated with anti-corrosion material.

3. The resistance of each cell to terminal connection is less than or equal to 150×10^{-6} ohms.

*These requirements are waived for the initial surveillance.

TVA-SQN-TS-36
Change No. 1
Sequoyah Nuclear Plant
Justification for Proposed Technical Specification Change

DIESEL GENERATOR BATTERY FLOAT VOLTAGE

The diesel generator batteries at Sequoyah have been replaced with lead calcium cells. The manufacturer (C&D Batteries) recommends a minimum float voltage of 2.17 volts for each cell. The Sequoyah batteries consist of 19 three cell units. The minimum total float voltage requirement is:

2.17 volts/cell x 57 cells = 123.69 volts

The minimum float voltage specified in surveillance requirement 4.8.1.1.3.a.2 should be 124 volts (rounded up).

The present technical specification test value of 129 volts exceeds the manufacturer's maximum of 128.25 volts. The larger voltage can shorten battery life.

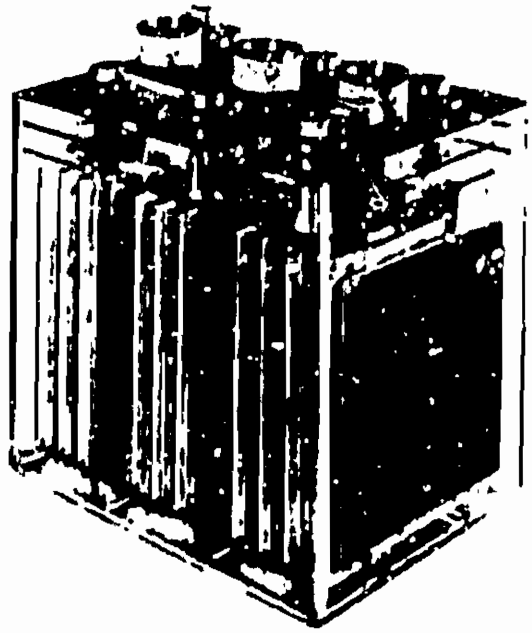
A copy of the manufacturer's specification sheets and part of the instruction manual are included are attachments.

Supersedes Section 12-337

STATIONARY BATTERIES

25 to 200 Amp. Hours
DCU - Lead Calcium
DU - Lead Antimony

SPECIFICATIONS



3DCU-7

		Height	Width	Thickness
CELLS PER UNIT	One, two or three			
PLATES				
Positive		5.88"	5.63"	0.206"
Negative		5.88"	5.63"	0.170"
Outside Negative		5.88"	5.63"	0.110"

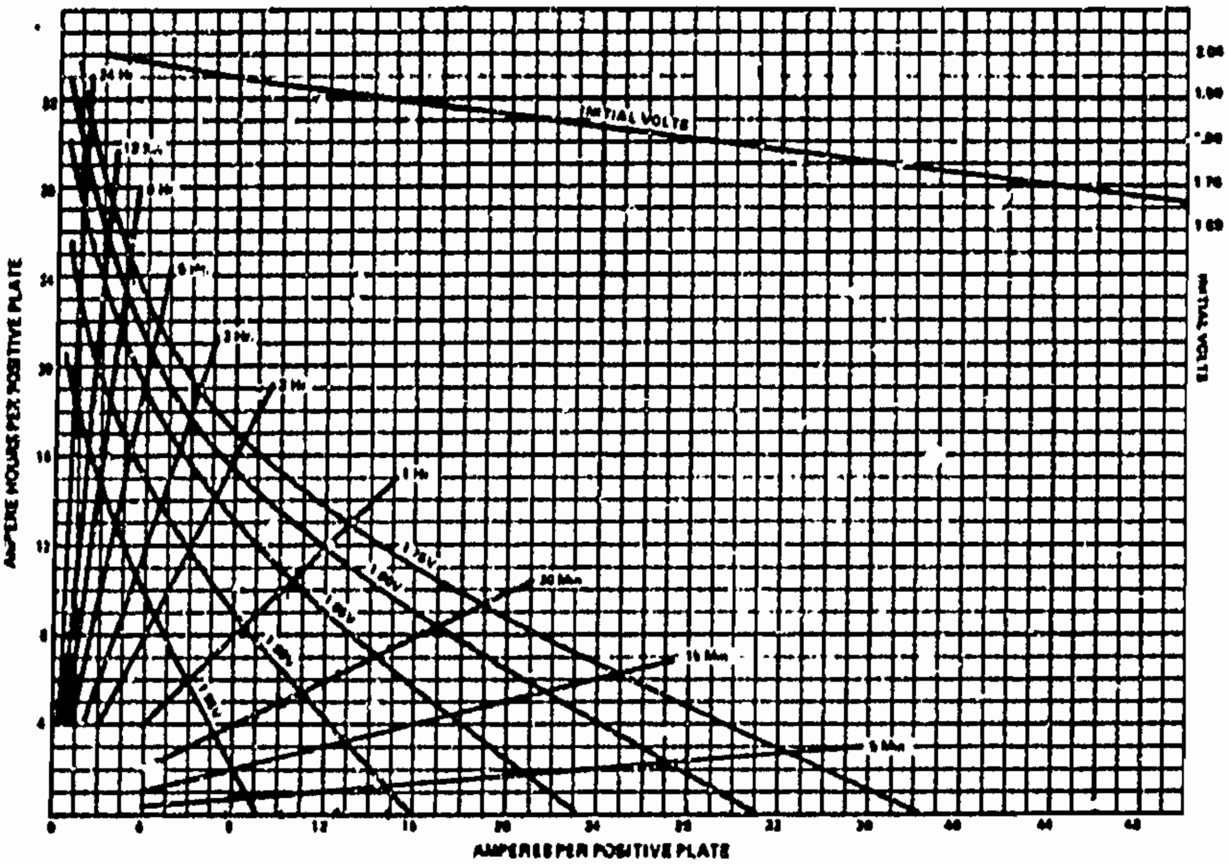
SPECIFIC GRAVITY ..... 1.210 nominal at 77°F
CONTAINER .... Transparent thermoplastic
CELL COVER .... Thermoplastic
SEPARATORS .... Microporous
RETAINERS .... Fibrous glass mat
ELECTROLYTE HEIGHT ABOVE PLATES .... 1.75" except 1' plate – 1.63"
SEDIMENT SPACE ...... 0.6' except 11 plate – 0.66"
TERMINALS .... DCU/DU - 3 thru 11. Two flag terminals with 1/4" - 20 bolts
DCU/DU - 13 thru 17: Two 0.75" posts with 5/16" - 18 stud end cap nuts
VENT CAPS .... Flame arrestor type

Type of Cell		Cells per Unit	*Nominal Cap. 1.75 VPC @ 77°F (Includes Connector Voltage Drop)								Overall Dimensions			Approx. Weight (lbs.)		Elect. per Cell
			Ampere Hours					Amperes								
Calcium	Antimony		8 Hrs.	5 Hrs.	3 Hrs.	1.5 Hrs.	1 Hr.	30 Min.	15 Min.	1 Min.	L (in.)	W (in.)	H (in.)	Wet Filled	Dry Packed	(lbs.)
2DCU-3	2DU-3	2	25	22	19	14.3	12.5	19	24.9	37.5	3.50			18	22	3
3DCU-3	3DU-3	3	25	22	19	[illegible]	12.5	19	24.9	37.5	5.78			27	32	3
2DCV 5	2DU-5	2	50	44	38	30.6	25	38	49.8	75	3.50			22	26	2.8
3DCU-5	3DU-5	3	50	44	38	30.6	25	38	49.8	75	5.78			33	38	2.8
2DCU-7	2DU-7	2	75	66	57	45.9	38	57	74.7	111	6.38	7.38	10.31	36	40	5.8
3DCU-7	3DU-7	3	75	66	57	45.9	38	57	74.7	111	8.47			53	58	5.8
2DCU-9	2DU-9	2	100	88	76	61.2	50	76	99.8	148	6.38			40	44	5.3
3DCU-9	3DU-9	3	100	88	76	61.2	50	76	99.8	148	9.47			60	65	5.3
2DCU-11	2DU-11	2	120	105	90	75	60	98	126	184	7.50	7.19	10.26	48	55	6.8
3DCU 11	3DU-11	3	120	105	90	75	60	98	126	184	11.13			71	79	6.8
DCU-13	DU-13	1	150	132	114	91.8	75	114	149.4	220	6.38			38	44	12.5
DCU-15	DU-15	1	175	154	132	107.1	88	133	174.3	253	9.38	7.38	10.75	40	46	11.5
DCU-17	DU-17	1	200	176	150	122.4	100	152	199.2	288	6.38			42	48	10.5

Note: Electrolyte weighs approximately 10 lbs. per gallon (1.210)
*Data based on discharge from float at 77°F for a minimum of 72 hours in accordance with Federal Specification W-B-134.

SWIFT INDUSTRIAL POWER

TYPICAL DISCHARGE CHARACTERISTICS OF DCU, DU
(EXCEPT DCU-11)



Data based on discharge from float at 77°F for a minimum of 72 hours in accordance with Federal Specification W-B-134.

RACK SPECIFICATIONS

Battery	No. of Cells	TWO TIER Model RD 701 (L) Width: 13 in. Height: 31.38 in. Length (L) Ft.		Weight Lbs.		No. Req'd.	TWO STEP Model RD 703-(L) Width: 17.5 in. Height: 24.38 in. Length (L) Ft.		Weight Lbs.		No. Req'd.	THREE TIER Model RD-702-(L) Width: 18 in. Height: 56.38 in. Length (L) Ft.		Weight Lbs.		No. Req'd.
2DCU/DU-3	12	3		48		1	3		47		1	–		–		–
thru	23/24	3		48		1	3		47		1	–		–		–
	26	3		48		1	3		47		1	–		–		–
3DCU/DU-5	60	5		61		1	5		62		1	5		107		1
2DCU/DU-7	12	3		48		1	3		47		1	–		–		1
thru	23/24	4		54		1	4		55		1	3		79		1
	28	4		54		1	4		55		1	3		73		1
3DCU/DU-9	60	9		106		1	5		108		1	4		91		1
2DCU/DU-11	12	3		48		1	3		47		1	–		–		–
and	23/24	4		54		1	4		55		1	3		79		1
	28	5		61		1	5		62		1	4		91		1
3DCU/DU-11	60	10		114		1	10		110		1	10		201		1
DCU/DU-13	12	4		64		1	4		55		1	–		–		–
thru	23/24	7		90		1	7		92		1	5		107		1
	25	9		98		1	8		100		1	6		114		1
DCU/DU-17	60	5		106		2	9		108		2	4		–		1

Notes: 1. Above data is for C&D standard racks only. For seismic zones, C&D type RP racks are available. See Section 12.660.

2. Rack lengths for other than 00 cell batteries can be calculated by the formula
Number of cells per tier or step x (L + 0.5) – 0.5 = Total Rack Length
(Where "L" is length of cell.)
Where dimensions are critical, check with C&D engineering.

3. Rack width does not include thickness of crossbracing. Increase width by 0.5 for crossbracing when this dimension is critical.

BATTERIES
3043 WALTON ROAD, PLYMOUTH MEETING, PA. 19462
an Eltra company

BATTERIES OF CANADA
180 CONNIE CRESCENT, UNIT 15, CONCORD, ONTARIO L4K 1B8
an Eltra company

Printed in U.S.A. 10M/180

3.11 SUITABLE WATER FOR FILLING

If in doubt about the suitability of the local water supply for use in lead-acid batteries, consult your nearest C & D Representative. If he does not have a recent analysis report available, send a one-quart sample in a chemically clean non-metallic container and stopper, prepaid to Technical Services Dept., C & D Batteries Division, Eltra Corporation, 3043 Walton Road, Plymouth Meeting, PA 19462. The sample will be analyzed and a report as to its safety for use in lead-acid batteries will be forwarded. Indicate the source of the water and the sender's name and location on the sample.

The quantity of water consumed by a battery is proportional to the amount of charge is receives. Lead-antimony batteries begin their life with low water consumption, which increases as much as five or more times toward the end of their life. Lead-calcium batteries, because of the greater purity of their components, require only about one-tenth the water needed by equivalent-sized new lead-antimony batteries. This low requirement remains constant during their entire life. Fig. 10 gives the approximate water consumption for various size cells at the normal operating temperature of 77°F.

3.12 CONNECTING BATTERY TO CHARGER

Only direct current (dc) is used for charging. With the charging source de-energized, connect the positive terminal of the battery to the positive of the charger or system and the negative terminal of the battery to the negative of the charger or system. Re-energize the system following procedures that are provided in charger manual.

4.0 INITIAL CHARGE

All batteries shipped wet and fully charged lose some charge in transit or while standing idle before installation. At the first opportunity, they should be given their first or initial charge using the following method.

4.1 CONSTANT VOLTAGE METHOD

This method of giving the initial charge is the most common and is used when circuit voltage limitations make it impractical to use the constant current method. First, determine the maximum allowable voltage that may be applied to the connected equipment. Divide this voltage by the number of cells in the battery, thus obtaining the maximum voltage per cell. Determine if the battery is a lead-antimony or lead-calcium type by the nomenclature on the cell. If lead-antimony, refer to the following table and charge for the time indicated at the maximum voltage permitted by the associated equipment.

TABLE I - LEAD-ANTIMONY CELLS

CHARGE VOLTAGE PER CELL (VPC) (1.210 SPECIFIC GRAVITY)			
INITIAL		FLOAT	EQUALIZE
VPC	HOURS	VPC	VPC
2.39	40	2.15 to 2.17	2.33 for 8 to 24 hrs.
2.36	60		
2.33	110		
2.30	160		
2.24	210		

If lead-calcium the following applies:

TABLE II - LEAD-CALCIUM CELLS

CHARGE VOLTAGE PER CELL (VPC)				
SP. GR. OF CELLS	FLOAT VPC		INITIAL/EQUALIZE (VPC)	
	MIN.	NOMINAL	CRITICAL CELL VOLT.	NOM. VPC
1.210	2.17	2.20-2.25	2.15	2.33-2.38
1.225	2.18	2.22-2.27	2.15	2.36-2.40
1.250	2.20	2.25-2.30	2.18	2.38-2.43
1.275	2.23	2.29-2.34	2.20	2.40-2.46
1.300	2.27	2.33-2.38	2.23	2.45-2.50

TABLE III - BRUSHING & TORQUE SPECIFICATIONS FOR CELL CONNECTIONS

CELL TYPE	RECOM. TORQUE	TYPE BRUSH
Cells with posts that do not have copper inserts:		
Communications Batteries KT, KCT, LT, LCT UPS & Switchgear Batteries DU & DCU 13, 15, 17 KA & KC 5, 7, 11, 13 KY & KCY-7 KCX 7, 9, 11, 13, 15, 17 LA & LC - 13, 15, 17 LY & LCY - 5, 7 Photovoltaic Batteries DCPSA - 11, 13, 15, 17 DCPSD - 9, 11, 13 KCPSA - 5, 7, 9, 11, 13, 15, 17 KCPSD - 5, 7, 9, 11, 13 LCPSA - 5, 7, 11, 13, 15, 17, 19, 21, 23, 25 LCPSD - 5, 11, 13, 15, 17, 19	110 inch-lbs. -0 inch-lbs. +10 inch-lbs.	wire brush
Mini-Tank Cells MT & MCT	160 inch lbs. -0 inch-lbs. +10 inch-lbs.	wire brush
Cells with posts that have copper inserts:		
Tank Cells RHA & RHC UPS & Switchgear Batteries KA & KC-15, 17, 19, 21 KY & KCY-23, 25 KCX-19, 21, 23, 25, 27, 29, 31, 33 LA & LC - 19, 21, 23, 25, 27, 29, 31, 33 LCX - All sizes LY & LCY - 9, 11, 35, 37, 39	160 inch-lbs. -0 inch-lbs. +5 inch-lbs.	plastic bristle brush
Cells with large flag terminals (no inserts):		
DU & DCU - 3, 5, 7, 9, 11 DCPSA - 3, 5, 7, 9 DCPSD - 3, 5, 7	70 inch-lbs -0 inch-lbs. +5 inch-lbs.	wire brush
Cells with small size terminals (no inserts):		
A, AC, B, BC and small specialty batteries	15 inch-lbs. -3 inch-lbs. +0 inch-lbs.	wire brush

ENCLOSURE 2

SEQUOYAH NUCLEAR PLANT

PROPOSED TECHNICAL SPECIFICATIONS

TVA-SQN-TS-36

CHANGE NO. 2

ISOLATION TIMES FOR CONTAINMENT ISOLATION VALVES

TABLE 3.3-5 (Continued)

TABLE NOTATION

(1) Diesel generator starting and sequence loading delays included. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI and RHR pumps.

(2) Using air operated valve

(3) The following valves are exceptions to the response times shown in the table and will have the values listed in seconds for the initiating signals and function indicated:

Valves: FCV-26-240, -243
Response times: 2.d. $21^{(8)}/ 31^{(9)}$
3.d. $22^{(8)}$
4.d. $21^{(8)}/ 31^{(9)}$
5.d. $24^{(8)}/ 34^{(9)}$
6.d. $21^{(8)}/ 31^{(9)}$

Valves: FCV-61-96, -97, -110, -122, -191, -192, -193, -194
Response times: 2.d. $31^{(8)}$
3.d. $32^{(8)}$
4.d. $31^{(8)}$
5.d. $34^{(8)}$
6.d. $31^{(8)}$

Valve: FCV-70-143
Response times: 2.d. $61^{(8)}/ 71^{(9)}$
3.d. $62^{(8)}$
4.d. $61^{(8)}/ 71^{(9)}$
5.d. $64^{(8)}/ 74^{(9)}$
6.d. $61^{(8)}/ 71^{(9)}$

(4) On 2/3 any Steam Generator

(5) On 2/3 in 2/4 Steam Generator

(6) Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing.

(7) Diesel generator starting and sequence loading delays <u>not</u> included. Offsite power available. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps.

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

TABLE 3.3-5 (Continued)

TABLE NOTATION

(1) Diesel generator starting and sequence loading delays included. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI and RHR pumps.

(2) Using air operated valve

(3) The following valves are exceptions to the response times shown in the table and will have the values listed in seconds for the initiating signals and function indicated:

Valves: FCV-26-240, -243

Response times:		
	2.d.	$21^{(8)}/31^{(9)}$
	3.d.	$22^{(8)}$
	4.d.	$21^{(8)}/31^{(9)}$
	5.d.	$24^{(8)}/34^{(9)}$
	6.d.	$21^{(8)}/31^{(9)}$

Valves: FCV-61-96, -97, -110, -122, -191, -192, -193, -194

Response times:		
	2.d.	$31^{(8)}$
	3.d.	$32^{(8)}$
	4.d.	$31^{(8)}$
	5.d.	$34^{(8)}$
	6.d.	$31^{(8)}$

Valve: FCV-70-143

Response times:		
	2.d.	$61^{(8)}/71^{(9)}$
	3.d.	$62^{(8)}$
	4.d.	$61^{(8)}/71^{(9)}$
	5.d.	$64^{(8)}/74^{(9)}$
	6.d.	$61^{(8)}/71^{(9)}$

(4) On 2/3 any Steam Generator

(5) On 2/3 in 2/4 Steam Generator

(6) Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing.

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps.

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

TVA-SQN-TS-36
Change No. 2
Sequoyah Nuclear Plant
Justification for Proposed Technical Specifications

ISOLATION TIMES FOR CONTAINMENT ISOLATION VALVES

The isolation times for the containment isolation valves on the ice condenser glycol lines were increased from 10 seconds to 30 seconds. These changes were approved by the NRC on May 4, 1982 for units 1 and 2 (Amendment 13 for the unit 1 operating license; Amendment 4 to the unit 2 operating license). During the process of revising our procedures, an error of omission was discovered in our original change request. Although the valve stroke time was changed, the overall phase A response time, which includes the valve stroke time, was overlooked. Also, a similar error was discovered in the fire protection system containment isolation valves. The fire protection valves list a 20-second valve stroke time. However, the phase A response time is not consistent with the valve stroke time.

NRC has reviewed and approved the response times for both sets of valves. This change only corrects errors in the implementation of the response time.

ENCLOSURE 3

SEQUOYAH NUCLEAR PLANT

PROPOSED TECHNICAL SPECIFICATIONS

TVA-SQN-TS-36

CHANGE NO. 3

INSTRUMENTATION SURVEILLANCE REQUIREMENT TEST FREQUENCY

OF TABLES 4.3-1 AND 4.3-2

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	S/U(1)	1, 2, and *
2. Power Range, Neutron Flux	S	D(2), M(3) and Q(6)	Q	1, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R(6)	Q	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(6)	[illegible]	1, 2
5. Intermediate Range, Neutron Flux	S	R(6)	S/U(1)	1, 2, and *
6. Source Range, Neutron Flux	S(7)	R(6)	Q and S/U(1)	2, 3, 4, 5, and *
7. Overtemperature Delta T	S	R	M	1, 2
8. Overpower Delta T	S	R	M	1, 2
9. Pressurizer Pressure--Low	S	R	Q	1, 2
10. Pressurizer Pressure--High	S	R	Q	1, 2
11. Pressurizer Water Level--High	S	R	Q	1, 2
12. Loss of Flow - Single Loop	S	R		1
13. Loss of Flow - Two Loops	S	R	N.A.	1

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
14. Main Steam Generator Water Level--Low-Low	S	R	Q	1, 2
15. Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level	S	R	Q	1, 2
16. Undervoltage - Reactor Coolant Pumps	N.A.	R	M	1
17. Underfrequency - Reactor Coolant Pumps	N.A.	R	M	1
18. Turbine Trip				
A. Low Fluid Oil Pressure	N.A.	N.A.	S/U(1)	1
B. Turbine Stop Valve Closure	N.A.	N.A.	S/U(1)	1
19. Safety Injection Input from ESF	N.A.	N.A.	M(4)	1, 2
20. Reactor Trip Breaker	N.A.	N.A.	M(5) and S/U(1)	1, 2, and *
21. Automatic Trip Logic	N.A.	N.A.	M(5)	1, 2, and *
22. Reactor Trip System Interlocks				
A. Intermediate Range Neutron Flux, P-6	N.A.	R	S/U(8)	2, and #
B. Power Range Neutron Flux, P-7	N.A.	R	S/U(8)	1
C. Power Range Neutron Flux, P-8	N.A.	R	S/U(8)	1
D. Power Range Neutron Flux, P-10	N.A.	R	S/U(8)	1, 2
E. Turbine Impulse Chamber Pressure, P-13	N.A.	R	S/U(8)	1
F. Power Range Neutron Flux, P-9	N.A.	R	S/U(8)	1
G. Reactor Trip, P-4	N.A.	R	S/U(8)	1, 2, and *

MAR 25 1982

TABLE 4.3-2

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. SAFETY INJECTION AND FEEDWATER ISOLATION				
a. Manual Initiation	N.A.	N.A.	M(1)	1, 2, 3, 4
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
c. Containment Pressure-High	S	R	Q	1, 2, 3
d. Pressurizer Pressure--Low	S	R	Q	1, 2, 3
e. Differential Pressure Between Steam Lines--High	S	R	Q	1, 2, 3
f. Steam Flow in Two Steam Lines--High Coincident with T_{avg}--Low-Low or Steam Line Pressure--Low	S	R		1, 2, 3
2. CONTAINMENT SPRAY				
ual Initiation	N.A.	N.A.	M(1)	1, 2, 3, 4
b. utomatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
c. Containment Pressure--High-High	S	R	Q	1, 2, 3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
3. CONTAINMENT ISOLATION				
a. Phase "A" Isolation				
1) Manual	N.A.	N.A.	M(1)	1, 2, 3, 4
2) From Safety Injection Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
b. Phase "B" Isolation				
1) Manual	N.A.	N.A.	M(1)	1, 2, 3, 4
2) Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
3) Containment Pressure--High-High	S	R	Q	1, 2, 3
c. Containment Ventilation Isolation				
1) Manual	N.A.	N.A.	M(1)	1, 2, 3, 4
2) Automatic Isolation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
3) Containment Gas Monitor Radioactivity-High	S	R	M	1, 2, 3, 4

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
4) Containment Purge Air Exhaust Monitor Radioactivity-High	S	R	M	1, 2, 3, 4
5) Containment Particulate Activity-High	S	R	M	1, 2, 3, 4
4. STEAM LINE ISOLATION				
a. Manual	N.A.	N.A.	M(1)	1, 2, 3
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3
c. Containment Pressure--High-High	S	R	Q	1, 2, 3
d. Steam Flow in Two Steam Lines--High Coincident with T_{avg}-- Low-Low or Steam Line Pressure--Low	S	R	Q	1, 2, 3
5. TURBINE TRIP AND FEEDWATER ISOLATION				
a. Steam Generator Water Level--High-High	S	R	Q	1, 2, 3
6. AUXILIARY FEEDWATER				
a. Manual	N.A.	N.A.	M(1)	1, 2, 3
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
c. Main Steam Generator Water Level-Low-Low	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. Station Blackout	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure - Low	N.A.	R	M	1, 2, 3
7. LOSS OF POWER				
a. 6.9 kv Shutdown Board Undervoltage				
1. Loss of Voltage	S	R	M	1, 2, 3, 4
2. Load Shedding	S	R	N.A.	1, 2, 3, 4
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a. Pressurizer Pressure, P-11	N.A.	R (4)	N.A.	1, 2, 3
b. T_{avg}, P-12	N.A.	R (4)	N.A.	1, 2, 3
c. Steam Generator Level, P-14	N.A.	R (4)	N.A.	1, 2

TABLE 4.3-1

REALTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	S/U(1)	1, 2, and *
2. Power Range, Neutron Flux	S	D(2), M(3) and Q(6)	Q	1, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R(6)	Q	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(6)	Q	1, 2
5. Intermediate Range, Neutron Flux	S	R(6)	S/U(1)	1, 2, and *
6. Source Range, Neutron Flux	S(7)	R(6)	M and S/U(1)	2, 3, 4, 5, and *
7. Overtemperature ΔT	S	R	M	1, 2
8. Overpower ΔT	S	R	M	1, 2
9. Pressurizer Pressure--Low	S	R	Q	1, 2
10. Pressurizer Pressure--High	S	R	Q	1, 2
11. Pressurizer Water Level--High	S	R	Q	1, 2
12. Loss of Flow - Single Loop	S	R	Q	1
13. Loss of Flow - Two Loops	S	R	N.A.	1
14. Steam Generator Water Level--Low-Low	S	R	Q	1, 2

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
15. Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level	S	R	Q	1, 2
16. Undervoltage - Reactor Coolant Pumps	N.A.	R	M	1
17. Underfrequency - Reactor Coolant Pumps	N.A.	R	M	1
18. Turbine Trip				
A. Low Fluid Oil Pressure	N.A.	N.A.	S/U(1)	1
B. Turbine Stop Valve Closure	N.A.	N.A.	S/U(1)	1
19. Safety Injection Input from ESF	N.A.	N.A.	M(4)	1, 2
20. Reactor Trip Breaker	N.A.	N.A.	M(5) and S/U(1)	1, 2, and *
21. Automatic Trip Logic	N.A.	N.A.	M(5)	1, 2, and *
22. Reactor Trip System Interlocks				
A. Intermediate Range Neutron Flux, P-6	N.A.	R	S/U (8)	2, and *
B. Power Range Neutron Flux, P-7	N.A.	R	S/U (8)	1
C. Power Range Neutron Flux, P-8	N.A.	R	S/U (8)	1
D. Power Range Neutron Flux, P-10	N.A.	R	S/U (8)	1, 2
E. Turbine Impulse Chamber Pressure, P-13	N.A.	R	S/U (8)	1
F. Power Range Neutron Flux, P-9	N.A.	R	S/U (8)	1
G. Reactor Trip, P-4	N.A.	R	S/U (8)	1, 2, and *

TABLE 4.3-2

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. SAFETY INJECTION AND FEEDWATER ISOLATION				
a. Manual Initiation	N.A.	N.A.	M(1)	1, 2, 3, 4
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
c. Containment Pressure-High	S	R	Q	1, 2, 3
d. Pressurizer Pressure--Low	S	R	Q	1, 2, 3
e. Differential Pressure Between Steam Lines--High	S	R	Q	1, 2, 3
f. Steam Flow in Two Steam Lines--High Coincident with T_{avg}--Low-Low or Steam Line Pressure--Low	S	R	Q	1, 2, 3
2. CONTAINMENT SPRAY				
a. Manual Initiation	N.A.	N.A.	M(1)	1, 2, 3, 4
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
c. Containment Pressure--High-High	S	R	Q	1, 2, 3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
3. CONTAINMENT ISOLATION				
a. Phase "A" Isolation				
1) Manual	N.A.	N.A.	M(1)	1, 2, 3, 4
2) From Safety Injection Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
b. Phase "B" Isolation				
1) Manual	N.A.	N.A.	M(1)	1, 2, 3, 4
2) Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
3) Containment Pressure--High-High	S	R	Q	1, 2, 3
c. Containment Ventilation Isolation				
1) Manual	N.A.	N.A.	M(1)	1, 2, 3, 4
2) Automatic Isolation Logic	N.A.	N.A.	M(2)	1, 2, 3, 4
3) Containment Gas Monitor Radioactivity-High	S	R	M	1, 2, 3, 4

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
4) Containment Purge Air Exhaust Monitor Radioactivity-High	S	R	M	1, 2, 3, 4
5) Containment Particulate Activity-High	S	R	M	1, 2, 3, 4
4. STEAM LINE ISOLATION				
a. Manual	N.A.	N.A.	M(1)	1, 2, 3
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3
c. Containment Pressure--High-High	S	R	Q	1, 2, 3
d. Steam Flow in Two Steam Lines--High Coincident with T_{avg} -- Low-Low or Steam Line Pressure--Low	S	R	Q	1, 2, 3
5. TURBINE TRIP AND FEEDWATER ISOLATION				
a. Steam Generator Water Level--High-High	S	R	Q	1, 2, 3
6. AUXILIARY FEEDWATER				
a. Manual	N.A.	N.A.	M(1)	1, 2, 3
b. Automatic Actuation Logic	N.A.	N.A.	M(2)	1, 2, 3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
c. Main Steam Generator Water Level-Low-Low	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. Station Blackout	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure-Low	N.A.	R	M	1, 2, 3
7. LOSS OF POWER				
a. 6.9 kv Shutdown Board Undervoltage				
1. Loss of Voltage	S	R	M	1, 2, 3, 4
2. Load Shedding	S	R	N.A.	1, 2, 3, 4
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a. Pressurizer Pressure, P-11	N.A.	R (4)	N.A.	1, 2, 3
b. T_{avg}, P-12	N.A.	R (4)	N.A.	1, 2, 3
c. Steam Generator Level, P-14	N.A.	R (4)	N.A.	1, 2

An instruction can be adaquately reviewed in approximately 10 minutes. This is an accumulated time of .667 hours per instruction or 392 manhours or 49 (8 hour) man days per year. The average salary is approximately $30 per hour for a cost of $11,760 per year.

CONCLUSION

The total time saved on both units 1 & 2 where the plants would be in a condition where a single failure would cause a safeguard actuation is 784 hours or 98 (8 hour) days. The operator distraction time saved would be 196 hours or 24.5 (8 hour) days.

The total manhour savings for both units would be 3920 man hours or 490 (8 hour) days at a cost of $98,000 in instrument mechanic time. The review time savings would be 523 manhours or 65.33 (8 hour) man days for a savings of $15,690.

The data collected and reviewed (attachment 1) shows these selected loops to be highly reliable. Extending the frequency to quarterly would have the previously covered positive benefits and would not jeopardize the overall reliability of the plant safety systems.

The plant will maintain a periodic assessment program to guarantee that the systems specified maintain their high reliability. This will include review of SI packages, and repair or replacement of components when problems occur.

TVA-SQN-TS-36
Change No. 3
Sequoyah Nuclear Plant
Justification for Proposed Technical Specifications

This request encompasses 49 instructions in total. There are a number of considerations to be addressed.

1. Each instruction requires an average of 1.0 hour with the loop actually removed from service. This totals 588 hours per year, per unit, that the plant is in a ½ trip condition. In other words this is 73.5 (8 hour) days with the plant in a compromised state.

   The proposed change would delete 392 hours or 49 (8 hour) days from the number now required. This would remove 2/3 of the time when a single plant failure could cause a safeguard actuation, thereby, improving plant reliability.

   The removal of instrument loops from service for the purpose of testing challenges the safeguards actuation system. We h had several occurrences of safety injection and reactor trip actuations directly related with the performance of surveillance instructions. We believe that by reducing the number of challenges to the safeguards systems, in our test program, we can reduce the possibility of inadvertently challenging our safeguard systems.

2. Each instruction performed requires interface with the unit operator. There is also the problem with status lights and indications that are associated with the loop being tested.

   A. The operator must spend approximately 15 minu. s reviewing and approving each instruction. This averages out to 147 hours or 18.375 (8 hour) days a year when he is distracted from his vital duties. The proposed change would return 98 hours or 12.25 (8 hour) days of the operators valuable time per year.

   B. While the loop being tested is removed from service the associated trip status lights and indicators are in an abnormal condition. The times on this are as described in item #1. Although the operators are trained to work with this type of situation it is feasible to consider it contributing to an improper decision at a critical moment.

3. We are expending large quantities of the available instrument mechanic and engineering time to perform and review the monthly functional tests.

   A. The average instruction requires app ately 2.0 hours to perform. The minimum number of people assigne 2 and normally it is 3. It will take 2.5 persons assigned as ave . This yields 2940 manhours or 367.5 (8 hour) man days per unit per year to perform these 49 instructions. At an average salary of $25 per hour, this is a cost of $73,500 per year. The proposed change would reduce the cost for performing these instructions to $24,500. More importantly it would free 1960 manhours or 245 (8 hour) man days for a much needed plant secondary preventive maintenance program.

      One additional factor is that the work load associated with the monthly testing is so great that many times they are performed on overtime. This creates budgetary problems and manpower problems.

   B. All instructions performed must be reviewed by the senior instrument mechanic foreman, the instrument engineer, the instrument assistant supervisor, and plant QA.

DATA COLLECTED ON SELECTED SQN FUNCTIONAL TEST

Note: The word tolerance used in these papers refers to manufacturer tolerance which is more restricting than technical specification tolerance.

I. Pressurizer Pressure Loops: IMI-99-FT 4.1, 4.2, 4.3, 4.4 for channels I, II, III, & IV.

A. FT 4.1: 13 instructions reviewed (13 consecutive monthly performances)
   1. 1-20-81 PB-455A (high pressure reactor trip) was not out of tolerance but adjusted closer to desired value.

B. FT 4.2: 12 instructions reviewed (12 consecutive monthly performances)
   1. There were no changes required.

C. FT 4.3: 13 instructions reviewed (13 consecutive monthly performances)
   1. 10-11-81 PB-457C (low pressure reactor trip) was not outside of tolerance but adjusted closer to desired value.

D. FT 4.4: 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

Conclusion: In total, 51 consecutive performances of pressurizer pressure monthly FTs were reviewed. There were two minor calibrations made to bring bistable setpoints closer to the desired value.

II. Pressurizer Level Loops: IMI-99-FT 5.1, 5.2, 5.3 for channels I, II, & III.

A. FT 5.1: 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

B. FT 5.2: 12 instructions reviewed (12 consecutive monthly performances)
   1. There were no changes required.

C. FT 5.3: 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

Conclusion: In total, 38 consecutive performances of pressurizer level monthly FTs were reviewed. There were no calibrations required.

III. Reactor Coolant System Flow Loops: IMI-99-FT-6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12 for four loop plant channels I, II, & III in each loop.

A. FT 6.1, 6.4, 6.7, & 6.10 (loops 1, 2, 3, & 4 protection set I): 13 instructions reviewed (13 consecutive monthly performances).
   1. There were no changes required.

B. FT 6.2, 6.5, 6.8, & 6.11 (loops 1, 2, 3, & 4 protection set II): 12 instructions reviewed (12 consecutive monthly performances).
   1. 2-25-81 FB-415 (flow loop 1 protection set II low flow reactor trip) was not outside tolerance but adjusted closer to desired value.

C. FT 6.3, 6.6, 6.9, & 6.12 (loops 1, 2, 3, & 4 protection set III): 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

Conclusion: In total, 152 consecutive performances of reactor coolant flow monthly FTs were reviewed. There was one minor calibration made to bring bistable setpoints closer to the desired value.

IV. Steam Generator Level Loops: IMI-99-FT 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10, 7.11, 7.12 for four loop plant channels I, II, III, IV in each loop.

A. FT 7.6 & 7.9 (protection set I): 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

B. FT 7.3 & 7.12 (protection set II): 12 instructions reviewed (12 consecutive monthly performances)
   1 There were no changes required.

C. FT 7.2, 7.5, 7.8, 7.11 (protection set III): 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

D. FT 7.1, 7.4, 7.7, 7.10 (protection set IV): 13 instructions reviewed
   1. There were no changes required.

Conclusion: In total, 154 consecutive performances of steam generator level monthly FTs were reviewed. There was no necessity for any recalibration.

V. Steam Generator Mismatch: IMI-99-FT 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8 for four loop plant channels I & II in each loop.

A. FT 8.1, 8.2, 8.3, 8.4 (protection set I) 14 instructions reviewed (14 consecutive monthly performances)
   1. 3-18-81 FB-522B: Bistable not outside tolerance but calibrated to bring it closer to the desired value.
   2. 10-7-81 FB-542B: Bistable not outside tolerance but calibrated to bring it closer to the desired value.

B. FT 8.5, 8.6, 8.7, 8.8 (protection set II) 12 instructions reviewed (12 consecutive monthly performances)
   1. 6-18-81 FB-513B: Bistable at tolerance, recalibrated to desired value.
   2. 10-16-81 FB-533B: Bistable not out of tolerance but calibrated to bring closer to desired value.
   3. 12-30-81 FB-513B: Bistable at tolerance recalibrated to desired value.

Conclusion: In total, 104 consecutive performances of steam generator flow mismatch monthly FTs were reviewed. There were no components outside tolerance but 5 bistables were recalibrated to bring them closer to the desired value.

VI. Steam Pressure Deviation: IMI-99-FT 9.1, 9.2 (protection sets III & IV)

A. FT 9.1 (protection set III): 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

B. FT 9.2 (protection set IV): 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

Conclusion: In total, 26 consecutive performances of steam generator pressure deviation monthly FTs were reviewed. There were no components requiring recalibration.

VII. Containment Pressure: IMI-99-FT 16.1, 16.2, 16.3, 16.4 four channels, protection sets I, II, III, IV

A. FT 16.1 (protection set I): 14 instructions reviewed (14 consecutive monthly performances)
   1. 1-27-81 PB-937A (high-high containment pressure) was not outside tolerance, but was adjusted closer to the desired value.

B. FT 16.2 (protection set II): 12 instructions reviewed (12 consecutive monthly performances)
   1. There were no changes required.

C. FT 16.3 (protection set III): 13 instructions reviewed (13 consecutive monthly performances)
   1. There were no changes required.

D. FT 16.4 (protection set IV): 13 instructions reviewed (13 consecutive monthly performances)
   1. 10-23-81 PB-934A (high-high containment pressure) was not outside tolerance, but was adjusted closer to desired value.

Conclusion: In total, 52 consecutive performances of containment pressure monthly FTs were reviewed. There were two minor calibrations made to bring bistable setpoints closer to the desired value.

VIII. NIS Power Range: IMI-99-PRM-FT 41, 42, 43, 44 four channels, protection sets I, II, III, IV

A. FT 41 (protection set I): 11 consecutive performances reviewed
   1. No changes required.

B. FT 42 (protection set II): 11 consecutive performances reviewed
   1. No changes required.

C. FT 43 (protection set III): 11 consecutive performances reviewed
   1. No changes required.

D. FT 44 (protection set IV): 11 consecutive performances reviewed
   1. No changes required.

Conclusion: In total, 44 consecutive performances of NIS power range monthly FTs were reviewed. There were no recalibrations required.

ENCLOSURE 4

SEQUOYAH NUCLEAR PLANT

PROPOSED TECHNICAL SPECIFICATIONS

TVA-SQN-TS-36

CHANGE NO. 4

CHANGES TO REFLECT INSTALLATION OF PERMANENT HYDROGEN

MITIGATION SYSTEM

CONTAINMENT SYSTEMS

HYDROGEN MITIGATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.4.3 The primary containment hydrogen mitigation system shall be operable.

APPLICABILITY: MODES 1 and 2.

ACTION

With one train of hydrogen mitigation system inoperable, restore the inoperable train to OPERABLE status within 7 days or increase the surveillance interval of S.R. 4.6.4.3 from 92 days to 7 days on the operable train until the inoperable train is returned to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.6.4.3 The hydrogen mitigation system shall be demonstrated OPERABLE:

a. At least once per 92 days by energizing the supply breakers and verifying that at least 62 of 64 igniters are energized.*

b. At least once per 18 months by verifying the cleanliness of each igniter by a visual inspection.

* Inoperable igniters must not be on corresponding redundant circuits which provide coverage for the same region.

TVA-SQN-TS-36
Change No. 4
Sequoyah Nuclear Plant

JUSTIFICATION FOR PROPOSED TECHNICAL SPECIFICATIONS

As required by Sequoyah Nuclear Plant unit 1 operating license condition 2.C(22).D, TVA is required to install a permanent hydrogen mitigation system. These changes reflect the installation of the permanent system. The permanent system hydrogen mitigation system is a two train system with 32 igniters in each train.

The permanent hydrogen mitigation system employs controlled ignition to mitigate the effects of hydrogen during potential degraded core accidents or class 9 accidents. The containment structures and key equipment have been shown by analysis or testing to survive the pressure and temperature loads from selected degraded core accidents and to continue to function. The extensive research program has confirmed our analytical assumptions, demonstrated equipment survivability and shown that controlled ignition can indeed mitigate the effects of hydrogen releases in closed vessels. The permanent hydrogen mitigation system is an adequate hydrogen control system that would perform its intended function in a manner that provides adequate safety margins.

ENCLOSURE 5

SEQUOYAH NUCLEAR PLANT

PROPOSED TECHNICAL SPECIFICATIONS

TVA-SQN-TS-36

CHANGE NO. 5

ADDITION OF SECOND LEVEL OF UNDERVOLTAGE PROTECTION

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
7. LOSS OF POWER					
a. 6.9 kv Shutdown Board —Loss of Voltage					
1. Start Diesel Generators	2/shutdown board	1 loss of voltage on any shutdown board	2/shutdown board	1, 2, 3, 4	20*
2. Load Shedding	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3, 4	20*
b. 6.9 kv Shutdown Board Degraded Voltage					
1. Voltage Sensors	3/shutdown board	2/shutdown board	2/shutdown board	1, 2, 3, 4	20*
2. Diesel Generator Start and Load Shedding Timer	2/shutdown board	1/shutdown board	1/shutdown board	1, 2, 3, 4	20*
3. SI/Degraded Voltage Enable Timer	2/shutdown board	1/shutdown board	1/shutdown board	1, 2, 3, 4	20*
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS					
a. Pressurizer Pressure - Not P-11	3	2	2	1, 2, 3	22a
b. T_{avg} - P-12	4	2	3	1, 2, 3	22b
c. Steam Generator Level P-14	3/loop	2/loop any loop	3/loop	1, 2	22c

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP					
A. RWST Level - Low	4	2	3	1, 2, 3, 4	18
COINCIDENT WITH Containment Sump Level - High	4	2	3	1, 2, 3, 4	18
AND Safety Injection	(See 1 above for Safety Injection Requirements)				

Note: Manual switchover of RHR pump suction from the RWST to containment sump will be employed until containment sump level indicators are returned OPERABLE. Automatic switchover is not required OPERABLE during the interim. This note will remain in effect for a period not to exceed 30 days (July 18, 1982).

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
6. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Main Steam Generator Water Level-low-low	> 21% of narrow range Instrument span each steam generator	> 20% of narrow range Instrument span each steam generator
d. S.I.	See 1 above (all SI Setpoints)	
e. Station Blackout	0 volts with a 5.0 second time delay	0 volts with a 5.0 ± 1.0 second time delay
f. Trip of Main Feedwater Pumps	N.A.	N.A.
g. Auxiliary Feedwater Suction Pressure-Low	$\geq$ 2 psig (motor driven pump) $\geq$ 6.5 psig (turbine driven pump)	$\geq$ 1 psig (motor driven pump) $\geq$ 5.5 psig (turbine driven pump)
7. LOSS OF POWER		
a. 6.9 kv Shutdown Board Undervoltage-Loss of Voltage		
1. Start of Diesel Generators	0 volts with a 1.5 second time delay	0 volts with a 1.5 ± 0.5 second time delay
2. Load Shedding	0 volts with a 5.0 second time delay	0 volts with a 5.0 ± 1.0 second time delay

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
b. 6.9 kv Shutdown Board- Degraded Voltage		
1. Voltage Sensors	6560 volts	6560 volts $\pm$ 33 volts
2. Diesel Generator Start and Load Shed Timer	300 seconds	300 seconds $\pm$ 15 seconds
3. SI/Degraded Voltage Logic Enable Timer	11 seconds	12 seconds $\pm$ 0.6 seconds
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a. Pressurizer Pressure Manual Block of Safety Injection P-11	$\leq$ 1970 psig	$\leq$ 1980 psig

TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
10. Station Blackout	
a. Auxiliary Feedwater Pumps	≤ 60
11. Trip of Main Feedwater Pumps	
a Auxiliary Feedwater Pumps	≤ 60
12. Loss of Power	
a. 6.9 kv Shutdown Board - Degraded Voltage or Loss of Voltage	$\leq 10^{(10)}$
13. RWST Level-Low Coincident with Containment Sump Level-High and Safety Injection	
a. Automatic Switchover to Containment Sump	≤ 250
14. Containment Purge Air Exhaust Radioactivity - High	
a. Containment Ventilation Isolation	$\leq 10^{(6)}$
15. Containment Gas Monitor Radioactivity High	
a. Containment Ventilation Isolation	$\leq 10^{(6)}$
16. Containment Particulate Activity High	
a. Containment Ventilation Isolation	$\leq 10^{(6)}$

TABLE 3.3-5 (Continued)

TABLE NOTATION

(1) Diesel generator starting and sequence loading delays included. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI and RHR pumps.

(2) Using air operated valve

(3) Valve FCV-70-143 is an exception to the response time shown in the table and will have the following values in seconds for the initiating signal and function indicated.

2.d. 61(8)/71(9)
3.d. 62(8)
4.d. 61(8)/71(9)
5.d. 64(8)/74(9)
6.d. 61(8)/71(9)

(4) On 2/3 any Steam Generator

(5) On 2/3 in 2/4 Steam Generator

(6) Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing.

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps.

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

(10) The response time for loss of voltage is measured from the time voltage is lost until the time full voltage is restored by the diesel. The response time for degraded voltage is measured from the time the load shedding signal is generated, either from the degraded voltage or the SI enable timer, to the time full voltage is restored by the diesel. The response time of the timers are covered by the requirements on their setpoints.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
c. Main Steam Generator Water Level-Low-Low	S	R	M	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. Station Blackout	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure - Low	N.A.	R	M	1, 2, 3
7. LOSS OF POWER				
a. 6.9 kv Shutdown Board - Loss of Voltage				
1. Start Diesel Generators	S	R	M	1, 2, 3, 4
2. Load Shedding	S	R	N.A.	1, 2, 3, 4
b. 6.9 kv Shutdown Board - Degraded Voltage				
1. Voltage sensors	S	R	M	1, 2, 3, 4
2. Diesel Generators Start and Load Shedding Timer	N.A.	R	N.A.	1, 2, 3, 4
3. SI/Degraded Voltage Logic Timer	N.A.	R	N.A.	1, 2, 3, 4

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a. Pressurizer Pressure, P-11	N.A.	R (4)	N.A.	1, 2, 3
b. T_{avg}, P-12	N.A.	R (4)	N.A.	1, 2, 3
c. Steam Generator Level, P-14	N.A.	R (4)	N.A.	1, 2
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP				
a. RWST Level - Low COINCIDENT WITH	S	R	M	1, 2, 3, 4
Containment Sump Level - High AND	S	R	M	1, 2, 3, 4
Safety Injection	(See 1 above for all Safety Injection Surveillance Requirements)			

Note: Manual switchover of RHR pump suction from the RWST to containment sump will be employed until containment sump level indicators are returned OPERABLE. Automatic switchover is not required OPERABLE during the interim. This note will remain in effect for a period not to exceed 30 days (July 18, 1982).

SURVEILLANCE REQUIREMENTS (Continued)

d. At least once per 18 months by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for 2 hours when the battery is subjected to a battery service test

e. At least once per 60 months by verifying that the battery capacity is at least 82% of the manufacturer's rating when subjected to a performance discharge test. Once per 60 month interval, this performance discharge test may be performed in lieu of the battery service test.

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
7. LOSS OF POWER					
a. 6.9 kv Shutdown Board —Loss of Voltage					
1. Start Diesel Generators	2/shutdown board	1 loss of voltage on any shutdown board	2/shutdown board	1, 2, 3, 4	20*
2. Load Shedding	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3, 4	20*
b. 6.9 kv Shutdown Board Degraded Voltage					
1. Voltage Sensors	3/shutdown board	2/shutdown board	2/shutdown board	1, 2, 3, 4	20*
2. Diesel Generator Start and Load Shedding Timer	2/shutdown board	1/shutdown board	1/shutdown board	1, 2, 3, 4	20*
3. SI/Degraded Voltage Enable Timer	2/shutdown board	1/shutdown board	1/shutdown board	1, 2, 3, 4	20*
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS					
a. Pressurizer Pressure - Not P-11	3	2	2	1, 2, 3	22a
b. T_{avg} - P-12	4	2	3	1, 2, 3	22b
c. Steam Generator Level P-14	3/loop	2/loop any loop	3/loop	1, 2	22c

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP					
A. RWST Level - Low COINCIDENT WITH	4	2	3	1, 2, 3, 4	18
Containment Sump Level - High	4	2	3	1, 2, 3, 4	18
AND Safety Injection	(See 1 above for Safety Injection Requirements)				

Note: Manual switchover of RHR pump suction from the RWST to containment sump will be employed until containment sump level indicators are returned OPERABLE. Automatic switchover is not required OPERABLE during the interim. This note will remain in effect for a period not to exceed 30 days (July 18, 1982).

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
6. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Main Steam Generator Water Level-low-low	≥ 21% of narrow range Instrument span each steam generator	≥ 20% of narrow range Instrument span each steam generator
d. S.I.	See 1 above (all SI Setpoints)	
e. Station Blackout	0 volts with a 5.0 second time delay	0 volts with a 5.0 ± 1.0 second time delay
f. Trip of Main Feedwater Pumps	N.A.	N.A.
g. Auxiliary Feedwater Suction Pressure-Low	≥ 2 psig (motor driven pump) ≥ 5.5 psig (turbine driven pump)	≥ 1 psig (motor driven pump) ≥ 5.5 psig (turbine driven pump)
7. LOSS OF POWER		
a. 6.9 kv Shutdown Board Undervoltage-Loss of Voltage		
1. Start of Diesel Generators	0 volts with a 1.5 second time delay	0 volts with a 1.5 ± 0.5 second time delay
2. Load Shedding	0 volts with a 5.0 second time delay	0 volts with a 5.0 ± 1.0 second time delay

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
b. 6.9 kv Shutdown Board- Degraded Voltage		
1. Voltage Sensors	6560 volts	6560 volts ± 33 volts
2. Diesel Generator Start and Load Shed Timer	300 seconds	300 seconds ± 15 seconds
3. SI/Degraded Voltage Logic Enable Timer	11 seconds	11 seconds ± 0.6 seconds
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a. Pressurizer Pressure Manual Block of Safety Injection P-11	≤ 1970 psig	≤ 1980 psig

TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
10. Station Blackout	
a. Auxiliary Feedwater Pumps	$\leq$ 60
11. Trip of Main Feedwater Pumps	
• Auxiliary Feedwater Pumps	$\leq$ 60
12. Loss of Power	
a. 6.9 kv Shutdown Board - Degraded Voltage or Loss of Voltage	$\leq 10^{(10)}$
13. RWST Level-Low Coincident with Containment Sump Level-High and Safety Injection	
a. Automatic Switchover to Containment Sump	$\leq$ 250
14. Containment Purge Air Exhaust Radioactivity - High	
a. Containment Ventilation Isolation	$\leq 10^{(6)}$
15. Containment Gas Monitor Radioactivity High	
a. Containment Ventilation Isolation	$\leq 10^{(6)}$
16. Containment Particulate Activity High	
a. Containment Ventilation Isolation	$\leq 10^{(6)}$

TABLE 3.3-5 (Continued)

TABLE NOTATION

(1) Diesel generator starting and sequence loading delays included. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI and RHR pumps.

(2) Using air operated valve

(3) Valve FCV-70-143 is an exception to the response time shown in the table and will have the following values in seconds for the initiating signal and function indicated.

2.d. $61^{(8)}/71^{(9)}$
3.d. $62^{(8)}$
4.d. $61^{(8)}/71^{(9)}$
5.d. $64^{(8)}/74^{(9)}$
6.d. $61^{(8)}/71^{(9)}$

(4) On 2/3 any Steam Generator

(5) On 2/3 in 2/4 Steam Generator

(6) Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing.

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps.

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

(10) The response time for loss of voltage is measured from the time voltage is lost until the time full voltage is restored by the diesel. The response time for degraded voltage is measured from the time the load shedding signal is generated, either from the degraded voltage or the SI enable timer, to the time full voltage is restored by the diesel. The response time of the timers are covered by the requirements on their setpoints.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
c. Main Steam Generator Water Level-Low-Low	S	R	M	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. Station Blackout	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure - Low	N.A.	R	M	1, 2, 3
7. LOSS OF POWER				
a. 6.9 kv Shutdown Board - Loss of Voltage				
1. Start Diesel Generators	S	R	M	1, 2, 3, 4
2. Load Shedding	S	R	N.A.	1, 2, 3, 4
b. 6.9 kv Shutdown Board - Degraded Voltage				
1. Voltage sensors	S	R	M	1, 2, 3, 4
2. Diesel Generators Start and Load Shedding Timer	N.A.	R	N.A.	1, 2, 3, 4
3. SI/Degraded Voltage Logic Timer	N.A.	R	N.A.	1, 2, 3, 4

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a. Pressurizer Pressure, P-11	N.A.	R (4)	N.A.	1, 2, 3
b. T_{avg}, P-12	N.A.	R (4)	N.A.	1, 2, 3
c. Steam Generator Lev 1, P-14	N.A.	R (4)	N.A.	1, 2
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP				
a. RSWT Lev-1 - Low COINCIDENT WITH	S	R	M	1, 2, 3, 4
Containment Sump Level - High AND	S	R	M	1, 2, 3, 4
Safety Injection	(See 1 above for all Safety Injection Surveillance Requirements)			

Note: Manual switchover of RHR pump suction from the RWST to containment sump will be employed until containment sump level indicators are returned OPERABLE. Automatic switchover is not required OPERABLE during the interim. This note will remain in effect for a period not to exceed 30 days (July 18, 1982).

SURVEILLANCE REQUIREMENTS (Continued)

d. At least once per 18 months by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for 2 hours when the battery is subjected to a battery service test.

e. At least once per 60 months by verifying that the battery capacity is at least 82% of the manufacturer's rating when subjected to a performance discharge test. Once per 60 month interval, this performance discharge test may be performed in lieu of the battery service test.

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TVA-SQN-TS-36
Change No. 5
Sequoyah Nuclear Plant
Justification for Proposed Technical Specifications

These technical specifications are being revised to reflect the addition of a second level of over and undervoltage protection required by operating license conditions 2.C(18).c (unit 1) and 2.C(11).b (unit 2).

The second level of undervoltage relays operate if a 6900-volt shutdown board bus voltage drops below the level required to successfully start all the safety-related equipment that would be required for the design basis accident. The relays will initiate 3 different time delay sequences. The first sequence of 30 seconds will ride through normal system transients before annunciating in the main control room. The second sequence of 10 seconds is short enough to allow safety-related equipment to be powered within the time required by the safety analysis. At the end of 10 seconds, if a safety injection has been initiated or is subsequently initiated, the shutdown board will transfer to its diesel generator.

The third time delay of five minutes is long enough to allow operator action to correct the undervoltage condition but not allow damage to connected safety-related equipment. At the end of the 5-minute delay, the shutdown board will transfer to its diesel if voltage has not been corrected. Since the loss of voltage relays on normal feeder only are set at 80 percent of nominal for four seconds, the band of voltages that a nonaccident degraded voltage condition can exist is from 80-95 percent of nominal for five minutes. At 80 percent of nominal, the voltage at the terminals of running motors will not drop below 71 percent of motor-rated voltage. NEMA class B motors will not stall out or be damaged above this point for the time delay of five minutes. Also, during the five minute time delay, the 125V dc vital battery boards could be powered by the batteries instead of the battery chargers. However, the vital batteries have sufficient capacity to meet this requirement as well as meet the original design requirements as identified in section 8.3.2 of the Sequoyah FSAR.

Attached is supplementary technical information that provides the basis for our justification.

ATTACHMENT

Tennessee Valley Authority
Sequoyah Nuclear Plant Units 1 and 2
Degraded Voltage Relaying
Supplementary Technical Information

061273.01

CONTENTS

SUPPLEMENTARY TECHNICAL INFORMATION
DEGRADED GRID PROTECTION FOR CLASS 1E POWER SYSTEMS
SEQUOYAH NUCLEAR PLANT

1.0 INTRODUCTION

On July 28, 1978, the NRC requested TVA to assess the susceptibility of the safety-related electrical equipment at Sequoyah Nuclear Plant to a sustained voltage degradation of the offsite source and interaction of the offsite and onsite emergency power systems. FSAR question 8.33 contained four positions with which the current design of the plant was to be compared. After comparing the current design to the staff positions, TVA was required to either propose modifications to satisfy the positions and criteria or furnish an analysis to substantiate that the existing facility has equivalent capabilities.

By this submittal, TVA is proposing certain design modifications to satisfy the criteria and staff positions. The modifications include installation of a second-level undervoltage protection system for the Class 1E equipment. The NRC required that the setpoint, surveillance requirements, test requirements, and allowable limits were to be included by TVA in the plant technical specifications.

2.0 DESIGN BASE CRITERIA

The design base criteria that were applied in determining the acceptability of the system modifications to protect the safety-related equipment from a sustained degradation of offsite grid are:

1. General Design Criterion 17 (GDC 17), "Electri Power Systems," of appendix A, "General Design Criteria for Nuc. Power Plants," of 10 CFR 50.

2. IEEE Standard 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations."

3. IEEE Standard 308-1974, "Class 1E Power Systems for Nuclear Power Generating Stations."

4. Staff positions as detailed in FSAR question 8.33 dated July 28, 1978.

5. ANSI Standard C84.1-1977, "Voltage Ratings for Electrical Power Systems and Equipment (60 HZ)."

3.0 EVALUATION

This section provides, in subsection 3.2, a description of the proposed modifications for the second-level undervoltage protection; and, in subsection 3.3, a discussion of how the proposed modifications meet the design base criteria.

3.1 Existing Undervoltage Protection. The present design uses three single induction disks, inverse time undervoltage relays with a setpoint of 70 percent of nominal for each 6900V shutdown board to detect loss of voltage.

1. A Westinghouse-type CV-7 relay monitors the voltage on the normal feed to the board and will initiate transfer in 2.5 seconds (at zero volts) to the alternate breaker if the alternate supply voltage is greater than 90 percent of nominal (detected by Westinghouse-type SG relays). The closure of the alternate breaker is delayed until the residual bus voltage is less than 30 percent of nominal (detected by GE-type RAV relays).

2. A GE-type IAV relay on the 6.9-kV bus initiates the automatic start sequence of the diesel generator for a sustained loss of voltage for 1.5 seconds (at zero volts).

3. A second GE-type IAV relay on the 6.9-kV bus for a sustained loss of voltage for a total of five seconds (at zero volts) will initiate load shedding (the normal and alternate feeder breakers are tripped and locked out; all the 6.9-kV motor loads and the major 480V loads are tripped). When the diesel generator set has attained rated speed and voltage (maximum of 10 seconds from initiation of automatic start signal), it is automatically connected to the 6.9-kV shutdown board bus. The return of voltage to the 6.9-kV shutdown board bus initiates logic which connects the required loads in the proper sequence and time.

3.2 Modification. TVA will (1) replace the existing loss of voltage relays, on normal feeder breaker only, with three instantaneous solid-state relays (ITE-type 27H) arranged in a two-out-of-three coincidence logic (see Figure A-II). The logic will energize two timers, either of which will initiate transfer to the alternate, if the alternate supply voltage is greater than 95 percent of nominal by tripping the bus normal supply breaker. The relays will have a nominal setpoint of 5520 volts ± 1 percent (80% of nominal) with a relay/timer combined time delay of 4 seconds + 5 percent. The diesel generator starting and load shedding circuitry described in 3.1 -2,-3 will not be modified. (2) To protect the Class 1E buses from a sustained degraded undervoltage, each of the two 6.9kV Class 1E buses per unit will be provided with a set of three instaneous solid-state undervoltage relays (ITE-type 27/59H). These relays will have a nominal setpoint of 6560V ± 1/2 percent (95% of nominal). The relays will be arranged in a two-out-of-three coincidence logic

to initiate three time delay sequences (see Figure A-I). The first sequence of 30 seconds will ride through normal system voltage transients (motor starts - both safety and nonsafety related) before annunciating the undervoltage in the main control room. The second sequence is short enough to allow safety-related equipment to be powered within the time required by the safety analysis. At the end of 10 seconds if an SIS has been initiated, or is subsequently initiated, the shutdown board degraded voltage relays will initiated load shedding and subsequently transfer the shutdown board to its diesel generator. The return of bus voltage initiates load sequencing of safety-related equipment. The third time delay is long enough to allow operator action but not result in damage to connected safety-related equipment. At the end of five minutes, the shutdown board will initiate load shedding and subsequently transfer the shutdown board to its diesel generator if degraded voltage has not been corrected. The error associated with these relay/timers is ± 0.5 percent.

To protect the Class 1E buses from a sustained over-voltage, each of the two 6.9-KV Class 1E buses per unit will be provided with a set of three instantaneous solid-state overvoltage relays (ITE-type 59H). These relays will be arranged in a one-out-of-three coindence logic which will annunciate in the control room. The relays will have a nominal voltage setpoint of 7260 volts $\pm$ 1 percent (105 percent of nominal). The operator will take the action necessary to reduce the voltage.

Load shedding for a loss of bus voltage ($\leq$70 percent) is being being maintained once the diesel generators are supplying their respective buses. Degraded voltage relaying will not open the standby supply breaker and will not initiate load shedding and resequencing if a 6900-volt shutdown board is supplied by its diesel generator. The output of these relays is blocked when the standby breaker is closed. TVA's bases for this is discussed in section 3.3.2.

Proposed changes to the plant's technical specifications, adding the surveillance requirements, allowable limits for the setpoint and time delay, and limiting conditions for operation for the second level undervoltage monitors are furnished in appendix B. An analysis to substantiate the limiting conditions and minimum and maximum setpoint limits is furnished in appendix A.

3.3 Discussion

3.3.1 NRC staff position 1 requires that a second level of undervoltage protection for the onsite power system be provided. The position stipulates other cirteria that the undervoltage protection must meet. Each criterion is restated below followed by a discussion regarding TVA's compliance with that criterion.

1. "The selection of voltage and time setpoints shall be determined from an analysis of the voltage requirements of the safety-related loads at all onsite system distribution levels."

TVA's proposed setpoint of 6560 volts at the 6.9-kV bus is 99 percent of the motor-rated voltage of 6.6 kV. This setpoint reflected down to the 480V buses will be at least 90 percent of the motor-rated voltage during their operation. As the 460-volt motors are the most limiting equipment in the system, this setpoint is adequate. See analysis in appendix A for details.

2. "The voltage protection shall include coincidence logic to preclude spurious trips of the offsite power sources."

The proposed modification incorporates a two-out-of-three logic scheme which satisfies this criterion.

3. "The time delay selected shall be based on the following conditions:

   a. The allowable time delay, including margin, shall not exceed the maximum time delay that is assumed in the FSAR accident analysis."

   For a degraded voltage condition simultaneous with a SI actuation, the proposed time delay of 10 seconds, to load shed and connect the diesel generator to the bus does not exceed the maximum time delay in the accident analysis.

   Without the presence of a SI signal, the time delay of 5 minutes will not be the cause of any damage to the safety-related equipment. The setpoint is within voltage ranges recommended by ANSI C84.1-1977.

   b. "The time delay shall minimize the effect of short-duration disturbances from reducing the availability of the offsite power source(s)."

   The time delays selected will prevent spurious trips from the offsite source on starting the largest driven motor loads.

   c. "The allowable time duration of a degraded voltage condition at all distribution system levels shall not result in failure of safety systems or components."

   The time delays chosen will not cause any failures of the safety-related equipment since the voltage setpoint is within the allowable tolerance of the equipment-rated voltage.

4. "The voltage monitors shall automatically initiate the disconnection of offsite power sources whenever the voltage setpoint and time-delay limits have been exceeded."

This criterion is met due to multiple logic sensing of the voltage monitors and redundant timing relays (for the under-voltage scheme).

5. "The voltage monitors shall be designed to satisfy the requirements of IEEE Standard 279-1971."

The proposed modifications are designed to meet the applicable requirements IEEE Standard 279.

6. "The technical specifications shall include limiting conditions for operation, surveillance requirements, trip setpoints with minimum and maximum limits, and allowable values for the second-level voltage protection monitors."

TVA's proposal for technical specification changes are furnished in appendix B.

3.3.2 The second NRC staff position requires "that the system design automatically prevents load shedding of the emergency buses once the onsite sources are supplying power to all sequenced loads. The load shedding must also be reinstated if the onsite breakers are tripped. In the event an adequate basis can be provided for retaining the load-shed feature when loads are energized by the onsite power system, the licensee's bases for the setpoint and limits must be documented."

TVA has elected to retain the loss-of-voltage (≤70 percent) load-shed feature once the diesel generators are supplying their respective buses. TVA's bases for retention of the this feature is that it provides for automatic resequencing of the loads following any temporary loss of bus voltage. Since the loss-of-voltage load shedding relay setpoint is fixed at 4860 volts (70 percent of nominal), the starting of the largest driven load will not cause actuation of the load shedding feature. Therefore, the operation of the load shedding relay system is:

1. To shed loads to relieve overloading the diesel generator.

2. Allow the diesel generator to recover to rated speed and voltage.

3. Reconnect required loads in the proper sequence.

It is TVA's position that only mechanical or electrical component failures of the diesel generator could cause the voltage to reach a this level (70 percent) for the time delay required to initiate the loss-of-voltage load shed relays. Should this occur, the second redundant safety train would safely shut down the unit. The minimum and maximum value of the undervoltage setpoints will be included in the Technical Specifications.

3.3.3 The third NRC staff position requires that certain test requirements be added to the technical specifications. These tests were to demonstrate the full-functional operability and independence of the onsite power sources and are to be performed at least once per 18 months during shutdown. The tests are to simulate loss of offsite power in conjunction with a safety injection actuation signal and to simulate interruption and subsequenct reconnection of onsite power sources.

These requirements are already met by Sequoyah surveillance requirements 4.8.1.1.2.d.6 and 4.8.1.1.2.d.7.

3.3.4 The fourth NRC staff position requires that the voltage levels at the safety-related buses be optimized for the full load and minimum load conditions that are expected throughout the anticipated range of voltage variations of the power source by appropriate adjustment of the voltage tap settings of the intervening transformers. It is required that the adequacy of the design in this regard be verified by actual measurement, and by correlation of measured values with analytical results.

An analysis of Sequoyah unit 1 has been completed and the results submitted to A. Schwencer, Chief, Licensing Branch No. 2, from our L. M. Mills, Manager, Nuclear Regulation and Safety, on October 3, 1980. These results verified the adequacy of our design calculations for the ac auxiliary power system used in optimizing the transformer taps for varying conditions of operation. On April 2, 1981, another letter was sent to your A. Schwencer concerning NRC's agreement to not repeat the test for our Sequoyah Unit 2. Therefore, TVA satisfies the requirements of this position.

4.0 CONCLUSIONS

TVA has determined that the modifications comply with the three staff positions. All the staff's requirements and design base criteria have been met. The modifications will protect the Class 1E equipment from a sustained degraded voltage condition of the offsite power source.

The proposed changes to the technical specification adequately test the system modifications. The surveilance requirements, limiting conditions for operation, minimum and maximum limits for the trip setpoint, and allowable values meet the intent of the staff positions.

It is therefore concluded that TVA's proposed modifications and technical specification changes are adequate. TVA intends to incorporate these modifications in the plant design on both units by the end of the first refueling outage of unit 1 and the technical specification changes will be implemented at that time. This is in accordance with the requirements stated in our unit operating license.

061198.06

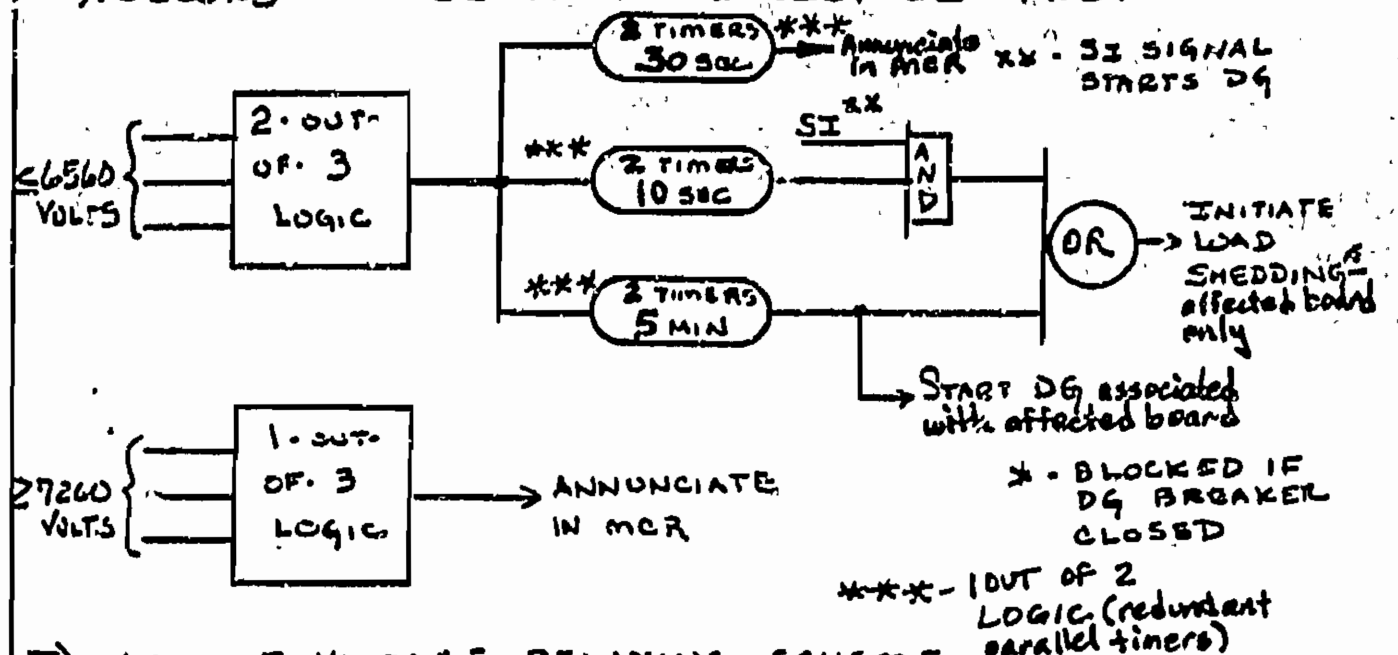
SHEET ______ OF ______

SEQUOYAH NUCLEAR PLANT
DEGRADED AND LOSS OF VOLTAGE
RELAYING SCHEME

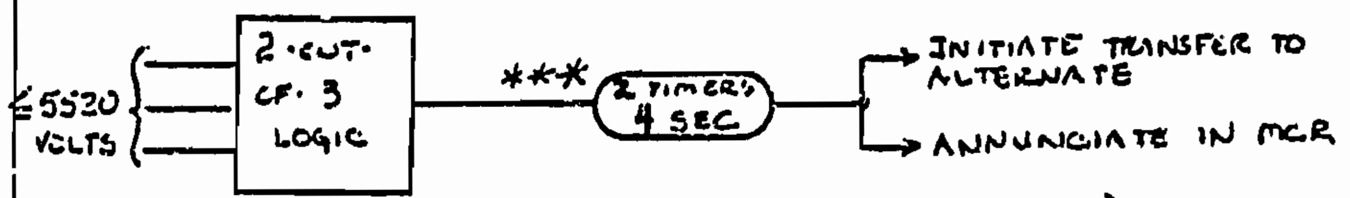
COMPUTED GLN DATE 10-15-81
CHECKED ______ DATE ______

FIGURE A

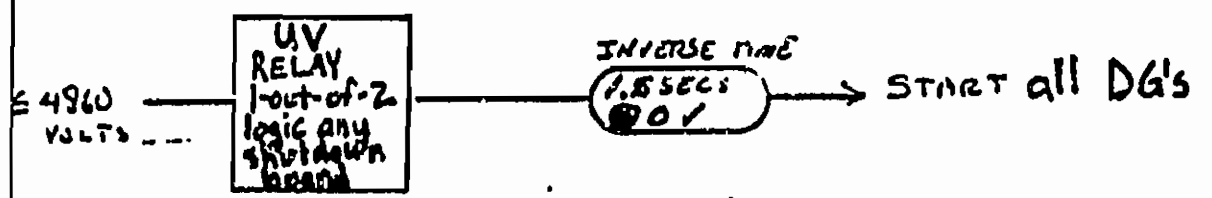
I). SECOND - LEVEL OF UNDERVOLTAGE PROTECTION



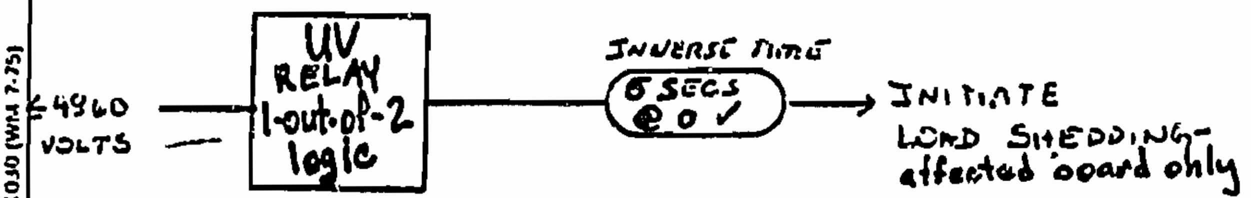
II). LOSS-OF-VOLTAGE RELAYING SCHEME



ON NORMAL FEEDER (MODIFIED TO ABOVE SCHEME)



ON SWITCHGEAR BUS (EXISTING)



ON SWITCHGEAR BUS (EXISTING)

Tennessee Valley Authority
Sequoyah Nuclear Plant Units 1 and 2
Degraded Voltage Relaying
Supplementary Technical Information

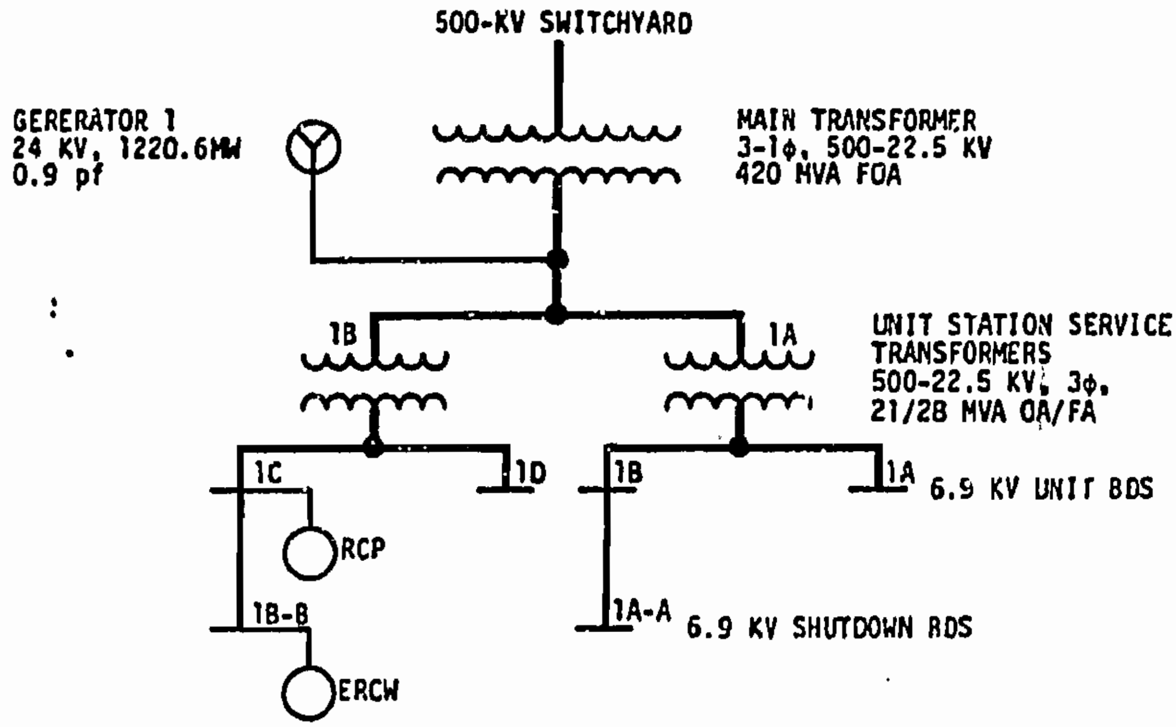
Appendix A
Voltage and Time Delay Analysis

061273.02

FIGURE B

PROGRAM N2DVUN

THE PURPOSE OF THIS PROGRAM IS TO EVALUATE THE VOLTAGES ASSOCIATED WITH NORMAL OPERATION.



MOTOR AND BOARD VOLTAGES

MOTOR	HP	BOARD	STARTUP KV		MAX. RECOVERY TIME (SEC)	STEADY STATE KV	
			MOTOR	BD		MOTOR	BD
RCP	6000	UNIT	5956	6120	28	6600	6624
ERCW pp	700	SHUTDOWN	6285	6498	2	6528	6580

CONDITIONS:

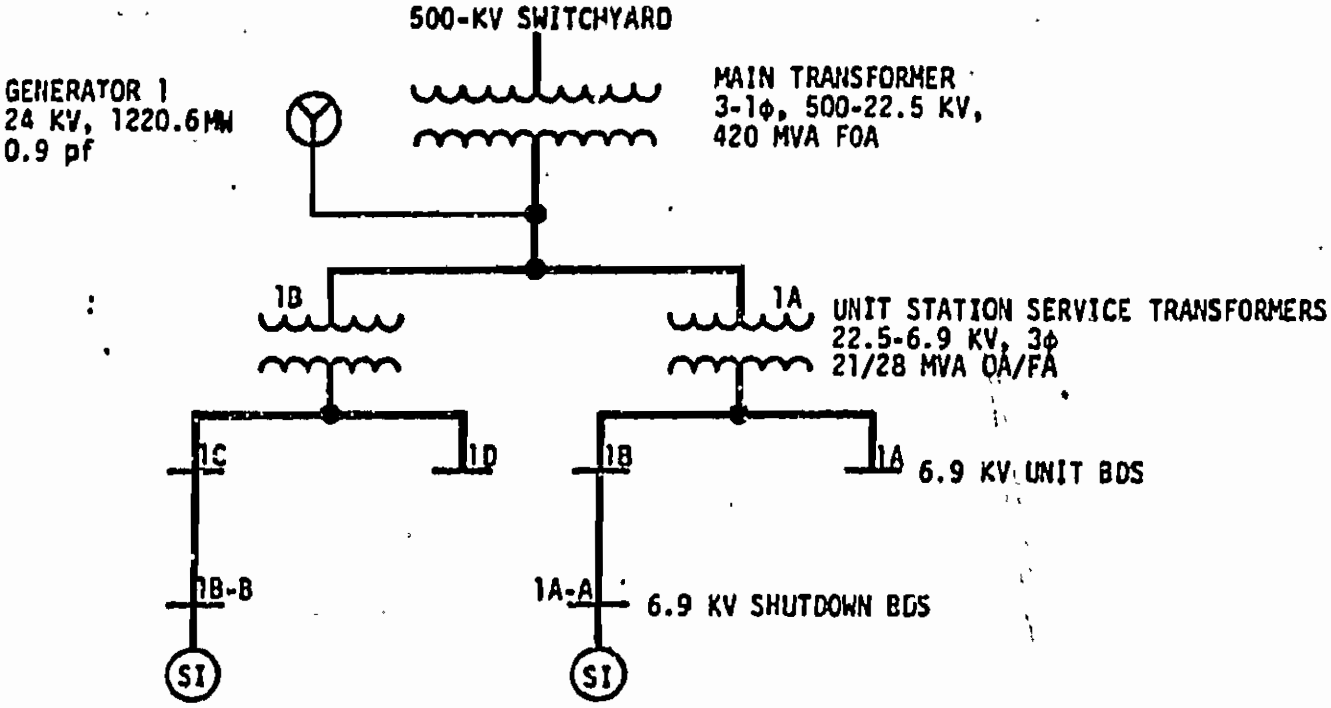
1. Generator Voltage at its Minimum of 22.0 kV.

2. USST Voltage Taps at the +2-1/2 Percent Buck Position.

FIGURE C

PROGRAM NCDVUL

THE PURPOSE OF THIS PROGRAM IS TO EVALUATE VOLTAGES ASSOCIATED WITH THE DESIGN-BASIS ACCIDENT WHILE UNIT CONNECTED.



MOTOR AND BOARD VOLTAGES

MOTOR	HP	BOARD	BOARD START-UP KV	RECOVERY TIME (SEC)	BOARD STEADY-STATE KV
ALL SI ACTUATED LOADS	-	UNIT	6387	~4	6685
	~4000	SHUTDOWN	6197	~4	6639

CONDITIONS:

1. Generator Voltage at its Minimum of 22.8 kV.

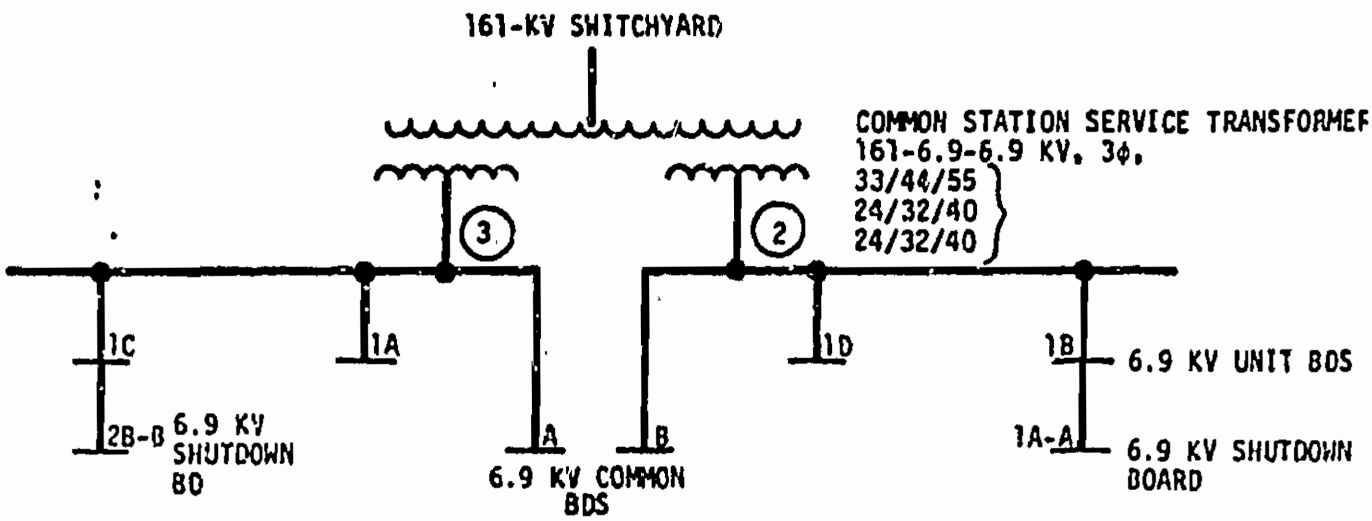
2. USST Voltage Taps at the +2-1/2 Percent Buck Position.

FIGURE D

PROGRAM N2DVCL

THE PURPOSE OF THIS PROGRAM IS TO EVALUATE VOLTAGES ASSOCIATED WITH THE DESIGN-BASIS ACCIDENT UNDER THE FOLLOWING CONDITIONS:

1) UNIT 1 LOCA WITH SWITCHYARD ELECTRICAL FAULT.
2) UNIT 2 FULL-LOAD REJECTION STILL UNIT CONNECTED.
3) ONE CSST OUT-OF-SERVICE.
4) 161-KV GRID VOLTAGE AT 162 KV.
5) CSST VOLTAGE TAPS AT THE -5% BOOST POSITION.



COMPUTER NODE: 2

MOTOR AND BOARD VOLTAGES

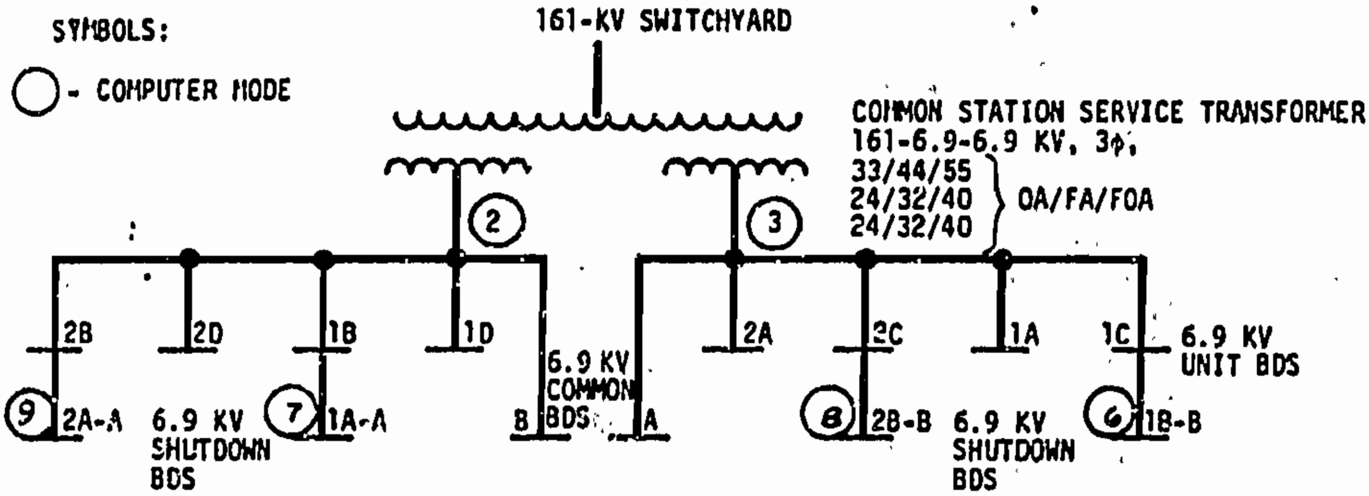
MOTOR	HP	BOARD	BOARD START-UP KV	RECOVERY TIME (SEC)	BOARD STEADY-STATE KV
ALL SI ACTUATED LOADS	4000	UNIT 2	6577	~4	7045
		SHUTDOWN	6370	~4	6995
	4000	UNIT 3	6578	~4	7059
		SHUTDOWN	6375	~4	7007

FIGURE E

PROGRAM N2FLR2U

THE PURPOSE OF THIS PROGRAM IS TO EVALUATE VOLTAGES ASSOCIATED WITH THE WORST-CASE COMMON STATION SERVICE TRANSFORMER (CSST) LOADING UNDER THE FOLLOWING CONDITIONS:

1) ONE CSST OUT-OF-SERVICE
2) BOTH UNITS IN FULL-LOAD REJECTION
3) 161-KV GRID AT 162 KV
4) CSST VOLTAGE TAPS AT THE -5% BOOST POSITION



BOARD	NODE	STEADY-STATE KV
UNIT	2	6629
SHUTDOWN	9	6589
SHUTDOWN	7	6585
UNIT	3	6662
SHUTDOWN	8	6618
SHUTDOWN	6	6617

Tennessee Valley Authority
Sequoyah Nuclear Plant Units 1 and 2
Degraded Voltage Relaying
Supplementary Technical Information

Appendix B
Technical Specification Changes

061273.03

The justifications for the proposed technical specification changes required for the degraded voltage protection modification are provided below. Marked up copies of the affected page follow.

<u>Page 3/4 3-21</u>

The engineered safety feature actuation system instrumentation for loss of electric power has been modified to include the degraded voltage instrumentation.

<u>Page 3/4 3-27</u>

The setpoints are determined to be adequate for protection based on the study presented in appendix A, "Voltage and Time Delay Analysis," to the degraded voltage report.

<u>Page 3/4 3-32</u>

The footnote was added to the loss of power response time to identify exactly what is measured for the degraded voltage channels. The timers are excluded because the response time is dependent on both the timers selected and the presence of a safety injection (SI) signal. The response will be measured from the time of a signal out of the timers to the time full voltage is restored. This eliminates the need to consider the SI signal and the different timer setpoints. The response time of the timers is covered by the setpoints specified in table 3.3-4.

<u>Page 3/4 3-37</u>

The surveillance requirements are modified to include testing of the degraded voltage channels. The channel check for the voltage sensors will consist of a verification that the annunciator panel is not lit if the voltage is in specification. Channel checks cannot be performed on the timers and are, therefore, listed as not applicable. The channel functional test will consist of a test of the annunciator circuits only. The timers cannot be tested without actuating the diesels and shedding loads, therefore, these circuits are listed as not applicable.

<u>Page 3/4 8-13</u>

The minimum battery capacity has been increased to 82 percent to account for possible discharge during the five minute delay on the degraded voltage protection channel actuation. The new limit will ensure that the batteries can meet the two hour accident load requirement for all cases.

MJB:COH
5/28/82

Tennessee Valley Authority
Sequoyah Nuclear Plant Units 1 and 2
Degraded Voltage Relaying
Licensing Submittal

Appendix C
FSAR Changes

061273.04

Replace pages 8.3-8 and 8.3-9 of "Standby Diesel Generator Operation" with the following:

061274.04

Standby Diesel Generator Operation

The diesel generator system is shown on single line diagram, Figure 8.3-20. The schematic of the engine start and stop circuits is shown in Figure 8.3-21. Remote control of the engine from the main control room is accomplished through interposing relays located in the diesel building. The schematic for this control is shown in figure 8.3-22.

The 6.9-kV shutdown boards in each power train derive power from either of two circuits from the 6.9-kV unit boards, or from their respective standby power source. During conditions where neither the nuclear unit nor preferred (offsite) power are available, each 6.9-kV shutdown board is energized from a separate, independent dedicated standby diesel generator unit. See table 8.2-2 for complete description of board transfer schemes.

The connection of the diesel generators to the 6.9-kV shutdown boards is initiated by either the loss-of-voltage relays on the 6.9-kV bus or the degraded voltage relays. The loss-of-voltage relays are set to pickup at 70 percent of nominal whereas the degraded voltage relays are set to pickup at 95 percent of nominal. A sustained voltage below these setpoints will initiate starting the diesel generators, tripping the normal or alternate feeder breaker, all 6.9-kV loads except the 480V shutdown board transformers, and the major 480V loads. Table 8.3-2 lists the loads that are automatically tripped. For a complete description of the voltage relay logic, see the system description of section (page 8.3-4). When the diesel generator set has reached rated speed and voltage (maximum of 10 seconds from initiation of automatic start signal), it is automatically connected to the 6.9-kV shutdown board bus. The return of voltage to the 6.9-kV shutdown board bus initiates logic which connects the required loads in the proper sequence. Table 8.3-3 shows the order in which the loads are applied.

The loss of voltage load shedding relays remain in the circuit at all times. If the load shedding relays (≤70 percent) and time delay (5 seconds at 0 volts) setpoint is reached, the proper operation is:

1. To shed loads to prevent overloading the diesel generator.

2. Allow the diesel generator to recover to rated speed and voltage.

3. Reconnect the loads in the proper sequence.

Since the load shedding relays recognize loss of voltage, the starting of the largest driven load will not cause actuation of the load shedding feature.

As shown in Table 8.3-3, there are two loading sequences. One, which is applied in the absence of a "safety injection signal (SIS)," the non-accident condition," and the other, the "accident condition," applied when a safety injection signal is received prior to, or coincident with a sustained loss of voltage on the 6.9-kV shutdown board. A safety injection signal received during the course of a nonaccident shutdown loading sequence will cause the actions described below:

1. Loads already sequentially connected which are not required for an accident will be disconnected.

2. Loads already sequentially connected which are required for an accident will remain connected.

3. Loads awaiting sequential loading that are not required for an accident will not be connected.

4. Loads awaiting sequential loading that are required for an accident will have their sequential timers reset to time zero from which they will then be sequentially loaded.

Replace the bus transfer scheme description for the 6.9-kV shutdown boards in Table 8.2.2 with the following:

OF1274.04

Item	Board/Bus	Power Supplies Normal	Alternate	Standby	Remarks
15	6.9-kV Shutdown Board 1A-A	6.9-kV Unit Board 1B	6.9-kV Unit Board 1A	Diesel Gen 1A-A	Automatic transfer to the alternate is initiated by undervoltage on the normal feeder at 80% nominal voltage for four seconds. Transfer between normal and alternate is accomplished by closing alternate breaker at 30% nominal voltage if alternate supply voltage 95% nominal. Loss-of-bus voltage (≤70 percent) for 1.5 seconds starts the diesel generators and continued failure for an additional 3.5 seconds will trip incoming feeder breakers and most motor breakers. When diesel generator is up to rated speed and voltage, the emergency breaker will close automatically to connect the diesel to the board, and loads will be applied as required by a sequential timer. Return to normal supply is manual only and is a fast transfer (≤6 cycles). MCR is annunciated on under voltage condition at 80% nominal. Transfer to the diesel generator for a sustained degraded undervoltage (UV) is initiated in 10 seconds (if a SI has been initiated, or is subsequently initiated) and 5 minutes for non-SI if below setpoint of 95% nominal. MCR annunciation occurs for UV of 95% nominal and overvoltage of 105% nominal. The shutdown utility bus allows any 6.9-kV shutdown board to be connected to any other or all other 6.9-kV shutdown boards. All circuit breakers connected to this bus are normally open and disconnected. Use of the bus requires manual insertion and closing of two of the breakers.
16	6.9-kV Shutdown Board 1B-B	6.9-kV Unit Board 1C	6.9-kV Unit Board 1D	Diesel Gen 1B-B	

Replace "System Operation" in section 8.3.1.1 with the following:

061274.04

To protect the Class 1E buses from a sustained degraded undervoltage, each of the two 6.9-kV Class 1E buses per unit will be provided with a set of three instaneous solid-state undervoltage relays (ITE-type 27/59H). These relays will have a nominal setpoint of 6560V ± 1/2 percent (95 percent of nominal). The relays will be arranged in a two-out-of-three coincidence logic to initiate three time delay sequences. The first sequence of 30 seconds will ride through normal system voltage transients before annunciating the undervoltage in the main control room. The second sequence of 10 seconds is short enough to allow safety-related equipment to be powered within the time required by the safety analysis. At the end of 10 seconds if a SIS has been initiated, or is subsequently initiated, the shutdown board will transfer to its diesel generator. The third time delay of five minutes is long enough to allow operator action but not allow damage to connected safety-related equipment. At the end of five minutes, the shutdown board will transfer to its diesel generator if the voltage has not returned to normal.

To protect the Class 1E buses from a sustained overvoltage, each of the two 6.9-kV Class 1E buses per unit will be provided with a set of three instantaneous solid-state overvoltage relays (ITE-type 59H). These relays will be arranged in a one-out-of-three coindence logic which will annunciate in the control room. The relays will have a nominal voltage setpoint of 7260 volts ± 1 percent (105 percent of nominal). The operator will take the action necessary to reduce the voltage.

There are no automatic transfers of board supplies between redundant power sources. All 480V shutdown boards and all motor control centers have alternate feeders to their respective board buses. Transfers between the normal and alternate feeder are manual. Some manual transfers of loads between power trains are used. These transfers are at the 480V level and involve nine loads which are tabulated in Table 8.3-10.

A means of manually interconnecting power sources at the 6.9-kV level is provided. This is provided by the shutdown utility bus, which on figure 8.1-2, allows any 6.9-kV shutdown board to be connected to any other or all other 6.9-kV shutdown boards. All circuit breakers connected to this bus are normally open and disconnected (racked out). Use of the bus requires manual insertion and closing of two of the breakers. The purpose of this utility bus is to increase the flexibility of the Standby Power System.

A manual means of supplying power to the 480V auxiliary building common board (which is not normally supplied power from the diesel generators during a condition where offsite power is lost) is provided. Provisions have been made to manually connect this board to the 480V shutdown boards 1B2 and 2B2. This is shown in figure 8.3-9. The purpose is to provide power to operate the ice condenser refrigeration units and glycol pumps during the unlikely condition of a loss of offsite power that exceeds 2-3 days. The two normal bus feeder breakers must be moved from their normal compartments to the compartments which are connected to the 480V shutdown boards 1B2 and 2B2.

System Operation

The 6.9-kV shutdown boards in each power train derive power from either of two circuits from the 6.9-kV unit boards, or from their respective standby power source (diesel generator). The feeders connecting each shutdown board with these three sources are termed the normal, alternate, and standby feeders. The normal and alternate feeders can derive power from the nuclear unit, via separate unit station service transformers and separate 6.9-kV unit boards. The normal and alternate feeders can also derive power from the separate preferred source circuits, via separate windings (on either of two separate common station service transformers) and separate 6.9-kV unit boards. During conditions where neither nuclear unit nor preferred (offsite) power is available, each 6.9-kV shutdown board is energized from a separate standby diesel generator, via the standby feeder.

The alignment of each unit's standby distribution system is determined by plant conditions, the sources selected to energize it, and the status of components within the distribution system.

A loss of voltage (≤ 80%) on a normal feeder to a 6.9-kV shutdown board is detected by a two-out-of-three logic followed by a definite time delay of four seconds to initiate automatic transfer to the alternate feeder, if the alternate feeder voltage is at least 95 percent of nominal. The transfer is delayed until the bus voltage has decreased to 30 percent of nominal. The return transfer to the normal feeder is initiated manually and is a high-speed transfer, completed in approximately six cycles or less.

A sustained (1.5 seconds at zero volts) loss of voltage (≤ 70 percent) on the 6.9-kV shutdown board starts the diesel generator and initiates (after an additional 3.5 seconds) logic that trips the normal or alternate feeder breaker, all 6900V loads (except the 480V shutdown board transformers), and the major 480V loads. Table 8.3-2 shows the loads that are automatically stripped. Figures 8.318 and 8.3-19 show the load stripping schematically. When the diesel generator has reached rated speed and voltage, the generator will be automatically connected to the 6.9-kV shutdown board bus. (Refer to figure 8.3-20a.) This return of voltage to the 6.9-kV shutdown bus initiates logic which connects the required loads in sequence. Table 8.3-3 shows the sequence of applied loads. The standby (onsite) power system's automatic sequencing logic is designed to automatically connect the required loads in proper sequence should the logic receive an accident signal prior to, concurrent with, or following a loss of all nuclear unit and preferred (offsite) power.

The following analyses evaluates voltages associated with different conditions of unit operation and shutdown.

For normal operation of units 1 and 2, the main generator is used to supply power to the plant auxiliary power system through the unit station service transformers. With the main generator at its minimum voltage of 22.8 kV, starting the largest motor on the 6.9-kV unit and shutdown board will not cause spurious tripping of the normal (see Figure B).

If a safety injection (SI) should occur during normal operation of the unit, the reactor would be tripped and the turbine stop valves closed. If an electrical fault in the generator or switchyard is not present, the generator is not tripped, via the main transformer high-side breaker, for 30 seconds. During this time, approximately 4000 horsepower of SI motors are simultaneously started. The 6.9-kV shutdown board voltage will dip to approximately 6200 volts but will recover to 6640 volts after approximately four seconds, with the main generator voltage at its minimum of 22.8 kV (see Figure C).

For the same condition, but with an electrical fault of the switchyard or main generator, the 6.9-kV unit boards are transferred (approximately six cycles) to the preferred offsite supply. With one of the two CSST's out of service, the starting of the SI actuated loads will cause the 6.9-kV shutdown boards to dip to approximately 6370 volts for approximately four seconds recovering to approximately 7000 volts, with the 161-kV grid at 162 kV (see Figure D).

For the case of a two-unit full-load rejection, with one CSST out of service and the 161-kV grid at 162 kV, the steady-state 6.9-kV shutdown board voltages range from 6585 to 6618 volts, which is adequate for starting the required medium- and low-voltage motors (see Figure E).

For all the cases listed above, the recovery voltages and times are within the time and voltage settings of the degraded undervoltage detection system and would not cause spurious trips of the normal or preferred supplies.

Analysis of Time Delay Selected

The second level of undervoltage relays operate if a 6900-volt shutdown board bus voltage drops below the level required to successfully start all the safety-related equipment that would be required for the design basis accident. The relays will initiate three time delay sequences. The first sequence of 30 seconds will ride through normal system transients before annunciating in the main control room. The second sequence of 10 seconds is short enough to allow safety-related equipment to be powered within the time required by the safety analysis. At the end of 10 seconds, if a safety injection has been initiated, or is subsequantly initiated, the shutdown board will transfer to its diesel generator.

The third time delay of five minutes is long enough to allow operator action to correct the undervoltage condition, but not allow damage to connected safety-related equipment. At the end of the 5-minute delay, the

shutdown board will transfer to its diesel if voltage has not been corrected. Since the loss of voltage relays on normal feeder only are set at 80 percent of nominal for four seconds, the band of voltages that a non-accident degraded voltage condition can exist is from 80 to 95 percent of nominal for five minutes. At 80 percent of nominal the voltage at the terminals of running motors will not drop below 71 percent of motor rated voltage. NEMA Class B motors will not stall out or be damaged above this point for the time delay of five minutes. Also, during the five-minute time delay the 125V dc vital battery boards could be powered by the batteries instead of the battery chargers. However, the vital batteries have sufficient capacity to meet this requirement, as well as meet the original design requirements as identified in section 8.3.2 of the Sequoyah FSAR.

For a loss of voltage, both the selected time delays allow for the loss-of-voltage relays to initiate transfer to the alternate supply, if it is greater than 95 percent of nominal, before tripping and transferring to the diesels.

An error of $\pm$ 0.5 percent for the timer/relays in the degraded voltage protection circuits has been considered in the design.

December 23, 1982

Docket Nos: 50-327
and 50-328

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

Subject: Issuance of Amendment No. 17 to Facility Operating License No. DPR-77 and Amendment No. 8 to Facility Operating License No. DPR-79 - Sequoyah Nuclear Plant, Units 1 and 2

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 17 to Facility Operating License No. DPR-77 and Amendment No. 8 to Facility Operating License No. DPR-79.

The amendments change the diesel generator battery float voltage and the isolation times for containment isolation valves. The other changes requested in your September 17, 1982, letter will be addressed in future amendments.

A copy of the related safety evaluation supporting Amendment No. 17 to Facility Operating License DPR-77 and Amendment No. 8 to Facility Operating License DPR-79 is enclosed. Also enclosed is a copy of the Federal Register Notice which has been forwarded to the Office of the Federal Register for publication.

Sincerely,

/s/

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Enclosures:
1. Amendment No. 17 to DPR-77
2. Amendment No. 8 to DPR-79
3. Safety Evaluation
4. Federal Register Notice

cc w/enclosures:
See next page

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PDR ADOCK 05000327
P PDR

OFFICE	LA:DL:LB #4	DL:LB #4	DL:LB #4	DL:LB #4			
SURNAME	MDuncan/hmc	MMiller	CStahle	EAdensam			
DATE	10/3/82	10/3/82	[illegible]/82	10/[illegible]/82			

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY USGPO: 1981—335-960

SEQUOYAH

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Honorable Don Moore, Jr.
County Judge
Hamilton County Courthouse
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Regional Administrator
Nuclear Regulatory Commission,
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

OFFICE ▶							
SURNAME ▶							
DATE ▶							

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 17
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Sequoyah Nuclear Plant, Unit 1 (the facility) Facility Operating License No. DPR-77 filed by the Tennessee Valley Authority (licensee), dated September 17, 1982, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the license, as amended, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Appendix A Technical Specifications as indicated in the attachments to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-77 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 17, are hereby incorporated into the license.

OFFICE							
SURNAME							
DATE							

The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Attachment:
Appendix A Technical
Specification Changes

Date of Issuance: December 23, 1982

OFFICE	LA:DL:LB #4	DL:LB #4	DL:LB #4	OELD	DL:LB #4	AD:L:DL	
SURNAME	MDuncan/hmc	MMiller	CStahle	[illegible]	EAdensam	TMNovak	
DATE	12/3/82	12/3/82	12/17/82	12/ /82	12/23/82	12/ /82	

ATTACHMENT TO LICENSE AMENDMENT NO. 17

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Amended Page
3/4 3-33
3/4 8-6

OFFICE							
SURNAME							
DATE							

TABLE 3.3-5 (Continued)

TABLE NOTATION

(1) Diesel generator starting and sequence loading delays included. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI and RHR pumps.

(2) Using air operated valve

(3) The following valves are exceptions to the response times shown in the table and will have the values listed in seconds for the initiating signals and function indicated:

Valves: FCV-26-240, -243
Response times:
2.d. 21[8]/ 31[9]
3.d. 22[8]
4.d. 21[8]/ 31[9]
5.d. 24[8]/ 34[9]
6.d. 21[8]/31[9]

Valves: FCV-61-96, -97, -110, -122, -191, -192, -193, -194
Response times:
2.d 31[8]
3.d. 32[8]
4.d. 31[8]
5.d. 34[8]
6.d. 31[8]

Valve: FCV-70-143
Response times:
2.d. 61[8]/71[9]
3.d. 62[8]
4.d. 61[8]/71[9]
5.d. 64[8]/74[9]
6.d. 61[8]/71[9]

(4) On 2/3 any Steam Generator

(5) On 2/3 in 2/4 Steam Generator

(6) Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing.

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps.

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel Generator starting and sequence loading delays included. Response time limit includes operating time of valves.

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.3 The 125-volt D.C. distribution panel, 125 volt D.C. battery bank and associated charger for each diesel generator shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying:

1. That the parameters in Table 4.8-1a meet the Category A limits.

2. That the total battery terminal voltage is greater than or equal to 124 volts on float charge.

b. At least once per 92 days by:

1. Verifying that the parameters in Table 4.8-1a meet the Category B limits,

2. Verifying there is no visible corrosion at either terminals or connectors, or the cell to terminal connection resistance of these items is less than 150 x 10^{-6} ohms, and

3. Verifying that the average electrolyte temperature of 6 connected cells is above 60 F.

c. At least once per 18 months by verifying that:

1 The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.

2. The battery to battery and terminal connections are clean, tight and coated with anti-corrosion material.

3. The resistance of each cell to terminal connection is less than or equal to 150 x 10^{-6} ohms.

4.8.1.1.4 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission pursuant to Specification 6.9.1. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per nuclear unit basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 8
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Sequoyah Nuclear Plant, Unit 2 (the facility) Facility Operating License No. DPR-79 filed by the Tennessee Valley Authority (licensee), dated September 17, 1982, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the license, as amended, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Appendix A Technical Specifications as indicated in the attachments to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 8 , are hereby incorporated into the license.

OFFICE ▶							
SURNAME ▶							
DATE ▶							

The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Attachment:
Appendix A Technical
Specification Changes

Date of Issuance: December 23, 1982

OFFICE	LA:DL:LB #4	DL:LB #4	DL:LB #4	OELD	DL:LB #4	AD:L:DL	
SURNAME	MDuncan/hmc	[illegible]	CStahle	[illegible]	EAdensam	TNovak	
DATE	12/3/82	12/3/82	12/[illegible]/82	12/[illegible]/82	12/[illegible]/82	12/[illegible]/82	

ATTACHMENT TO LICENSE AMENDMENT NO. 8

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Amended Page
3/4 8-6
3/4 3-33

OFFICE ▶							
SURNAME ▶							
DATE ▶							

TABLE 3.3-5 (Continued)

TABLE NOTATION

(1) Diesel generator starting and sequence loading delays included. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps, SI and RHR pumps.

(2) Using air operated valve

(3) The following valves are exceptions to the response times shown in the table and will have the values listed in seconds for the initiating signals and function indicated:

Valves: FCV-26-240, -243
Response times: 2.d. 21(8)/31(9)
3.d. 22(8)
4.d. 21(8)/31(9)
5.d. 24(8)/34(9)
6.d. 21(8)/31(9)

Valves: FCV-61-96, -97, -110, -122, -191, -192, -193, -194
Response times

2.d. 31(8)
3.d. 32(8)
4.d. 31(8)
5.d. 34(8)
6.d. 31(8)

Valve: FCV-70-143
Response times: 2.d. 61(8)/71(9)
3.d. 62(8)
4.d. 61(8)/71(9)
5.d. 64(8)/74(9)
6.d. 61(8)/71(9)

(4) On 2/3 any Steam Generator

(5) On 2/3 in 2/4 Steam Generator

(6) Radiation detectors for Containment Ventilation Isolation may be excluded from Response Time Testing.

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps.

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

SURVEILLANCE REQUIREMENTS (Continued)

f. At least once per 10 years* by:

1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypoclorite solution, and

2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.

4.8.1.1.3 The 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger for each diesel generator shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying:

1. That the parameters in Table 4.8-1a meet the Category A limits.

2. That the total battery terminal voltage is greater than or equal to 124 volts on float charge.

b. At least once per 92 days by:

1. Verifying that the parameters in Table 4.8-1a meet the Category B limits,

2. Verifying there is no visible corrosion at either terminals or connectors, or the cell to terminal connection resistance of these items is less than 150×10^{-6} ohms, and

3. Verifying that the average electrolyte temperature of 6 connected cells is above 60 F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration.

2. The battery to battery and terminal connections are clean, tight and coated with anti-corrosion material.

3. The resistance of each cell to terminal connection is less than or equal to 150×10^{-6} ohms.

*These requirements are waived for the initial surveillance.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 17 TO FACILITY OPERATING LICENSE DPR-77

AND AMENDMENT NO. 8 TO FACILITY OPERATING LICENSE DPR-79

TENNESSEE VALLEY AUTHORITY

INTRODUCTION

In a September 17, 1982, transmittal TVA requested a correction to their inadvertent errors involving containment isolation valve stroke times which were overlooked in requesting the May 4, 1982, amendments to both licenses.

Also in their September 17 le r, TVA requested a change to the diesel generator battery float voltage. TVA has replaced the diesel generator batteries at Sequoyah with lead calcium cells necessi ting a lower float voltage.

EVALUATION

The May 4, 1982, amendments lengthened the valve isolation times for the ice condenser glycol lines from 10 to 30 seconds. Errors in the technical specifications were incurred when the overall phase A response time was not changed to reflect the increased isolation time. Similarly, the isolation time for the fire protection valves had been approved as 20 seconds in the initial issuance of Sequoyah Units 1 and 2 Technical Specifications, which is greater than or equal to the overall phase A response time. For both the glycol line isolation valves and the fire protection isolation valves, the corresponding phase A response times were increased. Because this amendment corrects discrepancies resulting from previously approved tech specs, the staff agrees that the amendment should be instituted.

Additionally, the new deisel generator cells at Sequoyah require a change in the minimum float voltage of surveillance requirement 4.8.1.1.3.9.2 for Units 1 and 2. There are 57 cell units with a manufacturer's recommended minimum float voltage of 2.17 volts/cell. Therefore, 123.69 volts or 124 volts is the minimum total float voltage requirement. Because the manufacturer's recommended maximum of 128.25 volts is presently exceeded in the technical specification, the tech spec voltage of 129 volts could contribute to shorter battery life.

From this justification, the staff agrees that survillance requirement 4.8.1.1.3.9.2 should be changed from 129 volts to 124 volts.

8301060003 821223
PDR ADOCK 05000327
P PDR

OFFICE ▶							
SURNAME ▶							
DATE ▶							

ENVIRONMENTAL CONSIDERATION

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered, do not create the possibility of an accident of a type different from any evaluated previously, and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: December 23, 1982

Principal Contributors: Melanie Miller, Licensing Branch No. 4, DL
Carl Stahle, Licensing Branch No. 4, DL
John Knox, Power Systems Branch, DSI
James Pulsipher, Containment Systems Branch, DSI

OFFICE	LA:DL:LB #4	DL:LB #4	DL:LB #4	CSB	PSB	DL:LB #4	
SURNAME	MDuncan/hmc	MMiller	CStahle	WButler	MSrinivasan	EAdensam	
DATE	12/ /82	12/3/82	12/1/82	12/10/82	12/1/82	12/2/82	

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-327 AND 50-328

TENNESSEE VALLEY AUTHORITY

NOTICE OF ISSUANCE OF AMENDMENTS

FACILITY OPERATING LICENSE NOS. DPR-77 AND DPR-79

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 17 to Facility Operating License No. DPR-77 and Amendment No. 8 to Facility Operating License No. DPR-79, issued to Tennessee Valley Authority (licensee) for the Sequoyah Nuclear Plant, Units 1 and 2 (the facilities) located in Hamilton County, Tennessee. These amendments change the diesel generator battery float voltage and the isolation times for containment isolation valves. The amendments are effective as of their dates of issuance.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations. The Commission has made appropriate findings as required by the Act and the Commission's regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) environmental impact statements, or negative declarations and environmental impact appraisals need not be prepared in connection with issuance of these amendments.

OFFICE							
SURNAME							
DATE							

For further details with respect to this action, see (1) Tennessee Valley Authority letter dated September 17, 1982, (2) Amendment No. 17 to Facility Operating License No. DPR-77 with Appendix A Technical Specification page changes; (3) Amendment No. 8 to Facility Operating License No. DPR-79 with Appendix A Technical Specification page changes; and (4) the Commission's related Safety Evaluation.

All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D. C., and the Chattanooga Hamilton County Bicentennial Library, 1001 Broad Street, Chattanooga, Tennessee 37402. A copy of Amendment No. 17and Amendment No. 8 may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 23rd day of December 1982.

FOR THE NUCLEAR REGULATORY COMMISSION

/s/

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

form only

OFFICE	LA:DL:LB #4	DL:LB #4	DL:LB #4	OELD	DL:LB #4		
SURNAME	MDuncan/hmc	MMiller	CStahle	[illegible]	EAdensam		
DATE	10/3/82	10/3/82	10/7/82	10/5/82	10/7/82		

DISTRIBUTION:
Docket Nos. 50-327/328
LB #4 r/f
E. Adensam
C. Stahle
M. Duncan
M. Miller
D. Eisenhut
OELD

December 17, 1982

Docket Nos: 50-327
and 50-328

MEMORANDUM FOR: Thomas M. Novak, Assistant Director for Licensing
Division of Licensing

THRU: Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

FROM: Carl Stahle, Project Manager
Licensing Branch No. 4
Division of Licensing

SUBJECT: ISSUANCE OF AMENDMENT NO. 17 TO FACILITY OPERATING LICENSE DPR-77 AND AMENDMENT NO. 8 TO FACILITY OPERATING LICENSE DPR-79, SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

Regarding the issuance of subject amendments, there is no known public correspondence or irreversible impact associated with this subject.

Carl Stahle, Project Manager
Licensing Branch No. 4
Division of Licensing

8301060009 821223
PDR ADOCK 05000327
P PDR

OFFICE	LA:DL:LB #4	DL:LB #4	DL:LB #4	DL:LB #4			
SURNAME	MDuncan/hmc	MMiller	CStahle	EAdensam			
DATE	12/3/82	12/3/82	12/ /82	12/ /82			

NRC FORM 318 (10-80) NRCM 0240 **OFFICIAL RECORD COPY** USGPO: 1981-335-960

AMENDMENT NO. 17 TO FACILITY OPERATING LICENSE DPR-77 - SEQUOYAH UNIT 1
AMENDMENT NO. 8 TO FACILITY OPERATING LICENSE DPR-79 - SEQUOYAH UNIT 2

DISTRIBUTION w/enclosures:

Docket No. 50-327/328
LB #4 r/f
C. Stahle
M. Duncan
OELD
E. Adensam
R. Hartfield, MPA
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D. Eisenhut/R. Purple
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T. Barnhart (8)
E. L. Jordan, DEQA:I&E
J. M. Taylor, DRP:I&E
L. J. Harmon, I&E File

bcc w/enclosures:

NRC PDR
Local PDR
NSIC
TERA
A. Rosenthal, ASLAB
ASLBP
ACRS (16)
W. Jones (10)

Licensee Response/NRC Response/NRC Question Closure

Id	**369**
NRC Question Number	**VKG019**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**10/8/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**10/8/2014 6:00 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**180**
NRC Question Number	**VKG020**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.4**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS SR 3.8.4.2 contains the following statement: "Verify each vital battery charger can recharge the battery to the fully charged state within 36 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state."** **Please provide summary of calculation which shows that the battery can be recharged to the fully charged state within 36 hours.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:14 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**352**
NRC Question Number	**VKG020**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

The SQN Vital Battery Charger sizing analysis is performed in accordance with IEEE Standard 946-1985 and uses the following formula:

$$I_{CH} = L + \frac{1.1 \text{ X } AH}{T}$$

where: I_{CH} = charger rated output (amps),
L = continuous DC load (amps),
1.1 = constant that compensates for battery losses,
AH = Amp-Hours removed from the battery, and
T = time to recharge the battery to approximately 95% of capacity (hours).

SQN Vital Battery Chargers are required to recharge the battery within 36 hours with normal load applied following a station blackout condition that lasts for 4 hours. Assuming the following:

From the battery sizing calculation for Vital Battery Charger I:
AH = 1416 Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = 80 amps.

$$I_{CH} = 80 \text{ amps} + \frac{(1.1 \text{ x } 1416 \text{ Amp-Hours})}{36 \text{ Hours}} = 123 \text{ Amps}$$

From the battery sizing calculation for Vital Battery Charger II:
AH = 1390 Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = 72 amps.

$$I_{CH} = 72 \text{ amps} + \frac{(1.1 \text{ x } 1390 \text{ Amp-Hours})}{36 \text{ Hours}} = 114 \text{ Amps}$$

From the battery sizing calculation for Vital Battery Charger III:
AH = 1406 Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = 69 amps.

$$I_{CH} = 69 \text{ amps} + \frac{(1.1 \times 1406 \text{ Amp-Hours})}{36 \text{ Hours}} = 112 \text{ Amps}$$

From the battery sizing calculation for Vital Battery Charger IV:
AH = 1423 Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = 75 amps.

$$I_{CH} = 75 \text{ amps} + \frac{(1.1 \times 1423 \text{ Amp-Hours})}{36 \text{ Hours}} = 118.5 \text{ Amps}$$

Therefore, the SQN Vital Battery Chargers effective rating is 150A and has the capacity to recharge the batteries in 36 hours.

Response Date/Time	**9/26/2014 6:55 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/26/2014 5:53 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**391**
NRC Question Number	**VKG020**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	

SQN responded to RAI VKG020 by providing a summary of the 125V vital battery charger sizing calculation for each charger. Following communications with the NRC, it was discovered that the battery sizing calculations had been revised related to the battery loading for each battery; however, the calculations for charger sizing had not been revised. SQN entered this into the Corrective Action Program and revised the calculations to correct this issue. The new battery sizing calculations increase the requirements for the battery chargers on three of the four chargers. In all cases, the 150 Amp battery chargers exceed the required values listed below and remain capable of recharging the batteries within the required 36 hours.

The revised SQN Vital Battery Charger requirements are summarized below. The italicized and bold numbers reflect the values from the revised charger sizing calculations. The original numbers supplied in the initial response are in () :

For Vital Battery Charger I:
AH = *1417.96* (1416) Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = *79.29* (80) amps.

$$I_{CH} = 79.29\ (80)\ \text{amps} + \frac{1.1 \times 1417.96\ (1416)\ \text{Amp-Hours}}{36\ \text{Hours}} = 122.62\ (123)\ \text{Amps}$$

For Vital Battery Charger II:
AH = *1397.36* (1390) Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = *74.02* (72) amps.

$$I_{CH} = 74.02\ (72)\ \text{amps} + \frac{1.1 \times 1397.36\ (1390)\ \text{Amp-Hours}}{36\ \text{Hours}} = 116.72\ (114)\ \text{Amps}$$

From the battery sizing calculation for Vital Battery Charger III:
AH = *1400.30* (1406) Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = *69.99* (69) amps.

$$I_{CH} = 69.99\ (69)\ \text{amps} + \frac{1.1 \times 1400.30\ (1406)\ \text{Amp-Hours}}{36\ \text{Hours}} = 112.78\ (112)\ \text{Amps}$$

From the battery sizing calculation for Vital Battery Charger IV:
AH = *1422.43* (1423) Amp-Hours,
T = 36 hours, and
Continuous load without diversity following a station blackout = *75.45* (75) amps.

$$I_{CH} = 75.45\ (75)\ \text{amps} + \frac{1.1 \times 1422.43\ (1423)\ \text{Amp-Hours}}{36\ \text{Hours}} = 118.91\ (118.5)\ \text{Amps}$$

Response Date/Time	**12/3/2014 5:50 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner**

	Vijay Goel **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**12/3/2014 4:51 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**393**
NRC Question Number	**VKG020**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**12/8/2014**
Notification	**Scott Bowman Michelle Conner Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**12/8/2014 2:09 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**181**
NRC Question Number	**VKG021**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.4**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS SR 3.8.4.2 pertains to surveillance of the vital battery charger only. Please either explain why the diesel generator (DG) battery charger does not have the related SR or provide a similar SR.**
Attach File 1	
Attach File 2	
Issue Date	**7/24/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**7/24/2014 8:24 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**353**
NRC Question Number	**VKG021**
Select Application	**Licensee Response**
Attachment 1	
Attachment 2	
Response Statement	**ITS LCO 3.8.4 requires two vital DC electrical power trains and four diesel generator (DG) DC electrical power subsystems to be OPERABLE. ITS 3.8.4 does not have a DG battery charger testing requirement because the purpose of the DG batteries is to provide power to initially start the DG. Once the DG is running, the safety function is met and there is not a recharge time or extended load profile required to be tested.**
Response Date/Time	**9/26/2014 7:00 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/26/2014 5:55 AM**
Date Modified	
Modified By	

Licensee Response/NRC Response/NRC Question Closure

Id	**370**
NRC Question Number	**VKG021**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**10/8/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**10/8/2014 6:01 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**182**
NRC Question Number	**VKG022**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.6**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number(s)	
NRC Reviewer Supervisor	**Ravi Grover (for RBE)**
Technical Branch POC	
Conf Call Requested	**N**
NRC Question	**In response to the NRC staff RAI GMW-002 #2, the licensee stated that SQN will incorporate the minimum float current measurement time into the Bases for SR 3.8.6.1. The following sentences will be added to the SR [Bases]: "The minimum required procedural time to measure battery float current will be 30 seconds or as recommended by the float current measurement instrument manufacturer. The minimum float current measurement time is required to provide a more accurate battery float current reading."** **Please provide markup of Bases for SR 3.8.6.1 with the above changes.**
Attach File 1	
Attach File 2	
Issue Date	**8/5/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**8/5/2014 10:33 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**250**
NRC Question Number	**VKG022**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for VKG022.pdf** (33KB)
Attachment 2	
Response Statement	**See Attachment 1 for the draft revised ITS SR 3.8.6.1 Bases insert on pages 459 and 473 of Enclosure 2, Volume 13.**
Response Date/Time	**8/8/2014 8:05 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**8/8/2014 7:04 AM**
Date Modified	
Modified By	

BASES

ACTIONS (continued)

E.1

With one or more batteries in redundant ~~subsystems~~ trains with battery parameters not within limits there is not sufficient assurance that battery capacity has not been affected to the degree that the batteries can still perform their required function, given that redundant batteries are involved. With redundant batteries involved this potential could result in a total loss of function on multiple systems that rely upon the batteries. The longer Completion Times specified for battery parameters on non-redundant batteries not within limits are therefore not appropriate, and the parameters must be restored to within limits on at least one ~~subsystem~~ train within 2 hours. 1

F.1

With one or more batteries with any battery parameter outside the allowances of the Required Actions for Condition A, B, C, D, or E, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding battery must be declared inoperable. Additionally, discovering one or more vital batteries ~~in one subsystem~~ with one or more battery cells float voltage less than ~~[~~2.07~~]~~ V and float current greater than ~~[~~2~~]~~ amps indicates that the battery capacity may not be sufficient to perform the intended functions. INSERT 1 ~~The battery must therefore be declared inoperable immediately.~~ 5 2 5

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

Verifying battery float current while on float charge is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The float current requirements are based on the float current indicative of a charged battery. Use of float current to determine the state of charge of the battery is consistent with IEEE-450 (Ref. 1). ~~[The 7 day Frequency is consistent with IEEE-450 (Ref. 1).~~

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 7

The minimum required procedural time to measure battery float current will be 30 seconds or as recommended by the float current measurement instrument manufacturer. The minimum float current measurement time is required to provide a more accurate battery float current reading.

BASES

ACTIONS (continued)

E.1

With one or more batteries in redundant ~~subsystems~~ trains with battery parameters not within limits there is not sufficient assurance that battery capacity has not been affected to the degree that the batteries can still perform their required function, given that redundant batteries are involved. With redundant batteries involved this potential could result in a total loss of function on multiple systems that rely upon the batteries. The longer Completion Times specified for battery parameters on non-redundant batteries not within limits are therefore not appropriate, and the parameters must be restored to within limits on at least one ~~subsystem~~ train within 2 hours. 1

F.1

With one or more batteries with any battery parameter outside the allowances of the Required Actions for Condition A, B, C, D, or E, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding battery must be declared inoperable. Additionally, discovering one or more vital batteries ~~in one subsystem~~ with one or more battery cells float voltage less than ~~[~~2.07~~]~~ V and float current greater than ~~[~~2~~]~~ amps indicates that the battery capacity may not be sufficient to perform the intended functions. INSERT 1 ~~The battery must therefore be declared inoperable immediately.~~ 5 2 5

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

Verifying battery float current while on float charge is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The float current requirements are based on the float current indicative of a charged battery. Use of float current to determine the state of charge of the battery is consistent with IEEE-450 (Ref. 1). ~~[The 7 day Frequency is consistent with IEEE-450 (Ref. 1).~~

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 7

The minimum required procedural time to measure battery float current will be 30 seconds or as recommended by the float current measurement instrument manufacturer. The minimum float current measurement time is required to provide a more accurate battery float current reading.

Licensee Response/NRC Response/NRC Question Closure

Id	**323**
NRC Question Number	**VKG022**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**9/4/2014**
Notification	**Scott Bowman** **Michelle Conner** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**9/4/2014 12:13 PM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**183**
NRC Question Number	**VKG023**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.6**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS 3.8.6, Bases, Background states: "The Vital battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. This specific gravity corresponds to an open circuit battery voltage of approximately 123.78 V for 60 cell battery (i.e., cell voltage of 2.063 volts per cell (Vpc))....This provides adequate over-potential which limits the formation of lead sulfate and self-discharge."** **The above discussion pertains to the Vital batteries. Please provide similar discussion for the DG batteries consisting of 58 cells.**
Attach File 1	
Attach File 2	
Issue Date	**8/13/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**8/13/2014 9:36 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**354**
NRC Question Number	**VKG023**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 VKG-023 R1.pdf** (558KB)
Attachment 2	
Response Statement	**In response to VKG023, the ITS 3.8.6 Bases Background Section, on pages 455 and 469 of Enclosure 2, Volume 13, will be modified to include a description of the DG batteries. Specifically, the ITS 3.8.6 Bases will be revised to add, "The DG battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. Each DG battery consists of 58 cells; however, a battery is considered OPERABLE with 57 cells if one is strapped out. Optimal long term performance is obtained by maintaining a float voltage of 2.20 to 2.25 Vpc. This provides adequate over-potential which limits the formation of lead sulfate and self-discharge."** **See Attachment 1 for the draft revised ITS 3.8.6 Bases.**
Response Date/Time	**9/26/2014 8:15 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**9/26/2014 7:12 AM**
Date Modified	
Modified By	

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Parameters

BASES

BACKGROUND

This LCO delineates the limits on battery float current as well as electrolyte temperature, level, and float voltage for the ~~DC power subsystem~~ Vital and diesel generator (DG) batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources - Operating," and LCO 3.8.5, "DC Sources - Shutdown." In addition to the limitations of this Specification, the ~~[licensee controlled program]~~ Battery Monitoring and Maintenance Program also implements a program specified in Specification 5.5.~~17~~ 15 for monitoring various battery parameters. 1 2 3

The Vital battery cells are of flooded lead acid construction with a nominal specific gravity of ~~[~~1.215~~]~~. This specific gravity corresponds to an open circuit battery voltage of approximately ~~120~~ 123.78 V for ~~[58]~~ 60 cell battery (i.e., cell voltage of ~~[2.065]~~ 2.063 volts per cell (Vpc)). The open circuit voltage is the voltage maintained when there is no charging or discharging. ~~Once fully charged with its open circuit voltage ≥ [2.065] Vpc, the battery cell will maintain its capacity for [30] days without further charging per manufacturer's instructions.~~ Optimal long term performance however, is obtained by maintaining a float voltage ~~[2.20 to 2.25]~~ 2.17 Vpc. This provides adequate over-potential which limits the formation of lead sulfate and self discharge. ~~The nominal float voltage of [2.22] Vpc corresponds to a total float voltage output of [128.8] V for a [58] cell battery as discussed in the FSAR, Chapter [8] (Ref. 2).~~ 1 2 4 2 1

The DG battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. Each DG battery consists of 58 cells; however, a battery is considered OPERABLE with 57 cells if one is strapped out. Optimal long term performance is obtained by maintaining a float voltage of 2.20 to 2.25 Vpc. This provides adequate over-potential which limits the formation of lead sulfate and self-discharge.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the U FSAR, Chapter ~~[~~6~~]~~ (Ref. 3) and Chapter ~~[~~15~~]~~ (Ref. 4), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. 1 2

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one ~~subsystem~~ train of DC sources OPERABLE during accident conditions, in the event of: 1

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

b. A worst-case single failure.

Battery parameters satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Parameters

BASES

BACKGROUND

This LCO delineates the limits on battery float current as well as electrolyte temperature, level, and float voltage for the ~~DC power subsystem~~ Vital and diesel generator (DG) batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources - Operating," and LCO 3.8.5, "DC Sources - Shutdown." In addition to the limitations of this Specification, the ~~[licensee controlled program]~~ Battery Monitoring and Maintenance Program also implements a program specified in Specification 5.5.~~17~~ 15 for monitoring various battery parameters. 1 2 3

The Vital battery cells are of flooded lead acid construction with a nominal specific gravity of ~~[~~1.215~~]~~. This specific gravity corresponds to an open circuit battery voltage of approximately ~~120~~ 123.78 V for ~~[58]~~ 60 cell battery (i.e., cell voltage of ~~[2.065]~~ 2.063 volts per cell (Vpc)). The open circuit voltage is the voltage maintained when there is no charging or discharging. ~~Once fully charged with its open circuit voltage ≥ [2.065] Vpc, the battery cell will maintain its capacity for [30] days without further charging per manufacturer's instructions.~~ Optimal long term performance however, is obtained by maintaining a float voltage ~~[2.20 to 2.25]~~ 2.17 Vpc. This provides adequate over-potential which limits the formation of lead sulfate and self discharge. ~~The nominal float voltage of [2.22] Vpc corresponds to a total float voltage output of [128.8] V for a [58] cell battery as discussed in the FSAR, Chapter [8] (Ref. 2).~~ 1 2 4 2 1

The DG battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. Each DG battery consists of 58 cells; however, a battery is considered OPERABLE with 57 cells if one is strapped out. Optimal long term performance is obtained by maintaining a float voltage of 2.20 to 2.25 Vpc. This provides adequate over-potential which limits the formation of lead sulfate and self-discharge.

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter ~~[~~6~~]~~ (Ref. 3) and Chapter ~~[~~15~~]~~ (Ref. 4), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. 1 2

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one ~~subsystem~~ train of DC sources OPERABLE during accident conditions, in the event of: 1

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

b. A worst-case single failure.

Battery parameters satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Licensee Response/NRC Response/NRC Question Closure

Id	**368**
NRC Question Number	**VKG023**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**10/8/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**10/8/2014 5:58 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**184**
NRC Question Number	**VKG024**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.7**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**
NRC Question	**ITS SR 3.8.7.1 states: "Verify correct inverter voltage, frequency, and alignment to required AC vital buses." However, ITS SR 3.8.8.1 states: "Verify correct inverter voltage, frequency, and alignments to required AC vital boards."** **Please explain why the ITS 3.8.7 uses the term "AC vital buses," and ITS 3.8.8 uses the term "AC vital boards." Also, verify that the terms "boards" and "buses" are applied appropriately in any other instances in the ITS submittal.**
Attach File 1	
Attach File 2	
Issue Date	**8/13/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	
Date Added	**8/13/2014 9:36 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**378**
NRC Question Number	**VKG024**
Select Application	**Licensee Response**
Attachment 1	**Attachment 1 for RAI VKG024.pdf** (1MB)
Attachment 2	
Response Statement	

In response to VKG024, the ISTS Specifications and ISTS Bases markups for 3.8.7, Inverters - Operating, and 3.8.8, Inverters - Shutdown, on pages 494-497, 500-503, 505-508, and 523-526 of Enclosure 2, Volume 13, will be revised to refer to AC vital instrument power boards vice AC vital buses and DC source vice DC bus. This revision aligns ITS with the CTS nomenclature for these components. Justification for deviation (JFD) 1 indicators will be added to address the revision. Additionally, the ITS submittal was reviewed to identify other locations where the term "bus(es)" was used, and where appropriate, the nomenclature will be revised to "board(s)." See the response to RAI VKG025 for changes in nomenclature associated with ITS Sections 3.8.9 and 3.8.10. See below for additional ITS Sections affected by the proposed revision:

1. **The ITS 3.8.1 Bases Actions and Surveillance Requirements Sections will be revised to replace the term "bus(es)" with "board(s)." JFD 1 indicators will be added, as needed, to address the revision. (Pages 103, 124, 129-133, 139-141, 143, 153, 174, 179-183, 189-191, and 193 of Enclosure 2, Volume 13)**

2. **The ITS 3.8.1 Bases Surveillance Requirement Section for ITS SR 3.8.1.17 will be revised to change the last sentence in the first paragraph to read, "Reference 2 provides a summary of the automatic loading of Shutdown Boards." (Pages 143 and 193 of Enclosure 2, Volume 13)**

3. **The ITS 3.8.2 Bases LCO Section will be revised to replace the term "bus" with "board." Additionally, the following sentence will be revised to remove the word "buses," "The DG 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 6.9 kV shutdown boards buses." (Pages 225 and 232 of Enclosure 2, Volume 13)**

4. **The ITS 3.8.4 Bases Background Section will be revised to replace the term AC vital "bus" with AC vital "instrument power board." ITS 3.8.4 Bases LCO Section will be revised to replace the term "bus" with "board." JFD 1 indicators will be added, as needed, to address the revisions. (Pages 319, 323, 325, 334, 338 and 340 of Enclosure 2, Volume 13)**

See Attachment 1 for draft revised ISTS markups for Units 1 and 2.

Response Date/Time	**11/4/2014 8:40 AM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman Michelle Conner Vijay Goel Khadijah Hemphill Andrew Hon Lynn Mynatt Ray Schiele**
Added By	**Scott Bowman**
Date Added	**11/4/2014 7:39 AM**
Date Modified	
Modified By	

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power System and separate and independent DGs for each 6.9kV Shutdown Board ~~train~~ ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA. 1

~~Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit.~~ 1

~~[In addition, one required automatic load sequencer per train must be OPERABLE.]~~ 2

Each qualified offsite circuit must be physically independent, capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the 6.9kV Shutdown Boards ~~ESF buses~~. 1 1

INSERT 8 ~~[Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. Offsite circuit #2 consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201, powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.]~~ 1

Each DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective 6.9kV Shutdown Board ~~ESF bus~~ on detection of board ~~bus~~ undervoltage. This will be accomplished within ~~[~~10~~]~~ seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the 6.9kV Shutdown Board ~~ESF buses~~. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby with the engine at ambient conditions. ~~Additional DG capabilities must be demonstrated to meet required Surveillance, e.g., capability of the DG to revert to standby status on an ECCS signal while operating in parallel test mode.~~ 1 2 1 5

Proper sequencing of loads, ~~[~~including tripping of nonessential loads,~~]~~ is a required function for DG OPERABILITY. 2

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the DGs, separation and independence are complete.

~~For the offsite AC sources, separation and independence are to the extent practical. A circuit may be connected to more than one ESF bus, with fast transfer capability to the other circuit OPERABLE, and not violate separation criteria. A circuit that is not connected to an ESF bus is required to have OPERABLE fast transfer interlock mechanisms to at least two ESF buses to support OPERABILITY of that circuit.~~ 1

SURVEILLANCE REQUIREMENTS (continued)

has an allowable rating

Although no power factor requirements are established by this SR, the DG ~~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 DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. 1 2

~~[The 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 3).~~

~~OR~~ 7

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 6

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing board ~~bus~~ loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance. 1

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the engine-mounted "day" ~~day~~ tank ~~[and engine mounted tank]~~ is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%. 5 2

Enclosure 2, Volume 13, Rev. 0, Page 124 of 638

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load (600kw) without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. ~~[For this unit, the single load for each DG and its horsepower rating is as follows:]~~ This Surveillance may be accomplished by: 1 2

a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the ~~bus~~ board, or 1

b. Tripping its associated single largest post-accident load with the DG solely supplying the ~~bus~~ board. 1

Consistent with Regulatory Guide 1.9 ~~As required by IEEE-308~~ (Ref. ~~12~~ 3), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. 1

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. ~~[The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 6

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR for DGs 1A-A and 1B-B could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. 5

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ ~~[0.9]~~ 0.89. 2 This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ ~~[0.9]~~ 0.89. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ ~~[0.9]~~ 0.89 results in voltages on the emergency ~~busses~~ boards that are too high. 1 Under these conditions, the power factor should be maintained as close as practicable to ~~[0.9]~~ 0.89 while still maintaining acceptable voltage limits on the emergency ~~busses~~ boards. 1 In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of ~~[0.9]~~ 0.89 2 may not cause unacceptable voltages on the emergency ~~busses~~ boards, 1 but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to ~~[0.9]~~ 0.89 without exceeding the DG excitation limits.

SURVEILLANCE REQUIREMENTS (continued)

~~REVIEWER'S NOTE~~
~~The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable,~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~

6

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the ~~bus~~ board if the trip initiator can be corrected or isolated. 1

~~[The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.~~

~~OR~~

7

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~------------------------------REVIEWER'S NOTE------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~ 6

This SR has been modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR for DGs 1A-A and 1B-B could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ ~~[0.9]~~ 0.89. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ ~~[0.9]~~ 0.89. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ ~~[0.9]~~ 0.89 results in voltages on the emergency ~~busses~~ boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to ~~[0.9]~~ 0.89 while still maintaining acceptable voltage limits on the emergency ~~busses~~ boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of ~~[0.9]~~ 0.89 may not cause unacceptable voltages on the emergency ~~busses~~ boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to ~~[0.9]~~ 0.89 without exceeding the DG excitation limits.

5 2 1 2 1 1

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE---------------------------~~
~~The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable,~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~
~~--~~ 6

SR 3.8.1.11

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency ~~buses~~ boards and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time. 1

The DG 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. 2

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 DG 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

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~

6

This Surveillance is modified by three Notes. Note 1 states that momentary transients due to changing ~~bus~~ board loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance for DGs 1A-A and 1B-B could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. Note 3 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ ~~[0.9]~~ 0.89. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 3 allows the Surveillance to be conducted as a power factor other than ≤ ~~[0.9]~~ 0.89. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ ~~[0.9]~~ 0.89 results in voltages on the emergency ~~busses~~ boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to ~~[0.9]~~ 0.89 while still maintaining acceptable voltage limits on the emergency ~~busses~~ boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of ~~[0.9]~~ 0.89 may not cause unacceptable voltages on the emergency ~~busses~~ boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained close as practicable to ~~[0.9]~~ 0.89 without exceeding the DG excitation limits.

1 5 2 1 2 1 1

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within ~~[~~10~~]~~ seconds. The ~~[~~10~~]~~ second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. 2

~~[The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 6
~~--]~~

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least ~~[~~2~~]~~ hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing board ~~bus~~ loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing. 2 1

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG 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 DG to reload if a

BASES

SURVEILLANCE REQUIREMENTS (continued)

subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on ~~bus~~ board undervoltage, and the load sequence timers are reset. 1

~~[The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~REVIEWER'S NOTE~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~]~~ 6

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance for DGs 1A-A and 1B-B in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. 5

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.] Credit may be taken for unplanned events that satisfy this SR.~~ 5

SR 3.8.1.~~18~~ 17 5

Under accident ~~[~~and loss of offsite power~~]~~ conditions loads are sequentially connected to the ~~bus~~ board by the ~~[automatic load sequencer]~~ load sequence timers. The 1 2 sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The ~~[10]~~ 5% load sequence time interval tolerance ensures that 2 sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ~~ESF buses~~ ~~6.9 kV~~ Shutdown Boards. 1

~~[The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~ 6

BASES

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power System and separate and independent DGs for each ~~train~~ 6.9kV Shutdown Board ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA. 1

~~Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit.~~ 1

~~[In addition, one required automatic load sequencer per train must be OPERABLE.]~~ 2

Each qualified offsite circuit must be physically independent, capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ~~ESF buses~~ 6.9kV Shutdown Boards. 1 1

INSERT 8 ~~[Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. Offsite circuit #2 consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201, powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.]~~ 1

Each DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ~~ESF bus~~ 6.9kV Shutdown Board on detection of ~~bus~~ board undervoltage. This will be accomplished within ~~[~~10~~]~~ seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the ~~ESF buses~~ 6.9kV Shutdown Board. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby with the engine at ambient conditions. ~~Additional DG capabilities must be demonstrated to meet required Surveillance, e.g., capability of the DG to revert to standby status on an ECCS signal while operating in parallel test mode.~~ 1 2 1 5

Proper sequencing of loads, ~~[~~including tripping of nonessential loads,~~]~~ is a required function for DG OPERABILITY. 2

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the DGs, separation and independence are complete.

~~For the offsite AC sources, separation and independence are to the extent practical. A circuit may be connected to more than one ESF bus, with fast transfer capability to the other circuit OPERABLE, and not violate separation criteria. A circuit that is not connected to an ESF bus is required to have OPERABLE fast transfer interlock mechanisms to at least two ESF buses to support OPERABILITY of that circuit.~~ 1

SURVEILLANCE REQUIREMENTS (continued)

has an allowable
rating

Although no power factor requirements are established by this SR, the DG ~~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 DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. 1 2

~~[The 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 3).~~

~~OR~~ 7

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---~~] 6

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing board ~~bus~~ loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance. 1

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the engine-mounted "day" ~~day~~ tank ~~[and engine mounted tank]~~ is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%. 5 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load (600kw) without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. ~~[For this unit, the single load for each DG and its horsepower rating is as follows:]~~ This Surveillance may be accomplished by: 1 2

a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the ~~bus~~ board, or 1

b. Tripping its associated single largest post-accident load with the DG solely supplying the ~~bus~~ board. 1

Consistent with Regulatory Guide 1.9 ~~As required by IEEE-308~~ (Ref. ~~12~~ 3), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. 1

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. ~~[The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~------------------------------REVIEWER'S NOTE------------------------------~~ 6
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~

This SR is modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR for DGs 2A-A and 2B-B could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. 5

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ ~~[0.9]~~ 0.89. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ ~~[0.9]~~ 0.89. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ ~~[0.9]~~ 0.89 results in voltages on the emergency ~~busses~~ boards that are too high. Under these conditions, the power factor should be maintained as close as practicable to ~~[0.9]~~ 0.89 while still maintaining acceptable voltage limits on the emergency ~~busses~~ boards. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of ~~[0.9]~~ 0.89 may not cause unacceptable voltages on the emergency ~~busses~~ boards, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to ~~[0.9]~~ 0.89 without exceeding the DG excitation limits. 2 1 2 1 1

SURVEILLANCE REQUIREMENTS (continued)

~~-----REVIEWER'S NOTE-----~~
~~The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable,~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~

~~-----~~

6

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the ~~bus~~ board if the trip initiator can be corrected or isolated. 1

[~~The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths.~~

~~OR~~

7

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 6

This SR has been modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR for DGs 2A-A and 2B-B could cause perturbation to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.89 ~~[0.9]~~. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the Surveillance to be conducted at a power factor other than ≤ 0.89 ~~[0.9]~~. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.89 ~~[0.9]~~ results in voltages on the emergency boards ~~busses~~ that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.89 ~~[0.9]~~ while still maintaining acceptable voltage limits on the emergency boards ~~busses~~. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of 0.89 ~~[0.9]~~ may not cause unacceptable voltages on the emergency boards ~~busses~~, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to 0.89 ~~[0.9]~~ without exceeding the DG excitation limits.

5 2 1 2 1 1

SURVEILLANCE REQUIREMENTS (continued)

~~-----REVIEWER'S NOTE-----~~
~~The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:~~

~~a. Performance of the SR will not render any safety system or component inoperable,~~

~~b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and~~

~~c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.~~
~~----------~~

6

SR 3.8.1.11

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency ~~buses~~ boards and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time. 1

The DG 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. 2

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 DG 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

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~---------------------------------REVIEWER'S NOTE----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance~~
~~Frequency Control Program should utilize the appropriate Frequency~~ 6
~~description, given above, and the appropriate choice of Frequency in the~~
~~Surveillance Requirement.~~
~~---]~~

This Surveillance is modified by three Notes. Note 1 states that
momentary transients due to changing ~~bus~~ board loads do not invalidate this 1
test. Similarly, momentary power factor transients above the power factor
limit will not invalidate the test. The reason for Note 2 is that during
operation with the reactor critical, performance of this Surveillance for DGs 2A-A and 2B-B could 5
cause perturbations to the electrical distribution systems that could
challenge continued steady state operation and, as a result, unit safety
systems. This restriction from normally performing the Surveillance in
MODE 1 or 2 is further amplified to allow the Surveillance to be performed
for the purpose of reestablishing OPERABILITY (e.g., post work testing
following corrective maintenance, corrective modification, deficient or
incomplete surveillance testing, and other unanticipated OPERABILITY
concerns) provided an assessment determines plant safety is maintained
or enhanced. This assessment shall, as a minimum, consider the
potential outcomes and transients associated with a failed Surveillance, a
successful Surveillance, and a perturbation of the offsite or onsite system
when they are tied together or operated independently for the
Surveillance; as well as the operator procedures available to cope with
these outcomes. These shall be measured against the avoided risk of a
plant shutdown and startup to determine that plant safety is maintained or
enhanced when the Surveillance is performed in MODE 1 or 2. Risk
insights or deterministic methods may be used for this assessment.
Credit may be taken for unplanned events that satisfy this SR. Note 3
ensures that the DG is tested under load conditions that are as close to
design basis conditions as possible. When synchronized with offsite
power, testing should be performed at a power factor of ≤ ~~[0.9]~~ 0.89. This 2
power factor is representative of the actual inductive loading a DG would
see under design basis accident conditions. Under certain conditions,
however, Note 3 allows the Surveillance to be conducted as a power
factor other than ≤ ~~[0.9]~~ 0.89. These conditions occur when grid voltage is
high, and the additional field excitation needed to get the power factor to
≤ ~~[0.9]~~ 0.89 results in voltages on the emergency ~~busses~~ boards that are too high. 1
Under these conditions, the power factor should be maintained as close
as practicable to ~~[0.9]~~ 0.89 while still maintaining acceptable voltage limits on 1
the emergency ~~busses~~ boards. In other circumstances, the grid voltage may be 2
such that the DG excitation levels needed to obtain a power factor of ~~[0.9]~~ 0.89
may not cause unacceptable voltages on the emergency ~~busses~~ boards, but the 1
excitation levels are in excess of those recommended for the DG. In such
cases, the power factor shall be maintained close as practicable to ~~[0.9]~~ 0.89
without exceeding the DG excitation limits.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within ~~[~~10~~]~~ seconds. The ~~[~~10~~]~~ second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. 2

~~[The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5).~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 6
~~-----]~~

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least ~~[~~2~~]~~ hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing board ~~bus~~ loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing. 2 1

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG 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 DG to reload if a

SURVEILLANCE REQUIREMENTS (continued)

subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on ~~bus~~ board undervoltage, and the load sequence timers are reset. 1

~~[The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 6

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance for DGs 2A-A and 2B-B in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this SR. 5

SURVEILLANCE REQUIREMENTS (continued)

~~following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.] Credit may be taken for unplanned events that satisfy this SR.~~ 5

SR 3.8.1.~~18~~ 17 5

Under accident ~~[~~and loss of offsite power~~]~~ conditions loads are sequentially connected to the ~~bus~~ board by the ~~[automatic load sequencer]~~ load sequence timers. The 1 2 sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The ~~[10]~~ 5% load sequence time interval tolerance ensures that 2 sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ~~ESF buses~~ ~~6.9 kV~~ Shutdown Boards. 1

~~[The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.~~ 7

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 6

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BASES

LCO (continued)

INSERT 1 ~~[Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. The second offsite circuit consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201 powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.]~~ 1

The DGs must be capable of starting, accelerating to rated speed and voltage, and connecting to their ~~its~~ respective 6.9 kV shutdown board ~~ESF bus~~ on detection of board ~~bus~~ undervoltage. This sequence must be accomplished within ~~[~~10~~]~~ seconds. The DG 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 6.9 kV shutdown boards ~~ESF buses~~. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby at ambient conditions. 3 1 2 1

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

~~[In addition, proper sequencer operation is an integral part of offsite circuit OPERABILITY since its inoperability impacts on the ability to start and maintain energized loads required OPERABLE by LCO 3.8.10.]~~ 4

~~It is acceptable for trains to be cross tied during shutdown conditions, allowing a single offsite power circuit to supply all required trains.~~ 1

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 and during movement of ~~[recently]~~ irradiated fuel assemblies provide assurance that: 2

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

b. Systems needed to mitigate a fuel handling accident ~~[involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)]~~ are available, 2

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

BASES

LCO (continued)

INSERT 1

~~[Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. The second offsite circuit consists of the Startup Transformer, which is normally fed from the Switchyard Bus A, and is fed through breaker PA 0201 powering the ESF transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.]~~ 1

s their 6.9 kV shutdown board board

The DG 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 DG 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 DG in standby with the engine hot and DG in standby at ambient conditions. 3 1 2 1

6.9 kV shutdown boards

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

~~[In addition, proper sequencer operation is an integral part of offsite circuit OPERABILITY since its inoperability impacts on the ability to start and maintain energized loads required OPERABLE by LCO 3.8.10.]~~ 4

~~It is acceptable for trains to be cross tied during shutdown conditions, allowing a single offsite power circuit to supply all required trains.~~ 1

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6 and during movement of ~~[recently]~~ irradiated fuel assemblies provide assurance that: 2

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

b. Systems needed to mitigate a fuel handling accident ~~[involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)]~~ are available, 2

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

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources - Operating

BASES INSERT 1

BACKGROUND

INSERT 1 The ~~station~~ 125 V Vital DC electrical power sub system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital ~~bus~~ instrument power board power (via inverters). INSERT 2 As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3). 1 1

The ~~[~~125~~/250]~~ Vital VDC electrical power sub system consists of two independent and redundant safety related Class 1E DC electrical power ~~subsystems~~ trains (~~[Train A and Train B]~~ INSERT 3). Each ~~subsystem~~ train consists of ~~[~~two~~]~~ 125 VDC batteries ~~[(each battery [50]% capacity)]~~, the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. 2 1 1

INSERT 4 ~~[The 250 VDC source is obtained by use of the two 125 VDC batteries connected in series.~~ Additionally there is ~~[~~one~~]~~ spare battery charger ~~per subsystem~~ INSERT 5, which provides backup service in the event that the preferred battery charger is out of service. If the spare battery charger is substituted for one of the preferred battery chargers, then the requirements of independence and redundancy between ~~subsystems~~ trains are maintained. ~~]~~ 2

During normal operation, the ~~[~~125~~/250]~~ Vital VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries. 2 1

The ~~[Train A and Train B]~~ Vital DC electrical power ~~subsystems~~ trains provide the control power for its associated Class 1E AC power load group, ~~[4.16]~~ 6.9 kV ~~switchgear,~~ Shutdown Boards and ~~[~~480~~]~~ V load centers. The DC electrical power ~~subsystems~~ trains also provide DC electrical power to the inverters, which in turn power the AC vital ~~buses~~ instrument power boards. 2 1 2 1 1 1

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution System - Operating," and LCO 3.8.10, "Distribution Systems - Shutdown."

BASES

BACKGROUND (continued)

When desired, ~~the~~ each Vital battery charger can be placed in the equalize mode. The equalize mode is at a higher voltage than the float mode and charging current is correspondingly higher. The battery charger is operated in the equalize mode after a battery discharge or for routine maintenance. Following a battery discharge, the battery recharge characteristic accepts current at the current limit of the battery charger (if the discharge was significant, e.g., following a battery service test) until the battery terminal voltage approaches the charger voltage setpoint. Charging current then reduces exponentially during the remainder of the recharge cycle. Lead-calcium batteries have recharge efficiencies of greater than 95%, so once at least 105% of the ampere-hours discharged have been returned, the battery capacity would be restored to the same condition as it was prior to the discharge. This can be monitored by direct observation of the exponentially decaying charging current or by evaluating the amp-hours discharged from the battery and amp-hours returned to the battery. 1

INSERT 7 1

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the U FSAR, Chapter [6] (Ref. 5) and Chapter [15] (Ref. 6), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. 1 2 1

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

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

b. A worst-case single failure.

The DC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The Vital DC electrical power ~~subsystems~~ trains, each ~~subsystem~~ train consisting of [two] batteries, battery charger [for each battery] and the corresponding control equipment and interconnecting cabling supplying power to the associated ~~bus~~ board within the ~~subsystem~~ train are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any DC electrical power ~~subsystem~~ train does not prevent the minimum safety function from being performed (Ref. 4). 1 2 1 2 1 1

INSERT 8 1

BASES

LCO (continued)

Vital train

An OPERABLE DC electrical power ~~subsystem~~ requires all required batteries and respective chargers to be operating and connected to the associated DC ~~bus~~(~~e~~s). board 1 1

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and 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 integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 5 and 6 are addressed in the Bases for LCO 3.8.5, "DC Sources - Shutdown."

ACTIONS

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

train vital

Condition A represents one ~~subsystem~~ with one ~~[~~or two~~]~~ battery chargers inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within ~~[~~12~~]~~ hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability. 1 2 2

~~-----REVIEWER'S NOTE-----~~
~~A plant that cannot meet the 12 hour Completion Time due to an inherent battery charging characteristic can propose an alternate time equal to 2 hours plus the time experienced to accomplish the exponential charging current portion of the battery charge profile following the service test (SR 3.8.4.3).~~
~~----------~~ 4

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources - Operating

BASES INSERT 1 sub

BACKGROUND The ~~station~~ DC electrical power system provides the AC emergency 1
125 V Vital power system with control power. It also provides both motive and
instrument power board control power to selected safety related equipment and preferred AC vital
~~bus~~ power (via inverters). As required by 10 CFR 50, Appendix A, 1
INSERT 2 GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3).

Vital sub

The [125~~/250~~] VDC electrical power system consists of two independent 2 1
INSERT 3 and redundant safety related Class 1E DC electrical power ~~subsystems~~ trains 1
train (~~[Train A and Train B]~~). Each ~~subsystem~~ consists of [two] 125 VDC batteries ~~[(each battery [50]% capacity)]~~, the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling.

INSERT 4 [~~The 250 VDC source is obtained by use of the two 125 VDC batteries connected in series.~~ Additionally there is [one] spare battery charger ~~per~~ 2
INSERT 5 ~~subsystem~~, which provides backup service in the event that the preferred battery charger is out of service. If the spare battery charger is substituted for one of the preferred battery chargers, then the requirements of independence and redundancy between ~~subsystems~~ are maintained.]

trains

Vital

During normal operation, the [125~~/250~~] VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries. 2 1

Vital trains

The ~~[Train A and Train B]~~ DC electrical power ~~subsystems~~ provide the 6.9 2 1
control power for its associated Class 1E AC power load group, ~~[4.16]~~ kV 2
Shutdown Boards ~~switchgear,~~ and [480] V load centers. The DC electrical power 1
trains ~~subsystems~~ also provide DC electrical power to the inverters, which in 1
turn power the AC vital ~~buses~~. 1

instrument power boards

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution System - Operating," and LCO 3.8.10, "Distribution Systems - Shutdown."

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BASES

BACKGROUND (continued)

each Vital battery

When desired, ~~the~~ charger can be placed in the equalize mode. The equalize mode is at a higher voltage than the float mode and charging current is correspondingly higher. The battery charger is operated in the equalize mode after a battery discharge or for routine maintenance. Following a battery discharge, the battery recharge characteristic accepts current at the current limit of the battery charger (if the discharge was significant, e.g., following a battery service test) until the battery terminal voltage approaches the charger voltage setpoint. Charging current then reduces exponentially during the remainder of the recharge cycle. Lead-calcium batteries have recharge efficiencies of greater than 95%, so once at least 105% of the ampere-hours discharged have been returned, the battery capacity would be restored to the same condition as it was prior to the discharge. This can be monitored by direct observation of the exponentially decaying charging current or by evaluating the amp-hours discharged from the battery and amp-hours returned to the battery. 1

INSERT 7

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the U FSAR, Chapter ~~[~~6~~]~~ (Ref. 5) and Chapter ~~[~~15~~]~~ (Ref. 6), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. 1 2 1

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

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

b. A worst-case single failure.

The DC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The Vital DC electrical power trains ~~subsystems~~, each train ~~subsystem~~ consisting of ~~[~~two~~]~~ batteries, battery charger ~~[~~for each battery~~]~~ and the corresponding control equipment and interconnecting cabling supplying power to the associated board ~~bus~~ within the train ~~subsystem~~ are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any DC electrical power train ~~subsystem~~ does not prevent the minimum safety function from being performed (Ref. 4). 1 2 1 2 1 1

INSERT 8 1

BASES

LCO (continued)

Vital train
An OPERABLE DC electrical power ~~subsystem~~ requires all required batteries and respective chargers to be operating and connected to the associated DC ~~bus~~(~~e~~s). board 1 1

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and 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 integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 5 and 6 are addressed in the Bases for LCO 3.8.5, "DC Sources - Shutdown."

ACTIONS

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

train vital
Condition A represents one ~~subsystem~~ with one ~~[~~or two~~]~~ battery chargers inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within ~~[~~12~~]~~ hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability. 1 2 2

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~A plant that cannot meet the 12 hour Completion Time due to an inherent battery charging characteristic can propose an alternate time equal to 2 hours plus the time experienced to accomplish the exponential charging current portion of the battery charge profile following the service test (SR 3.8.4.3).~~
~~--~~ 4

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters - Operating

3.8.2.1 LCO 3.8.7 The required Train A and Train B inverters shall be OPERABLE.

T

--------------------NOTE--------------------

3.8.2.1 Note * ~~[[One/t~~wo~~]~~ inverter~~[~~s~~]~~ may be disconnected from ~~[its/~~their~~]~~ associated DC ~~bus~~ source for ≤ 24 hours to perform an equalizing charge on ~~[its/~~their~~]~~ associated ~~[~~common~~]~~ battery, provided:

a. The associated AC vital ~~bus~~ instrument power board(~~es~~) ~~[is/~~are~~]~~ energized from ~~[its/~~their~~]~~ ~~[Class 1E constant voltage source transformers]~~ [inverter using internal AC source~~]~~, and

b. All other AC vital ~~buses~~ instrument power boards are energized from their associated OPERABLE inverters connected to their DC source. ~~]~~

----

2 1

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
ACTION b	A. One ~~[~~required~~]~~ inverter inoperable.	A.1	--------NOTE-------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any AC vital ~~bus~~ instrument power board de-energized. ---------------------------- Restore inverter to OPERABLE status.	24 hours	2 1
ACTION b	B. Required Action and associated Completion Time not met.	B.1 <u>AND</u>	Be in MODE 3.	6 hours	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.8.2.1	SR 3.8.7.1 Verify correct inverter voltage, ~~[~~frequency~~]~~, and alignment to required AC vital ~~buses~~ instrument power boards.	~~[7 days~~ 1 ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 3

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Inverters - Operating

3.8.2.1 LCO 3.8.7 The required Train A and Train B inverters shall be OPERABLE.

3.8.2.1 Note *

T

---NOTE---
~~[[One/t~~wo~~]~~ inverter~~[~~s~~]~~ may be disconnected from ~~[its/~~their~~]~~ associated DC ~~bus~~ source for ≤ 24 hours to perform an equalizing charge on ~~[its/~~their~~]~~ associated ~~[~~common~~]~~ battery, provided:

a. The associated AC vital ~~bus~~ instrument power board(~~es~~) ~~[is/~~are~~]~~ energized from ~~[its/~~their~~]~~ ~~[Class 1E constant voltage source transformers]~~ ~~[~~inverter using internal AC source~~]~~, and

b. All other AC vital ~~buses~~ instrument power boards are energized from their associated OPERABLE inverters connected to their DC source. ~~]~~

----

2 1

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
ACTION b	A. One ~~[~~required~~]~~ inverter inoperable.	A.1 --------------NOTE-------------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any AC vital ~~bus~~ instrument power board de-energized. ------------------------------------- Restore inverter to OPERABLE status.	24 hours	2 1
ACTION b	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND	6 hours	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.8.2.1	SR 3.8.7.1 Verify correct inverter voltage, ~~[~~frequency~~]~~, and alignment to required AC vital ~~buses~~ instrument power boards.	~~[7 days~~ 2 1 ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ 3

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters - Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC vital ~~buses~~ instrument power boards because of the stability and reliability they achieve. INSERT 1 The function of the inverter is to provide AC electrical power to the vital ~~buses~~ instrument power boards. The inverters can be powered from an internal AC source/rectifier or from the station battery. The station batter~~y~~ies provide~~s~~ an uninterruptible power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the UFSAR, Chapter ~~[~~8~~]~~ (Ref. 1). 1 1 1 1 1 2

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter ~~[~~6~~]~~ (Ref. 2) and Chapter ~~[~~15~~]~~ (Ref. 3), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RPS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems. 1 2

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital ~~buses~~ instrument power boards OPERABLE during accident conditions in the event of: 1

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

b. A worst case single failure.

Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

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1

INSERT 1

instrument power boards

There are two unit inverters and one spare inverter per channel, each capable of supplying its associated AC vital ~~buses~~, making a total of twelve inverters. Inverters 1-I and 2-I are connected to DC Channel I, inverters 1-II and 2-II are connected to DC Channel II, inverters 1-III and 2-III are connected to DC Channel III, and inverters 1-IV and 2-IV are connected to DC Channel IV. The spare inverter for a specified channel may be substituted for one of the two inverters of the same channel.

BASES

LCO (continued)

eight inverters (two per channel)

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the RPS and ESFAS instrumentation and controls is maintained. The ~~four inverters [(two per train)]~~ ensure an uninterruptible supply of AC electrical power to the AC vital ~~buses~~ instrument power boards even if the ~~4.16 kV~~ 480 volt safety ~~buses~~ boards are de-energized. 1 2 1

OPERABLE inverters require the associated vital ~~bus~~ board to be powered by the inverter with output voltage and frequency within tolerances, and power input to the inverter from a [125 VDC] station battery. Alternatively, power supply may be from an internal AC source via rectifier as long as the station battery is available as the uninterruptible power supply. 1

This LCO is modified by a Note that allows [one/two] inverters to be disconnected from a [common] battery for ≤ 24 hours, if the vital ~~bus(es)~~ instrument power board(s) is powered from a~~n~~ ~~[Class 1E constant voltage transformer or~~ inverter using internal AC source] during the period and ~~all other~~ the remaining required inverters are ~~operable~~. This allows an equalizing charge to be placed on one battery. If the inverters were not disconnected, the resulting voltage condition might damage the inverter[s]. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital ~~bus~~ instrument power board while taking into consideration the time required to perform an equalizing charge on the battery bank. 2 1 1 3 1

The intent of this Note is to limit the number of inverters that may be disconnected. Only those inverters associated with the single battery undergoing an equalizing charge may be disconnected. All ~~other~~ remaining required inverters must be aligned to their associated batteries, regardless of the number of inverters or unit design. 1

APPLICABILITY

The inverters 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.

Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.8, "Inverters - Shutdown."

BASES

ACTIONS

A.1

instrument power board

With a required inverter inoperable, its associated AC vital ~~bus~~ becomes inoperable until it is ~~[~~manually~~]~~ re-energized from its ~~[Class 1E constant voltage source transformer or~~ inverter using internal AC source~~]~~. 1 2

For this reason a Note has been included in Condition A requiring the entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating." This ensures that the vital ~~bus~~ board is re-energized within ~~2~~ 8 hours. 1 1

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC vital ~~bus~~ instrument power board is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC vital ~~buses~~ instrument power board is the preferred source for powering instrumentation trip setpoint devices. 1 1

B.1 and B.2

If the inoperable devices or components 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.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital ~~buses~~ instrument power boards energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation of the RPS and ESFAS connected to the AC vital ~~buses~~ instrument power boards. ~~[The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.~~ 1 1 4

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters - Operating

BASES

BACKGROUND

instrument power boards

The inverters are the preferred source of power for the AC vital ~~buses~~ because of the stability and reliability they achieve. INSERT 1 The function of the inverter is to provide AC electrical power to the vital ~~buses~~. The inverters can be powered from an internal AC source/rectifier or from the station battery. The station batter~~y~~ies provide~~s~~ an uninterruptible power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the UFSAR, Chapter ~~[~~8~~]~~ (Ref. 1).

instrument power boards

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter ~~[~~6~~]~~ (Ref. 2) and Chapter ~~[~~15~~]~~ (Ref. 3), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RPS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital ~~buses~~ instrument power boards OPERABLE during accident conditions in the event of:

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

b. A worst case single failure.

Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

1 **INSERT 1**

instrument power boards

There are two unit inverters and one spare inverter per channel, each capable of supplying its associated AC vital ~~buses~~, making a total of twelve inverters. Inverters 1-I and 2-I are connected to DC Channel I, inverters 1-II and 2-II are connected to DC Channel II, inverters 1-III and 2-III are connected to DC Channel III, and inverters 1-IV and 2-IV are connected to DC Channel IV. The spare inverter for a specified channel may be substituted for one of the two inverters of the same channel.

BASES

LCO (continued)

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the RPS and ESFAS instrumentation and controls is maintained. The ~~four inverters [(two per train)]~~ eight inverters (two per channel) ensure an uninterruptible supply of AC electrical power to the AC vital ~~buses~~ instrument power boards even if the ~~4.16 kV~~ 480 volt safety ~~buses~~ boards are de-energized. 1 2 1

OPERABLE inverters require the associated vital ~~bus~~ board to be powered by the inverter with output voltage and frequency within tolerances, and power input to the inverter from a [125 VDC] station battery. Alternatively, power supply may be from an internal AC source via rectifier as long as the station battery is available as the uninterruptible power supply. 1

This LCO is modified by a Note that allows [~~one/~~two] inverters to be disconnected from a [common] battery for ≤ 24 hours, if the vital ~~bus~~ instrument power board(es) is powered from a n ~~[Class 1E constant voltage transformer or~~ inverter using internal AC source] during the period and the remaining required ~~all other~~ inverters are operable. This allows an equalizing charge to be placed on one battery. If the inverters were not disconnected, the resulting voltage condition might damage the inverter[s]. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 24 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected AC vital ~~bus~~ instrument power board while taking into consideration the time required to perform an equalizing charge on the battery bank. 2 1 1 3 1

The intent of this Note is to limit the number of inverters that may be disconnected. Only those inverters associated with the single battery undergoing an equalizing charge may be disconnected. All ~~other~~ remaining required inverters must be aligned to their associated batteries, regardless of the number of inverters or unit design. 1

APPLICABILITY

The inverters 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.

Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.8, "Inverters - Shutdown."

BASES

ACTIONS

A.1

instrument power board

With a required inverter inoperable, its associated AC vital ~~bus~~ becomes inoperable until it is ~~[~~manually~~]~~ re-energized from its ~~[Class 1E constant voltage source transformer or~~ inverter using internal AC source~~]~~. 1 2

For this reason a Note has been included in Condition A requiring the entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating." This ensures that the vital ~~bus~~ instrument power board is re-energized within ~~2~~ 8 hours. 1 1

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC vital ~~bus~~ instrument power board is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC vital ~~buses~~ instrument power boards is the preferred source for powering instrumentation trip setpoint devices. 1 1

B.1 and B.2

If the inoperable devices or components 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.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and AC vital ~~buses~~ instrument power boards energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation of the RPS and ESFAS connected to the AC vital ~~buses~~ instrument power boards. ~~[The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.~~ 1 1 1 4

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters - Shutdown

instrument power

3.8.2.2 LCO 3.8.8 ~~[Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown."]~~ 1

Two

~~[One]~~ inverter[s] shall be OPERABLE~~.]~~ to support one train of the 120 V AC vital board electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

~~-----REVIEWER'S NOTE-----~~
~~This second option above applies for plants having a pre-ITS licensing basis (CTS) for electrical power requirements during shutdown conditions that required only [one] inverter to be OPERABLE. The "[or more]" optional wording in Condition A is also eliminated for this case. The first option above is adopted for plants that have a CTS requiring the same level of DC electrical power subsystem/inverter support as is required for power operating conditions.~~
~~----------~~ 2

Applicability
DOC M01

APPLICABILITY: MODES 5 and 6,
During movement of ~~[recently]~~ irradiated fuel assemblies. 1

ACTIONS

-----NOTE-----
DOC M01 LCO 3.0.3 is not applicable.

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
DOC M03	A. One [or more] [required] inverter[s] inoperable.	~~A.1 Declare affected required feature(s) inoperable.~~	~~Immediately~~	3
		~~OR~~		1
DOC L02		~~A.2.1~~ A.1 Suspend movement of ~~[recently]~~ irradiated fuel assemblies.	Immediately	3
		AND		

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L02	~~A.2.2~~ A.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND ~~A.2.3~~ A.3 Initiate action to restore required inverters to OPERABLE status.	Immediately 3 Immediately 3

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.8.2.2 DOC M02	SR 3.8.8.1 Verify correct inverter voltage, ~~[~~frequency,~~]~~ and alignments to required AC vital ~~buses~~ ~~boards~~ instrument power boards.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ 1 2 5

CTS

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Inverters - Shutdown

instrument power

3.8.2.2 LCO 3.8.8 ~~[Inverters shall be OPERABLE to support the onsite Class 1E AC vital bus electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown."]~~ 1

Two

~~[One]~~ inverter~~[~~s~~]~~ shall be OPERABLE~~.]~~ to support one train of the 120 V AC vital board electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

~~-----REVIEWER'S NOTE-----~~
~~This second option above applies for plants having a pre-ITS licensing basis (CTS) for electrical power requirements during shutdown conditions that required only [one] inverter to be OPERABLE. The "[or more]" optional wording in Condition A is also eliminated for this case. The first option above is adopted for plants that have a CTS requiring the same level of DC electrical power subsystem/inverter support as is required for power operating conditions.~~
~~----------~~ 2

Applicability
DOC M01

APPLICABILITY: MODES 5 and 6,
During movement of ~~[recently]~~ irradiated fuel assemblies. 1

ACTIONS

-----NOTE-----

DOC M01 LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M03 A. One ~~[~~or more~~]~~ ~~[~~required~~]~~ inverter~~[~~s~~]~~ inoperable.	~~A.1 Declare affected required feature(s) inoperable.~~	~~Immediately~~ 3
	~~OR~~ 1	
DOC L02	~~A.2.1~~ A.1 Suspend movement of ~~[recently]~~ irradiated fuel assemblies.	Immediately 3
	AND	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME	
DOC L02	~~A.2.2~~ A.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND ~~A.2.3~~ A.3 Initiate action to restore required inverters to OPERABLE status.	Immediately Immediately	3 3

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.8.2.2 DOC M02	SR 3.8.8.1 Verify correct inverter voltage, ~~[~~frequency,~~]~~ and alignments to required AC vital ~~buses~~ ~~boards~~ instrument power boards.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1 2 5

Licensee Response/NRC Response/NRC Question Closure

Id	**387**
NRC Question Number	**VKG024**
Select Application	**NRC Question Closure**
Attachment 1	
Attachment 2	
Response Statement	
Response Date/Time	
Closure Statement	**This question is closed and no further information is required at this time to draft the Safety Evaluation.**
Question Closure Date	**12/1/2014**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**
Added By	**Khadijah Hemphill**
Date Added	**12/1/2014 8:20 AM**
Date Modified	
Modified By	

ITS NRC Questions

Id	**185**
NRC Question Number	**VKG025**
Category	**Technical**
ITS Section	**3.8**
ITS Number	**3.8.9**
DOC Number	
JFD Number	
JFD Bases Number	
Page Number (s)	
NRC Reviewer Supervisor	**Jake Zimmerman**
Technical Branch POC	**Add Name**
Conf Call Requested	**N**

NRC Question

ITS 3.8.9, Condition A states: "One or more Unit 1 AC electrical power distribution subsystems inoperable." ITS 3.8.9, Condition B states: "One or more AC vital subsystems inoperable."

The ITS Bases Table B 3.8.9-1 provides a list of the AC electrical power distribution boards and AC vital boards of Train A and Train B, for Units 1 and 2.

The footnote of Table B 3.8.9-1 (*Each train of the AC and DC electrical power distribution systems is a subsystem) is not clear. The intent of Condition A and Condition B is that distribution subsystems or boards of only one train is inoperable.

Please revise as necessary the following:

1. **Revise the footnote of Table B 3.8.9-1 to redefine/clarify distribution subsystems.**
2. **Revise Bases and ITS, as necessary, based on redefinition of distribution subsystems**
3. **Ensure Bases Table 3.8.9-1 reflects *appropriate* subsystems**

Attach File 1	
Attach File 2	
Issue Date	**8/13/2014**
Added By	**Khadijah Hemphill**
Date Modified	
Modified By	

Date Added	**8/13/2014 9:37 AM**
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele** **Roger Scott**

Licensee Response/NRC Response/NRC Question Closure

Id	**383**
NRC Question Number	**VKG025**
Select Application	**Licensee Response**
Attachment 1	**RAI VKG025 Attachment 1 R1.pdf** (4MB)
Attachment 2	
Response Statement	**In response to VKG025, the ITS 3.8.9 Specifications and Bases, on pages 561-566 and 569–590 of Enclosure 2, Volume 13, will be revised. Specifically, ITS 3.8.9 LCO will be revised to state, "Two electrical power distribution trains shall be OPERABLE." ITS 3.8.9 Condition A will be revised to state, "One or more AC electrical power distribution subsystems inoperable due to one or more Unit 1 [Unit 2 for the Unit 2 technical specifications] AC shutdown boards inoperable." ITS 3.8.9 Condition C will be revised to state, "One or more vital DC electrical power distribution subsystems inoperable." ITS 3.8.9 Condition D will be revised to state, "One or more AC electrical power distribution subsystems inoperable due to one or more Unit 2 [Unit 1 for the Unit 2 technical specifications] AC shutdown boards inoperable." ITS 3.8.9 Condition E will be revised to state, "One or more DG DC electrical power distribution panels inoperable." ITS 3.8.9 Condition F will be revised to state, "Required Action and associated Completion Time not met." As a result of the revision to ISTS LCO 3.8.9, a new Justification for Deviation (JFD) 5 will be added to the ITS 3.8.9 Justification for Deviations Section, on page 567. Additionally, JFD 5 indicators will be added to the ISTS markups. Additional changes to the ITS 3.8.9 Specification are associated with changes in nomenclature (i.e., changing AC vital subsystems to AC vital instrument power distribution subsystems). JFD indicators will be added, as needed, to the right hand margin of the ISTS markups to align with the Justification for Deviations**

associated with each change.

The ITS 3.8.9 Bases Background Section will be revised to clarify what constitutes an electrical power distribution subsystem and explain the relationship between electrical power distribution subsystems and trains. An insert (Insert 6) will be added to explain the relationship and actions required if a board or motor control center (MCC) not reflected on ITS Table B 3.8.9-1 is out of service. A redundant paragraph following the description of the AC electrical power distribution subsystem will be deleted. As a result of the deletion, a new JFD 8 will be added to the ITS 3.8.9 Bases Justification for Deviations Section, on page 591 of Enclosure 2, Volume 13. JFD 8 indicators will be added, as well. The ITS 3.8.9 Bases LCO and Actions Section will be revised to align with changes made to ITS 3.8.9 Specifications. An insert (Insert 7) will be added to the LCO Section to clarify the electrical power distribution subsystems required to meet the LCO statement, Two electrical power distribution trains shall be OPERABLE." Additionally, the ITS 3.8.9 Bases Action Section for Action A.1 will be revised to remove the phrase "in one train" so that the first sentence reads, "With one or more Unit [Unit 2 for the Unit 2 technical specifications] required AC boards (except AC vital boards), inoperable and a loss of function has not occurred, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe condition, assuming no single failure." As a result of the revision, a new JFD 9 will be added to the ITS 3.8.9 Bases Justification for Deviations Section, on page 591 of Enclosure 2, Volume 13. JFD 9 indicators will be added, as well. ITS Table B 3.8.9-1 will be revised (Revised Insert 5) to remove the footnote at the bottom of the table; reflect the appropriate electrical power distribution boards as required in CTS 3.8.1.1, CTS 3.8.2.1, and CTS 3.8.2.3; and reorder the subsystems to align with the order of their descriptions in the Bases

Background Section. Additional changes to the ITS 3.8.9 Bases are associated with changes in nomenclature (i.e., changing AC vital subsystems to AC vital instrument power distribution subsystems). JFD indicators will be added, as needed, to the right hand margin of the ISTS Bases markups to align with the Justification for Deviations associated with each change.

The ITS 3.8.9 Discussion of Changes, on pages 553-559 of Enclosure 2, Volume 13, were reviewed and revisions will be made to align with changes made to the Specification.

The ITS 3.8.10 Specifications and Bases, on pages 618-623 and 626-635 of Enclosure 2, Volume 13, will be revised to align with changes made to ITS 3.8.9 Specifications and Bases. Specifically, ITS 3.8.10 Condition B will be revised to state, "One or more required DG DC electrical power distribution panels inoperable," (similar to the change to ITS 3.8.9 Condition E). Additionally, the phrase "AC vital" will be revised to "AC vital instrument."

The ITS 3.8.10 Discussion of Changes, on pages 612-616 of Enclosure 2, Volume 13, were reviewed and revisions will be made to align with changes made to the Specification.

During review for RAI VKG025, it was discovered that the previously submitted ITS 3.8.9 Condition C allows more than one 125-volt DC board to be inoperable. CTS 3.8.2.3 Action a states, in part, "With one 125-volt D.C. board inoperable or not energized, restore the inoperable board to OPERABLE and energized status within 2 hours or be in at least HOT STANDBY within the next 6 hours." This is a less restrictive change and is not justified in a corresponding DOC. As a result, the CTS markups, on pages 547 and 552 of Enclosure 2, Volume 13, will be revised to indicate that CTS 3.8.2.3 Action a is being changed in ITS 3.8.9 Condition C to

allow 2 hours to restore one or more inoperable 125-volt DC boards to OPERABLE status. Additionally, a new DOC L02 will be added to the ITS 3.8.9 Discussion of Changes Section, on page 559 of Enclosure 2, Volume 13, to justify the change to CTS 3.8.2.3 Action a. DOC L02 indicators will be added to the CTS markups.

Also during review, it was discovered that DOC LA04 stated that information contained in CTS 3.8.2.1 Footnote # would be relocated to the ITS 3.8.9 Bases. The Bases does not contain this information. Therefore, the paragraph describing a vital DC electrical power distribution subsystem in the ITS 3.8.9 Bases Background Section, on pages 569 and 580 of Enclosure 2, Volume 13, will be revised to include this information.

Additionally, RAI VKG025 states that, "The intent of Condition A and Condition B is that distribution subsystems or boards of only one train is inoperable." The following information is provided concerning this statement. ISTS 3.8.9 Condition A states, "One or more AC electrical power distribution subsystems inoperable." Condition A does not state that the inoperable subsystems are only in one train of the AC electrical power distribution subsystem. ISTS 3.8.9 Condition E states, "Two or more electrical power distribution subsystems inoperable that result in a loss of safety function." Both Condition A and Condition E address a situation with more than one electrical power distribution subsystem inoperable. According to ITS Chapter 1.0, Use and Application, all applicable Conditions are required to be entered for an LCO. If it is discovered that the inoperability of more than one electrical power distribution subsystem results in a loss of safety function, then entry into Conditions A and E would be required. If it is discovered that the inoperability does not result in a loss of safety function, then entry into Condition A is all that is required regardless of the number of inoperable trains.

Therefore, ISTS Condition A provides Required Actions if one or more AC electrical power distribution subsystems are inoperable and a loss of safety function has not occurred. It is not the intent of ISTS Condition A to be applicable to only one inoperable train of AC electrical power distribution subsystems. The same logic is applicable to ISTS 3.8.9 Condition B.

See Attachment 1 for the draft revised CTS 3.8.2.3 markups, ITS 3.8.9 DOC L02, ISTS Specifications and Bases markups, ITS 3.8.9 Bases Inserts 6 and 7, and ITS 3.8.9 JFD 8. The changes to the ITS submittal have been annotated with red text for inserted letters or words and where deletions have occurred, the text has been lined through and highlighted.

Response Date/Time	**11/24/2014 1:05 PM**
Closure Statement	
Question Closure Date	
Notification	**Scott Bowman** **Michelle Conner** **Vijay Goel** **Khadijah Hemphill** **Andrew Hon** **Lynn Mynatt** **Ray Schiele**
Added By	**Scott Bowman**
Date Added	**11/24/2014 12:05 PM**
Date Modified	
Modified By	

ITS A01 ITS 3.8.9

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTI0N - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.8.9 3.8.2.3 The following D.C. vital battery channels shall be energized and OPERABLE: LA01

~~CHANNEL I~~ ~~Consisting of 125 - volt D.C. board No. I~~, 125 - volt D.C. battery bank No. I* and a full capacity charger.

~~CHANNEL II~~ ~~Consisting of 125 - volt D.C. board No. II~~, 125 - volt D.C. battery bank No. II*, and a full capacity charger.

~~CHANNEL III~~ ~~Consisting of 125 - volt D.C. board No. III~~, 125 - volt D.C. battery bank No. III*, and a full capacity charger.

~~CHANNEL IV~~ ~~Consisting of 125 - volt D.C. board No. IV~~, 125 - volt D.C. battery bank No. IV*, and a full capacity charger.

See ITS 3.8.4

Applicability APPLICABILITY: MODES 1, 2, 3 and 4.

ACTIONS ACTION:

or more

L02

ACTION C a. With one 125-volt D.C. board inoperable, restore the inoperable board to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD
ACTION F SHUTDOWN within the following 30 hours.

b. With one 125-volt D.C. battery bank and/or its charger inoperable, restore the inoperable battery bank and/or charger to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. See ITS 3.8.4

*D.C. Battery Bank V may be substituted for any other Battery Bank as needed. See ITS 3.8.4

ITS

A01

ITS 3.8.9

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.8.9

3.8.2.3 The following D.C. vital battery channels shall be OPERABLE and energized:

LA01

~~CHANNEL I~~ ~~Consisting of 125 -volt D.C. board No. I~~, 125 - volt D.C. battery bank No. I* and a full capacity charger.

~~CHANNEL II~~ ~~Consisting of 125 - volt D.C. board No. II~~, 125 - volt D.C. battery bank No. II*, and a full capacity charger.

~~CHANNEL III~~ ~~Consisting of 125 - volt D.C. board No. III~~, 125 - volt D.C. battery bank No. III*, and a full capacity charger.

~~CHANNEL IV~~ ~~Consisting of 125 - volt D.C. board No. IV~~, 125 - volt D. C. battery bank No. IV*, and a full capacity charger.

See ITS 3.8.4

Applicability

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTIONS

ACTION: or more

L02

ACTION C

ACTION F

a. With one 125-volt D.C. board inoperable or not energized, restore the inoperable board to OPERABLE and energized status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one 125-volt D.C. battery bank and/or its charger inoperable or not energized, restore the inoperable battery bank and/or charger to OPERABLE and energized status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

See ITS 3.8.4

SURVEILLANCE REQUIREMENTS

LA02

In accordance with the Surveillance Frequency Control Program

SR 3.8.9.1

4.8.2.3.1 Each D.C. bus train shall be determined OPERABLE and energized ~~with tie breakers open between redundant busses~~ ~~at least once per 7 days~~ by verifying correct breaker alignment, indicated power availability from the charger and battery, and voltage on the bus ~~of greater than or equal to 125 volts.~~

LA03

See ITS 3.8.4

LA05

4.8.2.3.2** Each 125-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying that the parameters in Table 4.8-2 meet the Category A limits, and

See ITS 3.8.4 and 3.8.6

* D.C. Battery Bank V may be substituted for any other Battery Bank as needed.
** This surveillance includes Battery Bank V, but not Charger V.

See ITS 3.8.4

DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS does not contain specific ACTIONS for the condition where a diesel generator (DG) DC distribution subsystem is inoperable. However, the CTS definition of OPERABLE-OPERABILITY, CTS 1.19, states, in part, that a system, subsystem, train, or component or device shall be OPERABLE or have OPERABILITY when all necessary auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s). ITS 3.8.9, ACTION E specifically states that when a DG DC ~~distribution subsystem~~ is inoperable to declare the associated DG inoperable immediately. This changes the CTS by specifically stating the CTS 1.19 requirement in ITS LCO 3.8.9.

electrical power distribution panel

instrument

The purpose of ITS 3.8.9 is to ensure the necessary AC, vital DC, DG DC, and AC vital electrical power distribution subsystems are available to provide emergency electrical power to ensure the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded and to mitigate postulated events. The change is acceptable since it is consistent with the requirements in CTS 1.19 that all attendant equipment must be capable of performing its related support function to support a required feature. Although not explicitly stated in CTS, this action is always applied due to the application of CTS 1.19. This change is designated as administrative because it does not result in technical changes to the CTS.

A03 CTS 3.8.2.1 ACTION a states, in part, that with less than the above complement of AC boards OPERABLE and energized, to restore the inoperable boards to OPERABLE status within 8 hours. ITS 3.8.9 Required Action A.1 allows 8 hours to restore ~~the associated unit's~~ AC electrical power distribution subsystem(s) to OPERABLE status. In addition, Required Action A.1 includes a Note that requires entry into applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources – Operating," for vital DC ~~Sources~~ made inoperable by inoperable power distribution subsystems. This changes the CTS by explicitly requiring the compensatory actions for DC ~~Sources~~ to be taken if made inoperable by inoperable power distribution subsystems. The discussion for limiting the Required Actions to the associated unit's AC boards is contained in DOC L01.

AC electrical

electrical power trains

AC electrical

shutdown

This change is acceptable because no changes are made to CTS requirements. The change in format from the CTS to the ITS maintains the technical requirements. The addition of the Note only acts as a reminder to enter the appropriate actions if the emergency bus which supplies the Train A or Train B

DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

battery charger becomes de-energized. In the event an emergency board is inoperable such that a Train A or Train B battery charger were inoperable, ITS LCO 3.0.6 would allow taking only the Distribution System - Operating ACTIONS; taking exception to complying with the DC Sources - Operating ACTIONS. Since the Distribution System - Operating ACTIONS may not be sufficiently conservative in this event (i.e., a battery charger may be without power), specific direction to take appropriate ACTIONS for the DC Sources - Operating is added (ITS 3.8.9, Note to ACTION A) when there is no power to support the associated required battery charger. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 4.8.1.1.3 requires, in part, that the 125 volt DC distribution panel for each DG be demonstrated OPERABLE. ITS SR 3.8.9.1 requires, in part, verifying correct breaker alignments and voltage to the 125 volt DC distribution subsystem ~~for each DG~~. This changes the CTS by requiring correct breaker alignment verification and correct voltage for the DG DC ~~bus~~ electrical power distribution subsystem.

The purpose of CTS 4.8.1.1.3 is to provide assurance that necessary power to required supported systems is available with sufficient capacity, capability, redundancy, and reliability to ensure the fuel, RCS, and containment design limits are not exceeded and postulated accidents are mitigated. This change is acceptable because it provides additional assurance that the panels associated with the DG DC bus electrical power distribution subsystem are OPERABLE. This change is designated as more restrictive because it adds a new Surveillance Requirement to the CTS for verification of correct breaker alignment and voltage.

M02 CTS 3.8.2.1 ACTION a states that with less than the above complement of AC boards OPERABLE and energized, to restore the inoperable boards to OPERABLE status within 8 hours. CTS 3.8.2.3 ACTION a states that with one 125 volt DC board inoperable, to restore the inoperable boards to OPERABLE status within 2 hours. However, there are no limitations to preclude a loss of function due to numerous concurrently inoperable AC and DC boards. ITS 3.8.9 ACTION G has been added, requiring entry into ITS 3.0.3 if the loss of two or more required electrical power distribution subsystems result in a loss of safety function. This changes CTS by adding an explicit Action to enter LCO 3.0.3 for a loss of two or more electrical power distribution subsystems that result in a loss of safety function.

The purpose of the CTS ACTIONS is to limit the time the unit can operate under these conditions. CTS 3.8.2.3 ACTION a specifies the compensatory actions for one inoperable DC board. With two inoperable DC boards, CTS 3.8.2.3 does not provide any actions and entry into LCO 3.0.3 would be required. CTS 3.8.2.1 ACTION a is applicable to all inoperable AC boards even if there is a loss of safety function. Certain combinations of inoperable AC and DC electrical power distribution subsystems result in a loss of safety function (e.g., an inoperable Train A AC electrical power distribution subsystem in combination with an

DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

inoperable Train B vital DC electrical power distribution subsystem). ITS 3.8.9 includes ACTION G, which requires immediate entry into LCO 3.0.3 if the loss of one or more required electrical power distribution subsystems boards results in a loss of safety function. ITS 3.8.9 Required Action G.1 preserves the intent of ITS LCO 3.0.3 and reflects an additional restriction on plant operation. This change is designated as more restrictive because an explicit action has been added which requires entry into LCO 3.0.3 with any combination of required AC and/or DC boards inoperable that results in a loss of safety function.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.8.1.1.3.b.5 requires, in part, a separate 125 volt DC distribution panel to be OPERABLE for each DG. CTS 3.8.2.1 requires, in part, the AC electrical boards to be OPERABLE and lists the specific AC shutdown boards and AC vital instrument power board channels, including the applicable nominal voltage. CTS 3.8.2.3 requires, in part, vital DC boards to be OPERABLE and lists the specific boards and includes the nominal voltage. ITS LCO 3.8.9 requires the applicable electrical power distribution subsystems to be OPERABLE. This changes the CTS by moving the specific names of the buses and the associated nominal bus voltages (i.e., 6900 V, 480 V, 125 V, and 120 V) from the CTS to the ITS Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.8.9 retains the requirement for the required distribution subsystems to be OPERABLE. In addition, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. The Technical Specification Bases Control Program in Chapter 5 controls changes to the Bases, requiring an evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.8.1.1.3 requires, in part, verification that the 125 volt DC distribution panel for each diesel generator is demonstrated OPERABLE. CTS 4.8.2.1 requires, in part, the specified AC boards to be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated voltage on the busses. CTS 4.8.2.3.1 requires, in part, each DC bus train to be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment, indicated power availability from the charger and battery, and voltage on the bus. DOC M01 discusses addition of a surveillance requirement to verify correct alignments and voltage for the DG

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DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

DC distribution subsystem with a frequency of 7 days. ITS SR 3.8.9.1 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for these SRs and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LA03 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.8.2.1 requires the AC electrical boards to be OPERABLE and energized "with tie breakers open between redundant boards." CTS 4.8.2.1 also requires the AC boards to be determined OPERABLE and energized from AC sources "with tie breakers open between redundant busses" by verifying correct breaker alignment and indicated voltage on the buses. CTS 4.8.2.3.1 requires, in part, the DC bus trains to be determined OPERABLE and energized "with tie breakers open between redundant buses". ITS LCO 3.8.9 requires the applicable electrical power distribution subsystems to be OPERABLE and ITS SR 3.8.9.1 requires the verification of correct breaker alignments and voltage to required AC, vital DC, DG DC, and AC vital instrument electrical power distribution subsystems. This changes the CTS by moving the procedural detail that the boards must have their tie breakers open between redundant boards from the CTS to the ITS Bases.

The removal of these details for meeting Technical Specification requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the electrical power distribution subsystems to be OPERABLE and requires the verification of correct breaker alignments and voltage to required AC, vital DC, DG DC, and AC vital instrument electrical power distribution subsystems. In addition, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. The Technical Specification Bases Control Program in Chapter 5 controls changes to the Bases. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal

DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LA04 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 4.8.2.1 states, in part, that the specified A.C. boards shall be determined OPERABLE by verifying correct breaker alignment. CTS 3.8.2.1 includes Note # that allows D.C. Channel V to be substituted for any one channel of channels I-IV, thus verification of correct breaker alignment is required when Channel V is substituted. ITS SR 3.8.9.1 does not contain this design information. This changes the CTS by moving the details that DC channel V can be substituted for any one of channels I-IV from the CTS to the ITS Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.8.9 retains the requirement for the required distribution subsystems to be OPERABLE. In addition, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. The Technical Specification Bases Control Program in Chapter 5 controls changes to the Bases, requiring an evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA05 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 4.8.2.3.1 requires, in part, each DC bus to be determined OPERABLE by verifying voltage of greater than or equal to 125 volt DC on the bus. ITS SR 3.8.9.1 requires, in part, verification of correct breaker alignment and voltage to the DG DC electrical power distribution subsystems. This changes the CTS by removing the specified voltage limit from the surveillance and placing it in the Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement to verify the correct voltage to each diesel generator 125 volt DC distribution panel and to each vital DC board. In addition, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. The Technical Specification Bases Control Program in Chapter 5 controls changes to the Bases. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 CTS 3.8.2.1 ACTION a requires that with less than the listed AC electrical boards OPERABLE and energized to restore the inoperable boards to OPERABLE status within 8 hours. ITS LCO 3.8.9 ACTION A requires that with one or more

due to one or more of the associated unit's AC shutdown boards inoperable

DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

due to one or more of the opposite unit's AC shutdown boards inoperable

electrical power distribution subsystems

~~associated unit's~~ AC electrical power distribution subsystems ~~boards(s)~~ inoperable to restore AC electrical power distribution subsystem(s) to OPERABLE status within 8 hours. ITS 3.8.9 ACTION D requires that when one or more ~~opposite unit's~~ AC ~~boards~~ are inoperable to declare the associated supported required feature(s) inoperable immediately. This changes the CTS by providing a separate ACTION to declare the required supported feature(s) inoperable and follow the applicable ACTIONS for the affected shared system LCOs when the opposite unit's required AC boards are inoperable.

The safety function of the Standby AC Power System is to supply power to support the functioning of components and systems required to assure that (1) fuel design limits and reactor coolant pressure boundary design conditions are not exceeded due to anticipated operational occurrences, and (2) the core is cooled and vital functions are maintained in the event of postulated accidents, subject to loss of the Preferred Power System and subject to any single failure in the Standby Power System. To accomplish its safety function, the onsite Class 1E AC distribution system supplies electrical power to two power trains for each unit. Each power train includes two Class 1E 6.9 kV shutdown boards powered from one of two separate and independent offsite power lines or a dedicated onsite DG. Two DGs in one train can provide the safety related functions to mitigate a loss-of-coolant accident (LOCA) in one unit and safely shut down the other unit. The core cooling and containment cooling system loads are unitized to the respective unit's 6.9 kV shutdown boards. Although the core cooling systems and containment systems credited in the mitigation of an anticipated operational occurrence (AOO) or postulated Design Basis Accident (DBA) are unitized (not shared with the opposite unit) and powered from the associated unit's shutdown boards, some safety-related systems (e.g., Essential Raw Cooling Water (ERCW), Component Cooling (CCS), Emergency Gas Treatment (EGTS), Auxiliary Building Gas Treatment, (ABGTS), Control Room Emergency Ventilation (CREVS), and Control Room HVAC (CRACS)) are shared between the units. The AC sources for these loads are distributed across both unit's shutdown boards. Therefore, in addition to requiring the associated unit's boards to be OPERABLE; the opposite unit's boards supplying power to a required shared system component is also required to be OPERABLE. The purpose of CTS 3.8.2.1 ACTION a is to limit the time AC boards can be inoperable. The proposed change maintains the CTS ACTIONS and allowed outage time for the associated unit's AC boards, and proposes a new ACTION that changes the allowed outage time for the opposite unit's AC boards. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the repair period. These changes are acceptable because the Required Actions associated with the required features are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation, while providing time to repair the inoperable features. If the necessary repairs cannot be made within the established Completion Time, the applicable Conditions for the affected shared system LCOs establish the Required Actions to exit the MODE of Applicability for that inoperable required feature. This change is acceptable because the provided ACTIONS effect restoration of the opposite unit's AC boards

shutdown

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DISCUSSION OF CHANGES
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

shutdown

commensurate with the importance of maintaining these AC boards capable of supporting the associated unit's required feature(s). This change is designated as less restrictive, because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 (*Category 4 - Relaxation of Required Action*) CTS 3.8.2.3 ACTION a. states, “With one 125-volt D.C. board inoperable, restore the inoperable board to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.” For more than one 125-volt DC board inoperable, CTS 3.8.2.3 does not contain a specific requirement; therefore, entry into LCO 3.0.3 is required. ITS 3.8.9 CONDITION C provides Required Actions for one or more vital DC electrical power distribution subsystems inoperable. ITS 3.8.9 Required Action C.1 requires restoration of vital DC electrical power distribution subsystem(s) to OPERABLE status within 2 hours. Additionally, ITS 3.8.9 ACTION G requires entry into LCO 3.0.3, immediately, if two or more inoperable electrical power distribution subsystems result in a loss of safety function. This changes the CTS by allowing more than one 125-volt DC board to be inoperable, provides an additional hour to restore inoperable 125-volt DC boards to OPERABLE status, and eliminates the requirement to enter LCO 3.0.3 if more than one 125-volt DC board is inoperable and a loss of safety function has not occurred.

The purpose of CTS 3.8.2.3 is to ensure that two trains (subsystems) of the vital DC electrical power distribution system (four 125-volt DC boards, two per train) are capable of supplying the associated loads during a design bases accident (DBA). This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering that only a small amount of time is provided to restore the required features, and the low probability of a DBA occurring during the repair period. Allowing an additional hour to restore one or more inoperable vital DC electrical power distribution subsystems (or more than one 125-volt DC board) is appropriate as it may avoid a shutdown, a unit transient, while the vital DC electrical power distribution subsystem is not in full working order. The ITS requires immediate entry into LCO 3.0.3 if the loss of more than one vital DC electrical power distribution system results in a loss of safety function, therefore, all safety analysis assumptions are being met. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

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3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

3.8.1.1
3.8.2.1
3.8.2.3

LCO 3.8.9 Two ~~Train A and Train B AC,~~ vital DC, ~~and AC vital~~ ~~, and diesel generator (DG) DC~~ ~~bus~~ electrical power distribution ~~subsystems~~ trains shall be OPERABLE. ~~1~~ 5

Applicability
3.8.1.1
3.8.2.1
3.8.2.3

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.8.2.1 ACTION a. DOC A03 — A. One or more ~~Unit 1~~ AC electrical power distribution subsystems inoperable due to one or more Unit 1 AC shutdown boards inoperable.	A.1 --------------NOTE-------------- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," for vital DC electrical power trains made inoperable by inoperable AC electrical power distribution subsystems. ------------------------------------- Restore ~~Unit 1~~ AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours
3.8.2.1 ACTION a. — B. One or more AC vital ~~buses~~ instrument power distribution subsystems inoperable.	B.1 Restore AC vital ~~bus~~ instrument power distribution subsystem(s) to OPERABLE status.	~~2~~ 8 hours
3.8.2.3 ACTION a. DOC L02 — C. One ~~or more~~ vital DC electrical power distribution subsystems inoperable. STET	C.1 Restore vital DC electrical power distribution subsystem~~(s)~~ to OPERABLE status. STET	2 hours

~~2~~ 2 1 1 ~~2~~ 1 1

INSERT 1 2

2 **INSERT 1**

DOC L01	D. One or more ~~Unit 2~~ AC electrical power distribution subsystems inoperable due to one or more Unit 2 AC shutdown boards inoperable.	D.1 Declare associated required feature(s) inoperable.	Immediately
DOC A02	E. One or more ~~required~~ DG DC ~~subsystems~~ electrical power distribution panels inoperable.	E.1 Declare associated supported DG inoperable.	Immediately

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
3.8.2.1 ACTION a. 3.8.2.3 ACTION a.	F ~~D~~. Required Action and associated Completion Time ~~for Condition A, B, or C~~ not met.	F ~~D~~.1 AND F ~~D~~.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours	2
DOC M02	G ~~E~~. Two or more electrical power distribution subsystems inoperable that result in a loss of safety function.	G ~~E~~.1	Enter LCO 3.0.3.	Immediately	2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.8.2.1 4.8.2.3.1 DOC M01	SR 3.8.9.1 Verify correct breaker alignments and voltage to ~~[required]~~ AC, vital DC, DG DC, and AC vital ~~bus~~ instrument electrical power distribution subsystems.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	3 1 4

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

3.8.1.1
3.8.2.1
3.8.2.3

LCO 3.8.9 Two ~~Train A and Train B AC,~~ vital ~~DC,~~ ~~and AC vital~~ ~~, and diesel generator (DG) DC~~ ~~bus~~ electrical power distribution ~~subsystems~~ trains shall be OPERABLE. 1 5

Applicability
3.8.1.1
3.8.2.1
3.8.2.3

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.8.2.1 ACTION a. DOC A03 A. One or more ~~Unit 2~~ AC electrical power distribution subsystems inoperable due to one or more Unit 2 AC shutdown boards inoperable.	A.1 --------------NOTE-------------- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," for vital DC electrical power trains made inoperable by inoperable AC electrical power distribution subsystems. -------------------------------------	2 2 1 1
3.8.2.1 ACTION a.	Restore ~~Unit 2~~ AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours 2
3.8.2.1 ACTION a. B. One or more AC vital instrument power distribution ~~buses~~ subsystems inoperable.	B.1 Restore AC vital ~~bus~~ instrument power distribution subsystem(s) to OPERABLE status.	8 ~~2~~ hours 1
3.8.2.3 ACTION a. DOC L02 C. One ~~or more~~ vital DC electrical power distribution subsystem~~s~~ inoperable. STET	C.1 Restore vital DC electrical power distribution subsystem~~(s)~~ to OPERABLE status.	2 hours 1

INSERT 1 2

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2 **INSERT 1**

DOC L01	D. One or more ~~Unit 1~~ AC electrical power distribution subsystems inoperable due to one or more Unit 1 AC shutdown boards inoperable.	D.1 Declare associated required feature(s) inoperable.	Immediately
DOC A02	E. One or more ~~required~~ DG DC ~~subsystems~~ electrical power distribution panels inoperable.	E.1 Declare associated supported DG inoperable.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
3.8.2.1 ACTION a. 3.8.2.3 ACTION a. F ~~D~~. Required Action and associated Completion Time ~~for Condition A, B, or C~~ not met.	F ~~D~~.1	Be in MODE 3.	6 hours
	AND		
	F ~~D~~.2	Be in MODE 5.	36 hours
DOC M02 G ~~E~~. Two or more electrical power distribution subsystems inoperable that result in a loss of safety function.	G ~~E~~.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.8.2.1 4.8.2.3.1 DOC M01 SR 3.8.9.1	Verify correct breaker alignments and voltage to ~~[required]~~ vital AC, DG DC, DC, and AC vital ~~bus~~ instrument electrical power distribution subsystems.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~

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JUSTIFICATION FOR DEVIATIONS
ITS 3.8.9, DISTRIBUTION SYSTEMS - OPERATING

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant-specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. Changes are made to the ISTS to reflect the interaction between an operating unit's electrical distribution subsystem and those credited features needing support from the opposite unit's associated electrical distribution subsystem.

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. ISTS SR 3.8.9.1 provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.8.9.1 is "In accordance with the Surveillance Frequency Control Program."

5. ISTS LCO 3.8.9 is modified to: "Two electrical power distribution trains shall be OPERABLE." This change is made to simplify and clarify what is required to meet the LCO. As described in the ISTS Bases, each train consists of specific AC and DC electrical power distribution subsystems. Therefore, it is unnecessary to state in ISTS LCO 3.8.9 the specific electrical power distribution subsystems of Train A and B that are required to meet the LCO.

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems - Operating

DG DC, instrument INSERT 1

BASES 1

vital

BACKGROUND The onsite Class 1E AC, DC, and AC vital ~~bus~~ electrical power 1
distribution systems are divided ~~by train~~ into [two] redundant and ~~vital~~ 2 1
independent ~~AC, DC, and AC vital bus electrical power distribution~~ 1
trains ~~subsystems.~~ INSERT 2 1

Each four two

~~The~~ AC electrical power subsystem ~~for each train~~ consists of ~~a primary~~ 1
6.9 kV Shutdown Boards ~~Engineered Safety Feature (ESF) 4.16 kV bus~~ and ~~secondary~~ [480 ~~and~~ 1 2
Shutdown Boards ~~120]~~ V ~~buses, distribution panels, motor control centers and load centers.~~ 1
train of 6.9 kV Shutdown Boards Each ~~[4.16 kV ESF bus]~~ has ~~at least~~ [one separate and independent 2 1
offsite source of power] as well as a dedicated onsite diesel generator 2
6.9 kV Shutdown Board (DG) source. for each 6.9 kV Shutdown Board Each ~~[4.16 kV ESF bus]~~ is normally connected to a 2
preferred offsite source. ~~After a loss of the preferred offsite power source~~ 1
~~to a 4.16 kV ESF bus, a transfer to the alternate offsite source is~~
~~accomplished by utilizing a time delayed bus undervoltage relay.~~ If ~~all~~ an 1
is offsite source~~s are~~ unavailable, the onsite emergency DG suppli~~es~~ s y power
affected 6.9 kV Shutdown Boards to the ~~4.16 kV ESF bus~~. Control power for the ~~4.16 kV~~ breakers is 1
supplied from the Class 1E batteries. Additional description of this
6.9 kV Shutdown Board
system may be found in the Bases for LCO 3.8.1, "AC Sources - Operating," and the Bases for LCO 3.8.4, "DC Sources - Operating."

~~boards~~ ~~The secondary AC electrical power distribution subsystem for each train includes the safety related buses, load centers, motor control centers, and distribution panels shown in Table B 3.8.9-1.~~ 8 ~~1~~

consists of two Unit 1 120 V AC vital instrument power boards and two Unit 2 120 V AC vital instrument power boards

instrument power distribution subsystem~~s~~

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

two

Each 125 V vital

~~The~~ DC electrical power distribution subsystem consists of [125] V 1 2
boards ~~bus(es) and distribution panel(s)~~. 1

The 125 V vital DC electrical power distribution subsystem has manual access to a fifth vital battery. The fifth vital battery is intended to serve as a replacement for any one of the four 125 V DC vital batteries with no loss of system reliabilty under any mode of operation.

INSERT 3 1

AC, vital

The list of ~~all required~~ DC and ~~vital~~ AC distribution ~~buses [and panels]~~ is 1 2 4
subsystems
presented in Table B 3.8.9-1. DG DC,

vital instrument electrical power

electrical power boards and distribution panels required for the

INSERT 6 1

1

INSERT 1

The two units share several structures and systems including the preferred and emergency (standby) electric power systems (UFSAR Chapter 8.0). The vital DC Power System is shared to the extent that a few loads (e.g., the vital inverters) in one nuclear unit are energized by the DC power channels assigned primarily to power loads of the other unit. In no case does the sharing inhibit the safe shutdown of one unit while the other unit is experiencing an accident. The Standby Power System serving each unit is divided into two redundant load groups (power trains). These power trains (Train A and Train B for each unit) supply power to safety-related equipment. Generally, the Engineered Safety Feature (ESF) loads assigned to a unit are supplied by the unit designated trains. For example, Safety Injection (SI) pump 1A-A (associated with Unit 1) is supplied by Shutdown Board 1A-A (also associated with Unit 1) while SI pump 2A-A (associated with Unit 2) is supplied by Shutdown Board 2A-A (also associated with Unit 2).

Separate and similar systems and equipment are provided for each unit when required. In certain instances, both units share systems or some components of a system. Shared systems are the exception to the unit/power system association. Because both units share the power system, one unit's power system(s) supports certain components required by the other unit (e.g., emergency gas treatment system). ~~To show the unit, train, board, and panel association, Table B 3.8.9-1 lists these power system components by train and unit designation.~~

1

INSERT 2

Each electrical power distribution train consists of:
a. an AC electrical power distribution subsystem,
b. an AC vital instrument power distribution subsystem,
c. a vital DC electrical power distribution subsystem, and
d. a diesel generator (DG) DC electrical power distribution subsystem.

~~In addition, each diesel generator (DG) has an associated DC electrical power distribution panel.~~

1

INSERT 3

Each

electrical power

consists of two

DC

s that supply power to the respective DG's auxiliary loads

~~The~~ DG ~~125 Volt~~ DC distribution subsystem ~~includes a~~ 125 V distribution panel ~~for each DG~~. During normal operation, power is supplied to the distribution panel by a 480 VAC board through a battery charger. During emergency operation of the DG (loss of offsite power source), the distribution panel is supplied power from a ~~58 cell~~ battery. This panel supplies power for DG control, protection, and the engine DC lube oil circulating pump.

dedicated

Insert Page B 3.8.9-1

1 **INSERT 6**

Associated with each board listed in Table B 3.8.9-1 are a number of safety significant electrical loads. When one or more of the boards specified in Table B 3.8.9-1 becomes inoperable, entry into the appropriate ACTIONS of LCO 3.8.9 is required. Some boards, distribution panels, and motor control centers (MCCs), which help comprise the AC and DC electrical power distribution subsystems, are not listed in Table B 3.8.9-1. The loss of electrical loads associated with these boards, panels, or MCCs may not result in a complete loss of a safety function necessary to shut down the reactor and maintain it in a safe condition. Therefore, should one or more of these boards, panels, or MCCs become inoperable due to a failure not affecting the OPERABILITY of a board listed in Table B 3.8.9-1 (e.g., a breaker supplying a single distribution panel fails open), the individual loads associated with the board, panel, or MCC are declared inoperable, and the appropriate Conditions and Required Actions of the LCOs governing the individual loads are entered.

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the U FSAR, Chapter ~~[~~6~~]~~ (Ref. 1), and in the U FSAR, Chapter ~~[~~15~~]~~ (Ref. 2), assume ESF systems are OPERABLE. The AC, vital DC, DG DC, and AC vital instrument ~~bus~~ electrical power distribution systems 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, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

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

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

b. A worst case single failure.

The electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The required electrical power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, vital DC, DG DC, and AC vital instrument ~~bus~~ electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Insert 7 ~~The AC, vital DC, DG DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE.~~

Maintaining ~~the Train A and Train B AC, vital DC, DG DC, and AC vital bus~~ two electrical power distribution trains ~~subsystems~~ OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution trains ~~subsystems~~ will not prevent safe shutdown of the reactor.

OPERABLE AC electrical power distribution subsystems require the associated boards ~~buses, load centers, motor control centers, and distribution panels~~ to be energized to their proper voltages. OPERABLE vital DC and DG DC electrical power distribution subsystems require the associated boards ~~buses and distribution panels~~ and distribution panels, as applicable, to be energized to their proper voltage from either the associated battery or charger. OPERABLE AC vital instrument ~~bus electrical~~ power distribution subsystems require the associated boards ~~buses~~ to be energized to their proper voltage from the associated ~~[~~inverter via inverted DC voltage, or inverter using internal 120 volt regulated AC source~~, or Class 1E constant voltage transformer]~~.

1 4 **INSERT 7**

Two electrical power distribution trains are required to be OPERABLE. Each train includes:

a. an AC electrical power distribution subsystem (i.e., one Unit 1 6.9 kV shutdown board, one Unit 2 6.9 kV shutdown board, and associated 480 V shutdown boards),
b. an AC vital instrument power distribution subsystem (i.e., two Unit 1 120 V AC instrument power boards and two Unit 2 120 V AC instrument power boards),
c. a vital DC electrical power distribution subsystem (i.e., two 125 V DC boards), and
d. a DG DC electrical power distribution subsystem (i.e., two 125 V DG distribution panels).

BASES

LCO (continued)

vital DG DC,

In addition, tie breakers between redundant safety related AC, DC, and AC vital ~~bus~~ power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem, that could cause the failure of a redundant subsystem and a loss of essential safety function(s). If any tie breakers are closed, the affected redundant electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related redundant electrical power distribution subsystems. It does not, however, preclude redundant Class 1E ~~4.16 kV buses~~ from being powered from the same offsite circuit. 1 4 1 1

instrument electrical

6.9 kV Shutdown Boards

APPLICABILITY

The electrical power distribution subsystems 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 3

;

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

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems - Shutdown."

ACTIONS

A.1

~~Unit 1~~ ~~boards~~ portions of the

instrument

electrical power distribution subsystems

due to one or more inoperable Unit 1 AC shutdown boards,

With one or more ~~Train A and B~~ ~~required~~ AC ~~buses, load centers, motor control centers, or distribution panels~~ (except AC vital ~~buses~~), ~~in one train~~ inoperable and a loss of function has not occurred, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the ~~required~~ AC ~~buses, load centers, motor control centers, and distribution panels~~ must be restored to OPERABLE status within 8 hours. 4 1 9 4 1 1 4 1 1

boards

portions of the

~~Unit 1~~

~~boards~~

electrical distribution subsystems

case

of Unit 1 boards

Condition A worst scenario is one train without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by 4 4

Unit 1

BASES

ACTIONS (continued)

stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit ; and 3

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

Required Action A.1 is modified by a Note that requires the applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," to be entered for vital DC electrical power trains made inoperable by inoperable AC electrical power distribution subsystems. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability of ~~a~~ one or more AC electrical power distribution ~~system~~ subsystems can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that the appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution subsystems. 1 1 4 1 1

B.1

With one or more AC vital ~~buses~~ instrument power distribution subsystems inoperable, and a loss of function has not yet occurred, the remaining OPERABLE portions of the AC vital instrument power distribution ~~buses~~ subsystems are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum ~~[~~required~~]~~ ESF functions not being supported. Therefore, the ~~required~~ affected AC vital instrument power distribution ~~bus~~ subsystem(s) must be restored to OPERABLE status within ~~2~~ 8 hours by powering the ~~bus~~ subsystems from the associated ~~[~~inverter via inverted DC~~,~~ or inverter using internal 120 volt regulated AC source~~, or Class 1E constant voltage transformer]~~. 1 2 1 1 2

Condition B represents one or more AC vital ~~buses~~ instrument power distribution subsystems without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining vital ~~buses~~ ~~subsystems~~ instrument power boards and restoring power to the affected vital ~~bus~~ ~~subsystem~~ instrument power boards. 1 1 1

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BASES

ACTIONS (continued)

8

This ~~2~~ hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than ~~2~~ hours if declared inoperable, is acceptable because of: 1

8

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue~~,~~ ; 3

b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train~~,~~ ; and 3

c. The potential for an event in conjunction with a single failure of a redundant component.

8

instrument power distribution subsystems

The ~~2~~ hour Completion Time takes into account the importance to safety of restoring the AC vital ~~bus~~ to OPERABLE status, the redundant capability afforded by the ~~other~~ OPERABLE vital ~~buses~~, and the low probability of a DBA occurring during this period. 1

remaining ~~subsystems~~ AC instrument power boards

STET

C.1

electrical power distribution

subsystems

vital

With one ~~or more~~ DC ~~buses or distribution panels~~ inoperable, and a loss of function has not yet occurred, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the ~~[required]~~ DC ~~buses and distribution panels~~ must be restored to OPERABLE status within 2 hours by powering the ~~bus~~ from the associated battery or charger. 4 1 2

portions of the vital

portions of the vital

s

vital subsystems

subsystem

STET

vital electrical power distribution subsystems

Condition C represents one ~~or more~~ DC ~~buses or distribution panels~~ without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining ~~trains~~ and restoring power to the affected ~~train.~~ 1

panels 1

BASES

ACTIONS (continued)

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while not allowing stable operations to continue~~,~~; 5 3

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train~~,~~; and 3

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for vital DC ~~buses~~ electrical power distribution subsystems is consistent with Regulatory Guide 1.93 (Ref. 3). 1

INSERT 4

~~D~~F.1 and ~~D~~F.2 4

If ~~the~~ an inoperable electrical power distribution subsystem 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. 1

~~E~~G.1 4

Condition ~~E~~G corresponds to a level of degradation in the electrical power distribution system that ~~causes~~ results in a ~~required~~ loss of safety function ~~to be lost~~. When more than one inoperable electrical power distribution subsystem results in the loss of a ~~required~~ safety function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown. 4 1 1

1 4

INSERT 4

due to one or more inoperable Unit 2 AC shutdown boards

instrument boards

(s)

D.1

With one or more ~~Unit 2~~ AC electrical power distribution subsystems (except AC vital) inoperable, the associated required feature(s) must be declared inoperable immediately and the ~~appropriate~~ Condition(s) entered. The Required Actions of these ~~appropriate~~ Conditions will determine the impact of the inoperable Unit 2 AC ~~electrical power distribution subsystem~~.

corresponding

shutdown board(s)

electrical power distribution panels

E.1

With one or more ~~required~~ DG DC ~~subsystems~~ inoperable there is no longer assurance the supported DG is able to start and perform its necessary safety function. The DG must therefore be declared inoperable immediately and the ~~appropriate~~ Condition(s) entered.

(s) corresponding affected (s)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

instrument

vital DG DC,

sub

This Surveillance verifies that the ~~[~~required~~]~~ AC, DC, and AC vital ~~bus~~ electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical ~~divisions~~ is maintained, and the appropriate voltage is available to each required ~~bus~~. The verification of proper voltage availability on the ~~buses~~ ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these ~~buses~~. ~~[The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.~~ 2 1 4

power distribution trains board 1

boards

6

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 7

REFERENCES

1. U FSAR, Chapter ~~[~~6~~]~~.
2. U FSAR, Chapter ~~[~~15~~]~~. 1 2
3. Regulatory Guide 1.93, December 1974.

Safety Related Onsite

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

INSERT 5

~~TYPE~~	~~VOLTAGE~~	~~TRAIN A*~~	~~TRAIN B*~~
~~AC safety buses~~	~~[4160 V]~~	~~[ESF Bus] [NB01]~~	~~[ESF Bus] [NB02]~~
	~~[480 V]~~	~~Load Centers [NG01, NG03]~~	~~Load Centers [NG02, NG04]~~
	~~[480 V]~~	~~Motor Control Centers [NG01A, NG01I, NG01B, NG03C, NG03I, NG03D]~~	~~Motor Control Centers [NG02A, NG02I, NG02B, NG04C, NG04I, NG04D]~~
	~~[120 V]~~	~~Distribution Panels [NP01, NP03]~~	~~Distribution Panels [NP02, NP04]~~
~~DC buses~~	~~[125 V]~~	~~Bus [NK01]~~	~~Bus [NK02]~~
		~~Bus [NK03]~~	~~Bus [NK04]~~
		~~Distribution Panels [NK41, NK43, NK51]~~	~~Distribution Panels [NK42, NK44, NK52]~~
~~AC vital buses~~	~~[120 V]~~	~~Bus [NN01]~~	~~Bus [NN02]~~
		~~Bus [NN03]~~	~~Bus [NN04]~~

1

~~* Each train of the AC and DC electrical power distribution systems is a subsystem.~~ 1

1 **INSERT 5**

TYPE	VOLTAGE (nominal)	SR 3.8.9.1 Voltage Range	TRAIN A~~*~~ SUBSYSTEMS		TRAIN B~~*~~ SUBSYSTEMS	
Vital DC ~~battery boards~~	125 V	≥ 129 V and ≤ 140 V	Board I	Board III	Board II	Board IV
AC ~~safety boards~~ electrical power	6900 V 480 V	≥ 6560 V and ≤ 7260 V ≥ 440 V and ≤ 508 V	Unit 1 SD BD 1A-A SD BD 1A1-A 1A2-A ~~Rx MOV Bd 1A1-A 1A2-A~~ ~~C & A Vent Bd 1A1-A~~ ~~Diesel Aux Bd 1A1-A 1A2-A~~ ~~ERCW MCC 1A-A~~	Unit 2 SD BD 2A-A SD BD 2A1-A 2A2-A ~~Rx MOV Bd 2A1-A 2A2-A~~ ~~C & A Vent Bd 2A1-A~~ ~~Diesel Aux Bd 2A1-A 2A2-A~~ ~~ERCW MCC 2A-A~~	Unit 1 SD BD 1B-B SD BD 1B1-B 1B2-B ~~Rx MOV Bd 1B1-B 1B2-B~~ ~~C & A Vent Bd 1B1-B~~ ~~Diesel Aux Bd 1B1-B 1B2-B~~ ~~ERCW MCC 1B-B~~	Unit 2 SD BD 2B-B SD BD 2B1-B 2B2-B ~~Rx MOV Bd 2B1-B 2B2-B~~ ~~C & A Vent Bd 2B1-B~~ ~~Diesel Aux Bd 2B1-B 2B2-B~~ ~~ERCW MCC 2B-B~~
AC vital instrument power ~~boards~~ electrical	120 V	≥ 120.6 V and ≤ 126.6 V	Unit 1 Board 1-I Board 1-III	Unit 2 Board 2-I Board 2-III	Unit 1 Board 1-II Board 1-IV	Unit 2 Board 2-II Board 2-IV
DG DC ~~boards~~ electrical power	125 V	≥ 124 V and ≤ 135 V	DG 1A-A Dist. Pnl.	DG 2A-A Dist. Pnl.	DG 1B-B Dist. Pnl.	DG 2B-B Dist. Pnl.

This page is replaced by Revised Insert 5. Changes made to INSERT 5 are illustrated on this page. Insertions are indicated by a text box with an arrow. Deletions are indicated with lines drawn through deleted text and highlighting. The subsystems in ITS Table B 3.8.9-1 have been reordered to align with the order of their description in the Bases Background Section.

1 **REVISED INSERT 5**

TYPE	VOLTAGE (nominal)	SR 3.8.9.1 Voltage Range	TRAIN A SUBSYSTEMS		TRAIN B SUBSYSTEMS	
			Unit 1	Unit 2	Unit 1	Unit 2
AC electrical power	6900 V	≥ 6560 V and ≤ 7260 V	SD BD 1A-A	SD BD 2A-A	SD BD 1B-B	SD BD 2B-B
	480 V	≥ 440 V and ≤ 508 V	SD BD 1A1-A 1A2-A	SD BD 2A1-A 2A2-A	SD BD 1B1-B 1B2-B	SD BD 2B1-B 2B2-B
			Unit 1	Unit 2	Unit 1	Unit 2
AC vital instrument electrical power	120 V	≥ 120.6 V and ≤ 126.6 V	Board 1-I Board 1-III	Board 2-I Board 2-III	Board 1-II Board 1-IV	Board 2-II Board 2-IV
Vital DC electrical power	125 V	≥ 129 V and ≤ 140 V	Board I	Board III	Board II	Board IV
DG DC electrical power	125 V	≥ 124 V and ≤ 135 V	DG 1A-A Dist. Pnl.	DG 2A-A Dist. Pnl.	DG 1B-B Dist. Pnl.	DG 2B-B Dist. Pnl.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems - Operating

DG DC, instrument INSERT 1 1

BASES

vital

BACKGROUND The onsite Class 1E AC, DC, and AC vital ~~bus~~ electrical power distribution systems are divided ~~by train~~ into ~~[~~two~~]~~ redundant and independent ~~AC, DC, and AC vital bus electrical power distribution subsystems.~~ ~~vital~~ 1 2 1 1 1

trains INSERT 2 Each four two

~~The~~ AC electrical power subsystem ~~for each train~~ consists of ~~a primary Engineered Safety Feature (ESF) 4.16 kV bus~~ and ~~secondary~~ ~~[~~480 ~~and 120]~~ V ~~buses, distribution panels, motor control centers and load centers~~. Each ~~[4.16 kV ESF bus]~~ has ~~at least~~ ~~[~~one separate and independent offsite source of power~~]~~ as well as a dedicated onsite diesel generator (DG) source. Each ~~[4.16 kV ESF bus]~~ is normally connected to a preferred offsite source. ~~After a loss of the preferred offsite power source to a 4.16 kV ESF bus, a transfer to the alternate offsite source is accomplished by utilizing a time delayed bus undervoltage relay.~~ If ~~all~~ offsite sources ~~are~~ unavailable, the onsite emergency DG suppl~~ies~~ power to the ~~4.16 kV ESF bus~~. Control power for the ~~4.16 kV~~ breakers is supplied from the Class 1E batteries. Additional description of this system may be found in the Bases for LCO 3.8.1, "AC Sources - Operating," and the Bases for LCO 3.8.4, "DC Sources - Operating." 1 1 2 1 2 1 2 2 1 1 1

6.9 kV Shutdown Boards; Shutdown Boards; train of 6.9 kV Shutdown Boards; 6.9 kV Shutdown Board; for each 6.9 kV Shutdown Board; an; is; s; y; affected 6.9 kV Shutdown Boards; 6.9 kV Shutdown Board

~~boards~~ ~~The secondary AC electrical power distribution subsystem for each train includes the safety related buses, load centers, motor control centers, and distribution panels~~ shown in Table B 3.8.9-1. 8 ~~1~~

instrument power distribution subsystems consists of two Unit 1 120 V AC vital instrument power boards and two Unit 2 120 V AC vital instrument power boards

Each

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

vital two Each 125 V boards

The 125 V vital DC electrical power distribution subsystem has manual access to a fifth vital battery. The fifth vital battery is intended to serve as a replacement for any one of the four 125 V DC vital batteries with no loss of system reliabilty under any mode of operation.

~~The~~ DC electrical power distribution subsystem consists of ~~[~~125~~]~~ V ~~bus(es) and distribution panel(s)~~. 1 2 1

INSERT 3 AC, vital

The list of ~~all required~~ DC and ~~vital~~ AC distribution ~~buses [and panels]~~ is presented in Table B 3.8.9-1. 1 1 2 4

subsystems DG DC, vital instrument electrical power

electrical power boards and distribution panels required for the

INSERT 6 1

SEQUOYAH UNIT 2 Revision XXX

1

INSERT 1

The two units share several structures and systems including the preferred and emergency (standby) electric power systems (UFSAR Chapter 8.0). The vital DC Power System is shared to the extent that a few loads (e.g., the vital inverters) in one nuclear unit are energized by the DC power channels assigned primarily to power loads of the other unit. In no case does the sharing inhibit the safe shutdown of one unit while the other unit is experiencing an accident. The Standby Power System serving each unit is divided into two redundant load groups (power trains). These power trains (Train A and Train B for each unit) supply power to safety-related equipment. Generally, the Engineered Safety Feature (ESF) loads assigned to a unit are supplied by the unit designated trains. For example, Safety Injection (SI) pump 1A-A (associated with Unit 1) is supplied by Shutdown Board 1A-A (also associated with Unit 1) while SI pump 2A-A (associated with Unit 2) is supplied by Shutdown Board 2A-A (also associated with Unit 2).

Separate and similar systems and equipment are provided for each unit when required. In certain instances, both units share systems or some components of a system. Shared systems are the exception to the unit/power system association. Because both units share the power system, one unit's power system(s) supports certain components required by the other unit (e.g., emergency gas treatment system). ~~To show the unit, train, board, and panel association, Table B 3.8.9-1 lists these power system components by train and unit designation.~~

Each electrical power distribution train consists of:
a. an AC electrical power distribution subsystem,
b. an AC vital instrument power distribution subsystem,
c. a vital DC electrical power distribution subsystem, and
d. a diesel generator (DG) DC electrical power distribution subsystem.

1

INSERT 2

~~In addition, each diesel generator (DG) has an associated DC electrical power distribution panel.~~

1

INSERT 3

Each

electrical power

consists of two

DC

s that supply power to the respective DG's auxiliary loads

~~The~~ DG ~~125 Volt~~ DC distribution subsystem ~~includes a~~ 125 V distribution panel ~~for each DG~~. During normal operation, power is supplied to the distribution panel by a 480 VAC board through a battery charger. During emergency operation of the DG (loss of offsite power source), the distribution panel is supplied power from a ~~58 cell~~ battery. This panel supplies power for DG control, protection, and the engine DC lube oil circulating pump.

dedicated

Insert Page B 3.8.9-1

1 INSERT 6

Associated with each board listed in Table B 3.8.9-1 are a number of safety significant electrical loads. When one or more of the boards specified in Table B 3.8.9-1 becomes inoperable, entry into the appropriate ACTIONS of LCO 3.8.9 is required. Some boards, distribution panels, and motor control centers (MCCs), which help comprise the AC and DC electrical power distribution subsystems, are not listed in Table B 3.8.9-1. The loss of electrical loads associated with these boards, panels, or MCCs may not result in a complete loss of a safety function necessary to shut down the reactor and maintain it in a safe condition. Therefore, should one or more of these boards, panels, or MCCs become inoperable due to a failure not affecting the OPERABILITY of a board listed in Table B 3.8.9-1 (e.g., a breaker supplying a single distribution panel fails open), the individual loads associated with the board, panel, or MCC are declared inoperable, and the appropriate Conditions and Required Actions of the LCOs governing the individual loads are entered.

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the U FSAR, Chapter ~~[6]~~ (Ref. 1), and in the U FSAR, Chapter ~~[15]~~ (Ref. 2), assume ESF systems are OPERABLE. The AC, DG DC, vital DC, and AC vital instrument ~~bus~~ electrical power distribution systems 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, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems. 1 2 2 1 4

The OPERABILITY of the AC, vital DC, and DG DC, AC vital instrument ~~bus~~ electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining electrical power distribution systems OPERABLE during accident conditions in the event of: 1 4 1

a. An assumed loss of all offsite power or all onsite AC electrical power; and 3

b. A worst case single failure.

The electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). 1

LCO

The required electrical power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, vital DC, DG DC, and AC vital instrument ~~bus~~ electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Insert 7 ~~The AC, vital DC, DG DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE.~~ 1 1 4 1 4

Maintaining ~~the Train A and Train B AC, vital DC, DG DC, and AC vital~~ ~~bus~~ two electrical power distribution trains ~~subsystems~~ OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution trains ~~subsystems~~ will not prevent safe shutdown of the reactor. 1 4 4 1

OPERABLE AC electrical power distribution subsystems require the associated boards ~~buses, load centers, motor control centers, and distribution panels~~ to be energized to their proper voltages. OPERABLE vital DC and DG DC electrical power distribution subsystems require the associated boards ~~buses and distribution panels~~ and distribution panels, as applicable, to be energized to their proper voltage from either the associated battery or charger. OPERABLE AC vital instrument ~~bus electrical~~ power distribution subsystems require the associated boards ~~buses~~ to be energized to their proper voltage from the associated ~~[~~inverter via inverted DC voltage, or inverter using internal 120 volt regulated AC source~~, or Class 1E constant voltage transformer]~~. 1 2

1 4 INSERT 7

Two electrical power distribution trains are required to be OPERABLE. Each train includes:

a. an AC electrical power distribution subsystem (i.e., one Unit 1 6.9 kV shutdown board, one Unit 2 6.9 kV shutdown board, and associated 480 V shutdown boards),
b. an AC vital instrument power distribution subsystem (i.e., two Unit 1 120 V AC instrument power boards and two Unit 2 120 V AC instrument power boards),
c. a vital DC electrical power distribution subsystem (i.e., two 125 V DC boards), and
d. a DG DC electrical power distribution subsystem (i.e., two 125 V DG distribution panels).

BASES

LCO (continued)

In addition, tie breakers between redundant safety related AC, vital DC, DG DC, and AC vital ~~bus~~ instrument electrical power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem, that could cause the failure of a redundant subsystem and a loss of essential safety function(s). If any tie breakers are closed, the affected redundant electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related redundant electrical power distribution subsystems. It does not, however, preclude redundant Class 1E ~~4.16 kV buses~~ 6.9 kV Shutdown Boards from being powered from the same offsite circuit. 1 4 1 1

APPLICABILITY

The electrical power distribution subsystems 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 3

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

Electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.10, "Distribution Systems - Shutdown."

ACTIONS

<u>A.1</u>

With one or more ~~Unit 2~~ ~~Train A and B~~ ~~required~~ AC ~~boards~~ ~~buses, load centers, motor control centers, or distribution panels~~ electrical power distribution subsystems (except AC vital instrument ~~buses~~ boards), ~~in one train~~ portions of the inoperable due to one or more inoperable Unit 2 AC shutdown boards, and a loss of function has not occurred, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining portions of the power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the ~~required~~ ~~Unit 2~~ AC ~~boards~~ ~~buses, load centers, motor control centers, and distribution panels~~ electrical distribution subsystems must be restored to OPERABLE status within 8 hours. 4 1 9 4 1 1 1 4 1

Condition A worst case scenario is one train of Unit 2 boards without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining Unit 2 train by 4 4

BASES

ACTIONS (continued)

stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit and 3

;

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

Required Action A.1 is modified by a Note that requires the applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," to be entered for DC trains made inoperable by inoperable power distribution subsystems. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability of ~~a~~ distribution ~~system~~ can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that the appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution systems. 1

vital
electrical power
AC electrical 1 4
subsystems
1
1
sub
one or more AC electrical power

B.1

instrument power distribution
subsystems
subsystems 1
portions of the

With one or more AC vital ~~buses~~ inoperable, and a loss of function has not yet occurred, the remaining OPERABLE AC vital ~~buses~~ are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum ~~[~~required~~]~~ ESF functions not being supported. Therefore, the ~~required~~ AC vital ~~bus~~ must be restored to OPERABLE status within ~~2~~ hours by powering the ~~bus~~ from the associated ~~[~~inverter via inverted DC~~,~~ inverter using internal AC source~~, or Class 1E constant voltage transformer]~~.

2
instrument power distribution
subsystem(s) 1
affected
subsystems 1 2
8
or
120 volt regulated

instrument power distribution
subsystems

Condition B represents one or more AC vital ~~buses~~ without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining vital ~~buses~~ and restoring power to the affected vital ~~bus~~. 1

~~subsystems~~
1
instrument power boards
~~subsystem~~

SEQUOYAH UNIT 2
Revision XXX

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BASES

ACTIONS (continued)

8

This ~~2~~ hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than ~~2~~ hours if declared inoperable, is acceptable because of: 1 1

8

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue~~,~~ ; 3

b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train~~,~~ ; and 3

c. The potential for an event in conjunction with a single failure of a redundant component.

8

instrument power distribution subsystems

remaining

The ~~2~~ hour Completion Time takes into account the importance to safety of restoring the AC vital ~~bus~~ to OPERABLE status, the redundant capability afforded by the ~~other~~ OPERABLE vital ~~buses~~, and the low probability of a DBA occurring during this period. 1

~~subsystems~~ AC instrument power boards

C.1

STET electrical power distribution subsystems

vital

portions of the vital

With one ~~or more~~ DC ~~buses or distribution panels~~ inoperable, and a loss of function has not yet occurred, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the ~~[required]~~ DC ~~buses and distribution panels~~ must be restored to OPERABLE status within 2 hours by powering the ~~bus~~ from the associated battery or charger. 4 1 2

portions of the vital

s

vital subsystems

subsystem electrical power distribution subsystems

vital

STET

Condition C represents one ~~or more~~ DC ~~buses or distribution panels~~ without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining ~~trains~~ and restoring power to the affected ~~train~~. 1 1

panels

BASES

ACTIONS (continued)

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while not allowing stable operations to continue~~,~~; 5 3

b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train~~,~~; and 3

c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for vital DC ~~buses~~ electrical power distribution subsystems is consistent with Regulatory Guide 1.93 (Ref. 3). 1

INSERT 4

~~D~~F.1 and ~~D~~F.2 4

If ~~the~~ an inoperable electrical power distribution subsystem 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. 1

~~E~~G.1 4

Condition ~~E~~ G corresponds to a level of degradation in the electrical power distribution system that ~~causes~~ results in a ~~required~~ loss of safety function ~~to be lost~~. When more than one inoperable electrical power distribution subsystem results in the loss of a ~~required~~ safety function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown. 4 1 1

1 4

INSERT 4

due to one or more inoperable Unit 1 AC shutdown boards

instrument boards

D.1

(s)

With one or more ~~Unit 1~~ AC electrical power distribution subsystems (except AC vital) inoperable, the associated required feature(s) must be declared inoperable immediately and the ~~appropriate~~ Condition(s) entered. The Required Actions of these ~~appropriate~~ Conditions will determine the impact of the inoperable Unit 1 AC ~~electrical power distribution subsystem~~.

corresponding

electrical power distribution panels

shutdown board(s)

E.1

With one or more ~~required~~ DG DC ~~subsystems~~ inoperable there is no longer assurance the supported DG is able to start and perform its necessary safety function. The DG must therefore be declared inoperable immediately and the ~~appropriate~~ Condition(s) entered.

(s) corresponding affected (s)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

instrument

vital DG DC,

sub

This Surveillance verifies that the [required] AC, DC, and AC vital ~~bus~~ electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical ~~divisions~~ is maintained, and the appropriate voltage is available to each required ~~bus~~. The verification of proper voltage availability on the ~~buses~~ ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these ~~buses~~. ~~[The 7 day Frequency takes into account the redundant capability of the AC, DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.~~ 2 1 4

power distribution trains 1

board

boards

6

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 7

REFERENCES

1. U FSAR, Chapter [6].
2. U FSAR, Chapter [15]. 1 2
3. Regulatory Guide 1.93, December 1974.

Safety Related Onsite

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

INSERT 5

~~TYPE~~	~~VOLTAGE~~	~~TRAIN A*~~	~~TRAIN B*~~
~~AC safety buses~~	~~[4160 V]~~	~~[ESF Bus] [NB01]~~	~~[ESF Bus] [NB02]~~
	~~[480 V]~~	~~Load Centers [NG01, NG03]~~	~~Load Centers [NG02, NG04]~~
	~~[480 V]~~	~~Motor Control Centers [NG01A, NG01I, NG01B, NG03C, NG03I, NG03D]~~	~~Motor Control Centers [NG02A, NG02I, NG02B, NG04C, NG04I, NG04D]~~
	~~[120 V]~~	~~Distribution Panels [NP01, NP03]~~	~~Distribution Panels [NP02, NP04]~~
~~DC buses~~	~~[125 V]~~	~~Bus [NK01]~~	~~Bus [NK02]~~
		~~Bus [NK03]~~	~~Bus [NK04]~~
		~~Distribution Panels [NK41, NK43, NK51]~~	~~Distribution Panels [NK42, NK44, NK52]~~
~~AC vital buses~~	~~[120 V]~~	~~Bus [NN01]~~	~~Bus [NN02]~~
		~~Bus [NN03]~~	~~Bus [NN04]~~

1

~~* Each train of the AC and DC electrical power distribution systems is a subsystem.~~ 1

1 **INSERT 5**

TYPE	VOLTAGE (nominal)	SR 3.8.9.1 Voltage Range	TRAIN A~~*~~ SUBSYSTEMS		TRAIN B~~*~~ SUBSYSTEMS	
Vital DC ~~battery boards~~ electrical power	125 V	≥ 129 V and ≤ 140 V	Board I	Board III	Board II	Board IV
AC ~~safety boards~~ electrical power	6900 V	≥ 6560 V and ≤ 7260 V	Unit 1 SD BD 1A-A	Unit 2 SD BD 2A-A	Unit 1 SD BD 1B-B	Unit 2 SD BD 2B-B
	480 V	≥ 440 V and ≤ 508 V	SD BD 1A1-A 1A2-A ~~Rx MOV Bd 1A1-A 1A2-A~~ ~~C & A Vent Bd 1A1-A~~ ~~Diesel Aux Bd 1A1-A 1A2-A~~ ~~ERCW MCC 1A-A~~	SD BD 2A1-A 2A2-A ~~Rx MOV Bd 2A1-A 2A2-A~~ ~~C & A Vent Bd 2A1-A~~ ~~Diesel Aux Bd 2A1-A 2A2-A~~ ~~ERCW MCC 2A-A~~	SD BD 1B1-B 1B2-B ~~Rx MOV Bd 1B1-B 1B2-B~~ ~~C & A Vent Bd 1B1-B~~ ~~Diesel Aux Bd 1B1-B 1B2-B~~ ~~ERCW MCC 1B-B~~	SD BD 2B1-B 2B2-B ~~Rx MOV Bd 2B1-B 2B2-B~~ ~~C & A Vent Bd 2B1-B~~ ~~Diesel Aux Bd 2B1-B 2B2-B~~ ~~ERCW MCC 2B-B~~
AC vital instrument power ~~boards~~ electrical	120 V	≥ 120.6 V and ≤ 126.6 V	Unit 1 Board 1-I Board 1-III	Unit 2 Board 2-I Board 2-III	Unit 1 Board 1-II Board 1-IV	Unit 2 Board 2-II Board 2-IV
DG DC ~~boards~~ electrical power	125 V	≥ 124 V and ≤ 135 V	DG 1A-A Dist. Pnl.	DG 2A-A Dist. Pnl.	DG 1B-B Dist. Pnl.	DG 2B-B Dist. Pnl.

This page is replaced by Revised Insert 5. Changes made to INSERT 5 are illustrated on this page. Insertions are indicated by a text box with an arrow. Deletions are indicated with lines drawn through deleted text and highlighting. The subsystems in ITS Table B 3.8.9-1 have been reordered to align with the order of their description in the Bases Background Section.

1 **REVISED INSERT 5**

TYPE	VOLTAGE (nominal)	SR 3.8.9.1 Voltage Range	TRAIN A SUBSYSTEMS		TRAIN B SUBSYSTEMS	
			Unit 1	Unit 2	Unit 1	Unit 2
AC electrical power	6900 V	≥ 6560 V and ≤ 7260 V	SD BD 1A-A	SD BD 2A-A	SD BD 1B-B	SD BD 2B-B
	480 V	≥ 440 V and ≤ 508 V	SD BD 1A1-A 1A2-A	SD BD 2A1-A 2A2-A	SD BD 1B1-B 1B2-B	SD BD 2B1-B 2B2-B
			Unit 1	Unit 2	Unit 1	Unit 2
AC vital instrument electrical power	120 V	≥ 120.6 V and ≤ 126.6 V	Board 1-I Board 1-III	Board 2-I Board 2-III	Board 1-II Board 1-IV	Board 2-II Board 2-IV
Vital DC electrical power	125 V	≥ 129 V and ≤ 140 V	Board I	Board III	Board II	Board IV
DG DC electrical power	125 V	≥ 124 V and ≤ 135 V	DG 1A-A Dist. Pnl.	DG 2A-A Dist. Pnl.	DG 1B-B Dist. Pnl.	DG 2B-B Dist. Pnl.

JUSTIFICATION FOR DEVIATIONS
ITS 3.8.9 BASES, DISTRIBUTION SYSTEMS - OPERATING

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

3. The punctuation corrections have been made consistent with the Writer's Guide for the Improved Standard Technical Specifications, TSTF-GG-05-01, Section 5.1.3.

4. Changes are made to be consistent with changes made to the Specification.

5. Editorial changes made for enhanced clarity.

6. ISTS SR 3.8.9.1 provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Therefore, the Frequency for ITS SR 3.8.9.1 is "In accordance with the Surveillance Frequency Control Program."

7. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

8. This redundant information has been deleted. Following the description of the electrical power distribution subsystems is a statement that a list of all boards and distribution panels is found in Table B 3.8.9-1.

9. Changes are made to ISTS 3.8.9 Bases Action A.1 to resolve a conflict within the first sentence. The first sentence states that, "With one or more Train A and B required AC buses, load centers, motor control centers, or distribution panels (except AC vital buses), in one train inoperable and a loss of function has not occurred, the remaining AC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure." ISTS 3.8.9 Condition A states, "One or more AC electrical power distribution subsystems inoperable." ISTS 3.8.9 Condition E states, "Two or more electrical power distribution subsystems inoperable that result in a loss of safety function." Both Condition A and Condition E address a situation with more than one electrical power distribution subsystem inoperable. According to ITS Chapter 1.0, Use and Application, all applicable Conditions are required to be entered for an LCO. If it is discovered that the inoperability of more than one electrical power distribution subsystem results in a loss of safety function, then entry into ISTS 3.8.9 Conditions A and E would be required. If it is discovered that the inoperability does not result in a loss of safety function, then entry into ISTS 3.8.9 Condition A is all that is required regardless of the number of inoperable trains. ISTS 3.8.9 Condition A provides Required Actions if one or more AC electrical power distribution subsystems are inoperable and a loss of safety function has not occurred. It is not the intent of ISTS 3.8.9 Condition A to be applicable to only one inoperable train of AC electrical power distribution subsystems. Therefore, the phrase, "in one train," has been deleted.

DISCUSSION OF CHANGES
ITS 3.8.10, DISTRIBUTION SYSTEMS - SHUTDOWN

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.8.1.2.b.5 requires, in part, a separate and independent 125 volt DC distribution panel for diesel generator (DG) OPERABILITY. ITS 3.8.10 ACTION B requires for one or more inoperable DG DC electrical power distribution panels ~~subsystems~~ to immediately declare the associated DG inoperable. This changes the CTS by specifying an Action to declare a DG inoperable if its associated DC electrical power distribution panel ~~subsystem~~ is inoperable.

The purpose of CTS 3.8.1.2.b.5 is to specify the requirements for DG OPERABILITY. ITS 3.8.10 ACTION B preserves the intent of CTS 3.8.1.2.b.5 by declaring the DG inoperable if the associated DG DC distribution panel ~~subsystem~~ is inoperable. This change is designated as administrative because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.8.1.2.b.5 requires, in part, a separate ~~sparate~~ 125 volt DC distribution panel for each DG set to be OPERABLE. CTS 3.8.2.2 states, in part, that as a minimum the following AC electrical boards shall be OPERABLE and energized, and then lists the applicable boards. CTS 3.8.2.4 requires, in part, that as a minimum the following 125 volt DC boards shall be energized and OPERABLE as listed. ITS 3.8.10 states that the necessary portion of AC, vital DC, DG DC, and AC vital instrument electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE. In addition, an optional Required Action (ITS 3.8.10 Required Action A.1) has been added which allows the associated supported required feature(s) to be declared inoperable. This changes the CTS by requiring those necessary portions of electrical power distribution subsystems to be OPERABLE to support equipment required to be OPERABLE, which could require more distribution boards or panels to be OPERABLE than is currently required. In addition, an action has been added to allow an option to the existing actions.

The purpose of CTS 3.8.1.2.b.5, CTS 3.8.2.2 and CTS 3.8.2.4 is to ensure that at least one train of AC, vital DC, DG DC, and 120 volt AC vital instrument electrical power distribution systems are OPERABLE. This change adds a requirement that the applicable portions of AC, vital DC, DG DC, and 120 volt AC vital instrument electrical power distribution subsystems must be OPERABLE when required to support equipment required to be OPERABLE by the Technical Specifications. This

DISCUSSION OF CHANGES
ITS 3.8.10, DISTRIBUTION SYSTEMS - SHUTDOWN

added restriction conservatively assures the needed electrical power distribution boards and panels are OPERABLE, even if this results in both trains of one or more of the electrical power distribution systems being required. Because the ITS 3.8.10 electrical power distribution subsystem OPERABILITY requirements require the necessary portions of the distribution subsystems to be OPERABLE to support equipment required to be OPERABLE, if a portion of the electrical power distribution subsystem cannot supply any required equipment, that electrical power distribution subsystem is inoperable. In this event, it may not be necessary to suspend, irradiated fuel handling, and positive reactivity additions. Conservative actions can be assured if all required equipment without the necessary power is declared inoperable, and the associated ACTIONS of the individual equipment is taken (ITS 3.8.10 Required Action A.1). Therefore, along with the conservative additional requirements placed on the electrical power distribution subsystems, Required Action A.1, which requires the associated supported equipment to be declared inoperable, is also added. These changes are acceptable since the additions represent restrictions consistent with implicit assumptions for operation in shutdown conditions (required equipment receiving the necessary required power), and these restrictions are not currently imposed by the Technical Specifications. This change is designated as more restrictive because it adds a new requirement to the CTS and more boards may be required to be OPERABLE in ITS than in the CTS.

M02 CTS 3.8.1.2, CTS 3.8.2.2 and CTS 3.8.2.4 are applicable in MODES 5 and 6. ITS 3.8.10 is applicable in MODES 5 and 6 and during movement of irradiated fuel assemblies and contains an ACTIONS Note stating that LCO 3.0.3 is not applicable. This changes the CTS by adding the Applicability of "During movement of irradiated fuel assemblies," and adds a Note to the ACTIONS stating that LCO 3.0.3 is not applicable.

This change is acceptable because the proposed requirements are necessary to ensure the electrical power subsystems are OPERABLE to support equipment required to be OPERABLE during movement of irradiated fuel assemblies. Movement of fuel normally occurs during MODES 5 and 6; however, it can also occur outside of containment in other plant MODES (MODES 1, 2, 3, and 4) or other conditions (i.e., reactor defueled). This addition to the applicability is needed to ensure the appropriate electrical distribution system requirements are specified during fuel handling and to ensure the appropriate actions are taken (i.e., stop fuel movement) when the minimum electrical supply is not available. In addition, this change adds a clarification Note stating that LCO 3.0.3 is not applicable because LCO 3.0.3 has no Required Actions that restore safety. If moving irradiated fuel assemblies while in MODES 5 or 6, LCO 3.0.3 is not applicable because LCO 3.0.3 applicability is limited to MODES 1, 2, 3, and 4 only with a designated endpoint of MODE 5. In addition, if moving irradiated fuel assemblies while in MODES 1, 2, 3, or 4, the fuel movement is independent of reactor operations and the inability to suspend movement in accordance with ITS 3.8.10 Required Actions would not be sufficient reason to require a reactor shutdown. This Note has been added for clarification and is necessary since defaulting to LCO 3.0.3 would require the reactor to be shutdown, but would not require suspension of the activities with a potential for releasing radioactive materials. This change is designated as more restrictive because the ITS requires equipment to be OPERABLE during movement of irradiated fuel

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DISCUSSION OF CHANGES
ITS 3.8.10, DISTRIBUTION SYSTEMS - SHUTDOWN

assemblies both inside and outside of the containment, not only when in MODES 5 and 6.

M03 CTS 4.8.1.2 requires, in part, the performance of CTS 4.8.1.1.3, which includes a requirement that the 125 volt DC distribution panel for each DG be demonstrated OPERABLE. ITS SR 3.8.10.1 requires, in part, verification of the correct breaker alignments and voltage to the 125 volt DC distribution panel for each DG. This changes the CTS by adding a specific surveillance requiring verification of correct breaker alignment and correct voltage to the DG DC distribution subsystem.

The purpose of CTS 4.8.1.2 is to provide assurance that necessary power to required supported systems is available with sufficient capacity, capability, redundancy, and reliability to ensure the fuel, Reactor Coolant System, and containment design limits are not exceeded and postulated accidents are mitigated. This change is acceptable because it provides additional assurance that the distribution panels associated with the DG DC electrical power distribution subsystem are OPERABLE. This change is designated as more restrictive because it add a Surveillance Requirement to the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.8.1.2 requires AC electrical power sources to be OPERABLE, listing the sources and subsystems. CTS LCO 3.8.2.2 requires AC electrical boards to be OPERABLE, listing the boards. CTS LCO 3.8.2.4 requires DC electrical equipment and boards to be energized and OPERABLE and CTS 4.8.2.4.1 requires the overall battery voltage to be greater than or equal to 125 volts. ITS LCO 3.8.10 requires necessary portions of the AC, vital DC, DG DC,
instrument
and AC vital electrical power distribution subsystems to be OPERABLE to support equipment required to be OPERABLE. ITS SR 3.8.10.1 requires the verification of correct breaker alignment and voltage to each required AC, vital
vital
instrument
DC, and ~~vital~~ AC electrical power distribution subsystem. The details of the boards are contained in the ITS Bases. This changes the CTS by moving description of the boards and panels (including the nominal voltages and any specified limits) from the CTS to the ITS Bases.

The removal of these details relating to system design from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the electrical power distribution subsystems to be OPERABLE and requires the verification of correct breaker alignment and voltage to required AC and DC electrical power distribution subsystems. This change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the

DISCUSSION OF CHANGES
ITS 3.8.10, DISTRIBUTION SYSTEMS - SHUTDOWN

Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.8.2.2 requires, in part, that the specified AC boards be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated voltage on the buses. CTS 4.8.2.4.1 requires, in part, that each required DC battery board be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability with an overall battery voltage of greater than or equal to 125 volts. ITS SR 3.8.10.1 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for this SR and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

<u>LESS RESTRICTIVE CHANGES</u>

L01 *(Category 4 – Relaxation of Required Action)* With less than the minimum complement of AC boards OPERABLE and energized, CTS 3.8.2.2 requires the establishment of containment integrity within 8 hours. With less than the minimum complement of DC boards OPERABLE and energized, CTS 3.8.2.4 also requires the establishment of containment integrity within 8 hours. ITS 3.8.10 ACTION A requires, in part, suspending movement of irradiated fuel assemblies, suspension of operations involving positive reactivity additions that could result in the loss of required SDM or boron concentration, the initiation of actions to restore required AC, vital DC, and AC vital instrument board electrical power distribution subsystems to OPERABLE status, and the declaration of the associated required residual heat removal subsystems(s) inoperable and not in

DISCUSSION OF CHANGES
ITS 3.8.10, DISTRIBUTION SYSTEMS - SHUTDOWN

operation. This changes the CTS by replacing the existing Required Action to restore containment integrity.

The purpose of the CTS 3.8.2.2 Action and CTS 3.8.2.4 Action is to isolate the containment to minimize any release from the plant if an event were to occur during shutdown conditions. This change is acceptable because the Required Actions establish remedial measures taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features including the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the repair period. The proposed Required Actions require the suspension of movement of irradiated fuel assemblies, the suspension of operations involving positive reactivity additions that could result in the loss of required SDM or boron concentration, the initiation
instrument
of actions to restore required AC, vital DC, and AC vital electrical power distribution subsystems to OPERABLE status, and the declaration of the associated required residual heat removal subsystems(s) inoperable and not in operation. Suspending the movement of irradiated fuel assemblies will prevent a fuel handling accident from occurring. Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. The actions to restore required AC, vital DC, and AC vital electrical power distribution subsystems to OPERABLE status will place the plant in compliance with the LCO. Declaration of the associated required decay heat removal subsystems(s) inoperable and not in operation will require the plant to enter the applicable LCOs to apply additional Required Actions. The proposed actions will immediately minimize the potential for any accident releases outside of containment and are considered acceptable instead of the current action to restore containment integrity within 8 hours. The actions may be considered somewhat more restrictive since immediate action is required, however, is classified as less restrictive since the current actions to restore containment integrity have been deleted. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems - Shutdown

3.8.1.2, 3.8.2.2, 3.8.2.4

LCO 3.8.10 The necessary portion of AC, vital DC, ~~and~~ AC vital instrument ~~bus~~ , and diesel generator (DG) DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE. 1

Applicability 3.8.1.2, 3.8.2.2, 3.8.2.4 DOC M02

APPLICABILITY: MODES 5 and 6,
During movement of ~~[recently]~~ irradiated fuel assemblies. 2

ACTIONS

---NOTE---

DOC M02 LCO 3.0.3 is not applicable.

ACTION 3.8.2.2 3.8.2.4 DOC M01; DOC L01; DOC L01

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, vital DC, or AC vital instrument ~~bus~~ electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend movement of ~~[recently]~~ irradiated fuel assemblies.	Immediately
	AND	
	A.2.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.	Immediately
	AND	

1

2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L01	A.2.3 Initiate actions to restore required AC, vital DC, and AC vital ~~bus~~ instrument electrical power distribution subsystems to OPERABLE status.	Immediately 1 1
	<u>AND</u>	
DOC L01 INSERT 1	A.2.4 Declare associated required residual heat removal subsystem(s) inoperable and not in operation.	Immediately 1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
4.8.1.2, 4.8.2.2, 4.8.2.4.1 SR 3.8.10.1 Verify correct breaker alignments and voltage to required AC, vital DC, ~~and~~ AC vital ~~bus~~ instrument, and DG DC electrical power distribution subsystems.	~~[7 days~~ ~~OR~~ 1 In accordance with the Surveillance Frequency Control Program ~~]~~ 3

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1

INSERT 1

DOC A02

B. One or more required DG DC electrical power distribution ~~subsystems~~ panels inoperable.	B.1 Declare associated DG(s) inoperable.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems - Shutdown

3.8.1.2, 3.8.2.2, 3.8.2.4

LCO 3.8.10 The necessary portion of AC, vital DC, ~~and~~ AC vital instrument ~~bus~~, and diesel generator (DG) DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE. 1

Applicability 3.8.1.2, 3.8.2.2, 3.8.2.4 DOC M02

APPLICABILITY: MODES 5 and 6,
During movement of ~~[recently]~~ irradiated fuel assemblies. 2

ACTIONS

DOC M02

-----------------------------------NOTE-----------------------------------
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION 3.8.2.2 3.8.2.4 DOC M01 A. One or more required AC, vital DC, or AC vital instrument ~~bus~~ electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable. 1 OR	Immediately
DOC L01	A.2.1 Suspend movement of ~~[recently]~~ irradiated fuel assemblies. 2 AND	Immediately
DOC L01	A.2.2 Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration. AND	Immediately

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
DOC L01		A.2.3 Initiate actions to restore required AC, vital DC, and AC vital ~~bus~~ instrument electrical power distribution subsystems to OPERABLE status.	Immediately	1 1
		AND		
DOC L01	INSERT 1	A.2.4 Declare associated required residual heat removal subsystem(s) inoperable and not in operation.	Immediately	1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.8.1.2, 4.8.2.2, 4.8.2.4.1	SR 3.8.10.1 Verify correct breaker alignments and voltage to required AC, vital DC, ~~and~~ AC vital ~~bus~~ instrument, and DG DC electrical power distribution subsystems.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1 3

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1

INSERT 1

DOC A02	B. One or more required DG DC electrical power distribution ~~subsystems~~ panels inoperable.	B.1 Declare associated DG(s) inoperable.	Immediately

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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.10 Distribution Systems - Shutdown

BASES

BACKGROUND

A description of the AC, vital DC, diesel generator (DG) DC, and AC vital instrument ~~bus~~ electrical power distribution systems is provided in the Bases for LCO 3.8.9, "Distribution Systems - Operating." 1

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter ~~[~~6~~]~~ (Ref. 1) and Chapter ~~[~~15~~]~~ (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC, vital DC, DG DC, and AC vital instrument ~~bus~~ electrical power distribution systems 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, and containment design limits are not exceeded. 1 2 1 1

The OPERABILITY of the AC, vital DC, DG DC, and AC vital instrument ~~bus~~ electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY. 1

The OPERABILITY of the minimum AC, vital DC, DG DC, and AC vital instrument ~~bus~~ electrical power distribution subsystems during MODES 5 and 6, and during movement of ~~[recently]~~ irradiated fuel assemblies ensures that: 1 2

a. The unit can be maintained in the shutdown or refueling condition for extended periods,

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status, and

c. Adequate power is provided to mitigate events postulated during shutdown, such as a fuel handling accident ~~[involving handling recently irradiated fuel. Due to radioactive decay, AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)]~~. 2

The AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of required systems, equipment, and components - all specifically addressed in each LCO and implicitly required via the definition of OPERABILITY.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the unit in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents ~~[involving handling recently irradiated fuel]~~). 2

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of ~~[recently]~~ irradiated fuel assemblies, provide assurance that: 2

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

b. Systems needed to mitigate a fuel handling accident ~~[involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)]~~ are available, 2

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

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

vital DG DC, instrument

The AC, DC, and AC vital ~~bus~~ electrical power distribution subsystems requirements for MODES 1, 2, 3, and 4 are covered in LCO 3.8.9. 1

ACTIONS

LCO 3.0.3 is not applicable while in MODE 5 or 6. However, since irradiated fuel assembly movement can occur in MODE 1, 2, 3, or 4, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 5 or 6, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, 3, or 4, the fuel movement is independent of reactor operations. Entering LCO 3.0.3, while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.

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ACTIONS (continued)

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

Although redundant required features may require redundant trains of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem train may be capable of supporting sufficient required features to allow continuation of ~~[recently]~~ irradiated fuel movement. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend movement of ~~[recently]~~ irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required SDM (MODE 5) or boron concentration (MODE 6). Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that what would be required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM. 2 2

Suspension of these activities does not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal (RHR) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.~~4~~ 3 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR ACTIONS would not be entered. Therefore, Required Action A.2.~~5~~ 4 is provided to direct declaring RHR inoperable and not in operation, which results in taking the appropriate RHR actions. 3 3